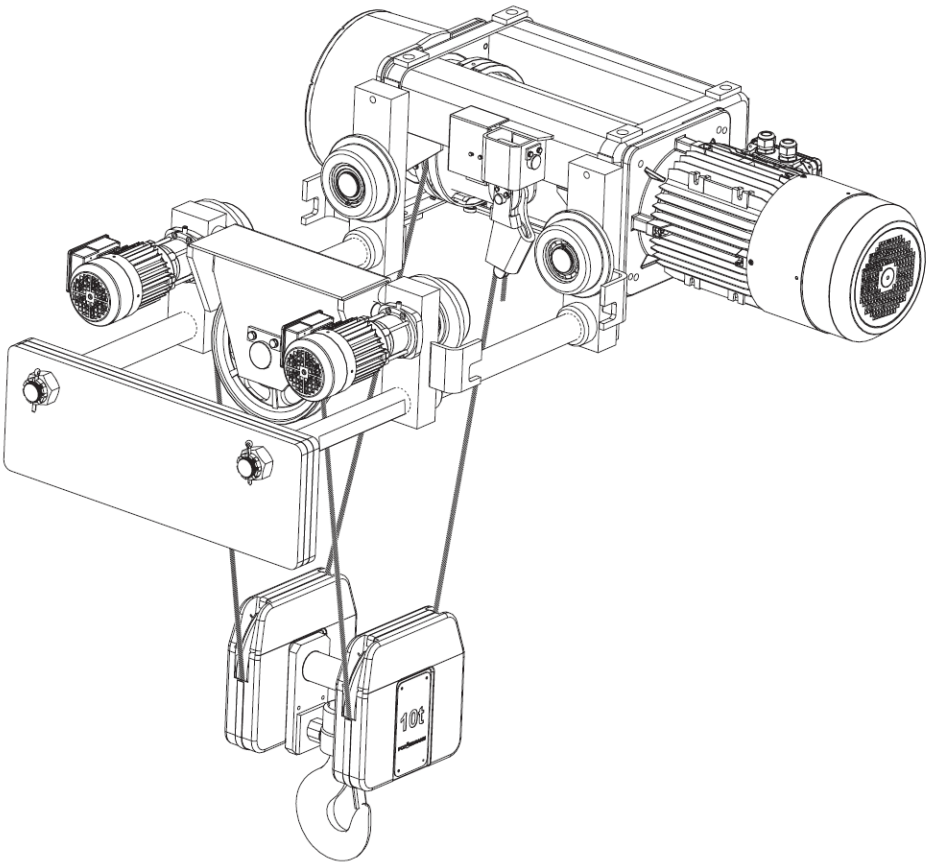
MANUAL

- **INSTALATION**
- **OPERATION**
- **MAINTENANCE**

ELECTRIC ROPE HOISTS

MT/M/MTL SERIES 03/2016



PODEM™

Contents

1. PRELIMINARY INFORMATION

Contents of the manual

This manual contains the description of the trolley/hoist and its "intended purpose" the operation and performance technical data, as well as the installation, operation and maintenance instructions for all supported or suspended versions, with mono or double rail trolley.

Recipients of the manual

This manual has been prepared for:

- The works manager, workshop manager or site manager
- The installation technicians
- The operator
- The maintenance technicians

The manual must be left in the safekeeping of a duly authorized person, in an appropriate place where it is always available in the best conditions for reference. In the event of loss or damage, ask for a copy directly from PODEM.

How to use this manual?

The instructions are accompanied by symbols facilitating the reading and specifying the various type of information supplied.

1.1. SAFETY ALERT AND INFORMATION SYMBOLS

Pay utmost attention to the instructions accompanied by this symbol and strictly observe the prescriptions.

Important information:

This symbol calls the attention on useful information and hints for handling, assembly and installation procedures.

Where necessary, references and numbers corresponding to the illustrations appear through-out the text. In the illustrations any part of the trolley/hoist described in the text is indicated with a number.

1.2. IMPORTANT INFORMATION

Before starting any procedure, the operator must read the relevant section(s) of this instruction manual. The guarantee of problem-free operation and of fully correspondence of the performances with the foreseen duty strictly depends on the proper observation of all instructions contained in this manual.

Note: ***All specific date for every type of hoists is given in its passport.***

1.3. LIABILITY

The instructions in this manual do not substitute, but only resume the obligations stated by the actual safety and injury prevention laws and regulations.

With reference to the content of this instruction manual, PODEM declines any liability in following cases:

- Use in despite of national safety and injury prevention.
- Defective layout of the structures on which the hoist is intended for.
- Failure to read or comply with the instructions supplied in this manual.
- Faults in the main power supply.
- Unauthorized changes to the hoist.
- Use by not instructed operators.

Readability and presentation of plates.

Plates must always be kept in a readable condition of all their details and regularly cleaned. If only one of the information of a plate deteriorates and/or is no Longer readable, we recommend ordering another plate from the manufacturer quoting the data in this manual or on the original plate, especially the Serial number and to replace the old one.

Plate types:

- Identification plate hoist/trolley
- Rating plate hoist and travel motors
- Rating plate lower blocks

2. DESCRIPTION OF THE HOIST/TROLLEY
2.1. COMPONENTS OF THE HOIST/TROLLEY

The electric hoists have been designed and tested in conformity with the FEM calculation rules for lifting equipment.
Accordingly to the application, the electric hoists are available in following versions:

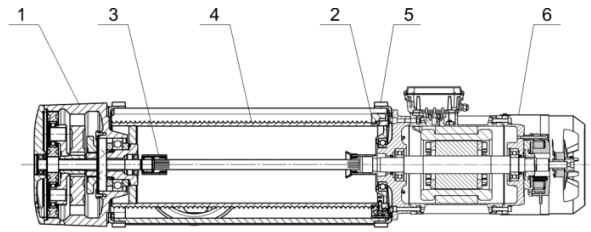
- Standard, foot mounted type
- Normal headroom trolley
- Low headroom trolley

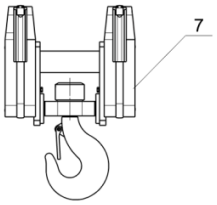
This permits to reduce/optimize the distance between the suspension point of the load on the hook and the travel surface.

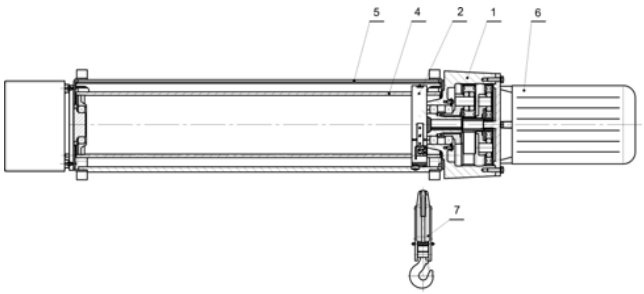
- With double rail trolley

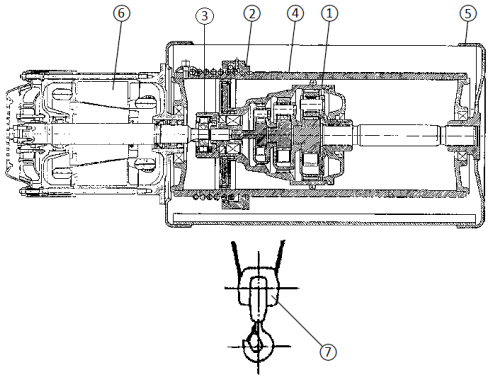
Hoisting mechanism
The hoisting gear consists of following assemblies:

1. Gear box
2. Rope guide
3. Coupling
4. Rope drum
5. Hoist body
6. Electric brake motor
7. Lower block









Electric motor with built-in brake

- **Electric motor with conical rotor and fail safe built-in conical brake**

Three-phase asynchronous 1 or 2 speed motors with conical rotor and integrated conical brake driven by a coil spring. The brake release is due to the sliding of the rotor after switching-on the power supply and automatically engages the brake when the power is switched off.

- **Electric motor with cylindrical rotor and built-in electromagnetic brake**

The brake is opening when the voltage is being fed. When feed voltage of brake coil switches off, under the pressure of helical springs the brake anchor gets pressed to a friction disc and stops its motion, as well as the electric motor that is rigidly connected thereto.

Coupling
The torque of the motor is transmitted to the shaft of the gearbox by a toothed coupling connected to the gearbox shaft.

Planetary gearbox
The 2 or 3-stage planetary gearbox ensures the required hoisting speed. All gears of the planetary gearbox are made of heat-treated high quality steel.

Drum
The drum is driven centrally by the hollow output shaft of the gearbox. The shaft of the gearbox and the guide plate of the second stage are supported on roller bearings installed in the drum. On the hoist type "M" the gearbox is located inside the drum. The profile of rope grooves on the drum is machined in compliance with the DIN standards.

Rope guide
The rope guide basically consists of two parts:

- Guide ring
- Pressure spring - which properly guide the rope on the drum grooves.

The guide ring maintains the rope in position during the uncoiling and prevents it from coming off the groove and, when the load swings, is guided by a fixed bar and runs on roller bearing.

Hoist body
The supporting framework is a compact welded structure made of two steel flanges joined by profiled plates.

Hook block
The structure of the lower block with hook and 2 or 4 rope falls allows the distribution of the tensile force generated from the load on the ropes. The side covers of the lower block protecting the pulleys are strong and shock resistant.

Overload device
All standard hoists of the MT/M/MTL Series with 2 or 4 falls are with a overload device with two reaction thresholds. There are two types of overload devices:

- Overload device type HOT - consists of an electromechanical system with pre-calibrated springs acting on two micro switches which operate the auxiliary circuit and stopping all movements.
- Dynamometric pin - load limiting device designed for connection with pin load cell. Load limiting is carried out by two relays safety operation logic toggling occurs when a load reaches the threshold set by means of two trimmers. Further trimmer adjustment allows setting the filter applied to the load cell signal.

For the both types of load limiters 1st is a WARNING threshold, 2nd is a STOP threshold.

Electrical equipment
Upon request, the trolley/hoist is available with an own electric equipment consisting of electromagnetic switches for the control of all movements of the hoist and fuses for protection against shorts. The control circuits are in low voltage (48/42V). A terminal box with numbered terminals ensures simplicity and safety in the wiring for all external functions.

2.2. TECHNICAL DATA

Reference standards
The standard hoists of PODEM are manufactured in compliance with following standards and regulations:

- **Machinery Directive 2006/42/EC**
- **Directive 2006/95/EC**
- **Directive Electromagnetic compatibility 2004/108/EC**
- **EN 12100-2** Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles
- **EN 12077-2** Cranes safety - Requirements for health and safety - Part 2: Limiting and indicating devices
- **EN 13586** Cranes - Access
- **EN 12644-1** Cranes - information for use and testing - Part 1: Instructions
- **EN 12644-2** Cranes - Information for use and testing - Part 2: Marking
- **EN 60204-1** Safety of machines. Electrical equipment of machines. Part 1: General requirements
- **EN 60204-32** Safety of machinery - Electrical equipment of machines - Part 32: Requirements for hoisting machines
- **EN 60947** Low-voltage switchgear and control gear
- **EN 12385-3** Steel wire ropes - Safety - Part 3: Information for use and maintenance
- **EN 12385-4** Steel wire ropes - Safety - Part 4: Stranded ropes for general lifting applications
- **EN 12100-1** Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology
- **IEC 34-1** Rotary electric machines
- **IEC 34-5 IP** Classes of protection
- **VBG 8; VBG 9a** Safety instruction for lifting machines
- **DIN 15020** Material handing machines. Elements of driving. Calculation of their design
- **FEM 9.511** Bases for calculation of serial lifting mechanisms. Classification of mechanisms
- **FEM 9.661** Bases for calculation of serial lifting mechanisms. Sizes and quality of driving elements for pulley systems (reeving) with ropes
- **FEM 9.683** Bases for calculation of serial lifting mechanisms. Selection of travel motors
- **FEM 9.755** Serial lifting devices. Measures for achievement of safe periods of operation of serial production of lifting mechanisms, driven by motors
- **FEM 9.811** serial lifting mechanisms. Rules for electric hoists (wire rope and chain hoists)

Operating conditions
PODEM standard hoists are designed to operate under following conditions:

- Temperature range: -20°C - max +40°C
- Relevant humidity: < 80%
- Elevation max 1000 M.S.L.

For operation in other environmental conditions than specified above, contact the manufacturer for special implementations.

Standard protections and insulation
The standard PODEM hoists are designed to operate in an environment protection from atmospheric influences. Electric components are supplied with the protections and insulation as shown in Table 1 and 2.

Motors — Table 1

Function	Protection		Insulation class
	Motor	Brake	
Lift	IP 54	IP 23	
Travel	IP 54	IP 23	

Electrical Equipment		Table 2
Item	**Protection**	**Max. voltage insulation**
Electrical panel	IP 55	1500V
Cables	CE 120/22	450/750V
Connectors	IP 55	600V
Push button	IP 55	500V
Limit switch	IP 54	500V

Implementation for operation in the open air, not standard protections and isolations can be supplied upon request.

Noise level

The sound pressure level during the operation of all components of the hoist is clearly 85 dB (A) measured at 1m distance and 1.60m from the floor.

Power supply

Serial PODEM hoists are designed for three phase AC power supply for 380V/50Hz ±10% for double speed motors.

The design of the power supply line must be adequate for the rated current ranges and consumption for the motors foreseen in the offered equipment configuration.

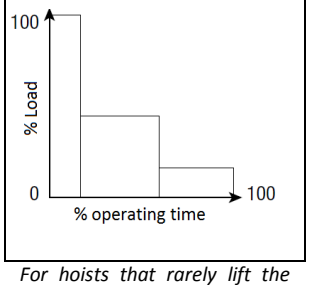
Motors for special voltages and frequencies are available upon request.

2.3. HOIST SELECTION IN COMPLIANCE WITH FEM-GROUPS

Two parameters determine the duty class of the hoist:

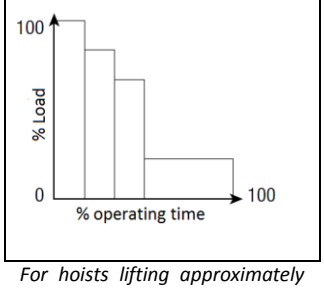
- Running time
- Duty class

L1 Light duty



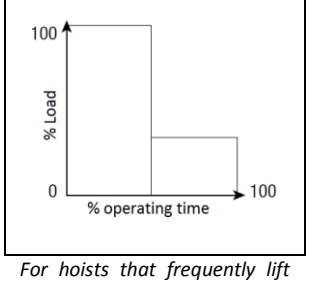
For hoists that rarely lift the maximum load and mainly reduced loads.

L2 Middle duty



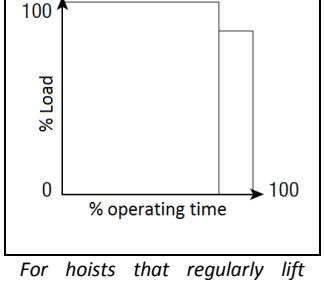
For hoists lifting approximately the same ratio maximum, medium and reduced loads.

L3 Heavy duty



For hoists that frequently lift the maximum load and normally medium loads.

L4 Very heavy duty



For hoists that regularly lift loads near the maximum value.

Duty class	Running Time "T"		
FEM group	**I Am**	**2m**	**3m**
L1 - Light duty	6300	12500	25000
L2 - Middle duty	3200	6300	12500
L3 - Heavy duty	1600	3200	6300
L4 - Very heavy duty	800	1600	3200

Temporary service

As foreseen in the **FEM standard 9.683**, electric brake motors for travel and lifting are designed and manufactured for intermittent duty in relation with the selected duty class. However for example in case of long travel strokes of hook travel, it is possible that these intermittent duty rates cannot be observed. In these cases the hoist may be operated in **temporary service**, with the possibility to establish the running time taking into account the limit temperatures permissible for the motors. In these cases, make sure that the motors are not started for more than 10 times and for maximum running time in compliance with the duty class selected basing on a.m. FEM standards (see table 3).

Selection criteria

When choosing the proper hoist take into account the following considerations:

- The maximum load (capacity)
- The maximum hook travel
- The lifting speed needed
- The operating conditions

The general hoist model is defined in accordance with the load spectrum, the average daily operating time, the capacity and the rope reeving.

