WIRE ROPE HOISTS INSTRUCTION MANUAL

Craftsman AUTOMATION

ENGINEERING ADVANTAGE

www.craftsmanautomation.com

INSTRUCTION MANUAL

WARNING

This equipment should not be installed, operated or maintained by any person who has not read and understood all the contents of this manual. Failure to read and comply with the contents of this manual can result in serious bodily injury or death, and/or property damage.

This Owner's Manual is required when maintaining and inspecting this product, so after reading it, keep it in a convenient location.

When checking the product, make a note of the following details.

MODEL	MFG SERIAL NO	INSTALLATION DATE

BLANK PAGE

WELCOME TO CRAFTSMAN MATERIAL HANDLING SYSTEM

- Thanks for choosing Craftsman Electric Wire Rope Hoist Series.
- This manual provides important information for all personnel involved with the safe installation, operation and proper maintenance of this product. Even if you feel you are familiar with this or similar equipment, you should read this manual before operating the hoist.

ON RECEIPT OF THE HOIST…...

- Please ensure that the hoist is received in good condition. In the unlikely event of damage, please consult the supplier. Do not install or commission a damaged hoist!

SAFETY ALERT INDICATIONS

- Improper use of electric wire rope hoist causes danger such as drop of lifted load. Read this Owner's Manual carefully before installation, operation and maintenance. Use the product after understanding the product knowledge, safety information and precautions.
- This Owner's Manual classifies the safety information and precautions into three categories of

"DANGER", "WARNING" and "CAUTION"

- Also read the instruction manual of the device associated with electric wire rope hoist, and follow the described contents.

	**DANGER** DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury, and property damage.
	**WARNING** WARNING indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury, and property damage.
	**CAUTION** **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in **minor or moderate injury** or property damage. It may also be used to alert against unsafe practices.
	**NOTICE** **IMPORTANT INFORMATION** Notice about a harmful situation with possible consequences: the product itself or surrounding objects could be damaged
	**PROHIBITED** This shows something that is prohibited (something that must not be done).

NOTICE

- **CRAFTSMAN** shall not be liable for any damage incurred thereof due to natural disaster such as fire, earth quake and thunderbolt, conduct by third party, accident, willful conduct or negligence by owner, erroneous use and other use exceeding the operational condition.
- **CRAFTSMAN** shall not be liable for any incidental damage due to the use or non-use of the product such as the loss of business profit, suspension of business and damage of the lifted load.
- **CRAFTSMAN** shall not be liable for any damage arising from negligence of the contents in the Owner's Manual and the use of the product exceeding the scope of its specification.
- **CRAFTSMAN** shall not be liable for any damage arising from the malfunction due to the combination of the product with other devices in which CRAFTSMAN is not concerned.

Information on the Craftsman wire Rope Hoist

- The hoist is of modular design.
- The main assemblies include gearbox, hoist motor, integrated electrics and rope reeving components.
- Every individual given the task of transporting, installing, commissioning, operating, maintaining and repairing the hoist.
    - the operating instructions
    - the safety regulations and
    - the safety instructions in the individual chapters and sections.
- The specifications and the descriptions in this instruction manual were correct at the time of going to press. However, the possibilities of any deviations cannot be fully excluded in the manual and we therefore assume no legal responsibility or warranty for damage arising as a result of this decimation.

Disclaimer

- The manufacturer and its associated selling company will not be liable, if any changes done on the wire rope hoist apart from instruction given in this manual.
- This document and the information content herein, is the exclusive property of Craftsman Automation and represents a non-public, confidential and proprietary trade secret that may not be reproduced, disclosed to third parties, altered or otherwise employed in any manner whatsoever without the express written consent of craftsman copyright.
- For electrical instructions, kindly refer wire rope hoist electrical manual.

NOTICE

We are continuously striving after the improvement of its products and therefore reserves the right to modify at all the time without prior notification

If the manual is lost or became unusable, replacement documentation should be requested directly from the manufacturer by quoting the manual.

For enquiries contact us:

Craftsman Automation Limited

123/4, Sangothipalayam Road,
Arasur Post, Coimbatore - 641 407
Tamilnadu, India
Ph: +91-422-3051 000,
www.craftsmanautomation.com

TABLE OF CONTENTS

BLANK PAGE

TABLE OF CONTENTS

2. PRODUCT DESCRIPTION

3. INSTALLATION INSTRUCTIONS

4. OPERATIONAL INSTRUCTIONS

5. MAINTENANCE AND INSPECTION PROCEDURES

6. HOIST PACKING

7. INCIDENTS AND REPAIRS

8. HAZARDOUS WASTE PROCEDURES

BLANK PAGE

FOREWORD

BLANK PAGE

FOREWORD

0.- FOREWORD

- The purpose of this publication is to provide information about the installation, safe operation and maintenance of electric wire rope hoist.
- Each rope hoist is inspected and load tested on completion of manufacture at our works. The results of these tests are recorded on the inspection certificates, at the factory.
- It is important that the persons operating or servicing the hoist are familiar with the procedures and advice contained in this manual.

WARNING

Before proceeding with the installation and operation of the rope hoist, it is important that you carefully read these notes in order to ensure safe and efficient use of the equipment

0.0.1.- DISCLAIMER

- Craftsman Automation Limited makes no representations or warranties with respect to the contents of the document and disclaims any such warranty or fitness for any particular purpose.
- All information that has been provided was collected with the utmost care, and the compliance of the product with the document was fully tested and verified. However, the possibilities of any such deviations cannot be fully excluded in the manual and we therefore assume no legal responsibility or warranty for damage arising as a result of this documentation.

NOTICE

Craftsman automation Limited reserves the right to change and revise this operating manual from time to time without prior notice to any person or organization

0.0.2.- USER INFORMATION

- This operation manual will help you to get familiar with this product and to use the appropriate possible application. Read the operating manual carefully before working with the product to know the product and its other intended uses. Keep the manual in a safe place for further reference

NOTICE

Please pay attention to any information that comes attached to the unit that provides hints and make the usage easier

0.0.3.- WARRANTY

- Craftsman Automation Limited assumes no liability for damages that were caused by improper use, inadequately trained personnel, incorrect performance of work, as well as any changes, reconstruction or other modification of the device which is not approved. Any warranty claim becomes invalid if components were modified without consent; the device was installed, used or serviced in any way other than that described in this product manual.

NOTICE

Wearing parts are not subject to liability for defects.

We reserve the right to incorporate technical modifications within the scope of improving the operating characteristics and further development of the product.

FOREWORD

0.0.4.- SAFE OPERATING PRACTICES

- Being familiar with the equipment and safe operating practices is an extremely important factor in minimizing the possibility of personal injury to the operator and those working in the same area. This prevents the damage to property, the equipment and other materials.

DANGER

Hoist are designed for lifting and transporting material only. Under no circumstances, either during initial installation or in regular use, the hoist must not be used for lifting or transporting personnel, animals and livestock.

WARNING

No operator should be permitted to use the equipment who is not familiar with its operation, is not physically or mentally fit or has not been trained in the safe operating practices.
The misuse of hoist can lead to serious hazards and endangering the life of users, others working in the same area, property and equipment that are not protected against by mechanical means. Hazards can only be avoided by the exercise of safe operating practices

NOTICE

Safe operating practices involve a program of periodic inspection and preventive maintenance.

0.0.5.- SAFE OPERATION OF THE HOIST.

- Taking precedence over any specific rule listed here however, the most important rule of all is “common sense use”.
- A few minutes spent reading these rules can make an operator aware of dangerous practices and the precautions to be taken for his own safety and the safety of others. Frequent examinations and periodic inspections, as well as a conscientious observance of safety rules, may save lives as well as time and money.

0.0.6.- TARGET GROUP

- This operating manual is for those who have been introduced to the operating procedure, applications, safety devices and possible hazards of the machine.

0.0.7.- GROUP OF PERSONS

0.0.7.1.- OWNER

- Owners (employer, company) are defined as persons who own the rope hoist and who use it appropriately or allow it to be operated by suitable and trained persons.

0.0.7.2.- USER/OPERATOR

- Operating personnel or machine operators are defined as persons assigned by the owner of the machine to operate the machine.

0.0.7.3.- TRAINED PERSONNEL

- Trained personnel are individuals who have been educated and trained in the responsibilities assigned to them, as well as the potential risks associated with improper actions. They are familiar with the required protective measures, safety precautions, relevant regulations, and accident prevention protocols, and have demonstrated their capability to perform their duties competently. (These individuals must be trained and certified by the Manufacturer or by an Authorized Person approved by the Manufacturer to perform operation and inspection on the hoist.)

	NOTICE
	The units must be operated by qualified persons that are appropriately trained and that are familiar with it.

0.0.7.4.- QUALIFIED ELECTRICIAN

- Possesses knowledge and experience with electrical equipment gained through specialized training, along with an understanding of applicable standards and regulations. Additionally, the individual is capable of assessing the tasks assigned to them, identifying potential risks, and taking steps to avoid them.

  (These individuals must have the authorized person to work with electrical equipment according to the law of the land, and are trained and authorized by the manufacturer or approved by the manufacturer to perform electrical tasks on the hoist.)

0.0.7.5.- QUALIFIED MAINTENANCE PERSONNEL

- Qualified person has the necessary theoretical and practical knowledge required for the maintenance of wire rope hoist installation. The extent of the knowledge is governed by these operating instructions and other statutory or technical stipulations. Qualified person must have state of the art knowledge in order to reliably assess the rope hoist.

  (These individuals must be trained and authorized person by the manufacturer or approved by the Manufacturer to perform maintenance tasks on the hoist.)

0.0.7.6.- AUTHORIZED PERSON

- An "authorized person approved by the manufacturer" is someone who has been officially trained and allowed by the manufacturer to handle, operate, or maintain a product safely and correctly, following the manufacturer's instructions.

  (These individuals must be authorized by the manufacturer to perform installation and maintenance tasks on the hoist.)

0.0.8.- PRAGMATIC INDICATIONS

- Inspect and lubricate the components according to the intervals suggested in the enclosed charts - or as experience dictates according to odd or very particular environment conditions (temperature, working hours per day, capacity, humidity, etc.).
- The reliability of the equipment depends, largely, on a sound maintenance. Preventive maintenance procedures included in this document should be taken into consideration. A log should be kept to record servicing and inspection frequency.
- Preventive maintenance avoids a great part of the inopportune stopping and makes possible to program the interventions that require total immobilization of the equipment, thus minimizing downtime and resulting disturbances.
- Enclosed may be found detailed information on the different equipment used and available from the market, namely data sheets and catalogue except. Their consultation is advisable in conjunction with the present manual.

0.0.9.- NOISE LEVEL

- Sound level from the rope hoist, averaged out for an operating cycle of 50% with rated load and 50% without load. Use PPE approval ear plugs during operation.

Type	[dB A]
Wire Rope Hoist	75 - 90

BLANK PAGE

SAFETY INSTRUCTIONS

BLANK PAGE

SAFETY INSTRUCTIONS

1. - SAFETY INSTRUCTIONS

1.0.1. - WARNING LABELS

	WARNING
	This symbol points out important safety instructions, which is not followed could end in danger, the personal safety and property of yourself and others.

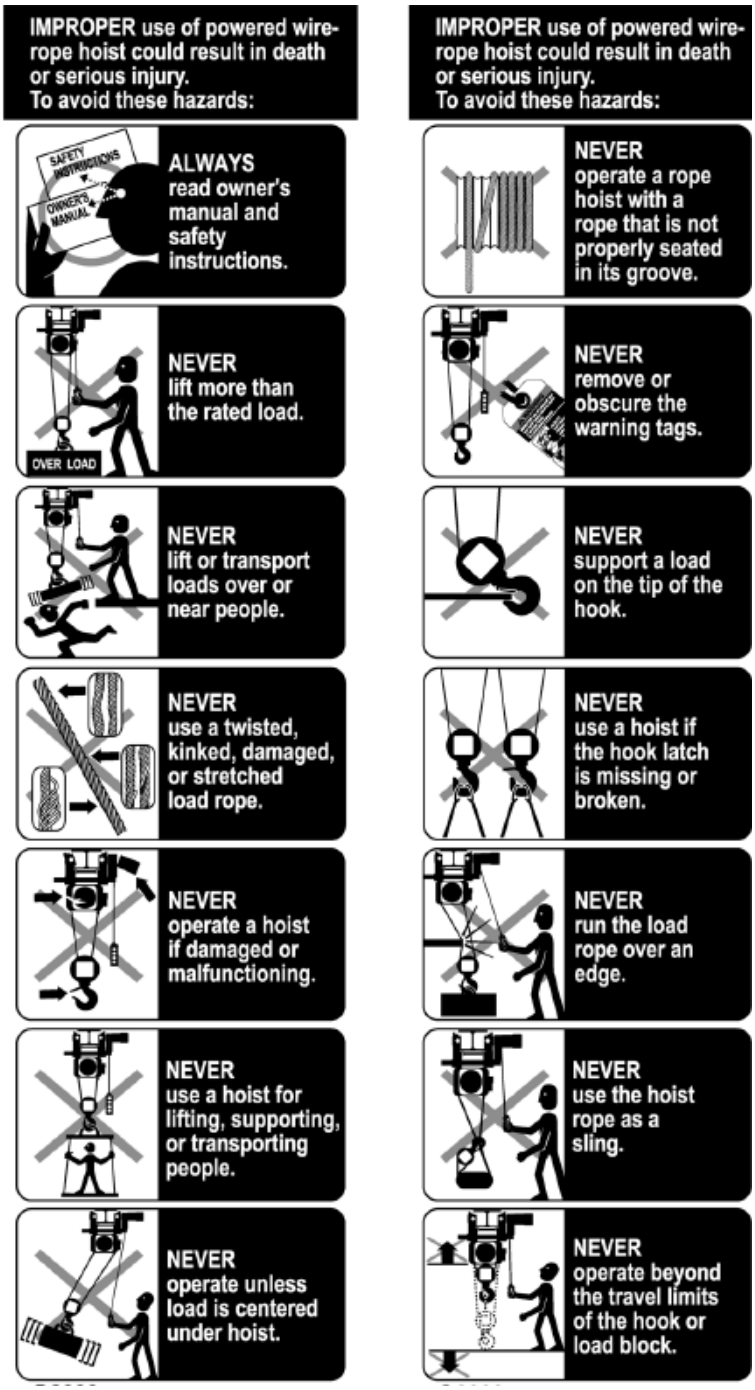


Figure 1.0.1

SAFETY INSTRUCTIONS

1.0.2.- SAFETY INSTRUCTIONS

- All safety instructions in this manual are designated by the accompanying symbol. Please follow them carefully. The following symbols indicate important information on risk and safety in operation. General regulations and laws for safety and accident prevention must also be observed.

1.0.2.1.- SAFETY SYMBOLS

The following symbols indicate important information on risks to life and safety in operation. These are to be strictly followed. Special hazard notices are located in the corresponding sections in which the danger arises.

Observe the product manuals

- In addition to the points described here, all instructions regarding safety in other supplied product manuals also applies.

Warning of General Hazard

- This symbol marks all the information on safety at works where risks to life and limbs are entailed.

Warning of suspended load

- Suspended loads always pose a hazard when working with the hoist. Always keep your own safety as well as the safety of others in while operating the hoist. Working or standing under the suspended loads is forbidden.

Safety in operation

- Information marked with this symbol in this manual must be followed to avoid damage to the wire rope hoist or the goods transported.

Warning of electrical voltage

- Which are marked with this symbol indicates electric shock hazard and should be operated only by qualified electrician.

Observe the maximum load capacity

- Observe the maximum load capacity of the hoist and do not exceed it! Look at the hoist hook block for maximum load rating.
- If the maximum load capacity is exceeded, the hoist and the supporting structure could be damaged. This in turn means the load could fall and kill or injure people. So, never lift load more than the maximum capacity.

Safety for personal

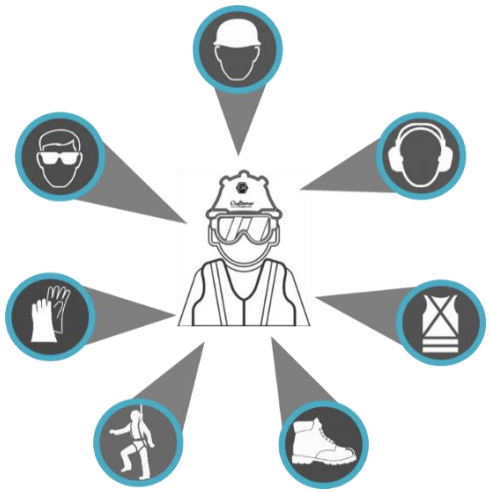
Information marked with this symbol must be followed to avoid damage to personal.

- Warning of Men Crushing.
- Warning of Head Hitting.
- Warning of Hand Crushing.



SAFETY INSTRUCTIONS

1.0.2.2.- SAFETY EQUIPMENT



- Main Switch with lock.
- Magnetic film warning sign "CAUTION SERVICE".
- Safety helmet.
- Safety boots.
- Safety gloves.
- Safety goggles.
- Safety vest.
- Ear muffs.

Fig 1.0.2.2. Safety Equipment.

It is mandatory to wear safety equipment during maintenance and service works.

SAFETY HELMETS:

You must always wear a protective helmet if there is a risk of injury to your head. The risks involving head injury can be divided into four areas.

1. Materials, tools or other items which may roll over and collapse.
2. Objects which protrude, or heavy materials or equipment which is hanging or swinging.
3. Electricity cables which are not insulated.
4. Confined space which make it difficult to move without bumping into something.

Selection of Protective Helmets:

The user has to use CE-labelled certified helmets that are manufactured in accordance with standard DS/EN 397. The color, shape and type of helmets must be chosen according to the job function.

WHITE - Managers, foreman, engineers or supervisors usually wear white hats on site. 

GREEN - Green is often used by safety inspector. 

YELLOW - This is the most widely used color. Yellow is the color for general laborers and earth moving operators. 

BLUE - Technical operators including electricians will normally wear blue hard hats. 

You should avoid using cracked helmets and the helmets that had been subjected to strong blows. They must fit firmly in your head and there must be suitable safe distance between the outside of the helmet and the head. The helmet lining is subject to perspiration, dirt and heat and so breaks down more quickly than the outside of the helmet. Therefore, the lining must be checked regularly and always be replaced in accordance with the supplier's instructions, but at the latest when the lining is showing signs of wear. Always discard the lining if you are in any doubt. All helmets can be cleaned using soapy water at temperatures of up to 45°C.

SAFETY INSTRUCTIONS

Safety Boots:

You should wear your shoes or boots embedded with steel toecaps if there is a risk of your feet being trapped or injured by falling objects when working with heavy objects weighing in excess of 16-20 kgs. Protective footwear must be suitable to individual employees and their needs. They should firmly in place and fit well. When working on ladders, steps, armoring and similar surfaces or when doing work which involves lot of walking protective footwear with flexible soles and separate heels should be worn. While erecting or dismantling the machine you must definitely wear shoes with steel toecaps. During handling of heavy materials, you must wear shoes with steel toecaps.

Safety Gloves:

- Gloves are used to avoid cuts, punctures that may happen while handling materials, assembling, dismantling, or packing. They also prevent us from abrasion, temperature extremes, vibration, electric shock.
- Wearing gloves for long periods can make the skin hot and sweaty which may lead to skin problems. In this case use separate cotton inner gloves.

Safety Goggles:

- To avoid the eye damages that will be caused due to metal spatter, dust, flying particles you must wear safety goggles. Eye protection must sit firmly in place so as to avoid falling of goggles from your eyes. They must be sufficiently large and give clear vision so that you could perform your work without any disturbance. If you already wear glasses, your eye protection must be large enough to leave space for your glasses, or else you must use eye protection with corrective lenses.

Ear Plugs:

- The user must wear ear defenders, if the noise load exceeds 85 dB(A), or if the peak value of impulses exceeds 135 dB(C) and otherwise if the noise load is harmful or causes significant inconvenience.

Safety Vest:

- A safety vest is a critical piece of safety equipment that are designed and regulated to enhance the visibility of workers. This vest needs to be worn by employers working in plants or warehouses where heavy equipment is operated. The high visibility vest can reduce incidents resulting in accidental injuries.

Main Switch Lock

During assembly, periodic maintenance or preventive maintenance (both inside and outside machine), all relevant national safety regulations must be strictly observed (e.g., accident prevention regulations). Inform the operating personnel before starting work.

SAFETY INSTRUCTIONS

1.0.2.3.- SAFETY PRECAUTIONS FOR INSTALLATION

WARNING

- Never have installation performed by other than a professional or someone with a special knowledge.
- Always perform grounding work. Also, install a leakage circuit breaker in the electric path, in addition to ground.
- Do not install the hoist where it will be exposed to rain and water and other environments outside the specifications.

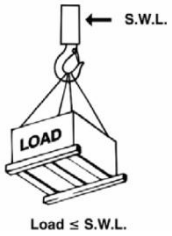
Failure to comply with these instructions may result in death or serious injury.

1.0.2.4.- SAFETY PRECAUTIONS FOR OPERATION

DANGER

- DON'T allow any unqualified personnel to operate the hoist.
- Before use, check brake operation. Do not operate the equipment if the brake does not operate positively.
- Do not operate the product if it has been damaged or if it is generating abnormal sounds or vibrations.
- Never operate the equipment when there are the following abnormalities at the hoist.

Failure to comply with these instructions may result in death or serious injury.

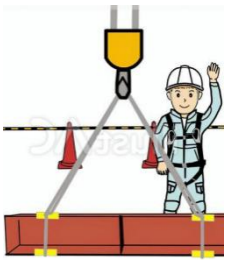


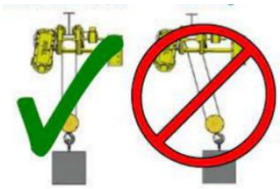
WARNING

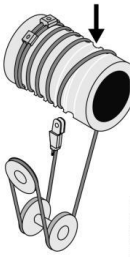
- Never lift a load exceeding the rated load. The rated load is given on the load block nameplate.
- (The weight of the load lifting attachment must be considered in the hoist operator's estimate of whether a load can be lifted with the safe working load of wire rope hoist.)
- DON'T lift or carry any human beings/animal using hoist.
- The wire rope hoist is not equipped with the necessary safety devices to safely transport people. This means that persons could fall during the transport and be killed or injured.

Failure to comply with these instructions may result in death or serious injury.

SAFETY INSTRUCTIONS







WARNING

- Do not lift persons either together with a load or without one. If any person's step onto the load or the load lifting attachment (e.g., climbing into a pallet cage or sitting on the crosshead), do not lift the load.
- Do not drag a load from the side.
- Always lift the load after moving the hoist directly above the load.
- Never walk under a profile with lifted load.
- Do not operate the equipment when there is someone within the range of movement of the load.
- Do not drive across or in front or behind the path of a profile with lifted load.
- Do not transport a load over a person's head.
- Do not leave the operation position with a load lifted. Also, do not keep a load lifted all the time.
- Do not be distracted from the load during operation.
- Do not operate in such a manner that the load and load block swing.
- Do not lift a load caught on building structures, etc.
- Do not attempt to catch loads.
- Check the operation of the limit switches.
- Do not wrap the wire rope directly around the load as a sling.
- The operator is responsible for ensuring that work is carried out with safety in mind and avoiding risks.
- Make sure the load clears neighbouring piles of stock, machinery or other obstructions when raising, lowering or travelling the load.
- Make sure that the beginning of the lifting is carried out softly.
- Check for the hook latches.
- Never use equipment with a damaged hook safety latch.
- Close the hook safety latch while lifting loads.
- Operators shall visually check the rope reeving. The ropes should all be properly seated in the grooves of the rope drum and rope sheaves. Check that rope is not twisted and that the ropes are not touching each other.
- Owner shall ensure that conditions at the hoist operating site correspond to the operating conditions for which the hoist is designed.

Failure to comply with these instructions may result in death or serious injury.

SAFETY INSTRUCTIONS

WARNING

- Before use, check pushbutton operation. Do not operate the equipment if the pushbuttons do not operate smoothly.
- If the hoist moves in the direction different from the pushbutton switch command, immediately stop operation.
- There is a danger of injury from incorrect operation or abnormal action.
- When it must be pushed with a larger force than normal, the push button switch could be damaged, so stop using it and immediately disassemble and inspect it
- Do not reverse a hoist with lifted load. Use special reversal equipment to reverse the load.
- Do not electrically weld a load hanging in midair.
- Do not ground the welder to the rope.
- Never touch the rope with a welding rod.
- Do not allow the body and trolley to collide with the stopper or structures.
- Do not touch the sharp edge with the rope.
- Never push up the rope with the load, lifting component, etc.
- If an earthquake is felt during operation, quickly lower the lifted load to the ground, and turn off the power.
- Do not touch the moving parts (rope, etc.) during operation.
- DON'T operate the hoist by consuming drugs or alcohol and during illness.
- DON'T allow the pendant control to swing.

Failure to comply with these instructions may result in death or serious injury.

CAUTION

- Check the operation of the limit switches.
- Check for the hook latches.
- Do not use the equipment at other than the rated voltage.
- Do not perform excessive inching (jogging).
- Do not get the load caught on another structure, wiring, etc.
- Do not get the pushbutton cable caught on another object and do not pull on the cable forcefully.
- Never exceed the duty rating and number of stars per hour.
- Don't re-use the fasteners.
- Don't transporting molten metal in normal application hoist
- Don't exceed the minimum capacity in lifting or tilting by using both hooks for Tandem or Dual hoist application.eg 10/5 load should not exceed 5T during combined hook operation

SAFETY INSTRUCTIONS

CAUTION

- Do not use the equipment when the warning and caution plates and labels installed on the Product were removed or soiled or are unreadable.
- Before use, verify that the lower hook rotates smoothly.
- Ensure proper slinging of the lifting component to the Hoist hook correctly.
- Always keep equipment & Pendant clean from dust, sand, Grease etc. to avoid deposition around the pushbuttons and subsequent Malfunction.
- When the push button switch is released after operation, naturally return it to the lowered position and make sure it does not strike any people or objects.
- Ensure safe height & clearance relative to the stationary objects, machineries and personnel around.
- Ensure lowering the object lifted & turn off the power while leaving the operating place.
- Always wear personnel protection equipment such as protection goggles, safety shoes, helmet and gloves during operation.

1.0.2.5.- SAFETY PRECAUTIONS FOR MAINTENANCE AND INSPECTION

DANGER

- DON'T adjust the factory original settings.
- Do not use the product when the usage or wear of a part has been exceeded permissible limits.
- DON'T Tamper / Reset the brake clutch of the Hoist without OEM knowledge.
- DON'T remove any parts from the hoist.
- DON'T Leave suspended Load unattended / without operator.
- DON'T attempt to lengthen the rope or repair damaged load rope.
- DON'T Modify original design / Welding / fixing irrelevant items in system.

Failure to comply with these instructions may result in death or serious injury.

WARNING

- Establish a regular schedule of service and thoroughly inspect and repair with special attention given to hooks, chain, brakes & limit switches and maintain correct records of this work.
- Observe the intervals specified for periodic tests. File the test reports in test logbook.
- Never modify the product and accessories.
- Use ONLY Genuine Parts supplied by OEM / Authorized Channel Partner by manufacturer.
- DON'T bypass / Tamper any mechanical or Electrical safety devices / components.

Failure to comply with these instructions may result in death or serious injury.

SAFETY INSTRUCTIONS

WARNING

- Always perform maintenance, inspection and repair in the no-load state.
- When an abnormality was found during maintenance and inspection, do not use the equipment. Immediately repair the trouble.
- Always turn off the power before performing maintenance and inspection or repair.
- Have maintenance, inspection and repair performed by a Qualified Person.

Failure to comply with these instructions may result in death or serious injury.

CAUTION

- When performing maintenance, inspection and repair, always tag the equipment ("Inspecting", "Energizing prohibited", etc.).
- * When a hoist is operated erroneously during the inspection, it may result in the accident such as fall-off of parts and tool and downfall.
- Wear protection equipment such as protection goggles, safety shoes and gloves depending on the work contents.
- * Otherwise, it may result in the injury due to scattered oil or sharp edge of a part.
- Pay attention to work method, work, procedure and work posture.
- If the product or the part is heavy, your hand is caught or your waist is hurt. Especially be careful for the work on an unstable scaffold such as the work at high lifted place using stepladder.
- Wear helmet and safety belt when carrying the high lift work.
- * Otherwise, it may result in injury or downfall accident.
- Remove the oil attached to the product or spilt on the floor.
- Otherwise, it may result in injury due to drop of the product or overturning.
- Keep the work area clean when disassembling the product.
- Assembling or mixing the part other than genuine part may result in the damage of the product or the accident due to defective operation.
- Check for damaged parts.

SAFETY INSTRUCTIONS

1.0.2.6.- OPERATING INSTRUCTION FOR INTENDED PURPOSE

- This hoist is intended for lifting freely movable & guided loads that cannot tilt within the normal work environment.
- The motor driven trolley and the manual trolley are designed and manufactured for the purpose to move the lifted load laterally with the combination with the wire rope hoist.
- If loads are to be towed horizontally, or in the case of guided loads, automatic operation, continuous deadweight or constantly repeated lifting motions, the individual application must be assessed as per the hoist selection procedure. Contact the manufacturer in case of doubt.
- If the hoist forms a part of a machine, the person placing it in the market must ensure that the hoist meets the specific and local statutory regulations of the application.
- The hoist is subjected to the safe working load is determined by the hoist selection criteria based on the user load spectrum.

WARNING

- The declaration of conformity is invalidated in case of any alterations, modifications carried out by user/owner.
- Ensure that all the safety precautions are followed as described in this manual during Installation / Operation / Maintenance.
- Use original spare parts.

1.0.2.7.- RESPONSIBILITIES OF OWNER

- The owner is obliged to ensure that the specified industrial safety measures comply with the latest rules and regulations and to observe new regulations during the entire service life of the machine.
- The owner must ensure that the hoist is only operated when in proper working order and that the relevant safety requirements and regulations are complied with.
- General safety, accident prevention and environmental protection regulations that apply where the machine is in operation must be observed and complied with in addition to the safety instructions contained in these operating instructions.
- The person who are going to operate/repair must be trained by the owner in accordance with the tasks to be performed. Personnel who work with or on the machine are provided with appropriate first-aid equipment. Personnel must be trained in the use of the first-aid equipment.
- The personnel are provided with the safety devices, always kept freely accessible and are checked regularly.

NOTICE

- The owner and any personnel authorized by him are responsible for correct operation of the machine and for clearly defining responsibilities for installation, operation, maintenance and cleaning. The operating instructions must be followed in full and without any limitations.

SAFETY INSTRUCTIONS

1.0.2.8.- SAFETY CONSCIOUS OPERATION

	NOTICE
	• Read and follow the operating instructions before starting to work with the wire rope hoist.

- The operator is responsible for ensuring that work is carried out with safety in mind and avoiding risks.
- Read and follow the operating instructions before starting to work with the wire rope hoists. Section 4.
- Before starting work, find out where the Emergency Stop red button is located on the control pendant.
- Report damage and defects of the hoist (abnormal noise, deformations, etc.,) to the responsible person immediately. Do not use the hoist until the faults have been eliminated.
- Do not remove information labels from the wire rope hoist. Replace non-readable or damaged labels.
- Hoist must be inspected by the relevant authority before commissioning and periodically based on usage and it has to be recorded.
- Observe statutory safety and accident prevention regulations.
- It is forbidden for persons to stand under suspended loads. This entails risks to life and limb!
- Do not insert your hand between edges which may pinch or cut.

EMERGENCY BRAKE INSTRUCTIONS (OPTIONAL DEVICE)

- In case the drum brake activates due to Motor brake fails, Key Shear, drive cut always contact a representative of the hoist manufacturer. The hoist must not be used before the cause to be found and repaired.
- Brake components must be checked for wear and damage and then adjusted as per instructions.

1.0.2.9.- ORGANIZATIONAL SAFETY PRECAUTIONS

- Only trained personnel shall operate the wire rope hoist.
- Ensure that work is being carried out in a safety-conscious manner.
- Observe the intervals specified for periodic tests. File the test reports in the test log book.
- Store the operating instructions within easy reach where the wire rope hoist is operated.
- The packaging is to be disposed of in an environmentally sound manner.
- Installation, commissioning, maintenance and repairs may only be carried out by manufacturer designated persons.

SAFETY INSTRUCTIONS

1.0.2.10.- ELECTRICAL SAFETY

WARNING

- Check that the mains voltage complies with that specified on the name plate.
- Connect mains supply cable and control cable in accordance with wiring diagram.

- Always keep away from dangerous electrical voltages.
- No user serviceable parts inside.
- The owner must ensure that the power supply cable, the fuse etc., used are in conformity to the electrical drawing.
- The hoist shall be operated within the voltage band specified in the nameplate.
- When the hoist is not properly grounded there is a danger of electric shock.
- The owner must ensure that the mains system and phase sequence is in order.
- The maintenance personnel must ensure that electric power switch is off at the time of maintenance, service work.
- The maintenance personnel must ensure no binding posts (luster terminals, etc.,) to be connected to the power supply cable of the hoist.
- The owner must ensure to use connections as per the recommendations in electrical drawing.
- The maintenance personnel must ensure all poles of the mains cable must be disconnected by a lockable switch and tagged during maintenance.
- The owner must install the hoist with MCB/MPCB (Motor Protection Circuit Breaker) as per the electrical circuit and provide proper grounding to avoid electric shock during working.
- Do not kink power cable and control cable and never allow the cable to come in contact with oil, grease, hot surfaces or chemicals.
- Avoid water at all times when working with electricity. Never touch or try repairing any electrical equipment or circuits with wet hands. It increases the conductivity of the electric current.
- Never use equipment with frayed cords, damaged insulation or broken plugs.
- Always use insulated tools while working.
- Always use appropriate insulated rubber gloves and goggles while working on any branch circuit or any other electrical circuit.
- Never try repairing energized equipment. Always check that it is de-energized first by using a tester. When an electric tester touches a live or hot wire, the bulb inside the tester lights up showing that an electrical current is flowing through the respective wire. Check all the wires, the outer metallic covering of the service panel and any other hanging wires with an electrical tester before proceeding with your work.
- Always check all your GFCI's once a month. A GFCI (Ground Fault Circuit Interrupter) is a RCD (Residual Current Device).

1.0.2.11.- PERIODIC TESTS

- It is the owner's duty to ensure that the hoist is inspected by a maintenance personnel at the regular intervals specified in this manual or as prescribed by national or international regulations, and that the inspections are properly recorded.

CAUTION

- Follow the periodic test intervals as described in the manual.
- The results of the test must be recorded.
- Intensive use entails shorter test and maintenance intervals.
- During the periodic test, all safety instructions mentioned in this manual shall be taken care of.

SAFETY INSTRUCTIONS

1.0.2.12.- RESPONSIBILITIES OF THE HOIST OPERATOR

- Hoists are used for various purposes, handle different types of loads and are operated different ways by many operators. Many workers, as part of their regular job responsibilities, normally operate hoists as non-dedicated operators.
- Because the manufacturer of the hoist has no direct involvement or control over the hoist's operation and application, conforming to good safety practices is the responsibility of the owner, and the equipment's operating personnel.

WARNING

Only those assigned by the owner, who have read and understood this manual and are knowledgeable about the proper operation of the product, should be permitted to work with it.
Failure to adhere to the instructions and warnings provided in this manual can result in serious injury or death or serious damage to the product.

WARNING

- No operator should be permitted to use the equipment who is not familiar with its operation, is not physically or mentally fit or has not been trained in the safe operating practices.
- The misuse of hoist can lead to serious hazards and endangering the life of users, others working in the same area, property and equipment that are not protected against by mechanical means. Hazards can only be avoided by the exercise of safe operating practices.
- Operating a product with an abnormal condition or malfunction can result in serious injury or death or serious damage to the product.

When working with wire rope hoists, the following must be observed.

- Every day before starting work, brakes, load suspension device and limit switches to be checked.
- Visually check the rope for any deformation, damage or twists.
- Check the rope for cleanness and correct lubrication according to the instructions given in chapter Lubrication.
- Check that the emergency stop button can be pressed down and that it will stay in that position.
- Listen for unusual noises.
- Check to ensure that the hook safety latch is on the hook, it is in good condition, and closes automatically.
- Loads must not be moved over people.
- The hoist operator must be able to see the whole of the working area. If this is not the case, an assistant must guide the operator.
- Loads must be attached safely and correctly. Suspended loads shall not be left unattended.
- Control and emergency stop device must be within easy reach.
- Inching operation (Briefly switching on the motor to achieve small movements) is meant for fine adjustments only and must be used rationally.

SAFETY INSTRUCTIONS

1.0.2.13.- EMERGENCY STOP

- Press the red emergency stop button, the system comes to a halt.
- To release the emergency, stop, turn the button in the clock wise direction.
- The emergency stop button is on the control pendant.

Fig 1.0.2.13 Emergency Stop

	WARNING
	An emergency stop is not the same as an emergency shutdown. • During emergency stop, only the power supply to the travel drives is cut off and the brakes are operated. • The system is not disconnected from the power supply. An emergency stop is initiated by pushing the emergency stop red color switch. The system can be restarted by turning the switch to the right. **Failure to comply with these instructions may result in death or serious injury.**

1.0.2.14.- DISPOSAL & RECYCLE OF HAZARDOUS MATERIALS

- All the electrical items used in the hoist should be properly disposed through authorized agency for disposing the electrical and electronic wastes or according to law of land.
- The gearbox oil should be properly disposed after usage as per the instruction given in section 8.
- All the plastic parts are should be properly recycled or disposed through authorized agency or as per law of land.

1.0.2.15.- NOTES ON HAZARDS

	CAUTION
	**In order to avoid injury, please pay attention to the following when using the equipment:** • Use protective clothing / equipment. • Do not wear long hair hanging down open. • Do not wear ring or other jewelry. • Do not wear clothes that are too big/wide. • Do not insert your hand between edges which may pinch or cut.

SAFETY INSTRUCTIONS

CAUTION

- For safe working, it is absolutely essential for operation and maintenance personnel to receive thorough instruction in the requirements of this Installation, Operation and Maintenance Manual.
- The hoist must not be used for breaking loose loads, pulling, dragging or transversely pulling loads since this could result in overloading.
- If tests and inspections are not conducted by specialist personnel of the hoist manufacturer and third parties are commissioned for such work, the organization operating the hoist is responsible for selecting suitably qualified personnel commissioning and conducting the tests.
- The acceptance test in accordance with this section is not intended as a substitute for any other tests which may be required by applicable national regulations. Such tests must be conducted in addition to the acceptance test.
- The National testing regulations may require higher test loads than those specified in the section for dynamic or static testing; this point must be clarified with the hoist manufacturer before testing is started.
- All repair works must be performed with all equipment disconnected from the power supply.
- All work on the brake and gear box must be performed by the specialists.
- All repair works and electrical works must be carried out only by the specialist electrical personnel.
- Overload protection devices are safety systems and must not be adjusted or over-ridden.

1.0.3.- OPERATING ENVIRONMENT

DANGER

- Using the hoist in an environment for which it is not designed can be dangerous, result in serious injury or death or serious damage to the product.
- It will also reduce the hoist lifetime and increase the maintenance requirements.

The product for general use may be used in a normal default industrial environment only, with the following limitations:

- Indoor hoist must be protected from outdoor weather conditions.
- Hoist must be operated within designed temperatures.
- Hoist must not be exposed to any corrosive chemicals or an explosive atmosphere.
- Hoist must not be located in an area prone to earthquakes.

1.0.4.- WEIGHT

- See factory certificate.

1.0.5.- INSTALLATION, COMMISSIONING, MAINTENANCE AND REPAIRS

Make sure that installation, commissioning, maintenance and repairs are carried out by qualified & authorized persons by the manufacturer. Do not carry out any alterations or modifications. Make sure that additional fitments are approved by the manufacturer. Use only original spare parts for repairs. Make sure that dismantled guards are screwed down again and locked.

SAFETY INSTRUCTIONS

1.0.5.1.- DO'S

CAUTION

- Read and follow the manufacturer's instruction, installation, and maintenance manuals.
- When repairing or maintaining a hoist, use only the manufacturer's recommended parts and materials.
- Remove the hoist from service and thoroughly inspect and repair as necessary if unusual performance or visual defects are noticed.
- Establish a regular schedule of service and inspection with special attention given to hooks, ropes, brakes, and limit switches, and maintain correct records of this work.
- Check the operation of the brakes, especially in hoists working many hours.
- Check the operation of the limit switches.
- Check for damaged hooks and ropes.
- Keep the rope clean and lubricated.
- Check the wire rope for improper seating, twisting, kinking, wear, or other defects before operating the hoist.
- Make sure load clears neighboring piles of stock, machinery, or other obstructions when raising, lowering or travelling the load. Centre the hoist over the load before operating.
- Avoid the load or load hook swinging when travelling the hoist.
- Be sure the load attachment is correctly seated in the saddle of the hook. Balance the load correctly before handling. Lift in a straight line, so that neither hoist body nor load or rope are angled around an object.
- Make sure that the beginning of the lifting is carried out softly.
- Know the hand signals for hoisting, cross travel and lifting if working with cab operated hoists.

1.0.6.- ENVIRONMENTAL INFORMATION

Environmental aspects have been considered when developing & manufacturing this equipment. Please refer (section 8.0.4) the instructions on safe lubrication & waste disposal to avoid pollution risks during use. Appropriate use and correct maintenance will improve the performance of this product.

1.0.6.1.- LIFE CYCLE ASSESSMENT

The stages of the product service life are:

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

1.0.6.2.- ENERGY CONSUMPTION

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

SAFETY INSTRUCTIONS

1.0.7.- SAFETY DURING LOAD HANDLING

1.0.7.1.- SAFETY PRECAUTIONS FOR HANDLING

CAUTION

Keep the Operation Manual until the product is disposed of, and keep it in a location where it can be easily accessed.

WARNING

- Do not allow personnel without knowledge of the contents of the instruction manual and caution plates to operate the equipment.
- Never allow unauthorized personnel to perform hoist operation or rigging work. Moreover, do not order them to do such work.
- Always conduct pre-operation inspection and periodic independent inspection.
- In all work there is a risk of head injury (e.g. collision with load hook), hands being crushed (e.g. on the load hook or when slinging the load) and injuries to the feet (e.g. due to falling lifting tackle). As a result of this people can be injured.
- Wear suitable protective clothing (e.g. industrial safety helmets, safety shoes with reinforced toes, protective gloves) for all work on or using the hoist. The actual combination of personal safety gear will depend on the conditions in the building and the use of the hoist, and is determined by the risk assessment.

Failure to comply with these instructions may result in death or serious injury.

DANGER

- Manage the product's useful life and have it completely overhauled or the equipment updated before the end of the useful life is reached.
- Any unauthorized modification to the system is inadmissible and leads to the expiration of the warranty. The liability for this danger is borne by the operator.

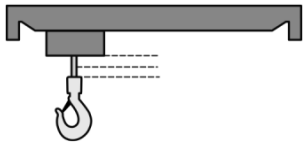
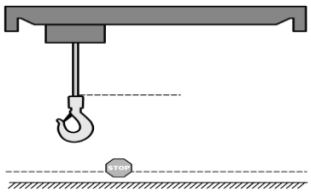
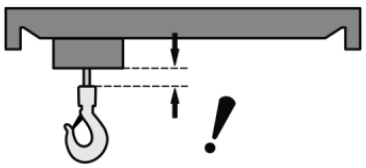
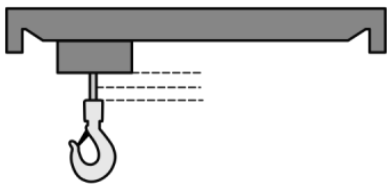
Failure to comply with this instruction may result in death or serious injury.

SAFETY INSTRUCTIONS

1.0.7.2.- BEFORE LIFTING

After securely attaching the load to the lifting device, the hoisting machinery must be correctly positioned and attached to perform the lift. The following steps must be followed before lifting.

The hoist is fitted with the following devices which work in conjunction with lifting and lowering movements:

1	Upper stop limit Stops the hoisting motion.	
2	Lower stop limit Stops the lowering motion.	
3	Up safety limit The hoist is equipped with a safety up limit. This will stop the lifting motion if the up-stop limit fails. Lifting device can be lowered until the up-safety limit switch has been reset. The hoist may not be used again before the failure has been investigated and repaired.	
4	Working limit switch with bypass (programmable) (optional – in semi automation or fully automated hoist) The hoist is equipped with a working limit switch which can be used for stopping the movement for operational purposes. By bypassing the working limit switch the operator may drive to the up limit.	

SAFETY INSTRUCTIONS

1.0.7.3.- LIFTING AND LOWERING MOTIONS

Correct load handling allows the operator to move loads quickly and safely.

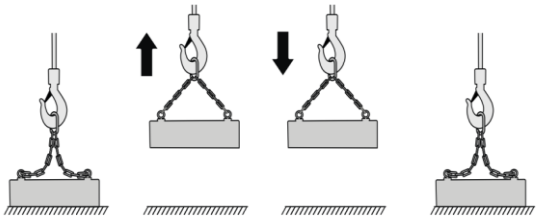


Fig 1.0.7.3 Lifting and Lowering motions

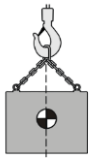
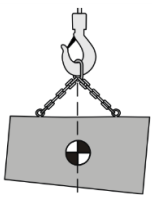
	**WARNING** • Handle the load safely at all times. During movements, ensure that the hook, the load, the hoist and its moving parts will not collide with objects or people. **Failure to comply with these instructions may result in death or serious injury.**

1.0.7.4.- EVALUATING THE LOAD

- To prevent overloading, the operator shall determine the weight of the load before lifting. The operator shall only lift the load when he or she is sure that it weighs no more than the permitted load of the hoist and accessories. The hoist's overload device shall not be used to determine whether the load can be lifted.
- Never attempt to lift a load that weighs more than the safe working load of the hoist and accessories.

	**CAUTION** • Attempting to lift a load that weighs more than the safe working load of the hoist and accessories. **Failure to comply with these instructions may result in death or serious injury.**

1.0.7.5.- BALANCING THE LOAD

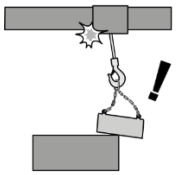
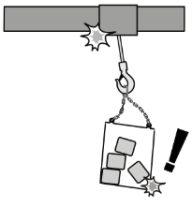
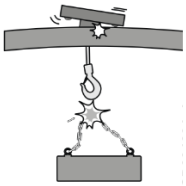
1	Lifting centrally balanced loads The center of gravity will usually be in line with the center of the load. Provided that the contents of the container cannot move around, the balance of the load stays the same.	
2	Lifting off-center balanced loads The center of gravity of an off-center balanced load will usually be towards the heavier end of the load. Provided that the contents of the container cannot move around, the balance of the load stays the same	

SAFETY INSTRUCTIONS

	WARNING
	Never try to balance an unbalanced load with your hands. Lower the load and adjust the lifting point. Trying to balance an unbalanced load with your hands could cause death or serious injury.

1.0.7.6.- SHOCK LOADING

The hoist and accessories are designed to take up the weight of loads gradually and steadily. They are not designed to withstand sudden increases or decreases in the apparent weight of the load. Shock loading can occur in any situation where the load on the hoist suddenly increases or decreases. Some examples of how shock loading can occur are shown below.

1	Change of load balance A change in load balance can suddenly pull on the hoisting rope.	
2	Unstable load If the load is unstable, it can exert sudden force on the hoisting rope. The contents of packing cases should be securely fastened so that they cannot move around during lifting.	
3	Rapid load reduction A sudden loss of the load can cause the trolley/hoist to jump	

	NOTICE
	Avoid shock loading the hoist. Shock loading the hoist could damage the hoist or the load.

	CAUTION
	After a shock, Hoist shall not be used before authorized service personnel or an experienced service technician authorized by the manufacturer or manufacturer's representative has determined that the hoist is safe to use. The usage of a defective hoist can result in serious damage, injury or death.

SAFETY INSTRUCTIONS

1.0.7.7.- ATTACHING THE LOAD

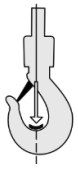
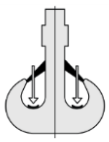
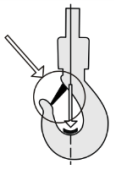
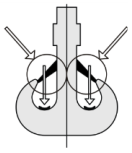
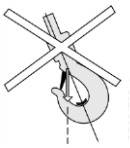
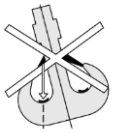
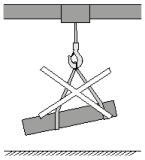
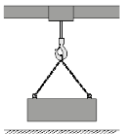
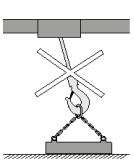
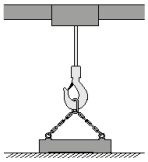
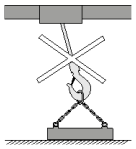
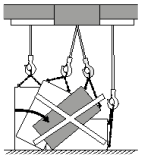
The load is usually attached to the hoist by means of some kind of pre-tested and reliable lifting device. The most common pre-tested and reliable lifting devices are chains, wire rope slings and lifting belts. The operator shall select a lifting device designed for the load being transported.

	**CAUTION**
	Always follow instructions provided by the lifting device manufacturer when using pre-tested and reliable lifting devices. Never use the hoist's ropes or chains as a sling to attach to the load.

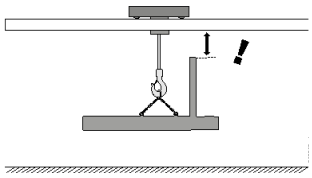
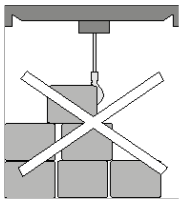
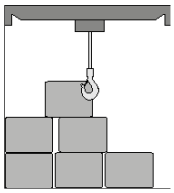
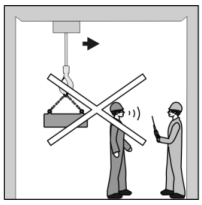
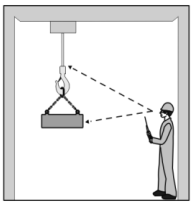
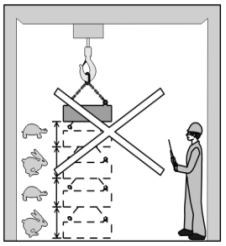
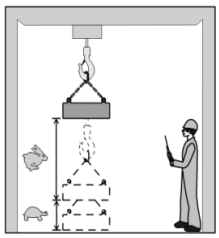
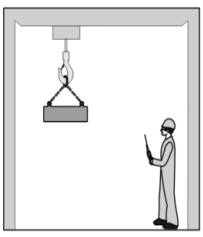
Lockable hook (Optional)

To prevent load handling problems caused by rotating the load. If a lockable hook block is used.

Load hand

1	To avoid damaging the hook, lifting devices must only be positioned on the load bearing surface of the hook. That is, the lowest point of the hook. Forces on ramshorn hooks must be equal on both load bearing surfaces.		
2	Ensure that the hook safety latches are closed. Check that the safety latch is not subjected to any force by the load.		
3	The weight of the load must be centered on the center line of the hook forging so that the load does not bend the neck of the hook. Never try to lift anything with the tip of the hook!		
4	Check that the load is balanced and safely fastened at the lifting points. The load must not be able to slide, slip or detach itself when suspended.		
5	The hoist must be positioned directly above (perpendicular to) the load so that there are no side-pulling forces.		
6	Do not drag the load along the ground.		

SAFETY INSTRUCTIONS

7	The operator shall ensure that the hoist or the load does not collide with anything or fall from the lifting device.		
8	Check that you have a clear view from the controller position. Remove any visual obstructions.		
9	Do not divert attention from the load while operating the hoist.		
10	Never leave the load hanging on the hook unattended.		
11	Avoid short, jerky motions. Unnecessary short starts cause the hoisting motor to overheat quickly. Do not switch the motor back and forth unnecessarily because it causes strain/ stress.		
12	The hoist is designed for lifting and transporting material only.		

	WARNING
	Never touch the ropes, chains or slings during lifting. There is a risk of catching or trapping your hands in the hook block or hoist. Catching or trapping your hands in the hook block or hoist could cause serious injury or death.

	NOTICE
	Do not allow the hook or other lifting device to strike the load on the ground while lowering the load. The wire rope hoist ropes could dislocate from the pulley grooves if they go slack.

	NOTICE
	Always remove the load from the hook by hand. Never try to use hoist motions to remove the load from the hook. The safety latch on the hook should prevent this.

1.0.7.8.- LOAD SWING

Load swing is caused by sudden speed or direction changes in the trolley or bridge movements. When starting up or accelerating, the load lags behind the bridge or trolley. When stopping or decelerating, the load tends to swing ahead, pulling on the hoist. If the hoist moves at high speed and then decelerates quickly, violent swinging may result. The load will swing further on a long rope close to ground level than on a short one close to hoist level.

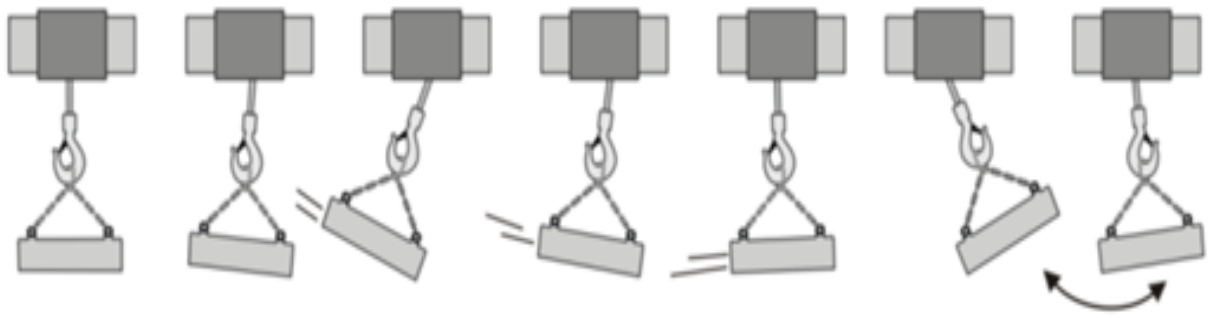


Fig 1.0.7.8 Load Swing

Load swing can be prevented or minimized by:

- Accelerating and decelerating as gently as possible.
- Moving the hoist at a speed appropriate for the load (higher speeds increase the likelihood of swinging).
- Transporting the load close to the hoisting machinery with short ropes.
- Coming to a complete stop before changing direction.
- Avoid using multiple motions at the same time.

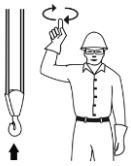
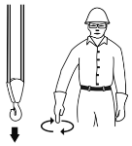
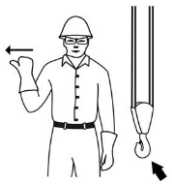
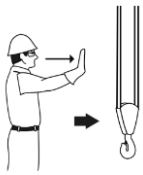
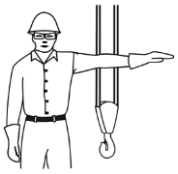
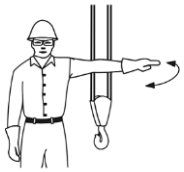
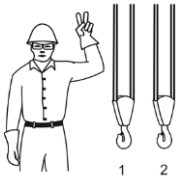
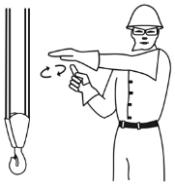
SAFETY INSTRUCTIONS

1.0.8.- HAND SIGNALS AND OTHER METHODS OF COMMUNICATION

- When one person is operating the hoist and another is giving hoisting instructions, communication must be clear. Both people must agree on and understand the language they use to describe hoisting actions. If electronic voice communication is used, such as telephone or radio, a dedicated channel must be used so that any commands from other personnel in the area will not confuse the operator.
- Hand signals can be used for communication. The operator must be trained to understand appropriate hand signals. A copy of the hand signals should be displayed at the operator's station and anywhere else where it could be useful.
- Special operations may require additional hand signals. Special signals must be agreed upon and understood before hoisting. It should not be possible to confuse special signs with the standard signs.
- The operator should only respond to hand signals from the person giving hoisting instructions, except to obey a stop signal, regardless of who gives it. The operator takes overall responsibility for movement and should only follow movement instructions when he or she judges it safe to do so.

HAND SIGNALS

- These are the most commonly used hand signals. A copy of the hand signals should be placed close to the operator's station for reference. Other standards for hand signals exist. All operators must agree on and understand the signals used to describe hoisting actions.

Description	ANSI Hand signal	Description	ANSI Hand signal
Hoist With forearm vertical, and forefinger pointing up, move hand in a small horizontal circle.		Lower With arm extended downward, forefinger pointing down, move hand in a small horizontal circle	
Trolley travel Palm up, fingers closed, thumb pointing in direction of motion, jerk hand horizontally.		Bridge travel Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.	
Stop Arm extended, palm down and hold position rigidly.		Emergency stops Arm extended, palm down, move hand rapidly right and left.	
Multiple trolleys Hold up one finger for block marked "1" and two fingers for block marked "2". Regular signals follow.		Move slowly Use one hand to give any motion signal and place the other hand motionless in front of hand giving the motion signal. (Hoist slowly as shown in example).	