Comparison between the duty modes as per FEM and ISO	
FEM 9.511	**ISO**
1Am	M4
2m	M5
3m	M6
4m	M7

Table 3

FEM	ISO	Continuous running time (min)	Max. number of subsequent starts during tuning time
1Am	M4	15	10
2m	M5	30	10
3m	M6	30	10

Selection examples

Capacity - 6300kg, Hook travel (H) - 7m
Lifting speed (V) - 6 m/min, Reeving - 4/1
Load spectrum - Medium, Cycles per hour (N) - 10
Daily working hours (T) - 8 h

$$T_m = \frac{2.H.N.T}{60.V} = \frac{2.7.10.8}{60.6} = 3.1h$$

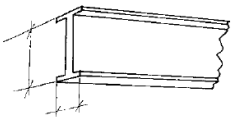
To the "medium" load spectrum and 3.1 average daily operating time the 2m (M5) duty mode corresponds as shown in the Load Spectrum/Duty Mode Table. Basing on the given values of capacity - 6300kg and reeving - 4/1, the Type Selection Table exhibits the MT 316 hoist models group.

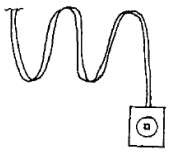
3. INSTALLATION INSTRUCTION
3.1. ASSEMBLY PREPARATION

Caution: *Before starting the assembly and the start up of the electric hoist, visually check that there are no mechanical or other damages caused by the transport.*

Before starting the installation, make sure that the technical data of the hoist and of the parts to be prepared by the user comply with the content of the order confirmation in order to ensure a proper installation especially.

Verify the suitability of the beam or the fixed support prepared to hold the hoist as well as the feeding line.

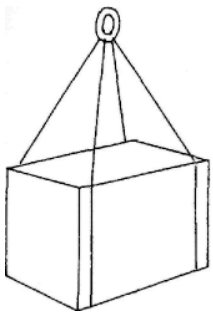




Inspect the working area where the hoist will be operating.

- Check that there are no obstacles in the way of the hook during the lifting.
- In case of hoist with trolley, make sure that the travel and lifting movements are free from obstacles and are not dangerous to people, things and workplace.
- Make sure that no permanent working activities are performed under the operating area of the trolley.

Provide suitable test weights for dynamic and static load tests, with suitable slings and lifting equipment as follows:



DYNAMIC TEST
mass =
rated capacity x 1,1
STATIC TEST
mass =

- **Rated capacity x 1.25** besides the rated capacity of 1t
- **Rated capacity x 1.5** up to the rated capacity of 1t

Check the suitability of the power supply line and the current/voltage values accordingly to the content of the order confirmation.

Verify that this documentation corresponds to the hoist to be installed.

3.2. PACKING

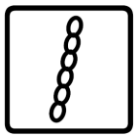
Check in the packing list or in the delivery note the list of the documents supplied with the equipment (including the instruction and maintenance manual the various certificates and the conformity declaration). The hoist can be delivered on pallets, crate, open case, closed case, according to the requirements of the customer at the order. In case of "closed case" respect the handling instructions as well as the indications and symbols marked thereon.

Handle with care

Do not overturn

Keep away from water

Do not stack



Indication of lifting means and holding points

Indication of lifting means and holding points

Indication of lifting means and holding points

Before handling the packaging take knowledge of the weight of the load until signed on the package and use proper tools.

If the hoist should not be installed immediately, notice following points:

The standard packaging is not "waterproof" and is intended for transport by land, and not by sea, inside covered rooms, without humidity.

The packed and suitable preserved equipment can be stored indoors for a period of about 1 year, at temperatures between -20°C and +70°C and 80% humidity. Different environmental conditions require a special package.

Identify the holding points if any marked on each package unit with the corresponding symbol. Before handling the load unit, visually check the package and consequently the goods for breakage or damages.

NEVER USE SLING CHAINS TO LIFT OR MOVE THE PACKAGE UNIT

LIFT THE PACKAGED HOIST WITH THE FORKS OF A LIFT TRUCK OR BY MEANS OF A TRANS-PALET

Dispose of the package accordingly to the local regulations.

3.3. TRANSPORT AND HANDLING

In order to ensure a careful and proper handling of the equipment, we recommend you to entrust qualified carriers with the transport. No other goods can be laid on the equipment or its package. During transport the goods must be properly protected against the rain. In case of ship transport, the package units must be kept in the hold protected against sprinkling water or humid winds.
Perform the handling with suitable means, lifting the equipment without dragging it.

3.3.1. STORAGE

The goods whether designed for indoor or outdoor installation, can be stored up to a maximum period of 1 year in environment with the following characteristics:

- Protected against atmospheric agents
- Humidity not higher than 80%
- Minimum temperature -20°C
- Maximum temperature +70°C

For storage periods over 1 year, ask the manufacturer for special protection procedures.

If the temperature rises above or falls below the given values and the humidity exceeds 80%, in the storage place, provide protections for the parcels with barrier bags and hygroscopic salts.

In case of storage outdoor, provide for supports to keep all packages without pallets clear of the floor and protect all packages with barrier bags and hydroscopic salts.

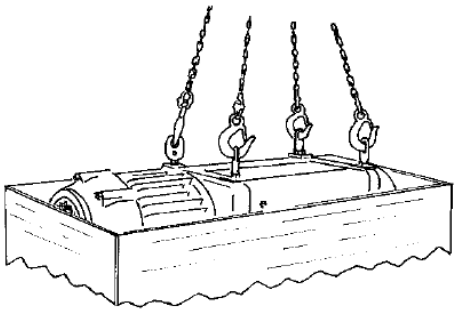
3.3.2. PACKAGE REMOVAL

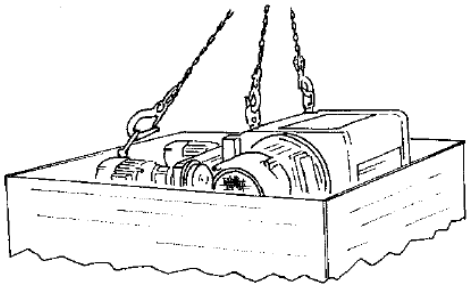
To extract the hoist from the package no special slings are required.

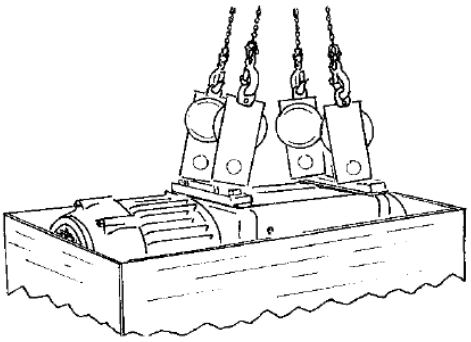
Use adequate slings for the mass of the hoist to be lifted.

After package removal, visually check the hoist for integrity before starting the installation.

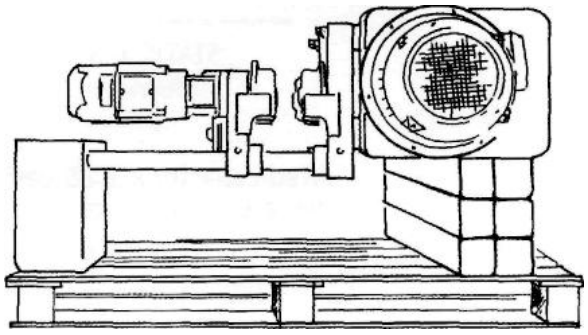
To extract the hoist, hook to the points provided as shown in the illustrations.







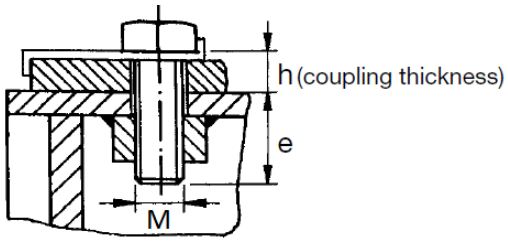
Once the hoist is removed from the packaging, put it on a pallet and ensure its stability.



3.4. ASSEMBLY OF COMPONENTS

Verify that the technical data of the hoist comply with foreseen kind of operation. Especially that the hook travel is not shorter than required and that the rated capacity is equal or higher than the loads to be lifted.

To assembly the stationary hoists (suspended type) always use the lock tab under the head of the bolt and bend it as shown.



Hoist type	Bolt	e min
MT 305-308	M14	30+h
MT 312-316	M20	35+h
MT 525	M24	50+h
M 740-750	M27	50+h
M 950-980	M36	70+h
M1100-1125	M30	60

In case of hoist with normal or low headroom monorail trolley, the trolleys are delivered with a pre-set beam width. This value is indicated in the order confirmation. Check for compliance and verify the space required on the catalogue.

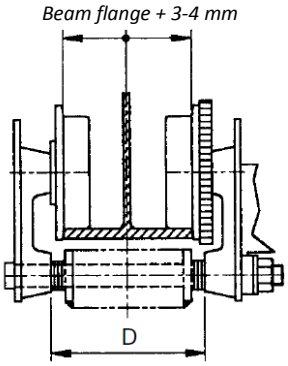
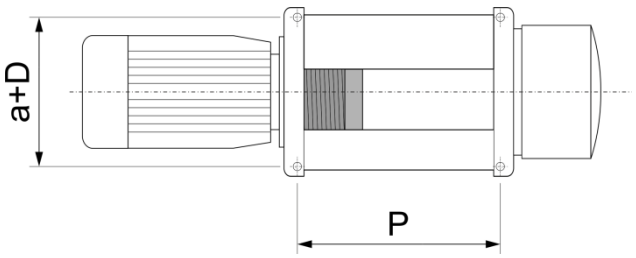
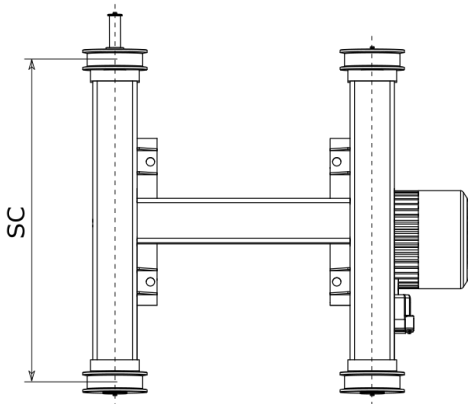


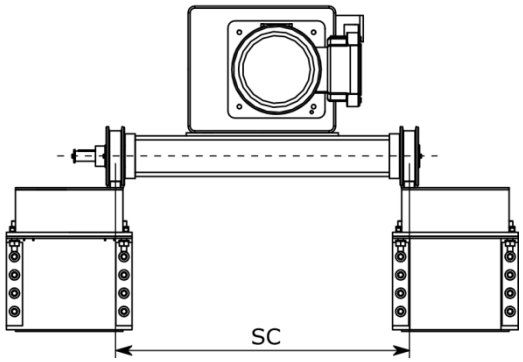
Figure 1

Verify the feet base for the stationary hoists as per catalogue or drawing.



Verify the gauge of double rail trolleys as per catalogue or drawing.



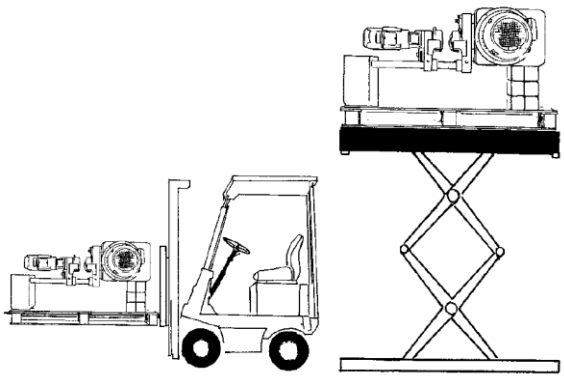


For any changes, please contact the Technical Department of PODEM.

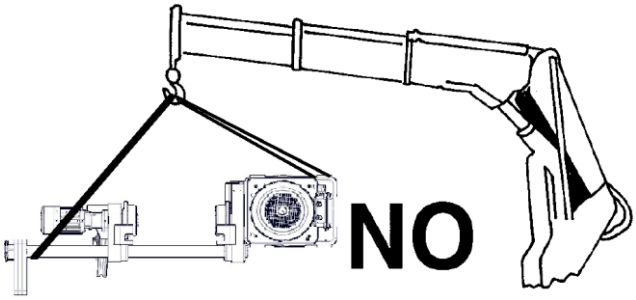
3.5. ASSEMBLY OF MONORAIL TROLLEY TO THE RAIL

With the hoist on the pallet, lift it vertically with a lift truck or platform.

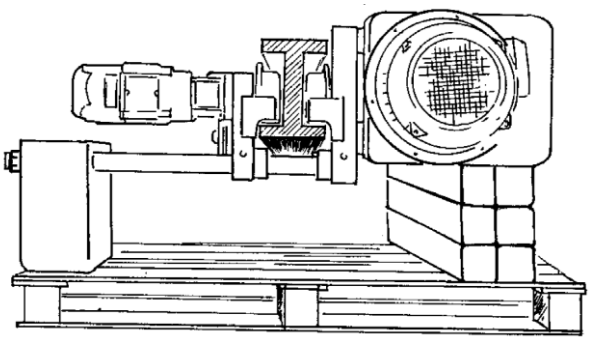
The step to be performed is to elevate, not to lift the hoist.



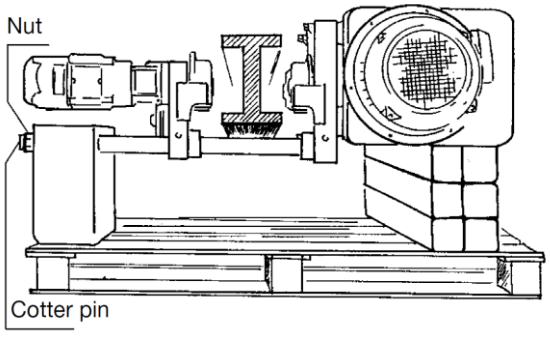
Do not use derricks for this step, otherwise the slings during the lifting would hinder the mounting on the rail.

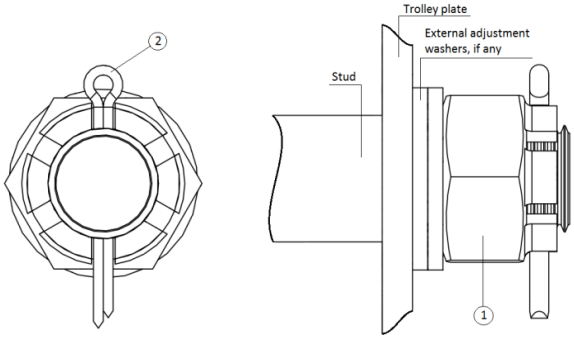


If the rail has one open end, fit the trolley on the open end of the rail and lock the rail end with a fixed stopper.



To mount the hoist on a closed end rail, widen the plate on the nut side proceeding as follows:





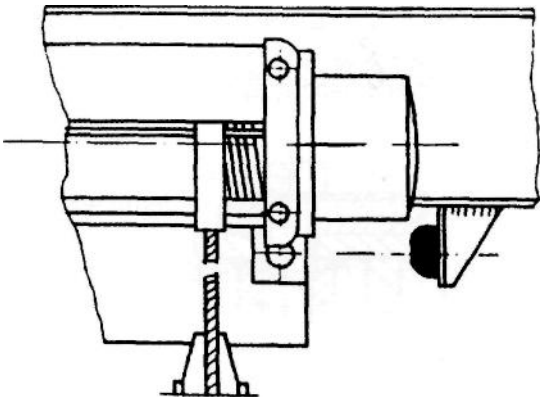
Remove the cotter pin item 2, loosen the nut item 1 until the plates spread enough to allow the wheels to pass on the external edge of the beam flange.

Place the trolley in position and restore the proper wheel base, paying attention to leave 3...4mm between the beam flange and wheel edge as shown on fig.1 on page 8.

Press the plate against the inner spacers, tighten again the nuts paying attention that the slot of the slotted nut item1 is aligned with the hole of the tie bolt, insert the cotter pin item 2 and bend the ends of the cotter pin so that it cannot came out.

In case of low headroom trolleys, before opening remove the counterweight, paying attention to put it again position before tightening of the nuts.

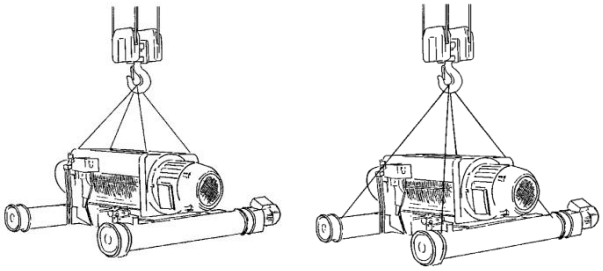
After the mounting, verify that the trolley travels smoothly and that there are no obstacles, such as projection on beam flanges, junctions plates, bolt heads, etc. Provide for rubber stopper at the ends of the trolley way as shown below.



Low headroom trolleys are with counterweight made of steel sheets with a pre-set weight located at the end of the bolts on the side of the travel gear-motor.

3.6. ASSEMMBLY OF DOUBLE RAIL TROLLEY

Lift the trolley hoist with a mobile crane using the hold points provided for and lay it on the previously arranged travel rails, after having checked the exact gauge of the runways.



Check the anti-derailment plates for proper mounting.

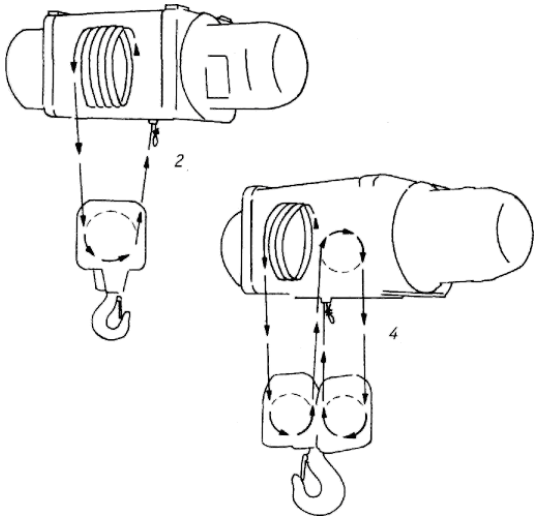
3.7. HOOK BLOCK ASSEMBLY

To ensure the safe and reliable operation of the hoist, special care must be given to the fixing of the two rope ends, observing following instructions.

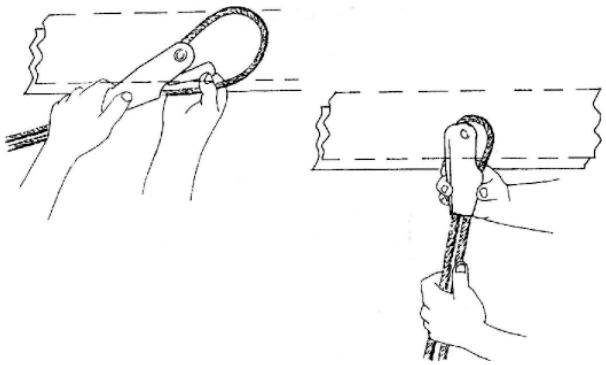
For transport reasons, the lower block is delivered loose, detached from the ropes. In this case, perform the Lower block mounting paying attention to the following points.

- The rope should not be twisted, but tight:

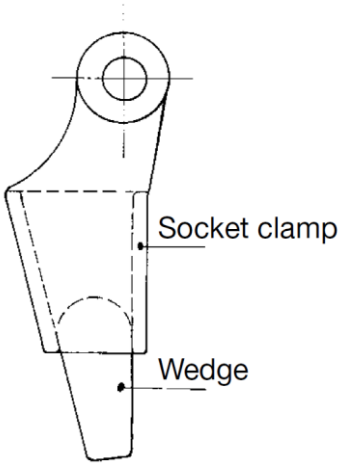
To mount the lower block of rope hoists with 2 or 4 falls, follow the indications in the figures below.



Pass the rope through the pulleys and fix it to the relevant traverse inserting the wedge into the seat of the socket without twisting the rope.

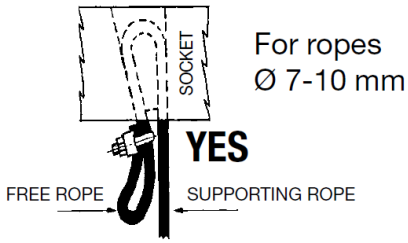


Before inserting the rope in the socket, make sure that the wedge supplied cannot come out without the rope wrapped around it, as shown below.

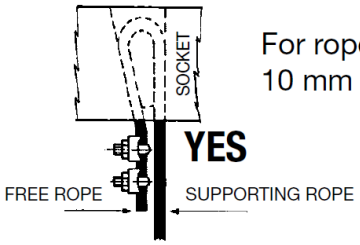


After that, fasten the supplied clamps to the free rope end.

Joint strength class		Tightening moment, Nm											
Screw	**Nut**	**M6**	**M8**	**M10**	**M12**	**M14**	**M16**	**M18**	**M20**	**M24**	**M27**	**M30**	**M36**
8.8	8	9	20	40	70	100	160	220	310	490	800	1100	1500
10.9	10	12	28	50	90	150	220	310	440	690	1120	1550	2100



For ropes
Ø 7-10 mm



For ropes over
10 mm

3.8. ELECTRICAL EQUIPMENT

First of all, check if the rated voltage and frequency on the identification plate of the hoist comply with the technical data of the hoist comply with the technical data of the power supply line of the workshop. After that, perform the connection and the start up of the electric hoist observing the wiring diagram located inside the electric equipment. If the feeding cable of the hoist does not form part of the delivery, determine its section in mm^2 taking into account the necessary length, the current consumption of the motors and the voltage group, refer to section 3.10 "Start up" on page 11.

3.9. WARNING OF HOISTS WITH EL. EQUIPMENT

Considering that bipolar motors generally have only one feeding voltage, it is impossible to change the voltage inverting the connection in the terminal box.

Verify that, under worst operating conditions (i.e., with the greatest number of users operating) and with the hoist at full load, the voltage at the motor terminals remains within a tolerance of +/- 10% of rated voltage.

Forcefully tighten the terminals in order to avoid loose contacts.

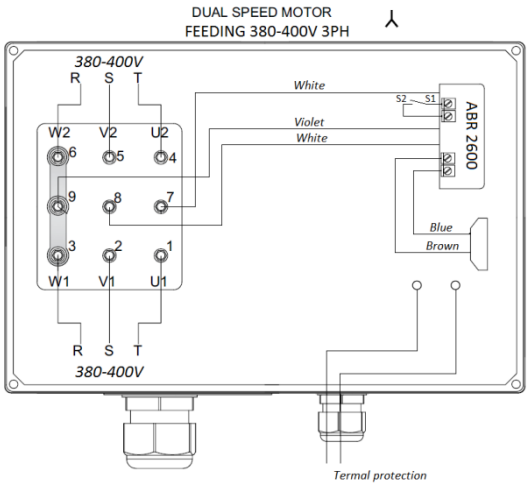
Make sure that the wiring diagrams of the terminal box refer to the installed hoist.

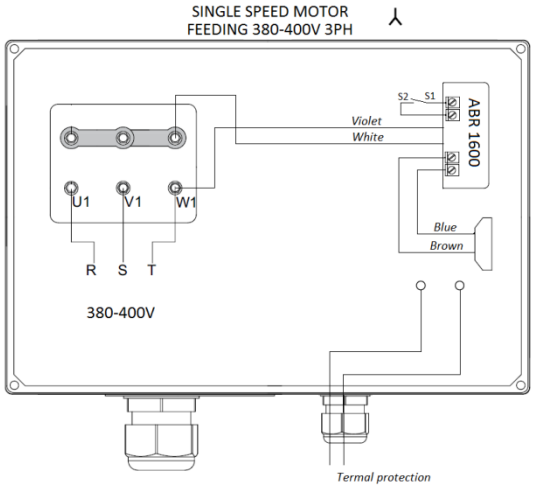
Define the capacity of the fuses accordingly to the amperage of the electric motors of hoist and trolley.

Define the cross section in mm^2 of the feeding cable, taking into account the necessary length and the current consumption of the motors and the voltage group.

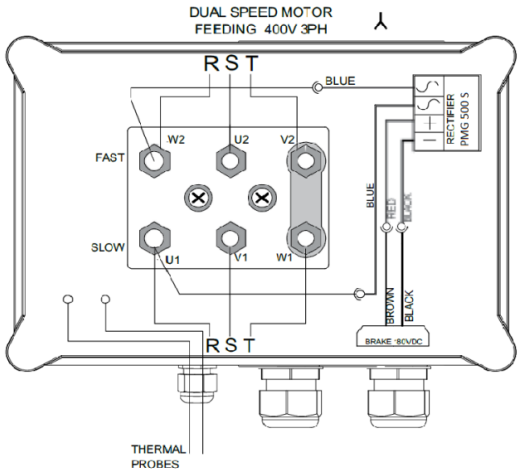
3.10. START UP
CONNECTIONS WITH CYLINDRICAL LIFTING MOTORS

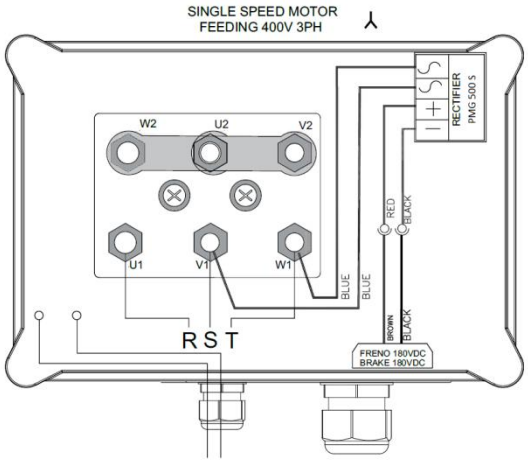
- Cylindrical motors type CT



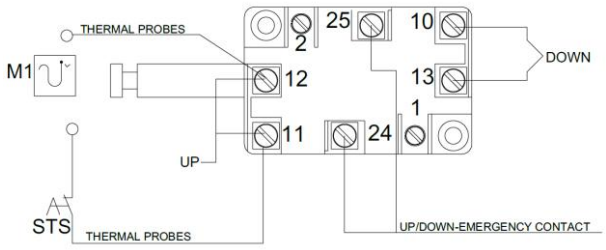


- Cylindrical motor type MB



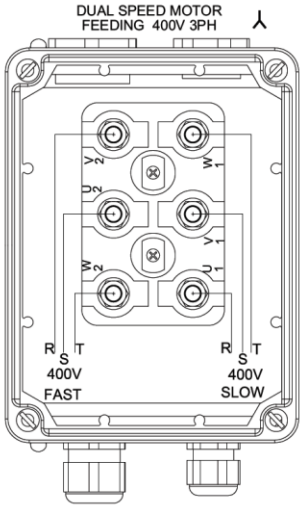


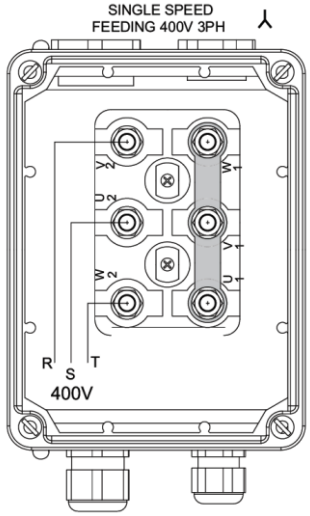
EXTERNAL HOISTING LIMIT SWITCH



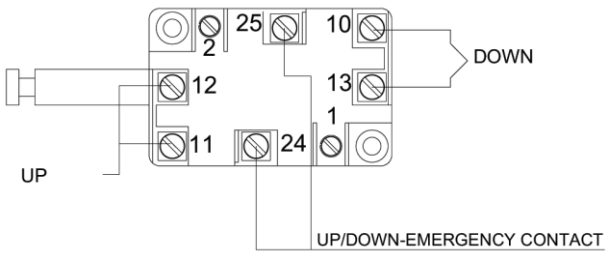
CONNECTIONS WITH LIFTING CONICAL MOTOR

- Hoists type MT 305, 308, 312, 316, 525

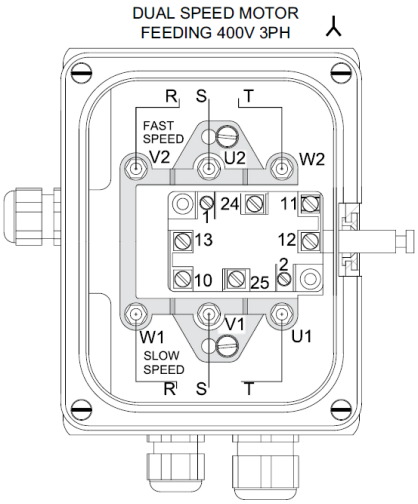


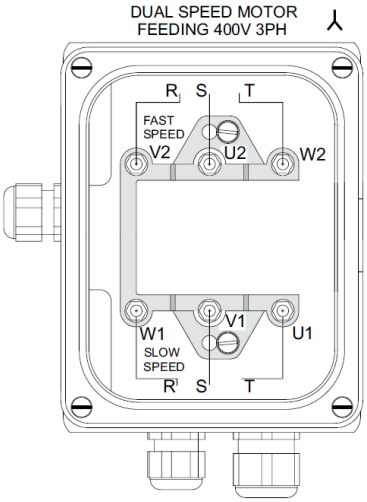


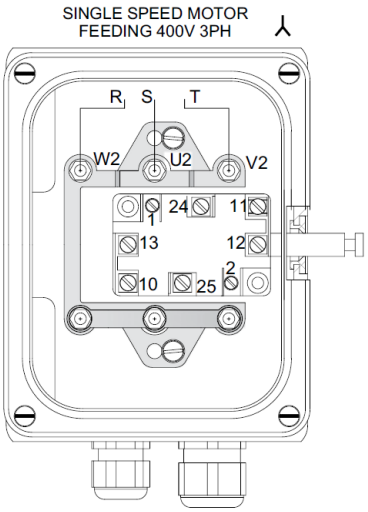
EXTERNAL HOISTING LIMIT SWITCH

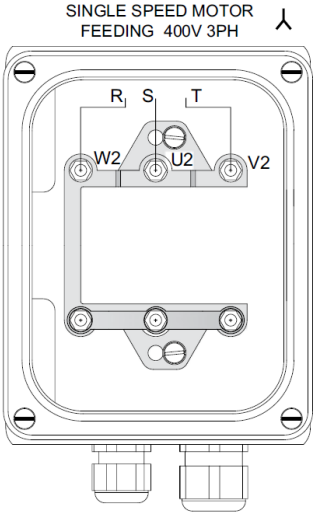


- Hoists type M740, 750, 950, 963, 980, 1100, 1125

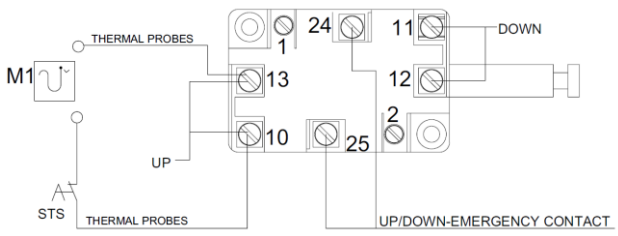




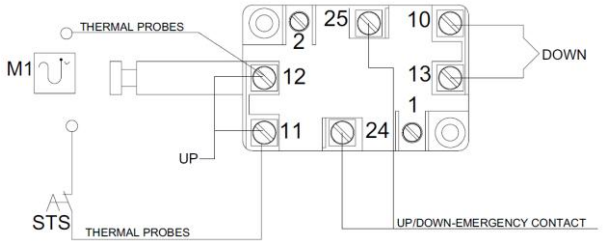




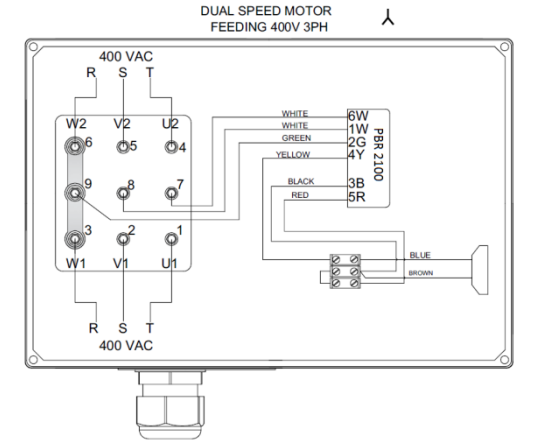
HOISTING LIMIT SWITCH ON THE MOTOR BOARD

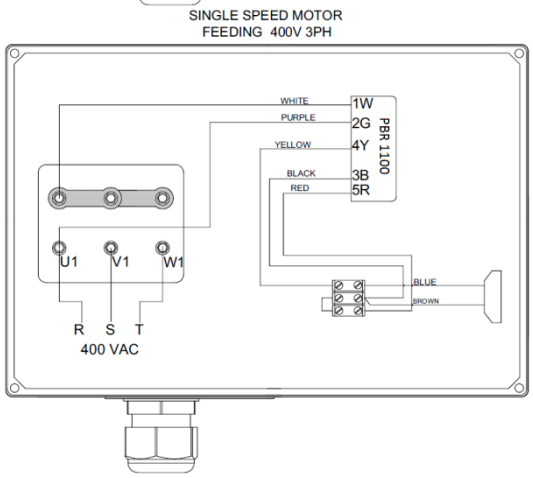


EXTERNAL HOISTING LIMIT SWITCH



CONNECTIONS WITH TRAVEL MOTORS





Verify the function of the power supply line and the capacity of the main magneto thermal Line circuit-breaker in relation to the motor powers and the relevant current consumption.