SAFETY INSTRUCTIONS

1.0.9.- CONTROL PENDANT

- This hoist is designed for safe operation within the limits of its rated capacity. It is controlled with the push button station.
- Two speed motor hoist models have 2-step buttons.
- The “UP” or “DOWN” button is pressed to the first step for the slow speed and pressed all the way down for the fast speed in both the direction.
- By releasing the push button, the hoist stops lifting the load.
- The speed can be varied by using the variable frequency drive model.
- When the hoist reaches the upper limit position (high hook), the upper limit switch, shutting down the lifting motion.

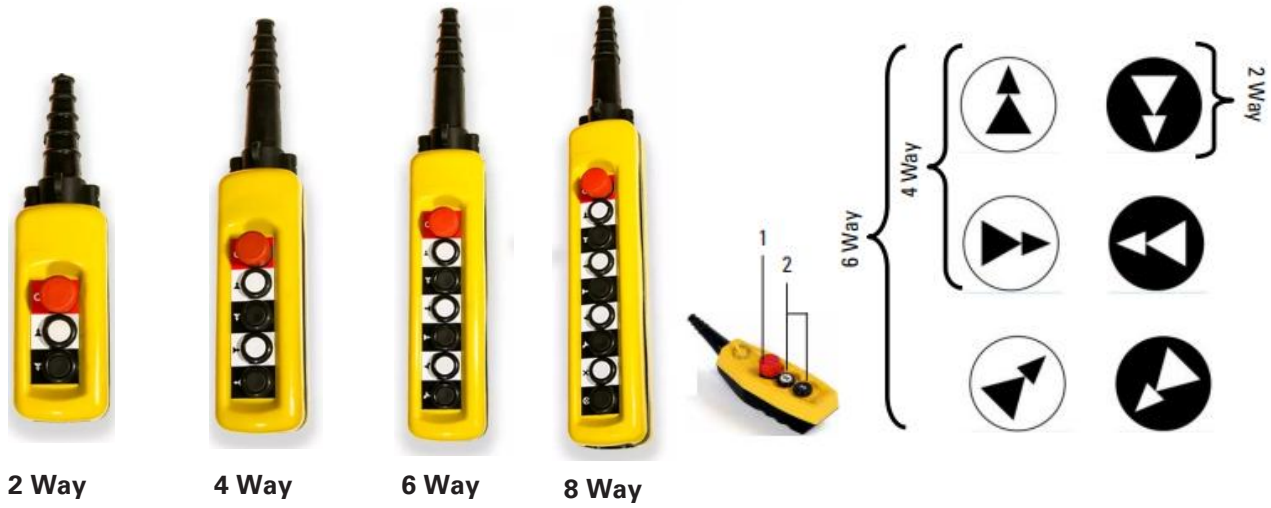


Fig 1.0.9 Push Button Controls

1. Emergency Stop push the red button.
2. Push Button Switches - (Half push Slow Speed & Full push High Speed).
   - 2 way - Lifting & Lowering
   - 4 way - Lifting, Lowering & Cross Travel Motion
   - 6 Way - Lifting, Lowering, Cross Travel Motion & Long Travel Motion
   - 8 Way - Lifting and Lowering for main and auxiliary hoist, Cross Travel Motion & Long Travel Motion

The electric wire rope hoist stops when the push button is released.

	**WARNING**
	Emergency switch is always ON when the hoist is not in use or hand over the pendant to the other operator. **Failure to follow this will lead to accidents, severe injury and may causes death.**

BLANK PAGE

PRODUCT DESCRIPTION

BLANK PAGE

2.- PRODUCT DESCRIPTION

2.0.1.- INTRODUCTION

- Wire rope hoists are intended for lifting freely movable loads.
- The modular concept of our series of wire rope hoists permits a assembly of variations on the basis of series components.
- The design is characterized by the rope drum and hoist motor being arranged in parallel.
- The hoist drive is a cylindrical rotor motor with a separately activated by electromagnetic brake.
- Design complies with the FEM regulations
- The main components of the wire rope hoist are the hoist motor, the gear, the rope drum and the panel box.
- Our certified quality assurance system to ISO 9001 guarantees consistently high quality.

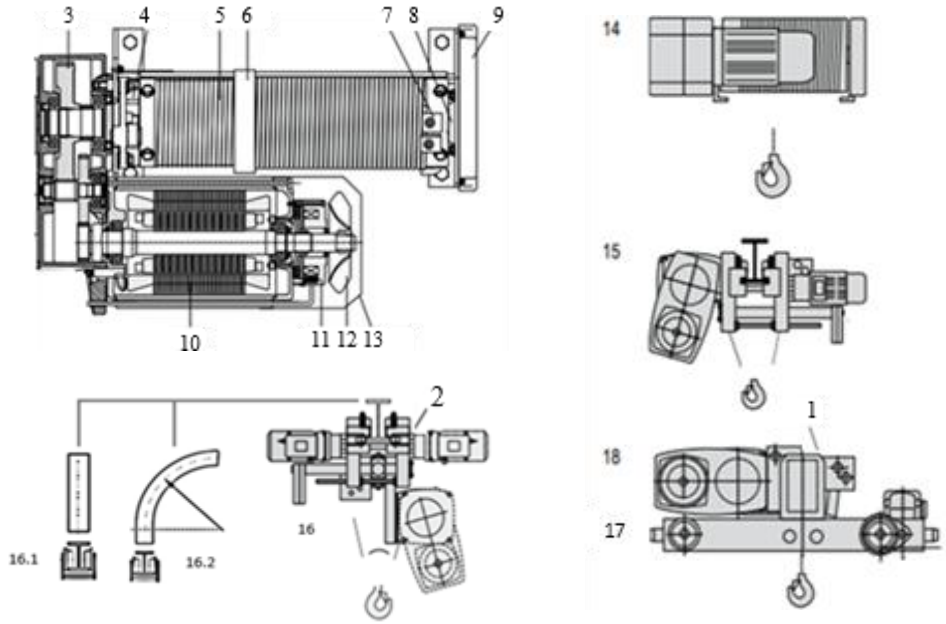


Fig 2.0.1 Wire Robe Hoist

1. Panel box
2. Rotary Limit Switch
3. Gear
4. Gear Box Output Shaft
5. Rope drum
6. Rope guide with rope tensioning spring
7. Clamps for rope attachment
8. Rope drum bearing
9. End cover
10. Motor
11. Brake
12. Fan
13. Fan cover
14. Stationary wire rope hoists, hoist for incorporation
15. Wire rope hoists with monorail trolley – Low headroom
16. Wire rope hoists with monorail trolley - Underslung

16.1 Straight trolley

16.2 Articulated trolley

17. Wire rope hoists with double rail trolley

NOTICE

- Diagram illustration shown in only for reference may vary with actual.
- A complete list of parts used in the hoist and assembly & disassembly procedure refer spare parts manual of relevant hoist supply.

PRODUCT DESCRIPTION

2.0.2.- INITIAL PRODUCT CHECK

- Wire rope hoist packed in a wooden pallet, the order details and the packing details stick outside the box.
- Check the specification of the hoist you purchased as listed below.
- Model No.
- Rated Capacity (kg)
- Height of Lift (meter)
- Power supply
- Push button pendant assembly (2 Button, 4 Button, 6 Button, 8 Button)

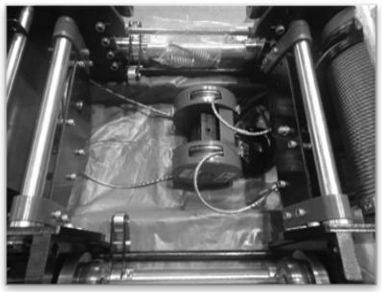


Fig 2.0.3 Hoist packing

2.0.3.- PARTS PACKAGED WITH THE WIRE ROPE HOIST

- Works Certificate
- Electrical Circuit Diagram
- Operation, Maintenance & Installation Manual
- Pendant Control

2.0.4.- STORAGE

- Keep the equipment at a clean and dust free environment.
- Do not store it outdoors.
- Store the hoist in dry places, relative air humidity of 60% (max).
- Protect the equipment against dirt, moisture and damage by an appropriate cover.
- Protect hooks, Wire rope and brake against corrosion.
- Normal transportation and storage temperature around -10° C to 40° C.
- Extra Care to be taken while loading and unloading the Hoist from the truck and also transportation of Hoist from one place to another.
- Use forklift/cranes for Hoist Transportation

	NOTICE
	• Make sure that the product is not deformed or damaged due to any accident during transportation • Make sure that the indication on the package and the product match with your order.

	NOTICE
	Environmental Protection Always dispose of packing materials in an environmentally compatible way and according to locally applicable disposal regulations

2.0.5.- REGULATIONS

NOTICE
The wire rope hoists are designed based on the standards and regulations mentioned below. Apart from all the instructions in this manual, strictly follow those standards and regulation for the better use of the hoist

FEM 9.511	- Rules for the design of series lifting equipment; Classification of mechanisms
FEM 9.661	- Dimensions and design of rope reeving components
FEM 9.811	- Rope and chain hoists - General Specifications
FEM 9.683	- Series lifting equipment; Selection of hoisting and travelling motors
FEM 9.751	- Series lifting equipment; Power driven series hoist mechanisms; Safety
FEM 9.755	- Serial hoist units; Measures for achieving safe working periods
BS EN 60204-1:2006+A1:2009	- Safety of machinery. Electrical equipment of machines. General requirements
DIN EN 60204-32:2008	- Electrical equipment of machines; Requirements for hoisting machines

2.0.6.- MECHANISM GROUP

When the product is designed and purchased, the predicted lifetime of the product is agreed, based on the expected use of the product. This expected use is known as the duty group. Our electric wire rope Hoists are allocated to mechanism groups in accordance with the following regulations. Under the allowance of the following mechanism groups, the hoist should be operated without exceeding the nominal values. On each identification plate, the mechanism group is indicated.

LOAD SPECTRUM

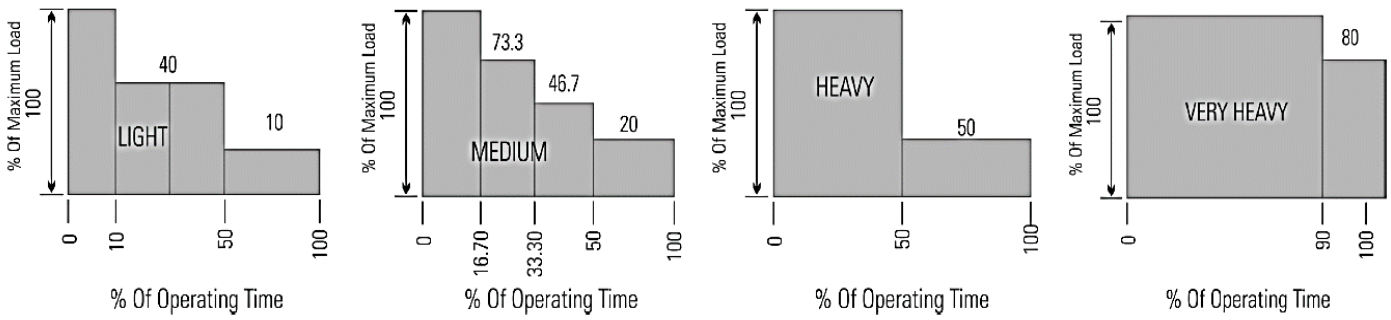


Fig 2.0.6 Load Spectrum

PRODUCT DESCRIPTION

	**CAUTION** The life of the product is governed by the size of the load and the load time. Never exceed the duty factor and starting frequency. **Failure to comply with these instructions may result in death or serious injury.**

FEM Mechanism Group 9.511

(Rules for Design of Serial Lifting Equipment: Classification of Mechanism) Class of Duty Table

Table 2.0.6

Mechanism group	1Cm	1Bm	1Am	2m	3m	4m	5m
Load group	Average operating period per day (hour)						
Light k < 0.50	< 1	1- 2	2-4	4-8	8-16	> 16	-
Medium 0.50 < k < 0.63	< 0.5	0.5-1	1-2	2-4	4-8	8-16	> 16
Heavy 0.30 < k < 0.80	< 0.25	0.25-0.5	0.5-1	1-2	2-4	4-8	8-16
Very Heavy 0.80 < k < 1.00	< 0.12	0.12-0.25	< 0.5	0.5-1	1-2	2-4	4-8

$$\text{Average Operating time per day} = \frac{2 \times \text{average hook path} \times \text{no. of cycles per hr.} \times \text{working time per day}}{60 \times \text{hoist speed}}$$

Load Capacity	-	5 T
Load spectrum from table	-	Medium Duty
Hoisting speed	-	4 m/min
Reeving	-	4/1
Average hook path	-	3 m
No. of cycles/hour	-	20
Working time/day	-	8 hours
Average Operating time per day	=	(2x 3 x 20 x 8) / (60 x 4)
	=	4 hours

For heavy load spectrum and average operating time of 4 hours, the table 2.0.6 shows the group 2m

	**DANGER** • Do not allow the product to be used outside the limits of the specified duty group. • Doing so risk of mechanical failure and can shorten the product life time.

PRODUCT DESCRIPTION

2.0.7.- PRODUCT ARTICLE CODE

CLH	05	A	4/1	V	12	2m	L1

TRACK GUAGE FOR CRAB HOIST
L1 = 1250 mm, **L2** = 1400 mm, **L3** = 1800 mm
L4 = 2240 mm, **L5** = 2500 mm, **L6** = 2800 mm
L7 = 3200 mm, **L8** = 3800 mm
FEM
1Am, 2m, 3m, 4m, 5m
LIFT HEIGHT
5m, 6m, 8m, 9m, 10m, 12m, 16m, 18m, 24m, 28m, 32m etc.…
VFD
V - Variable Frequency Drive
NUMBER OF FALLS
2/1, 4/1, 6/1, 8/1, 4/2, 6/2, 8/2, 10/2, 12/2, 8/2-Z, 10/2-Z, 12/2-Z
TROLLEY (CRU)
A - Articulated Trolley
S - Straight Trolley
F - Fixed Trolley
Range – 3, 5, 10, 12.5, 16, 20, 25, 30, 40, 60, 80, 100, 120 etc.…
CRU - CRAFTSMAN ROPE HOIST - UNDERSLUNG
CLH - CRAFTSMAN LOW HEADROOM ROPE HOIST - MONORAIL
CLHD - CRAFTSMAN LOW HEADROOM ROPE HOIST - CRAB
CR - CRAFTSMAN ROPE HOIST - CRAB
CLHM - CRAFTSMAN ROPE HOIST - MONORAIL HOT METAL
CLHDM - CRAFTSMAN ROPE HOIST - CRAB HOT METAL
CLX & CLXD – CRAFTMAN ROPE HOIST - SPECIAL MODELS

PRODUCT DESCRIPTION

2.0.8.- NAME PLATE AND LABELS ON PRODUCTS

All labels and name plate shall be attached on the products at the same position where they were or originally attached. Do not allow the labels and name plate to become obstructed or defaced. Replace them when damaged.

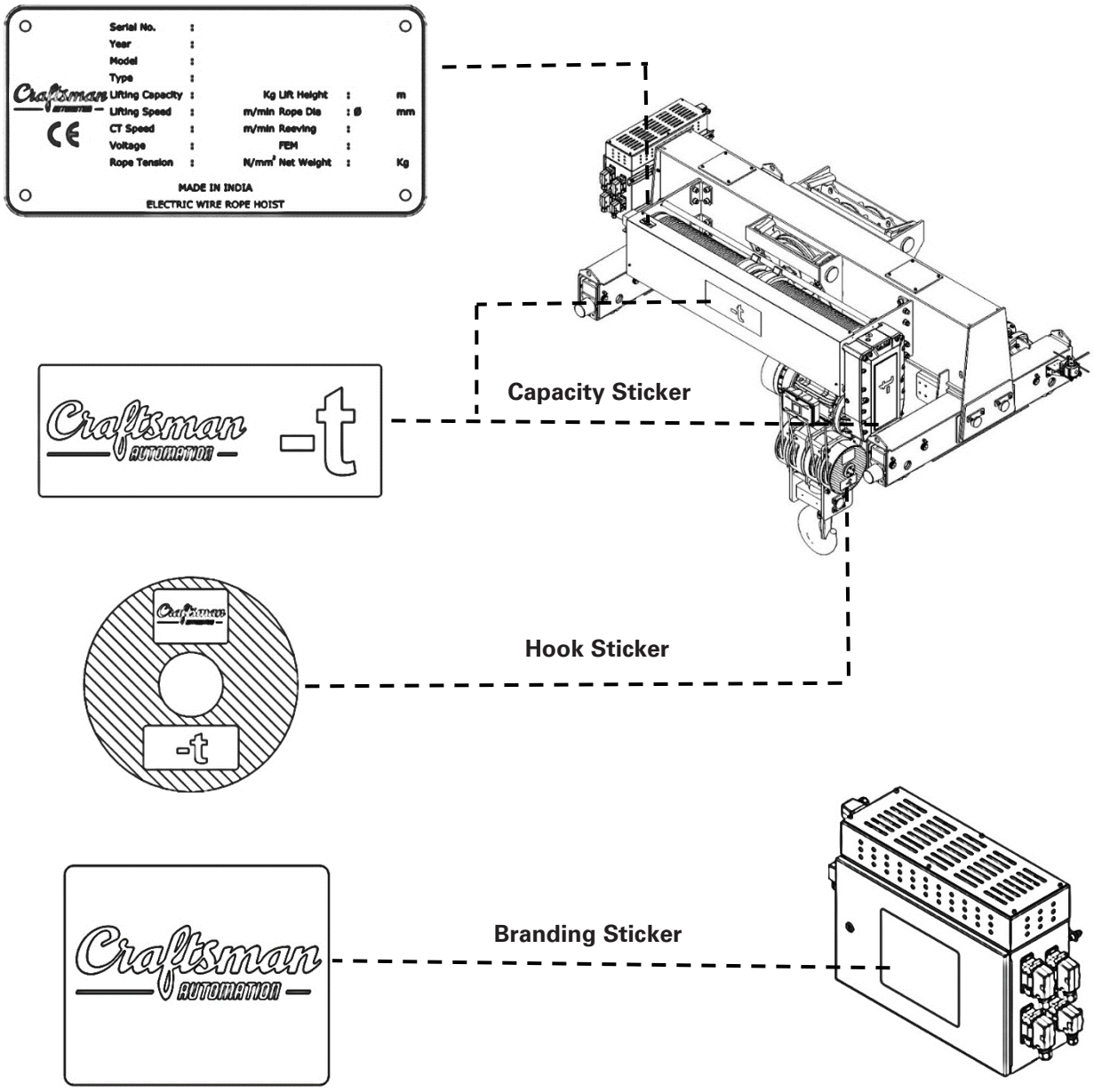


Fig 2.0.8 Hoisting Labels

	NOTICE
	• Image & diagram illustration shown only for reference, branding may change according to the joint venture of hoist supply.

PRODUCT DESCRIPTION

2.0.9.- HOIST COMPONENTS

2.0.9.1.- LIFTING AND TRAVEL MOTOR

- An induction motor with an incorporated brake is located outside the hoist.
- Insolation class F, protected against humidity in standard models.
- The standard motor version can have single speed.
- The other options are available based on customer requirement.
- According to the hoist model, the type of motors used are given in separate spare part catalogue
- The electromagnetic disc brake, has asbestos free, long life, flat faced brake linings.

NOTICE

- **For technical details, refer spare parts manual of relevant hoist supply.**

2.0.9.2.- GEAR BOX

- The gear box is made of machined Aluminum/cast iron.
- All the gears are of case harden material with ground helical located inside.
- The gear box is half-split built, by two or more stage gears are lubricated inside the closed housing that forms the box.
- All the axles are mounted on bearings. All the gearings are mounted in sealed gearboxes, with well positioned drainage lids, ventholes, oil level indicator bars and sealed axle exits.

2.0.9.3.- ROPE REEVING EQUIPMENT

2.0.9.3.1.- DRUM

- The drum is constructed from a high quality, seamless steel tube.
- The rope grooves are manufactured according to DIN-15061 and are determined by the arrangement of the wire rope outlets, be it of 1 or 2 outlets. The length of the drum varies in accordance with the lifting height. The drum ends are mounted on bearings.
- The surface finish of the grooves is very fine, without defects and imperfections that can damage the rope.
- The connection between the gearbox and the drum is centralized and is of a direct connection by means of a splined axle.
- The drum diameter varies according to the different hoist models.

NOTICE

- **For technical details, refer spare parts manual of relevant hoist supply.**

PRODUCT DESCRIPTION

2.0.9.3.2.- ROPE FASTENERS

The rope fasteners are specially manufactured and the number of staples and tightening torques of their fixing screws, depending on the hoist model as follows.

TABLE 2.0.9.3.2.- ROPE FASTENERS

HOIST MODELS	NUMBER OF FASTENERS	
	A	B
CRU 0.5	3	0
CRU 01	3	0
CRU 02	3	0
CLH 0.5 to CLH10	3	6
CLH16	5	10
CLHD 05 to CLHD 10	3	6
CLHD 16	5	10
CR16	5	10
CR20	5	10
CR32	5	10

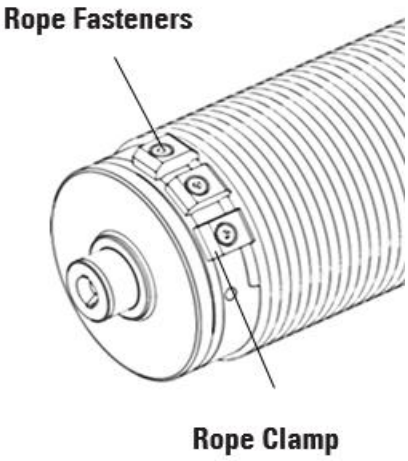


Figure 2.0.9.3.2 Rope Fasteners

A: One drum cable exit **B**: Two drum cable exits.

NOTICE

- Refer Table -3.0.6.1 for all grade tightening torque values and Loctite details.
- While fastening the bolt, Suitable torque should be select and tighten as per the given bolt grade.
- Wrong torque selection leads to break the bolt if overtighten or loosen the bolt under any vibration load.
- **The image & table values are for reference only.**
- **For technical details, refer spare parts manual of relevant hoist supply.**

2.0.9.3.3.- ROPE GUIDE

- The rope guide is made from GGG 40 spheroidal cast iron. The internal part is grooved in order to allow the rope to fit correctly.
- The guide consists of two halves which are fixed together by a bolt and spring. Applying pressure to this spring ensures elasticity.
- A special guide spring is fitted between the wire rope and the guide to maintain the correct tightness of the rope on the drum.
- To prevent the rope guide from rotating, it is driven along the drum assisted by guide shaft.

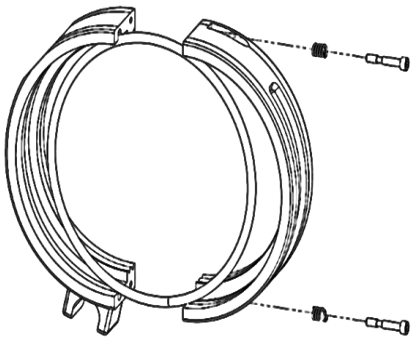


Figure 2.0.9.3.3

NOTICE

- **For technical details, refer spare parts manual of relevant hoist supply.**

PRODUCT DESCRIPTION

2.0.9.3.4.- WIRE ROPE - SELECTION

- The rope is selected according to the standard FEM 9.661.
- Depending on the hoist lifting height, the rope fixed into the hoist will be the standard type of non-rotating.
- User response is to use appropriate wire rope as recommended by manufacture.

	**DANGER**
	Different kind of wire rope may cause the load to fall, which could result in serious damage, injury or death.

2.0.9.3.4.1.- WIRE ROPE - TYPE

- H43 is a wire rope with compacted inner and outer strands with plastic insert.
- H40 is a wire rope with compacted inner and outer strands without plastic insert.
- The rope has a very high breaking force.

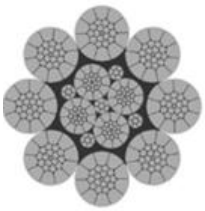
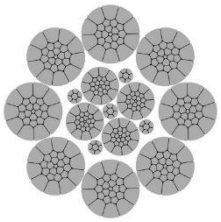
ROPE TYPE	MODELS	FALL	DIAMETER [mm]	MBL [KN]	GRADE [Mpa]	FINISH	CATEGORIES
 H43 (SKZ8 P)	CRU0.5 & CLH0.5	2/1	6.5	44.6	2160	Galvanized	Not Rotation Resistant
	CRU01 & CLH01	2/1	6.5	44.6			
	CRU02 & CLH02	2/1	6.5	44.6			
	CLH03	4/1	6.5	44.6			
	CLH05	2/1	8	67.5			
		4/1	8	67.5			
	CLH7.5	2/1	11	128			
		4/1	11	128			
	CLH10	2/1	11	128			
		4/1 & 6/1	11	128			
	CLH16	2/1	14	206			
		4/1 & 6/1	14	206			
	CR16	2/1	14	206			
		4/1 & 6/1	14	206			
		4/2	11	128			
		8/2	11	128			
		8/2-Z	14	206			
		10/2 & 10/2-Z	22	516			
		12/2 & 12/2-Z	22	516			
 H40 (SKZ8)	CR20	2/1	16.2	288			
		4/1	16.2	288			
		6/1	16.2	288			
		4/2 & 8/2	14	206			
		8/2-Z	16.2	288			
		10/2 & 10/2-Z	22	516			
		12/2 & 12/2-Z	22	516			
	CR32	4/1 & 6/1	22	516			
		8/2 & 8/2-Z	22	516			
		10/2 & 10/2-Z	22	516			
		12/2 & 12/2-Z	22	516			

Table: 2.0.9.3.4.1

PRODUCT DESCRIPTION

2.0.9.3.4.1.1.- H43 (SKZ8 P) AND H40 (SKZ8) WIRE ROPE

- **Total number of wires** : 4-6 mm 95, 7-15 mm 262, 16-24 mm 319, 25-44 mm 347, 45-64 mm 427, 65-76 mm 487
- **ISO 4309 Rope Category No** : 4-6 mm RCN.02, 7-15 mm RCN.04, 16-44 mmRCN.09, 45-76 mmRCN.13
- **Marking** : According to standard
- **Finish** : Galvanized or bright.
- **Standard** : EN 12385-4
- **Warning** : Not to be used with a swivel.
- **Fill factor** : 0.7403
- **RCN** : 02

2.0.9.3.5.- HOOK BLOCK

- Hook selection is according to DIN-15400 and manufacture is to DIN-15401/DIN-15402, depending on whether the hook is single or double.
- The hooks are of forged steel.
- They are mounted on axial thrust bearings which are on supported on block.
- The groove profile for wire rope sheaves following the DIN-15061 Standard.
- The hook crosshead pins and nuts are manufactures according to the DIN 15412 and DIN 15413, respectively.
- Hook construction change depending on the number of drum rope exits and the number of drums exits 2/1, 4/1 and 4/etc...

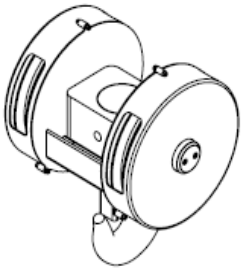


Figure 2.0.9.3.5

2.0.9.3.6.- ROTARY LIMIT SWITCH

- Limit switch is an endless screw type. Allows the limiting of the hook's travelling in its highest position and its lowest position.
- This limit switch equipment is of high precision, is easily regulated and is fitted in the drum axle. (See regulation in 5.0.10 of the maintenance manual)

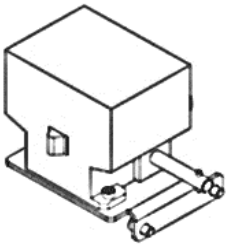


Figure 2.0.9.3.6

	NOTICE
	• Diagram illustration shown in only for reference may vary with actual. • **For technical details, refer spare parts manual of relevant hoist supply.**

2.0.9.3.7.- OVERLOAD PROTECTOR

2.0.9.3.7.1.- MECHANICAL OVERLOAD PROTECTOR

- This arrangement prevents the hoist overload which is being lifted.
- This overload protector consists of three major components:
    1. Spring element
    2. Limit switch
    3. Trigger arm
- The overload cut-off is set to rated load + 15%.
- This protection comes as a standard for the models operate without VFD – underslung hoist (CRU 0.5 to CRU 02) models.

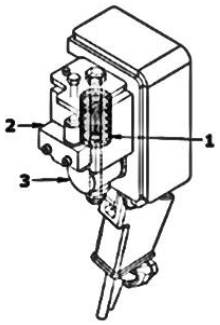


Figure 2.0.9.3.7.1

PRODUCT DESCRIPTION

2.0.9.3.7.2.- ELECTRONIC LOAD PROTECTOR

2.0.9.3.7.2.1.- VFD

Figure 2.0.9.3.7.2.1

- Precise and accurate overload protection system via variable frequency drive, which deactivates running in case of excessive overloading.
- This protection comes as a standard for all low headroom monorail and Crab hoist operate with VFD.
- The Overload Limiter is to be activated when the load is in the range of +5% to +10% of rated capacity.

2.0.9.3.7.2.2.- ROPE TENSION LOAD CELL (OPTIONAL)

Figure 2.0.9.3.7.2.2

- Rope tension load cell are used to provide overload protection range of +5% to +10% on rated load.
- The load cell is conveniently clamped on the rope at the end terminal.
- Accuracy depends upon various parameters including display resolution, installation method and point of loading reaching on the loading due to other mechanical fitment accuracy, gravity correction and many more.

2.0.9.3.7.2.3.- LOAD MEASURING PIN (OPTIONAL)

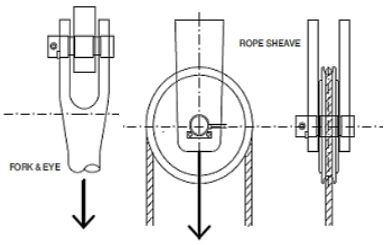


Figure 2.0.9.3.7.2.3

- Load measuring pins can be installed on sheave / anchor pins. A load measuring pin senses the force applied across it, via strain gauges installed either internally or externally.
- Two grooves are machined into the pin diameter to define the shear planes, which are located between the forces being measured.
- Drawings show some typical locations for load measuring pins
- Overload protection range of +5% to +10% on rated load.

NOTICE

- Diagram illustration shown in only for reference may vary with actual.
- **For technical details, refer spare parts manual of relevant hoist supply.**

WARNING

When changing the parameters or carrying out maintenance for the inverter is needed, ensure that it is performed by a person who have been authorized by the manufacture that he/she has expertise and enough knowledge on structure and characteristics of the hoist and inverter.

PROHIBITION

- Do not modify the inverter settings for load limit & other parameters.
- Do not change the wiring

DANGER

Failure to comply with these instructions may lead to an electrical shock, burn, malfunction, failure, or damage to the inverter, and may cause serious accidents resulting in death or severe injury

PRODUCT DESCRIPTION

2.0.9.3.7.3.- ROPE DRUM BRAKE (OPTIONAL)

2.0.9.3.7.3.1.- ROPE DRUM HYDRAULIC FAILSAFE DISC BRAKE (OPTIONAL)

Figure 2.0.9.3.7.3.1

- Hydraulic fail-safe brakes are spring applied and use hydraulic pressure to hold & open the brake.
- If the brake is turned off or power is lost, the spring engages the brake.
- Hydraulically released brakes are able to achieve very high torque ranges.
- This high torque output is important in safety brake applications, for instance when performing an emergency stop by braking on the output shaft.
- Hydraulic brakes can also be configured in a compact design, making them ideal for use in situations where space is limited.

2.0.9.3.7.3.2.- ROPE DRUM SOLENOID ACTUATION BRAKE (OPTIONAL)

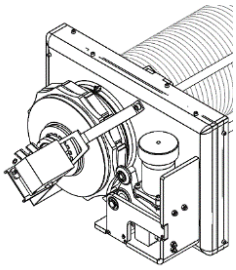


Figure 2.0.9.3.7.3.2

- The rope drum brake is an additional safety device with Mechanical drum brake for protection against drive failures. To obtain the maximum safety, it operates mechanically and applies directly to the rope drum. Drum brake has different configurations. Brake mechanism is factory test and set.

	NOTICE
	• Diagram illustration shown in only for reference may vary with actual. • **For technical details, refer spare parts manual of relevant hoist supply.**

	CAUTION
	• Drum brakes are tested and adjusted by the hoist manufacturer prior to delivery. Only qualifies personnel, authorized by the manufacturer may install, adjust and service the drum brake. • Service and maintenance of the drum brake must be done at regular intervals as recommended by the manufacturer. • The drum brake must always be kept clean. The braking torque reduces strongly if any grease or oil penetrates to the friction surfaces.

2.0.9.3.8.- RADIO REMOTE CONTROL (OPTIONAL)

Figure 2.0.9.3.8

- The Radio Remote Control Pendant is a wireless control device designed for safe and efficient operation of machinery and equipment from a distance.
- This pendant uses radio frequency (RF) signals to communicate with the control system, providing the operator with the flexibility to manage operations without being physically tethered to the equipment.

2.0.9.3.9.- HOIST PLATFORMS (OPTIONAL)

- Hoist platforms are fitted on hoist beam, it is only for inspection of hoist components.
- They are made of non-slip steel plates, suitable for human access only and not for material storage and service.

PRODUCT DESCRIPTION

2.0.9.3.10.- TRAVEL MACHINERY

The travel machinery is specially designed and manufactured for hoist duty.

- All hoists are fitted with single or double speeds.
- All travel actions are activated by means of motors equipped with electromagnetic disc brakes.

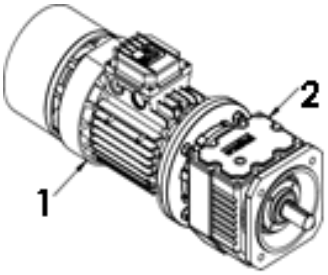


Figure 2.0.9.3.10

1– Motor,

2- Gear box

2.0.9.3.11.- WHEELS

- The wheels are of the double flange type for crab and single flange type for monorail, totally machined.
- Their diameter is such that the maximum load does not go beyond that allowed by the F.E.M. - 1001 rule.
- In crab the drive wheels travel on splined/keyed axles.
- The axles are mounted with taper roller /ball bearings.
- The diameter is selected to the drives such that the allowable limit is well within the maximum load on wheels.
- Travel Wheel and Thrust rocker wheel running surface must be free from weld, Joints and projections.

2.0.9.3.12.- STOPS

- They are made of hard rubber and fitted in both ends of end carriages which will absorb shocks and stand for life.
- These stops are capable enough to take higher load in case of collision or accident.

2.0.10.- 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 or moving people. The hoist is intended for indoor use only. Our hoist is manufactured to work in environmental conditions characterized by: -

1.	Temperature Range	-	-10°C to +45°C
2.	Relative Humidity	-	Less than 80%
3.	Altitude	-	Maximum up to 1000m above sea level
4.	Application	-	Indoor / Protected from Weather
5.	Thermal Insulation Class	-	F-Class
6.	Brake Enclosure	-	IP55
7.	Brake Type	-	Electromagnetic Disc Brake
8.	Electrical Power Supply	-	3-Phase, 415 V +/- 10%, 50Hz +/- 5%, AC Supply
9.	Control Supply	-	24 V, DC Supply

PRODUCT DESCRIPTION

2.0.11.- WIRE ROPE HOIST

2.0.11.1.- LOW HEADROOM MONORAIL-R-SERIES (CLH 03 to CLH 10)

- Machined Steel plates are used for the construction of low headroom monorail wire rope hoist - R-Series.
- The lifting mechanism remains on one side and with the travelling mechanism located on the other side
    1. Hoist clearance locking Nut (Torque 200 Nm)
    2. Steel plates
    3. Low headroom monorail wheels
    4. Cross travel
    5. Thrust Rocker

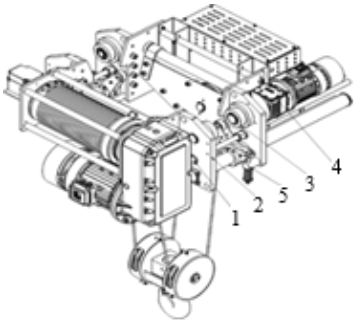


Figure 2.0.11.1

2.0.11.2.- LOW HEADROOM MONORAIL-R-SERIES (CLH 0.5 to CLH 02)

- Machine steel plate with two fall configurations.
- Designed with balanced wheel load.
- Square shaft is direct CT wheel.
    1. Hoist clearance locking Nut (Torque 200 Nm)
    2. Steel plates
    3. Low headroom monorail wheels
    4. Cross travel with external gear drive
    5. Square shaft for direct drive

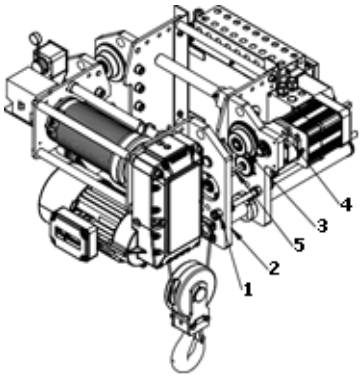


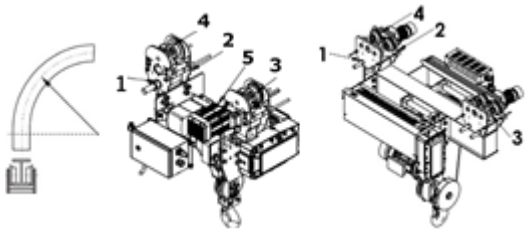
Figure 2.0.11.2

2.0.11.3.- UNDERSLUNG MONORAIL HOIST

- Underslung hoists are widely used for lifting objects on straight and curve section.
- Underslung has an electric drive trolley with open gearing wheels, square shaft is used to transfer the drive.
- The underslung hoist, with a capacity of above 1.5T, includes self-weight plates for balancing the hoist's self-weight. These weight plates are added to ensure stability. They are assembled opposite the rope drum to achieve proper weight distribution.
- The underslung hoists have following variant's:

2.0.11.3.1.- ARTICULATED TROLLEY: CRU-A

- Articulated trolley type wire rope hoist is provided for curved path.
- Trolley is individually able to rotate around the vertical axis.
- Hoist clearance locking Nut (Torque 200 Nm)
    1. Hoist Clamping Screws
    2. Steel plates
    3. Low headroom monorail wheels
    4. Cross travel with external gear drive
    5. Square shaft for direct drive



UPTO 1.5T **ABOVE 1.5T**

Figure 2.0.11.3.1

2.0.11.3.2.- STRAIGHT TROLLEY: CRU-S

- Straight trolley type wire rope hoist is provided for straighter travel path.
- Parts are listed for both articulated and straight trolley.
- Hoist clearance locking Nut (Torque 200 Nm)
    1. Hoist Clamping Screws
    2. Steel plates
    3. CT drive wheel assembly
    4. CT non-drive wheel assembly
    5. Cross travel assembly

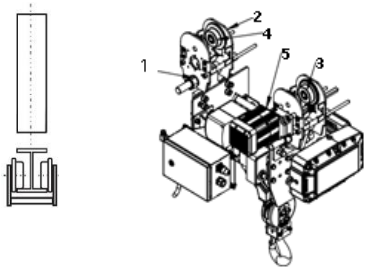


Figure 2.0.11.3.2

PRODUCT DESCRIPTION

2.0.11.3.3.- FIXED HOIST

- Fixed hoist does not have any trolley arrangements and used in applications
- where cross travel movement is not needed.
- Fixed hoist type is mainly used for the lifting and lowering purpose only.
- This mechanism is fixed with trolley by plate structure.
    1. Hoist clamping screws (Refer Torque Table for Tightening)
    2. Steel plates

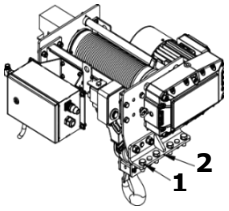


Figure 2.0.11.3.3

2.0.11.4.- LOW HEADROOM CRAB-R-SERIES.

- Crab hoist with standard track gauges of 1250, 1400, 1800, 2240, etc. (in mm) for different lifting heights as recommended by FEM standards.
- The crab hoist is made with two end carriages which are connected by hoist beam.
- The travel motion for trolley is done with the help of cross travel drives
    1. Structure of crab model
    2. Cross travel
    3. Wheel Block

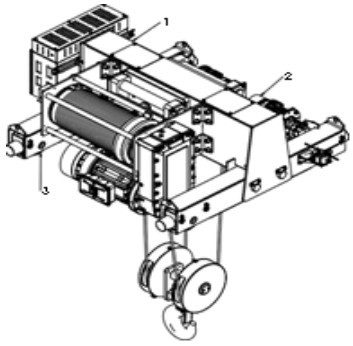


Figure 2.0.11.4

2.0.11.5.- DUAL CRAB DOUBLE GIRDER - TWIN HOOK

- Two independent hoists are mounted in common frame. Control Pendant unit controls two hoists for combined hoist operation or for one hoist operation.
- When using both the hoist with same load, then levelling the load manually is necessary for safety reasons, because the motors and gearboxes are not synchronous. Load capacity to be lifted is determined according to the individual load rated in the hoist.
- When using both the hoist at same time the total load capacity lifted should not exceed the minimum lifting capacity limit in the common frame. E.g.: In 25/10T model the load should not exceed the 10T.
- Failing to follow this instruction and any user adjustment is at their own risk.
    1. Structure of crab model
    2. Wheel Block
    3. Twin Hook
    4. Top Sheave Assembly
    5. Hook Block
- These hoists are ideal for die-flipping operations.

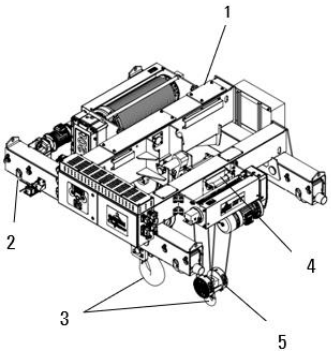


Figure 2.0.11.5

2.0.11.6.- HOT METAL HANDLING - MONORAIL AND CRAB

- Monorail and crab hoists are specifically designed for hot metal handling and foundry applications.
- Always ensure the Hoist and Hook is protected with Heatshield protection.
- it is mandate to provide additional safety protection and redundancy (50% Higher than the rated capacity) in hoist.
    1. Hoist Heat Shield.
    2. Hook Heat Shield
    3. Hook Safety Latch.
    4. Brake Disc

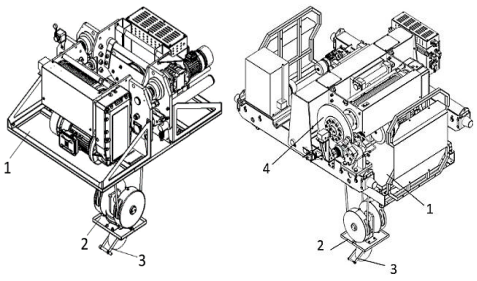


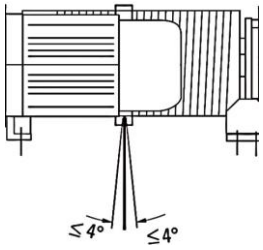
Figure 2.0.11.6

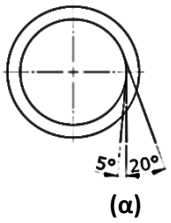
⚠	**DANGER**
	• Using normal hoist (not designed for hot metal) for hot metal lifting is declare as unsafe. • Manufacturer and its associated selling company are not liable in case of accidents. • **Failure to comply with these instructions may result in death or serious injury, property loss.**

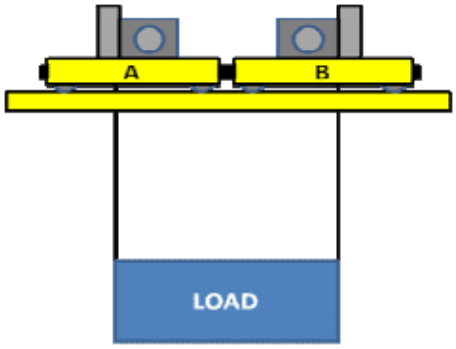
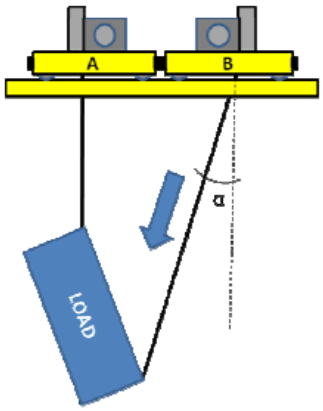
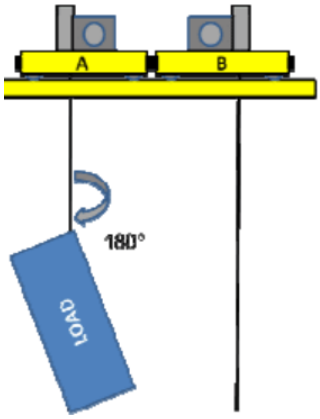
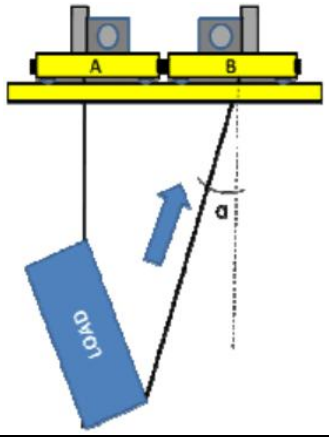
PRODUCT DESCRIPTION

Main and Aux Hoists Load Turning Capabilities

- The maximum permissible rope exit angle is 4° and also the radial rope exit angle (α) is 5° and 20°.





	
The load is suspended by two hooks equally	Hoist B is lowering until the whole load is suspended by the hoist A.
	
Load is turned 180° and around its vertical axis	Hoist B is lifting until load is on horizontal position again

	**WARNING** **Dual crab / Tandem Hoist Applications:** When using both the hoist at same time the total load capacity lifted should not exceed the minimum lifting capacity limit in the common frame. E.g.: In 25/10T model the load should not exceed the 10T. **Failure to comply with these instructions may result in death or serious injury.**

PRODUCT DESCRIPTION

2.0.11.7.- DOUBLE DRUM DOUBLE GIRDER - TRUE LIFT HOIST

- True lift model available on Twin drum-Z and articulated end carriage
- The main beam and end carriages are made with fabricated box, designed and calculated to resist the maximum bending, shearing and torsion forces. Diaphragms plates are positioned on the end carriage and the hoist beam to provide more rigidity in the construction. The end carriages are designed in such a way that the wheels can be replaced easily in case of worn-out.

1. Structure of crab model
2. Wheel Block
3. Hook Block
4. Top Sheave Assembly

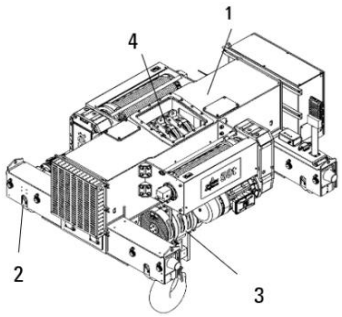


Figure 2.0.11.7

2.0.11.8.- DOUBLE GROOVE DOUBLE GIRDER – TRUE LIFT HOIST

- Compact design thanks to narrow track gauges and wheel base dimensions.
- Uniform distribution of wheel loads to all 4 wheels.
- LH & RH rope guide with zero displacement.

1. Structure of crab model
2. Wheel Block
3. Dual Groove Rope Drum
4. Top Sheave Assembly
5. Hook Block

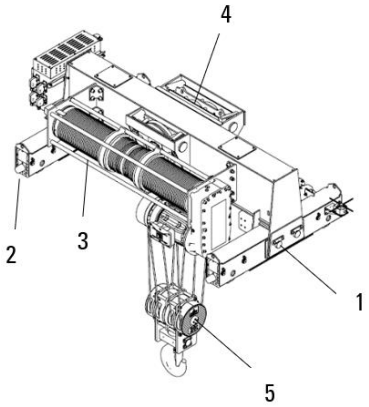
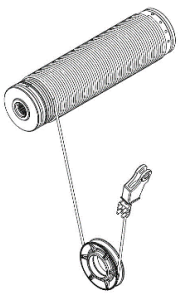


Figure 2.0.11.8

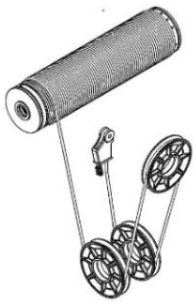
2.0.12.- ROPE REEVING SYSTEM

- 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 rope on the drum and the amount of rope falls. The reeving scheme is shown in the picture.
- Thanks to the drum diameter the moving of the rope guide is short. So, the hook block horizontal displacement is very small. In many cases that allows to use a standard reeving hoist instead of a true vertical hoist. The rope guide ensures that the wire rope winds on the drum correctly and prevents the wire rope from jumping into the wrong groove.

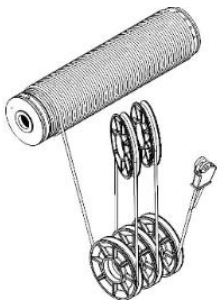
2.0.12.1.- SINGLE GROOVED ROPE DRUM - STANDARD REEVING



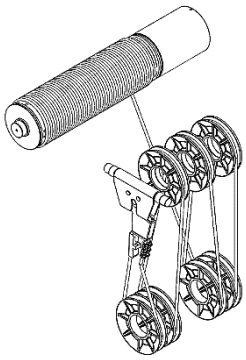
Type 2/1



Type 4/1



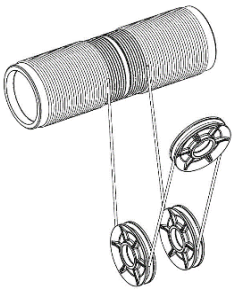
Type 6/1



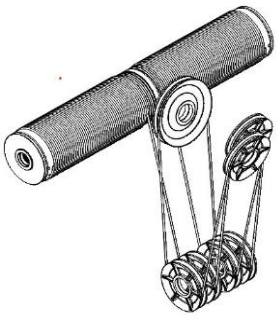
Type 8/1

PRODUCT DESCRIPTION

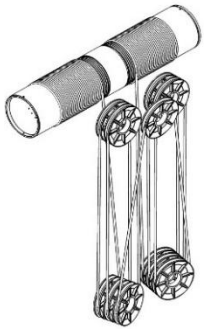
2.0.12.2.- DOUBLE GROOVED ROPE DRUM - REEVING OF TRUE VERTICAL LIFT



Type 4/2

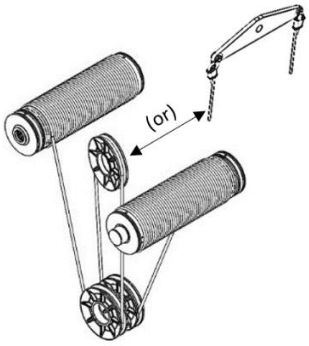


Type 8/2

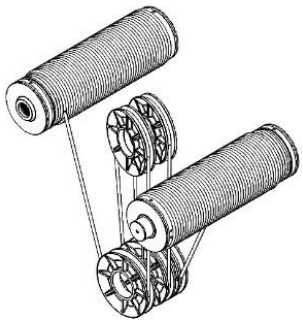


Type 12/2

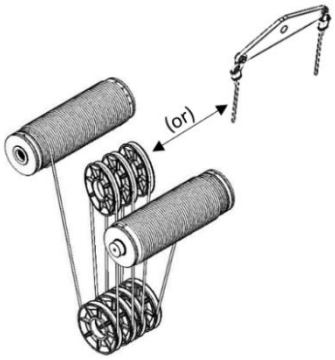
2.0.12.3.- DOUBLE ROPE DRUM –TWIN HOIST-Z (REEVING OF TRUE VERTICAL LIFT)



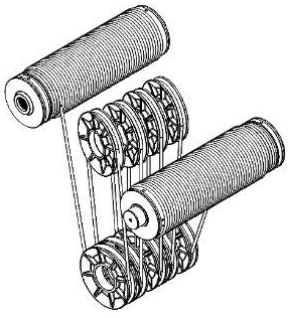
Type 4/2-Z



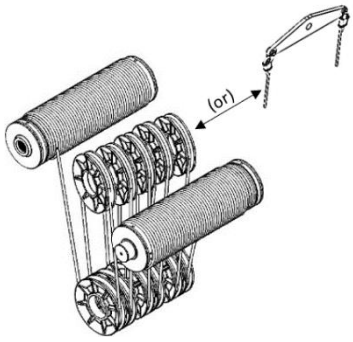
Type 6/2-Z



Type 8/2-Z



Type 10/2-Z



Type 12/2-Z

	NOTICE
	• Top reeving arrangements can be optional, with choices for models are shown typically including endless rope or end rope. • Diagram illustration shown in only for reference may vary with actual. • **For Assembly and disassembly procedure, refer spare parts manual of relevant hoist supply.**

INSTALLATION INSTRUCTIONS

BLANK PAGE

3.- GENERAL INSTRUCTIONS TO INSTALLATION OF THE HOIST

	**WARNING** • Before installation, read instructions in chapter "Safety first".

	**WARNING** • Installation procedure requires special skills and tools to ensure safe and reliable operation of the product. Installation work shall be carried out only by authorized service personnel or an experienced service technician authorized by the product's manufacturer

	**WARNING** Improper assembly can cause material damage or severe injuries. • Ensure that the supporting structure is designed for the maximum hoist load. • Ensure that an experienced person carries out the assembly. • Adhere to the national and local safety and accident prevention regulations, the occupational safety acts and environmental provisions. • Work that cannot be carried out from floor level must always be carried out from lifting platforms. • Use a safety harness when performing any work outside of lifting platforms. • Wear the prescribed personal protective equipment. • Secure the danger zone. • Maintain a sufficient safety distance from the product. • Use only original mounting accessories from the manufacturer. • Tighten the bolted connections to the specified tightening torques (refer Section 3.0.61). • Secure the trolleys during assembly, e.g., with straps, so that they cannot fall.

3.0.1.- PRE-INSTALLATION PROCEDURES

3.0.1.1.- GENERAL INFORMATION

- The wire rope hoist is delivered pre-assembled on a pallet with a wooden frame and is wrapped in cover for extra protection. Our packaging is not watertight and rain proof.
- Wire rope hoist is filled with lubricated oil wherever it comes.

Figure 3.0.1.1

INSTALLATION INSTRUCTIONS

3.0.1.2.- HANDLING

3.0.1.2.1.- TRANSPORTATION

- When moving the hoist or trolley hoist prior to installation, do not remove hoist from crate.
- Always move hoist/trolley hoist utilizing a fork lift, pallet jack or hoist system
- Do Not stack or place anything on top of the trolley hoist or crate.
- Avoid swinging and unbalanced conditions.

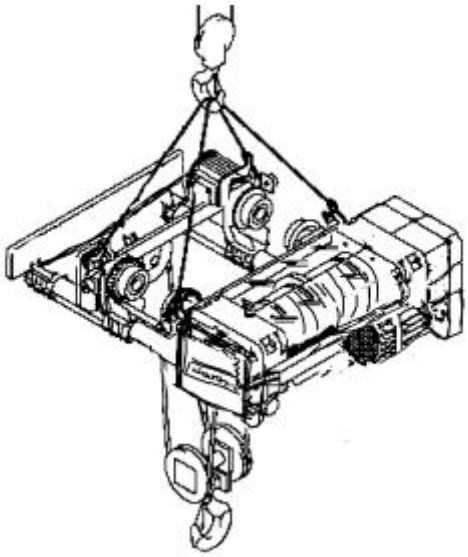


Figure 3.0.1.2.2

3.0.1.2.2.- LIFT POINTS FOR TRANSPORTATION

- When a pallet/crate is not practical, use of hoist lifting location is acceptable.
- This hoist is equipped with lifting lugs to facilitate lifting, while the trolley hoist is equipped with openings in the vertical plates to accept hooks or slings.
- While lifting do NOT support the deck mount hoist or trolley hoist any other way.