Make sure that the gearboxes are lubricated and that there are no oil leaks.

Verify that rope, drum, pulleys and rope guide are lubricated with grease.

Verify the proper installation of the rope into the socket and that the rope is not tensioned.

Check the stop limit switches for proper positions and fastening.

Verify the tightening of all fastening screws and bolts of the components.

3.11. FUNCTION CHECK AND ADJUSTMENT
3.11.1. UP-DOWN LIMIT SWITCHES

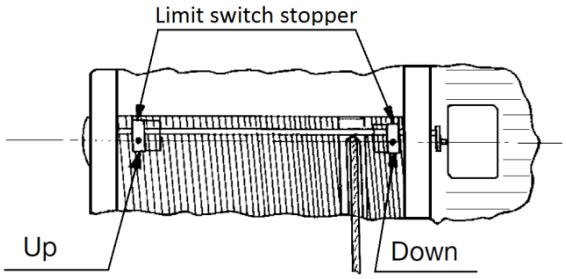
The installed limit switch has the function to stop the lifting in EMERGENCY cases only. In case of necessity to use it as a normal operational stop, a further limit switch should be installed.

After connection with the main power line, check that the hook is lifted when the "UP" button is pressed. If this is not the case, reverse two phases of the power supply

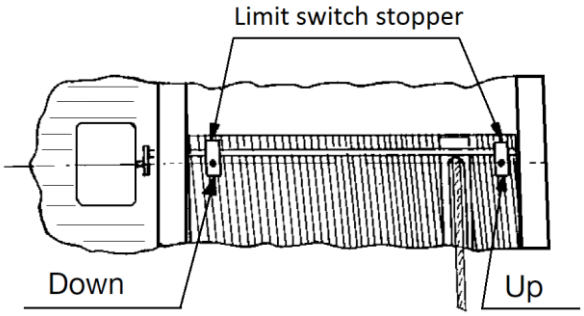
This step is extremely important because the proper operation of the up and down limit switches depends on it.

Take care to position the up and down limit switch stoppers at the correct locations on the limit switch control rod, so that the switch operates when the hook is at the desired height.

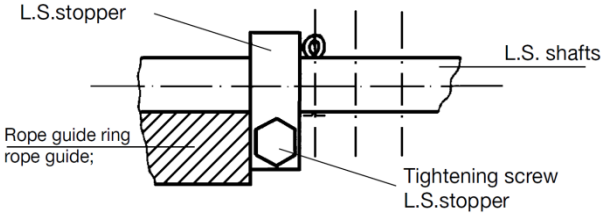
Type "MT"



Type "M"

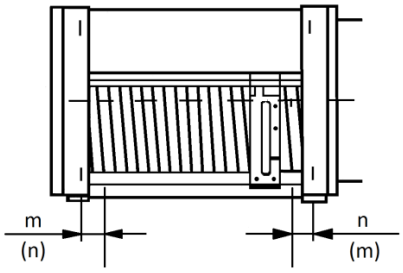


Detail Limit Switch STOPPER MOUNTING



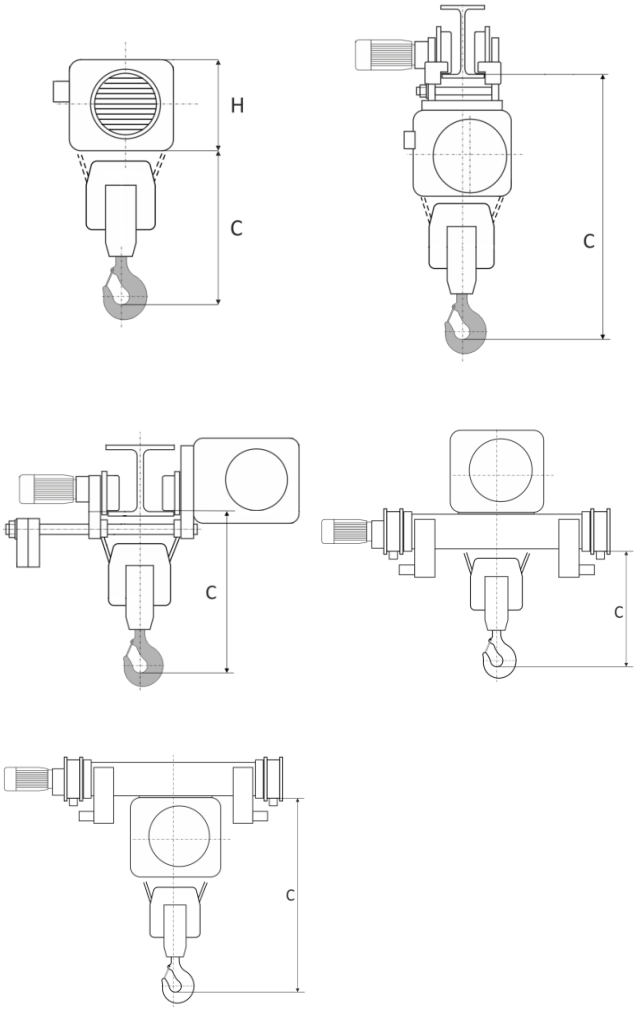
The max rope approach to the feet base should never exceed the values of Table 4.

Rope outlet positions m/n						Table 4
Hoist type	MT305 MT308	MT312 MT316	MT525	M740 M750	M950 M980	M1100 M1125
			m/n			
Stationary Monorail	45/48	48/56	60/61	50/57	55/90	75/120
Low headroom	45/48	48/56	60/61	50/57	55/90	75/120



m= Wind rope side for hoists MT305÷525
(n)= Unwind rope side for hoists MT305÷525
n= Unwind rope side for hoists M740÷1125
(m)= Wind rope side for hoists M740÷1125

Positioned at the "up" limit switch, the lower block should show the measures indicated in Table 4 and should be at the distance indicated in Table 5. For lifting speeds over 8m/min. This distance must be increased at least 50 mm.



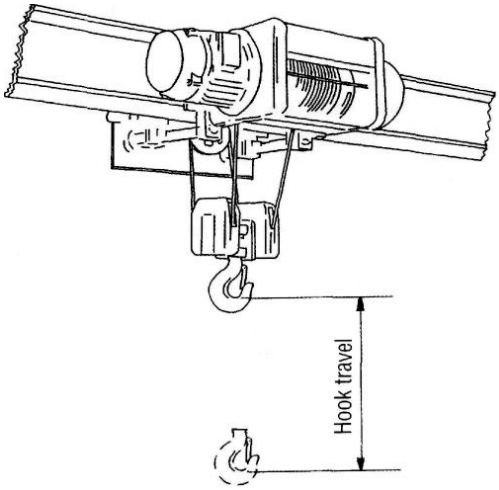
Hook travel

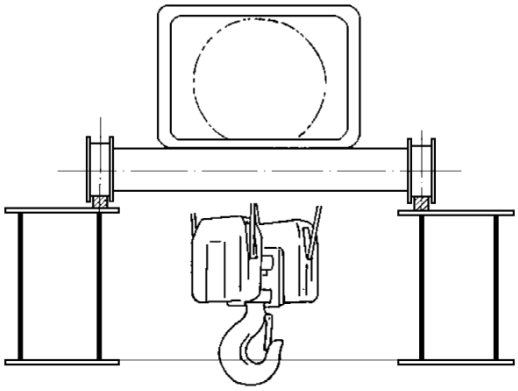
1 Variant (2 rope falls)				Table 5
	Stationary	Normal headroom	Low headroom	
MT 305	500	996	649	
MT 308	600	1096	749	
MT 312-316	670	1166	819	
MT 525	770	1356	924	
M 740-750	850	1635	925	
M 950	1030			
M 1125	1325			

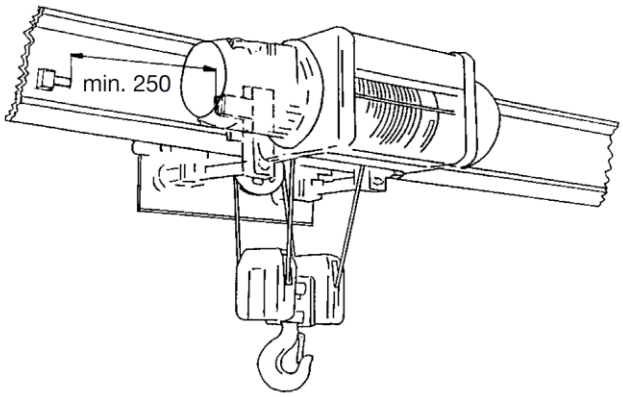
2 Variant (4 rope falls)				Table 5A
	Stationary	Normal headroom	Low headroom	Double rail trolley
MT 305	505	1001	654	505
MT 308	550	1046	699	550
MT 312	615	1111	769	615
MT 316	635	1131	773	635
MT 525	670	1256	813	670
M 740-750	826	1600	910	826
M 963	920			
M1125	1170			

NB: *The measures indicated for the low headroom models (C) are for beam flange up to max 300mm. For bigger beam flange, the measures C increases with 12mm every 10mm beam width.*

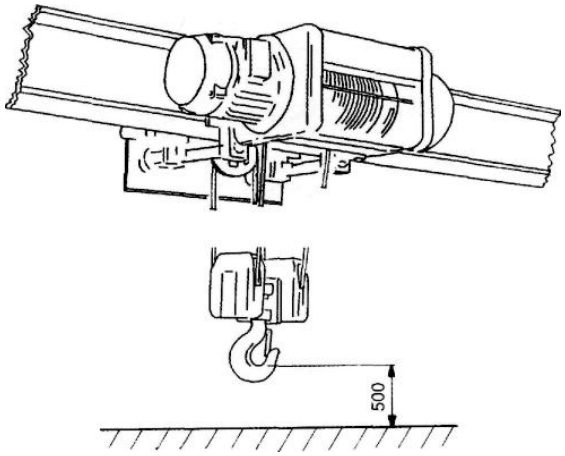
Run the button block over the whole pre-set hook travel and check that its stops correctly when it reaches the stopper on its way up and down.

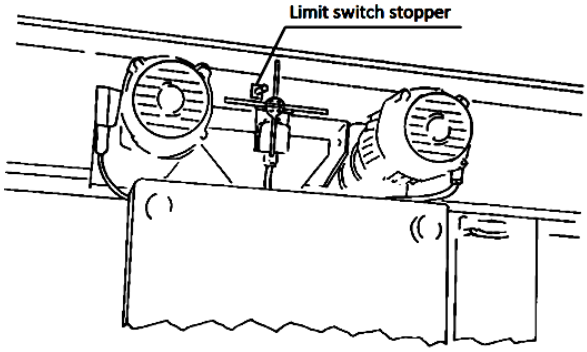






The setting of the down Limit switches must stop the lowering when the lower edge of the hook has reached a distance of 500mm from the floor and must have minimum 3 or 4 windings of wire rope on the drum.





3.11.2. TROLLEY TRAVEL LIMIT SWITCH

Perform the connection to the main power line.

Do not interfere with the internal connections of the trolley/hoist or the pendant.

Pressing the push-buttons "right-left", run the trolley along the whole length of the beam and check that it stops correctly.

Check the proper position of the stopper of the limit switch of the trolley, in order to ensure an adequate overrun room and avoid collisions between the trolley and the fixed end stop.

3.11.3. BRAKE RELEASE

In the "jogging" mode, check that the brake disk detaches from the brake pad, thus freely rotating without rubbing.

3.11.4. NOISE LEVEL

Verify the absence of abnormal noise during the lifting and the travel, such as: squeaks, cyclic noises, abnormal vibrations, etc. The noise level of the hoist, even with full load, must always be less than 85 dB and constant.

3.12. LOAD TESTS
3.12.1. DYNAMIC TESTS

Prepare adequate weights for the load tests as follows: rated capacity x 1.1 and proper slinging and lifting equipment.

Sling the load taking care to position the hook vertically above the Load itself, to avoid oblique pulls.

Tension the slings slowly, avoiding jerks.

Tension the slings using the "slow" speed, if is available.

Slowly lift the load and make sure that it happens smoothly, without abnormal noise level bends or structural settlements. After having lifted the load free of the ground with slow speed.

Repeat the test at maximum speed, carrying out the previous checks.

Check that the "up and down" emergency limit-switches are properly working.

Check that the brake is working properly, making sure that the mass is stopped within an adequate time and that there are no abnormal slipping of the load when the button is released.

Perform the same checks also for the horizontal travel operation, without lifting the load at the maximum height (lift it at 1m distance from the floor).

Operate first at slow speed, if available, and then at the maximum speed.

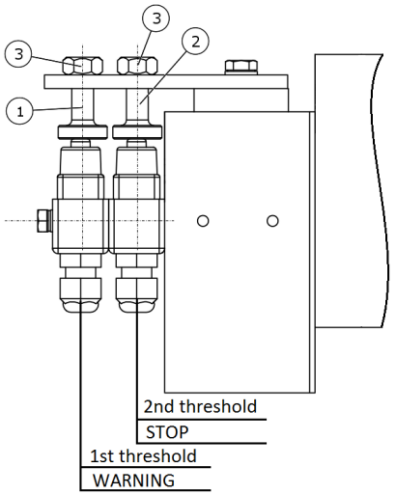
Check the trolley for smooth running on the beam and make sure that there is no abnormal nose or structural settlements.

3.12.2. LOAD LIMITER FUNCTION CHECK

The electromechanical load limiter is statically pre-set by the manufacturer. Should it not work properly during the installation and the final test of the equipment, perform its setting as follows:

- **1st threshold, warning:** Apply the load 10% higher than rated load, switch-on the hoist motor and set the reaction of the micro-switch with the adjusting screw item 1, loosening the locknut item 3. Turning the screw counterclockwise if the limiter acts beforehand, or clockwise if it does not reacts. After the adjustment, tighten the locknut item 3.

- **2nd threshold of the movements:** Apply a load 25% higher than rated load, switch-on the hoist motor and set the reaction of the micro-switch with the adjusting screw item 2, after loosening the locknut item 3. Turning the screw counterclockwise if the acts beforehand, or clockwise if it does not reacts. After the adjustment, tighten the locknut item 3.



The dynamometric load limiter is statically pre-set by the manufacturer. The cut off points are adjusted to adapt load cell response to the safe working load of the system. There is a difference in the working manner of the individual limiter and a summation limiter than for the double A+B board:

- **Individual limiter** - the maximum capacity, and therefore the weight, refers to the actual load on the pin. 10t hoist with pin loaded with 5t at 100%. The maximum capacity is 5 ton.

- **Double A+B limiter** - Calibration is obtained by connecting the tester to each board. In this case the maximum capacity, and therefore the weight, refers to the actual load on the hoist. 10t hoist 1 with pin loaded with 5t at 100%. The maximum capacity is 10t. 5t hoist 2 with pin loaded with 2.5t at 100%. The maximum capacity is 5t.

***Note:** Before starting the adjustment, set the maximum capacity of the system in code 22.*

Adjustment of dynamometric load limiter.

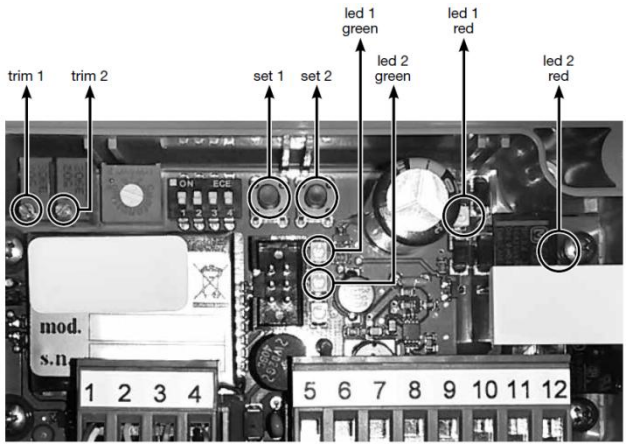
1. Option

By pressing the **CAL** key for some seconds you enter the instrument adjustment field when **CAL** is displayed.

OPERATING		
CAL		The display shows **CAL** and then the current weight
CAL		Press **CAL** to perform the zero calibration in unloaded system.
ZERO		**ZERO** is displayed
Load the known weight equivalent at least 50% of the full scale.		
***Caution:** Full scale value corresponding to the actual load on the pin for individual limiters and the actual load on the hoist for double limiters.*		
MODE		Press **MODE for few seconds** for weight adjustment
P0000		Now you have to enter the loaded weight value by means of the arrow keys. After setting the last digit to the right, the instrument exist the adjustment menu.
If the weight value is left as zero, the instrument does not change the previous setting.		

2. Second option

CONECTIONS:



Num.	Terminal box load sell
1	+ Cell power supply (pos.)
2	+ Signal (pos.)
3	- Signal (neg.)
4	- Sell power supply (neg.)

Num.	Terminal box relay power supply
5	+POWER 10-30 Vdc/24V
6	GND/24V
7	Relay 1 NO
8	Relay 1 NC
9	Relay 1 COM
10	Relay 2 NO
11	Relay 2 NC
12	Relay 2 COM

Apply the sample weight (rated load) and proceed as follows:

1 - List the load and check the intervention levels are correct.

2 - If the intervention level is not exact:

- turn the trimmer (1 or 2 according to the thresholds) in an anti-clockwise direction if the limiter does not activate.
- turn the trimmer (1 or 2 according to the thresholds) in a clockwise direction if the limiter activates before one of two thresholds is reached.

3 - In both cases, ignore the green led (green led 1 or green led 2 according to the thresholds) which flash to indicate the modification in progress.

4 - Continue to turn in the pre-selected direction until the red led switches off (red led 1 or red led 2 according to the thresholds) and wait for the green led (green led 1 or led 2 according to the thresholds) stops flashing.

5 - With the red led off, press the "set" key for approximately 5 (set 1 or set 2 according to the thresholds) and wait for the green led (green led 1 or green led 2 according to the thresholds) to stop flashing.
6 - Let the load off and start from point 1 to test the new settins.

3.12.3. STATIC TEST

Perform the static tests without switching-on the hoist and travel motors.

Lift the rated, hold it suspended and gradually increase the load up to an overload of 25% of the rated capacity, for hoist over 1000 kg, respectively 50% for hoists up to 1000 kg.

During this step the load should not be moved.

Verify that with the mass suspended (rated load plus overload) no slipping, abnormal noise level, permanent defections and structural settlements occur.

Verify that when pressing the "UP" push-button the lifting is not activated. Due to the cut-off by the overload device.

4. OPERATION AND MAINTANANCE INSTRUCTIONS
4.1. HOIST FUNCTIONS - INTENDED PURPOSE

The wire rope electric hoist is intended to handle goods or materials (by vertically lifting in the space) with the load hook and appropriate accessories, in industrial installations and is not suitable for civil uses, unless suitably adapted to this purpose. The hoist can be used in stationary or travelling operation on a trolley on bridge, jib or portal cranes, etc. or monorails. Basically, the hoist/trolley assembly performs its duty by means of two main movements:

- Vertical lifting of the load with the hoist
- Horizontal travelling of the load with the trolley

These movements are controlled by push-buttons on the pendant as follows:

- UP and DOWN push-buttons for the lifting function

UP

DOWN

- RIGHT and LEFT push-buttons for hoist travel function

LEFT **RIGHT**

The push-buttons activate the function when they are held pressed and of "graduated" type with two positions, the first step for the "slow" speed and the second step for the "fast" speed.

The red mushroom EMERGENCY STOP button on the pendant activates the STOP function when it is completely pressed. To enable the operation of the hoist, turn the EMERGENCY STOP button clockwise and lift it in its normal position.

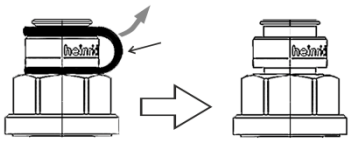
The hoist can also be operated by a radio control system. The push-buttons have the same functions as specified above, and the pendant is free, and not connected to the hoist.

In case that the radio remote control is damaged you can operate the hoist with optional standard pendant control (with cable).

4.2. BEFORE STARTING

Before start operating of the hoist, perform the following:

- Remove transportation lock from the bleed valve of the lifting reducer

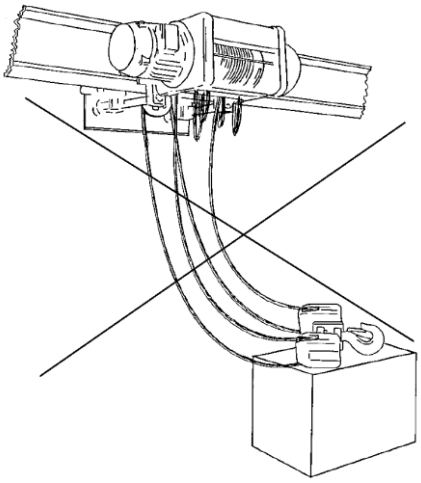


- Replace the transport aluminum plug with venting plastic plug of the motor-reducer for double girder trolley
- Perform a visual check of the equipment for integrity
- Switch-on the power turning the main switch to "ON" or "1"
- Verify the function of the hoist, checking the movements described in the previous section (HOIST FUNCTIONS - "Intended purpose") and performing the preliminary checks described in Chapter "**What must always be done!"** on page 20-21.

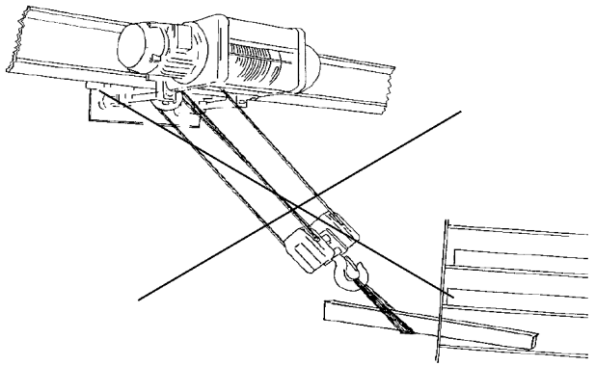
4.2.1. LIFTING

The operator must pay attention to hold the lifting ropes always taut, never laying the hook on the floor or on the loads to be lifted.

Slack ropes may twist, spring out from the drum windings or from lower block pulleys, from knots, suffer even serious damages and cause unexpected danger situations.



The operator must strictly avoid oblique (side) pulling of the load, which is always dangerous and hard to control, and especially oblique pulling as shown in the Figure, which could in addition cause the damage of the rope guide and of the grooves with consequent uneven coiling.



4.2.2. TROLLEY TRAVEL

It is essential to avoid forceful impacts between the trolley and the end stoppers, in order not to seriously damage the mechanical components and the structure. It must be kept in mind that the limit switches are placed in a position that allows the full travel of the trolley when this approaches them at low speed, and that the required braking distance increases with the speed and the load. Consequently, the operator must always slow down the travel speed when the trolley approaches the rail ends.

4.2.3. EMERGENCY AND INTERLOCK DEVICES

To disconnect the power supply to the equipment, switch-off the line circuit-breaker or press the "EMERGENCY STOP" button on the pendant. An electrical and mechanical interlock on the hoist and travel motors prevents the simultaneous rotation in two directions:

- The electric interlock on the hoist motors for slow and fast speed prevents the simultaneous power feeding.
- The voltage lack causes the immediate stop of all movement of the hoist, since the electric motors are equipped with automatic negative brakes.

4.2.4. SAFETY DEVICES

The hoisting limit switch, which limits the max hook travel, and the trolley travel limit switch are safety devices, not meant to be systematically used as normal stop or enabling devices for further operations. The overload device with two reaction thresholds (first: WARNING, second: STOP) prevent the operation of the hoist with an overload. The lifting hook is equipped with a safety catch preventing the accidental release of the slings.

4.2.5. LOAD LIMITER

The load limiter on the rope hoists has two reaction thresholds with following settings:

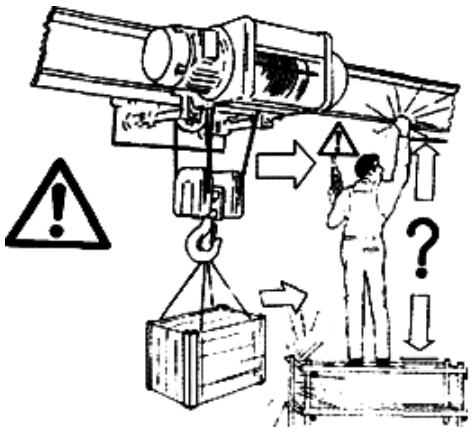
- The 1st threshold signal the reaching of the reated load.
- The 2nd threshold deactivates the lifting and travel functions, exception made for the load lowering.
- The overload device is not a weighing scale, and it is the responsibility of the operator to know the weight of the load he is lifting so the hoist is not being overloaded

4.3. WHAT MUST ALWAYS BE DONE!

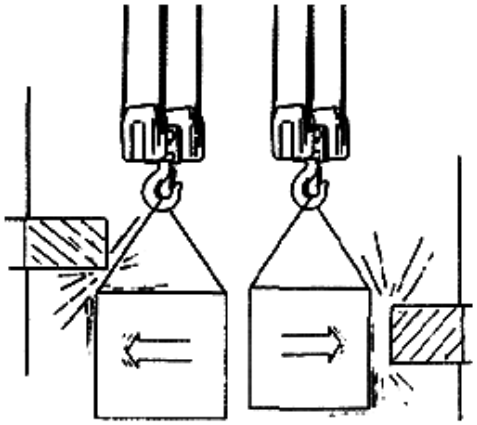
Precautions and operation criteria

The proper use of the hoist allows the owner to fully exploit its capabilities in complete safety. The potential granted only upon strictly observing of the instructions below. Therefore:

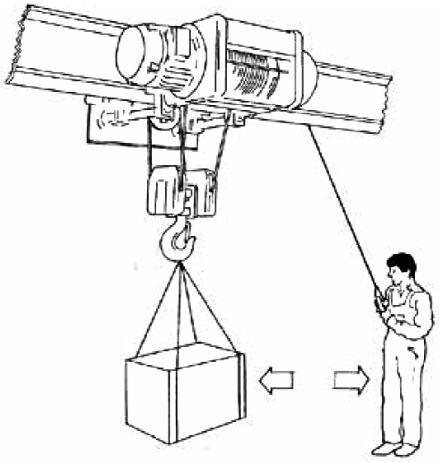
ALWAYS make sure that the way of the trolley, hoist and load is at a height preventing collisions with the operator.



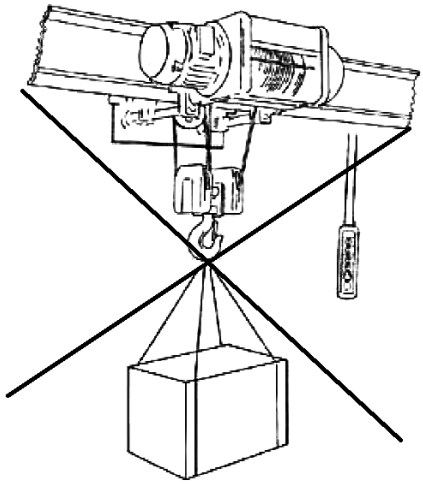
Before starting any operation, **ALWAYS** make sure that there are no obstacles on the way of the trolley-hoist.



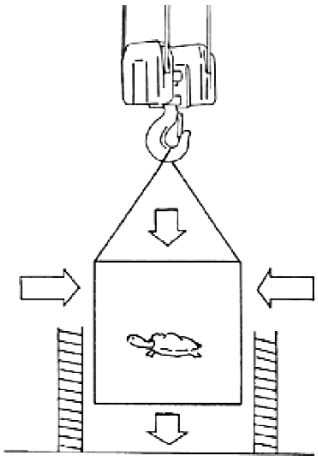
ALWAYS stand clear of the lifted load.



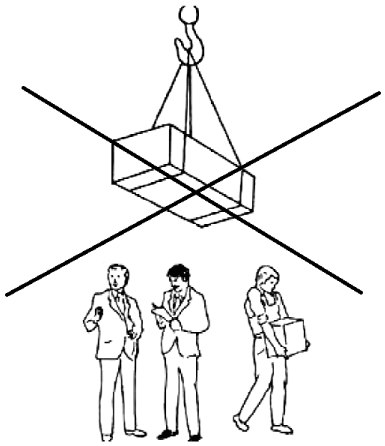
NEVER leave the suspended load unattended.



AWAYS use "low" speeds for approaching and spotting, for short distances.



NEVER lift a load with persons walking underneath.
NEVER walk, stand, work and operate under a suspended load.

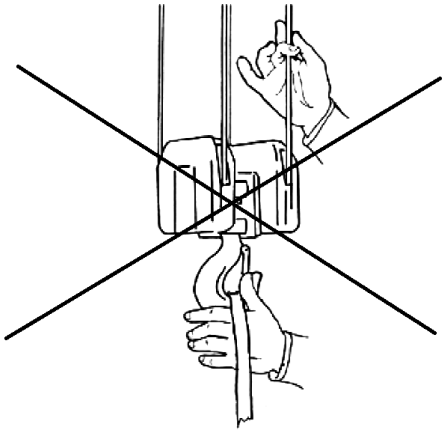


4.4. WHAT MUST NEVER BE DONE!

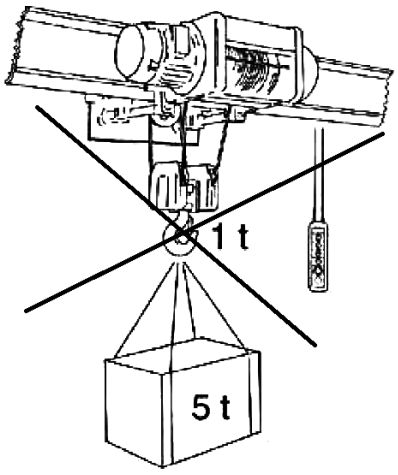
Contraindications and improper use

The use of the rope hoist for forbidden maneuvers, its improper use and poor maintenance, not only may generate serious danger situations for the safety of the workers and damages to the working place, but also prejudice the function and the intrinsic safety of the equipment. The actions described below obviously cannot cover all possible "improper uses" of the hoist, nevertheless represent the most "reasonably" foreseeable and must be considered as severely forbidden.

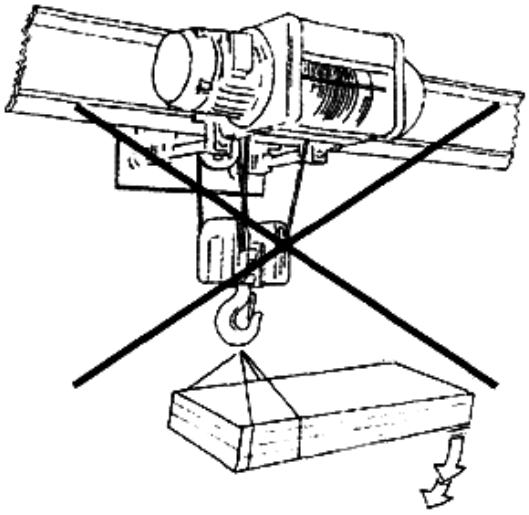
NEVER place hands in rotating pulleys, moving ropes, sling being tensioned in load contact area, or between hook and sling.