3.0.1.3.- ASSEMBLY, ADJUSTMENT AND MOUNTING LOCATION

WARNING

- When installing the trolley hoist on a beam, ALWAYS raise the hoist into position with the trolley assembled together and securely attached to a pallet.
- Raise the trolley hoist with a forklift, lifting platform, or other similar means
- Never use slings to raise and install the trolley hoist onto the beam as Figure 3.0.1.3 (a)
- For monorail Hoist, using a forklift or another suitable means, position the pallet so that the horizontal axis of the beam is parallel to the horizontal axis of the hoist as Figure 3.0.1.3 (b)
- Use lifting cranes to assemble the crab hoist in to main girder as mentioned in Fig 3.0.1.3 (c)

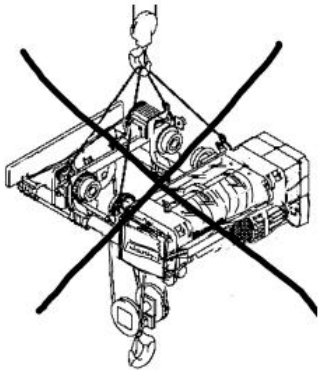


Figure 3.0.1.3 (a)

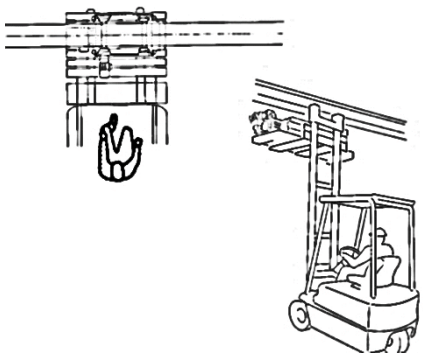


Figure 3.0.1.3 (b)

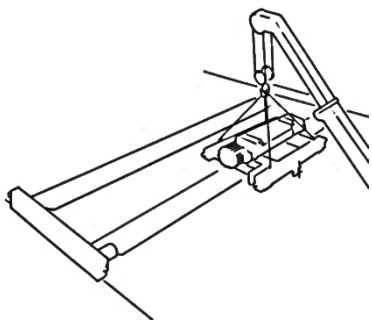


Figure 3.0.1.3 (c)

INSTALLATION INSTRUCTIONS

3.0.2.- TROLLEY RUNWAY INSTRUCTIONS ON THE GIRDER

3.0.2.1.- LOW HEADROOM MONORAIL-R-SERIES [CLH03, CLH05, CLH7.5, CLH10 & CLH16 WIRE ROPE HOISTS]

3.0.2.1.1.- INSTALLATION ON THE GIRDER

- Unscrew self-lock nut (1) by loosening the hex flange nut (2) which is on screw rod (3) of the travel motor side wheel trolley legs (5), along with split coupling assembly (9).
- Lift and place the drum side wheel trolley legs (4) on the girder flange and slide the travel motor side wheel trolley legs (5) towards the girder (6). Adjust dimension (D) proportionate to flange width (B).
- Ensure the distance between the Beam and Wheel is f/2 (1~2) mm max per side and tight the hex flange nuts (2) (Tightening Torque 210 Nm) (1) and self-lock nut (2).
- Tighten the split coupling assembly (9) with screws to restrict the hoist sliding motion and mark the screws with permanent paint.
- Value(E) depends upon the hoist beam width (B).
- Reverse the process to uninstall the hoist.

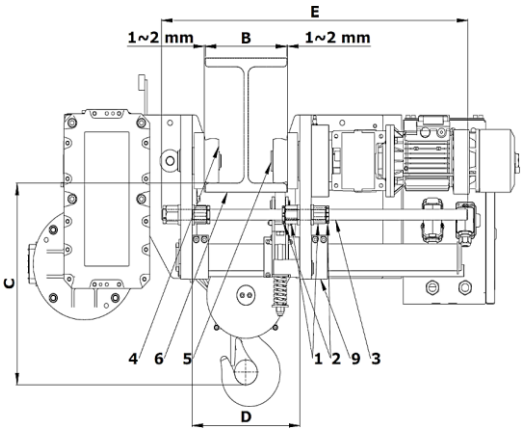


Figure 3.0.2.1

	**WARNING** • Do the flange width adjustment setting, once we place the hoist on the wooden pallet. • Changing the dimensions of flange width while lifting the hoist with hooks or hoist on fork lift pallet are not permitted.

3.0.2.1.2.- FINAL SETTING OF THE THRUST ROCKER

- After adjusting the trolley, press thrust rocker (6) against the bottom flange of the girder by means of tensioning screw (7). Tension the spring on thrust rocker (8) until the travel wheel is in contact with the girder flange. Thrust rocker running surface free from extended suspension clamp plates butt straps, bolt & screw heads etc. Wheel running surface to be free from oil, grease and dirt, which cause the wheel skid. Spring compression is done after thrust rocker contacts with the girder flange, then the Ny lock nut tights against the spring with respect to the corresponding models.

Capacity	3T	5T	7.5T	10T	15T	16T
Spring Compression (mm)	-9	-8	-12	-12	-13	-15

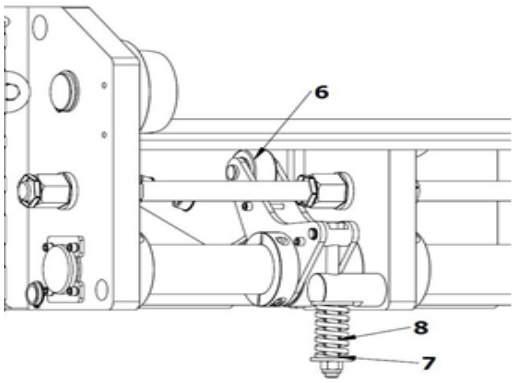
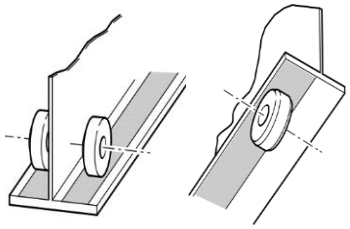


Figure 3.0.2.1.2

	**WARNING** • The running surfaces of rails or track beams must only be painted in the area of the wheels with a prime coat of 40 µ. • Rails and track beams should be kept clean; oil, grease, ice and dirt on the running surfaces will cause travel wheels to skid. • Don't re-use the NY lock nut ***Hatched running surfaces with prime coat only.*** 

INSTALLATION INSTRUCTIONS

3.0.2.2.- LOW HEADROOM MONORAIL-R-SERIES WITH CLH0.5, CLH01, CLH02 WIRE ROPE HOISTS

3.0.2.2.1.- INSTALLATION ON THE GIRDER

- Unscrew hex collar nuts (1) by loosening the hex self-lock nut (2) which is on screw rod (3), along with split coupling socket head screws (8).
- Adjust dimension (D) proportionate to flange width (B).
- Lock the motion with nuts using torque spanner (Tightening Torque 210 Nm). Ensure the distance between the Beam and Wheel is 1~2 mm max per side.
- Grease the geared wheel with multipurpose grease-NLGI-3.

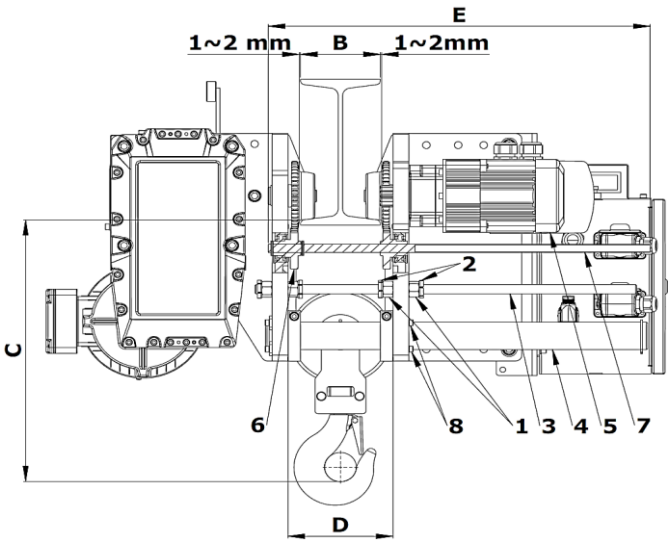


Figure 3.0.2.2.1

3.0.2.2.2.- INSTALLATION OF DRIVE SHAFT

- Different length of drive shafts for cross travel movement is available. This will be selected according to the flange width of the hoist beam (B). The drive shaft should be inserted in to the transfer gears from drive side. Coupling (6) is used to connect the CT motor (5) & drive shaft (7).
- After assembling, the hoist & trolley is checked for cross travel without load. The alignment and noise are tested to check the function of hoist.
- Value(E) depends upon the hoist beam width (B).
- After adjusting the value (D), Tighten the split coupling assembly with screws (8) (Refer Tightening Torque section 3.0.6.1 Table) to restrict the hoist sliding motion and mark the screws with permanent paint.
- Reverse the process to uninstall the hoist.

	**WARNING** • If the setting is established with the incorrect nuts, there is a risk of the load toppling. • Only perform setting work with the nuts (1) and (2)

	**NOTICE** **Danger of material damage** Modification of the flange width (on-site) can result in a change to the counterweight being necessary, in order to avoid the trolley tipping. • Have this checked by the manufacturer.

INSTALLATION INSTRUCTIONS

3.0.2.3.- SETTING OF "C" DIMENSION HEADROOM FOR RELEVENT BEAM WIDTH

- In the low headroom hoist 'C' dimension (Headroom) depends upon the hoist beam width (B).
- Hoist is supplied with the flange width as requested, with corresponding rope length.
- In case the flange width increases or decrease the rope length to be change accordingly and also ensure the rotary limit switch setting refer section 4.0.2.4.
- If the 'C' dimension is not as per the recommended, kindly ensure the flange width & the rope length as in table 3.0.2.4.

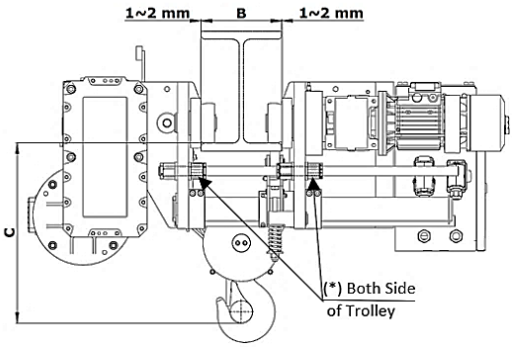


Figure 3.0.2.3(a)

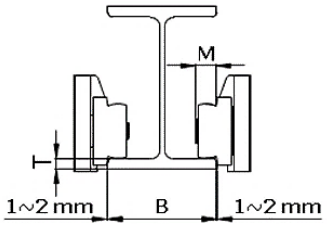


Figure 3.0.2.3 (b)

Hoist Model	Wheel Diameter (mm)	f/2 (mm)	B (mm)	M (mm)	T (mm)	(*) Tightening Torque (Nm) for Trolley setting Hex collar Flange Nut
CRU0.5, CRU01 & CRU02	82	1~2	100 to 320	24	32	210
CLH0.5, CLH01 & CLH02	82	1~2	100 to 500	24	32	210
CLH03 & CLH05	100	1~2	100 to 500	32	32	210
CLH7.5, CLH10 & CLH15	140	1~2	140 to 600	44.5	32	210
CLH15 & CLH 16	200	1~2	140 to 600	44.5	32	210

Table 3.0.2.3 (a)

Shortening the wire rope: -

- The rope must neither be shortened on or separated from the aluminum end sleeve nor the twisted rope end If in exceptional cases, it is necessary to shorten the wire rope, this must be done in compliance with engineering standard.
- Check the difference in the rope length for the corresponding beam width. If the rope length is excess, then trim and crimp the rope from the rope end tie side, for dismantling refer section 5.0.5.1.
- Cut excessive rope length and crimp the wire rope end with sleeve. After crimping assemble the rope to the rope anchorage as below.

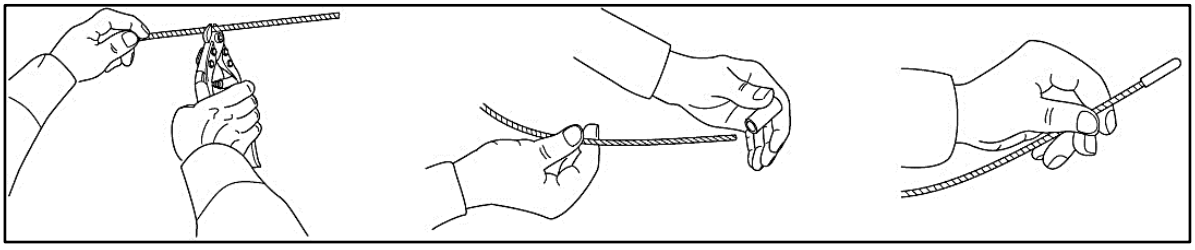


Figure 3.0.2.3 (c)

INSTALLATION INSTRUCTIONS

	CAUTION
	• If the intention is to cut or shorten a wire rope, the wire ropes must always be tied up next to the cut points to prevent the rope ends jumping out or a change to the rope and strand length. This is particularly important when cutting rotation resistant ropes where the strands may have been deliberately non-preformed as part of the manufacturing specification. • Each side of the cut must be tied up with steel wire. Insulating tape and adhesive tape do not prevent effective structural changes

	CAUTION
	Cutting hazard • When rolling out the wire rope, there is the danger of cutting fingers/hands on sharp edges of the wire rope. • Always wear protective gloves when working with the wire rope

	WARNING
	• Improper crimping of wire rope leads to rope slipping

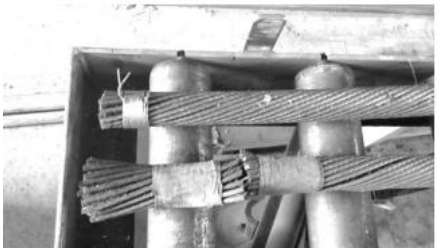


Figure 3.0.2.3 (c)

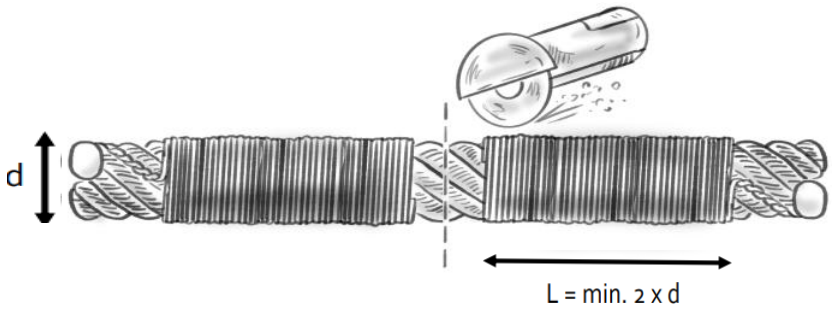


Figure 3.0.2.3 (d)

Seizing of wire rope: -

- If wire rope is required to be cut, it shall be seized before cutting.
- Seizing is warping of soft iron wire around a wire rope to prevent its wires from "flying apart" when the wire rope is cut between two adjacent seizing.
- Proper seizing's must be applied on both sides of the place where the cut is to be made.
- Two or more seizing are required on each side. Either of the following seizing methods is acceptable.

INSTALLATION INSTRUCTIONS

Method No. 1 is usually used on wire ropes over one inch in diameter.

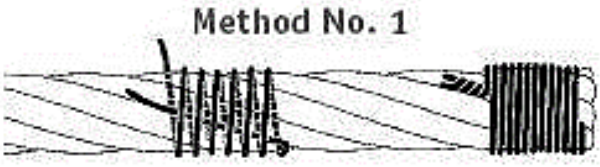


Figure 3.0.2.3 (e)

- For Method No. 1, place one end of the seizing wire in the valley between two strands.
- Then turn its long end at right angles to the rope and closely and tightly wind the wire back over itself and the rope until the proper length of seizing has been applied.
- Twist the two ends of the wire together to complete seizing.

Method No. 2 is applied to ropes one inch and under.

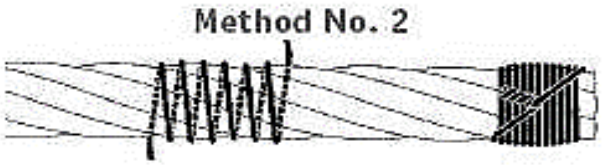


Figure 3.0.2.3 (f)

- For Method No. 2, wind the wire on the rope until the proper length of seizing has been applied.
- Twist the two ends of the seizing wire together to complete seizing.

The length of seizing and the diameters of the wires used for seizing depend on the wire rope diameter. Length of seizing shall be greater than two times the rope diameter. Suggested seizing wire diameters are as under

Wire Rope Diameter in mm	Suggested Seizing Wire Diameter in mm
3 to 8	0.8
9 to 15	1.2
16 to 24	1.5
25 to 33	2.0
34 to 43	2.5
44 and larger	3.0

Table 3.0.2.3 (b)

- After cutting the rope it is a good practice to braze rope ends to ensure that they don't unravel.
- Leave the seizing on the rope for added holding strength.
- As cutting a rope with a torch may result in uneven ends, it may be cut by wire rope cutter (in case of small size ropes) or by grinding.

INSTALLATION INSTRUCTIONS

Steps to assemble the rope onto the rope anchorage: -

- Run the crimped rope up though the rope anchorage.
- Bring the rope dead end back down through the top of the anchorage. Leave a loop of rope just large enough to insert the rope wedge.
- Insert the rope wedge into the loop.
- Pull down the dead end of the wire rope to seat the rope wedge.
- Install two or three wire rope lock clamps as recommended in the product (Also Refer clamp quantity in spare parts manual) to hold the dead end in place.
- For detailed assembling the wire rope refer sections 5.0.5.1.

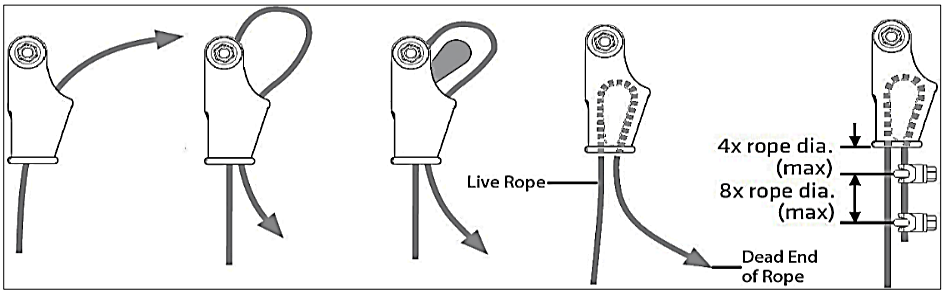


Figure 3.0.2.3 (g)

3.0.2.4.-HOIST BEAM WIDTH AND FLANGE THICKNESS

- Before installation of the hoist, kindly check the beam width (B), flange thickness (T) & wheel seating area (M) of the model.
- The hoist beam width of the installing hoist should within the limit per mentioned in table 3.0.2.4.
- The wheel seating area should be cleaned and the seated area (M) must be available for the free movement of the wheel.
- The hoist beam flange thickness (T) for the models should not exceed the values provided in the table

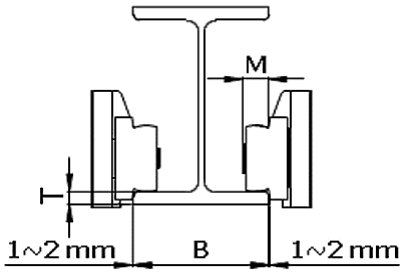


Figure 3.0.2.4

	**WARNING** • Make sure the hoist is secured and suitable for the loads to be supported. • Make sure the dimensions are compatible with the trolley which is to be installed.

Model	Flange Width (B) (mm)	D≤200	200>D≤300	300>D≤400	400>D≤500	500>D≤600
CLH0.5 CLH 01 CLH 02 Reeving - 2/1	Headroom (C) (mm)	450	550	650	750	850
	6 m	16.4 m	16.6 m	16.8 m	17.0 m	17.2 m
	9 m	21.8 m	22.0 m	22.2 m	22.4 m	22.6 m
	12 m	27.6 m	27.8 m	28.0 m	28.2 m	28.4 m
	18 m	38.7 m	38.9 m	39.1 m	39.3 m	39.5 m
	24 m	50.8 m	51.0 m	51.2 m	51.4 m	51.6 m

INSTALLATION INSTRUCTIONS

Model	Flange Width (B) (mm)	D≤200	200>D≤300	300>D≤400	400>D≤500	500>D≤600
CLH 03 Reeving - 4/1	**Headroom (C) (mm)**	**450**	**550**	**650**	**750**	**850**
	6 m	28.9 m	29.3 m	29.7 m	30.1 m	30.5
	9 m	40.0 m	40.4 m	40.8 m	41.2 m	41.6
	12 m	52.0 m	52.4 m	52.8 m	53.2 m	53.6
CLH 05 2.5 02 (2.5T-2Fall)	**Headroom (C) (mm)**	**750**	**850**	**950**	**1050**	**1050**
	12 m	28.7 m	28.9 m	29.1 m	29.3 m	29.5 m
	18 m	41.3 m	41.5 m	41.7 m	41.9 m	42.1 m
	24 m	53.9 m	54.1 m	54.3 m	54.5 m	54.7 m
CLH 05 Reeving - 4/1	**Headroom (C) (mm)**	**500.0**	**600.0**	**700.0**	**800.0**	**900.0**
	6 m	29.8 m	30.2 m	30.6 m	31.0 m	31.4 m
	9 m	42.4 m	42.8 m	43.2 m	43.6 m	44.0 m
	12 m	55.0 m	55.4 m	55.8 m	56.2 m	56.6 m
CLH 10 05 02 (5T-2Fall)	**Headroom (C) (mm)**	**900**	**1000**	**1100**	**1200**	**1300**
	12 m	30.4 m	30.6 m	30.8 m	31.0 m	31.2 m
	18 m	42.5 m	42.7 m	42.9 m	43.1 m	43.3 m
	24 m	54.5 m	54.7 m	54.9 m	55.1 m	55.3 m
CLH7.5 CLH 10	**Headroom (C) (mm)**	**700**	**800**	**900**	**1000**	**1100**
	6 m	32.1 m	32.5 m	32.9 m	33.3 m	33.7 m
	9 m	44.2 m	44.6 m	45.0 m	45.4 m	45.8 m
	12 m	56.2 m	56.6 m	57.0 m	57.4 m	57.8
CLH 10	**Headroom (C) (mm)**	**850**	**950**	**1050**	**1150**	**1250**
	18 m	81.5 m	81.9 m	82.3 m	82.7 m	83.1 m
CLH 10 15 06 (15T-6Fall)	**Headroom (C) (mm)**	**1300**	**1400**	**1500**	**1600**	**1700**
	6 m	47.0 m	47.6 m	48.2 m	48.8 m	49.4 m
	8 m	59.1 m	59.7 m	60.3 m	60.9 m	61.5 m
	12 m	84.0 m	84.6 m	85.2 m	85.8 m	86.4 m

Table 3.0.2.4

NOTICE

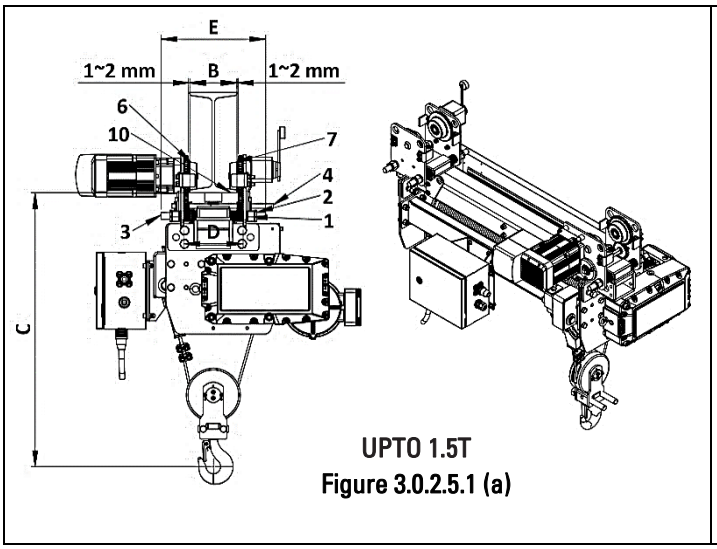
- The tabulated values are general technical details. For specific information, refer to the spare parts manual of the relevant hoist supply.

INSTALLATION INSTRUCTIONS

3.0.2.5.- UNDERSLUNG MONORAIL HOIST

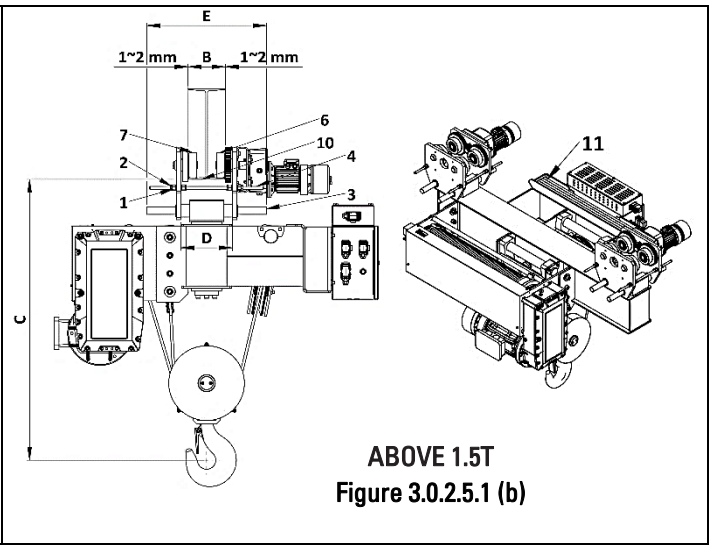
3.0.2.5.1.- INSTALLATION OF ARTICULATED & STRAIGHT TROLLEY HOISTS

- Installation method of the hoist CT trolley is common for both articulated and straight versions.
- Unscrew hex collar nuts (1) by loosening the hex self-lock nut (2) which is on CT support shaft (3).
- Place the CT geared drive wheel side trolley legs (6) on the girder flange and slide the CT geared driven wheel side trolley legs (7) towards the girder (10).
- Adjust dimension (D) proportionate to flange width (B) with the 2 mm washers (8) and 4 mm washers (9) provided.
- The provided washers are to be arranged symmetrically on both sides of the trolley based on the beam width (B).
- The arrangements of the washers are shown in the figure 3.0.2.5.1 (b) for both CT drive wheel trolley assembly and CT non-drive wheel trolley assembly.
- For certain beam width (B) washers are placed outside the plate because of the butting of CT support shaft (3).
- Value(E) depends upon the hoist beam width (B).
- Ensure the gap between the beam and the wheel flange is 1~2 mm max per side and lock the flange nut with torque spanner. (Tightening Torque 210 Nm)
- The underslung hoist, with a capacity of above 1.5T, includes weight plates (11) for balancing the hoist's self-weight. These weight (11) plates are added to ensure stability. They are assembled opposite the rope drum to achieve proper weight distribution.



UPTO 1.5T

Figure 3.0.2.5.1 (a)



ABOVE 1.5T

Figure 3.0.2.5.1 (b)

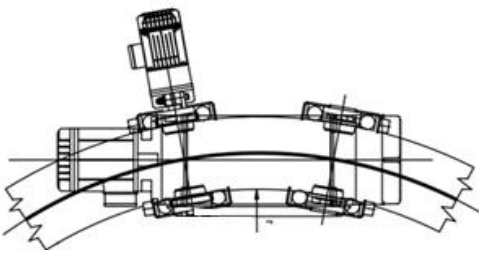


Figure 3.0.2.5.1 (D)

r, curve radius details see technical catalogue

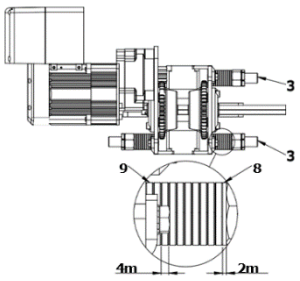


Figure 3.0.2.5.1 (C)

NOTICE

- Diagram illustration shown in only for reference may vary with actual.
- **For Assembly and disassembly procedure, refer spare parts manual of relevant hoist supply.**

INSTALLATION INSTRUCTIONS

3.0.2.5.2.- INSTALLATION OF FIXED HOIST

- Check the fixing holes in the site location where no distortion arises from unevenness, etc.
- Match the fixing holes in the mounting plates.
- Insert the pin on the mounting plate for locating purpose and then fasten with the fixing screws. Refer table 3.0.6.1 for tightening torque
- The customer's substructure must take up the torque from the rope drum. It must therefore be torsion resistant.
- Ensure the mounting structure strength for the rated load.

Lift (m)	Centre Distance (mm)
6	510
9	605
12	700
18	890
24	1080

TABLE 3.0.2.5.2

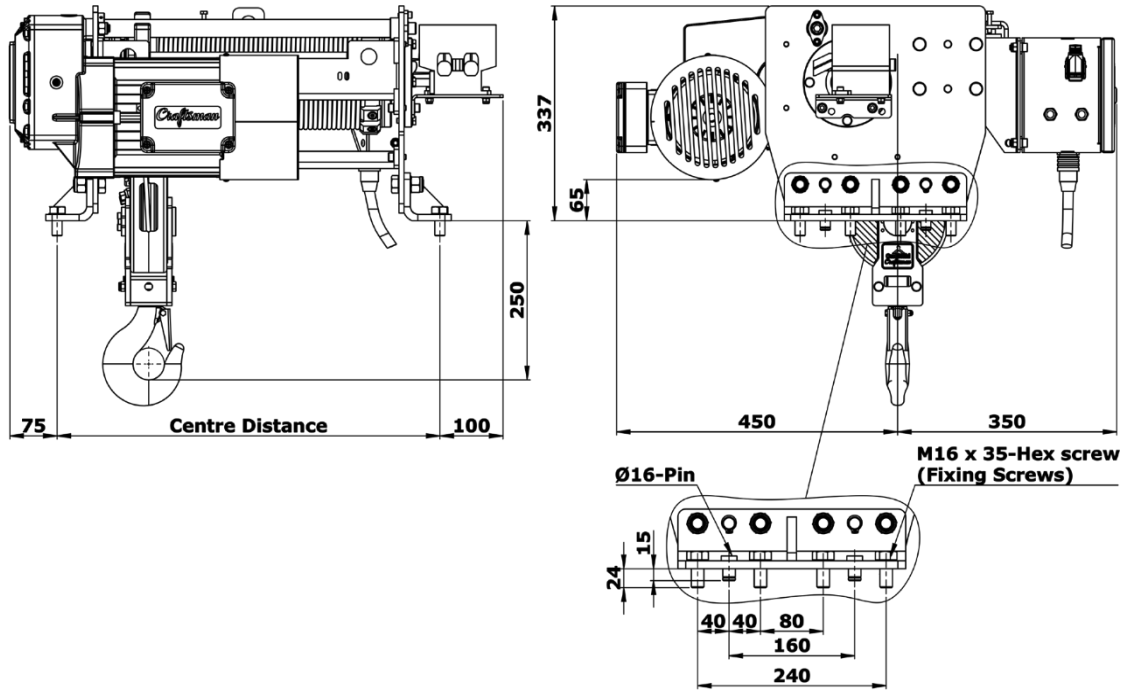


Figure 3.0.2.5.2

	DANGER
	Do not use this hoist for guided application. Hook displacement varies with respect to the hook up and down movement

INSTALLATION INSTRUCTIONS

3.0.2.6.- DOUBLE GIRDER AND ITS INSTALLATION

1. Pin of articulation
2. Trolley wheels
3. Cross travel mechanisms
4. End carriage

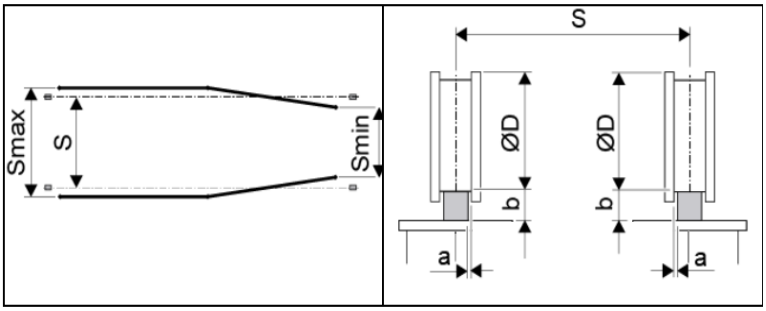


Figure 3.0.2.6 (a)

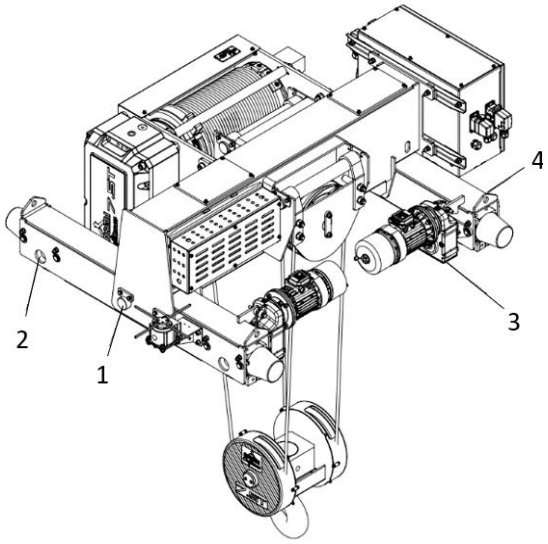


Figure 3.0.2.6 (b)

- Check track gauge on crab and rail
- S max – S min = 5mm
- Considering the height of lift and capacity of hoist, the travel gauge distance is already set in the crab hoist.
- The clearance between the wheel flanges and the runway track are minimum 5 mm per side according to the diameter of the wheel. The power cables should be connected to the hoist according to the circuit diagram.
- The cross-travel movements of crab hoist are regulated by proper positioning of end limit switches.
- The over travel limit switches are set according to the lift height required in the operation.
- After installation the hoisting function & cross travel functions, are tested without load. In case of any strange noise service team will check the hoist completely during this test.
- A well installed bridge runway within the tolerances should guarantees a correct travelling of the crab. Considerably increase the life of the travel mechanisms and their wearing parts.
- Before starting up a new installation check the tolerances of the assembly of the runways, these should be within the Values shown in the table 3.0.3
    - The runway rails must be free of grease, oil, paint or other impurities
    - At the ends of the runway, stopper with rubber buffers of adequate resistance should be fitted.

The failure to fulfil the instructions concerning the assembly of the hoist's rolling path could have the following consequences:

- Rapid wearing of the wheel flanges, excessive heating and deterioration of the bearings, deformities in the metallic structure, breaking of the welding beads and de railings.

	NOTICE
	• The trolley must run smoothly over the whole runway without jamming or increased friction at the wheel flanges. Increased friction at the flanges due to poor beam quality or incorrect trolley adjustment may lead to increased wear. • Ensure that the trolley runs smoothly without increased friction at the wheel flanges.

INSTALLATION INSTRUCTIONS

3.0.3.- TOLERANCES OF THE OVERHEAD TRAVELLING CRANE RUNWAYS

The tolerances shown in this chapter apply to a runway of the lifting equipment when it is new. If during the course of its use these tolerances are surpassed by 20%, the rail should be righted. If behavior during travelling is noticeably affected, it may be necessary to right the rail, even though the tolerated 20% has not been surpassed.

Tolerances of runways (for bi-rail crabs) according to F.E.M.1.001-1998.10.01 (BOOK LET 8)

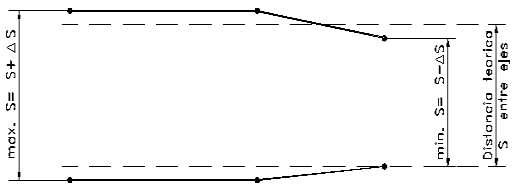
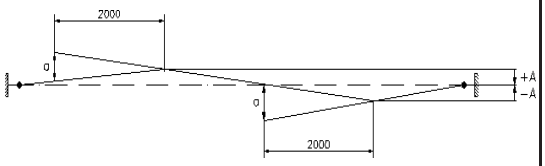
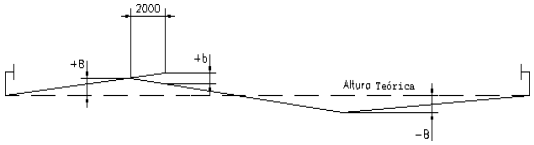
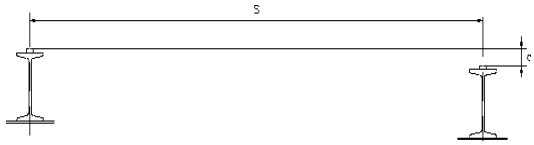
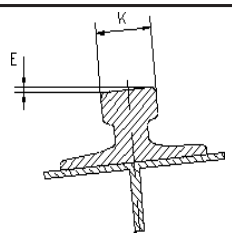
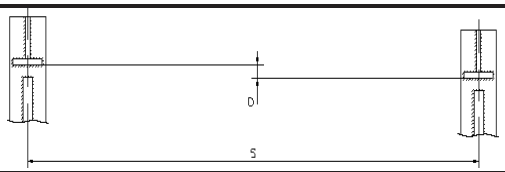
Span = S (Parallelism)		S = ±3 mm
Aligning of rail on the flat		A = ± 10 mm In a maximum rail length of 2,0 m., the following tolerance should not be exceeded: a = ± 1,0 mm
Height difference of a rail (length unevenness)		B = ± 10 mm In a maximum rail length of 2,0 m., the following tolerance should not be exceeded: b = ± 2 mm
Height difference between the two rails (cross unevenness)		C = 0.15 % of S max. = 10 mm
Unevenness of the railhead		Lengthways : E < 0,3 % Crosswise : E < 0,3 %
Difference between the stops over the horizontal plane		D = ± 0,7 ‰ of S max. = 20 mm

Table 3.0.3

INSTALLATION INSTRUCTIONS

3.0.4.- ELECTRICAL EQUIPMENT

DANGER

Electric shock hazard

- Make sure an electrical qualified person performs the work.
- Observe the relevant safety and accident prevention regulations.

Electrical equipment was installed as per National, State, and Local regulations.

- It comprises all electrical equipment of the hoist:
- Energy supply (main isolator, conductor lines…)
- Energy distribution (transformers, hoist disconnect switch, special circuits…)
- Operator interface and control devices mounted on the hoist (control pendant, radio transmitter, devices for emergency stop, limit switches…)
- Hoist control (electronic control devices, safety devices, radio receiver…)
- Drive, motor controls (power contactors, inverters…)
- Main drives (motors, brakes…)
- Auxiliary drives, sensors, load suspension equipment, actuators…)

3.0.4.1.- HOIST INPUT PANEL

- For the electrical input of the hoist, it is advisable to be equipped with an electrical distribution panel which contains the following elements:
  - **Linkable switch,** appropriate for the power installed in the hoist, which shuts off the electrical input of the Hoist in case of necessity.
  - **Fuses**, for protection from overloads that may occur. Choice will be based on the power installed in the hoist.

3.0.4.2.- SERVICE WIRES

- The selection of cable for the service wires will depend on:
  The supply voltage.
  The power installed in the Hoist.
  The distance from the service point, to the line input.
- It must also guarantee a thermic and mechanical protection at the same time as against external agents that could damage the input cable.
- The service wires should guarantee a voltage value within the margin of ± 5 % of the nominal voltage value when running in the terminals of the hoist.

3.0.4.3.- EARTHING

- All the metallic masses (motors, limit switches, electrical cabinet, etc.) should be linked electrically to each other and the earthling system by means of an appropriate section conductor, which can be naked or have yellow and green isolation.
- If in doubt, we recommend following instructions of the rules of low voltage or the advice of an electrical technician on what steps to take for correct earthing.

3.0.4.4.- RECEPTION TESTS

- This test needs to be carried out on reception of wire rope hoist, to check the specifications to which they should respond.

INSTALLATION INSTRUCTIONS

3.0.4.5.- TEST CONDITIONS

- Input electrical voltage
- The maximum permitted tolerance of the nominal electrical input voltage of the apparatus is ± 10 %.
- The runways should be adjusted to the tolerances specified in the rule according to **F.E.M.1.001-1998.10.01 (BOOK LET 8).**

3.0.4.6.- PROTECTION OF EQUIPMENT

- Protective devices include:
    - Devices for overcurrent protection (fuses, circuit breakers)
    - Motor protection devices
    - Overload safety devices
    - Temperature monitors
    - Limit switches
- The protective devices in the electrical equipment installed in the scope of supply must in no case be removed, replaced by different devices or bridged.
- If a protective device has reacted, the hoist must not be put back in service until the cause has been determined and eliminated with the assistance of a qualified person.
- Overcurrent protection devices
- Every hoist must have devices for disconnecting and switching the power supply.

3.0.4.7.- EMERGENCY STOP

It must be possible to disconnect the system electrically from the operating position. This function can be provided by:

- Emergency stop button in the control pendant in conjunction with the hoist switch contactor
- Main isolator.

3.0.4.8.- RUNWAY CONDUCTOR DISCONNECTING MEANS

- must disconnect the wire rope hoist on all poles,
- must be lockable in OFF position,
- must be installed in an easily accessible place in the system,
- must be marked as such to avoid mistakes.

3.0.4.9.- DISCONNECT SWITCH

Required for one or more hoists,

- must be lockable in OFF position.

3.0.4.10.- PROTECTIVE CONDUCTOR

	WARNING
	• With a missing protective conductor, an electric shock hazard exists. Material damage, severe injuries or death can result. • Connect the external protective earth system (PE) close to the terminals of the phase conductor using a protective conductor for each mains connection.

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

INSTALLATION INSTRUCTIONS

3.0.4.11.- CONNECTION FUSES

- Over current protection devices.
- The fuse values must be observed so that the hoist switch contacts do not weld if there is a short circuit and overload protection of lead is ensured.

3.0.4.12.- OVERLOAD DEVICE

- The wire rope Hoist is supplied with an overload protection

Description of system

- The overload safety device is a device which automatically prevents the hoist moving loads exceeding its safe working load during normal operation, considering the dynamic effects.
- This is achieved by measuring the force transmitted with the aid of a sensor and cutting the energy supply to the hoist drive and brake (stopping the hoist motion) (indirect-acting overload protection).
- The overload safety device is set to maximum working load +5 % to +10%.
- Different types of overload protection device are used in our wire rope hoist as below and its brief details mentioned in see section 2.0.9.3.7.
    - Mechanical Overload protector (Optional)
    - Electrical Load Protector – VFD
    - Electronic Load protector – Rope Tension cell (Optional)
    - Electronic Load Protector – Load Measuring Pin (Optional)

Overload safety device by others

	NOTICE
	When an overload safety device and thus the placement of the load sensors to measure the rope, forces are designed by others, all requirements relating to rope reeving, fleet angle and angle of installation of the hoist must be observed.

- The declaration of conformity/declaration of incorporation applicable only to the manufacturer's scope of delivery.
- The overload safety device cannot be set by the manufacturer if it is provided by others.

3.0.4.13.- CONNECTING TO MAINS

	WARNING
	Safety hazard. • If this procedure is not observed, serious accidents or damage to the hoist may occur

- Compare existing mains voltage and frequency with the information on the rating plate.
- Route cables into the hoist connection box through the cable glands.
- Connect according to the circuit diagrams supplied.
- Measure control voltage. If the measured value exceeds the rated control voltage by more than 10%, a different tapping point must be selected on the primary side of the control transformer.
- Do not connect any live lead to the temperature sensors! Damaged temperature sensors cannot protect the motor.

INSTALLATION INSTRUCTIONS

	WARNING
	On three phase hoists, it is possible to have “Reverse Phasing” causing the block to lower when the "UP" button is depressed. When this condition exists, the hoist operation will be dangerous

- Check that the direction of rotation of the rope drum corresponds to the symbols on the control pendant: Activate “slow up” button on control pendant. Never activate “down” button first! If the hook moves upwards or does not move because the hoist limit switch has disconnected in top hook position, the phase connection is correct.
- Crosscheck by activating “slow down” button on control pendant.
- If the movement of the hook does not correspond to the symbols on the control pendant, interchange two phase conductors of the supply cable.

3.0.4.14.- ELECTRIC MOTOR AND RELATED EQUIPMENT

Refer wire rope hoist electrical manual for following details

- Hoist and Travel motor specifications for all wire rope hoist models.
- Electrical Safety instructions
- Installation Instructions
- Operational Instructions
- Periodic Inspections
- Incidents & Repairs

3.0.4.15.- DIRECTION OF MOTOR STATION

- It is vitally important when applying power to the hoisting motor for the first time after installation, that correct direction of rotation is obtained from the motor.

3.0.4.16.- UP/DOWN LIMIT SWITCH

3.0.4.16.1.- ROTARY LIMIT SWITCH EQUIPMENT

- Check that the over travel end switch position, where the hook is on the high and low extreme positions. We have two set of limit switches. If one does not occur, then regulation of the end switch must take place, in such a way the second set of limit switch should be arranged in the equipment and its brief details mentioned in see section 4.0.2.4

3.0.4.16.2.- BLOCK OPERATING / GRAVITY LIMIT SWITCH EQUIPMENT [OPTIONAL]

- In addition to the geared limit switch, there is also a block operated upper limit switch (BLS) installed on the hoist. The BLS switch opens when the hook block lifts a weight and releases the tension from the cable that holds the switch in the closed position. The BLS is adjusted so that the rotary limit switch position activates first and the BLS second as backup safety and its brief details mentioned in see section 4.0.2.4

3.0.4.17.- PUSH BUTTON STATION

- Push Button Switch Set has a lock type emergency stop button and operation push button switches.
- Check that the push button station is not mechanically damaged. Check the fixing of the cable and supporting wires. Test the operation of emergency stops.
- Finally, check the direction of motor rotation.

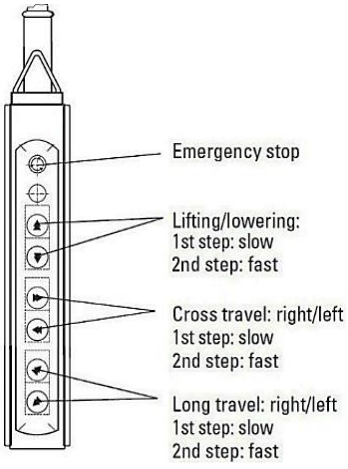


Figure 3.0.4.17

INSTALLATION INSTRUCTIONS

3.0.5.- ELECTRICAL INSTALLATION.

3.0.5.1.- ELECTRICAL INSTALLATION PRECAUTION

- Before installing of electric rope hoist, please Read the user manual electric circuit diagram & all safety instruction carefully. To install the electric rope hoist, install the protective electrical items as mentioned in the user manual.
- All the parts like beam, pillar & angles should be grounded properly to a separate earthing.
- The electric rope hoist power cable selection should be used as per electrical circuit diagram. (X1 *).
- The electric rope hoist ON/OFF disconnector switch should be used as per electrical circuit diagram (Q1).
- The electric rope hoist MCB/MPCB must be selected & installed as given in the electrical circuit diagram. (P1 *)
- Plug and play connector should be used between the hoist and disconnector switch MCB/(MPCB) as per block diagram (C1*).
- The Input power supply cable of electric rope hoist should be routed freely & without any disturbance/damage during cross travel.
- The phase sequence polarity of Input power supply cable must be connected as per circuit as per local standard (R, Y, B/R, S, T/1, 2, 3).

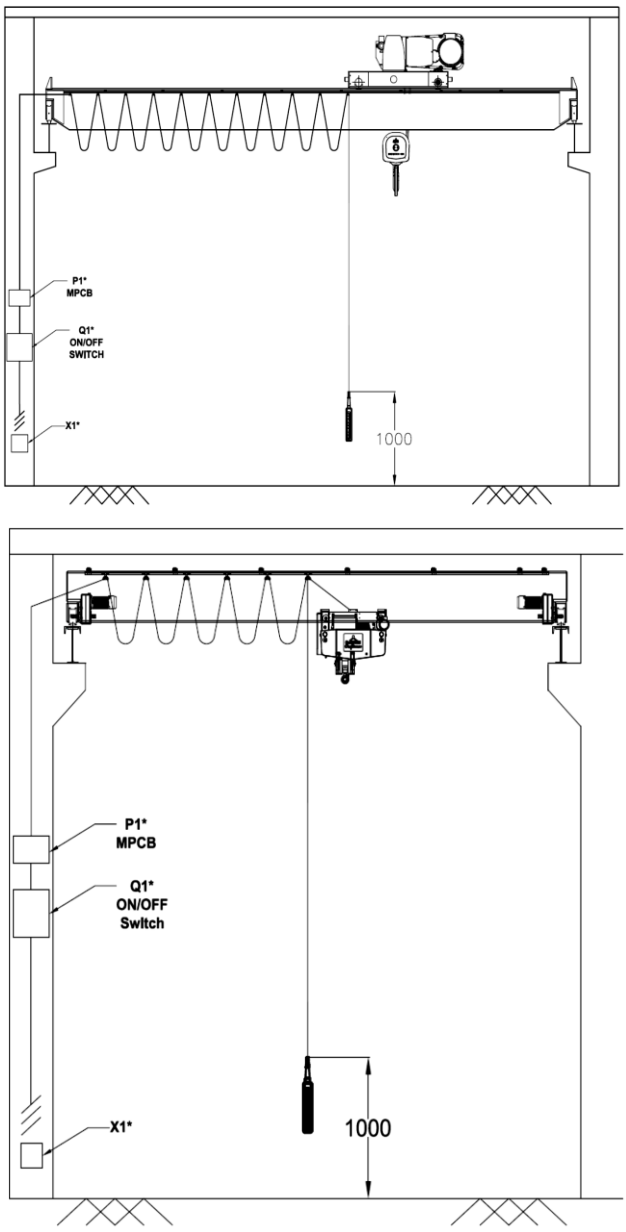


Figure 3.0.5.1

3.0.5.2.- ELECTRICAL INSTALLATION PROCEDURE

- Switch off all power.
- Install disconnector ON/OFF Switch.
- Install MCB/MPCB.
- Run cable to hoist equipment.
- Connect the Plug & play connector to the I/P Connector of the hoist.
- Route all the cable properly.
- Ensure the MCB/MPCB rating as well setting as given in electrical diagram.
- Check the direction of the movement as mentioned in the pendent. do not lift/move any load without checking the direction. If direction is changed, please ensure the phase sequence the I/P supply as well connection sequence of the wires.

3.0.5.3.- TESTS

- These will fulfil the rules of F.E.M.1.001-1998.10.01 (BOOK LET 8). with the following additional points.
- All electrical cable hoists are tested at the works prior to being put into service.
- An overload of 20% should be elevated and lowered with the nominal voltage. In this case the velocities will not be checked.
- If the customer wishes, the wire rope hoist manufacturer will provide a certificate of load test can be done on customer site. The load must be arranged by the customer.

INSTALLATION INSTRUCTIONS

3.0.6.- INSPECTION POINTS PRIOR TO PUTTING INTO SERVICE

3.0.6.1.- TIGHTENING TORQUE FOR BOLTS AND NUTS

- The Following tightening torques shall be applied on bolts in case, grade & tightening of a bolt is not specified in any way in the relevant drawing.

PRE-TENSED FORCE-(N) – TIGHTENING TORQUE- (Nm)

DIN Ø Mm	8.8		10.9		12.9	
	N	Nm	N	Nm	N	Nm
5	6257	6.03	8806	8.48	10591	10.2
6	8836	10.3	12405	14.71	14906	17.65
8	16230	25.5	22751	35.3	27360	42.17
10	24700	49	34740	67	41620	80
12	35600	83	50620	117	60740	140
14	49590	133	69740	187	83690	220
16	67690	200	95190	286	114230	340
18	83240	284	117050	400	140460	480
20	106350	396	149560	560	179470	670
22	132200	536	185910	750	223100	910
24	153000	685	215150	960	258170	1160
27	200170	995	281480	1400	337780	1680
30	244560	1350	343920	1910	412700	2290
33	303430	1830	426700	2570	512000	3090
36	356970	2360	501980	3320	602380	3980
39	437140	3040	614740	4270	737680	5120
42	502160	3770	706170	5300	847400	6360
45	585000	4680	822770	6580	987330	7900
48	660000	5650	928080	7940	1113700	9530

NOTES:

1. WHEN FIXING A TIGHTENING TORQUE IT IS CONSIDERED THAT THE BASE OF THE PARTS TO BE MOUNTED ARE IN CONDITIONS TO ALLOW
2. DON'T RE-USE THE FASTNERS
3. DON'T RE-USE THE NYLOCK NUT
4. APPROPRIATE LOCTITE SHOULD BE USED TO THE BOLT CONNECTION AS MENTIONED BELOW AND IT IS MANDATORY, UNLESS OTHERWISE SPECIFIED.

TYPE	APPEARANCE	STRENGTH	CONNECTION TYPE
LOCTITE 243	BLUE	MEDIUM	REMOVABLE
LOCTITE 270	GREEN	HIGH	PERMANENT

FORCE:

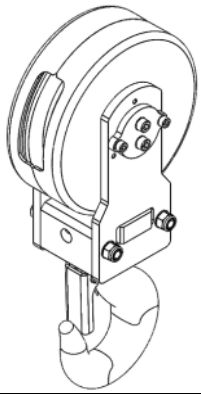
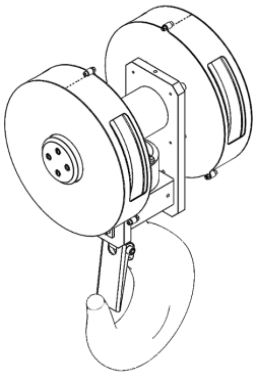
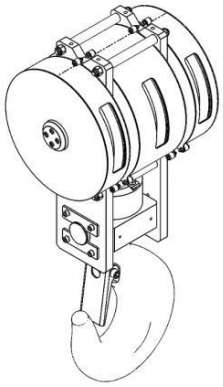
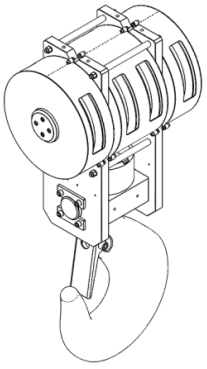
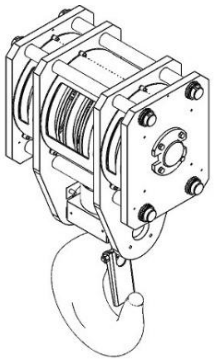
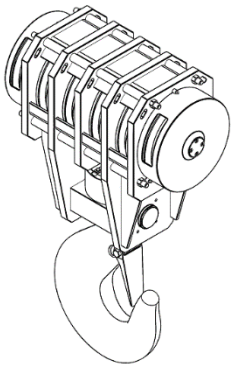
5. THE VALUES SHOWN ARE FOR CLEAN AND DRY THREADS.
6. TIGHTENING TORQUE TO BE FOLLOWED FOR ALL HOIST FASTENERS AS MENTIONED IN THE TABLE, UNLESS OTHERWISE SPECIFIED.
7. REDUCE THE TIGHTENING TORQUE BY 10% WHEN OIL IS USED AS A LUBRICANT.
8. REDUCE THE TIGHTENING TORQUE BY 10% WHEN NEW SCREWS WITH SURFACE COVERING ARE USED.
9. ALUMINIUM SCREWS REQUIRE A REDUCTION IN THE TIGHTENING TORQUE OF 30%.

Table 3.0.3.1

INSTALLATION INSTRUCTIONS

3.0.6.2.- HOOK BLOCK

- Hook Block assemblies are designed in accordance with the load requirements.
- The hook is supported by a crosshead piece which allows it to be inclined in addition to being rotated.
- Check that the hook block is undamaged and that all screws and nuts are secure.
- Check that the hook forging rotates freely.
- Ensure the capacity sticker is labeled on the side of hook block
- As shown below different types of hook block used in our wire rope hoist.

 • 2/1 Fall	 • 4/1 Fall • 4/2 Fall • 4/2-Z Fall	 • 6/1 Fall • 6/2 Fall • 6/2-Z Fall
 • 8/1 Fall • 8/2 Fall • 8/2-Z Fall	 • 10/1 Fall • 10/2 Fall • 10/2-Z Fall	 • 12/1 Fall • 12/2 Fall • 12/2-Z Fall

NOTICE

- All Bolt Connections must be adhesively bonded (LOCTITE 243)
- Hook Appearance may vary, depending on the size and type of the hook ordered.
- Depending on the number of rope falls, there are extra sheaves, side plates & sheave covers.
- Diagram illustration shown only for reference may vary with actual.

For Assembly and disassembly procedure, refer spare parts manual of relevant hoist supply.

3.0.6.3.- ROPE SHEAVES

- Rope sheaves are mounted inside the hoist or trolley frame and are equipped with antifriction bearings. This sheave is made up of spheroidal graphite cast iron particularly well suited for friction and pressure produced by steel wire rope.
- This part is subjected to wear and it require regular inspection.
- Check that the rope sheaves rotate freely and are undamaged

INSTALLATION INSTRUCTIONS

3.0.6.4.- OIL LEVEL

- Check the oil level, if an oil filled traveling gear.
- The hoist and travel gearboxes are filled with the required lubricant quantity in the factory. In normal cases, it is not necessary to change or supplement it.

CAUTION

- Synthetic oils must not be missed with mineral based oils
- Check and ensure the oil level before putting hoist into the operation

NOTICE

- Most of the bearings in the product have lifetime lubrication (if not provided with greasing nipple). There is no need to add lubricant to the life time lubricated bearings under normal operating conditions.
- If 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 refilling.

3.0.6.5.- END STOPS

- End stops are fitted to the runway of the trolley to limit travel of the trolley respectively. Bumpers are fitted to absorb the impact if the trolley runs into the end stops.
- Stops and bumpers are intended for emergency use only. Do not use buffers and stops as an operational means to stop travel during normal operations

NOTICE

Do not use buffer stops and buffers during normal operations

- Runways and runway stop, shall be by crane manufacturers scope. Crane supplier must ensure the strength and tolerance as per standard.

WARNING

Falling parts hazard.

If there are no end stops, the trolley can travel over the end of the runway.

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

3.0.6.5.1.- END STOPS FOR MONORAIL TROLLEYS

- The Monorail trolleys are supplied without buffers.
- Crane manufacture need to check & provided the suitable buffer stops, which withstand the rated damping force.

3.0.6.5.2.- END STOPS FOR DOUBLE RAIL TROLLEYS

- The double rail trolleys are supplied with mounted buffers.
- The runway must meet the requirements of ISO 12488-1.
- Make sure that the rail joints are even on both running and guide surfaces. Grind down if necessary.

INSTALLATION INSTRUCTIONS

3.0.6.6.- RUNNING

- Check that there are no strange noises or vibrations in the different movements of the hoist mechanisms.
- Runway Tolerances as shown in section 3.0.3

3.0.7.- REEVING ROPE

- The wire rope is wound onto the drum in the factory.
  If not, see section 5.0.5.1.
- The wire rope hoist must be switched on in order to reeve the rope. All work must therefore be carried out with extreme care: for your safety and for smooth functioning of the wire rope hoist!
- If the bottom hook block is not fitted, proceed as follows:
  1. Gripper pliers hold the rope securely with a gripper pliers.
  2. Lay out the end of the rope not wound on the drum, or let it hang freely.
  3. Check that the wire rope lies tightly on the rope drum.

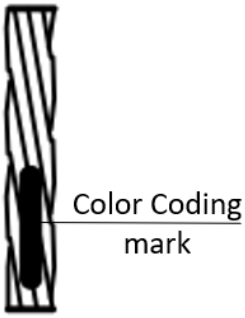


Figure 3.0.7

If the fit is loose: Dismount the rope guide, see section 5.0.5.1. Tighten up the wire rope on the rope drum and tension. Mount the rope guide, see section 5.0.5.1.

	NOTICE
	• **Material damage hazard.** Slack rope can destroy the rope guide and the wire rope. Avoid slack rope on the drum. • **Material damage hazard to wire rope.** Do not twist the rope, the color coding facilitates checking.

- Color code the beginning of the rope on one side.
- Reeve the end of the rope into the rope sheave(s) of the bottom hook block and return pulleys.
- Fasten the end of the rope in the rope anchorage
- Perform several runs over the full height of lift without load.
- Repeat with increasing loads.
- Make any twisting in the rope which may occur visible by sticking on a paper tag. Severe twisting is shown by the bottom hook block's turning, especially when not under load.

	NOTICE
	• **Material damage hazard.** Twisted ropes compromise safety and damage the rope. If any twisting occurs, remove the wire rope and untwist by letting it hang freely or laying it out. Twisting in the wire rope prejudices safety and service life. Any twisting must therefore be removed before subjecting the hoist to any further load. The rope could otherwise be permanently distorted and might have to be replaced!

	NOTICE
	Reeve the rope as shown in the schematic drawings in section 2.0.12 and attach the end of the rope at the rope anchorage. The bottom hook block must hang horizontally

The hook may rotate after a short time in operation due to residual stress in the rope

INSTALLATION INSTRUCTIONS

3.0.8.- TRAVEL LIMIT SWITCHES (OPTIONAL)

- The travel limit switch assembly is supplied but not mounted on the hoist.

	WARNING
	Falling parts hazard. • If limit switches are defective, wrongly installed or wrongly set, the trolley will run into the end stops without being braked. • Check the correct functioning and settings of the limit switches before commissioning

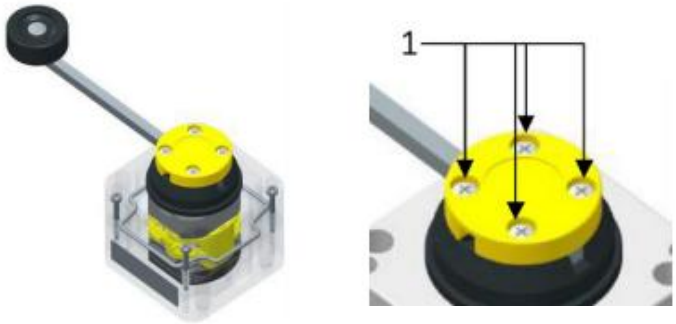
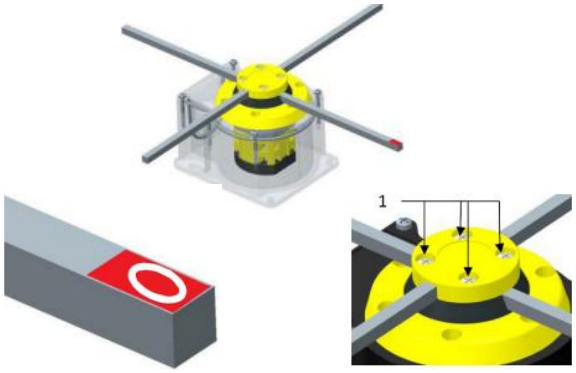
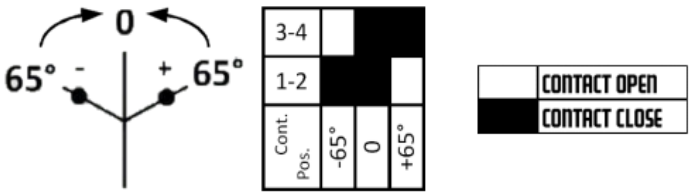
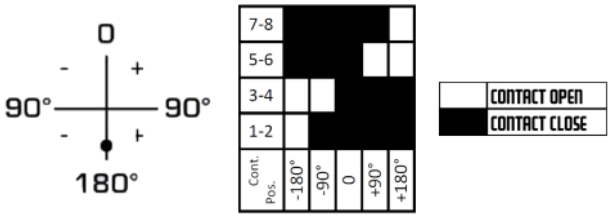
POSITION LIMIT SWITCHES (CROSS TRAVEL – MONORAIL)	POSITION LIMIT SWITCHES (CROSS TRAVEL – CRAB)
	
LIMIT SWITCH CONTACT OPENING & CLOSING • 3 positions automatic return to "0" with mechanical interlock (●) 	**LIMIT SWITCH CONTACT OPENING & CLOSING** • 3 positions automatic return to "0" with mechanical interlock (●) 
LIMIT SWITCH ROD ADJUSTMENT • Loosen the four screws (1) • Adjust the rods • Tighten the four screws (1)	**LIMIT SWITCH ROD ADJUSTMENT** • Loosen the four screws (1) • Adjust the rods • Tighten the four screws (1)

Table 3.0.8

INSTALLATION INSTRUCTIONS

3.0.9.- ROPE ANCHORAGE

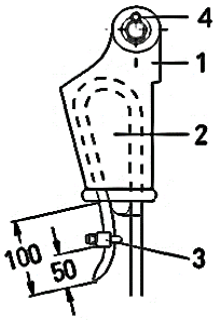


Figure 3.0.9

- Insert end of rope into rope anchorage according to reeving.
- Place rope around rope wedge (2) and pull it into the tapered rope recess (1) until the loose end of the rope project.
- Secure loose end of rope with rope clamp (3) from the end of the rope.
- No of rope clamps (3) will vary according to the model refer spare parts manual for more details
- Replace split pin (4) (if provided) or nut & locknut after dismantling it. Bend ends of split pin up.
- Replace the lock nut, circlip, split pin if its wear and tear.

	WARNING
	Falling parts hazard. Ropes which are not secured as specified may lead to the rope slipping and the load falling. • Always insert the rope correctly into the rope anchorage. • Replace split pin (if provided) every time it is dismantled.

3.0.10.- HOOK OPERATED HOIST LIMIT SWITCH (OPTIONAL)

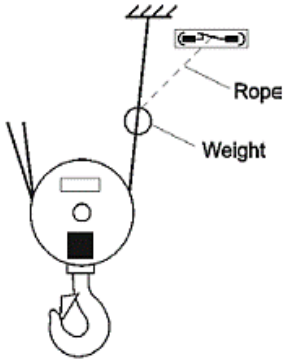


Figure 3.0.10

- If the rotary limit switch fails to activate at the correct number of turns, the gravity limit switch will be operated to provide an emergency stop
- Gravity limit switches can be used parallelly with rotary limit switch in a vertical type motion such as hoisting
- Gravity limit switch operates when the hoist reaches its predetermined point. In this condition the suspended weight rests on the surface of the hoist and suspended weight wire sags and counter weight changes the position and electrical contractor cut off power to stop the hoist motor.
- For block operated limit switch operating instructions refer section 4.0.2.5.1.

3.0.11.- ROPE DRUM BRAKE (OPTIONAL)

- Rope drum brake is factory tested & set by the manufacture.
- Exchanging the parts in drum brake is not permitted for customer.
- Rope Drum brake is designed to provide extra safety.
- Rope drum brake acts in direction of lowering.
- It prevents load dropping when mechanical components fail, for (e.g.: Motor brake fails, Key Shear, drive cut).

3.0.12.- RADIO REMOTE CONTROL PENDANT (OPTIONAL)

Figure 3.0.12

- The Radio Remote Control Pendant is a wireless control device designed for safe and efficient operation of machinery and equipment from a distance.
- This pendant uses radio frequency (RF) signals to communicate with the control system, providing the operator with the flexibility to manage operations without being physically tethered to the equipment.

3.0.13.- CHECK AFTER INSTALLATION

WARNING

- Wrong assembling or installation causes death or severe injury and also damage for material and property

3.0.13.1.- CHECK ITEMS

Make sure that the following items are satisfied

- No bolt, nut nor split pin is lost. Tightening and assembling are completed.
- Protection Wire for Push Button Switch Cord (Push Button Switch Wire) is securely tied to accept and endure the force instead of Push Button Switch Cord when the Push Button Switch Set is drawn.
- The Power Cable is fixed.
- Source voltage is proper.
- The earth wire is connected securely.
- The stoppers are securely mounted on the Traverse Rail.
- The running surface of Traverse Rail is not with paint or oil. There is no obstacle for the Traversing Device to run.
- The Main Unit is installed in a level position without any tilt.
- Cables are not loose and have not come off.

3.0.13.2.- OPERATIONAL CHECK

- Carry out the operational check as mentioned in section 4.0.1.

BLANK PAGE

OPERATIONAL INSTRUCTIONS

BLANK PAGE

OPERATIONAL INSTRUCTIONS

4. - GENERAL INSTRUCTIONS FOR USING THE HOIST

4.0.1. - OPERATION AND RULES

4.0.1.1.- USAGE WARNING

PROHIBTION

- **Do not use the Wire Rope with heavy rust, damage, breakage, abrasion or deformation.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load, etc.
- **Do not cut, extend, or weld the Wire Rope.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load, etc.
- **Do not use the Wire Rope with the Bottom Hook without smooth motion.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but may also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Do not use the Hook without a Hook Latch or damaged Hook.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load, etc.
- **Do not hook the Wire Rope with another hook.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but may also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Do not use the Wire Rope when its brake does not function securely, or when the stopping distance is too long.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Do not use the product if it moves oppositely to the direction indicated on the push button switch.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Do not lower the hoist while the Hook Block is on the load nor operate with no load while the rope is loosened. Otherwise, it may cause a turbulent winding of the Wire Rope.**
  Failure to comply with this instruction will lead to failure to obtain normal function and performance of the hoist and may lead to serious accidents.

MANDATORY

- **Carry out daily inspection before operation.**
  - (When any abnormality is found during inspection, turn off the power, indicate “FAILURE" and ask the maintenance engineer for repair.)
- **General checks before the daily start-up**
  - There should be no loose element on the hoist.
  - All the command and operation units should be in the normal position.
  - Check the hook, latch, pendent buttons, wire rope, guide are in working condition.
- **Check the slinging devices to make sure there is no abnormality.**
  Failure to comply with these instructions may lead to serious accidents resulting in death or severe injury.

OPERATIONAL INSTRUCTIONS

PROHIBTION

- **Do not use the product with an illegible nameplate or warning label affixed to the Main Unit.**
  Failure to comply with this instruction may lead to unexpected serious accidents.

MANDATORY

- **When using the product for the first time, affix the labels indicating East, West, North and South on the push button switches according to the direction that the product moves.**
  Failure to comply with this instruction may lead to serious accidents due to operational error.
- **Check the contents of the work and make sure that the hoist has proper performance for the capacity and lifting range.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but may also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Check the contents of the work and operate the hoist at a place enabling to look out the operating area without hindrance.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **When looking out the operating area is difficult, arrange an observer near the area for safety. Operate the hoist at a place with firm foothold without danger of falling, stumbling, slipping or overturning.**
  Failure to comply with this instruction may lead to serious accidents due to operational error.
- **Before moving the load, warn all the people in the surroundings.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Even if the hoist is permanently installed and used for the same purpose repeatedly, check the contents of the work and make sure that the work does not exceed the capacity on each occasion.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **When operating the hoist, wear clothes that do not impede the operation.**
  Failure to comply with this instruction may lead to serious accidents due to operational error.
- **Persons operating or working near the hoist must wear protective gears such as earplugs.**
  Failure to comply with this instruction can affect the health of a human body due to noise.

NOTICE

Appoint maintenance engineer or competent personnel among the qualified personnel for operation of wire rope hoists. Display the name of the personnel in an easily viewable place.

OPERATIONAL INSTRUCTIONS

4.0.1.2.- HOW TO OPERATE THE PUSH BUTTON SWITCHES

PROHIBTION

- **Do not hang the Push Button Switch Cord on other objects, or pull the cord strongly.**
  Failure to comply with this instruction will cause wire breakage, leading to failure to obtain normal function and performance of the hoist and may lead to serious accidents.
- **Do not use the Push Button Switch if its button does not operate smoothly.**
  Failure to comply with this instruction may lead to serious accidents due to operational error.
- **Do not bundle or tie the cord for the adjustment of its length.**
  Failure to comply with this instruction will cause wire breakage, leading to failure to obtain normal function and performance of the hoist and may lead to serious accidents.
- **The Push Button Switch is a resin product. Do not use the Push Button Switch in an environment such as using chemicals and solvents. It may cause the deterioration of its fiscal condition.**
  Failure to comply with this instruction will lead to failure to obtain normal function and performance of the hoist and may lead to serious accidents.

NOTICE

When taking hands off the Push Button Switch after operation, do not throw the switch. Be careful not to hit other workers with the Push Button Switch.

4.0.1.3.- GENERAL INFORMATION

PROHIBTION

- **Do not operate the hoist in an environment with flammable or explosive gas.**
  Failure to comply with this instruction may lead to serious accidents such as fire due to failure of the hoist.
- **Do not use the hoist exceeding the ratings (short period rating, intermittent rating) of the lifting motor and the maximum start-up frequency.**
  Failure to comply with this instruction may lead to serious accidents such as fire due to burning of the hoist motor.
- **Do not use the hoist by the voltage other than the rated voltage.**
  Failure to comply with this instruction may lead to serious accidents such as fire due to failure of the hoist.
- **Do not use the Emergency Stop Button for ordinary stop operation.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but may also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Do not expose the Wire Rope to sparks from welding.**
  Failure to comply with this instruction will significantly shorten the life of the wire rope, not only resulting in failure to obtain normal function and performance of the hoist, but also causing failure of the hoist, leading to serious accidents.
- **Do not contact welding rods or electrodes with the Wire Rope.**
  Failure to comply with this instruction will significantly shorten the life of the wire rope, not only resulting in failure to obtain normal function and performance of the hoist, but also causing failure of the hoist, leading to serious accidents.
- **Do not use the Wire Rope as the earth for welding work. (Fig. A)**
  Failure to comply with this instruction can seriously affect the health of user's body, and may lead to unexpected serious accidents.

Fig. A

OPERATIONAL INSTRUCTIONS

MANDATORY

Follow the operating environment and conditions for the hoist.
Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but may also cause malfunction and failure of the hoist and may lead to serious accidents.

4.0.1.4.- SLINGING

PROHIBTION

- **Do not apply a load to the tip of the Hook or the Hook Latch. (Fig. B)**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load, etc.
- **Do not bind a load with the Wire Rope directly. (Fig. C)**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load, etc.
- **Do not operate the Wire Rope while it is in contact with any sharp edges. (Fig. D)**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load, etc.

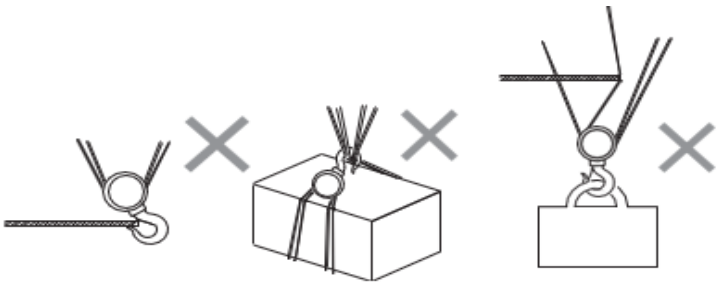


Fig. B Fig. C Fig. D

MANDATORY

- **Use the sling appropriate for the weight and shape of a load.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load, etc. Inappropriate slinging may result in danger such as drop of a lifted load.
- **Carry out the slinging with equal load on slinging devices for stable lifting of a load.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load, etc.
- **Attach the slinging devices securely to a load.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load, etc.
- **Attach the slinging devices to the Bottom Hook correctly.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load, etc.

OPERATIONAL INSTRUCTIONS

4.0.1.5.- LIFTING/LOWERING

PROHIBTION

- **Do not lift more than the capacity. (Fig. E)**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load.
- **Do not try to lift fixed structures (floor, ground, or buildings).**
  Failure to comply with this instruction may cause physical damage to equipment and machines including the hoist.
- **Do not constantly stop the hoist with the Upper Limit Emergency Stop Device (limit switch).**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but may also cause malfunction and failure of the hoist and may lead to serious accidents.

Fig. E

- **Do not use the hoist when the Overload Limiter is operated to stop winding.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load, etc.
- **Do not swing the lifted load.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but may also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Do not wind the slack Wire Rope with a load in one action to avoid exposing the Wire Rope to shock.**
  Failure to comply with this instruction may lead to serious accidents due to failure of the hoist. Stop lifting when the Wire Rope is stretched tight. Then lift slowly.
- **Do not carry out excessively frequent inching.**
  Failure to comply with this instruction may lead to serious accidents due to failure of the hoist.
- **Do not carry out plucking (sudden reversing of the motion).**
  Failure to comply with this instruction may lead to serious accidents due to failure of the hoist. When reversing the motion, first stop the hoist, and then reverse it.
- **Do not cause the load on the hook to fall downwards when taking a load off from a pallet. (Fig. F)**
  Failure to comply with this instruction may lead to serious accidents due to failure of the hoist.
- **Do not cause the load to come into contact with the Wire Rope.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load, etc.
- **Do not rotate a lifted load. Use the device for rotation.**
  Failure to comply with this instruction may lead to serious accidents due to failure of the hoist.

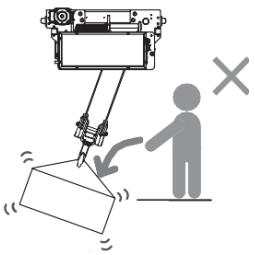


Fig. F

- **Do not carry out the welding or cutting work while a load is lifted.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Do not carry out repair or disassembling while a load is suspended.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load, etc. When repairing or disassembling a wire rope hoist, ensure that the product is placed down on the floor and that only maintenance engineers maintain the hoist.
- **Do not enter beneath a lifted load.**
  Failure to comply with this instruction may lead to unexpected serious accidents.

OPERATIONAL INSTRUCTIONS

MANDATORY

- **When the Upper Limit Emergency Stop Device (Limit switch) is operated, stop the lifting work immediately and lower the load.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but may also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Move the hoist right above the load and then lift the load. (Do not pull the load in an inclined direction.) (Fig. G)**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but may also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Do not leave from the operating position while a load is lifted. Always keep an eye on the lifted load.**
  Failure to comply with this instruction may lead to unexpected serious accidents.

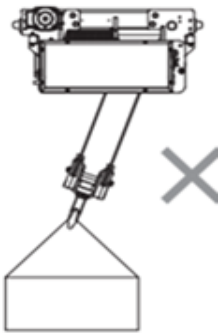


Fig. G

PROHIBTION

- **Do not use the Overload Limiter to measure the weight of a load.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but may also cause malfunction and failure of the hoist and may lead to serious accidents. The use of the Overload Limiter other than the intended purpose may result in injury or property damage

MANDATORY

- **When carrying a lifted load using a lifting magnet or a vacuum chuck, lower the height of the lifted load as low as possible.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Do not lift a load with two wire rope hoists.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load, etc.

4.0.1.6.- TRAVEL/TRAVERSE

PROHIBTION

- **Do not bump the lifted load against other structures or wiring.**
  Failure to comply with this instruction may lead to unexpected serious accidents.

MANDATORY

- **If the wire rope is entangled, stop the operation immediately and reset the entangled ropes.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but may also cause malfunction and failure of the hoist and may lead to serious accidents.

OPERATIONAL INSTRUCTIONS

PROHIBTION

- **Do not operate the hoist underneath the load or transport a load over people. (Fig. I)**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Do not operate the hoist when any person is in the area where the lifted load moves.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Do not allow people to enter into the area where a lifted load move.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Do not ride on a lifted load and do not use the hoist to support, lift, or transport people. (Fig. J)**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Prevent the hoist from bumping against a building or a structure.**
  Failure to comply with this instruction may lead to serious accidents due to failure of the hoist.
- **Do not operate or move the hoist while moving backward with a load kept lifted.**
  Failure to comply with this instruction can cause accidents affecting the health of a human body due to dropping, stumbling, tipping, or pinching. Operate the hoist while looking forward from the back of a load and moving ahead.

Fig. I

Fig. J

4.0.1.7.- IN ABNORMALITY OR FAILURE

MANDATORY

- **If the hoist is damaged or abnormal noise or vibration occurs, stop the operation immediately.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **If the hoist moves in the direction opposite to the indication on the Push Button Switch, stop the operation immediately.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **When the kink, entanglement, crack, deformation, attachment of foreign matters or abnormal engagement of the Wire rope is observed, stop the operation immediately.**
  Failure to comply with this instruction may lead to serious accidents resulting in death or severe injury such as drop of the lifted load, etc.

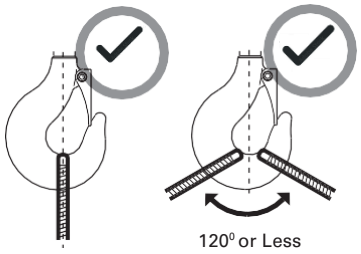
MANDATORY

- **When any abnormality is observed during the operation, indicate "FAILURE" and contact the maintenance engineers.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Should the power be interrupted, secure safety and contact the maintenance engineers.**
  Failure to comply with this instruction may lead to unexpected serious accidents.

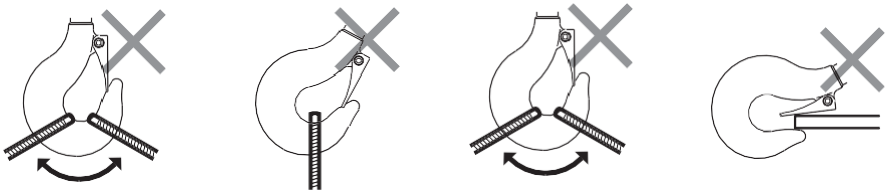
OPERATIONAL INSTRUCTIONS

4.0.1.8.- SLINGING THE LOAD PROPERLY

Sling the load at the extended line of the hook shaft



Do not carry out dangerous hooking as shown below



Improper hooking position of the lifted load or the sling

Angle exceeding 120° Angle to wide

Hook latch not closed

Hooking of the Load at the tip of the Hook

4.0.1.9.- SUPPRESSION OF LOAD SWINGING

PROHIBTION

- **Do not move the hoist with a load hung at one side of the hoist.**
  Otherwise, the load swings and hits a person or an object or drops to result in death or severe injury.

- Swinging of a load makes it difficult and dangerous to move the hoist. The basic idea of the operation is not to cause a load to swing. For this purpose, observe the following instructions.
  - Do not pull a load in an inclined direction.
  - Start slowly when traversing the load.
  - Do not lift suddenly.
- Even if you observe the above instructions, the lifted load may swing at the start and the stop of the hoist. Following operations can reduce the swing of the lifted load.

Operation

- Press the Traverse Button. (Fig. a)
- When the hoist starts to move, the lifted load delays slightly. (Fig. b)
- Release the button slightly before the time when the lifted load swings to the center position.
- When the lifted load comes to the position just beneath the hoist, press the button again and continue to traverse the load. (Fig. c)

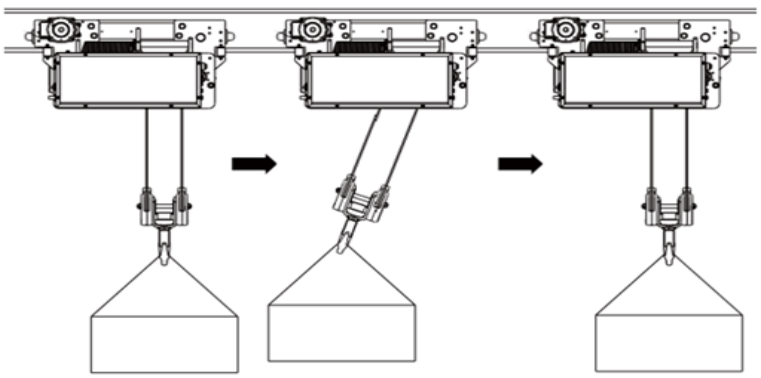


Fig. a **Fig. b** **Fig. c**

Figure 4.0.1.9

OPERATIONAL INSTRUCTIONS

4.0.1.10.- PRECAUTIONS AFTER WORK

PROHIBTION

- **Do not store the hoist in the excessively lifted state (where the Upper Limit Emergency Stop Device is active), or excessively lowered state (lowered to a length beyond the lifting range).**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but may also cause malfunction and failure of the hoist and may lead to serious accidents.

MANDATORY

- **Store the hoist with power off.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Indicate "FAILURE" on the hoist that needs repair to prevent it from being used by mistake.**
  Failure to comply with this instruction may lead to unexpected serious accidents.
- **Clean the hoist by wiping off dust and water droplets before storing.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but may also cause malfunction and failure of the hoist and may lead to serious accidents.
- **Clean the parts that house, or are scraped by, the wire rope, such as the rope drum, hook sheave, idle sheave, and rope guide, by removing the dirt, foreign matter, and water droplets from them before storing.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but may also cause malfunction and failure of the hoist and may lead to serious accidents.
- **When the hoist is installed outdoors, cover it with rain cover or roof after applying rust proof treatment.**
  Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but may also cause malfunction and failure of the hoist and may lead to serious accidents.

NOTICE

- Frequently clean the push buttons not to allow the dust and sands to attach.
- When storing the hoist for a long period, it is effective to perform idling operation at a certain interval in order to prevent rusting.
- When not using the hoist, wind up the Hook for storage to the height where it does not interfere with passers-by or other works.
- Decide the place to store the hoist in advance. It is recommended to hang the push button set on the pillar.

OPERATIONAL INSTRUCTIONS

4.0.2. - GENERAL INSTRUCTIONS FOR HOIST OPERATION

4.0.2.1. - HOIST OPERATION

- When power is applied to the hoisting motor, via control equipment, the electromagnetic brake is energized, and the brake disc (1) is released, which allows the rotation to the motor rotor (2). Motor axle (3), transmits movement via gears to the drum, where the wire rope is coiled (4).
- When the hoist is being operated, the rope guide (5) moves in axial direction along the rope drum following the movement of the loaded rope to ensure that it is properly wound in the rope drum grooves.
- All the elements form a compact unit with a frame (6) built by plate sheet and laminated profiles.
- This frame will be painted black.
- Hydraulic fail-safe disc brake (7) is additional safety brake especially we provided for Hot metal application (optional).

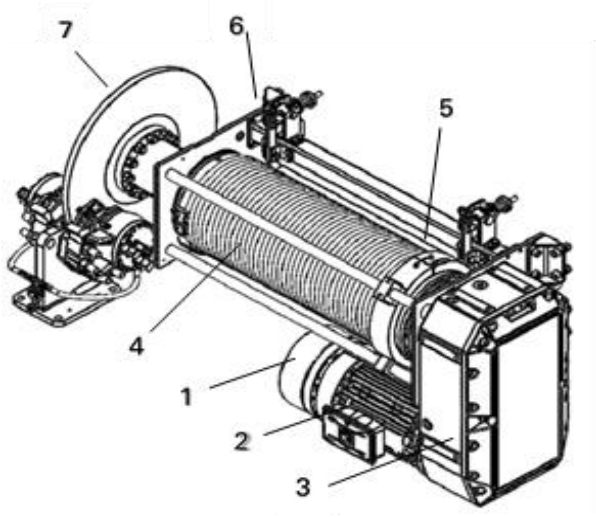


Figure 4.0.2.1

4.0.2.2. - MOTOR CONNECTIONS AND PROTECTION

- For single speed motors the winding is connected to the U, V, and W terminals.
- For double speed motors, the fast speed winding is connected to the U1, V1, and W1 terminals, and the slow speed winding is connected to the U2, V2, and W2 terminals.
- The supply voltage (when measured at the motor terminals), should not differ by more than 5% from the nominal voltage in order to ensure reliable operation. The motor brake will open reliably even with a voltage approximately 10% below the nominal, including start-up losses. It is therefore important that the correct cables are used in order to reduce the voltage drop to a minimum, in the supply line.
- Before the hoist is connected to the power supply, check that the voltage marked on the hoist and travel motor rating plates corresponds to the supply voltage. To protect against short-circuits in the power supply, fuses should be fitted.
- Fuses cannot act as thermal protection for a motor, since they are too coarse and dispersion of the melting current is too high. Neither do thermal relays provide correct protection, since there is no clearly defined point at which instantaneous tripping takes place and there is an unfortunate tendency for the unit to be too sluggish in operation in heavy overload conditions. Reliable thermal protection for the motor can be achieved by embedding thermistors into the stator windings during manufacture. Thermistors prevent the motor from burn-out due to overheating. This type of protection is available on customer request.

OPERATIONAL INSTRUCTIONS

4.0.2.3.- HOIST OVERLOAD DEVICE (MECHANICAL)

4.0.2.3.1.- CRU0.5, CRU01 & CRU02 UNDERSLUNG HOIST

Running:

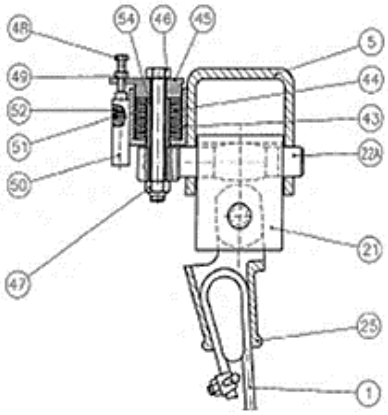


Figure 4.0.2.3

- The wire rope overload (1) is transmitted to the OVERLOAD device, through the wire rope anchorage (25) and wire rope end support (21), support fixation pin (22A). The support fixation pin (A) is leant from one end (A) to the support (5), and the other end (B) is compressing the plate spring (44) through the screw (46) and self-blocking nut (47).
- The device (43) is fixed to the support (5) and the end switch to the device (50). That end switch is activated by the OVERLOAD regulation screw (48) which is screwed to the axle (22A) and fixed with the nut (49).
- When the overload operates over the axle (22A) this one descends by the part (B), disconnecting the lifting system through the end switch (50) and OVERLOAD regulation screw (48).
- The axle (22A) has a barrel shape. Thanks to this geometrical figure, the transmitted effort, load or OVERLOAD will be the one received through the end wire rope support center (21).

4.0.2.4. - ROTARY LIMIT SWITCH EQUIPMENT

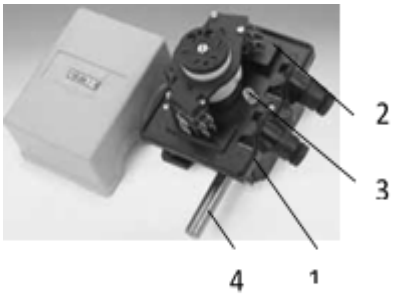


Figure 4.0.2.4 (a)

- Check that the end switch selector stops the hook on the high and low extreme positions. If this does not occur, then regulation of the end switch must take place.
- Rotary gear box (1) (figure 4.0.2.4 (a)) and axle (4) is connected to the drum axle.
- This equipment is fitted with four micro limit switches (3), in that two micro limit switches (2) are used for hoist travel limit in up and down. The remaining two micro limit switches (2) are used to set user limits in up and down position.
- All the four limit switches (2) are actuated by cam (3) which is attached in the rotary gear box.
- **Up & down, Both Set in Factory Set.**

UP	UP	Down	Down
1	2	1	2

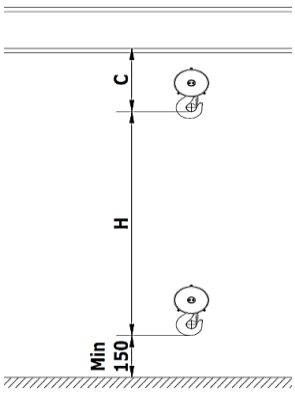


Figure 4.0.2.4 (b)

- Minimum clearance between hook and girder is to be maintain corresponding to the headroom for the specific model.
- Minimum clearance between hook and floor is 150 mm shown in Figure 4.0.2.4 (b).
- While setting up limit the hook is at top position, there must be at least four empty rope grooves left on the rope drum. (See Figure 4.0.2.4 (c)).
- And while setting down limit the hook is at bottom position, there must be at least four fully wound ropes left on the rope drum. (See Figure 4.0.2.4 (d)).
- As said from the above procedure it is to be followed for up & down limit switch setting, during both the hoist installation and rope change.

	WARNING
	• The limit switch is state of the art construction & is safe in operation. However, dangers may arise if it is used incorrectly & not for its intended purpose. • The upper hook level (C) for the hoist varies with the runway flange. The hoist will be seriously damage if the hook is set higher than the indicated 'C' value. • **Failure to comply with these instructions may result in death or serious injury.**

OPERATIONAL INSTRUCTIONS

Number of Empty Groove: 4

Figure 4.0.2.4 (c)

Number of Rope winding Groove: 4

Figure 4.0.2.4 (d)

4.0.2.5.- HOOK OPERATED HOIST LIMIT SWITCH WITH WEIGHT BALL "BLS" (OPTIONAL)

- The hook operated hoist limit switch is also available as "hook operated hoist limit switch with switch rod" variant. Only one variant can be mounted.
    - a min. distance to first obstacle
    - c Dimension between emergency and operational hoist limit switching, "top"
    - x1 Dimension between hook operated hoist limit switching/emergency hoist limit switching, top.
    - S (C↑) Hook operated hoist limit switching
    - S1 (A↑) Emergency hoist limit switching, "top"
    - S3 (B↑) Operational hoist limit switching, "top"

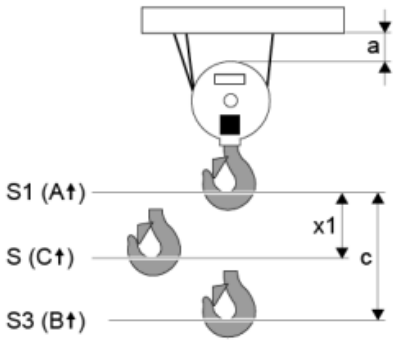


Figure 4.0.2.5 (a)

- The hook operated limit switch can be integrated as an optional hoist limit switch.
- It is triggered after the standard operational hoist limit switch S3,
- when the hook block relieves the weight-loaded limit switch.

Function

1. Limit Switch
2. Wire Rope
3. Connecting Rope
4. Ball
5. Bolted Connection
6. Wedge Clamp

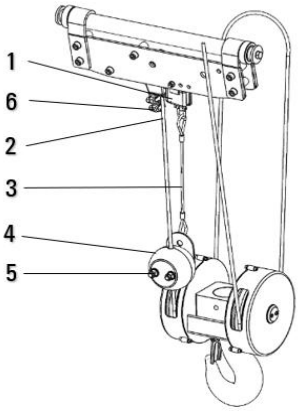


Figure 4.0.2.5 (b)

- The hook travels against the ball (4) and thereby relieves the connecting rope (3).
- The connecting rope (3) relieves the Limit switch spring (1) actuates the Limit switch.
- The hoisting movement is stopped.

4.0.2.5.1. - ADJUSTING / MOUNTING HOOK OPERATED HOIST LIMIT SWITCH WITH WEIGHT BALL

- Press the UP button in the control pendant carefully.
- Observe the hoisting movement until the operational hoist limit switch switches off in the top hook position (B↑).

OPERATIONAL INSTRUCTIONS

If the ball has not yet been mounted:

- Open the bolted connections (5).
- Fit the ball (4) on the rope.
- Tighten the bolted connections (5) to the prescribed tightening torque, see the Tightening torques for screws section.

If the ball has already been mounted:

- Loosen the rope clamp on the connecting rope (3) to adjust.
- Draw the connecting rope (3) through the ball (4) until the switch (1) is actuated.
- Secure the connecting rope (3) with the rope clamp.

4.0.2.6.- ROPE DRUM BRAKE (OPTIONAL)

4.0.2.6.1. - DRUM BRAKE OPERATION-SOLENOID TYPE

- Ratchet with brake liner (2) and Cam with brake liner (3) are mounted directly in rope drum (1) Pawl (4) is mounted in bracket.
- Cam follower (5) will follow the cam (3) naturally, and the spring (7) will provide a constant push on the follower (5) to follow the cam (3).
- Solenoid (6) is used to operate the Pawl (4), when hoisting or depositing function starts; first the solenoid is energized and goes up against a dead load, which is attached at the rear of the solenoid shaft.
- Every time the hoist unit stops, the solenoid (6) de energized and the dead weight above the solenoid shaft will push the shaft down, and actuates the pawl (4) into the brake ratchet (2). In case of failure of motor brake or drive system, the ratchet (2) and pawl (4) will hold the load from lowering motion.
- The motor brake is released after pawl (4), release.
- Disc spring (13) is Factory set by locknut (11) based on Lifting load.

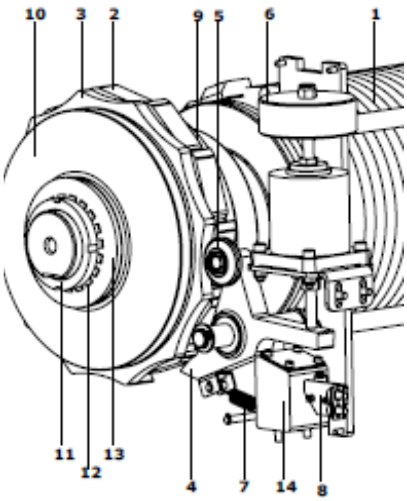


Figure 4.0.2.6.1

- Pawl block (14) is provided to arrest the movement of pawl (4) after it is locked inside ratchet; it will also safely guard the limit switch (8) such that the pawl will not hit and damage the limit switch.
- In case of failure of motor brake or drive system, the drum brake holds the weight, which actuates the limit switch (8) to cut-off the power supplies. This will disable the user to operate the hoist further.

4.0.2.6.2. - HYDRAULIC FAIL-SAFE DISC BRAKE

- The high capacity of these brakes makes them particularly suitable as service- or secondary emergency brakes e.g., on hoists.
- The brake calipers will be supplied with brake pads (1), with an average coefficient of friction of minimum 0.4. The width of the brake pads will be sufficient to remove the heat generated during the stopping sequence without exceeding the operating limits of the friction material.
- The brake pads will include pad retraction springs to retract the brake pads, in order to event unnecessary wear on the friction material when the brake is not engaged.

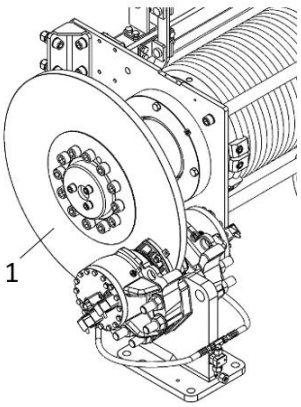


Figure 4.0.2.6.2

OPERATIONAL INSTRUCTIONS

	WARNING
	ROPE DRUM BRAKE INSTRUCTIONS: • In case, the drum brake activates always contact a representative of the hoist manufacturer! • The hoist must not put in to use unless the cause of failure is found and repaired. • All the brake components must be checked for wear or damage and the brake will be set for operation again. • Correct sequence functions during installation and operation to be confirmed by the manufacturer / authorized person. • Alteration and adjustment by the user are not permitted. Adjusting this is declared as unsafe. • Any user adjustment is at their own risk. Manufacture and its associated selling company are not liable in case of accidents.

4.0.3.- HOISTING AND TRAVEL (CT) MOTOR AND BRAKE

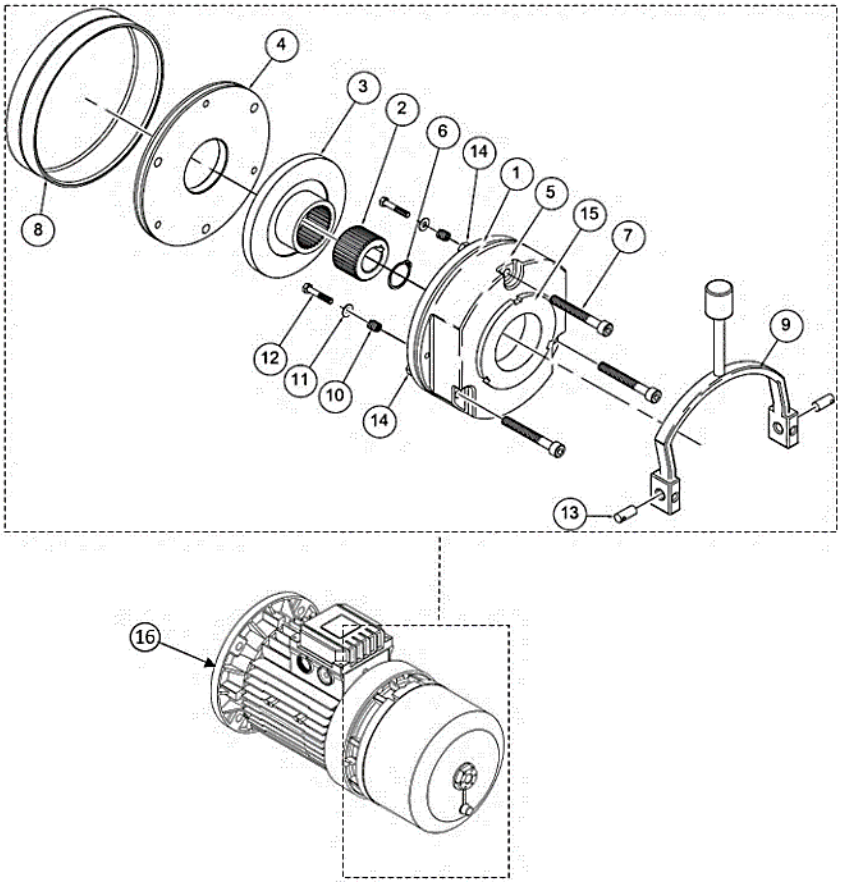


Figure 4.0.3

1. Armature plate
2. Brake hub
3. Brake disc (rotor)
4. Friction Plate
5. Brake Coil
6. Circlip for Brake Hub
7. Socket head Cap Screw
8. Dust Cover
9. Hand release mechanism
10. Hand release spring
11. Washer
12. Hex Head Bolt
13. Barrel nuts
14. Airgap Adjusting Nut
15. Torque adjuster nut (Factory set)
16. Motor

OPERATIONAL INSTRUCTIONS

4.0.3.1.- MOTOR

- Standard hoists are equipped with single 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.
- The hoist can be equipped with a frequency converter and specially designed motors for this duty
- Heavy duty motor with an incorporated brake and fan cooled.
- The brake disc lining material is asbestos free with high friction coefficient and very long lasting.
- Provided with IP54 enclosure rating.
- On request we can provided with IP55 or IP56 enclosure rating with H class insulation.

4.0.3.2.- BRAKE

- The traverse brake is a spring applied disc brake. The brake is electro-magnetically released by the application of DC to the brake coil in the stator.
- To access the traverse brake, the traverse drive fan cowl should be removed. First unscrew the hand release lever (if fitted). The brake rectifier is located in the motor terminal box.
- Spring applied Fail Safe Electromagnetic brake is designed to perform holding as well as emergency stopping functions (Normally On).
- These brakes are electromagnetically actuated with two friction surfaces on a single disc.
- The braking power is applied by means of compression springs.

	WARNING
	• Before adjusting the brake or changing the disc, disconnect the power supply to the hoist and to the brake.

4.0.4.- WIRE ROPE AND ANGLE OF INCLINATION

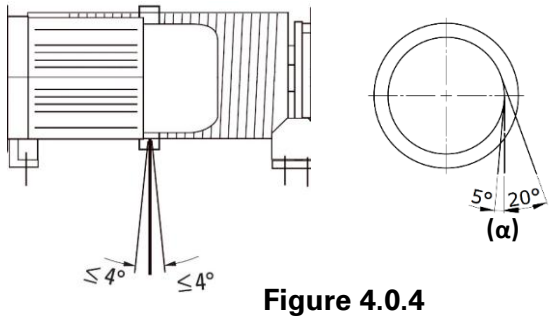


Figure 4.0.4

- Check condition of the wire rope making sure that it is neither kinked nor twisted out of shape, since damage of this kind renders the rope unserviceable. Also check the rope fasteners.
- Note: If you have to change the wire rope, see section 5.0.5.1 in the maintenance manual.
- The max. permissible rope exit angle is 4° and also the radial rope exit angle (α) is 5° and 20° (Figure 4.0.4).
- However even at these angles a reduction in service life is to be expected.
- Overhead hoists are designed to raise loads vertically; the load being lifted must be cantered under the hoist (Figure A).

	WARNING
	Rope damage hazard. The wire rope must not touch the rope or structural elements

OPERATIONAL INSTRUCTIONS

- Side pulling (Figure B) occurs when attempting to lift any load that is not located directly under the hoist.
- Another form of side pulling occurs when a wire rope hoist operator attempts to use the bridge or trolley drives to apply force to move an object horizontally when the load is not first fully suspended on the hoist and free of the floor or other support.
- Regardless of the manner in which side pull is applied, there are many unintended, damaging and potentially dangerous results that can occur. Side pulling a hoist, in most cases, results in a violation of industry standards.

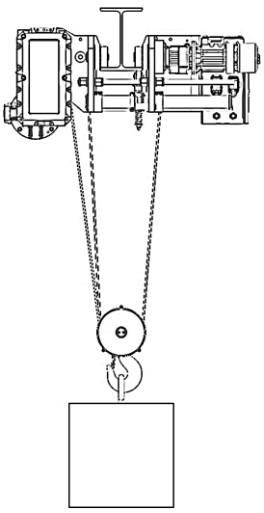


Figure A

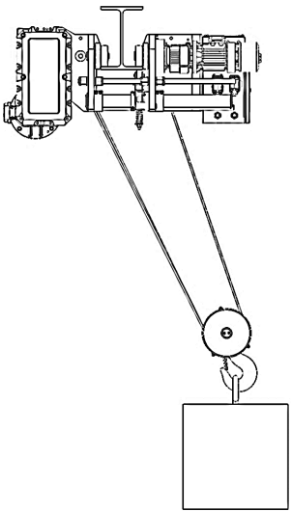


Figure B

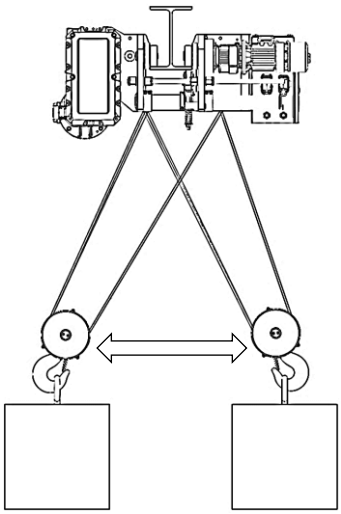


Figure C

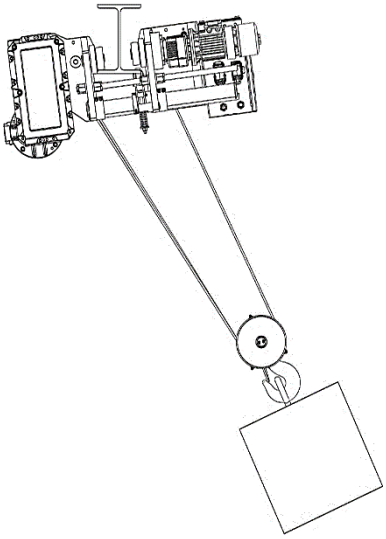


Figure D

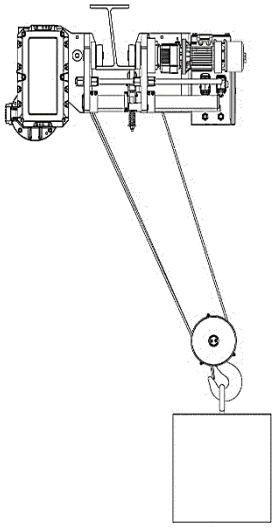


Figure E

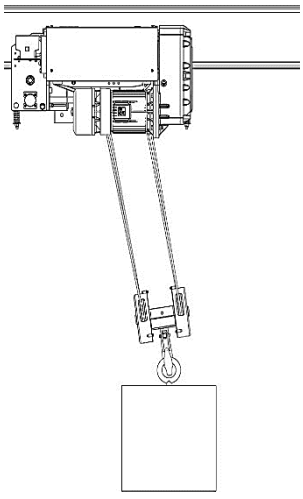


Figure F

Figure 4.0.4 (b)

OPERATIONAL INSTRUCTIONS

DANGERS OF SIDE PULLING ARE MENTIONED BELOW:

- As the load is lifted free of the floor or other support it will attempt to center itself under the hoist, causing the load to rapidly swing in a horizontal arc (Figure C). This pendulum effect can cause serious injury to personnel or damage to other equipment in the area.
- The wire rope can be forced out of the grooving on hoist drum. This can damage the rope, and may also cause damage to drums, sheaves, and other components. In the best-case scenario, this can lead to costly repairs and downtime. More importantly, it could cause the wire rope to break and the load to drop, putting equipment, facilities, and personnel at serious risk.
- Side pulling at an angle that is not in line with the length of the bridge or hoist (Figure D) could cause the trolley hoist to tip, making the trolley inoperable. In the worst case, the trolley hoist could actually be pulled off of the beam. This side pull condition also puts stresses on the beam itself and could cause the beam to skew (Figure E).
- Attempting to lift a load that is located beyond the end of a bridge beam or hoist (Figure F) could damage the safety stops at the end of the beam. In rare cases, this has caused the trolley hoist to fall of the end of the beam.
- Side pulling is not considered “normal operation” of the hoist and therefore may void the manufacturer’s warranty.

	**WARNING**
	1) Side pulling is one of the most common and most dangerous mistakes made with overhead hoists. 2) Failure to follow safe lifting practices can lead to serious personal injury and cause damage or death to human, equipment and facilities.

Here are some steps that can be taken to help avoid the potential hazards of side pulling: -

- Make sure that all new hoist systems are designed and installed by qualified material handling professionals. Have existing overhead lifting equipment and lifting applications reviewed by a qualified person to ensure these systems are properly located to provide full hook coverage (without side pulling) for all locations where materials to be lifted are located.
- Arrange for hoist operator safety training of all personnel within your organization who may use overhead lifting equipment as well as all managers or supervisors who may direct others to use that equipment.
- Ask your overhead lifting equipment provider about the availability and functionality of devices such as overload limit switches, rope guides and others equipment used to detect, prevent or reduce the damaging effects of unintended side pulling. Consider using an adjustable lifting beam and counterweight to allow an of-center load to be lifted without creating side-pull on the hoist.

BLANK PAGE

MAINTENANCE AND INSPECTION PROCEDURES

BLANK PAGE

MAINTENANCE AND INSPECTION PROCEDURES

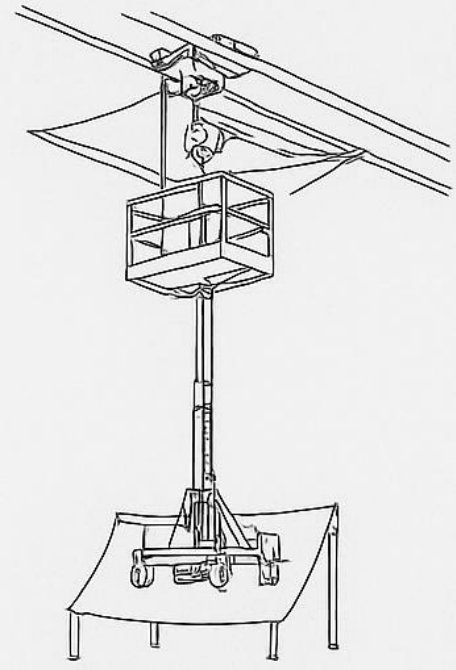
5.- MECHANICAL MAINTENANCE

Maintenance Plan

⚠	**WARNING**
	• As maintenance work can be carried out at a dangerous height, service person must have appropriate means of support (scaffolding, platform, ladders etc.) which allows the work to be performed in safe conditions and also have suitable individual protection devices.

⚠	**WARNING**
	• Danger of injury by assembly errors • Inappropriate installation can lead to severe injury and/or damage to property.

a)



b)

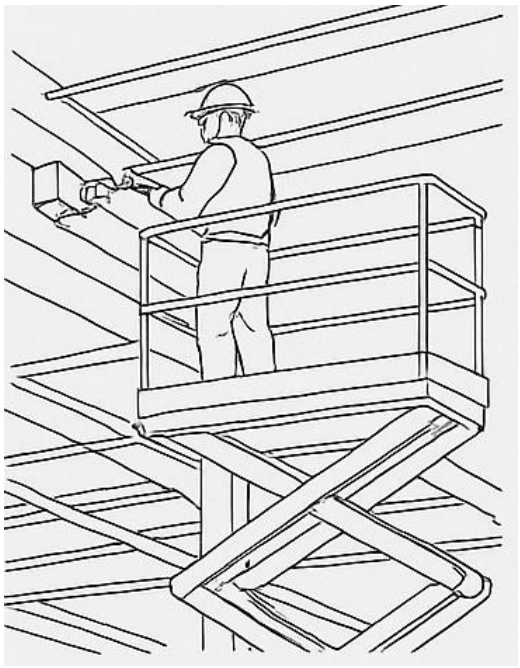


Figure 5

a) Securing the working area

b) Example of a suitable working platform

MAINTENANCE AND INSPECTION PROCEDURES

5.0.1.- GENERAL PREVENTIONS DURING MAINTENANCE AND INSPECTION

In case of incidental repairs, pay attention to the following criteria:

- Make sure the Hoist is totally disconnected and also the two main current input wire ropes if necessary.

	**DANGER**
	Live components. **There is danger to life and limb due to electric current.** • Work on electrical equipment may only be carried out by qualified personnel in compliance with the safety regulations.

- Isolate the space covering the work zone and place clear signs saying DANGER ZONE: HOIST UNDER REPAIR.
- Work is always carried out after informing the responsible person.
- If two or more hoists are using the same track, precautions should be taken so that the hoist under repair should not be reached by the others.
- Whenever possible, position the hoist at the end of the track for easy access of the maintenance personnel.
- Whenever possible, the repairs should be carried out outside working hours.
- At the end of the repairs and after checking by the responsible person in the factory, the repaired hoist will be delivered, informing of the tasks carried out.
- The hoist will be tested for all functions by the hoist operator at no load after repair.

	**WARNING**
	Danger of injury. **Inappropriate maintenance work may result in severe injury or damage to property.** • Maintenance work may only be carried out by authorized and instructed specialist personnel in compliance with all safety regulations. **Danger due to incomplete maintenance.** **Danger to life and limb since the operating safety of the machine is not ensured.** • Carry out all specified maintenance work appropriately and in time. • For any work you cannot carry out yourself, please contact Customer Service. • Make sure that the entries in the test and inspection booklet of the hoist installation are complete.

5.0.2.- INSPECTION

- All hoists are inspected and tested at the factory. Regular in-service inspection and preventative maintenance programs not only help reduce overall maintenance costs but may also prevent service shutdowns by forewarning of problems that could cause these shutdowns.
- Regular inspections, periodic minor adjustments, regular cleaning and lubrication and replacement of worn parts can help preserve good performance and operation of the hoist.
- Many factors influence the inspection and preventative maintenance program required for the hoist.
- Frequency and severity of service and material handled, local environmental conditions and various applicable codes are some of the factors that the user must consider to adjust inspection and maintenance program outlined in this section to meet the specific conditions.
- Inspection procedure for hoists in regular service is divided into two general classifications as outlined in ASME B30.16.
- These two general classifications are based upon the intervals at which inspections should be performed.
- The intervals are dependent upon the nature of the critical components of the hoist, and the degree of exposure of hoist components and parts to wear and deterioration.

MAINTENANCE AND INSPECTION PROCEDURES

- The degree of exposure is dependent upon hoist activity, and severity of hoist service. Environmental conditions in which the hoist operates are also important considerations for the user, when adjusting hoist inspection and maintenance programs to local conditions.
- Frequency of inspection and maintenance must be increased if hoist is subjected to severe atmospheric environmental conditions, such as corrosive vapors, extreme heat or cold, cement or dust and other airborne contaminants.
- The user should carefully consider all environmental conditions and adjust frequency and degree of maintenance for his local conditions.
    - **Normal service** – That distributed service, which involves operation with randomly distributed load within the rated load limit or uniform loads less than 65% of rated load for not more than 25% of the time.
    - **Heavy service** – That service, which involves operation within the rated load limit that exceeds normal service.
    - **Severe service** – That service which involves or heavy service with abnormal operating conditions.