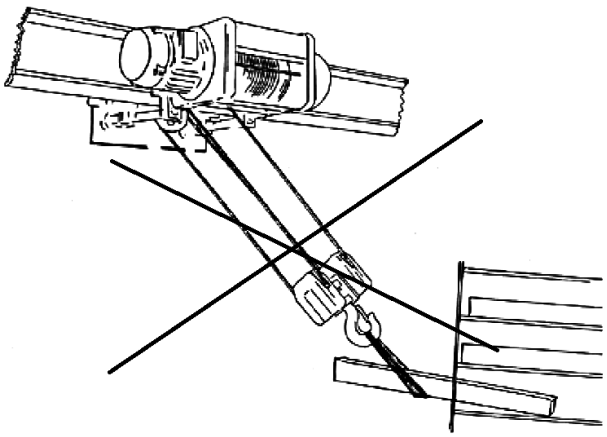
NEVER lift nor attach to the hook heavier loads, than the rated capacity.



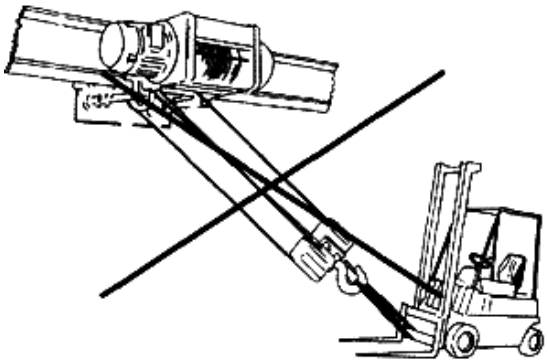
NEVER lift unbalanced loads.



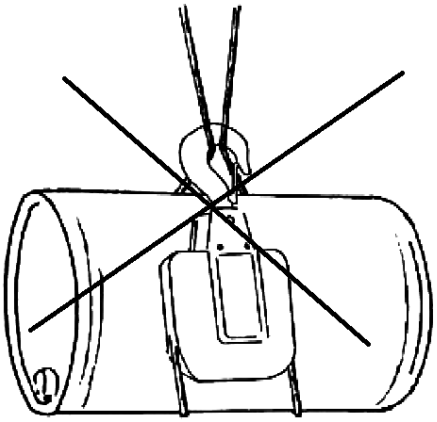
NEVER diagonally stretch the rope.



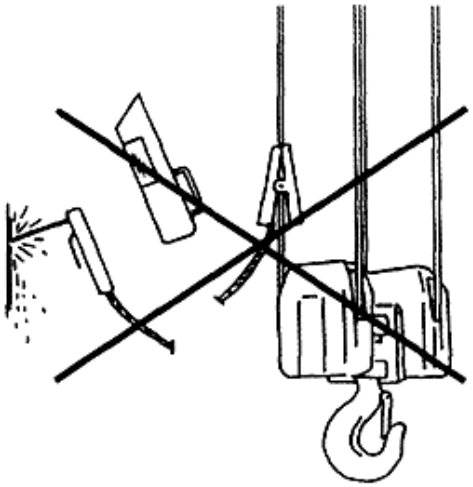
NEVER use the hoist to tow or pull.



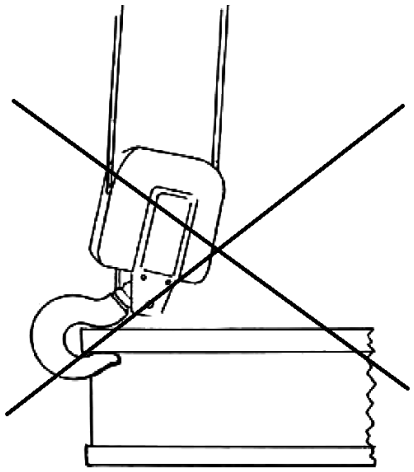
NEVER use the rope of the hoist to sling the load.



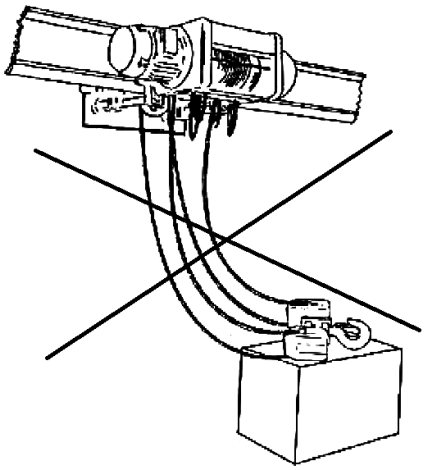
NEVER use the rope as a ground for welding.



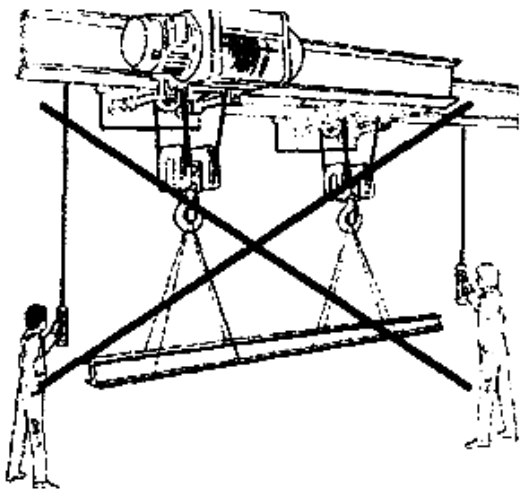
NEVER rig a load to the point of the hook.



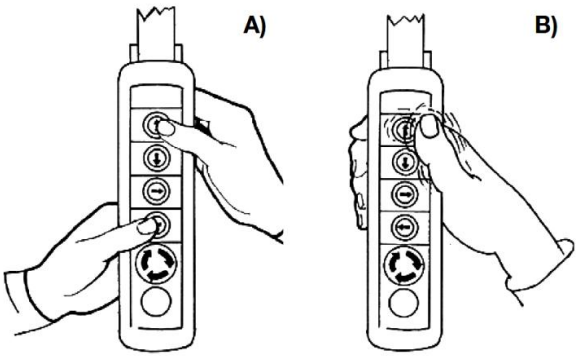
NEVER continue to lower the hook after positioning the load causing rope slack.



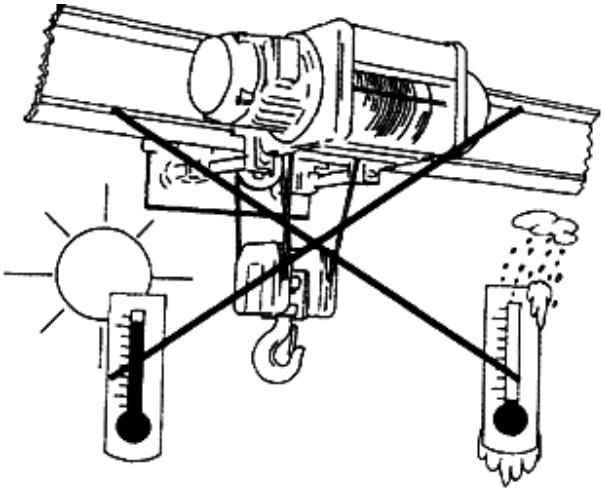
Without adequate safety procedures, **NEVER** lift a single load with two hoists.



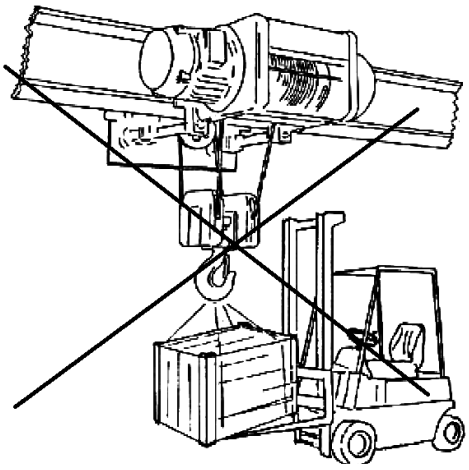
A) NEVER use the hoist with two simultaneous movements.
B) NEVER repeatedly push the push-buttons of the hoist.



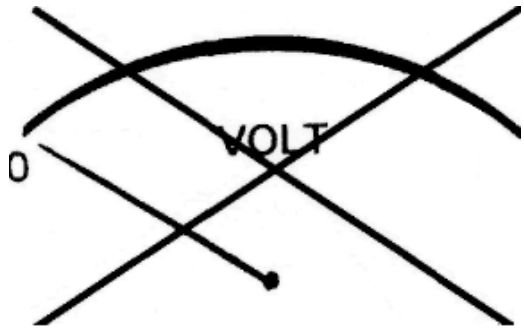
NEVER use the equipment under unsuitable environment conditions (-20°C +40°C; 80%).



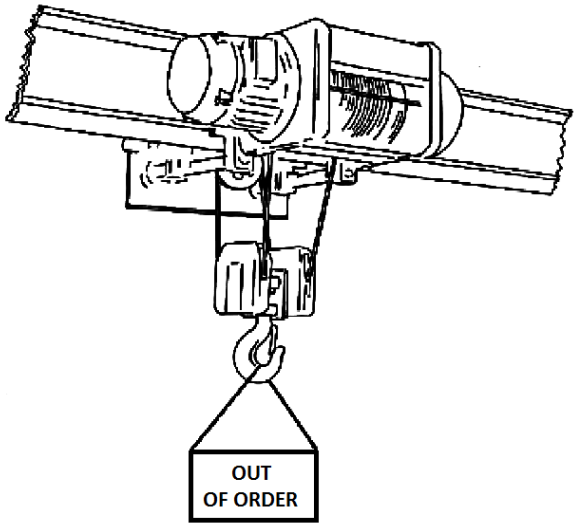
If the load remains suspended due to a fault of the hoist, **NEVER** tamper with the brake, but use suitable means to release the load.



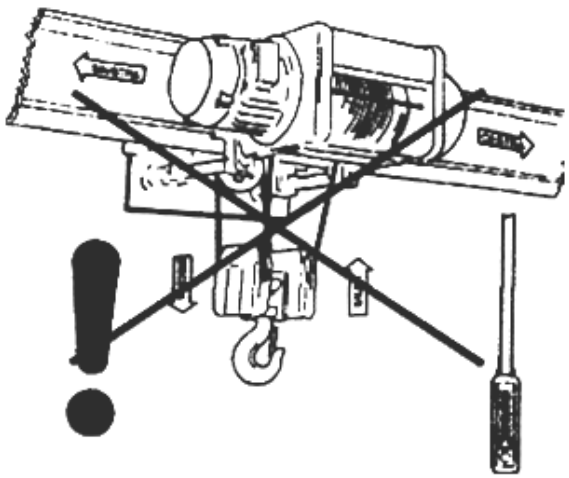
NEVER use the hoist in the presence of a strong voltage drop or an accidental lack of one of the three phases.



NEVER perform maintenance, inspection or repair steps without having previously put the hoist out of service, or with a suspended load and without having performed the relevant safety procedure.



NEVER use the trolley/hoist unless all its functions are working properly.



4.5. OPERATION

4.5.1. WORKING AREA

The working area must have following features:

- Minimum temperature -20°C and maximum temperature +40°C
- Maximum humidity 80%
- The standard trolley/hoist cannot be used in presence of corrosive and or abrasive fumes, smoke or dust, with fire or explosion risk and in any case is not allowed where the use of explosion-proof components is prescribed.
- It must not be used in areas with strong electromagnetic fields which may generate electrostatic discharges.

Further features of the working area:

Indoors - In this case the hoist does not require any particular, precaution, since it is not exposed to atmospheric agents.

Outdoors - The hoist can be exposed to atmospheric agents during and after the use. Whenever possible, it will be necessary to protect the trolley/hoist and its electric components with roofing or shelters. To avoid oxidation, protect the structure with suitable treatments and lubricate the mechanisms.

4.5.2. ADMISSIBLE LOADS

Shape and dimensions of the loads must comply with the features of the handling location and with the used equipment.
Loose or bulky materials must be put in suitable containers (to prevent them from accidentally falling), and equipped with suitable hooking means.

Changes in the static configuration of the loads during the lifting must not be possible.

4.5.3. INADMISSIBLE LOADS

Loads whose mass and accessories - if any included, exceed the capacity of the equipment.
Dangerous classified loads for their chemical-physical (e.g.: flammable materials, explosives, etc.).

4.5.4. LIFTING ACCESSORIES

Generally admitted accessories

Slings made of ropes, chains and/or textile slings, if necessary equipped with suspension rings and end hooks. Lifting accessories between the load and the hook, such as: hangers, pliers, suckers, magnets and electromagnets, etc. These accessories must be used in compliance with the instructions of their manufacturers. Their mass must be deducted from the rated capacity of the trolley/hoist to determine the useful lifting load.

Generally not admitted accessories:

All those accessories, whose functional and performance features can generate higher dynamic stresses in the trolley/hoist than permissible. Not permissible are for instance, accessories that allow immediate release of the load (if not foreseen in the project), which can therefore cause dynamic overstresses and/or accidental overloads. Accessories limiting the free handling of the load, or connected with separate power lines, etc.
When using a PODEM electric rope hoist, the operator must observe the directions given in order to obtain best efficiency and maximum safety for himself and for other people. In particular, it is very important to strictly obey following prescriptions:

Capacity - The capacity limit must never be exceeded (handling heavier loads, than the rated capacity, overloads or changing the settings of the load limiter), although determined with wide safety margins.

Maneuvers - It is a good practice to carry out one movement at time, since only this way a maneuver can be started, stopped and constantly followed by the operator, who must avoid repeated switching on/off in case of short movements. In fact, it is not true that maneuvers activated with "short bursts of current" are advantageous. Only a precise definition of the maneuver's starting and ending time allow real savings of time and energy.

Lighting - The hoist and trolley are not equipped with an own standard lighting system. The ambient lighting must allow the full safely operation of the hoist for the intended purpose. When carrying out maintenance steps in badly lighted areas and/or parts of the hoist, a portable lighting system must be prepared, taking care to avoid patches of shadow which may obstruct or reduce the visibility at the point where the work is being done or in the surrounding areas.

4.6. SWITCHING OFF AT WORK END

To switch off the hoist at shift end, observe the following:

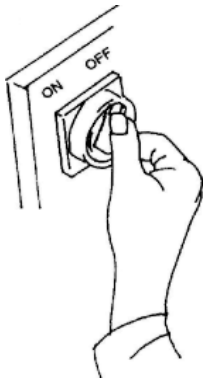
Remove the load handing slings from the lifting hook.

In case of hoist with trolley, move the equipment to the area chosen for its storage during its standstill.

Lift the hook in order to avoid dangerous interference with persons and objects under the equipment.

Stop all movements of the hoist pressing the "STOP" button.

Disconnect the power supply to the hoist turning the main switch to "OFF" or "0" (zero).



4.7. MAINTENANCE

The maintenance schedule includes ordinary procedures, such as inspections, checks and tests directly performed by the operator and/or by qualified maintenance personnel of the workshop, and periodical procedures, including adjustments, lubrication, performed by staff trained by the manufacturer by means of specific courses or publications.

4.7.1. ORDINARY MAINTANANCE

Ordinary maintenance covers ordinary procedures that may be carried out directly by the operator or by specialized technicians accordingly to the prescriptions of this manual and which do not require the use of special instruments and tools. The procedures consist of:

Daily steps performed by the operator and including:

- General visual checks
- Functional tests of motors, limit switches, brakes without loads, "START/STOP" push button
- Condition check of ropes and hooks.

Weekly steps performed by specialized technicians, including:

- Visual check of each mechanism and of lubricant leaks
- Functional check of the brakes with load
- Check of the limit switches and, if necessary, lubrication of the mechanisms, levers or control cams of the limit switches, to ensure the proper function and limit the wear
- Check of function and integrity of the pendant and of the relevant cable.