CAUTION

- Hoists used under harsh conditions may require a shorter servicing interval than stated in the table. 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 that is stated in the following table.
- If the hoisting machinery is used outdoors, the lubrication of all the hoisting machinery parts, as a general rule, should be carried out on a quarterly basis (every three months).

- The two classifications of hoist inspection are listed as **FREQUENT** and **PERIODIC**. In addition, daily inspections are required to be performed by the operator at the start of each shift, or at the time the hoist is first used during each shift.

5.0.2.1.- FREQUENT INSPECTION

- **FREQUENT** Inspection is visual examinations by the operator or other qualified personnel with intervals per the following criteria:

Table 5.0.2.1 (a) Frequent Inspection Intervals

Service	Hoist and Trolley Interval	Rope Inspection Interval
Normal Service	Monthly	Start of Every Shift
Heavy Service	Weekly to Monthly	
Severe Service	Daily to Weekly	
Special or Infrequent Service	As recommended by a qualified person before and after each occurrence.	

- Inspections should be made on a **FREQUENT** basis in accordance with Table 5.0.2.1 (b), "Frequent Inspection." Included in these **FREQUENT** Inspections are observations made during operation for any defects or damage that might appear between Periodic Inspections. A qualified person shall evaluate and resolve the results of **FREQUENT** Inspections such that the hoist/trolley is maintained in safe working condition.

MAINTENANCE AND INSPECTION PROCEDURES

Table 5.0.2.2.1 (b) Frequent Inspection	
All functional operating mechanisms for maladjustment and unusual sounds.	Hoist and trolley in accordance with ANSI/ASME B30.16
Operation of all limit switches and associated components	Upper limit devices in accordance with ANSI/ASME B30.16
Hoist/trolley braking system for proper operation	Hooks and hook latches in accordance with ANSI/ASME B30.10
Hook latch operation	Wire rope in accordance
Wire rope reeving for compliance	Proper function of pendant controls.

5.0.2.2.- PERIODIC INSPECTION

- **PERIODIC** Inspection is visual inspection by a qualified person with intervals per the following criteria:

Table 5.0.2.2 (a) Periodic Inspection Intervals		
Service	**Hoist and Trolley Interval**	**Rope Inspection Interval**
Normal Service	Yearly	1) At Least monthly, AND 2) Determined by a qualified person and based on such factors as expected rope life as determined by experience on the particular or similar installations; severity of environment; percentage of capacity lifts; frequency rates of operation; and exposure to shock loads. Inspections need not be at equal calendar intervals and should be more frequent as the rope approaches the end of its useful life. (Per ANSI B30.16)
Heavy Service	Semi annually	
Severe Service	Quarterly	
Special or Infrequent Service	As recommended by a qualified person before the first such occurrence and as directed by the qualified person for any subsequent occurrences.	

- Inspections should be made on a PERIODIC basis in accordance with Table 5.0.2.2 (b), "Periodic Inspection." A qualified person shall make evaluation and resolution of the results of PERIODIC Inspections such that the hoist is maintained in safe working condition.
- For inspections where load suspension parts of the hoist/trolley are disassembled, a load test per ANSI/ASME B30.16 must be performed on the hoist/trolley after it is re-assembled and prior to its return to service.

Table 5.0.2.2 (b) Periodic Inspection
Requirements of frequent inspection.
Evidence of loose bolts, nuts, or rivets.
Evidence of worn, corroded, cracked, or distorted parts such as suspension bolts, mounting eye bolts, stirrup bolts, stiffening plate bolts, gears, pins, bearings, pins, rollers.
Evidence of worn or damaged hook block, hook, clevises, yokes, shafts, wire rope and wire rope attachments.
Evidence of damage to hook retaining nuts or collars and pins, and welds or rivets used to secure the retaining members.
Evidence of worn or damaged rope-drum, rope guide and pulleys (sheaves).
End connections of wire rope.
Evidence of damage or excessive wear of load and idler sheaves.
Evidence of excessive wear on hoist or trolley motor parts.
Evidence of excessive wear on hoist or trolley brake system parts.
Evidence of excessive wear or damage to trolley wheels, gears and guide rollers.
Evidence of damage to supporting structure or trolley, if used.
Evidence of stress cracks on trolley stirrup plate welds.

MAINTENANCE AND INSPECTION PROCEDURES

Table 5.0.2.2.2 (b) Periodic Inspection
Electrical apparatus for signs of pitting or any deterioration of visible controller contacts and electrical components, such as, switches, contacts and pushbuttons.
Proper function of motion limit devices that interrupt power or cause a warning to be activated.
Proper function of load limiter device.
Evidence of damage to all cables, including festooned cables.
Function labels on pendant control stations for legibility.
Function, instruction and warning labels properly attached to the hoist/trolley and legible.
Verify proper lubrication of gears, rope drum, rope guide, rope, sheaves and all other parts requiring lubrication.

WARNING

- The inspection intervals listed above are nominal recommendations for reference purposes only. They are based on single shift operation under normal operating conditions and normal environmental conditions. Actual operating and environmental conditions should be reviewed by a qualified person and inspection intervals established on the recommendations of the qualified & authorized service person.
- If any damage or malfunctions are noted by the frequent or periodic inspection items of the hoist shall be tagged with an out-of-order sign and shall not be returned to regular operation until maintenance and repair of the damage or deficiencies found during the inspection have been corrected.
- Periodical inspecting and servicing procedure may only be carried out by a serviceman authorized by the hoist manufacturer, or by the service personnel that are adequately trained by the hoist manufacturer.

5.0.2.3.- OCCASIONALLY USED HOISTS AND TROLLEYS

- Hoists that are used infrequently shall be inspected as follows prior to placing in service:
  Hoist Idle More Than 1 Month, Less Than 1 Year: Inspect per **FREQUENT** Inspection criteria in Section 5.0.2.1.
  Hoist Idle More Than 1 Year: Inspect per **PERIODIC** Inspection criteria in Section 5.0.2.2.

5.0.2.4.- INSPECTION RECORDS

- Dated inspection reports and records should be maintained at time intervals corresponding to those that apply for the hoist's **PERIODIC** interval per Section 5.0.2.2. These records should be stored where they are available to personnel involved with the inspection, maintenance, or operation of the hoist/trolley.
- A long-range rope inspection program should be established and should include records of examination of ropes removed from service so a relationship can be established between visual observation and actual condition of the rope.

5.0.2.5.- RECOMMENDED INSPECTION AND MAINTENANCE PLAN

Below table shows the recommended inspection and maintenance plan that lists various components of the hoist that shall be checked in certain time.

CAUTION

- All maintenances activity must be performed by the authorized manufacture/authorized service team.
- For the safety carry out the inspection and servicing procedures for the hoist in accordance with maintenance task list.
- It is important to follow strictly the maintenance intervals. The safety of the equipment could be compromised if not.

MAINTENANCE AND INSPECTION PROCEDURES

Work to Carry Out and Checks	Before Putting into Operation	Daily Checking	Periodic Maintenance Intervals		
			3 months	6 months	12 months
Gear box – Lifting and Traveling					
Check oil levels and proceed with filling, if necessary.	X		X		
Oil level control.	X				X
Change oil in hoist/trolley gearbox.	3-5 years				
Lifting and Travelling Brake					
Measure the brake set and adjust it if necessary.			X		
Check brake disc wear and change if necessary.			X		
Check operation of the brake.	X	X		X	
Wire Rope, Rope Drum, Rope Clamp, Rope Guide, Rope Guide Springs and Thrust Rocker Spring					
Check rope drum and rope guide clamping, tight if necessary.	X		X		
Check lubrication of the rope & rope drum.	X		X		
Check spring condition of both the rope guide & thrust rocker.				X	
Check spring tension of both rope guide & thrust rocker.	X			X	
Examine wire rope for wear, damage and broken wires.	X	X	X		
Check wire rope, rope drum, rope clamp & rope guide.	X		X		
Hook and Sheaves					
Check hook, hook safety catch, hook rotation and wedge.	X	X		X	
Check hook wear, cracks and deformation.		X		X	
Check wear of block/return sheaves and bearings.				X	
Limit Switch & Overload Device					
Check the lifting & travel limit cut off of the hoist.	X	X	X		
Check correct operation and operation of the load detector.	X		X		
Over Load Spring		X	X		
Wheels and rolling					
Check wheel wear, bearings and rolling condition.	X			X	
Check the condition of end stopper and wheel buffer	X	X			X
Drive Shaft					
Check work condition, couplings and transmission.		X		X	
Terminals and connections					
Check condition of electrical wiring.	X				X
Check electrical enclosure seals.					X
Check operation of emergency switch.	X	X			X
Check control cables and control pendant.	X	X			X
Push Button					
Check condition and functions of buttons.	X	X		X	
Noises					
Check that there are not strange noises in the running of the motors, gear boxes and other hoist elements.	X				X
General Checking					
Check the hoist structure	X				X
Check all connections (bolts, welds, etc.)					X
Check securing elements (clips, bolts, etc.) for tight fit and corrosion.					X
Check and apply or supplement corrosion protection, as required.					X
Check adhesive grease in bearings and re-grease, as required.				X	

Table 5.0.2.5 Periodic Inspection Table

MAINTENANCE AND INSPECTION PROCEDURES

5.0.2.5.1.- DAILY INSPECTION BY OPERATOR

Required daily inspection items to be performed by the operator at the start of each shift, or at the time the hoist is first used during each shift are shown in below table.

INSPECTION ITEM	DESCRIPTION OF INSPECTION CHECK POINTS
Tagged Hoist	Check that hoist is not tagged with an out-of-order sign
Control Pendant	Check that travel motions ok with control pendant markings
Hook	Check for damage, cracks, nicks, gouges, deformation of the throat opening, wear on saddle or load bearing point, and twist. Refer to HOOK section of this manual.
Hook Latch	Check that hook latch is not missing and that it operates properly
Wire Rope	Check for broken wires, broken strands, kinks, and any type of deformation or damage to the rope structure. Refer to WIRE ROPE section of this manual.
Reeving	Check that wire rope is properly reeved and that rope parts are not twisted about each other. Refer to WIRE ROPE section of this manual.
Brakes	Check that hoist and trolley motions do not have excessive drift. If load dragging or increased stopping distance are observed, adjust the axial rotor stroke of the electric motor.
Limit Switches	Check that gravity type upper limit switch stops lifting motion of the hoist load block before striking any part of the hoist. (If supplied) check that the upper geared limit device stops lifting motion of the hoist load block two inches below the weight of the gravity type limit switch. check that the lower geared limit device stops lowering motion of the hoist hook with four wraps of wire rope at each drum.
Oil Leakage	Check for any sign of oil leakage on the hoist and on the floor area under the hoist.
Unusual Sounds	Check for any unusual sounds from the hoist and hoist mechanism while operating the hoist.
Warning Label	Check that warning label is not missing and that it is legible

Table 5.0.2.5.1

	WARNING
	• If any damage or malfunctions are noted by the daily inspection items, the operator shall not operate the hoist, and shall immediately advise the supervisor so corrective action can be taken. If the hoist is tagged with an out-of-order sign, the operator shall not operate the hoist. • Hoist operators should be trained to be aware of malfunctions of the equipment during operation, and to immediately stop operation if such malfunctions occur, and to immediately advise the supervisor so corrective action can be taken.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.2.5.2.- INSPECTION METHOD AND CRITERIA

Component	Inspection and maintenance task
Hoist	**Test-run the hoist first to see that all movements (hoisting, traveling) function smoothly without any unusual noise or vibration.** **Inspect the general condition and cleanness of the hoist.** Visually check the general condition and accumulation of dust or dirt. Pay special attention to: • Hoist motor body. Remove dust or dirt to eliminate insulating factor, as the motor heat must be able to dissipate that need cooling. • If the surfaces are not clean, parts may wear. Optical and other sensors. **Inspect the condition and fixing of covers.** • Test by hand that all covers are fixed. Visually check that covers are not bent or cracked. Fix or replace if needed
Stickers and markings	**Inspect the condition and readability of warning stickers and other stickers and markings.** • Visually check that all type plates and stickers exist and are readable. • Replace all missing and unclear stickers.
Capacity labeling	**Check that the capacity load of a hoist is readable on the hook block & hoist.**
Instructions and log books	**Check the availability and readability of instructions.** • Visually check product documentation. • Verify that the user and owner are aware of the documentation and it is available for them. • Replace all missing and not readable documentation
	Check the validity of log book. • Update the log book during the service process.

Table 5.0.2.5.2

5.0.2.5.3.- LIMITING DEVICES

Component	Inspection and maintenance task
Trolley buffers (Bumpers)	**Inspect the condition of trolley buffers and buffer end stops** • Verify that buffers (bumpers) make contact at the end stops. Replace worn or broken buffers.
Trolley traveling limit switches Hoisting limit switches Up Limit Slow Down Up Limit Down Limit Hook limit (Safety Up Limit/ Ultimate Limit)	**When installed, check the operation of the slowdown limit of a trolley.** **When installed, check the operation of the stop limit of a trolley.** **Verify the condition and operation of hoisting limit switches** • Operate the hoist in the up direction and slowly drive to the Up-Limit Switch Activation point. Check that it works. • Run the hook block down at a short distance and drive at high speed and check if the Slow Down Up Limit activates to override the highspeed command to slow down the speed before the Up Limit activates. • Operate the hoist in the down direction and drive to the Down Limit Switch Activation point. • Test the Hook Limit by hand actuation. Adjust or replace parts as required.

MAINTENANCE AND INSPECTION PROCEDURES

Component	Inspection and maintenance task
Up limit Distance	**Verify Up Limit Distance.** Verify the Up-Limit Distance to the frame of the trolley. It is important to adjust the C dimension according to the specification, to minimize rope and sheave wear.
Down Limit Distance	**Verify Down Limit Distance.** When the hook block is in the Down Limit Switch Activation point, verify that there is a minimum number of wraps of rope on the drum according to the standards (the absolute minimum is four full turns of a rope)
Overload protector	**Inspect the condition and operation of the overload protector.** **Mechanical switch and load sensor overload device:** • Test the free movements of mechanical parts. • Test the mechanical overload limit switch by mechanically activating the switch and checking for a click. • Clean and lubricate lever mechanism. • Verify that the set screw is locked in its place. • When required to confirm calibration, place a test weight of a nominal load plus 10%. Adjust mechanical overload to stop hoisting at 110% of capacity. • Replace damaged parts. **Power measurement overload device:** Conduct a test operation of the power measurement overload device according to the local regulations if necessary.
VFD	Check the amps and load limit setting properly. If need conduct a test operation of load limit

Table 5.0.2.5.3

5.0.2.5.4.- ELECTRICS

Component	Inspection and maintenance task
Emergency stop	**Check that the emergency button is clean and not damaged.** • Push in the emergency button. Test that no movement activates. Verify that the main contractor is off. • If the emergency stop is equipped with key locking, remove the key and test that it is not possible to release the emergency stop.
Main switch for hoist	**Check that the main switch is clean, clearly marked and not damaged.** • Test manually that the main switch switches off the hoist.
Wiring	**Inspect the condition of wiring and the connections**. • Follow the power supply and visually check the potential areas for damages • Pull on the wiring at the terminals • Check the wiring for any signs of wear, crushing, breaks, or cuts • Check visually that the cable bushings are tight • Check visually that the connectors are not damaged • Test by hand that the cable bushings are tight • Test by hand that the connectors are tight • Check randomly the tightness of screws at the terminal blocks and at the connections of other components. Note that the terminals can cause a heat damage to the insulation and/or to the connections.
Fuses	**Inspect visually that the fuse holder and the fuses are clean and there are no visible damages.** Check the correct amperage rating.

Table 5.0.2.5.4

MAINTENANCE AND INSPECTION PROCEDURES

5.0.2.5.5.- CONTROLS

Component	Inspection and maintenance task
Pendant	**Check the condition and functionality of push buttons and switches.** Check all markings and signs that they are readable. Drive all movements. Test all functions. • Change buttons/joystick or the whole pendant if needed.
Radio	**Check the condition and functionality of push buttons and switches.** Check all markings and signs that they are readable. Drive all movements. Test all functions. Change buttons/joystick or the whole pendant if needed. • Replace the battery if needed.

Table 5.0.2.5.5

5.0.2.5.6.- MOTORS AND GEARS

Component	Inspection and maintenance task
Hoisting motor	• Inspect for any unusual noise or vibration. • Drive and check that the hoisting motor operates properly when loaded. • Verify that the cooling fan is working properly. • Clean the cooling ribs surface from dust and dirt. **Check that all motor fastenings are tight and the motor is properly on its position.** If the bolts are loose, tighten them to the proper torque.
Travelling motor	• Inspect for any unusual noise or vibration. • Verify that the cooling fan is working properly. • Clean the cooling ribs surface from dust and dirt. **Check that all motor fastenings are tight and the motor is properly on its position.** If the bolts are loose, tighten them to the proper torque
Hoisting brake	**Check that there is no visible damage.** • Check that the outside surface of the brake is clean. Drive with nominal load and test that lifting and lowering brake smoothly and the braking time and distance is acceptable. • Disassemble the hoisting brake and measure disk pad thickness • Inspect the center hub teeth for cracks or any wear. Replace it if worn • Replace the disk when its condition is not complying with specifications • Clean the inner side of the brake from dust and dirt. **When the maximum allowed number of braking actions has taken place replace the hoisting motor brake. Check also the condition of coupling splines in the motor shaft and in the gear shaft**
Traveling brake	• Inspect that there is no visible damage. • Check that the outside surface of the brake is clean. Drive with load and test that brake operates smoothly and the braking time and distance is acceptable. **Disassemble the traveling brake:** • Measure the air gap, clean, and adjust the brake if needed Measure the brake pad. Replace it if necessary
Hoisting gear	• Check that the gearbox fastenings are secure. **Inspect the gearbox for possible lubrication leakage. If there is an excessive leakage, service the gearbox with manufacture.** • Test the gear running sound and vibrations with load. • Check that the breather-plug is free of dust and dirt. • Check the temperature of the hoisting gearbox by hand. • Check the oil level if an oil-filled hoisting gear

MAINTENANCE AND INSPECTION PROCEDURES

Component	Inspection and maintenance task
Traveling gear	**Check that the gearbox fastenings are secure.** • Inspect the gearbox for possible lubrication leakage. **Check visually the torque support mounting and the rubber bushing if present.** • Test the gear running sound and vibrations with load. • Check that the breather-plug is free of dust and dirt. • Check the temperature of the traveling gearbox by hand. • Check the oil level if an oil-filled traveling gear. **Open transmission:** • Inspect the open transmission visually for wear • Lubricate the open transmission.

Table 5.0.2.5.6

5.0.2.5.7.- MECHANICAL COMPONENT

Component	Inspection and maintenance task
Rope drum	**Rotation of a rope drum and the condition of bearings:** • Check the proper rotation of a drum and the condition of bearings. Drive with and without load. Pay attention to the running sound of the rope drum bearings and check that the rope drum does not touch with the machinery end plates or other parts. • Lubricate the drum bearings on both sides of the drum if not life- time lubricated.
	Inspect the condition and cleanliness of rope drum. • Check visually the grooves of the drum. Measure the groove wear if needed. • Clean and lubricate the drum surface.
Rope drum	**Inspect the fixing of the connection rods:** • Check visually that the connection rods are straight and the fixing screws are tight.
	Check the spring & key. • Check the spring & key for possible unusual noise during operation. Lubricate the spring & key.
	Inspect the condition and correct fastening of rope clamp. • Check that the rope clamp bolts are tight. • Ensure that there are friction turns when the hook is at the lowest position. • Ensure that the rope end projects from the last clamp to the specified length.
Rope guide	**Inspect the condition of the rope guide.** • Test the proper operation of the rope guide. Inspect the rope guide for loose or missing fittings. • Check the condition of the pressure spring. Clean the rope guide guiding rod. • Replace the worn parts. Lubricate the rope guide and the rope guide guiding rod.
Wire rope	**Inspect the condition of the rope.** Inspect the rope for • broken wires • kinks • wear dryness (lubricate if necessary).
Rope anchorage on drum	**Inspect the condition and correct position of a rope anchorage.** • Check that the rope clamp nuts are tight. • Ensure that the rope has not slipped in the rope anchorage by comparing to the nominal measurements. • Make sure that the rope end protrudes from the rope anchorage as specified. Inspect the condition of the wire rope near the rope anchorage. Inspect the anchorage shaft locking.

MAINTENANCE AND INSPECTION PROCEDURES

Component	Inspection and maintenance task
Rope anchorage on dead end	**Inspect the condition of a rope sheave support and a rope anchorage support.** • Check that the sheave support shaft(s) are correctly in their slots and correctly locked. • Lubricate the pivot bearing surfaces of the rope anchorage if needed. Ensure that the rope is assembled inside the rope anchorage correctly. Check that the wire rope clips have correct tightness and proper orientation.
Rope reeving	**Inspect the rope reeving assembly.** Lift up the hook and lower it down. Pay attention to the following issues: • Check if the hook block tries to rotate (remove the rotation by reassembling the end fixing and by rotating to the opposite direction) • Inspect that the reeving balancing tilts freely (in two rope systems) • Verify that the rope moves smoothly over all sheaves and trough the rope guide • Ensure that the rope is tight and properly laid on drum grooves. In true lift hoists, it is normal that the hoisting causes the hook block to rotate.
Rope sheaves (upper sheaves)	**Inspect the condition of rope sheaves.** • Measure the rope sheaves to check if any wear. • Inspect during operation if any unusual sound is coming from sheave bearings. **Check the condition of the rope sheave support structure.** • Check that the sheave support shafts are correctly in their slots and correctly locked. • Inspect the sheave support shaft fixing plate for any cracks replace the support shaft if required.
Hook safety latch	**Test by hand that the safety latch is not damaged and the spring keeps it closed.**
Hook forging	**Inspect the condition of hook forging.** Measure the hook forging opening if needed.
Hook block	**Check the operation and condition of the hook block.** Check the following: • The labels/stickers exist and are readable • The covers are not bent or damaged and do not touch to sheaves or rope • Lubricate all lubrication points. Lift an empty hook and test that: • The hook does not rotate. • The empty hook does not tilt. Test that the rope runs smoothly on sheaves with and without load.
	• Check the condition of the hook block hinge by tilting the hook forging. Check the condition of the hook thrust bearing by rotating the hook forging. **Lubricate the hook thrust bearing using the grease nipple, or open the cross bar if there is no grease nipple.**
Trolley wheels	**Inspect the condition and cleanliness of trolley wheels.** • Check the trolley wheels for possible wear in the trolley wheel surfaces and flanges. Check the adjustment of rail width or rail gauge and measure. Clean the wheel and its running surfaces from grease and oil. Replace the worn parts.
	Test trolley wheel operation. • Drive the trolley with and without load. Pay attention to the running sound of bearings. If necessary, lift the trolley and test by hand the free and smooth rotation of trolley wheels. • Check that the wheels are correctly aligned and inspect for possible wear that is caused by misalignment. Lubricate the bearings if needed and possible.

MAINTENANCE AND INSPECTION PROCEDURES

Component	Inspection and maintenance task
Trolley rail sweeps	**If provided Check the condition of trolley rail sweeps for any signs of wear and replace them if necessary.**
Load carrying structures	**Check the condition of bolted joints and load carrying structures.** Visually check the bolted and welded connections.

Table 5.0.2.5.7

5.0.2.5.8.- ANTI-COLLISION DEVICES (IF PROVIDED IN CRANE)

Component	Inspection and maintenance task
Photoelectric anti-collision device	**Inspect the condition and operation of the photoelectric anti-collision device.** • Clean the optical interfaces. • Check the screw connections. • Check the plug-in connections. • Inspect the operation of the photoelectric anti-collision device.
Ultrasonic anti-collision device	**Inspect the condition and operation of the ultrasonic anti-collision device.** • Clean the sensor off thick layers of dirt and caked-on dirt. Inspect the operation of the ultrasonic anti-collision device.

Table 5.0.2.5.8

5.0.2.5.9.- OPTIONAL DEVICE (IF PROVIDED IN CRANE)

Component	Inspection and maintenance task
Solenoid brake	**Inspect the condition and cleanliness of the drum brake.** • Check that the brake bands are in correct position. • Check that the cam spring is in good shape. • Check that the actuator mechanism is clean and moves freely. Test that the cam operates correctly when lifting and lowering. Test that the limit switch stops the motions. Lubricate the actuator and the cam mechanism if necessary.
Disc brake	**Inspect the condition and cleanliness of the second brake.** • Inspect that there is no visible damage in the brake. Check that the outside surface of the brake is clean. • Test that the second brake operates after the main brake. Check that lifting and lowering brake smoothly and braking time and distance is acceptable. • If needed, inspect the brake disk and clean the brake. • Note the correct torque of the fixing screws of the brake.
Manual brake release for hoist Motor	• Check that the manual brake release tools are available. Check that the operating instructions are available.

Table 5.0.2.5.9

MAINTENANCE AND INSPECTION PROCEDURES

5.0.3.- MAINTENANCE OF WIRE ROPE

- The wire ropes should be maintained according to the use of hoist and its duty cycle. Wire ropes should be properly cleaned and lubricated with recommended grease. Extra care will be taken on the bend portions of wire rope while greasing.
- Poor maintenance of wire rope will lead to shorter life time, particularly when it is working under severe working conditions.

5.0.4.- INSPECTION OF WIRE ROPE

- The wear in the wire rope greatly influences the work safety. It is necessary to inspect the wire rope regularly to avoid breakage. This will help to know the factors that are having more influence in wear and to take the necessary corrective actions.

5.0.4.1.- DAILY CHECK

- The wire rope should be checked against deterioration and deformation throughout the length. The importance will be given on the assembly areas of the hoist during check. If any suspect change is noticed, the same should be reported.

5.0.4.2.- PERIODIC INSPECTIONS AND MAINTENANCE TASKS

The frequency of the check can be fixed by considering the below parameters,

- The check must be done, according to the regulations of country where the hoist is used.
- Class of duty, type of hoist and its environmental condition also determines the frequency of check.
- The time duration of use of wire rope and results of previous checks will be considered for fixing the frequency of maintenance check.
- Apart from the above the wire should be checked when there is an incident that may cause damage to the rope and when dismantling and re-assembling rope. Similarly, if the hoist not used more than 3 months, it should be checked before putting into use.

5.0.4.3.- CHECK POINTS

- The complete rope should be checked for any damages. Other than that, the end connections of rope, rope at anchorage points, rope over compensating sheave, rope on drum and rope over hook sheaves should be checked by paying more attention.
- The rope should be checked at the end where it passes through anchorage, as this position is critical for fatigue and corrosion. The end fittings of the rope should be checked for any distortion and wear.
- The end sleeves in the rope should be checked for crack and there by chance of slippage of the rope.
- Inside the rope anchorage, the rope wedge lock should be checked for broken wires and tightness of rope.
- The rope should be checked for any possibilities of damage by friction due to external parts.
- The rope should be checked for corrosion and fatigue and any chance of exposed to high temperatures other than specified / ambient temperature.
- All the required checks should be done according to the code of practice which tells about termination of rope.
- The results should be recorded. The sheet attached (Annex-B) can be used for recording the checks.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.4.4.- CRITERIA TO DISCARD THE WIRE ROPE

The below criteria`s will determine the safe use of wire rope.

- The number of broken wires and its nature.
- Broken wires at both the end of ropes, Any localized grouping of wire ropes.
- The fracture of strands, Number of places it starts breaking and rate of propaganda.
- The core deterioration or deformation and shortened diameter.
- Reduced elasticity and permanent elongation.
- Wear and Corrosion both internally and externally.
- Damages due to heat and electric arcing.
- The combinations of errors will give the cumulative results for quick failure. So, all the checks should be carried out by competent person who can take decision to use or discard.
- Before replacing the new rope, the competent person should also check that the cause of damage is due to any damage in the hoist part. If so, it should also be corrected.

CAUTION

Risk of injury due to possibly broken wires.

- Always wear protective gloves when checking wire ropes.

5.0.4.5.- NATURE AND NUMBER OF BROKEN WIRES

- Any rope used in hoist has its own life time. So, replacement is must. Wire ropes with multi stranded construction will get broken internally which is invisible at majority of the times.
- Rope construction, duration of use, the duty of use will determine the rejection criteria for rotational resistant ropes. The number of visible broken wires which gives raise to rejection is given in the Table.
- Attention should be paid for any area exhibits a dryness or denaturing of the lubrication.

5.0.4.6.- BROKEN WIRES AT END OF ROPE

- Any Broken rope used at the end of the hoist even if it less in number; it indicates high stress area at that position. This may also occur due to incorrect assembly of rope with end anchorages and end clamps. Proper investigation must be made in this case and rope can be cut short and can be reused.

Product information

- H43 (SKZ8 P) is a wire rope (internal plastic component)
- H40 (SKZ8) is a wire rope
- Lay: Ordinary lay.
- Total number of wires: 4-6 mm 95, 7-15 mm 262, 16-24 mm 319, 25-44 mm 347, 45-64 mm 427, 65-76 mm 487
- ISO 4309 Rope Category No: 4-6 mm RCN.02, 7-15 mm RCN.04, 16-44 mmRCN.09, 45-76 mmRCN.13
- ISO 4309:2004-AMENDMENT/ 1Page 8 / Table 1

MAINTENANCE AND INSPECTION PROCEDURES

TABLE 1 — NUMBER OF WIRE BREAKS, REACHED OR EXCEEDED, OF VISIBLE BROKEN WIRES OCCURRING IN SINGLE-LAYER ROPES, SIGNALLING DISCARD OF ROPE

Rope category number RCN (see Annex E)	Number of load-bearing wires in outer strands	Number of visible broken wires related to the fatigue of the rope in a hoist which gives rise to rejection			
		Classification group for M1, M2, M3 and M4 mechanisms		Classification group for M5, M6, M7 and M8 mechanisms	
		ordinary		ordinary	
		Over a length of		Over a length of	
		6d	30d	6d	30d
01	n ≤ 50	2	4	4	8
02	51 ≤75	3	6	6	12
03	76 ≤ 100	4	8	8	16
04	101 ≤ 120	5	10	10	19
05	121 ≤ 140	6	11	11	22
06	141 ≤ 160	6	13	13	26
07	161 ≤ 180	7	14	14	29
08	181 ≤ 200	8	16	16	32
09	201 ≤ 220	9	18	18	38
10	221 ≤ 240	10	19	19	38
11	241 ≤ 260	10	21	21	42
12	261 ≤ 280	11	22	22	45
13	281 ≤ 300	12	24	24	48
14	300 < n	0,04 n	0,08 n	0,08 n	0,16 n

Table 5.0.4.6 (a)

- Filler wires are not regarded as load-bearing wires and are therefore excluded from the examination. In ropes having a number of layers of strands, only the visible outer layer is considered. In ropes having a steel core, this is regarded as an internal strand and is not considered.
- In the case of a calculation for numbers of visible broken wires, the value is rounded to a whole number. For ropes having outer wires in the external strands of larger size than the norm, the particular construction is down-graded in the table and indicated by an asterisk (*).
- d = nominal diameter of the rope.
- d = diameter of the rope.

NOTE - When a wire rope works totally or partly on synthetics or metallics with synthetic warranties, the wires breaking can happen in the inside, without any visible breaking or any important damages outside.

Table 2 Number of visible broken wires[1)] related to the fatigue of the rope in a crane which gives rise to rejection			
Classification groups for M1, M2, M3 and M4 mechanisms		Classification groups for M5, M6, M7 and M8 mechanisms	
Over a length[2)] of		Over a length[2)] of	
6d	*30d*	*6d*	*30d*
2	4	4	8

Table 5.0.4.6 (b)

MAINTENANCE AND INSPECTION PROCEDURES

5.0.4.7.- LOCALIZED GROUPING OF BROKEN WIRES

- Where broken wires are very close together, constituting local grouping of such breaks, the rope shall be discarded. If the grouping of such breaks occurs in a length less than 6 d or is concentrated in any one strand, it will be prudent to discard the rope even if the number of wire breaks is smaller than the maximum number indicated in tables 1 and 2.

5.0.4.8.- RATE OF INCREASE OF BROKEN WIRES

- In applications where the predominant cause of rope deterioration is fatigue, the commencement of broken wires will begin after a certain period of usage, but the number of breaks will progressively increase at ever-shortening intervals. In these cases, it is recommended that careful examination and recording of the increase of broken wires should be undertaken with a view to establishing the rate of increase of the breaks. An application of this "law" may be used in deciding the future date for rope discard.

5.0.4.9.- FRACTURE OF STRANDS

- If a complete strand fracture occurs, the rope shall be discarded.

5.0.4.10.- REDUCTION OF ROPE DIAMETER RESULTING FROM CORE DETERIORATION

Reduction of rope diameter resulting from deterioration of the core can be caused by:

a.-Internal wear and indentation.
b.-Internal wear caused by friction between individual strands and wires in the rope, particularly when it is subject to bending.
c.-Deterioration of a fiber core.
d.-Fracture of a steel core.
e.-Fracture of internal layers in a multi-strand construction.
If these factors cause the rope diameter (average of two diameter measurements normal to each other) to decrease by 3% of the nominal rope diameter for rotation-resistant ropes, or 10% for other ropes, the ropes shall be discarded even if no broken wires are visible.

NOTE. -

- New ropes may have an actual diameter greater than the nominal diameter so that the wear permissible will therefore, be greater by the same amount.
- Small deterioration may not be so apparent from normal examination, particularly if the rope stresses are well balanced throughout the individual strands. However, the condition may result in a high loss of rope strength, so that any suggestion of such internal deterioration shall be verified by internal examination procedures. Where such deterioration is confirmed, the wire rope shall be discarded (see annex D).

5.0.4.11.- EXTERNAL WEAR

- Abrasion of the crown wires of outer strands in the rope results from rubbing contact, under pressure, with the grooves in the sheaves and the drums. The condition is particularly evident on moving ropes at points of sheave contact when the load is being accelerated or decelerated, and shows itself as flat surfaces on the outer wires.
- Wear is promoted by lack of lubrication, or incorrect lubrication, and also by the presence of dust and grit.
- Wear reduces the strength of ropes by reducing the cross-sectional area of the steel.
- When owing to external wear the actual rope diameter has decreased by 7% or more of the nominal rope diameter, the ropes shall be discarded even if no wire breaks are visible.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.4.12.- DECREASED ELASTICITY

- Under certain circumstances usually associated with the working environment, a rope may sustain a substantial decrease in elasticity and will be unsafe for further use.
- Decreased elasticity is difficult to detect: if the examiner is in any doubt, advice should be obtained from a specialist in ropes. However, it is usually associated with the following:
    a. Reduction of rope diameter
    b. Elongation of the rope lay length.
    c. Lack of gap between individual wires and between strands, caused by the compression of the component parts against each other.
    d. The appearance of fine, brown powder within the strand gussets.
    e. While no wire breaks may be visible, the wire rope will be noticeably stiffer to handle and will certainly have a reduction in diameter greater than related purely to wear of individual wires. This condition can lead to abrupt failure under dynamic loading and is sufficient justification for immediate discard.

5.0.4.13.- EXTERNAL AND INTERNAL CORROSION

- Corrosion occurs particularly in marine and industrial polluted atmospheres, and will not only diminish the breaking strength by reducing the metallic area of the rope but will also accelerate fatigue by causing the irregular surface from which stress cracking will commence. Severe corrosion may cause decreased elasticity of the rope.

A.- EXTERNAL CORROSION

- Corrosion of the outer wires may be detected visually.

B.- INTERNAL CORROSION

- This condition is more difficult to detect than the external corrosion which frequently accompanies it, but the following indications may be recognized:
    1. Variation in rope diameter. In positions where the rope bends around sheaves, a reduction in diameter usually occurs. However, in stationary ropes it is not uncommon for an increase in diameter to occur due to the build-up of rust under the outer layer of strands.
    2. Loss of gap between the strands in the outer layer of the rope, frequently combined with wire breaks in the strand gussets.

  If there is any suggestion of internal corrosion, the rope should be subjected to internal examination as indicated in annex D; this shall be carried out by a competent person. Confirmation of severe internal corrosion is justification for immediate rope discard.

5.0.4.14.- DEFORMATION

- Visible distortion of the rope from its normal formation is termed "deformation" and may create a change at the deformation position which will result in an uneven stress distribution in the rope.
- Distinction is made between the following main deformations of rope on the basis of their appearance.
    a. Waviness.
    b. Basket or lantern distortion.
    c. Strand extrusion.
    d. Wire extrusion.
    e. Local increase in the diameter of the rope.
    f. Local decrease in the diameter of the rope.
    g. Flattened portions.
    h. Kinks or tightened loops & I - Bends

MAINTENANCE AND INSPECTION PROCEDURES

5.0.4.14.1.- WAVINESS (see annex E, plate 8)

- Waviness is a deformation where the longitudinal axis of the wire rope takes the shape of a helix. While not necessarily resulting in any loss of strength, such a deformation, if severe, may transmit a pulsation resulting in irregular rope drive. After prolonged working, this will give rise to wear and wire breaks.
- In the case of waviness (see figure 1), the wire rope shall be discarded if:

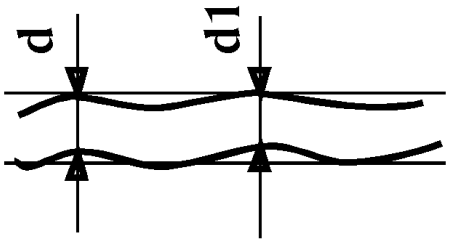


Figure 5.0.4.14.1

$$d1 > 4d / 3$$

- where d is the nominal diameter of the rope and d1 is the diameter corresponding to the envelope of the deformed rope, and the length of the rope under consideration does not exceed 25 d.

5.0.4.14.2.- BASKET OF LANTERN DISTORTION (see annex E, plate 9)

- This condition occurs in ropes having a steel Centre (or core) when the outer layer of strand has become dislocated, or when the outer layer becomes longer than the inner layer of strands. Such a condition may occur as a result of abrupt (snatch) loading of the rope from a slack condition. A basket or lantern formation is justification of immediate discard.

5.0.4.14.3.- STRAND EXTRUSION (see annex E, plate 10)

- This feature is frequently associated with basket or lantern deformation where the rope imbalance is indicated in the extrusion of the core.
- Strand extrusion is justification for immediate discard.

5.0.4.14.4.- WIRE EXTRUSION (see annex E, plates 11 and 12)

- In this condition, certain wires or groups or wires rise up, on the opposite side of the rope to the sheave groove, in the form of loops - this feature usually results from shock loading.
- If the deformation is severe, there is justification for rope discard.

5.0.4.14.5.- LOCAL INCREASE IN DIAMETER OF ROPE (see annex E, plates 13 and 14)

- A local increase in rope diameter may occur and could affect a relatively long length of the rope.
- The condition usually relates to a distortion of the core (in particular environments, a fiber core can swell up owing to the effect of moisture) and consequently it creates imbalance in the outer strands, which become incorrectly oriented.
- A severe condition is justification for rope discard.

5.0.4.14.6.- LOCAL DECREASE IN DIAMETER OF ROPE (see annex E, plate 17)

- A local decrease in the diameter of the rope is frequently associated with fracture of a core. Positions close to the terminations shall be carefully examined for such deformations.
- A severe condition is justification for rope discard.

5.0.4.14.7.- FLATTENED PORTIONS (see annex E, plates 18 and 19)

- Flattened portions occur as a result of mechanical damage; if severe, they are justification for rope discard.

5.0.4.14.8.- KINKS OR TIGHTENED LOOPS (see annex E, plates 15 and 16)

A kink or tightened loop is a deformation created by a loop in the rope which has been tightened without allowing for rotation about its axis. Imbalance of lay length occurs, which will cause excessive wear, and in severe cases the rope will be so distorted that it will have only a small proportion of its strength remaining.

A kink or tightened loop is justification for immediate discard.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.4.14.9.- BENDS (see annex E, plate 20)

Bends are angular deformations of the rope caused by external influence.

The condition is justification for immediate discard.

5.0.4.14.10.- DAMAGE DUE TO HEAT OR ELECTRIC ARCING

Wire ropes which have been subjected to exceptional thermal effects, externally recognized by the color produced, shall be discarded.

ANNEX A (Normative)

DIAGRAMMATIC ILLUSTRATION OF POSSIBLE DEFECTS TO BE CONSIDERED DURING EXAMINATION, WITH REFERENCE TO DIFFERENT AREAS

1. Examine termination of rope at drum.
2. Examine for defective coiling, which causes deformations (flattered portion) and wear, which can be severe at cross-over positions. Examine for wire breaks.
3. Examine for corrosion.
4. Look for deformations caused by snatch loading.
5. Examine portions which winds over the sheave for wire breaks and wear.
6. Points of attachment:
   - check for wire breaks and corrosion;
   - similarly, check section or rope which lies on or adjacent to
     i. compensating sheaves.
7. Look for deformation.
8. Check rope diameters.
9. Examine carefully length which runs through sheave block, particularly that length which lies on the sheave when the appliance is in a loaded condition.
10. Examine for wire breaks or surface wear.
11. Examine for corrosion.

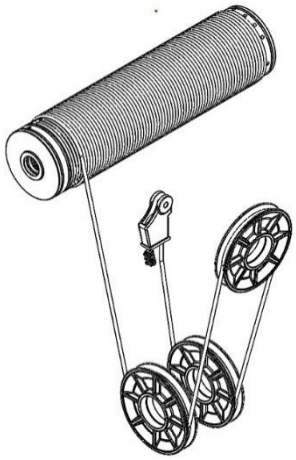


Figure 5.0.4.14.10

MAINTENANCE AND INSPECTION PROCEDURES

ANNEX B (Normative)

TYPICAL EXAMPLE OF EXAMINATION RECORD

Machine:..... Application:.....	
Construction:..... Direction of rope lay: RH/LH[1] ..... Type of lay: Ordinary/Langs[1] ..... Nominal diameter:..... Tensile grade:..... ungalvanized/galvanized[1]..... Type or core: steel/natural or synthetic textile/ mixed[1]..... Preformation:..... Length or rope:..... Type or termination:.....	Date fitted:..... Date discarded:..... Quality:..... Minimum breaking load:..... Working load:..... Diameter measured:..... Under a load of:.....

Visible broken wires	Abrasion of outer wires	Corrosion	Reduction of rope diameter	Positions measured	Overall assessment	Damage and deformations
Number in length of 6d	Degree of deterioration[2]	Degree of deterioration[2]	%		Degree of deterioration[2]	Nature

Date:.....	Signature:.....
Rope supplier:.....	Number of working hours.....
Other observations:.....	Reasons for discard:.....

Table 5.0.4.14.10

1. Delete as applicable.
2. In these columns, describe the latter as: slight, medium, high, very high, discard.

MAINTENANCE AND INSPECTION PROCEDURES

ANNEX C (Normative)
FREQUENCY OF EXAMINATION OR ROPE

C.1 SCOPE

- This annex recommends guidelines for frequency of examination or rope.

C.2 HOIST ON WHICH ROPES ARE EXPECTED TO HAVE EXTENDED PERFORMANCE

- In the case of hoist on which ropes are expected to have extended performance, the periodic examination shall take place at least once a month.
- NOTE- When defects occur, it is prudent to reduce the time interval between examinations.

ANNEX D (Normative)
INTERNAL EXAMINATION OF THE WIRE ROPE

D.0 INTRODUCTION

- Experience of examining wire rope and discarding it from service shows that internal deterioration, mainly as a result of corrosion and the normal progress of fatigue, is the prime cause of many rope failures. Normal external examination may not reveal the extent of internal deterioration, even to the point when fracture is imminent.
- Internal examination shall always be carried out by a competent person.

D.1 SCOPE

- All types of stranded wire ropes can be opened up sufficiently to permit assessment of their internal condition. It is difficult
- for large rope sizes. However, the majority or ropes fitted to hoist can be examined internally provided that they are at zero tension.

D.2 METHOD

- The method consists in attaching firmly to the rope, two clamping jaws of suitable size and distance apart.
- By applying a force to the clamping jaws in the opposite direction to the rope lay, the outer strands separate and move away from the core.
- Care should be taken during the opening process to ensure that the clamping jaws do not slip about the periphery of the rope. The strands should not be displaced excessively. When the wire rope only opens slightly, a small probe, such as a screwdriver, may be used to remove grease or debris which could hinder observation of the interior of the rope.
- The essential points which should be observed are:
    i. the state of the internal lubrication;
    ii. the degree or corrosion;
    iii. indentation of wires caused by pressure or wear
    iv. presence of broken wires (these are not necessarily easily visible)

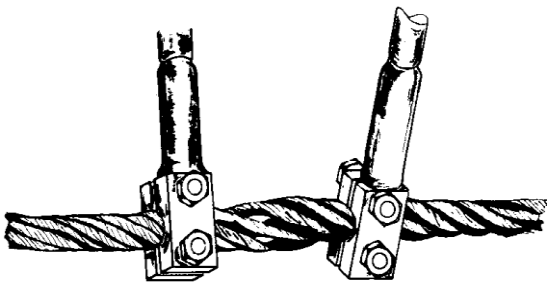


Figure D.2

- After examination, insert a service dressing into the opened part and effect rotation of the clamping jaws with moderate force to ensure correct replacement of the strands around the core. After removal of the jaws, the outer surface of the rope should normally be greased.

MAINTENANCE AND INSPECTION PROCEDURES

D.3 ROPE PORTIONS ADJACENT TO TERMINATION

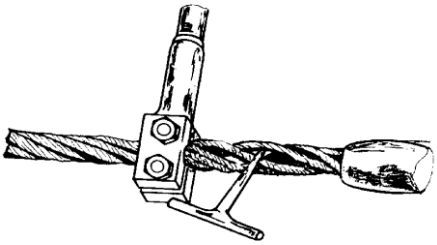


Figure D.3

- In examining these portions or rope, it is sufficient to use a single jaw. Since the end anchorage system, or a bar suitably
- Located through the end portion of the termination, will ensure the necessary immobilization of the other end.

D.4 PORTIONS WHICH SHOULD BE EXAMINED

- Since it is impracticable to examine the interior or the wire rope over the whole of its length, suitable sections must be selected.
- In the case of wire ropes which wind onto a drum, or pass over sheaves or rollers, it is recommended that the lengths which engage the sheave grooves when the hoist is in a loaded condition should be examined. Those localized areas in which shock forces are arrested (i.e. adjacent to drum and jib lead sheaves) and those lengths which are particularly exposed to the weather for long periods should be examined.
- Attention should be given to the area of rope close to its termination: this is particularly important in the case of fixed ropes, such as stays or pendants.
    - D.2) Internal examination of a continuous portion or rope (zero tension)
    - D.3) Internal examination at the end of a rope, close to the terminal fitting (zero tension)

ANNEX E (Normative)
TYPICAL EXAMPLES OF DEFECTS THAT MAY OCCUR IN WIRE ROPE

NOTE - For emphasis many plates show exaggerated deterioration, and the ropes depicted should have been discarded at an earlier stage. Action to be taken is printed in italics.

Plate 1 - Wire breaks and wire displacement over two adjacent strands in an ordinary lay rope.

Justification for discard

Plate 2 - A large number of wire breaks, associated with heavy wear in an ordinary lay rope

Justification for immediate discard

Plate 3 – Wire breaks in one strand, associated with slight wear in a Lang's lay rope

Further operation if this condition represents the worst condition (fractured wires should be broken out so that the end is at the strand gusset; this prevents further damage to the adjacent wires)

MAINTENANCE AND INSPECTION PROCEDURES

WEAR		EXTERNAL CORROSION	
	• Slight flats on outer wires. Little reduction in rope diameter.		• Beginning of surface oxidation.
	• Increased length of flats on individual outer wires.		• Wires rough to touch. General surface oxidation.
	• Flats on individual wires longer, affecting all crown wires in each strand. Marked reduction in rope size. • Outer criteria should be noted carefully.		• Oxidation now more marked.
	• Flats on individual wires now almost continuous - strands appear slightly flattened and wires are noticeably thin. • Could be justification for discard. Other criteria should be noted carefully; if the rope remains in service, the frequency of examination should be increased.		• Surface of wire now greatly affected by oxidation.
	• Flats touch each other, wires becoming slack with an estimated reduction in size of 40%. • Discard immediately. • **Plate 4** - Examples of the progression of wear and external corrosion in an ordinary lay rope.		• Surface heavily pitted and wire quite slack. • *Discard immediately*

MAINTENANCE AND INSPECTION PROCEDURES

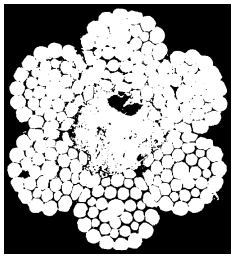
Plate 5- Wire breaks in several strands, local to a compensating sheave (and sometimes hidden by this sheave).

Justification for discard.

Plate 6- Wire breaks in two strands, local to a compensating sheave and associated with local severe wear, caused by the jamming of the sheave.

Justification for discard.

Plate 7 - An example of severe internal corrosion



The reduction of area of many outer wires in the strands where they are in contact with the core, the high degree of compression and loss of strand gap are all evident.

Justification for immediate discard

Plate 8 -Waviness: a deformation where the longitudinal axis of the rope takes the shape of helix

If the deformation exceeds the value indicated the rope shall be discarded

Plate 9 – Basket (bird cage) or lantern deformation of a multi-strand construction.

Justification for immediate discard

Plate 10 – Extrusion of a steel core, generally associated with a basket or lantern deformation in adjacent position.

Justification for immediate discard

Plate 11 - One strand only affected by wire extrusion, although examination over a length of rope shows that deformation is visible at regular intervals, normally of one lay length

Justification for immediate discard

Plate 12 - Aggravation of the previous fault (plate 11) (typical of a hoist rope on a piling machine) to a degree of severity

Justifying immediate discard

Plate 13 - Local increase in diameter of a Lang`s lay Wire rope caused by distortion of the steel core resulting from shock loading.

Justification for immediate discard

Plate 14 - Local increase in rope diameter, due to the protrusion of the fiber core, in a degraded condition between the outer strands.

Justification for discard

MAINTENANCE AND INSPECTION PROCEDURES

Plate 15 - A severe kink or lightened loop Note the screwed- up lay, causing the extrusion of the fiber core.

Justification for immediate discard

Plate 16 - A wire rope which has been kinked during installation but which has been placed in operation, and is now subject to localized wear and to wire slackness.

Justification for discard

Plate 17 - Local decrease in rope diameter, as the outer strands take the place of the fiber core, which has disintegrated. Note also presence of broken wires.

Justification for immediate discard

Plate 18 – Flattened portion due to local crushing, creating imbalance in the strands and associated with broken wires.

Justification for discard

Plate 19 - Flattened portion of multi- strand rope caused by improper coiling on a drum

Note: how the lay length of the outer layer of strands

has increased. Again, there will be imbalance of stress under load conditions.

Justification for discard

Plate 20 – Example of severe bend

Justification for discard

Plate 21 - Typical example of when the wire rope has jumped out of a sheave groove and wedged up.

A deformation in the form of "flattened portion" has resulted and there is local wear and many wire breaks.

Justification for immediate discard

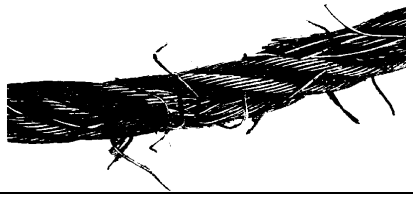


Plate22 - Cumulative effects of several deteriorating factors.

Note in particular the severe wear of the outer wires leading to looseness of the wires such that a basket-type deformation is forming. There are several wire breaks

Justification for immediate discard

MAINTENANCE AND INSPECTION PROCEDURES

5.0.5.- WIRE ROPE DRIVE

	**WARNING** **Danger due to damaged or twisted ropes!** A twist in the rope impairs its safety and durability. • Therefore, always remove twists!

	**WARNING** **Danger due to wire breakage!** With specific applications (e.g., Constant dead load, repeated holding position, automatic operation, oscillations, etc.), wire breakage can arise inside the rope, which is not visible from the outside. Danger of accidents! • In case of doubt, contact the manufacturer

	**WARNING** **Danger of load crash!** Further use of a wire rope that is worn out can lead to the rope breaking and a load crash, resulting in serious injuries or even death. • Check the wire rope regularly. • If a wire rope is worn out, it must be replaced immediately. • Use only original spare parts

- Wire ropes must be checked in accordance with the periods listed in the risk assessment, although at least once yearly. Depending on the operating conditions and the operational situation, additional tests may be necessary. Personnel who have been commissioned with monitoring wire ropes must be familiar with the relevant standards.
- A wire rope is worn out once it is no longer possible to be certain of safe continued operation due to wear. Maintenance, monitoring and the following criteria for discarding worn wire ropes are described in detail in the standard ISO 4309. Typical damage and wear conditions of wire ropes are presented in the following.

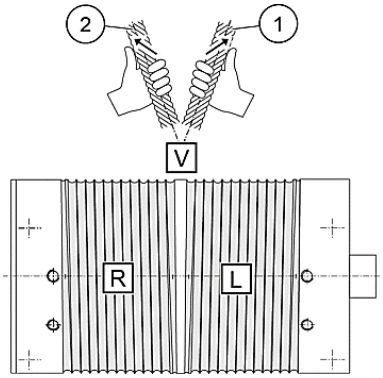
Changing the Wire Rope

	**WARNING** **Danger due to unsuitable rope,** • Hoist has a special wire rope construction • The replacement rope must be the same as the original rope. To determine which wire rope is installed, refer to the works certificate or rope certificate Therefore, always remove twists! • The Substitute rope must be equal to the original rope in terms of quality and strength

Refer spare parts manual for the rope specification to the relevant hoist supplied

WARNING

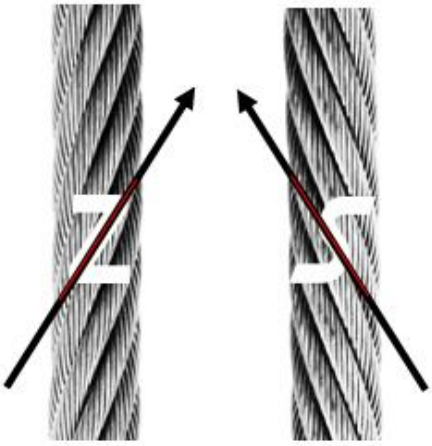
- Always tighten and secure ropes at the rope fastening point according to instructions given this manual refer section 2.0.9.3.2.
- With 2 wire ropes with a different direction of lay, observe the following:



- right-hand lay wire rope (1) laid on rope drum with left-hand groove (L)
- left-hand lay wire rope (2) laid on rope drum with right-hand groove (R).

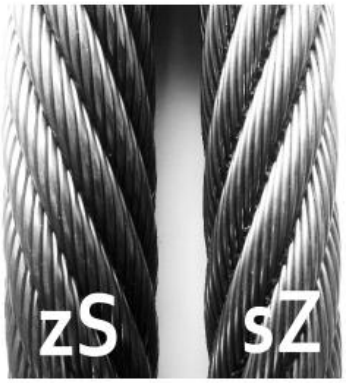
- *This wire rope lay is not applicable for Endless rope configuration Hoist*

Direction of lay of the rope



right hand lay rope Z left hand lay rope S

Ordinary lay:



left (zS) right (sZ)

- The wires in the outer strands have an opposite direction of lay than the outer strands in the rope. As a result, the wires practically lie on an axis with the rope itself.
- The first letter refers to the direction of lay of the strand and the second letter refers to the direction of lay of the rope.