Monthly steps performed by specialized technicians, including:

- Check of ropes and rope guide for efficiency
- Check of pulleys for wear
- Check of wheels for wear
- Check and cleaning of plug and socket connectors
- Check of oxidized contacts after cleaning, cover them with a thin layer of Vaseline
- Lubrication check of the cable trailers and cables
- Check of the efficiency and integrity of the power supply line and on its components
- Visual check of the equipment inside the control panels, to ascertain the presence of dust, if any

The recommended steps are indicative. They may be increased or decreased accordingly to the operation time of the hoist.

4.7.2. PERIODIC MAINTANANCE

The periodic maintenance includes steps performed by trained staff and concerning adjustments and lubrications (for the latter, refer to section 4.8 "Lubrication" on page 30-31), as indicated in tables 7, 8 and 8A. During the maintenance of mechanical and electrical components, switch-off the main isolating switch and place an "out of service" notice on the hoist.

For the single components of the equipment observe following instructions:

Ropes and fasteners - Check the condition of the rope to judge the possible deterioration. Rope and rope guide are wear parts, regular lubrication makes their life longer. It is often possible to improve the performances of the ropes finding out the causes of their deterioration. This can be done analyzing the old rope. During the inspections it is advisable to carefully observe the parts of the rope coiled on the pulleys and the fixing points at the ends. Note the date and the results of the checks as described in the relevant table, in order to be able to plan when the rope is to be replaced. The decision to replace the rope according to the ISO standard 4309/84 must be taken first of all considering the number and the location of broken strand wires, by the degree of wear and corrosion, by other important damages or tears. The rope must be replaced when the visible broken wires reach the maximum deterioration values given for one of two reference lengths, corresponding to 6 or 30 times the rope diameter. Keep in mind that breaks often are hard to identify, since the ends of the broken wire remain in the original location, without protruding from the surface of the rope. To see these breaks, it is necessary to remove the grease covering the rope, to slide a piece of soft wood along the rope and if is possible to bend the rope manually in order to force the wires ends to rise making themselves visible. The rope check must be performed "without load", to ease the visualization of possible breaks and to foresee a bending radius approximately corresponding to the pulley radius.

Checks during inspection:

Number of broken wires - Basing on the features of the rope, it is possible to find out in standard "Limit number of visible broken wires", the maximum permissible number of visible wire breaks on any rope section. In case of higher values, than those shown, the rope must be replaced.

Rope diameter decrease - If a wire core rope shows a decrease of 15% or more of its rated diameter (due to stretching in the bending area), it must be replaced.

Rope corrosion and wear - In case of decrease by 10% or more of the rated rope diameter due to corrosion or wear, the rope must be replaced even in absence of broken wires.

Rope deformation - Helical deformations with diameter decreases concentrated in short sections of the rope and local flattening or angular deformations due to severe external causes. In the first case, the deformation causes irregular movements of the rope while it is running, which are the primary cause of greater wear and wire breaks. in second case, the defect often occurs at the rope end sockets.

Heat influence - Ropes exposed to exceptionally high temperatures (externally shown by the annealed iron color assumed by the rope) must be replaced.

Number of load bearing wires in outer strands "n"	Number of visible broken wires requiring rope replacement							
	Duty mode: 1Am (M4) FEM 9.661				Duty mode: 2m, 3m (M5, M6) FEM 9.661			
	Not rotating construction		Left/Right equal lay construction		Not rotating construction		Left/Right equal lay construction	
	For length of 6d and 30d, as "d" is rope diameter							
	6d	30d	6d	30d	6d	30d	6d	30d
51 to 75	3	6	2	3	6	12	3	6
76 to 100	4	8	2	4	8	16	4	8
101 to 120	5	10	2	5	10	19	5	10
121 to 140	6	11	3	6	11	22	6	11
141 to 160	6	13	3	6	13	26	6	11
161 to 180	7	14	4	7	14	29	7	14
221 to 240	10	19	5	10	19	38	10	19

→ Inspect the entire wire rope for damage. The damage show here or any similar damage should not be detectable on the wire rope.

Examples of damage:

The jointing of the wire rope has opened. The inner strands of the wire rope are visible.

Loops have formed in the wire rope.

There is a kink in the wire rope. This results from violent external forces being applied to the wire rope.

The wire rope is flattened at one point. This results from the wire rope being pinched.

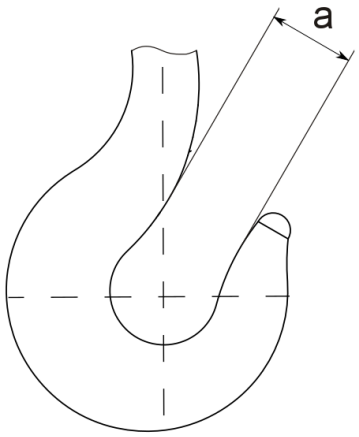
The bird caged has formed in the wire rope. This results from violent the wire rope being pinched.

The wire rope has corkscrew-type deformation.

→ Check the wire rope for detectable broken wires. if broken wires are found in the wire rope, do not work with the crane. Have a comprehensive wire rope test performed.

Above causes are described in detail in the ISO standards 4309.

Hook - Verify the function of the safety catch. Check the deflection pulleys of the rope for smooth rotation. The pulleys of the hook can be easily visually checked observing the inclination without load during the lifting and the subsequent lowering. If the hook during these travels shows a considerable inclination, first on one side and than on the other, from the vertical, this means taht the pulley friction is excessive and the pulleys must therefore be disassembled to check their running surfaces. With released rotation lock check the wheel for smooth running, without too much friction and jerk-free. Otherwise remove it and check the bearing. Check the area in contact with the slings for wear. Check the hook for cracks or bends. To measure the bending measure the distance between the stem and the point of hook in the figure. If the measured value is 5% higher than the value originally measured on the new hook (a) according to table DIN 15401, we recommend replacing the hook.



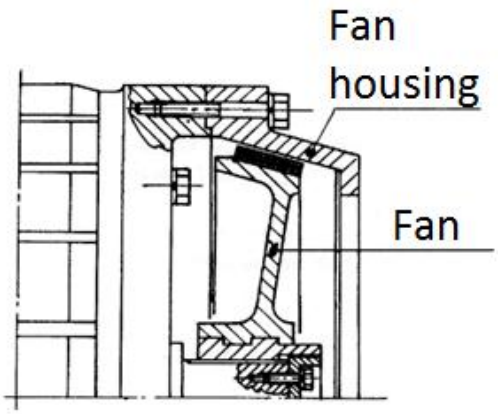
Pulley - Check each rotating pulley for smooth running. In case of irregularities, disassemble it and check the relevant bearing. Check the wear of the groove. Pulleys with cracks and breaks on the edges must not be used.

Drum - Check the tightening of the rope fastening screws and the wear. Check the integrity of the thread.

Gearbox - Check for abnormal vibrations which may be caused by damage of a bearing. In this case, disassemble the gearbox to replace the bearings.

NB: *For hoists type MT and MTL the gearbox is outside the hoist, while for the hoist type M it is inside the rope drum.*

Motor's brakes - Check the friction surfaces on the mobile fan and on the brake housing of the motor for wear.



For brake adjustment see - 4.10, pages 38-39

Wheels - Check the wheel flanges and the rolling surfaces for wear. If the thickness of the flange and/or of the rolling surface shows a higher wear, than shown in table 11 (pages 40), the wheels must be replaced. Verify the running noise of the bearings. An abnormal noise means that the bearing must be replaced.
Check the junctions wheel/axle and axle/gearbox for clearances. The presence of clearances means that the axle and/or the wheels must be replaced.

Stoppers - Check that the end stoppers are not bent and they are properly fastened to the structures. Furthermore, check that the stopper does not show signs of breaks or permanent distortion and is properly fixed to its support.

Electric equipment - If the electric equipment is not supplied by PODEM, please check the equipment in compliance with the suppliers recommendations. If the electric equipment is included in the supply, check the moving parts of the contactors for smooth movements. Otherwise the electromagnet might not be strong enough to ensure enough pressure between the contacts. It is also necessary to check the cleanness of the contact surfaces between stator and rotor, in order dust and cause the contactor to stick. Never lubricate the contacts with oil, which can carbonize and offer resistance to the passage of current, causing local overheating which shorten the life of the electromagnetic switch. Remove oxidation with a very fine file, and never with sandpaper or similar. In addition, check the contacts for wear, replacing them if (particularly in case of irregular wear) this prejudices the alignment of the assembly or weakens the pressure spring, so that the two contact surfaces not always come in contact. In case of disassembly, handle the coil very carefully to avoid damaging the winding, especially its ends. To avoid loose connections, overheating or noise, check the correctness of the supply voltage of the coils.

Limit switches - Check their condition and proper operation (operate the limit-switches manually several times). In particular, for the limit-switches movements, check their operation during an ordinary maneuver, testing first at low speed. Make a static check of their resistance to atmospheric agents. Check the mechanical integrity of the moving parts (Lever and springs) and check the tightness of the fastening screws.

Timers - Check and clean the contacts with the same procedure as the contactors. Check the intervention simulating an external operation and in case of damage, replace the damaged part.

Motors - Clean the motor removing any dust settled on the case that could hinder the regular cooling. Check that the ventilation openings are not obstructed. With the motor running at normal operation range, check the noise level, the temperature and the presence of any play in the rotor mountings. With the motor running at normal operation range, check the temperature of the case using a temperature probe. Temperatures above 110°C reveal in fact that the motor is overloaded. In this case, look for the causes inside the equipment and check the duty for which the hoist is intended. Check the current consumption and the voltage, comparing them with the rated values shown on rating plate of each motor.

4.7.3. MAINTENANCE SCHEDULES AND INTERVALS

The intervals between the maintenance procedures shown in table 6 below refer to a hoist working under normal duty conditions as stated by the FEM standards 9.511 for group I Am. For heavy duty conditions, the frequency of the maintenance operations must be increased.
This consideration is also valid if the hoist is used in a higher duty class, than the one specified. In case of normal and proper use of the hoist, its overhaul may be performed after a running time of approximately 10 years accordingly to the FEM standard 9.755 (S.W.P.).

The recommend intervals are indicative and may be changed in compliance with the duty class for which the equipment is used.

Table 6

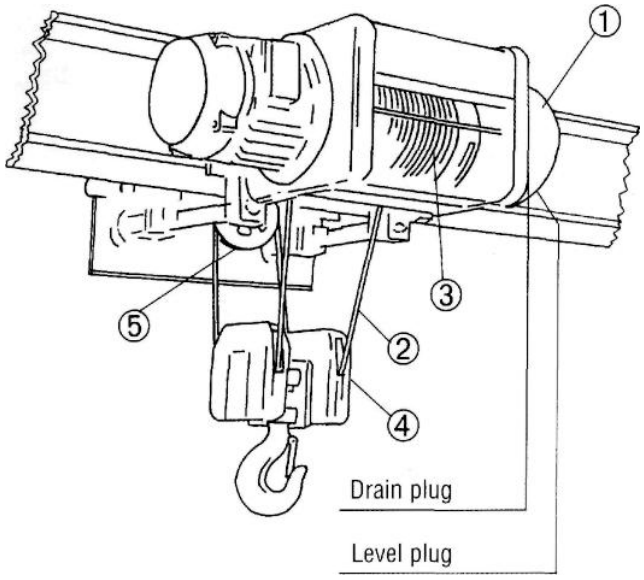
Recommended periodic maintenance and inspections						
Equipment components	I-st maintenance		Periodical inspections			Maintenance
	After 3 months	After 12 months	Daily	Weekly	Monthly	Every
Inspection of rope and fasteners	X				X	6 months
Limit switch function	X		X			6 months
Load limiter	X			X		1 year
Hook condition		X		X		1 year
Reducer function		X			X	1 year
Brake function	X		X			6 months
Brake adjustment	X					6 months
Inspection of wheels/gaskets/bearings		X				1 year
Stopper condition		X				1 year
Inspection of el. Equipment	X				X	1 year
Push button	X		X			3 months
Fastening bolts	X					6 months

4.8. LUBRICATION

A careful management of the lubrication operations of the equipment and the mechanisms is the preliminary condition to ensure the suitability of the hoist for the planned duty and its long duration. The lubricating capacity of oil decreases with time, therefore lubricants must be added or changed. The lubrication of the hoist is very simple and can be done by unskilled personnel, provided that the instructions in this manual are strictly followed and that the necessary checks and fillings up are carried out at the intervals shown in the "Lubrication table" (Tables 7, 8 and 8A on pages 30-31).

Draining and change of the hoist reducer oil:

- Drain the oil at a temperature of at least +20°C (in case of room temperature <20°C, it is necessary to run the gearbox without load for a few minutes in order to warm the oil before draining it)
- Remove the drain plug and let the oil flow out, wash the gearbox with gasoline, carry out a few no-load maneuvers and then drain completely
- Pour in the oil very slowly to allow time for it to reach the level, take care not to exceed the check level
- The lubricant type must never be more fluid than the one specified, to prevent leaks
- The quantity is indicated in table 8A on page 28



The gearboxes of the trolleys with normal and low headroom are maintenance-free, since the used lubricant has high EP-features, wear and oxidation protection capacity and a very high viscosity. Being "Long Life" lubricated, the gearboxes do not need any oil change or filling-up.

The gearbox of the hoist type M is pre lubricated from the factory and does not require maintenance, since the lubricant used has high EP-features, wear and oxidation protection capacity and a very high viscosity. Being "Long Life" lubricated, the gearbox does not need any oil change or filling-up.

Draining and change of the reducer oil on double rail trolleys:

- Drain the oil at a temperature of at least +20°C (in case of room temperature <20°C, it is necessary to run the gearbox without load for a few minutes in order to warm the oil before draining it)
- Remove the drain plug and let the oil flow out, wash the gear box with gasoline, carry out a few no-load maneuvers and then drain completely
- Pour in the oil very slowly to allow time for it to reach the level. Take care not to exceed the check level
- The lubricant type must never be more fluid than the one specified, to prevent leaks
- The quantity is indicated in table 7

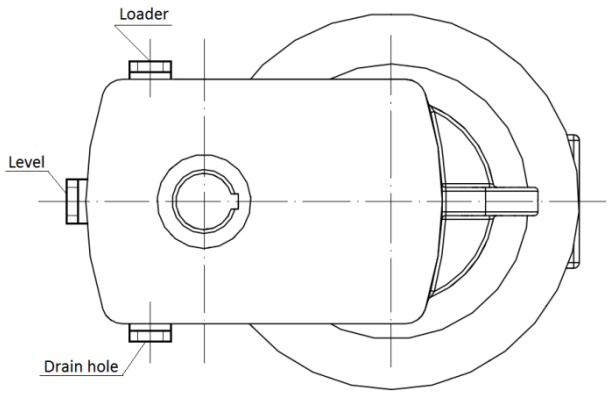


Table 7

Gearmotor	Oil	QTY	Interval
160	Ceran CA	0.5dm^3	3 years
200		0.8dm^3	
250		1.0dm^3	
315		1.2dm^3	

Table 8

Pos.	Item	Semi-liquid grease	Consistent grease	1 month	3 months	6 months	Yearly
1	Lifting reducer	CERAN CA	MOBIL-MOBILPLEX 45 BP-ENERGEASE HT0 SHEL-TIVELA COMPOUND A				
2	Rope				X		
3	Drum					X	
4	Hook block rollers						1
5	Counterpulley						1

Table 8A

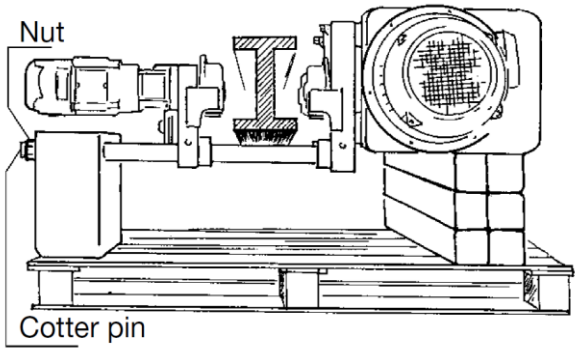
Hoist		Semi-liquid greace: CERAN CA	Trolley		Semi-liquid grease: CERAN CA		
					Quantity, kg		
Reeving	Capacity, t	Quantity,kg	Reeving	Capacity, t	Low headroom	Normal headroom	
						1pcs. Trolley	2pcs. Trolleys
2/1	1/1.6	0.8	2/1	1/1.6	0.07	0.07	0.06
4/1	2/3.2	0.8	4/1	2/3.2	0.07	0.07	0.06
2/1	3.2	1.0	2/1	3.2	0.07	0.12	0.06
4/1	5/6.3	1.0	4/1	5/6.3	0.13	0.12	0.06
2/1	5	1.2	2/1	5	0.13	0.12	0.06
4/1	10	1.2	4/1	10	0.13	-	2x0.06

4.9. REPLACEMENT

Removal and installation procedure

4.9.1. MONORAIL TROLLEY

Replacements of components of the hoist or trolley must be performed by skilled and trained technicians with specific knowledge of lifting equipment.