5.0.5.1.- WIRE ROPE REPLACEMENT PROCEDURE

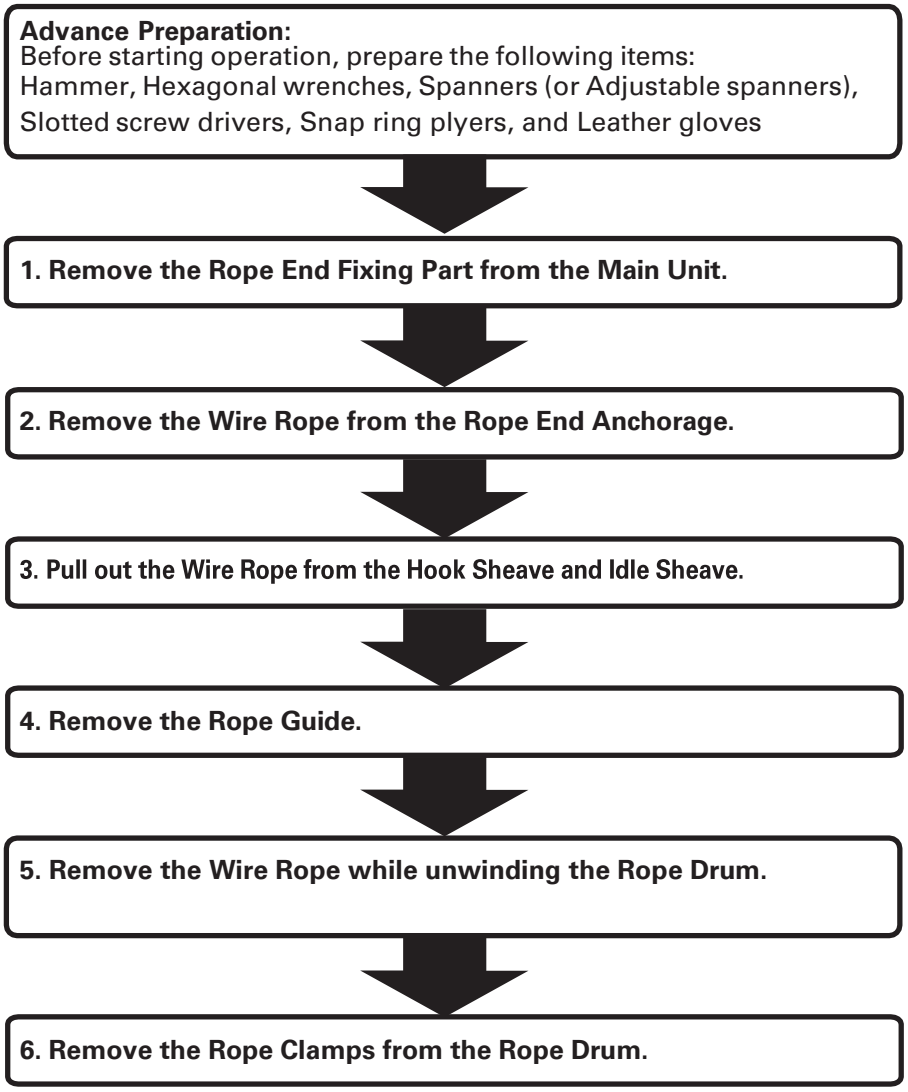
- The rope clamps are specially manufactured and should be tightened to the respective torque

for more details see table 3.0.6.1

- *For more detail refer spare parts manual for relevant model supplied.*

5.0.5.1.1- REMOVING WIRE ROPE

- follow the procedure below to remove the wire rope

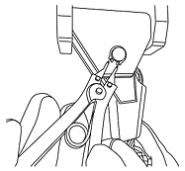


	NOTICE
	• Diagram illustration shown in only for reference may vary with actual. • **For Assembly and disassembly procedure, refer spare parts manual of relevant hoist supply.**

MAINTENANCE AND INSPECTION PROCEDURES

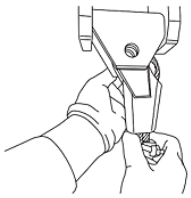
Step 1:

- Remove the lock nut/circlip/cotter pin from the anchorage shaft supporting the Rope End Fixing Part of the main unit.



Step 2:

- Pull out the anchorage shaft from the end assembly.

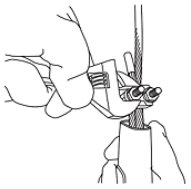


Step 3:

- Remove the nut and then the Wire Clip at the rope end.

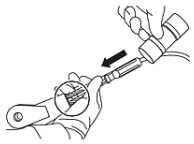
CAUTION

- Your hand may be injured.
- Wear gloves. Etc., and be careful of frayed wires at the rope end during operation

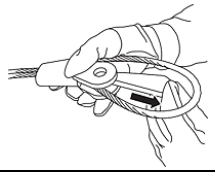


Step 4:

- Tap lightly the tip of the rope wedge, and pull out the rope wedge from the rope anchorage.

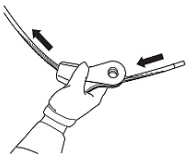


- If it is difficult to tap the tip of the rope wedge, put a slotted screw driver on the rope wedge as shown in the figure and tap the driver with a hammer.



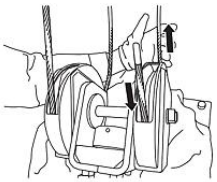
Step 5:

- Remove the Wire Rope from the rope wedge.



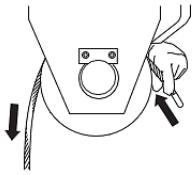
Step 6:

- Pull out slowly the Wire Rope from the Hook Sheave of the Hook Block.
- Image shown as just for working procedure. Number of sheaves on the hook block will vary according to the load and reeving. For more details refer section 5.0.7.2

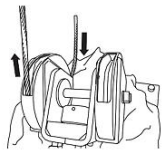
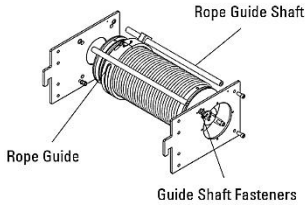
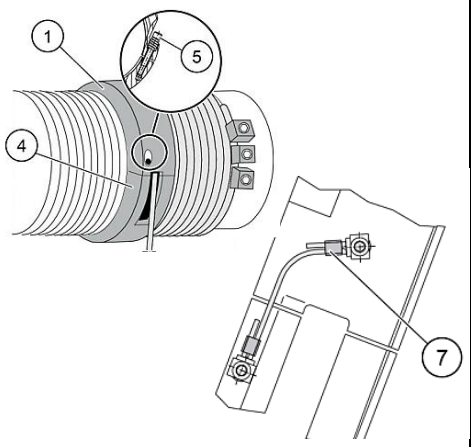
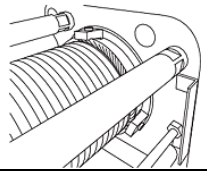
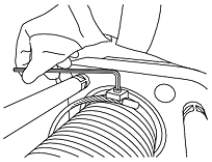


Step 7:

- Pull out slowly the Wire Rope from the Idle Sheave.
- Image shown as just for working procedure. Number of sheaves on the idle block will vary according to the load and reeving.



MAINTENANCE AND INSPECTION PROCEDURES

Step 8: • Pull out slowly the Wire Rope from the other Hook Sheave of the Hook Block. • Image shown as just for working procedure. Number of sheaves on the hook block will vary according to the load and reeving. For more details refer section 5.0.7.2	
Step 9: • Rotate the rope drum in anticlockwise direction, rope guide start moves towards the starting groove of the rope drum and simultaneously wire rope also unwind from the rope drum grooves. • Once wire rope reaches the end, remove the guide shaft from the assembly by removing the guide shaft fasteners.	
Step 10: • Remove the Rope Guide from the Rope Drum by following the procedure described below. **Step 10.1:** • Unscrew the rope guide shaft on the rope drum. The rope guide ring now turns freely. **Step 10.2:** • Loosen screws (5). **Step 10.3:** • Loosen the rope guide ring lock (7) on one side (if supplied). **Step 10.4:** • Remove the ring halves (1) and (4). **Step 10.5:** • Detach the rope tension spring.	
Step 11: • Perform unwinding operation while pulling the Wire Rope by hand so that the Wire Rope does not float away from the Rope Drum. Remove in advance the Wire Rope to the position of the Rope Clamp as shown right.	
Step 12: • Loosen socket bolts and remove Wire Clamps at the locations to remove the Wire Rope from the Wire Drum. Remove the Wire Rope while holding it by hand so as to prevent the Wire Rope from being removed suddenly by tension of the Wire Rope.	

NOTICE

- After removing the wire rope using the above procedure, follow the procedure described from the next page to attach the replacement wire rope

WARNING

- Maintenance activity should be carried out only be authorized person only.
- Insufficient skilled work may lead to accident, severe injury and causes death.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.5.1.2- ATTACHING THE WIRE ROPE IN TO THE HOIST

Advance Preparation:
Before starting operation, prepare the following items:
Replacement Wire Rope, Hammer, Hexagonal wrenches, Spanners (or Adjustable spanners), Snap ring plyers, and Leather gloves

1. Unpack and straighten the Wire Rope.

2. Fasten the Wire Rope with the Rope Clamp on Rope Drum.

3. Perform lifting operation to wind the Wire Rope on the Rope Drum.

4. Attach the Rope Guide.

5. Pass the rope end through the Hook Sheave and Idle Sheave.

* No of Hook sheave and idle sheave will vary according to reeving type 2/1, 4/1, 6/1, 4/2, 8/2, 12/2, 8/2-Z. For more details refer section 5.0.6.2 to 5.0.6.6

6. Pass the Wire Rope through the rope wedge, and insert the rope anchorage.

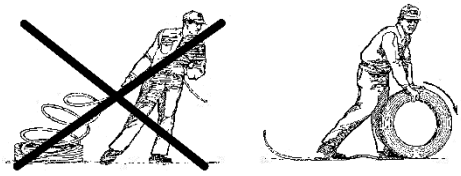
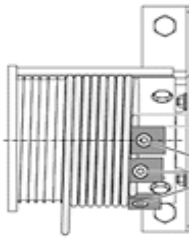
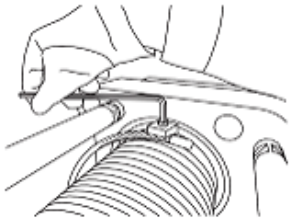
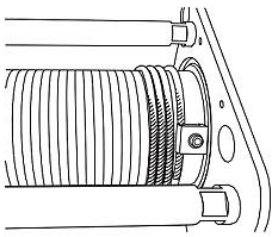
7. Fix the Wire rope clamp to the rope end.

8. Attach the Rope wedge, socket sleeve to the rope end

MAINTENANCE AND INSPECTION PROCEDURES

	MANDATORY
	Use a genuine Wire Rope having a proper rope diameter, length, structure and breaking strength. • Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but may also cause failure of the hoist and may lead to serious severe injury, death or any property damage.

	NOTICE
	• Diagram illustration shown in only for reference may vary with actual. • **For Assembly and disassembly procedure, refer spare parts manual of relevant hoist supply.**

Step 1: • Unpack the Replacement Wire Rope. Straighten the Replacement Wire Rope into a straight untwisted line in a wide space. Note: Replace the Wire Rope in a straightened state. If the Wire Rope is assembled in a twisted state, it moves violently or floats away from the Rope Drum when wound on it.	
Step 2: • Fasten the end of the Wire Rope to the Wire Drum with the socket bolt and Wire Clamp as shown in the figure. (The minimum amount of protrusion of the Wire Rope must be approximately three times the rope diameter.) • Fixing the rope to the rope drum refer section 5.0.6.1 **Note**: Be sure to fasten the Wire Rope from the position indicated in the figure on the right.	
Step 3: • Perform lifting operation to rotate the Rope Drum slowly by certain degrees. Fasten the Wire Rope at the following position.	
Step 4: • Fasten the Wire Rope to the remaining position in the same way as Step 3). (The Wire Rope must be fastened to give hole positions in the rope drum) • Refer spare parts manual for number of clamps, bolt size & torque as per check and tightening torque refer section 3.0.6.1	
Step 5: • After fastening the wire rope, rotate the Rope drum slowly, and place the wire rope wound in parallel by two turns in the Rope Drum's groove from the groove's start point (where the groove starts). Place the Wire rope in the groove of the Rope Drum by rotating the Rope Drum in the lifting direction while pulling lightly the wire rope with a hand so as to prevent the wire rope from floating • Wind the Wire rope around the rope drum to some extent	

MAINTENANCE AND INSPECTION PROCEDURES

Step 6:

- Attach the Rope Guide to the Rope Drum by following procedure described below

Step 6.1: Place the ring half of the rope guide (1) with next to the last rope winding of the rope drum such that the wire rope exits the opening "X".

Step 6.2: Slide the rope tension spring (2) with special tool (3) into the guide groove of the rope guide ring half (1) and hook the spring ends together.

Step 6.3: Place second rope guide ring half with large opening (4) on the rope drum.

Step 6.4: Run the wire rope straight and free of bends from the drum groove through the opening.

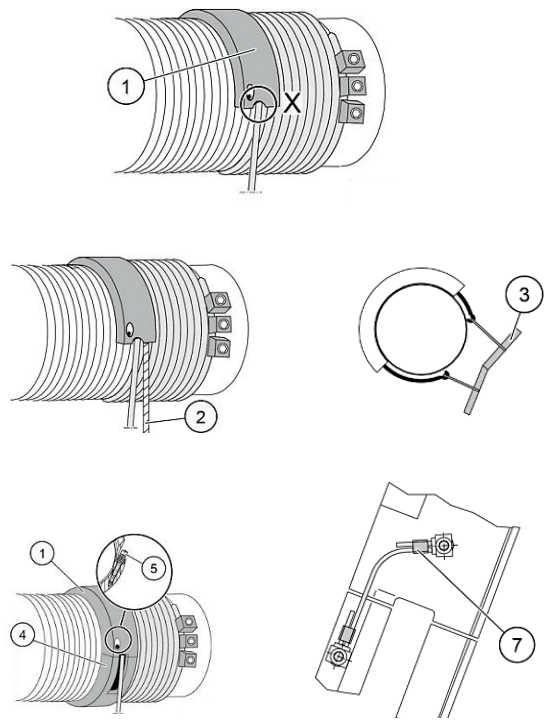
Step 6.5: Make sure that the two rope guide ring halves (1) and (4) meet each other with no offset.

Step 6.6: Connect both rope guide ring halves (1) and (4) together with screw/spring (5).

Step 6.7: Make sure the rope guide lies flexibly on the rope drum and can be turned by hand.

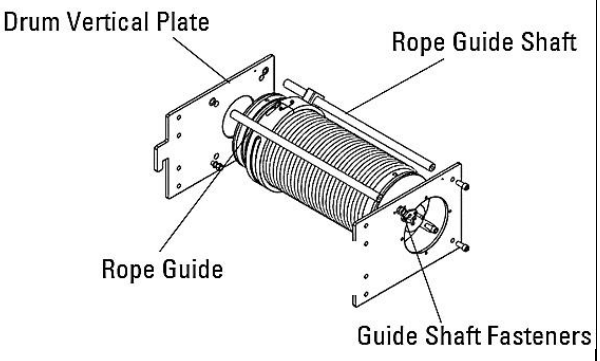
Step 6.8: Assemble the rope guide ring lock (7) (If supplied).

NOTICE
If this is not the case, an error has occurred during installation or the rope drum is damaged



Step 7:

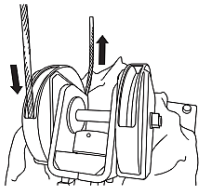
- Assemble the Rope Guide Shaft on Drum vertical plate to the Rope drum using guide shaft fasteners
- Guide shaft helps to prevent the rope guide self-rotation while movement on the rope drum and its act like a guide to it.
- After guide shaft assembly, rotate the Rope drum slowly, and place the wire rope wound in the Rope Drum's groove till the other end.
- Place the Wire rope in the groove of the Rope Drum by rotating the Rope Drum in the lifting direction while pulling lightly the wire rope with a hand so as to prevent the wire rope from floating



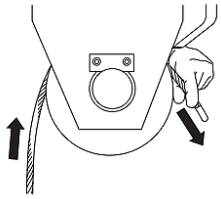
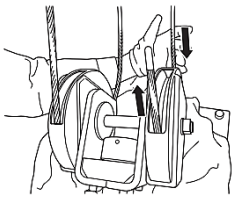
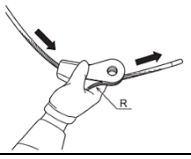
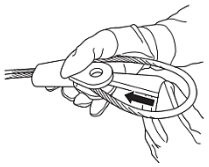
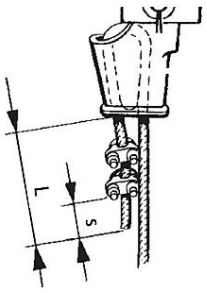
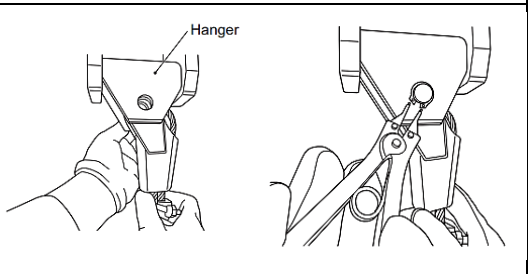
Step 8:

- Pay attention to passing position, Pass the rope end through the Hook Sheave.

Image shown as just for procedure for Understanding. Number of sheaves on the hook block will vary according to the load and reeving. For more details refer section 5.0.7.2



MAINTENANCE AND INSPECTION PROCEDURES

Step 9: • Pay attention to passing position, Pass the rope through the Idle Sheave. • Image shown as just for understanding procedure. Number of sheaves on the Idle block will vary according to the load and reeving.	
Step 10: • Pass the wire rope through the other hook sheave of the hook Block. • Image shown as just for understanding procedure. Number of sheaves on the hook block will vary according to the load and reeving.	
Step 11: • Pass the wire rope through the rope anchor be careful about the position. (Pass the wire rope from the side not having an arc shape [R-Shape].)	
Step 12: • Insert the rope lock **Step 13:** • Pass the wire rope from the gap between the rope lock and the rope anchor	
Step 14: • Fix the wire rope clamp to the rope end • Fix the wire clip at a distance of four times the wire rope diameter from the lower wind of the socket, that the wire rope of a length of four times the wire rope diameter is exposed. Pull the wire rope sufficiently before fixing so that the wire rope does not float away from the rope lock • tightening torque of the wire clip refer table 3.0.6.1 • Fixing the rope-to-rope anchorage refer section 5.0.6	
Step 15: • Insert the anchorage shaft from inside into the rope end fixing part of the main unit, and fix the socket • When this is done, untwist the wire rope and insert the socket into the hanger in the direction shown in the figure. **Step 16:** • Firmly fix the tip of the fixed end shaft with the (snap ring/nut & lock nut/cotter pin).	

WARNING

- Maintenance activity should be carried out only be authorized person only.
- Insufficient skilled work may lead to accident, severe injury and causes death.
- On assembly use thread-locking adhesive for all screws
- Refer table 3.0.6.1 for tightening screws and Loctite details and don't reuse the nylon nut.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.6.- FIXING THE ROPE END ANCHORAGE

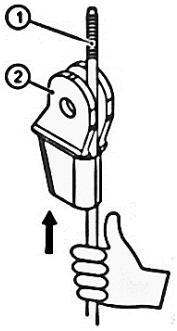
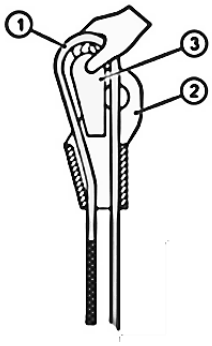
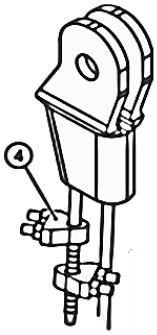
The free end of the Rope is fixed in a suspended rope anchorage. The rope clamps ensure that the rope cannot accidentally slip through the rope anchorage.

NOTICE

- Diagram illustration shown in only for reference may vary with actual.
- Rope anchorage assembly and disassembly procedure is same for all Hoist.
- Overload device is available only in underslung Hoist [CRU0.5, CRU01, CRU02].
- Make sure that the rope enters the anchorage in the correct direction.

For Assembly and disassembly procedure, refer spare parts manual of relevant hoist supply.

Rope Assembly Procedure

1	 Insert the rope (1) into the rope anchorage (2)	2	 Turn rope (1) back to rope anchorage (2). Insert the wedge (3) into the rope anchorage (2), making sure that a length around 50mm (s) of free end and 150mm (L) to anchorage (2).
3	 Insert the rope clamps (4)		

WARNING

- Maintenance activity should be carried out only be authorized person only.
- Insufficient skilled work may lead to accident, severe injury and causes death.
- On assembly use thread-locking adhesive for all screws
- Refer table 3.0.6.1 for tightening screws and Loctite details and don't reuse the nylon nut.

MAINTENANCE AND INSPECTION PROCEDURES

NOTICE

Checking the rope anchorage

- Visually inspect the rope anchorage, and check that the rope has not moved in the anchorage and that the rope clamp is tight. Fit a new anchorage if any breakage or deformation is found.

Changing the rope anchorage:

- Lower the hook onto a support and remove the rope anchorage
- Push the wedge out of the anchorage (2), remove the nut, washers and shaft.
- Fit a new rope anchorage, push the rope dead end through the anchorage again
- Tighten the rope into its housing, leaving around 50mm (s) of free end and 150mm (L) to anchorage (2).

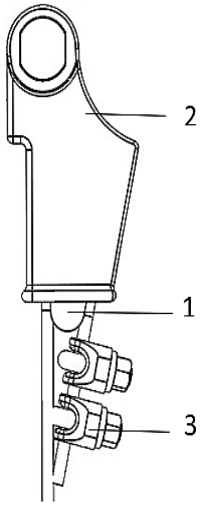


Figure 5.0.6 (a)

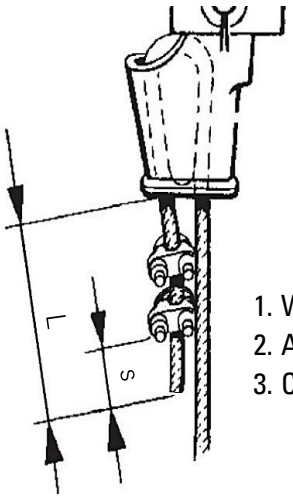


Figure 5.0.6 (b)

1. Wedge
2. Anchorage
3. Clamping element

Model	Rope Ø (mm)	Clamp size	Number of Clamps	Tightening torque
CRU 0.5 CRU 0.1 CRU 02	6.5	M6	2	Refer chapter 3.0.6.1
CLH 0.5 CLH 01 CLH 02	6.5	M6	2	
CLH 03	6.5	M6	2	
CLH 05 CLHD 05	8	M8	2	
CLH 7.5 CLHD 7.5	11	M10	3	
CLH 10 CLHD10	11	M10	3	
CLH 16 CLHD 16 CR16	14	M12	3	
CR20	16.2	M16	3	
CR32	22	M16	3	

Table 5.0.6

WARNING

- Tightening torque of the clamp nut should be checked as per standard.
- It is recommended that self-locking nuts are always replaced when removed

Self-locking nuts cannot be reused

- For more details about nut tightening torque refer section 3.0.6.1

NOTICE

- Diagram illustration shown in only for reference may vary with actual.
- We have tabulated the rope specification and no of clamps in general, refer spare parts manual for the relevant model supplied.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.6.1.- FIXING THE ROPE TO THE ROPE DRUM

- The rope is fixed to the rope drum with rope clamps. The number of rope clamps varies with the type of Hoist
- Fix the rope end (3) to the drum by clamps (2) and fasten each of them by bolts (1).
- The sizes of the bolts are given in below table.

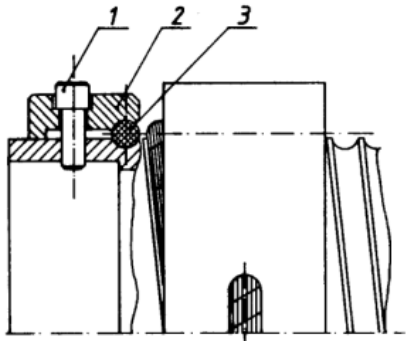
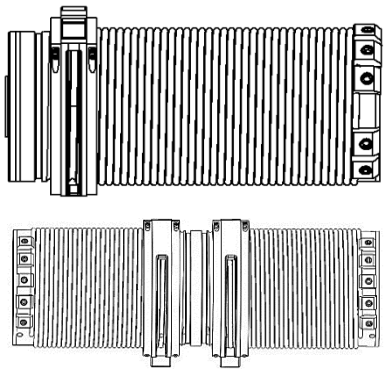


Figure 5.0.6.1 (a)



A = One roped version

B = True vertical lift

Figure 5.0.6.1 (b)

Model	Rope Ø (mm)	Clamp size	Number of Clamps		Tightening torque
			A	B	
CRU 0.5, CRU 0.1, CRU 02	6.5	M8	3	-	Refer chapter 3.0.6.1
CLH 0.5, CLH 01, CLH 02	6.5	M8	3	-	
CLH 03	6.5	M8	3	-	
CLH 05, CLHD 05	8	M10	3	6	
CLH 7.5, CLHD 7.5	11	M10	3	6	
CLH 10, CLHD10	11	M10	3	6	
CLH 16, CLHD 16, CR16	14	M16	5	10	
CR20	16.2	M16	5	10	
CR32	22	M16	5	10	

Table 5.0.6.1

WARNING

- In addition to the clamps on the rope ends, there must always be at least four full turns of rope on the drum when the hook is at its lowest position in order to provide friction and prevent interference between rope guide and clamp.
- Check that the rope clamp bolt does not extend into inner surface of the drum tube.
- The rope clamps are specially manufactured and should be tightened to the respective torque for more details see table 3.0.6.1

NOTICE

- Diagram illustration shown in only for reference may vary with actual.
- We have tabulated the rope specification and no of clamps in general, refer spare parts manual for the relevant model supplied.

	MANDATORY
	After replacing the wire rope, check that the Rope guide moves smoothly under no load and the wire rope moves without obstruction. • Failure to comply with this instruction may not only result in failure to obtain normal function and performance of the hoist, but may also cause failure of the hoist and may lead to serious accidents, injury, death and property damage.

5.0.6.2.- REEVING 2/1

5.0.6.2.1.- DISCARDING OF THE ROPE AND REMOVAL OF THE ROPE GUIDE

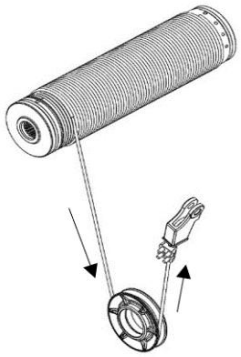


Figure 5.0.6.2.1 (a)

- Lower the Hook bottom block (22) and place it on the working platform or floor.
- Set the hoist limit switch so that a lowering beyond the lowest hook position becomes possible.
- Remove the End tie block (11) with its security elements, remove the rope lock (12) using their fasteners (13-16).
- Un pass the wire rope from Hook block (22).
- Reel off the wire rope from the rope drum (1) by move the rope guide (5) towards to Drum starting groove and stop it one its touch the rope clamp (3).
- loosen the hoist cover fasteners (8, 10) and demount the hoist cover (9).
- Loosen the tensioning parts (6) and remove the guide shaft (7) and also demount the rope guide (5).
- Completely reel off the rope and detach rope clamps (3) and Fasteners (4).

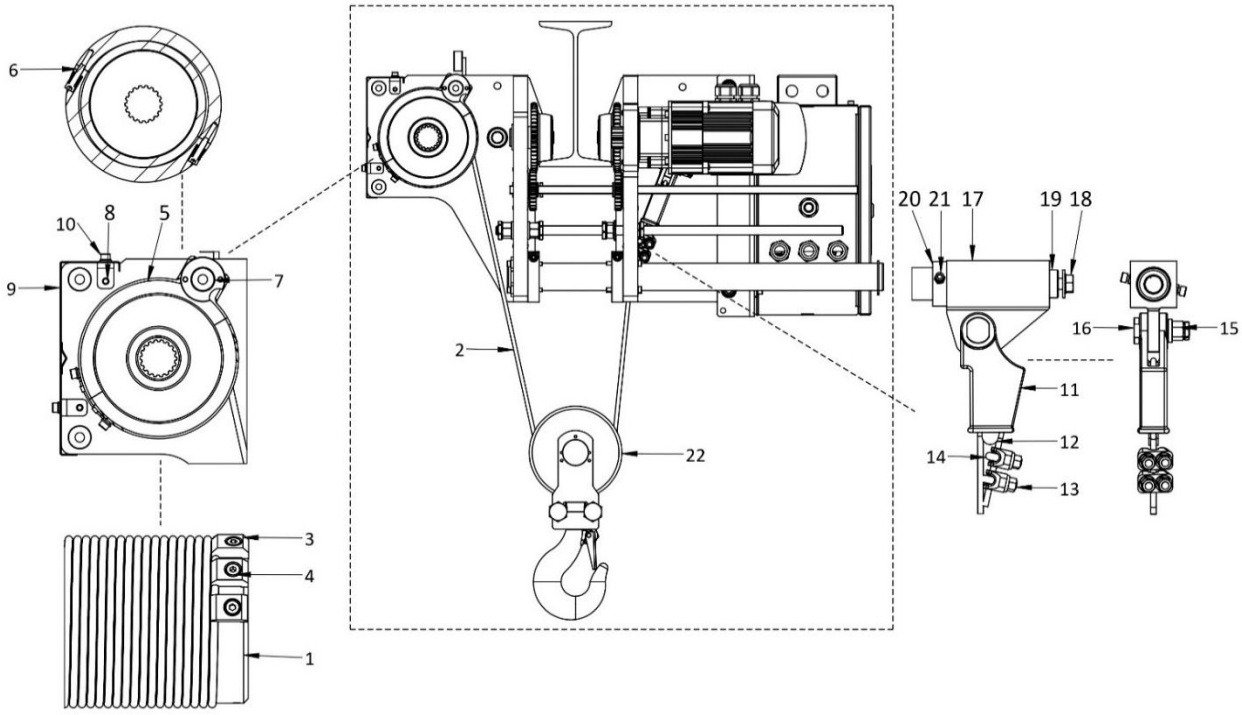


Figure 5.0.6.2.1 (b)

	NOTICE
	• Arrow shows the rope reeving direction. • Diagram illustration shown in only for reference may vary with actual.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.6.2.2.- INSTALLATION OF A NEW WIRE ROPE AND OF THE ROPE GUIDE

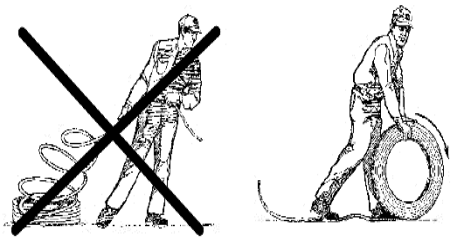


Figure 5.0.6.2.2

- Pay out the original spare rope on the ground under the wire rope hoist.
- Make sure the rope is twist– and buckling–free. Before winding the wire rope over the drum (1), remove all oil and grease residues from the drum. From below, push the wire rope (2) under the rope clamps (3) and Fasteners (4) until the rope end protrudes by approx.3cm.
- Tighten the fastening screws according to the prescribed torques. See section 3.0.6.1
- Tautly wind the rope around the drum (1) by ap-prox. 6–8 turns. Make sure the rope is twist–free.
- Grease the rope drum around the rope guide ring with the special grease
- Spread the rope guide (5) and lead it over the drum (1) in such a way that its threaded segments engage in the grooves of the rope drum and that the ending rope line (2) exits through the guide slit.
- Suspend tension parts (6) and adjust them by turning the eye bolt until the rope guide ring is fitting tight.
- Twist the rope guide ring (5) until the guide edge engages in drum casing. Then fasten the rope guide ring (6).
- Reeve the free rope end without twisting and fasten it in the rope socket (12-16) of the fixed-point tie–bar (17) through the hook block sheave and idle sheave (if available).
- Entirely coil up the rope and adjust the limit switch to the highest and lowest position.

5.0.6.2.3.- REMOVING TWIST

- Over the course of time, a twist may develop in wire ropes. The result is that the bottom block twist when the rope is unloaded. To eliminate this tendency to twist, the bottom block must be lowered to the ground, the rope lock released and the rope turned 180°. The rope must then be attached firmly to the bottom block again. The effectiveness of the action taken must be checked by raising and lowering the hoist without a load. It may be necessary to repeat this procedure several times.

5.0.6.3.- REEVING 4/1

5.0.6.3.1.- DISCARDING OF THE ROPE AND REMOVAL OF THE ROPE GUIDE

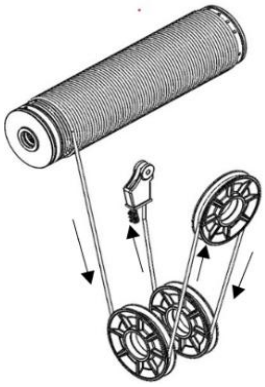


Figure 5.0.6.3.1 (a)

- Lower the Hook bottom block (21) and place it on the working platform or floor.
- Set the hoist limit switch so that a lowering beyond the lowest hook position becomes possible.
- Remove the End tie assembly (16) with its security elements (17), remove the rope lock (14) using their fasteners (18 & 19) and detach the rope end (15,20).
- Un pass the wire rope from Hook block (21) and its Hook Sheave (11) and Top idle Sheave (12)
- Reel off the wire rope from the rope drum (1) by move the rope guide (5) towards to Drum starting groove and stop it one its touch the rope clamp (3).
- loosen the hoist cover fasteners (8, 10) and demount the hoist cover (9).
- Loosen the tensioning parts (6) and remove the guide shaft (7) and also demount the rope guide (5).
- Completely reel off the rope and detach rope clamps (3) and Fasteners (4).

NOTICE

- Arrow shows the rope reeving direction.
- Diagram illustration shown in only for reference may vary with actual.

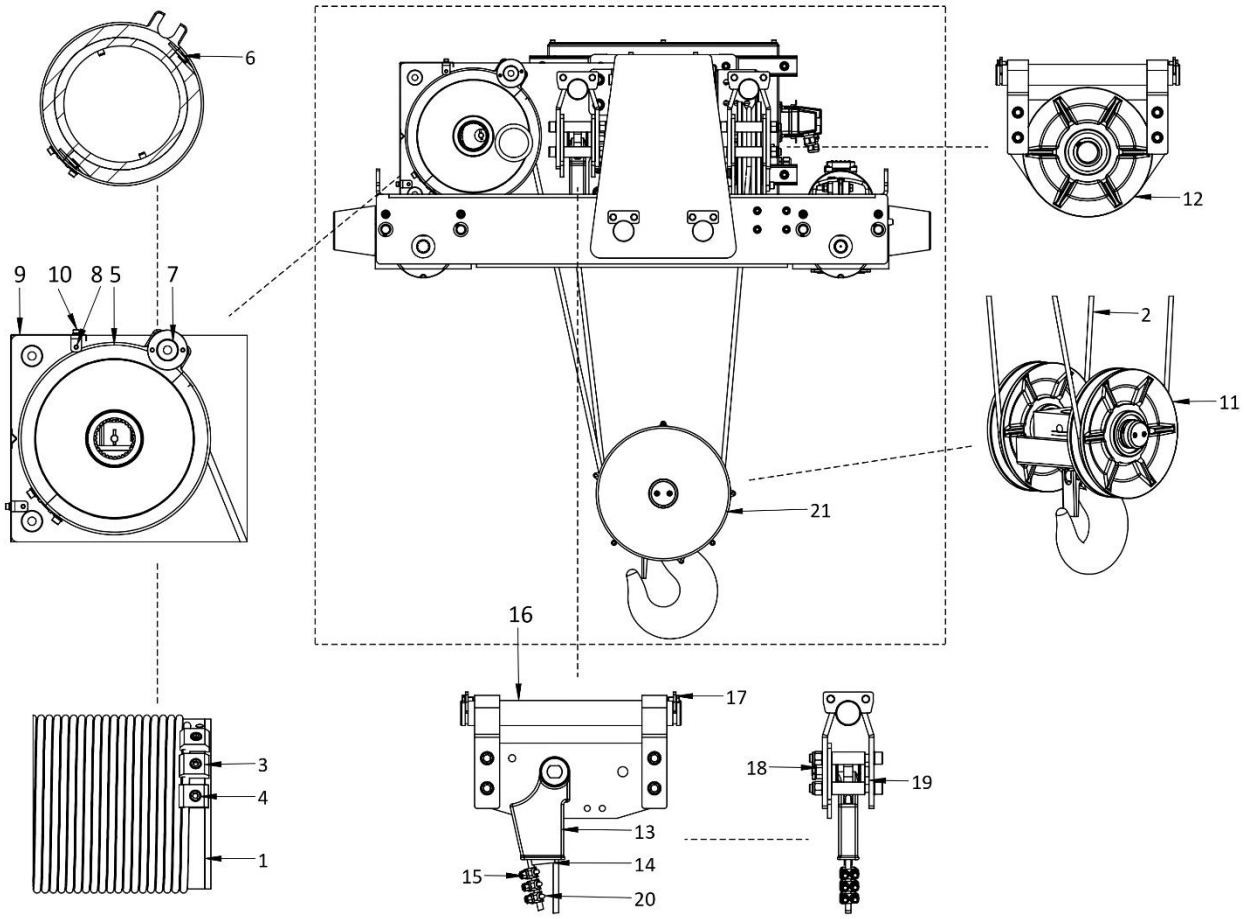


Figure 5.0.6.3.1 (b)

NOTICE
• Diagram illustration shown in only for reference may vary with actual.

5.0.6.3.2.- INSTALLATION OF A NEW WIRE ROPE AND OF THE ROPE GUIDE

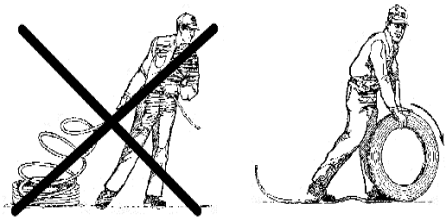


Figure 5.0.6.3.2

- Pay out the original spare rope on the ground under the wire rope hoist.
- Make sure the rope is twist– and buckling–free. Before winding the wire rope over the drum (1), remove all oil and grease residues from the drum. From below, push the wire rope (2) under the rope clamps (3) and Fasteners (4) until the rope end protrudes by approx.3cm.
- Tighten the fastening screws according to the prescribed torques. See section 3.0.6.1
- Tautly wind the rope around the drum (1) by ap-prox. 6–8 turns. Make sure the rope is twist–free.
- Grease the rope drum around the rope guide ring with the special grease
- Spread the rope guide (5) and lead it over the drum (1) in such a way that its threaded segments engage in the grooves of the rope drum and that the ending rope line (2) exits through the guide slit.
- Suspend tension parts (6) and adjust them by turning the eye bolt until the rope guide ring is fitting tight.
- Twist the rope guide ring (5) until the guide edge engages in drum casing. Then fasten the rope guide ring (6).

MAINTENANCE AND INSPECTION PROCEDURES

- Reeve the free rope end without twisting and fasten it in the rope socket (13-19) of the fixed-point tie–bar (17) through the hook block sheave and top idle sheave (12).
- Entirely coil up the rope and adjust the limit switch to the highest and lowest position.

5.0.6.3.3.- REMOVING TWIST

- Over the course of time, a twist may develop in wire ropes. The result is that the bottom block twist when the rope is unloaded. To eliminate this tendency to twist, the bottom block must be lowered to the ground, the rope lock released and the rope turned 180°. The rope must then be attached firmly to the bottom block again. The effectiveness of the action taken must be checked by raising and lowering the hoist without a load. It may be necessary to repeat this procedure several times.

5.0.6.4.- REEVING 6/1

5.0.6.4.1.- DISCARDING OF THE ROPE AND REMOVAL OF THE ROPE GUIDE

- Lower the Hook bottom block (21) and place it on the working platform or floor.
- Set the hoist limit switch so that a lowering beyond the lowest hook position becomes possible.
- Remove the End tie assembly (16) with its security elements (17), remove the rope lock (14) using their fasteners (18 & 19) and detach the rope end (15,20).
- Un pass the wire rope from Hook block (21) and its Hook Sheave (11) and also from top idle Sheave (12)
- Reel off the wire rope from the rope drum (1) by move the rope guide (5) towards to Drum starting groove and stop it once its touch the rope clamp (3).
- loosen the hoist cover fasteners (8, 10) and demount the hoist cover (9).
- Loosen the tensioning parts (6) and remove the guide shaft (7) and also demount the rope guide (5).
- Completely reel off the rope and detach rope clamps (3) and Fasteners (4).

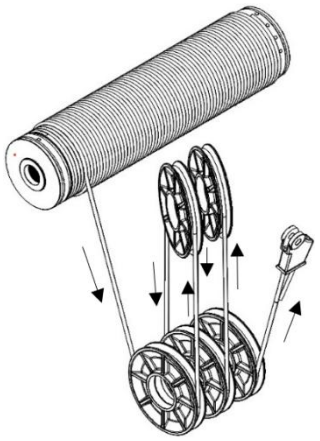


Figure 5.0.6.4.1 (a)

5.0.6.4.2.- INSTALLATION OF A NEW WIRE ROPE AND OF THE ROPE GUIDE

- Pay out the original spare rope on the ground under the wire rope hoist.
- Make sure the rope is twist– and buckling–free. Before winding the wire rope over the drum (1), remove all oil and grease residues from the drum. From below, push the wire rope (2) under the rope clamps (3, 4) until the rope end protrudes by approx.3cm. Tighten the fastening screws according to the prescribed torques. See section 3.0.6.1

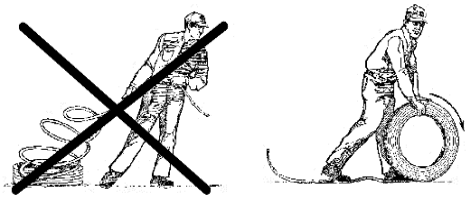


Figure 5.0.6.4.2

- Tautly wind the rope around the drum (1) by ap-prox. 6–8 turns. Make sure the rope is twist–free.
- Grease the rope drum around the rope guide ring with the special grease
- Spread the rope guide (5) and lead it over the drum (1) in such a way that its threaded segments engage in the grooves of the rope drum and that the ending rope line (2) exits through the guide slit.
- Suspend tension parts (6) and adjust them by turning the eye bolt until the rope guide ring is fitting tight.
- Twist the rope guide ring (5) until the guide edge engages in drum casing. Then fasten the rope guide ring (6).
- Reeve the free rope end without twisting and fasten it in the rope socket (14-16) of the fixed-point tie–bar (17) through the hook block sheave and top idle sheave (if available).
- Entirely coil up the rope and adjust the limit switch to the highest and lowest position.

	NOTICE
	• Arrow shows the rope reeving direction. • Diagram illustration shown in only for reference may vary with actual.

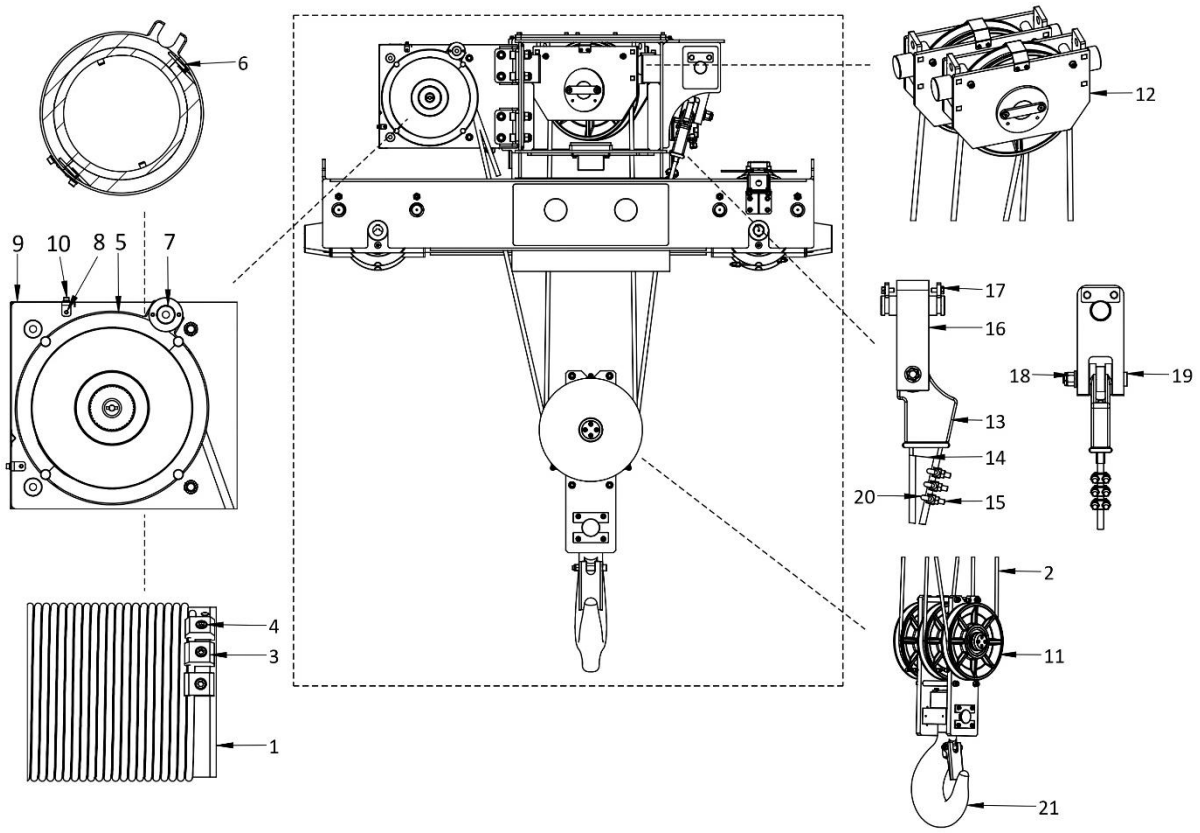


Figure 5.0.6.4.1 (b)

	NOTICE
	• Diagram illustration shown in only for reference may vary with actual.

5.0.6.4.3.- REMOVING TWIST

- Over the course of time, a twist may develop in wire ropes. The result is that the bottom block twist when the rope is unloaded. To eliminate this tendency to twist, the bottom block must be lowered to the ground, the rope lock released and the rope turned 180°. The rope must then be attached firmly to the bottom block again. The effectiveness of the action taken must be checked by raising and lowering the hoist without a load. It may be necessary to repeat this procedure several times.

5.0.6.5.- REEVING 4/2, 8/2 AND 12/2 DOUBLE GROOVE (TRUE VERTICAL LIFT)

5.0.6.5.1.- DISCARDING OF THE ROPE AND REMOVAL OF THE ROPE GUIDE

- Lower the bottom block (13) and place it on the working platform or floor.
- Set the hoist limit switch so that a lowering beyond the lowest hook position becomes possible.
- loosen the hoist cover fasteners (8, 10) and demount the hoist cover (9) and remove the guide shaft (7).
- Allow the rope to unroll completely and release the rope clamps (3) Fasteners (4) at both ends of the rope drum (1).
- Finally unpassed the wire rope (2) from Hook Block sheaves (14) and Top sheave Assemblies (11) and (12).

MAINTENANCE AND INSPECTION PROCEDURES

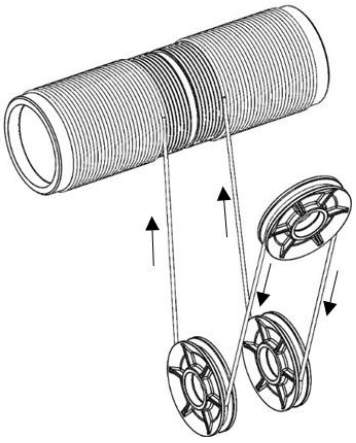


Figure 5.0.6.5.1 (a)

For Reeving 4/2

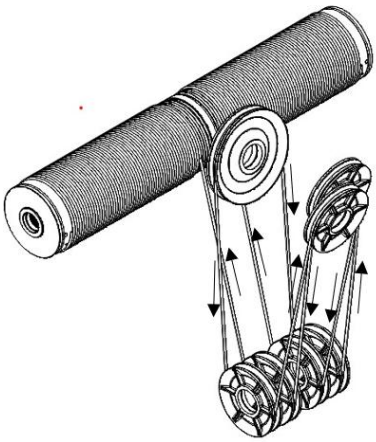


Figure 5.0.6.5.1 (b)

For Reeving 8/2

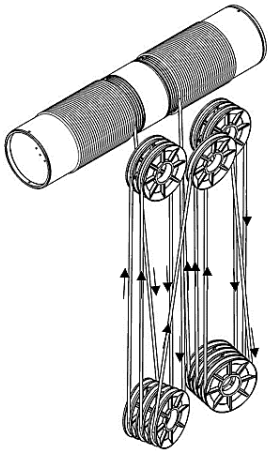


Figure 5.0.6.5.1 (c)

For Reeving 12/2

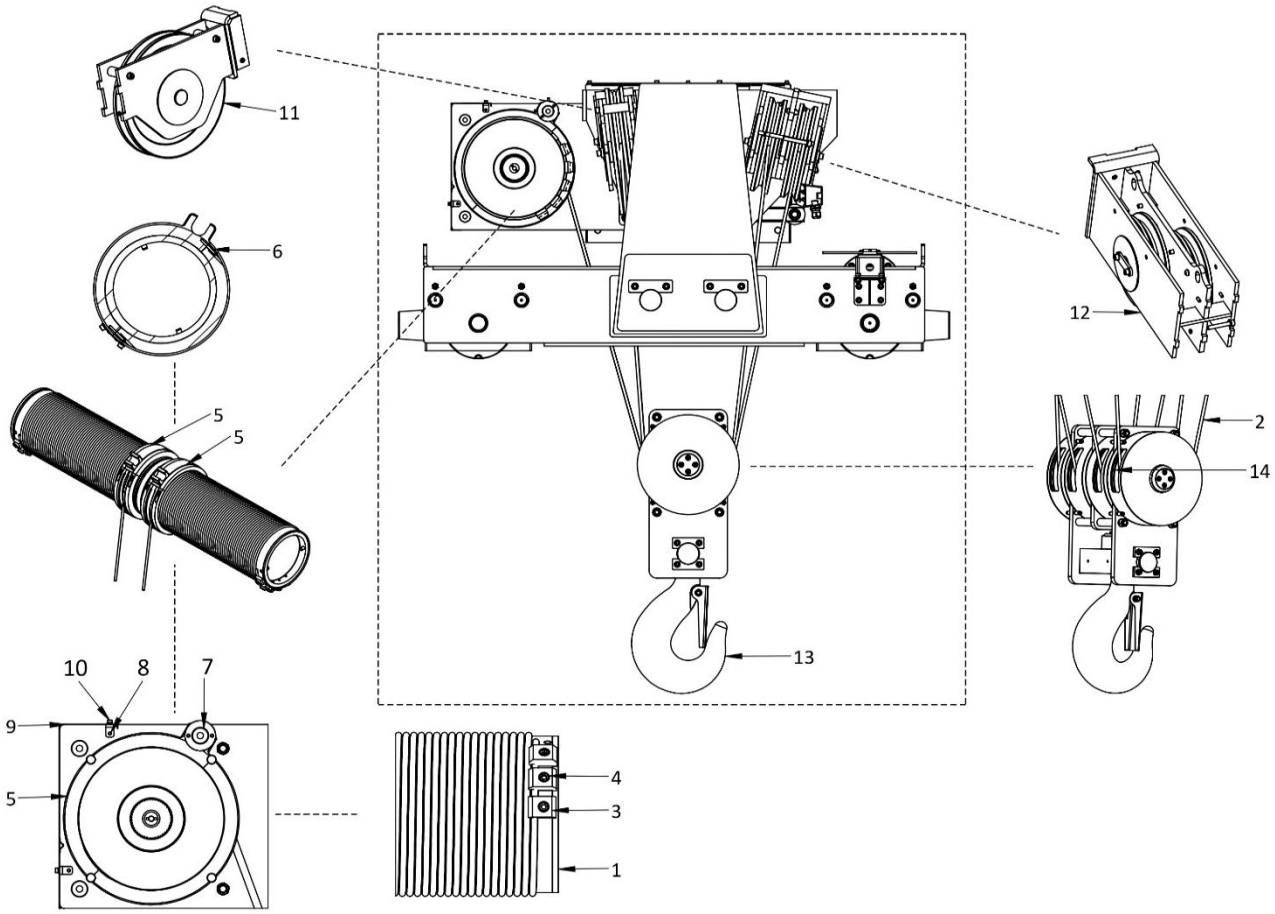


Figure 5.0.6.5.1 (d)

NOTICE

- Arrow shows the rope reeving direction.
- Diagram illustration shown in only for reference may vary with actual.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.6.5.2.- INSTALLATION OF A NEW WIRE ROPE AND OF THE ROPE GUIDE

- Pay out the original spare rope on the ground under the electric wire rope hoist. Make sure the rope is twist– and buckling–free. Before winding the wire rope over the drum (1), remove all oil and grease residues from the drum.
- Position the rope on the Top Sheave assembly-2 (12) in such a way that the two loose ends of the rope have about the same length.
- Insert the rope without twisting.
    - For Reeving 4/2 See Figure 5.0.6.5.1(a)
    - For Reeving 8/2 See Figure 5.0.6.5.1(b)
    - For Reeving 12/2 See Figure 5.0.6.5.1(c)

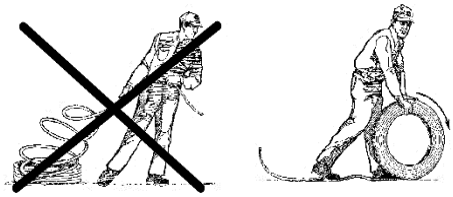


Figure 5.0.6.5.2

- Insert both ends of the rope (2) under the rope clamps (3 and 4) from below until the ends protrude about 3 cm. Tighten the fastening screws according to the prescribed torques.
- Tautly wind the rope around the drum (1) by approx.6–8 turns. Make sure the rope is twist–free.
- Grease the rope drum around the rope guide ring with the special grease.
- Spread the rope guide (5) and lead it over the drum (1) in such a way that its threaded segments engage in the grooves of the rope drum and that the ending rope line (2) exits through the guide slit.
- Suspend tension parts (6) and adjust them by turning the eye bolt until the rope guide ring is fitting tight.
- Twist the rope guide ring (5) until the guide edge engages in drum casing. Then fasten the rope guide ring (6).
- Entirely coil up the rope and adjust the limit switch to the highest and lowest position.

5.0.6.5.3.- REMOVING TWIST

- Over the course of time, a twist may develop in wire ropes. The result is that the bottom block twist when the rope is unloaded. To eliminate this tendency to twist, the bottom block must be lowered to the ground, the rope lock released and the rope turned 180°. The rope must then be attached firmly to the bottom block again. The effectiveness of the action taken must be checked by raising and lowering the hoist without a load. It may be necessary to repeat this procedure several times.

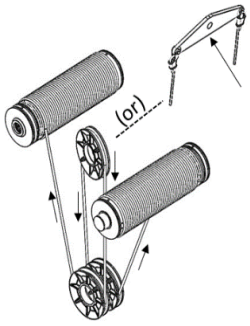
5.0.6.6.- REEVING 4/2-Z, 6/2-Z, 8/2-Z, 12/2-Z (DOUBLE DRUM - TRUE VERTICAL LIFT)

5.0.6.6.1.- DISCARDING OF THE ROPE AND REMOVAL OF THE ROPE GUIDE

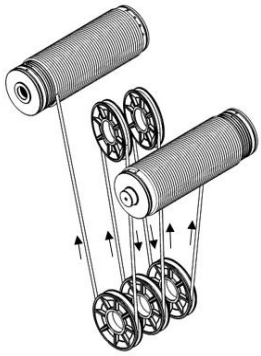
Type: Endless Rope Reeving

- Lower the bottom block (13) and place it on the working platform or floor.
- Set the hoist limit switch so that a lowering beyond the lowest hook position becomes possible.
- loosen the hoist cover fasteners (8, 10) and demount the hoist cover (9) and remove the guide shaft (7).
- Loosen the tensioning parts (6) and remove the guide shaft (7) and also demount both rope guide (5).
- Allow the rope to unroll completely and release the rope clamps (3) Fasteners (4) at both ends of the rope drum (1).
- Finally unpassed the wire rope (2) from Hook Block sheaves (11) and Top sheave Assemblies (12).

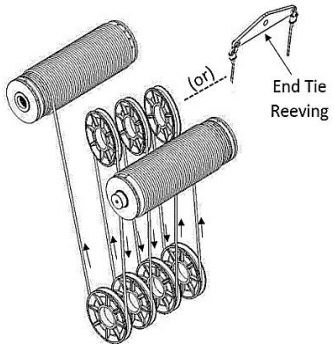
MAINTENANCE AND INSPECTION PROCEDURES



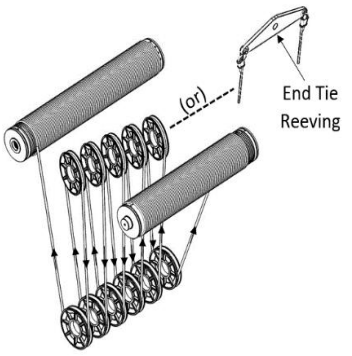
For Endless Reeving 4/2-Z
Figure 5.0.6.6.1 (a)



For Endless Reeving 6/2-Z
Figure 5.0.6.6.1 (b)



For Endless Reeving 8/2-Z
Figure 5.0.6.6.1 (c)



For Endless Reeving 12/2-Z
Figure 5.0.6.6.1 (d)

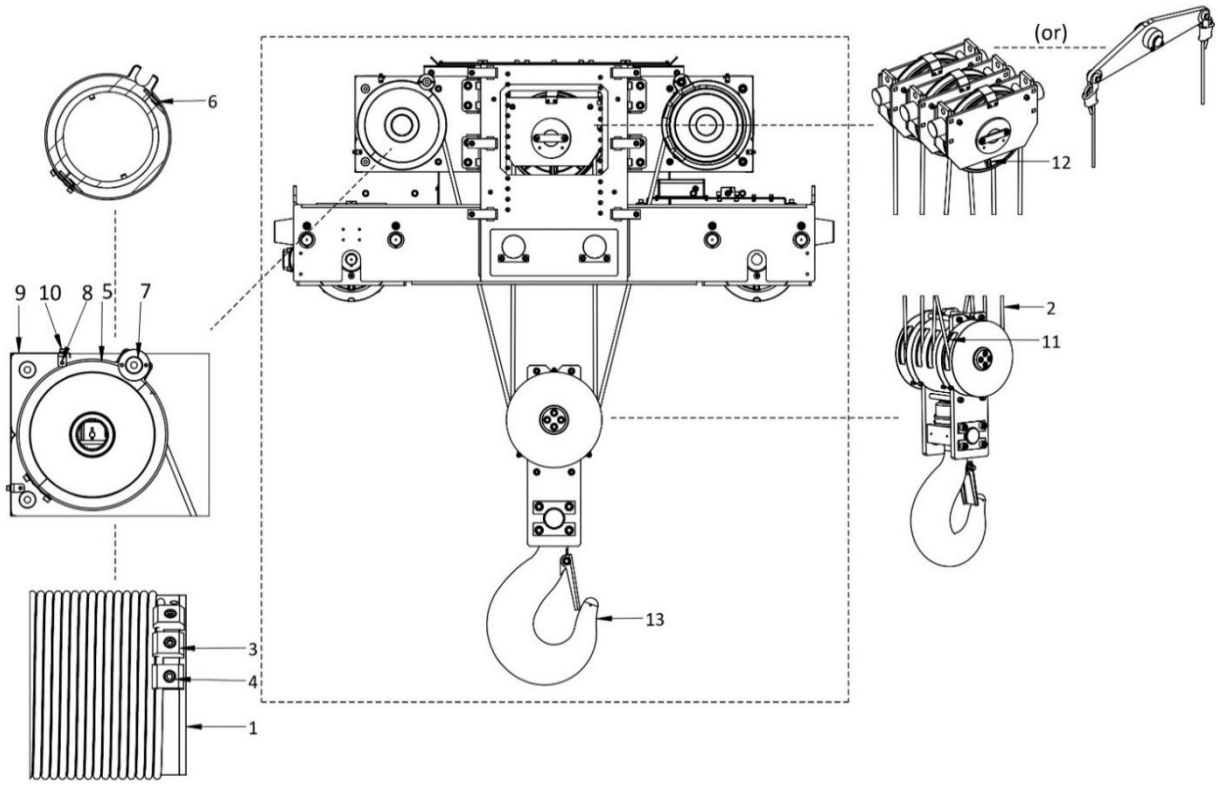
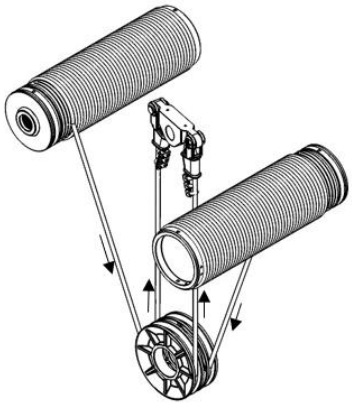


Figure 5.0.6.6.1 (e)

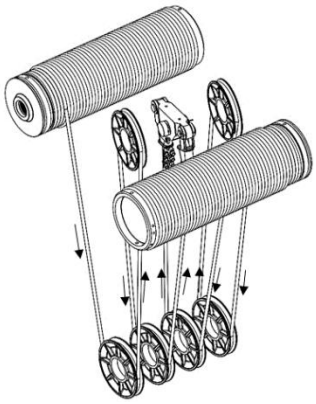
	NOTICE
	• Arrow shows the rope reeving direction. • Diagram illustration shown in only for reference may vary with actual.

Type: End Type Rope Reeving

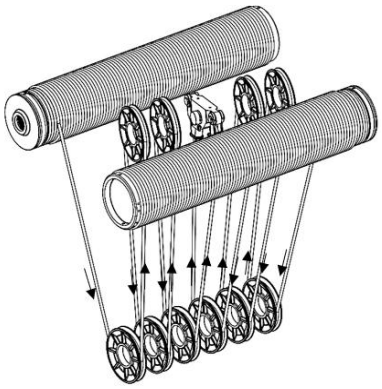
- End Tie robe reeving exist only for the even pully configuration in the bottom block (not suitable for odd pully configuration).
- 4/2 End tie rope reeving (see figure 5.0.6.6.1 (f)) is a combination of two 2/1 + 2/1 reeving. For discarding & installation of new rope refer section 5.0.6.2.
- 8/2 End tie rope reeving (see figure 5.0.6.6.1 (g)) is a combination of two 4/1 + 4/1 reeving. For discarding & installation of new rope refer section 5.0.6.3.
- 12/2 End tie rope reeving (see figure 5.0.6.6.1 (h)) is a combination of two 6/1 + 6/1 reeving. For discarding & installation of new rope refer section 5.0.6.4.



For End Type Reeving 4/2-Z
Figure 5.0.6.6.1 (f)



For End Type Reeving 8/2-Z
Figure 5.0.6.6.1 (g)



For End Type Reeving 12/2-Z
Figure 5.0.6.6.1 (h)

NOTICE

- Arrow shows the rope reeving direction.
- Diagram illustration shown in only for reference may vary with actual.

5.0.6.6.2.- INSTALLATION OF A NEW WIRE ROPE AND OF THE ROPE GUIDE

- Pay out the original spare rope on the ground under the electric wire rope hoist. Make sure the rope is twist– and buckling–free.
- Before winding the wire rope over the drum (1), remove all oil and grease residues from the drum. From below, push the wire rope (2) under the rope clamps (3) and Fasteners (4) until the rope end protrudes by approx.3cm. Tighten the fastening screws according to the prescribed torques. See section 3.0.6.1

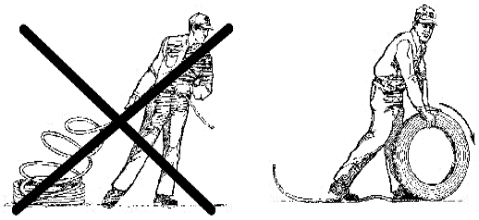


Figure 5.0.6.6.2 (a)

- Tautly wind the rope around the drum (1) by ap-prox. 6–8 turns. Make sure the rope is twist– and buckling–free.
- Grease the rope drum around the rope guide ring with the special grease
- Spread the rope guide (5) and lead it over the drum (1) in such a way that its threaded segments engage in the grooves of the rope drum and that the ending rope line (2) exits through the guide slit.
- Suspend tension parts (6) and adjust them by turning the eye bolt until the rope guide ring is fitting tight.
- Twist the rope guide ring (5) until the guide edge engages in drum casing. Then fasten the rope guide spring (6).
- Reeve the free rope end without twisting and push the rope clamps (3) of the rope drum (1) until the rope & protrudes by approx. 3cm.Tighten & fastening screws according to the prescribed torques. See section 3.0.6.1
- Entirely coil up the rope and adjust the limit switch to the highest and lowest position.

5.0.6.6.3.- REMOVING TWIST

Over the course of time, a twist may develop in wire ropes. The result is that the bottom block twist when the rope is unloaded. To eliminate this tendency to twist, the bottom block must be lowered to the ground, the rope lock released and the rope turned 180°. The rope must then be attached firmly to the bottom block again. The effectiveness of the action taken must be checked by raising and lowering the hoist without a load. It may be necessary to repeat this procedure several times.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.7.- HOOK AND HOOK BLOCKS

5.0.7.1.- HOOK

	NOTICE
	Danger of material damage • The bottom hook block must be checked for damage. Deformations, cracks and cuts caused by impact must be assessed. • The damage can only be evaluated by a qualified person
	WARNING
	A damaged load hook can cause the load to fall and result in serious injuries. • Check the load hook for damage, corrosion and wear. • Check function of the hook safety latch.

- Should be kept in good condition and check that they have no cracks or bites. Inspect the Hook Block and the bearings. Inspect the hook pulleys. Thoroughly clean the inside of the pulley covers, if they exist, and prevent dust absorption. Load hooks on hoists in regular service should be visually inspected daily by the operator. If the hoist is used in multiple-shift operations, load hooks should be visually inspected by the operator at the start of each shift.
- When visual inspection indicates that a more detailed inspection is required, the following are some recommended inspection procedures in addition to what is stated in the manual furnished by the manufacturer with the hoist.
- These procedures also would apply to scheduled frequent and periodic inspections. Measure hook throat opening from metal to metal of the hook as shown by dimension E in Figure.

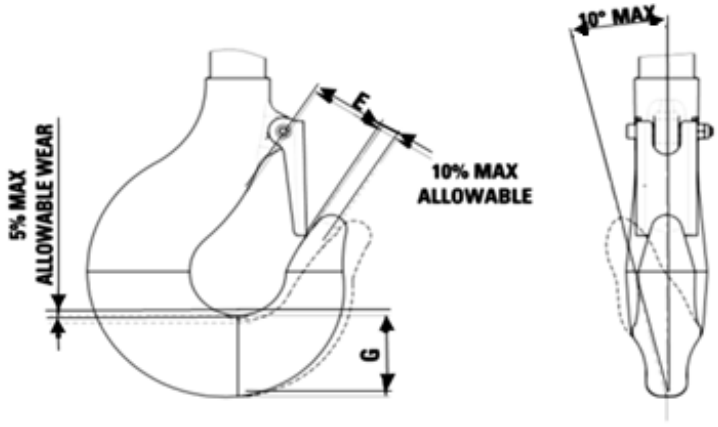


Figure 5.0.7.1

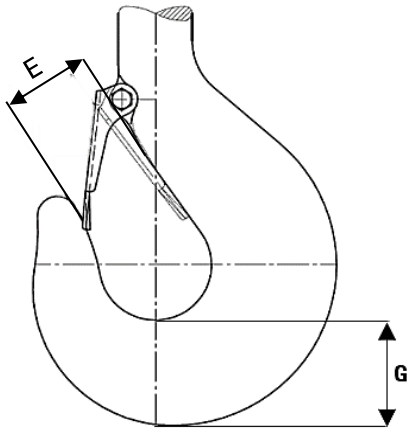
- DO NOT measure from latch to metal.
- Hook must be replaced when throat opening measurement has increased 10% over the original throat opening dimension of a new hook. If hook throat opening dimensions are not covered in the manual furnished with the hoist, the hook throat opening should be measured by the owner/user prior to installing the hoist.
- This will establish a reference point to use in future inspections for determination when the throat opening dimension has increased 10% requiring hook replacement.
- Measure hooks depth at load bearing point (base, bowl, or saddle) of the hook as shown by dimension G in Figure above.
- Hook must be replaced, when wear at load bearing point is 5% of the original depth of the hook load bearing point.
- The manual furnished by the manufacturer with the hoist may include original dimensions and replacement dimensions for depth at load bearing point of standard hooks specified for the hoist line.

MAINTENANCE AND INSPECTION PROCEDURES

- If hook depth at load bearing point dimensions is not covered in the manual furnished with the hoist, the hook depth at load bearing point should be measured by the owner/user prior to installing the hoist.
- This will establish a reference point to use in future inspections for determination when wear at the load bearing point has reached 5% requiring hook replacement. A bend or twist of the hook exceeding 10° from the plane of the unbent hook requires replacement of the hook. Hooks having damage from chemicals, corrosion, or deformation shall be replaced.
- Damage in the form of cracks, nicks, and gouges shall be replaced.

Table 5.0.7.1 (a) Single shank Hook – DIN 15401

Hook Nr	Dimensions (mm)			
	G	G-Min	E	E-Max
Nr 006	14	13.3	20	22.0
Nr 010	17	16.2	22	24.2
Nr 012	19	18.1	24	26.4
Nr 020	22	20.9	27	29.7
Nr 025	24	22.8	28	30.8
Nr 04	29	27.6	32	35.2
Nr 05	31	29.5	34	37.4
Nr 08	37	35.2	38	41.8
Nr 1	40	38.0	40	44.0
Nr 1.6	48	45.6	45	49.5
Nr 2.5	58	55.1	50	55.0
Nr 4	67	63.7	56	61.6
Nr 5	75	71.3	63	69.3
Nr 6	85	80.8	71	78.1
Nr 8	95	90.3	80	88.0
Nr 10	106	100.7	90	99.0
Nr 12	118	112.1	100	110.0
Nr 16	132	125.4	112	123.2
Nr 20	150	142.5	125	137.5
Nr 25	170	161.5	140	154.0
Nr 32	190	180.5	160	176.0
Nr 40	212	201.4	180	198.0
Nr 50	236	224.2	200	220.0
Nr 63	265	251.8	224	246.4
Nr 80	300	285.0	250	275.0
Nr 100	335	318.3	280	308.0
Nr 125	375	356.3	315	346.5
Nr 160	425	403.8	355	390.5
Nr 200	475	451.3	400	440.0
Nr 250	530	503.5	450	495.0

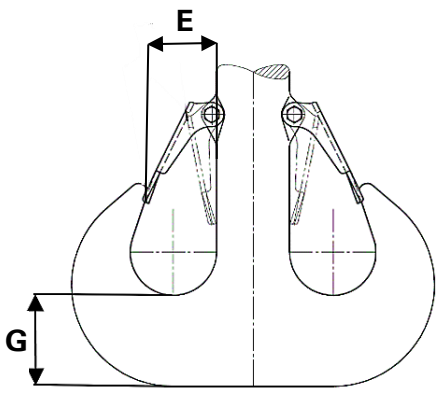


NOTICE

- Diagram illustration shown in only for reference may vary with actual.
- **The tabulated values are general technical details.**
- **For assembly and disassembly, refer spare parts manual of relevant hoist supplied.**

MAINTENANCE AND INSPECTION PROCEDURES

Table 5.0.7.1 (b) Ramshorn Hook – DIN 15402					
Hook Nr	Dimensions (mm)				
	G	G-Min	E	E-Max	
Nr 05	27	25.7	27	29.7	
Nr 08	33	31.4	30	33.0	
Nr 1	36	34.2	32	35.2	
Nr 1.6	43	40.9	36	39.6	
Nr 2.5	50	47.5	40	44.0	
Nr 4	60	57.0	45	49.5	
Nr 5	67	63.7	50	55.0	
Nr 6	75	71.3	56	61.6	
Nr 8	85	80.8	63	69.3	
Nr 10	95	90.3	71	78.1	
Nr 12	106	100.7	80	88.0	
Nr 16	118	112.1	90	99.0	
Nr 20	132	125.4	100	110.0	
Nr 25	150	142.5	112	123.2	
Nr 32	170	161.5	125	137.5	
Nr 40	190	180.5	140	154.0	
Nr 50	212	201.4	160	176.0	
Nr 63	236	224.2	180	198.0	
Nr 80	265	251.8	200	220.0	
Nr 100	300	285.0	224	246.4	
Nr 125	335	318.3	250	275.0	
Nr 160	375	356.3	280	308.0	
Nr 200	425	403.8	315	346.5	
Nr 250	475	451.3	355	390.5	



NOTICE

- Diagram illustration shown in only for reference may vary with actual.
- **The tabulated values are general technical details.**
- **For assembly and disassembly, refer spare parts manual of relevant hoist supplied.**

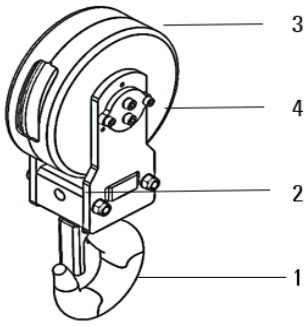
DANGER

- Never repair hooks by welding or reshaping. Heat applied to the hook will alter the original heat treatment of the hook material and change the strength of the hook.

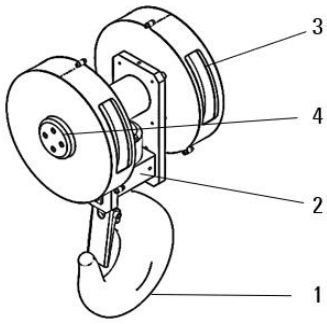
MAINTENANCE AND INSPECTION PROCEDURES

5.0.7.2.- HOOK BLOCKS

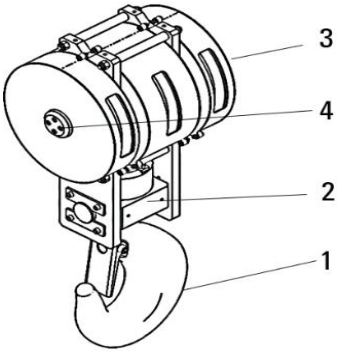
2/1 Fall



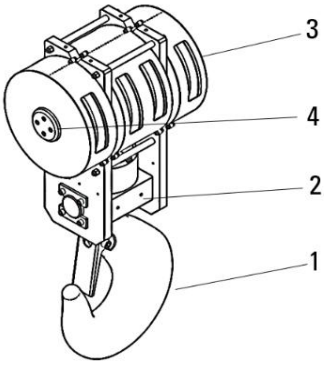
4/1 & 4/2 Fall



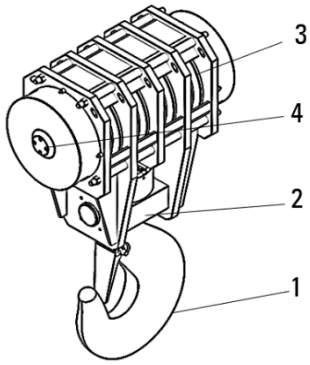
6/1 & 6/2 Fall



8/2 & 8/2-Z Fall



12/2 & 12/2-Z Fall



1. Hook
2. Hook Housing
3. Rope Sheaves
4. Secure Elements

NOTICE

- Hook Appearance may vary, depending on the size and type of the hook ordered, and additional sheaves, side plates, and sheave covers are included based on the number of rope falls.
- **For Assembly and disassembly procedure, refer spare parts manual of relevant hoist supply.**

WARNING

- Maintenance activity should be carried out only be authorized person only.
- Insufficient skilled work may lead to accident, severe injury and causes death.
- On assembly use thread-locking adhesive for all screws
- Refer table 3.0.6.1 for tightening screws and Loctite details and don't reuse the nylon nut.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.8.- ROPE SHEAVES

- It is of primary importance for the life of the wire rope that the profile of the throats, of the pulleys and the grooves of the drums are always in good condition. For above reason these parts should be inspected & lubricated regularly, taking the necessary measures if signs of excessive wear or defects caused by the wire ropes are noticed.
- **Checking the rope sheaves:**
  Inspect the rope sheave and change it in the following circumstances if there are cracks in the flanges have worn to a sharp edge or if the bottom of the groove shoes signs of a rope pattern. The rope sheaves must also be changed if they are worn to the limits given in the following table.

Wire rope Hoist Sheave dimensions (mm)				
ØD (PCD)	t actual	t min	h actual	h max
160	7	4	14.2	16
180	7	4	14.2	16
200	10	6	15.3	17
260	12	6	25	27.5
280	10	6	22	24
360	13.5	7	29.5	32
450	16	8	37	40

Table 5.0.8

1. Sheave Axle Shaft (or) Load Pin
2. Sheave Bearing
3. Sheave
4. Secure Elements
5. Sheave Cover

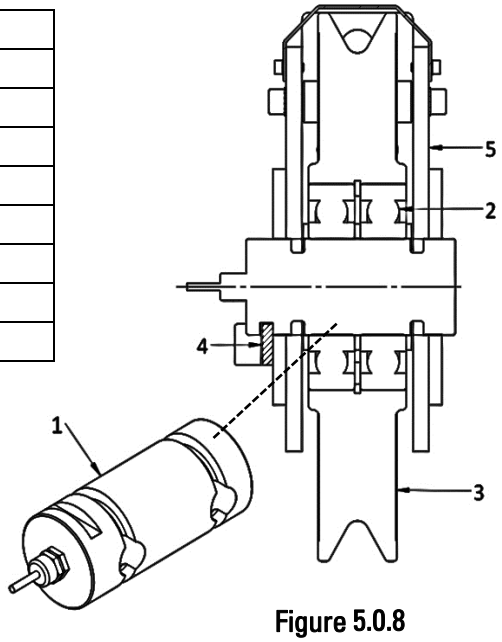
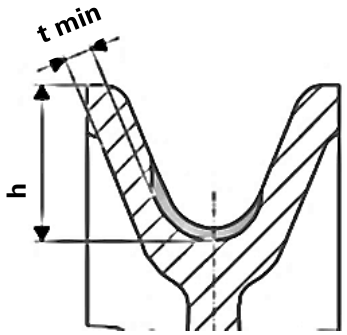
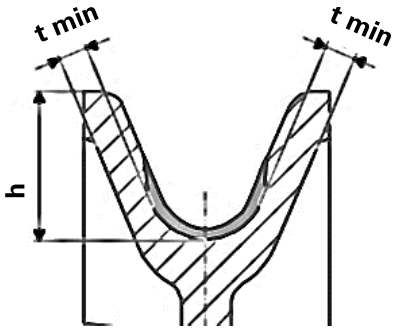


Figure 5.0.8

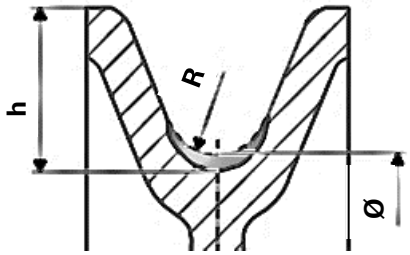
Sheave wear limit



Wear Limits on one side and in the groove base



Wear limits on both sides and in the groove base



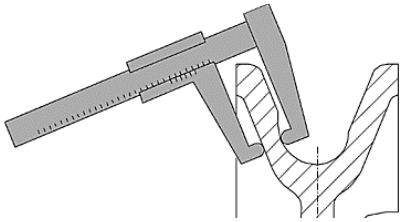
Wear limits in the groove base

- Look to see if there is wear between the grooves, if there is, file them to give them smooth radius.
- Make sure the grooves have not become excessively deep.
- Inspect the pulley throats. Rope sheave should rotate easy in assembly without load.
- Make sure there is not excessive scratching due to the wire ropes in the throats of the pulley. If there are scratches, eliminate them and replace the new sheave. Check the noise and temperature of the pulley bearings.

MAINTENANCE AND INSPECTION PROCEDURES

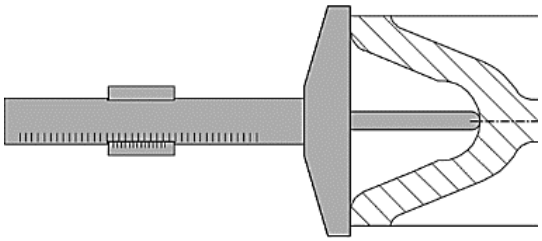
NOTICE

The cross section of the rope groove must not be less than the specified minimum dimension **t min** at any position. Negative impressions in the rope groove must not exceed the specified h max dimension.



The rope sheave must be replaced, if the wall thickness as measured is <t min or the groove depth as measured is >h max. Furthermore, the rope sheave must be replaced.

Measure the wall thickness with a special caliper

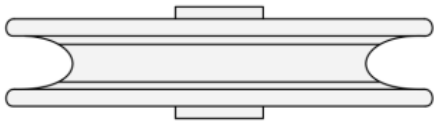


Measure the groove base depth with a depth gauge

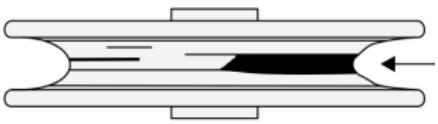
The following table shows the reason for replace the rope sheave and its inspection method.

Reason for rope sheave replacement	Type of inspection
Flange cracks	Visual
Flanges have worn to a sharp edge, or if the bottom of the groove shows signs of rope imprints or incorrect width	Visual
There is asymmetric wear of the flanges (this indicates heavy wear)	Visual
Presence of Wear in the sheave groove	See above Figures
Sheave groove depth exceeds the specification	

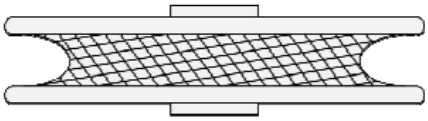
Rope sheave wear type examples:



NORMAL CONDITION



SEIZED BEARING



OVERLOADING

NOTICE

- **For technical details, refer spare parts manual of relevant hoist supply.**

MAINTENANCE AND INSPECTION PROCEDURES

5.0.9. - ROPE DRUM WEAR INSPECTION

NOTICE

- Clean the rope drum grooves before you start measuring groove wear.

The rope drum must be replaced if

- The groove wear is more than allowed
- A top of the drum is bend towards groove
- The wear of the teeth of the drum is visible

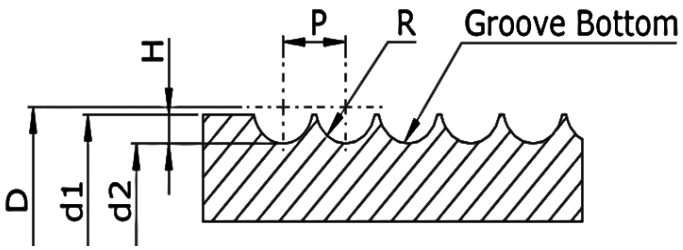


Figure 5.0.9

Rope Diameter	Ø6.5	Ø8	Ø11	Ø14	Ø16.2	Ø22
Drum nominal diameter (D)	142	200.4	274	326	327.2	408.5
Drum diameter at groove crest (d1)	140	198	271	322	322	403.5
Drum diameter at groove bottom (d2)	135	192	262	311	310	384.5
Groove pitch (P)	7.5	9.5	13	16	18	25
Initial Groove Depth (H)	2.5	3	4.5	5.5	6	9.5
Groove radius (R)	3.5	4.2	6	7.5	8.6	12
The difference between the worn area and non-worn area in groove depth and radius (H & R)	**1.0**	**1.0**	**1.0**	**1.5**	**1.5**	**1.5**
* All dimensions shown in the table are in mm.						

Table 5.0.9

NOTICE

- Diagram illustration shown is only for reference may vary with actual.
- **The tabulated values are general technical details. For specific information, refer to the spare parts manual of the relevant hoist supply.**
- **For Assembly and disassembly procedure, refer spare parts manual of relevant hoist supply.**

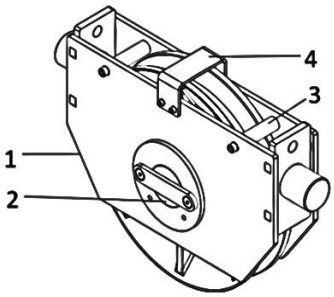
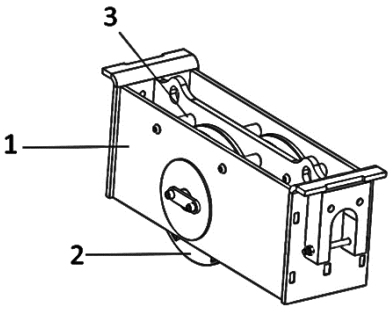
5.0.10. - ROTARY LIMIT SWITCH EQUIPMENT

- The Rotary limit switch protects the hoist, acting as an automatic emergency stop device, by limiting the lifting and falling movements in the high and low maximum positions.
- Two hard limits and two working limits are provided in the hoist. The hard limits are factory set. It should not be adjusted any point of time in the hoist.
- The working limits can be set by the service person for the first time according to the required hook path.
- It should not be adjusted at any point of time in the hoist. (Contact the authorized service personnel) Wiring should be checked for loose connections.
- Check the upper and lower limit tripping functions. For more details, refer section 4.0.2.4

MAINTENANCE AND INSPECTION PROCEDURES

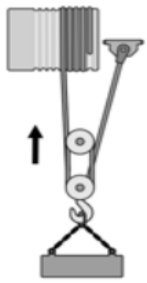
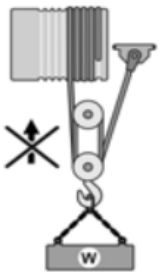
5.0.11.- TOP SHEAVE ARRANGEMENT FOR HOIST

- Following figures shows the sheave, sheave shaft and bearing arrangement for the Top or idle sheave assembly.
- Number of top sheaves may vary depends up on the number of falls and type of hoist rope reeving.

Top sheave assembly for all hoist	Top Sheave assembly for True vertical Lift Hoist
 1. Sheave Cover 2. Sheave Shaft or Load Pin 3. Spacer 4. Top Plate	 1. Sheave Cover 2. Sheave 3. Spacer

5.0.11.1.- MAINTENANCE OF MECHANICAL OVERLOAD DEVICE

- The Disc spring guide & springs are to be cleaned and greased.
- Limit switch position has been set in the factory according to the working load limit.
- Alteration by the user is not permitted. Adjusting this setting is declared as unsafe.
- Rope clamp tight to be checked. Rope condition to be checked.
- Check the proper seating of rope around rope wedge inside rope anchorage. For more details, refer chapter 5.0.6

1	 Prepare a test load that is 10 % heavier than the operating point for overload protection of the hoist. Raise the test load a little and only once. W = 110 % of Operating point of overload protection.	2	 If the overload protection halts the hoisting of the test load, it is operating correctly. If the overload protection does not prevent hoisting of the test load, the overload protection must be readjusted.

WARNING

- Only a service agent that is authorized by the manufacturer may adjust the overload protection.
- Do not repeat the overload test unnecessarily. The test can only be conducted in carefully prepared and properly supervised conditions
- Any adjustment by the user in the setting of limit switch is at his own risk. Manufacturer and its associated selling company are not liable to any accidents and if this is adjusted. Visually check the rope anchorage connection point.

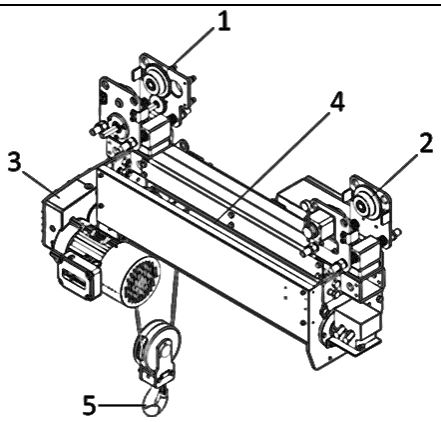
NOTICE

- Diagram illustration shown is only for reference may vary with actual.
- **For Assembly and disassembly procedure, refer spare parts manual of relevant hoist supply.**

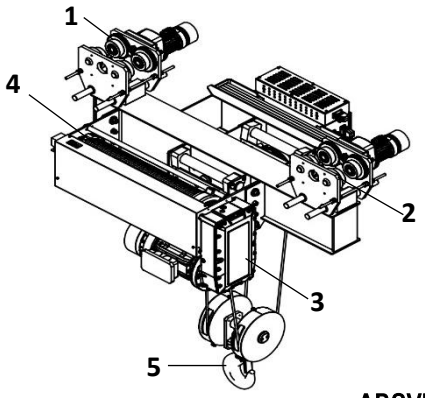
MAINTENANCE AND INSPECTION PROCEDURES

5.0.12.- SINGLE GIRDER TROLLEY

- Single-girder trolleys are available in two versions (underslung hoist and low headroom hoist), where the available height above the main girders determines the construction.
- Single-girder trolleys are commonly used in applications where lighter load handling is required.
- The underslung hoist, with a capacity above 1.5T, includes weight plates for balancing the hoist's self-weight. These weight plates are added to ensure stability. They are assembled opposite the rope drum to achieve proper weight distribution.

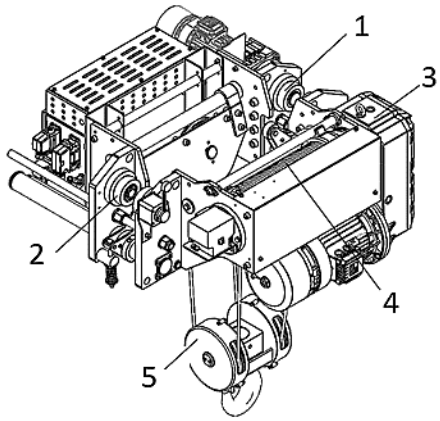


UPTO 1.5T



Underslung Hoist Trolley

ABOVE 1.5T



Low Headroom Hoist Trolley

1. Drive Wheel Assembly
2. Non-Drive Wheel Assembly
3. Hoist Motor & Gear Box
4. Rope Drum
5. Hook

NOTICE

- Diagram illustration shown is only for reference may vary with actual.
- **For Assembly and disassembly procedure, refer spare parts manual of relevant hoist supply.**

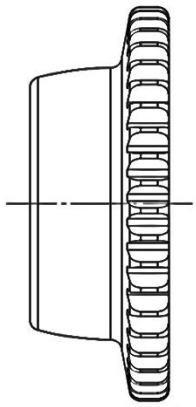
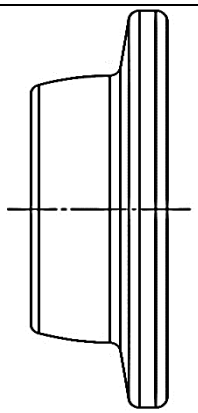
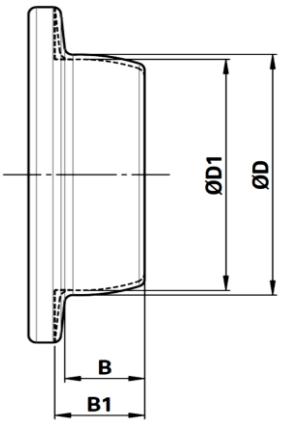
WARNING

- Maintenance activity should be carried out only be authorized person only.
- Insufficient skilled work may lead to accident, severe injury and causes death.
- Refer table 3.0.6.1 for tightening screws and Loctite details and don’t reuse the nylon nut.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.12.1. - MONORAIL AND UNDERSLUNG WHEEL WEAR

- Wheels must have checked periodically according to the periodic maintenance table.
- Visual inspection of the wheels for wear is given in the table below.

		
Drive wheel	**Non-Drive wheel**	**Wheel Wear**
Inspect visually the condition of the trolley wheels. Change the trolley wheels if they are worn more than the wear limits.		

Nominal Value		Limit of Wear	
D (mm)	B (mm)	D1 (mm)	B2 (mm)
82	24	78	26
100	33	95	35
140	44.5	133	46.5
200	44.5	190	46.5

Table 5.0.12.1

Application rules:

- Carry out a visual examination of the wheel`s tread for hairline cracks. If so, wheels should be replaced.
- Check the diameter of the wheel, replace if original diameter is reduced by Max 5% Observe whether the tendency can be increased between inspections. And if is necessary, the wheel should be replaced.
- The driving wheels should be maintained at equal diameters, and two wheels should be changed at same time, even though one of them is in changing condition. Check the wheel`s treads are free from oil.
- if premature wearing is observed, check the alignment of the elements of the system (rails, axles, etc.).
- A high degree of wear on the flanges indicates that the trolley is canting or running heavily on one side. The cause must be ascertained and eliminated.
- Check the wheel as per the table 5.0.12.1 and replace if it exceeds the wear limit.

NOTICE

- Diagram illustration shown is only for reference may vary with actual.
- **The tabulated values are general technical details. For specific information, refer to the spare parts manual of the relevant hoist supply.**

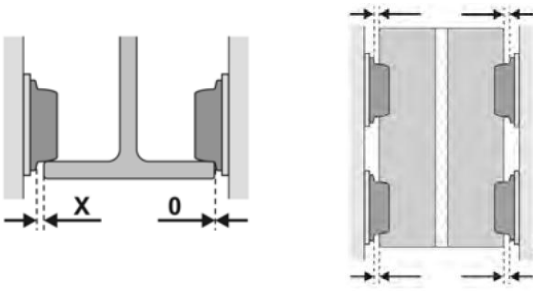
CAUTION

- Asymmetrical wear may indicate misalignment on wheels. If the wheels are asymmetrically worn, measure the wheel alignment.
- Readjust if possible or change the parts if necessary.

MAINTENANCE AND INSPECTION PROCEDURES

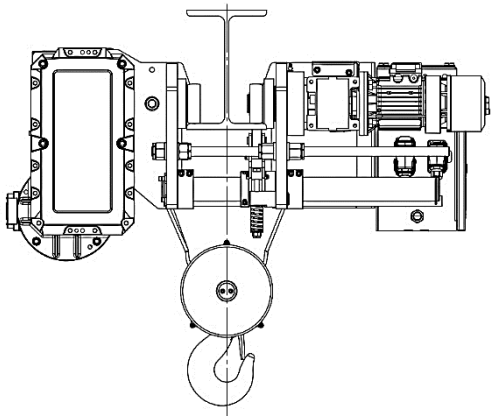
5.0.12.2.- MAINTENANCE OF SINGLE GIRDER TROLLEY STRUCTURE

1



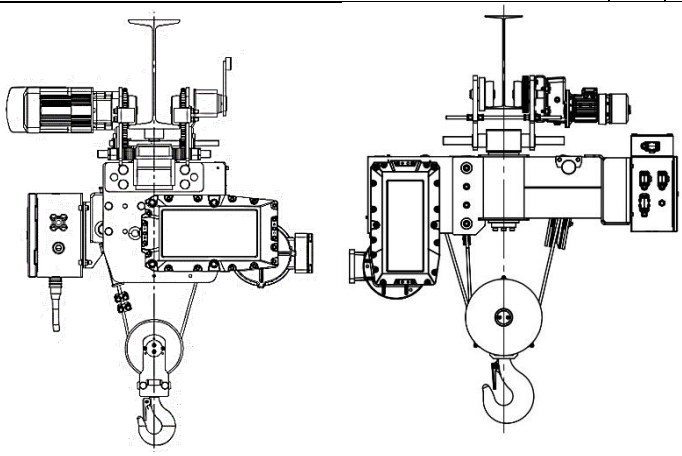
- Check the gap between the wheel flange and the flange of the beam.
- Check that the wheels of the trolley are correctly aligned. Adjust alignment if necessary.
- Adjust the side plate of the trolley inwards until there is a gap of approximately X = 1~2 mm between the wheel flange and the flange of the beam.
- Check the tightening torque of the lock nut, for more details see table 3.0.6.1.
- Gap maintaining the wheel details see section 3.0.2.4

2



- Check that the position of the monorail hoist trolley is adjusted so that the hook is hanging below the centerline of the beam.
- Ensure that the correct tightening torque is maintained as per table 3.0.6.1

3



UPTO 1.5T ABOVE 1.5T

- Check that the position of the underslung hoist trolley is adjusted so that the hook is hanging below the centerline of the beam.
- Ensure that the correct tightening torque is maintained as per table 3.0.6.1

WARNING

- Maintenance activity should be carried out only be authorized person only.
- Insufficient skilled work may lead to accident, severe injury and causes death.
- Refer table 3.0.6.1 for tightening screws and Loctite details and don't reuse the nylon nut.

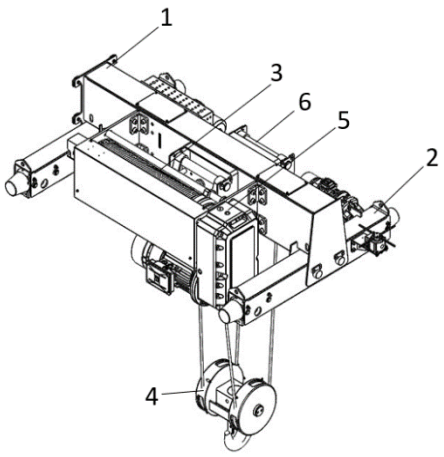
NOTICE

- Diagram illustration shown is only for reference may vary with actual.
- **For Assembly and disassembly procedure, refer spare parts manual of relevant hoist supply.**

MAINTENANCE AND INSPECTION PROCEDURES

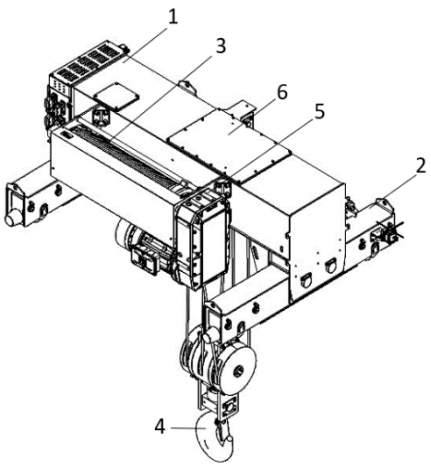
5.0.13.- DOUBLE GIRDER TROLLEY

- Double-girder trolleys are also available in two versions (CLH series & CR series).
- CLH Series hoists are available up to the Capacity 25 tons.CR Series multiple variant (capacity 20T to 120T).
- Double Drum True vertical Lift Hoist and Single drum dual groove true vertical lift Hoist.

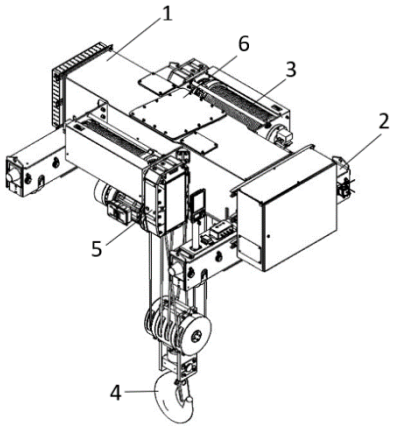


CLH Series Hoist Trolley

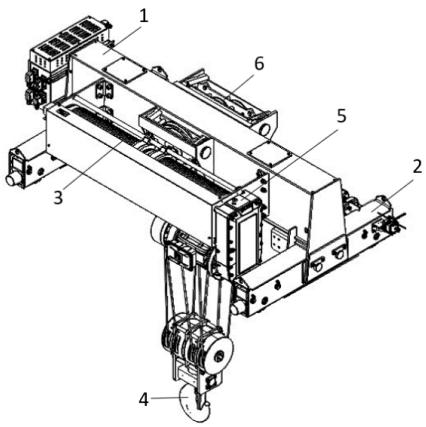
1. Hoist Beam
2. End Carriage
3. Rope Drum
4. Hook
5. Motor & Gear Box
6. Top Sheave



CR Series Hoist Trolley



Double Drum Single Groove Hoist Trolley (True Vertical Lift)



Single Drum Double Groove Hoist Trolley (True Vertical Lift)

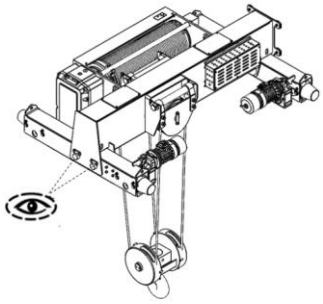
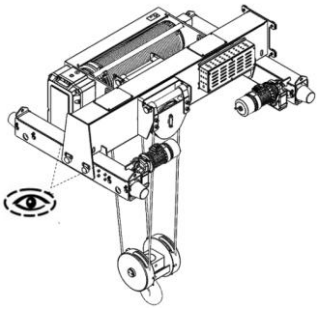
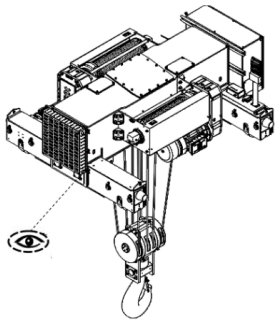
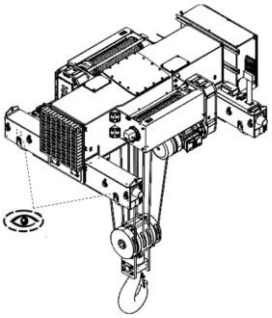
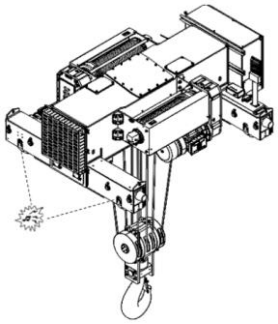
NOTICE

- Diagram illustration shown in below steps is only for reference may vary with actual.
- **For Assembly and disassembly procedure, refer spare parts manual of relevant hoist supply.**

5.0.13.1.- MAINTENANCE OF DOUBLE GIRDER TROLLEY STRUCTURE

- The structure should be inspected once a year to check for any deformities or breakages.
- Check the welded joints, to make sure there are no hairline bites.
- Check that the screws are tightened and ensure all the fastener of the structure are tightened.
- Repaint the structural parts, before 10% of the painted surface is oxidized

MAINTENANCE AND INSPECTION PROCEDURES

1		**Bolted joints** • Check the tightness of the bolted joints • Replace loose bolts • Replace worn out (or) rusted fasteners.	2		**Welded joints** • Check the welds for cracks. • Replace the trolley if cracks are found.
3		**Load bearing structure** • Check the load bearing structure (such as a load beam, the end carriage housing). Replace the structure if deformations, cracks, or broken welding seams are found.	4		**Trolley wheels** • Check that the wheels are correctly aligned. • If an overspeed situation occurs, check that the trolley wheels have not been damaged and that the trolley is properly on the rails
5		**Trolley (alignment)** • If the traveling motion produces loud noise or strong vibration, the trolley is probably incorrectly installed on the track. • Check that the trolley is properly mounted on the track			

NOTICE

- Do not use the hoist before you have identified and eliminated the cause of excessive noise or vibration.
- Diagram illustration shown is only for reference may vary with actual.
- **For Assembly and disassembly procedure, refer spare parts manual of relevant hoist supply.**

WARNING

- Maintenance activity should be carried out only be authorized person only.
- Insufficient skilled work may lead to accident, severe injury and causes death.
- Refer table 3.0.6.1 for tightening screws and Loctite details and don't reuse the nylon nut.

5.0.13.2.- PROCEDURE FOR THE ASSEMBLING & DISMANTLING OF WHEEL BLOCK AND THEIR BEARINGS

- Place the bearings in the wheel. Fit the wheel and bearing set in the wheel block housing and close it with wheel block cover. Tighten the cover and housing by using hexagonal bolts and nuts with the holes provided.
- In end carriage connections of Wheel blocks, the drive unit is supported by Torque arm bracket which is welded to the structure plate as shown in figure 5.0.13.2.1 & 5.0.13.2.2.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.13.2.1.- ASSEMBLY INSTRUCTION FOR WHEEL BLOCK FROM 112 TO 200

- This arrangement has Welding flange welded directly to the structure plate and its location is ensured with the help of connecting pins.
- Welding flange helps to precisely locate the Splined drive shaft with the splined wheel hub in the drive wheel.
- Place and locate the welding flange on the structure plate with help of connecting pins.
- Arrest the movement of welding flange by tacking with the structure plate and weld the welding flange throughout its periphery. See table below for welding thickness details:
- Insert required pin spacers combinations into the Connecting pins (or) use for the position alignment and arrest its axial movement by circlip`s.
- Assemble the ball bearing and shaft key to the splined shaft and insert the same to splined wheel hub through the welding flange. Position the ball bearing inside the welding flange and arrest its axial movement by a circlip.
- Temporarily assemble the torque arm bracket on the torque arm hole and tighten the same. This is to find the exact location to weld the torque arm bracket on structure plate.
- Insert gearbox into the other end of shaft and position the gearbox in such a way that the gearbox is perfectly vertical.
- Tack the torque arm bracket on the structure plate and remove the gearbox by dismantling from the torque arm bracket and then weld the torque arm bracket with the structure plate. See table below for welding thickness details:

Wheel Size	112	125	160	200
Weld Seam Thickness for Torque Arm Bracket (mm)	6	6	8	8

- Reassemble the gearbox on to the torque arm bracket and arrest the axial movement of the shaft by a circlip on gearbox end.

Wheel Block Assembly with Welding flange

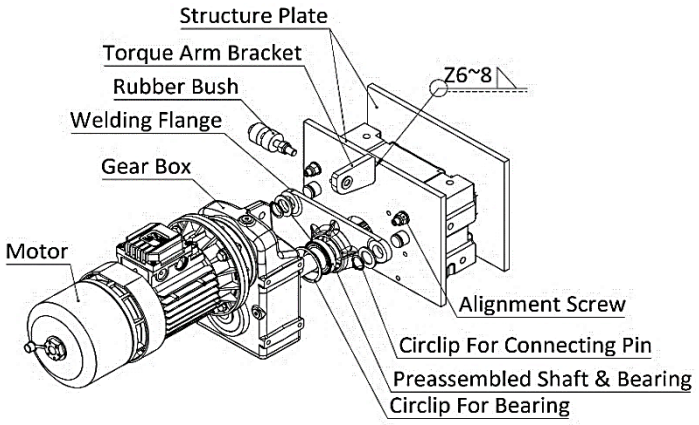


Figure 5.0.13.2.1

Wheel block Assembly without Welding flange

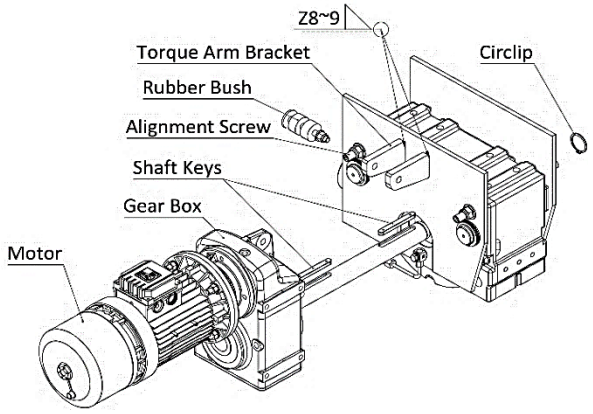


Figure 5.0.13.2.2

NOTICE

- Diagram illustration shown is only for reference may vary with actual
- **The tabulated values are general technical details. For specific information, refer to the spare parts manual of the relevant hoist supply.**
- For detailed assembly & technical instructions of wheel block, refer the wheel block assembly instructions and spare part details.

WARNING

- Maintenance activity should be carried out only be authorized person only.
- Insufficient skilled work may lead to accident, severe injury and causes death.
- Refer table 3.0.6.1 for tightening screws and Loctite details and don't reuse the nylon nut.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.13.2.2.- ASSEMBLY INSTRUCTION FOR WHEEL BLOCK FROM 250 TO 500

- Assemble the two shaft keys into the shaft and insert the one end of shaft to the Wheel and lock the axial movement with circlip on other side of Wheel. Temporarily assemble the torque arm bracket on the torque arm hole and tighten the same. This is to find the exact location to weld the torque arm bracket on structure plate.
- Insert gearbox into the other end of shaft and position the gearbox in such a way that the gearbox is perfectly vertical.
- Tack the torque arm bracket on the structure plate and remove the gearbox by dismantling from the Torque arm bracket and then weld the torque arm bracket with the structure plate.
- See table below for welding thickness details:

Wheel Size	250	320	400	500
Weld Seam Thickness for Torque Arm Bracket (mm)	8	8	9	9

- Reassemble the gearbox to the Torque arm bracket and arrest the axial movement of the shaft by a circlip on another end of gearbox. After completing the assembly instructions of the wheel blocks, mount the motor on to the drive gearbox with the required number of fasteners. Tighten the flange nuts with the socket head flat point screw and lock the connecting pin with circlip on both side of the end carriage and arrest the axial movement. Ensure that the wheel block is placed center of the end carriage, if not then adjust the flange nut as required.

5.0.13.3.- WHEEL AND RAIL WIDTH SELECTION

- *Regularly, every six months, inspect wear and deformation in the wheel tread, and any marks in the flanges.*

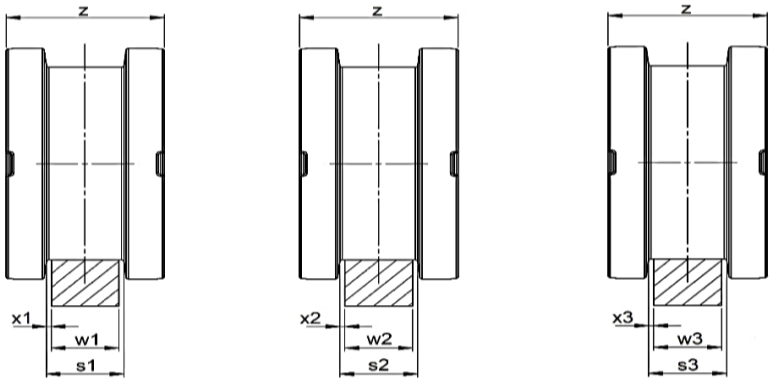


Figure 5.0.13.3

* - Applicable other than cranes

Wheel block size / Wheel Diameter	Wheel tread width (s)			Rail width (w)			Distance per side (x)			Wheel width (z)
	s1	s2	s3	w1	w2	w3	x1	x2	x3	
112	50	62	-	32,40	45,50,55*	-	9, 5	8.5, 6, 3.5	-	82
125	50	62	-	32,40	45,50,55*	-	9, 5	8.5, 6, 3.5	-	82
160	50	65	-	32,40	45,50,55*	-	9, 5	10, 7.5, 5	-	97
200	57	70	82	32, 40, 45	50, 55, 60	63, 70, 75*	12.5, 8.5, 6	10, 7.5, 5	9.5, 6, 3.5	114
250	57	70	85	40, 45	50, 55, 60	63, 70, 75, 80*	8.5, 6	10, 7.5, 5	11, 7.5, 5, 2.5	117
320	57	70	85	40, 45	50, 55, 60	63, 70, 75, 80*	8.5, 6	10, 7.5, 5	11, 7.5, 5, 2.5	125
400	70	86	110	50, 55	60, 63, 70	75, 80, 90, 100	10, 7.5	13, 11.5, 8	17.5, 15, 10, 5	150
500	86	110	-	70	75, 80, 90, 100	-	8	17.5, 15, 10, 5	-	150

NOTICE

- Diagram illustration shown in only for reference may vary with actual.
- **The tabulated values are general technical details. For specific information, refer to the spare parts manual of the relevant hoist supply.**

MAINTENANCE AND INSPECTION PROCEDURES

5.0.13.4.- WHEEL WEAR

- There are notches at the side faces of travel wheels used to indicate the flange wear. Periodic check should be done to see if there is any notch opened.
- Travel wheels should be replaced even if only one notch is opened.

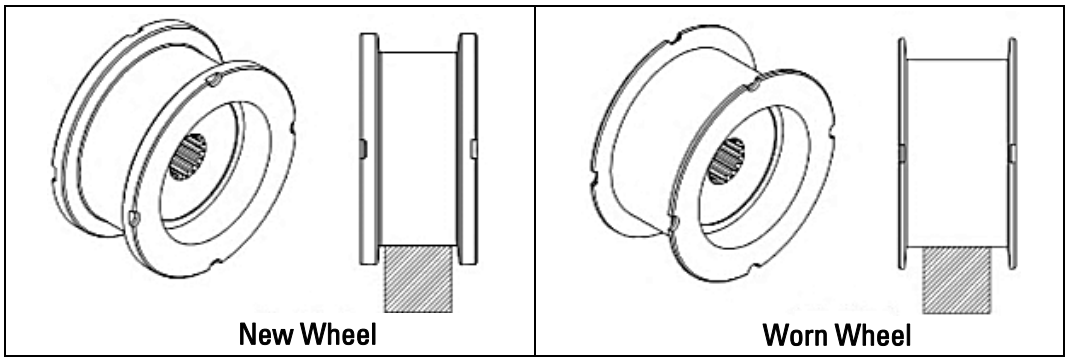
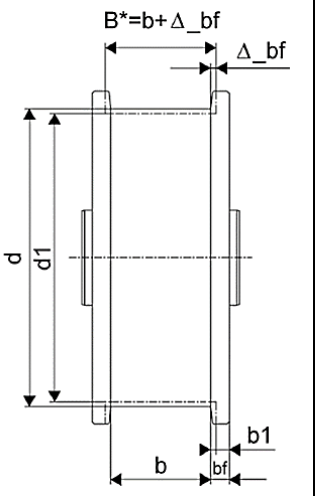


Figure 5.0.13.4

- Small wearing is normal for rail wheels. If wearing affects the movement of hoist or even one of the wearing limits (d1, b1, B*, Δ bf, t) has been increased, the wheel must be replaced.

Table 5.0.13.4 Wearing limits of flange wheels

Wheel diameter d (mm)	Minimum Wheel diameter d1 (mm)	Wheel tread width b (mm)			Initial flange thickness bf (mm)	Minimum Flange thickness b1 (mm)	Maximum increase in groove per side Δ_bf (mm)	Wheel width after wear B* (mm)		
		s1	s2	s3				B1	B2	B3
112	105.5	50	62	-	10	5	5	60	72	-
125	118.5	50	62	-	10	6	4	58	70	-
160	153.5	50	65	-	16	7	9	68	83	-
200	193	57	70	82	16	10	6	69	82	94
250	243	57	70	85	16	10	6	69	82	97
320	313	57	70	85	20	12	8	73	86	101
400	393	70	86	110	20	12	8	86	102	126
500	493	86	110	-	20	12	8	102	126	-



NOTICE

- Diagram illustration shown in only for reference may vary with actual.
- The travel wheel should be replaced when it reaches the wear limit as specified in the table.
- **The tabulated values are general technical details. For specific information, refer to the spare parts manual of the relevant hoist supply.**

WARNING

Safety risk.

- If anyone of the limits for wear is attained, the pat must be replaced by a qualified person.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.13.5.- BUFFER ELEMENTS (ADDITIONAL FITTINGS)

- Buffers with high energy absorption capacity are used to prevent any damages to the structures when it collides with external objects.
- Use of buffers elements depends upon the type of application. There is a provision in the wheel blocks side faces to mount the buffer elements.
- Buffer elements can be selected according to the wheel sizes as per the table 5.0.13.3.

Code	Diameter Ø A (mm)	Length L1 (mm)	Length L2 (mm)	D	Material	Wheel Block Size
RB60	60	60	12	M12	Rubber	112, 125
			20			
RB80	80	70	12	M12	Rubber	160
			20			
RB100	100	85	35	M12	Rubber	200, 250, 320, 400, 500
RB125	125	105				
PU80	80	80	12	M12	Polyurethane	112, 125, 160
			20			
PU100	100	100	35	M12	Polyurethane	200, 250, 320, 400, 500
PU125	125	120				
PU160	160	160				250, 320, 400, 500
PU200	200	200				400, 500

Table 5.0.13.5 Buffer Elements Dimensions

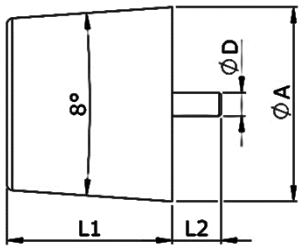


Figure 5.0.13.5 (a)

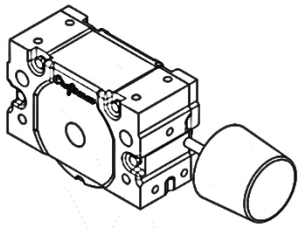
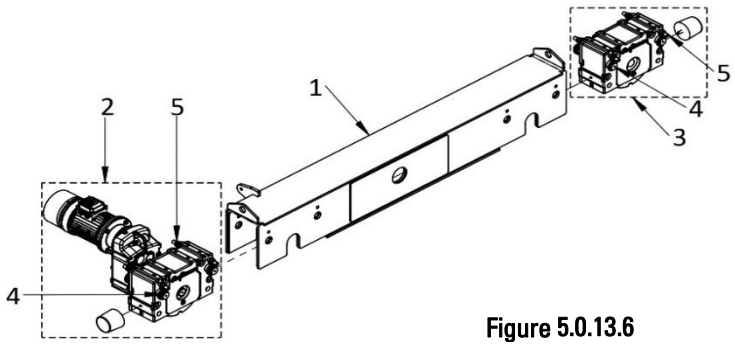


Figure 5.0.13.5 (b)

5.0.13.6.- WHEEL BLOCK AND END CARRIAGE CONNECTION

Assembly	Disassembly
• Place a jack under the end carriage (1) and lift it the end carriage. Insert the wheel block drive assembly (2) to the end carriage (3) and then assemble the connecting pin (4) and stud screws (5).	• Place a jack under the end carriage (1) and lift it the end carriage. Remove the connecting pin (4) and stud screws (5) from the Wheel block drive assembly (2) and separate from the End Carriage.
**Follow this procedure for wheel block non-drive assembly (3) also*	



1. End carriage
2. Wheel Block Drive assembly
3. Wheel Block Non-Drive Assembly
4. Connecting Pin
5. Stud Screws

Figure 5.0.13.6

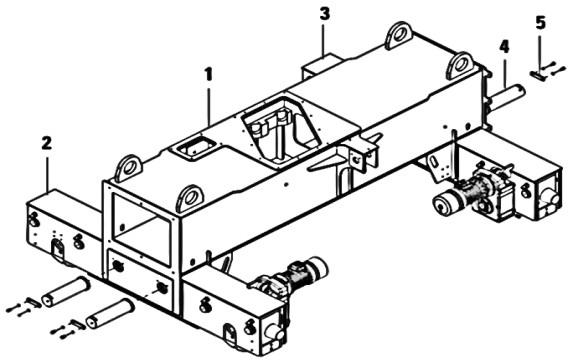
NOTICE

- Standard Wheel Block bolt length L2 is 12 for RB60, RB80 & PU80.
- Standard Wheel Block with Rail Sweep Plate bolt length L2 is 20 for RB60, RB80 & PU80
- Diagram illustration shown in only for reference may vary with actual.
- **The tabulated values are general technical details. For specific information, refer to the spare parts manual of the relevant hoist supply.**

MAINTENANCE AND INSPECTION PROCEDURES

5.0.13.7.- END CARRIAGE AND HOIST BEAM CONNECTION FOR ALL CRAB HOIST

- Place the Hoist Beam (1) on End carriage LH (2) and End carriage RH (3) as shown in below Figure
- Use Connecting pin (4) and Lock plate (5) to secure the connection between Hoist beam (1) and End carriage (2 &3)



1	Hoist Beam
2	End Carriage LH
3	End Carriage RH
4	Connecting Pin
4	Lock Plate for Pin

- ***Hoist beam and end carriages may vary depends on Hoist capacity and number of falls.***
- ***Above image is only for reference purpose may vary with actual***
- ***For more detail refer spare parts manual of relevant hoist supply.***

5.0.13.8. - ROPE DRUM BRAKE. (OPTIONAL)

- Check the drum brake linear material and surrounding surfaces are free from grease and oil.
- Always contact a representative of hoist manufacturer at least twice in a year for inspecting the rope drum brake. On request, the manufacture will inspect by specially trained technician.
- Whenever a drum brake is applied, information must be passed to hoist manufacturer for complete repair and inspection of hoist. Check the function and condition of drum brake components as shown in section 4.0.2.6.1, if necessary, contact a representative of hoist manufacturer for repair.
- During the routine inspections of brakes, no catching tests should be carried out. Exchanging or adjusting the parts of drum brake is not permitted for customer it is declared unsafe.
- The effectiveness of drum brake will be good when the above-described inspection will be followed.

CAUTION

DRUM BRAKE INSTRUCTIONS:

- The hoist must not be used before finding the cause for drum braking, and it should be repaired by hoist manufacturer.
- The drum brake components must be checked for wear and damage and then adjusted as per Instructions.
- Correct sequence functions of solenoid (6) Figure 4.0.2.6.1, limit switch (8) & hoist motor is to be checked and confirmed by the manufacturers.
- Alteration by the user is not permitted. Adjusting is declared unsafe.
- Any adjustment by the user in the setting of drum brake is at his own risk. Manufacturer and its associated selling company are not liable to any accidents cause property damage & human death.

5.0.13.9.- AMBIENT CONDITIONS

The hoist is designed for normal operating conditions in indoors. For any special conditions refer the manufacturer.

- Permissible ambient temperatures while working- around - 10° C to + 45° C
- Normal Transportation & Storage temperature - around - 10° C to + 45° C

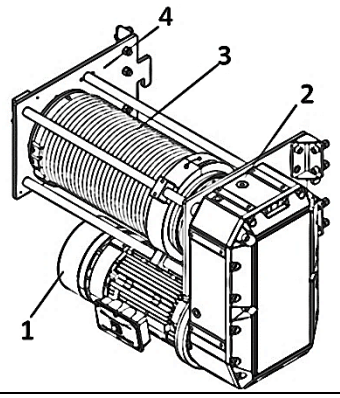
WARNING

- Using a normal hoist for handling hot metal is considered as unsafe & accident may cause & loosing properties and also human death.
- For hot metal application it is user response to check & conform with the hoist manufacture about the load pattern, number of cycles, operating hours temperature condition& heat shield protection & temperature condition has to be check with manufacture.

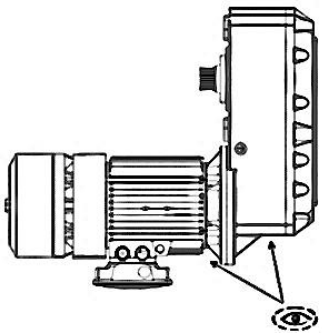
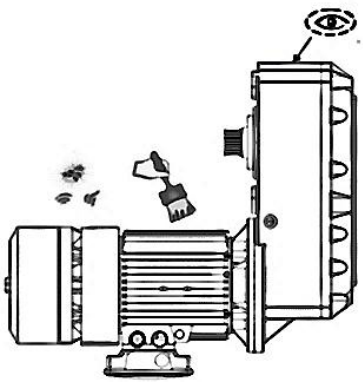
MAINTENANCE AND INSPECTION PROCEDURES

5.0.14.- HOIST MACHINERY

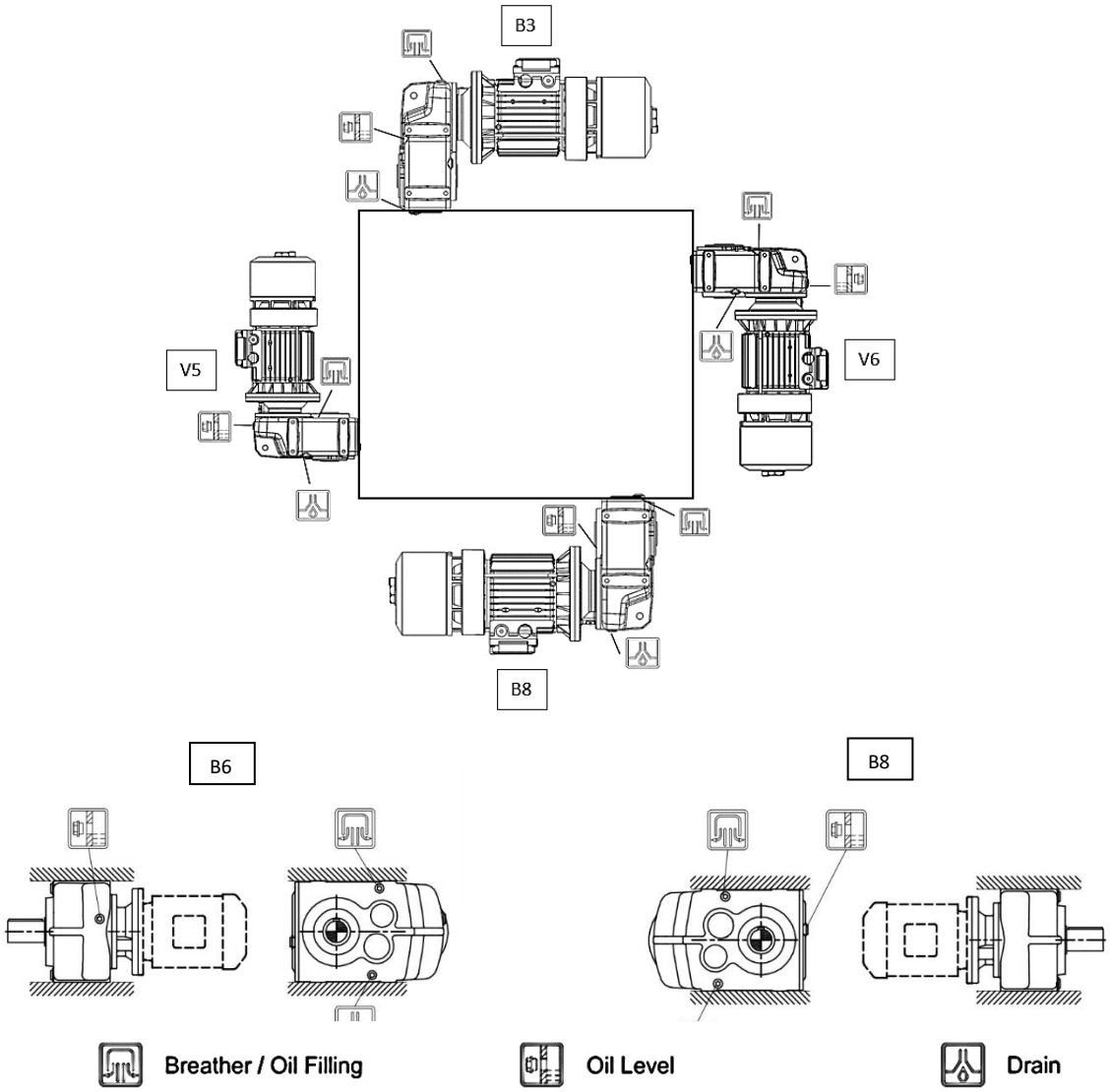
- The main components of the hoisting machinery are the hoisting motor, gearbox and rope drum
- Power from the motor is transmitted to the gear box to get the desired speed, torque of the hoist and then transmitted to the rope drum
- One end of the transmission train that is comprised of the hoisting motor, gearbox and rope drum is fixed to the end flanges of the hoisting machinery.

HOISTING MOTOR	
	1. Motor 2. Gearbox 3. Rope Drum 4. Rope drum vertical plate

5.0.14.1.- MAINTENANCE OF HOIST AND GEAR BOX UNIT

1		• Check the gearbox visually for leakage. In case the gearbox shows signs of excessive leakage, find the reason for the leakage and replace the worn part, or the complete gearbox.
2		• Check for any excessive noise, vibration, and/or heat. Check that the traveling motor operates properly when loaded. • Check the breather-plug breaths freely and clean if needed Clean the cooling-ribs surface when needed

3. CT gear box Mounting Position



NOTICE

- Any one of the two surface can be employed foe mounting the gear unit as per convenience.
- Diagram illustration shown in only for reference may vary with actual.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.14.2.- BRAKE AIR GAP ADJUSTMENT

In brake, air gap (S_{LN}) is the distance between the brake coil (stator) and armature plate. Check the air gap near the screws using a feeler gauge. These values must match the specifications for S_{LN} found in the table. If the measured value S_{LN} is outside of the tolerance, readjust this dimension.

- S_{LN} - Rated air gap
- S_{Lmin} - Minimum air gap
- S_{Lmax} - Maximum air gap

1. Loose the socket head cap screws.
2. Slightly and adjust the air gap (turn the sleeve bolts using a wrench).
3. Tighten the screws (Use Torque wrench to tighten the screws).
4. Check the air gap again and repeat the adjustment if necessary.
5. After adjusting the air gap to its optimal value, make sure to tighten the locknuts.

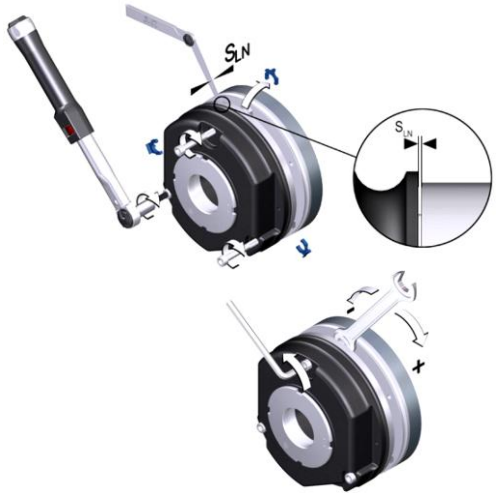


Figure 5.0.14.2

Size (mm)	S_{LN} $^{+0.1/-0.05}$ (mm)	S_{Lmax} Service brake (mm)	Max. adjustment, permissible wear distance (mm)	Rotor thickness (mm)	
				minimum	Maximum
06	0.2	0.5	1.5	4.5	6.0
08				5.5	7.0
10				7.5	9.0
12	0.3	0.75	2.0	8.0	10.0
14			2.5	7.5	
16			3.5	8.0	11.5
18	0.4	1.0	3.0	10.0	13.0
20			4.0	12.0	16.0
25	0.5	1.25	4.5	15.5	20.0

Table 5.0.14.2 Characteristics of air gap

NOTICE

- The tabulated values are general technical details. For more specific information, refer to the Intorq manual.

WARNING

- The system must not be allowed to continue operations after the maximum air gap SLmax has been exceeded. Exceeding the maximum air gap can cause a major reduction in the braking torque.
- Failing to maintain this distance may result in vibrations, very loud noise, brake coil burning or even total brake failure.
- Periodical checking of air gap is required, as it increases with brake disc wear.
- Friction surfaces must always be kept free of oil and grease.
- Maintenance activity should be carried out only be authorized person only.
- Insufficient skilled work may lead to accident, severe injury and causes death.

DANGER

- After working on brake, always perform a functional test with rated load.
- To replace the brake assembly, the electromagnet supply wires inside the electric box must be disconnected first.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.15.- CONTROL PANEL

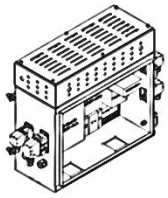
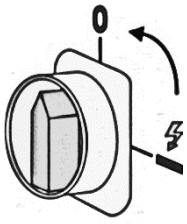
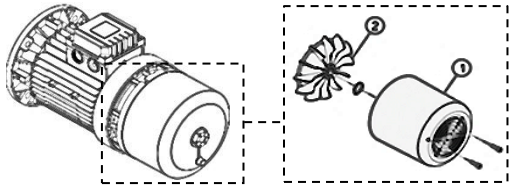
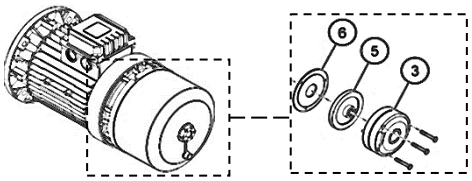
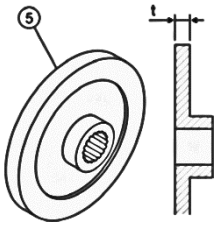


Figure 5.0.15

- The Control Panel on the hoist contains the accessories of electrical items that supervises the safe operation of the hoist.
- This unit maintain the functions of hoist runs safety and calculates the working conditions during which the hoist can operate safely.
- Separate operating and servicing instructions for the electrical are delivered with the hoist.

5.0.16.- TRAVEL AND HOIST MOTOR BRAKE

Disassembly

1	 Lower the hook to the ground. Switch OFF the power supply to the hoist. Remove the protective cover of the hoisting machinery. Lock the rope drum with a wooden wedge to prevent it from rotating.	2	 Remove the fan cover (1) and fan (2).
3	 Remove the fixing screws for the brake. Detach the brake (3), brake disc, (5) and friction disc (6)	4	 Check the brake type on the rating plate that is fixed to the brake. Measure the thickness of the brake disc (5). Replace the brake disc if the thickness (t) is less than the recommended thickness for brake disc change as according to the below table.

NOTICE

- For more specific information, refer to the Intort manual.
- Diagram illustration shown in below steps is only for reference.
- **For Assembly and disassembly procedure, refer spare parts manual of relevant hoist supply.**

WARNING

- Lock the rope drum to prevent it from rotating when hoisting brake is detached. The weight of falling rope can rotate the unlocked drum and cause hazardous situation.
- Maintenance activity should be carried out only be authorized person only.
- Insufficient skilled work may lead to accident, severe injury and causes death.
- On assembly use thread-locking adhesive for all screws
- Refer table 3.0.6.1 for tightening screws and Loctite details and don't reuse the nylon nut.

MAINTENANCE AND INSPECTION PROCEDURES

5.0.17. - LUBRICATION

- All moving parts of the hoist or trolley for which lubrication is specified should be inspected, checked and lubricated on a regular basis. The method used to deliver lubricant should be checked for proper delivery of the lubricant. This section applies to the hoist and trolley only.
- Hoist and trolley drive unit gear are enclosed and provided a liberal oil reservoir from which gears and bearings inside the housing are splash- lubricated. Check oil level in gear housings periodical, with intervals determined by used and operating conditions, refer to the Inspection section of this manual. Hoist and trolley machinery must be stationary when inspecting, checking, adding, or changing lubricants. The main switch of the hoist, crane, or lifting system must be de- energized. Lock and tag the main switch in the de-energized position.
- In principle the gearbox fluid grease/oil will only be changed in the general checks indicated in the Maintenance Plan point 5.0.2.5 of these manuals.
- The wire rope, guide and drum will be lubricated in accordance with the points of this manual.
- Wheel and sheave bearings are lubricated for life (If grease not provided).

A & B - GEARBOX LUBRICATION

- The lubrication used should be that specified in the lubrication table.
- Special care should be taken when there is an increase of oil temperature in the speed reducers and gears. This temperature control is vital for the working life of helical gears.

Lubrication:

- By bath and splashing.
- With this system the gears are lubricated by partial immersion in oil and the bearings by means of splashing caused by the gears when they rotate. In this way all the surfaces in contact, with relative movement (gears and bearings) are reached by an ample flow of oil which is constantly renovated. It applies to all reducers.

Change of grease:

- Grease change should be annual.
- To change or renew the grease, the relevant instructions should be followed.

C - LUBRICATION OF WHEEL BLOCK

- 112 to 200-wheel blocks are made of self-lubricating ball bearings, it doesn`t require any periodic lubrication.
- 250 to 500-wheel blocks are made of tapered roller bearings which does require lubrication periodically. These wheel blocks are provided with individual grease nipples for each of the bearings.
- Check and lubricate the wheel block bearings for every 12 months of operation periodically as instructed.

	**CAUTION** • DO NOT use lubricants that do not meet the specifications of the recommended

	**WARNING** • Before inspecting, checking, adding, or changing lubricants of the hoist or trolley, refer to the maintenance and inspection procedures section of this manual. • Leaking oil endangers operation. • Oil leaks/loss of oil in the course of operation may cause damage to or total failure of the machine. In such a case, stop the machine and notify Service. **All lubricants:** • May cause mild eye irritation- avoid contact with eyes. • May cause moderate skin irritation- avoid prolonged or repeated contact with skin. Wash thoroughly after handling. • Are slightly combustible; keep away from extreme heat and open flame

MAINTENANCE AND INSPECTION PROCEDURES

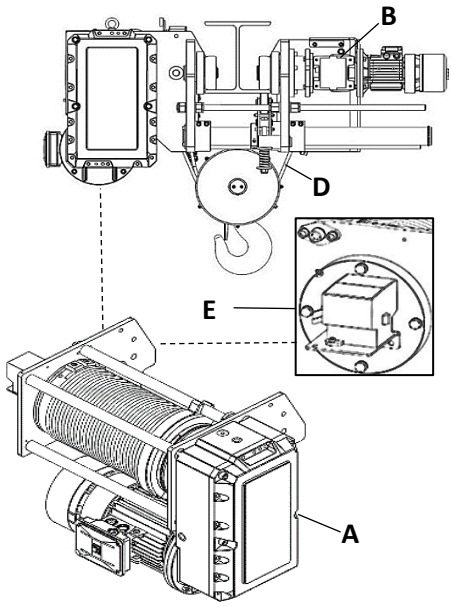
E. - DRUM BEARING LUBRICATION

- In hoist drum both sealed and open bearings are used based on the load & size.
- So, wherever the grease nipple is provided the lubrication is to be done.
- Check and lubricate the drum bearings for every 12 months of operation periodically.

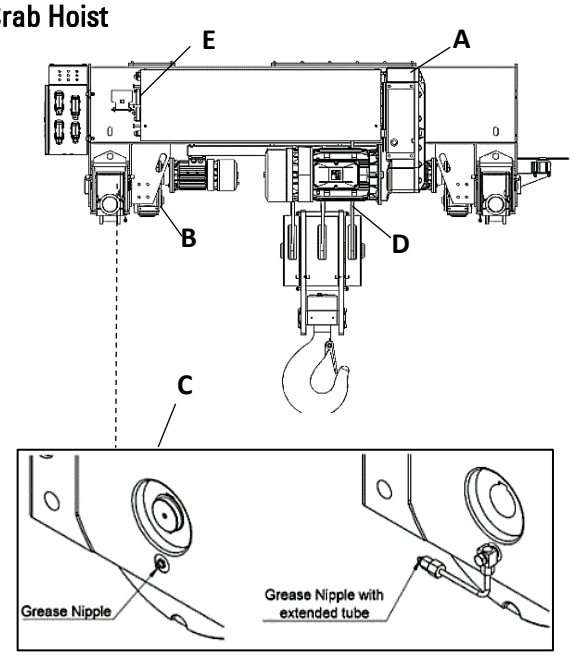
F - CROSS TRAVEL HOUSING BEARING LUBRICATION

- Cross travel housing bearings are of both open and sealed designs which are needed to be greased periodically.
- The grease nipples are provided in suitable position for greasing.
- Check and lubricate the cross-travel bearings for every 12 months of operation periodically.

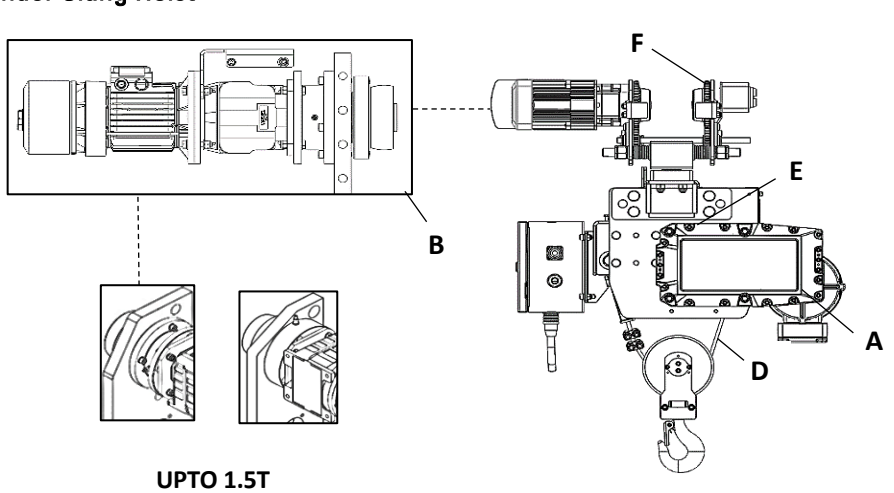
Monorail Hoist



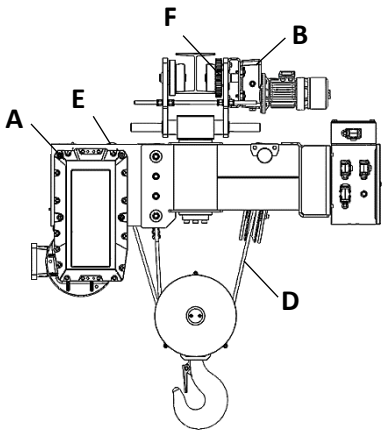
Crab Hoist



Under Slung Hoist



UPTO 1.5T



ABOVE 1.5T

MAINTENANCE AND INSPECTION PROCEDURES

Position	Component	On Initial Putting into Operation	After 3 Months of Operation	After 12 Months of Operation	After Every 12 Months	After Each 36 Months		Type of Lubrication
A	Lifting Gear Box	X	X	X		X	Change Oil / Top Up	Pour it
B	Traveling Gear Box	X	X	X		X	Change Oil / Top Up	Pour it / Fill it
C	Wheel Block			X	X	X	Grease	Filling with Grease
D	Wire Rope	X	X	X	X		Grease	Filling with Grease
E	Rope Drum & Guide	X	X	X	X		Clean and Grease	filling with grease by brush
F	Cross Travel Bearing & Open Gear			X	X	X	Grease	filling with grease

NOTICE

- Refer to Table 5.0.1.7 for the lubrication type and quantity.
- **The tabulated values are general technical details. For specific information, refer to the spare parts manual of the relevant hoist supply.**

Table 5.0.17 lubrication type and quantity

Position of lubricant Point	Lubricant type	Lubricant type	Type of Hoist	Hoist Model	Gear Box DWG. No.	Quantity of lubricant (liter)
			Underslung Hoist (Hoist Gear Box)	CRU0.5	PD-1293	2
				CRU01	PD-1292	
				CRU02	PD-1291	
			Low head room Monorail – CLH Series (Hoist Gear Box)	CLH03	PD-1240	3.5
				CLH05	PD-1314	3.5
				CLH7.5	PD-1313	6.2
				CLH10	PD-1313	6.2
				CLH16	PD-1275	12
			Crab CR Series (Hoist Gear Box)	CR16	PD-1275	12
				CR 20	PD-1349	15
				CR 32	PD-1354	30
B	Grease	Shell Alvania EP00 Sputtering	Type of Hoist	Hoist Model	Gear Box DWG. No.	Quantity of lubricant (liter)
			Underslung Hoist (CT Gear Box)	CRU0.5	H02 AS04	Grease as required
				CRU01		
				CRU02		
			Low head room Monorail – CLH Series (CT Gear Box)	CLH03	PD-1257	0.5
				CLH05	PD-1257	0.5
				CLH7.5	PD-1258	0.8
				CLH10	PD-1258	0.8
				CLH16	PD-1269	0.83

B	Oil	Omala 460 Sputtering	Quantity of lubricant on gearbox (liter)							
			Mounting Position	Wheel Block Size						
				112	125	160	200	250	320	400	500
			B3	0.55	0.6	0.83	1.6	2.2	2.6	5.2	16.2
			B6	0.5	0.55	0.85	1.4	2.4	2.8	5.3	16.7
C D E F	Grease	Multipurpose grease NLGI-33 Spray (or) Brush	Grease as required							

MAINTENANCE AND INSPECTION PROCEDURES

5.0.18. - INSPECTION RULES

- Observe the noise of the gears with load and no load. If there is any strange noise, inspect the teeth of the gears, the joining screws and the fixing of the speed reducers and the bearings. Also examine the lubrication.
- Examine the oil temperature. The maximum temperature should not exceed 60º C.
- Check that the oil level conforms to that established by the manufacturer and checks its cleanliness.
- Avoid oil leaks
    A. Try not to overfill with oil.
    B. Inspect the oil seals and change them when their edges are damaged.
    C. Vent holes and filters should be kept clean (if there are any).
- Inspect the teeth of the gears.
    A. Wear of the teeth of the toothed wheel, pinion and the thickness. Acceptable limit of 10% of the original thickness
    B. Check for any abnormal signs, such as pitting or scratches on the gear teeth.
- Inspect the fixing screws of the gearboxes which should secure and fix in the appropriate way

BLANK PAGE

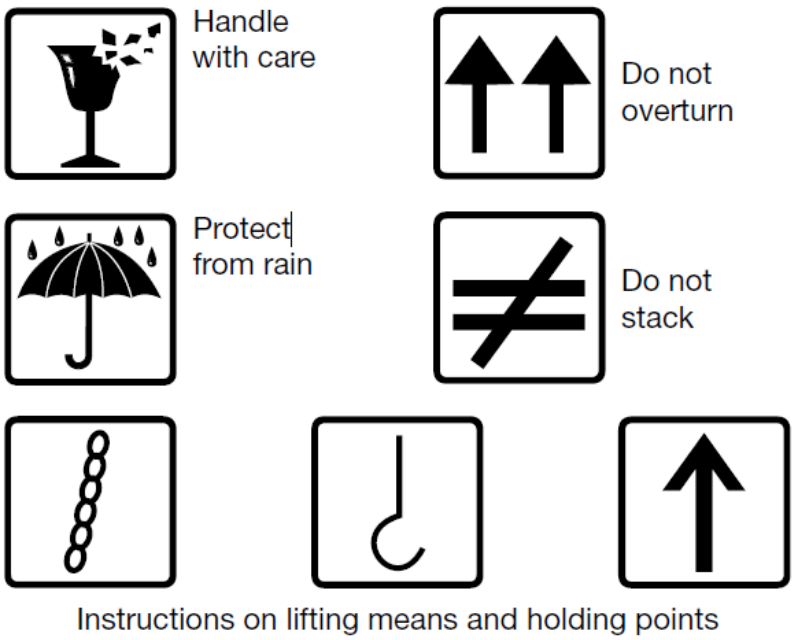
HOIST PACKING

BLANK PAGE

6.- HOIST PACKING

6.0.1. - PACKING

- The wooden packing ensures the electric hoists against mechanical damages and the influence of the climatic factors for during shipment and storage.
- The hoist unit and control pendant are shipped in cardboard packaging or on pallets.
- In some cases, the hoist and related parts can be contained in a wooden cage, carrying signs and pictograms which gives important information regarding its handling and transportation.
- When the hoists are delivered on pallets, they are generally covered by a polyethylene film to protect them from dust.
- Related accessories, being part of the supply, can be delivered inside cardboard boxes which, in relation to the mass to be handled, can be fitted with or without a pallet.
- The standard packing is not watertight, rainproof and is intended for overland destinations, not overseas, and for covered and not damp areas.
- For different environmental conditions it is necessary to provide special packing.
- Any special packing, rain-proofed and/or intended for overseas destinations, can be prepared on request.
- When handling the packed article observe the following requirements:
- The boxes shall lie only on their base; shall be stored in dry premises only; shall be gripped at the indicated places (when using load-gripping devices).
- These requirements are indicated on the box sides by relevant signs (See Figure 6.0.1).



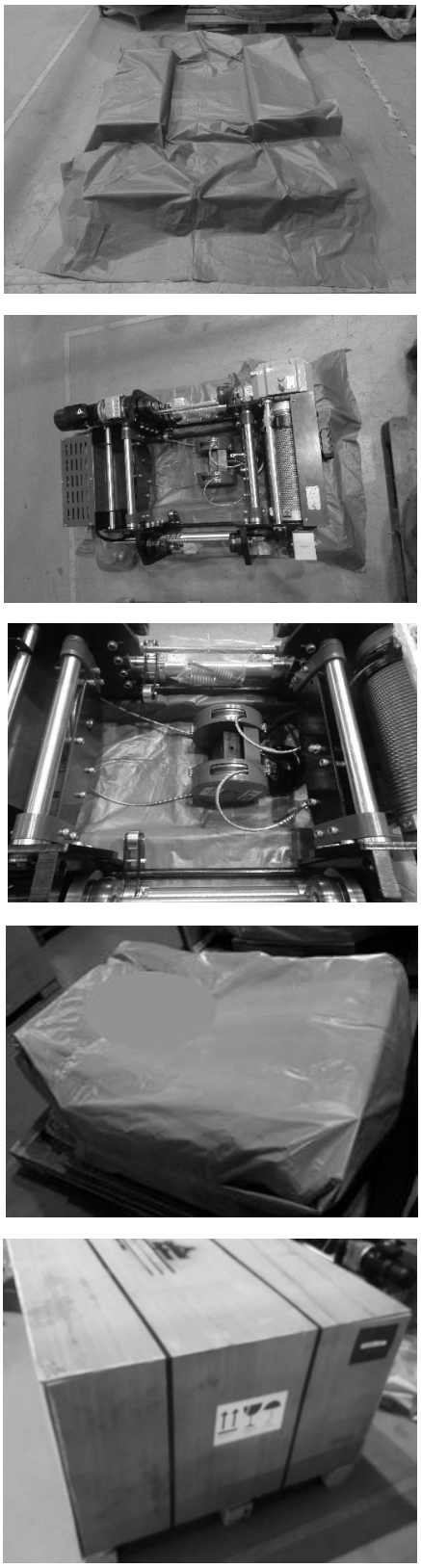


Figure 6.0.1

HOIST PACKING

6.0.2. - TRANSPORTATION AND SHIPMENT

- Transportation should be carried out by qualified transport contractors able to ensure the correct handling of the transported material. During transportation, avoid putting weights on top of the hoist or on other packed items, because they could cause them damage.
- During transportation phases we recommend that the pallet, or chest/cages containing the hoist and related accessories, are not tilted or overturned to avoid dangerous variations in their center of gravity and, therefore, to ensure the best stability.
- When shipping the electric hoists do not put other loads on.
- Place the cases with electric hoists tightly in the vehicle or fasten them by additional means.
- The vehicles shall be covered.
- Temperature range: -10°C to +45°C as for a short term (up to 24 hours)
- The manufacturer and associated selling company take no responsibility in case of transportation by the client or transport contractors chosen by client.

6.0.3. - UNPACKING

- Carefully dismount the wooden case, release the two bands fixing the polythene stuff to the article.
- Remove the polythene stuff. Unscrew screws fixing the article to the wooden case base.
- Make sure the push button, control cable and hook with roller block is not damaged.

Figure 6.0.3

6.0.4. - STORAGE

Keep the equipment and accessories locked and stored only under the following conditions:

- Do not store it outdoors. Store in dry and dust-free places, relative air humidity: max. 80%.
- Do not expose it to aggressive media.
- Protect it against solar radiation. Avoid mechanical vibrations.
- Storage temperature: -10°C to +45°C.
- Avoid strong temperature fluctuations (condensed water).
- Check the general condition of all parts of the packing at regular intervals. If required, refresh or renew preservation.
- If stored in damp locations, the equipment must be packed tight and protected against corrosion (desiccant).
- The items, stored on the right way, can be kept in a warehouse for a period of two years in covered areas in which the temperature is between -10°C and +45°C with relative humidity less than 80%.

INCIDENTS & REPAIRS

BLANK PAGE

INCIDENTS & REPAIRS

7. - INCIDENTS AND REPAIRS

7.0.1. - REPAIRS

- Precaution: All repairs should be carried out by specialized personnel.
- Wire Rope Hoists should be repaired and maintained by specialists authorized by Carlstahl Craftsman.
- Carlstahl Craftsman does not accept responsibility for loss or damage caused by repairs carried out on the Hoists by unauthorized personnel. We recommend that maintenance should be carried out by Carlstahl Craftsman Maintenance service staff.
- Note: The guarantee will only be covered when using original spare parts supplied by Carlstahl Craftsman.
- Our Maintenance Department and Technicians in charge will be entirely at your disposal for all type of consultations.

7.0.2. - HAZARDS, CAUSES, PRECAUTIONS WITH SOLUTIONS

All the solutions described should be solved by a specialist.

DESCRIPTION	HAZARD	CAUSES	PRECAUTIONS
GENERAL SAFETY PRECAUTIONS	Moving part hazard.	To prevent serious injury and property damage.	Do not operate or install hoist without reading and understanding the operator's manual. Keep hands clear of wire rope, hook and fairlead opening during operation and when spooling. Stand clear of wire rope and load during operation. Keep others away. Inspect hoist installation and wire rope condition before operating hoist. Do not use the hoist to lift persons. Do not exceed hoist's rated capacity. Never touch wire rope or hook while in tension. Be certain the anchor you select will withstand load. Know & understand your hoist fully before hoisting operation. Do not use hoist for outdoor operation. Wear heavy leather gloves when handling the wire rope. Never use the hoist with damaged rope.

INCIDENTS & REPAIRS

GENERAL SAFETY PRECAUTIONS	Motor overheating	Excessive load or too frequent use.	Operate within rated load and according to duty cycle rating.
		Brake drags.	Check and adjust brake lining clearance.
		Raise in surrounding temperature above the ambient temperature of 50°C.	The frequency of hoist operation must be limited to avoid overheating of motor.
		Frequent start or reversing.	Avoid excessive inching, jogging or plugging. This type of operation drastically shortens the motor and causes excessive brake wear.
	Abnormal noise on hoist.	Noisy gears - excessive wear of gear insufficient quantity of lubrication oil.	Check the gears. Replace the gears or fill the correct quantity of lubricate oil.
		Components are not lubricated.	Clean and lubricate wire rope.
	Electrical accident	When you touch the hoist, body, rope or hook, you feel the shock.	Make sure the hoist is grounded perfectly. Check the insulation resistance. Dry the moisture around switches completely.
	Grounding resistance	Measure the grounding resistance with earth resistance meter if the grounding resistance 100 Ω or less.	Make a grounding correctly.
	Breakage of electrical wire.	Electrical short circuit.	Check the wire. Repair the wire if broken.
	Wrong wiring	Uneven movement in the hoist.	Check the wiring in accordance with the wiring diagram. Correct the wiring if it is wrong.
	Burnout or breakage of transformer coil.	Measure the resistance of transformer coil if it is infinity.	Replace the transformer.
	Push button pendant not working.	Breakage inside the switch.	Check that the push button switch cord is connected with the switch unit correctly. Repair the cord if it has no conduction.
		Faulty switch unit.	Check the conduction of the contact points. Replace the push button switch if it has no conduction.
		Wire breakage of push button switch cord.	Check the conduction of the push button switch cord. If it has no conduction, replace the cable or the push button switch cord as a set.

INCIDENTS & REPAIRS

OPERATOR	Untrained	The load may not be prepared for hoisting properly.	Read and understand the manual. Keep a copy with you for reference.
	Inexperienced	The rope may not be properly attached to the load.	If there is something you don't understand "Do not guess" seek assistance from experienced operators.
	No Safety Equipment or PPE	May be a danger to others. Injury or Death.	Always use accredited and rated accessories. Wear safety PPE always.
HOIST COMMISSIONING	Hoist mounted out of alignment.	Excessive wear on parts, hoist may not work efficiently.	Refer to the manual to set up the hoist correctly.
	Commissioning is very difficult.	Small problems will be leading to a major failure.	Fit the hoist correctly, so it can easily be removed.
	Mounting bolt may vibrate & loose	Leading to thread stripping, hoist damage and potential failure.	Use Loctite 270 permanent thread locker sealer on fixed bolts. Use Loctite 243 thread locker for assembly bolts (i.e., removable). Use Loctite 638 for dowel pins. Check periodically or recommended according to the instruction manual.
	Bolts not secured properly.	May cause damage & accident.	Check the bolts are tightened as per torque.
LUBRICATION	Low oil level	May lead to breakdown.	Check manual - seek manufacturer's advice. Service engineer has to check for lubrication.
		Insufficient lubrication of bearings, etc. will cause breakages and eventual failure.	Check oil level regularly.
		Hoist will run out of lubrication causing failure.	Check - fill and oil/grease regularly.
WIRE ROPE	Lantern Distortion	Ropes the outer layer of strand has become dislocated, or when the outer layer becomes longer than the inner layer of strands. Such a condition may occur as a result of abrupt (snatch) loading of the rope from a slack condition.	Replace. Always use recommended rope size. Seek advice from manufacturer.

INCIDENTS & REPAIRS

WIRE ROPE	Kinked or Tightened loops	Deformation created by a loop in the rope which has been tightened without allowing for rotation about its axis. Imbalance of lay length occurs, which will cause excessive wear, and in severe cases the rope will be so distorted that it will have only a small proportion of its strength remaining.	Replace. Always use recommended rope size. Seek advice from manufacturer.
	Over Size	Breakage - Too big a rope wrapped around a small diameter drum will cause early fatigue. Rope guide will damage.	Replace. Always use recommended rope size. Seek advice from manufacturer.
	Under Size	Too small a rope may not meet rated capacity.	Replace. Always use recommended rope size. Seek advice from manufacturer.
	Strand Extrusion	Rope imbalance is indicated in the extrusion of the core.	Replace. Always use recommended rope size. Seek advice from manufacturer.
	Wire Extrusion	Wires or groups of wires rise up, on the opposite side of the rope to the sheave groove, in the form of loops.	Replace. Always use recommended rope size. Seek advice from manufacturer.
	Flattened Portions	Ropes flattened by hitting any object while moving the load.	Replace. Always use recommended rope size. Seek advice from manufacturer.
	Bends	Angular deformations of the rope caused by external influence.	Replace. Always use recommended rope size. Seek advice from manufacturer.
	Rope bird-nests on the drum when rope becomes slack.	Rope becomes untidy and twisted on the drum which can damage the rope.	Rope & rope guide damage. Replace.
	Rope jumps over the drum.	Severe damage can be caused to the hoist and rope.	The rope guide & spring be worn. Replace.
	The wire rope has uncoiled itself from the drum.	Rope guide fault	Wire rope guide to be checked.
		Wire rope fault	Steel wire rope to be checked for wear and deformation.
		Spring fault	Check the spring of the rope guide.

INCIDENTS & REPAIRS

WIRE ROPE	Breakage	Rope break under load can cause serious accident. Injury or death may happen.	Replace. Never stand below the load and the hoist, always stand clear of hoist. Always wear safety PPE on hands, feet body and eyes especially. See instruction manual for other potential rope wear & failure.
HOISTING LOADS	Not preparing load for hoisting.	The load may not be prepared for hoisting properly.	Read and understand the manual before hoisting
	Shock loads	This type of load imposes a strain on the hoist many times the actual weight of the load can cause failure of the rope or hoist.	Avoid shock loads at all costs.
	Hoist not lifting rated load.	Overload limit fault.	Limit switch to be checked.
		Mechanical arrangement fault.	Mechanical elements to be checked.
		VFD fault.	Check the drive condition.
	Hoist failure, rope breakage, and severe wear and tear.	Personal injury or death. Damage to the lifting load.	To ease the load on the hoist you may find it necessary to utilize a rated hook block. Always ensure the rated capacity on the hook block before lifting the load.
SUSPENDED LOADS	Don't stand under suspended loads.	Serious injury or death may occur. The load may fall.	Follow all safety procedures in the manual and stay well clear of the load.
	Crowded working area.		
	Maintain a clear working space.		
	Rope and equipment failure.		
	Impatience		
	Incorrect positioning of lifting equipment.		
HOISTING OVER A LONG DURATION.	Overheating of gear box.	Breakdown of oil causing eventual failure. Excessive wear, shorter life span, eventual failure.	Stop hoist and check for temperature rises. Allow until to cool. After a big job check oil and replace if burnt or has lost viscosity. Check rope and re-grease.

INCIDENTS & REPAIRS

HOOK	The hook rises too far and blocks everything.	Safety Limit Switch	Limit switch setting to be checked. Contactor (stuck) check.
	On suspending the load, the hook is triggered in lifting, but it works in lowering.	Overload limiter triggered	Check the load for the rated capacity. Check the limit switch & VFD overload regulator.
	The hook tackle and wire rope have become twisted.	The wire rope has a twist in it.	Remove the twist from the wire rope. Change the wire rope in case of deterioration.
	Hook moves in wrong direction.	Wrong or reversed connections on the control station or terminal block.	Check the connection in the wiring diagram.
		Failure of the direction switch to affect dynamic braking at time of reversal.	Check the connections to switch. Replace the damaged switch or faulty capacitor.
SIDE PULLING	Loads up the hoist on an incorrect angle.	Hoist & rope guide damage or failure. Severe wear and tear.	Avoid side pulling.
MOTOR BRAKE	Over-adjusted	Excessive wear and eventual failure.	Refer instruction manual for motor brake details.
	Under-adjusted		
LIFTING	The Hoist does not move or not working.	Electrical input fault	Check the input voltage, correct it if required. Contact the hoist supplier.
		Input fuses	Check the input fuses and replace them if necessary.
		Control fuses	Check the control fuses and replace them if necessary.
		Safety limit switch triggered.	Look at safety limit switch position.
		The emergency stop button is activated.	Deactivate it.
		Triggered fuse.	Replace the fuse.
		Main switch is off.	Turn it on.
		VFD does not operate.	Contact hoist manufacturer or hoist supplier.
		Overload.	Reduce the load.
		A supply phase is missing.	Check the connection of the 3 phases.

INCIDENTS & REPAIRS

LIFTING	Hoist lifts but not lowering.	Broken conductor in pendant cord.	Test continuity of each conductor. Replace cable if needed.
		Up/down switch malfunctioning.	Repair or replace switch.
		Motor coil burning. Measure the coil resistance of each phase.	Replace the motor when the resistance of all phases is infinity.
	Hoist lowers but not lifting.	Overloaded.	Reduce load to within rated capacity.
		Up/down switch malfunctioning.	Repair or replace switch.
		Start capacitor damaged.	Replace the capacitor.
	The load slips when lowering.	Lifting brake fault	Check the condition of brake disc
	The hoist lifting motor hums but does not lift.	Blown fuse	Motor MCCB to be checked.
		Electromagnetic brake not working.	Check the Electromagnetic brake in motor.
		Connector fault in one phase.	Check the Connector output voltage.
	Motor not running.	No incoming power or low voltage.	Check hoist connections to power source. If low voltage, have a certified electrician to check the incoming power.
		Fuse blown or circuit breaker tripped.	Replace fuse or reset circuit breaker.
		Rectifier damaged in the phase protector so that the brake won't work.	Replace phase protector.
		Transformer damaged.	Replace transformer.
		Motor damaged.	Have motor replaced by a qualified service technician.
	The motor works, but very slowly.	Fault in the Brake control.	Motor brake assembly to be checked.
TRAVEL	The cross travel does not move.	Fault in the motor.	Check the Voltage reaches motor.
		Limit Switch triggered	Limit switch position to be checked and corrected.
		Fault in motor phases.	Check the motor voltage.
	The cross travel moves very slowly.	Fault in brake	Check the electromagnetic brake in the motor.
		Fault in Limit Switch position.	Brake rectifier to be corrected.
	Braking is long.	Brake disc	Brake springs to be adjusted.
			Check the condition of brake disc.

INCIDENTS & REPAIRS

TRAVEL	The cross travel only moves slowly in one direction.	Limit switch triggered.	Limit switch position to be checked and corrected.
	The motor turns but does not transmit movement.	Fault in Gearbox	Condition of the gearbox to be checked
	Load continues drifting down excessively even when hoist is stopped.	Grease or oil on the lining.	Disassemble the brake and clean the lining.
		Disc brake is worn.	Adjust clearance between armature and iron core.
		Abrasion of brake lining.	Replace the brake lining.
FOR GENERAL MAINTENANCE OVERVIEW	May cause hoist failure if proper maintenance procedures are not adhered to.	Personal injury or death. Hoist failure. Damage to the lifting load.	Check all components for alignment & tighten. Check brake wear and adjust if necessary. Inspect oil level in gearbox and add as necessary. Check rope for excessive wear. Never stand directly below of the hoist while hoisting.
	Not adhering to manufacturers maintenance guide.		
	Not reading manual		
	Not adhering to advice by experienced operators.		
	Impatience		
	Laziness		

INCIDENTS & REPAIRS

7.0.3. - PERIODIC MAINTENANCE CHECK LIST:

S.NO	DATE	DESCRIPTION	PERSON NAME & SIGN	REMARK
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

INCIDENTS & REPAIRS

7.0.4. - COMMISSIONING REPORT:

<table>
<tr><td colspan="3" rowspan="3">COMMISSIONING REPORT</td><td>DATE:</td><td></td></tr>
<tr><td>Report No:</td><td></td></tr>
<tr><td>Customer Code</td><td></td></tr>
<tr><td colspan="2">Hoist Model:</td><td colspan="3">Hoist Type:</td></tr>
<tr><td colspan="5">Customer Name & Address</td></tr>
<tr><td colspan="5"></td></tr>
<tr><td>Phone No</td><td>Tele No</td><td rowspan="2">Contact Person</td><td>Name</td><td></td></tr>
<tr><td></td><td></td><td>Dept</td><td></td></tr>
<tr><td>E-Mail</td><td colspan="2"></td><td>Fax No</td><td></td></tr>
<tr><td colspan="5">THE ABOVE-MENTIONED MACHINE HAS BEEN COMMISSIONED SATISFACTORILY ON _____</td></tr>
<tr><td colspan="2">FOR CARLSTAHL CRAFTSMAN.</td><td colspan="3">FOR CUSTOMER</td></tr>
<tr><td>Name & Designation</td><td>Signature</td><td colspan="2">Name & Designation</td><td>Signature</td></tr>
<tr><td></td><td></td><td colspan="2"></td><td></td></tr>
<tr><td></td><td></td><td colspan="2"></td><td></td></tr>
<tr><td></td><td></td><td colspan="2"></td><td></td></tr>
</table>

INCIDENTS & REPAIRS

7.0.5. - COMMISSIONING CHECK LIST:

COMMISSIONING REPORT	Date:		
Check Points	Model:		
Description	Checking method	Status	Remarks
1.Check any transportation damage.	Visual		
2 Inspection on hook.	Visual		
3. Tightening of the screw connectors on hooks, trolley.	Spanners		
4. Check rope clean & oiled, rope must not twist.	Visual		
5. Measure & Record the hook aperture (Z=_____mm& H_____mm)	Manual		
6. Electrical connections as per the circuit diagram including customer power supply	Manual		
7. Check runway clean, free of grease & paint	Visual		
8. Stopper for Up & Down, Cross travel & Long travel	Visual		
9. Hoist Front and Rear trolley connected by guide shaft and screw rod – Nut assembled	Spanners		
10. Gap between Beam & Trolley.	Vernier		
11. Brake inspection - Up & Down, Cross & Long travel (with full load).	Visual		
12. Direction of movement of hoist corresponding to the symbols on control pendant.	Visual		
13. Load test - 20% over load (Only Once)	Visual		
14. Motor current in Amps without load -Slow/High speed (Use: Tong tester).	R		
	Y		
	B		
15. Motor current in Amps with rated load - Slow/High speed (Use: Tong tester).	R		
	Y		
	B		
16.Motor current in Amps without rated load in Cross Travel Motor- Slow/high speed (use: Tong tester)			
17.Motor current in Amps with rated load in Cross Travel Motor- Slow/high speed (use: Tong tester)			
Training given to customer end person Name: Sign:	Customer comments		
Commissioning person name: Sign:	Customer Signature with seal:		

BLANK PAGE

HAZARDOUS WASTE PROCEDURES

BLANK PAGE

HAZARDOUS WASTE PROCEDURES

8. - OVERVIEW OF HAZARDOUS WASTE MANAGEMENT PROCEDURE

To ensure effective system for the collection, segregation, storage and disposal of used materials:

- Used oil, Grease, oil filters, and oil solvent.
- O-Rings, Oil Seals.
- E-Waste (Electrical and Electronic)

8.0.1. - WASTE MANAGEMENT PROCEDURES

8.0.1.1. - USED OIL

S. No	Description of waste	Pour In
1	Lubrication oils	"Used oil" Barrel
2	Gear Box oil	
3	Grease	

8.0.1.2. - USED PLASTIC AND RUBBER

S. No	Description of waste	Store In
1	Polyethylene & Polyamide materials	"Separate Container or Barrel"
2	Plastic	
3	Plastic stickers	
4	Display Board	
5	Hose	
6	Insulation tape	
7	Polyethylene sheet	
8	Teflon taps bits	
9	Oil seals	
10	O Rings	
11	End Buffers	
12	Closing Caps	
13	Funnels & Filters	

HAZARDOUS WASTE PROCEDURES

8.0.1.3. - E-WASTE (ELECTRICAL / ELECTRONIC)

S. No	Description of waste	Store In
1	PCB	"Separate Container or Barrel"
2	Drives	
3	Resisters	
4	Fuses, Circuit Breakers	
5	Wires	
6	Sensors	
7	Switches, contactors & Starters	
8	Fan	
9	Solenoid	
10	Relays	
11	Transformers	
12	Capacitors	

8.0.2. - MANAGEMENT OF CONTAINERS

- Used oil must store in used oil containers that are in good condition (no severe rusting, apparent structural defects or deterioration) and not leaking (no visible leaks). Remove damaged containers from use or repair immediately.
- Keep containers (including funnels) closed except, when adding or removing used oil.
- Used oil is NOT to be collected in an underground or aboveground storage tank.
- Store Plastic and E waste in separate container or barrel.

8.0.3. - LABELING

- Containers and above ground tanks used to store used oil must be labelled or marked clearly with the words
- “Used Oil” and not as “Waste Oil”.
- Mark the plastic and E waste container/Barrel as “Universal Waste”.
- Hazardous wastes: Used Oil, Plastics, E Waste should not mix with each other.

8.0.4. - DISPOSAL

- Arrange Self-Transport for pickup and disposal of hazardous waste, when the container is full.
- Collected Hazardous waste should be disposed as:
    - If there is a Disposal procedure followed by the customer for Hazardous waste, (OR)
    - Dispose through TNPCB or CPCB authorized agents. (OR)
    - Dispose through authorized waste management personnel.

8.0.5. - CAUTION

- Do not burn used oil waste, Plastics & E Waste.
- Improper disposal will lead to significant environment impact.

TÜV INDIA
TÜV NORD Group

Statement of Confirmation

No.: CE/18-19/114

Client's reference - Technical File Number:

Name & Address of the Manufacturer: CAL/IMS/QS/TF-04

Craftsman Automation Limited
123/4, Sangothipalayam Road Arasur Post,
Coimbatore-641407,
Tamilnadu, INDIA.

Craftsman AUTOMATION

Product Nomenclature: Electric Rope Hoists
Model Number : Monorail Hoist- CLH03, CLH05, CLH7.5, CLH10

Review Results/Observations
The Technical File referenced above submitted by the manufacturer has been reviewed for its document contents.
The Technical File generally covers the documentation content requirements of the European Directive/s:

- EC Machinery Directive 2006/42/EC
- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU

Standards Referred to: EN ISO 12100:2010, EN 13489-1:2015, EN 14492-2:2006+A1:2009/AC:2010, EN 60204-32:2008, EN 61000-6-2:2005, EN 61000-6-4:2007+A1:2011.

Document issued by the Manufacturer: Declaration of Conformity

Marking on the Product: CE

Date of Review: 29th January 2019

Technical Inspection Services TÜV TÜV India

Mahesh Gaur
Head - CE Certification

(This Statement of Confirmation is valid under the conditions stated overleaf)

Job no: 8116469751

Registered & Head Office: 801, Raheja Plaza I, LBS Marg, Ghatkopar (W), Mumbai 400 086 | Email: infoindia@tuv-nord.com Tel: +91-22-66477000
Website: www.tuv-nord.com/in Toll Free Number: 1800-209-0902

TÜV INDIA
TÜV NORD Group

Statement of Confirmation

No.: CE/18-19/115

Client's reference - Technical File Number: CAL/IMS/QS/TF-05

Name & Address of the Manufacturer:
Craftsman Automation Limited
123/4, Sangothipalayam Road Arasur Post,
Coimbatore-641407,
Tamilnadu, INDIA.

Craftsman AUTOMATION

Product Nomenclature: Electric Rope Hoists
Model Number : Crab Hoist- CLHD05, CLHD7.5, CLHD10, CLHD16

Review Results/Observations
The Technical File referenced above submitted by the manufacturer has been reviewed for its document contents.
The Technical File generally covers the documentation content requirements of the European Directive/s:

- EC Machinery Directive 2006/42/EC
- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU

Standards Referred to: EN ISO 12100:2010, EN 13489-1:2015, EN 14492-2:2006+A1:2009/AC:2010, EN 60204-32:2008, EN 61000-6-2:2005, EN 61000-6-4:2007+A1:2011.

Document issued by the Manufacturer: Declaration of Conformity

Marking on the Product: CE

Date of Review: 29th January 2019

Mahesh Gaur
Head - CE Certification

(This Statement of Confirmation is valid under the conditions stated overleaf)

Job no: 8116469751

Registered & Head Office: 801, Raheja Plaza I, LBS Marg, Ghatkopar (W), Mumbai 400 086 | Email: infoindia@tuv-nord.com Tel: +91-22-66477000
Website: www.tuv-nord.com/in Toll Free Number: 1800-209-0902

Craftsman Automation Limited
123/4, Sangothipalayam Road,
Arasur Post, Coimbatore - 641 407
Tamilnadu, India
Ph: +91-422-7161 000
Fax: +91-422-7161 234
www.craftsmanautomation.com

April, 2025 Rev-F