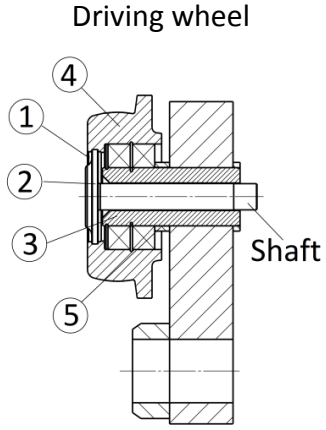


Low headroom monorail trolley

Driving wheel

Removal: Remove the ring item 1 on the grooved hole. Pull out the pin item 2, remove the ring on the wheel axle item 3 and pull out the wheel with a puller (picture 3, page 31).

Installation: Verify the position of the spacer item 5, install the wheel, item 4, fit the ring item 3, insert the pin item 2, turning it till the groove gets perfectly into the gearbox, fit the ring item 1 in its seat, check the wheel for smooth running switching-on the motor (picture 3, page 31).



Picture 3

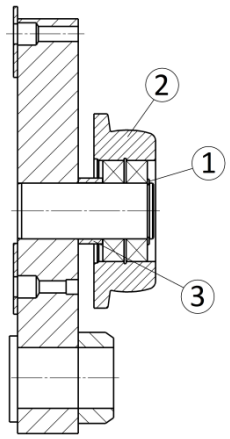
Normal and low headroom monorail trolley

Idle wheel

Removal: Remove the ring item 1, pull out the wheel item 2 with a puller (picture 3, page 31).

Installation: Verify the position of the spacer item 3, install the wheel item 2 and fit the stop ring item 1 (picture 4, page 32).

Idle wheel



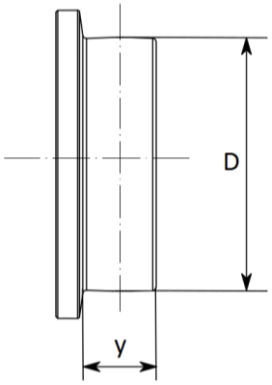
Picture 4

Wheels must be replaced when the original dimensions change as shown.

Picture 5

Maximal tolerance on dimension D: -5% of the original value.

Maximal tolerance on dimension y: +10% of the original value.



Original sizes of standard wheels					
Low	D	125	155	195	250
headroom	Y	40	45	45	50

Original sizes of standard wheels								
Normal	D	100	120	125	140	155	200	250
headroom	Y	40	32	35	40	45	48	50

If during the periodical inspections the measured internal dimension of the wheels exceeds the dimension "beam flange +3-4 mm" it is necessary to restore the old dimension varying the closure of the side plates of the trolley as shown in section 3.4 "Assembly of components" on pages 7-8 (deduct the measured difference from the "D" dimension).

Motor for low headroom trolley

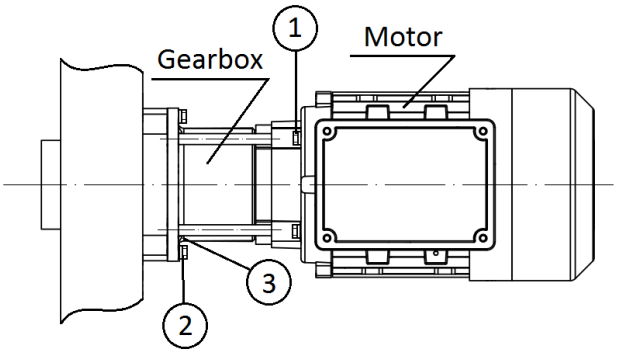
Removal: Trolley with wheels diameter 125 and 155mm:
Loosen the stud bolts item 3 and pull out the motor.

Installation: Trolley with wheels diameter 125 and 155mm:
Install the motor and tighten again the screws item 1.

Gearmotor for low headroom trolley

Removal: Loosen the 4 screws item 2 and pull out the gearmotor until.

Installation: Install the gear motor oscillating it, so that the seat the gearbox perfectly fits into the projection of the wheel drive shaft, and then tighten the 4 screws item 2.



MOTOR for low headroom trolley

Removal: Loosen the 3 screws item 1 and pull out the motor.

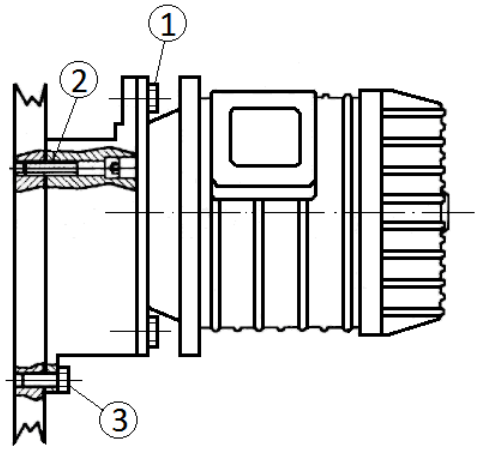
Installation: Install the motor turning it so that the drive shaft perfectly fits in its seat, paying attention to align the driving gear of the gearbox of the trolley (or pre-reducer) and then definitively tighten the 3 screws item 1.

Pre-reducers for normal headroom

Removal: Remove the motor as previously described, and then loosen the screws item 2 and 3 and pull out the pre-gearbox.

Installation: Install the pre-gearbox turning it so that its seat perfectly fits into that of the plate of the trolley. Place the pre-gearbox in its original position, tighten the screws item 2-3, install the motor as previously described.

Motor



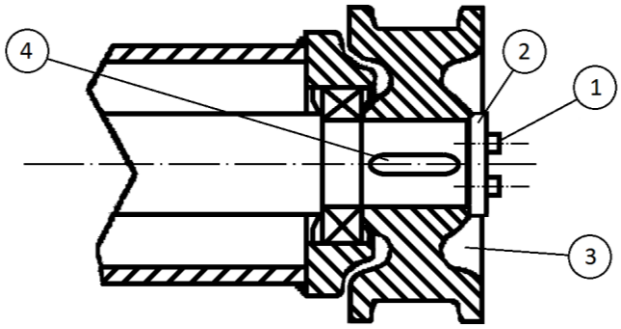
4.9.2. DOUBLE RAIL TROLLEY

Wheels must be replaced when the original dimensions change as shown.

Wheel removal: Loosen the screws item 1, remove the wheel stopper item 2 and pull out the wheel item 3 with a puller. **NB:** To remove the wheel from the gearmotor side, first remove the gearmotor.

Wheel installation: Check that the key item 4 is properly positioned, install the wheel item 3, place the wheel stopper item 2 and tighten the screws item 1.

NB: To install the wheel from the gearmotor side, first install the wheel and then the gearmotor.

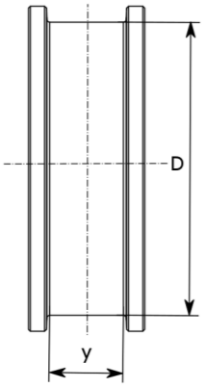


Wheels must be replaced when the original dimensions change as shown.

Picture 5.1

Maximal tolerance on dimension D: -5% of the original value.

Maximal tolerance on dimension y: +10% of the original value.

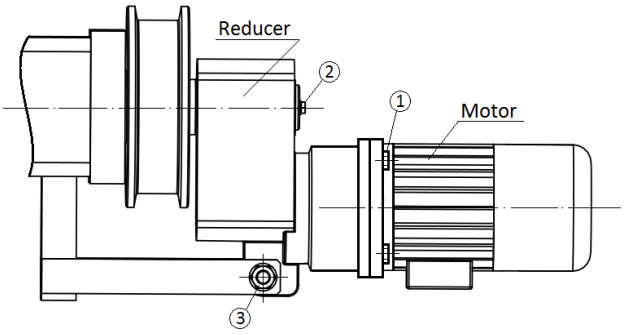


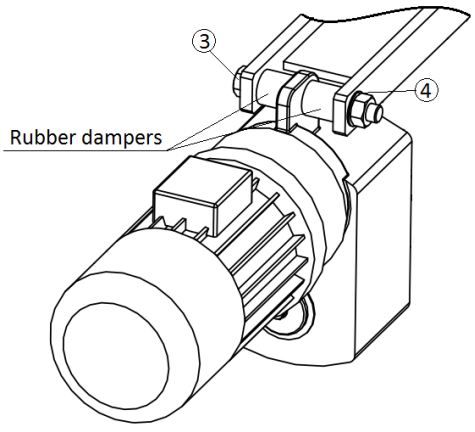
Original sizes of standard wheels					
Double rail trolley	D	160	200	250	320
	Y	50	60	60	70/90*

Travel motor

Removal: Loosen the 4 screws item 1 and pull out out the motor, remove the half-coupling from the dive shaft using a puller.

Installation: Install the half-coupling on the drive shaft, verify that the rubber of the flexible coupling is placed into the seat of the half-coupling fitted to the gearbox, and install the motor carefully tightening the screws item1.





Gearmotor
Removal: Remove the screw item 2 and the relevant washer, remove the screw item 3 on the torque rod, and pull out the planetary gear from the shaft of the trolley.

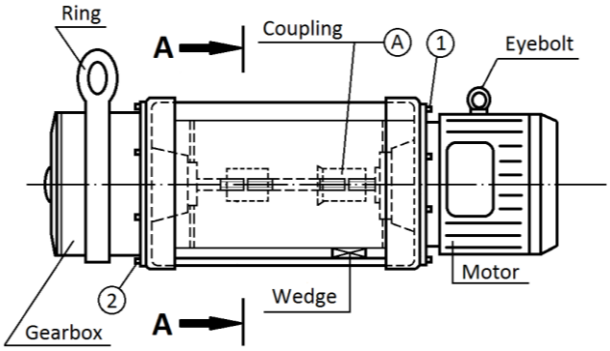
Installation: Verify the presence of the key into the shaft seat, fit the gearbox on the shaft. Fit the damper rubbers on the torque rod as shown, and tighten the screw item 3.
Fit the nut and washer item 4.

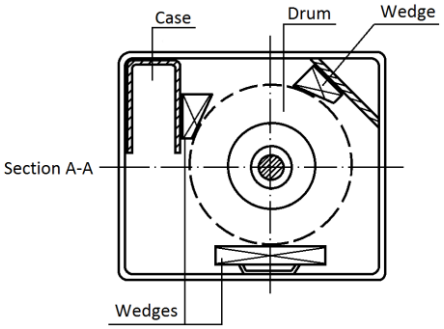
4.9.3. LIFTING MOTOR

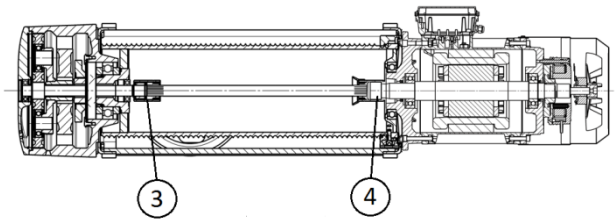
Hoists type MT

Removal: Insert wooden wedges between the drum and the case to prevent the drum from falling, loosen the screws item 1, pull out the motor slinging it to the lifting eye fitted before.

Installation: Check the two half-couplings (inside the groove seats and the external teeth) for wear. Insert the intermediate shaft into the half-coupling on the gearbox side item 3 and verify the proper fitting of the half-coupling on the motor side item 4 and the proper position of the drum (in order to avoid shifting during the removal). Hold the motor with slings or bands fastened to the lifting eye provided and oscillate it in order to match the male and female hub and the seat of the drum bearing until the proper position is reached. Finally, tighten the screws item 1.



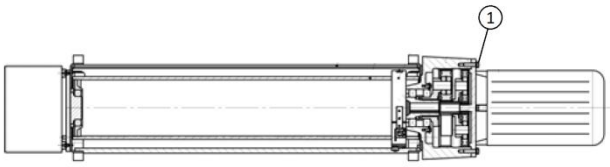




Hoists type MTL

Removal: Loosen the screws item 1, pull out the motor slinging it to the lifting eye fitted before.

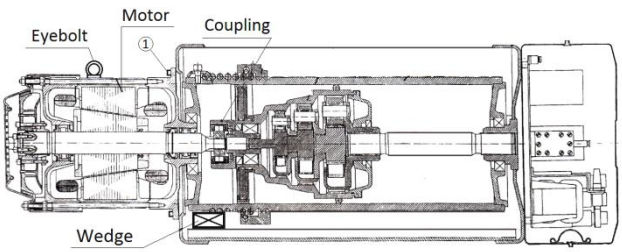
Installation: Hold the motor with slings or bands fastened to the lifting eye provided and oscillate it in order to match the male and female hub until the proper position is reached. Finally, tighten the screws item 1.



Hoists type M

Removal: Insert wooden wedges between the drum and the case to prevent the drum from falling, loosen the screws item 1, pull out the motor slinging it to the lifting eye fitted before.

Installation: Check the half-coupling (inside the groove seat and the external teeth) for wear. Verify the proper fitting of the half-coupling and the proper position of the drum (in order to avoid shifting during the removal). Hold the motor with slings or bands fastened to the lifting eye provided and oscillate it in order to match the male and female hub and the seat of the drum bearing until the proper position is reached. Finally, tighten the screws item 1.



Never use the fastening screws to approach the motor to the case, since this could damage the couplings and the relevant stop rings. Install and tighten the fastening screws item 1 only after proper positioning of the motor into the seat of the case.

This step, if performed as above described, requires special experience and therefore only skilled technicians can be entrusted with it. Whenever possible, we recommend to install the motor with the hoist on the floor in vertical position.

4.9.4. LIFTING REDUCER OF MT AND MTL - HOISTS

(see the figures on page 34 "LIFTING MOTOR)

Removal: Fit wooden wedges like for the motor removal, on the gearbox side, loosen the screws item2, pull out the gearbox balancing it with sling bands.

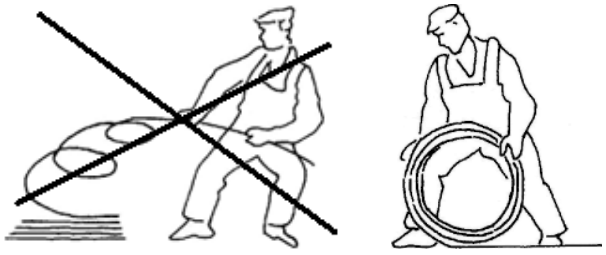
Installation: Proceed as described in section 4.9.3. (hoist motor installation), first placing the motor side half-coupling item 4, then the relevant intermediate shaft and inserting the gearbox until reaching of the proper position, then tighten all the screws item 2.

Never use the fastening screws to approach the gearbox to the case, since this could damage the coupling and the relevant stop rings. Install and tighten the fastening screws item 2 only after proper positioning of the gearbox into the seat of the case.

Whenever possible, we recommend to remove and install the gearbox with the hoist on the floor in vertical position to facilitate the procedure.

4.9.5. ROPE

Before fitting a new rope, it is necessary to check the pulley grooves and the drum thread for wear or bends due to the winding of the old rope. If necessary, replace the damaged parts. Unwind the new rope without twisting it, so as not to cause bends.



For wire rope replacement follow the next steps:

- **Rope guide removal -** Loosen the screws item 1 (Fig. 1) detach the rope guide shoe item 2 (Fig. 1), remove the rope clamp spring (Fig. 2), pull out the rope guide ring from the drum (Fig. 3).

Fig. 1

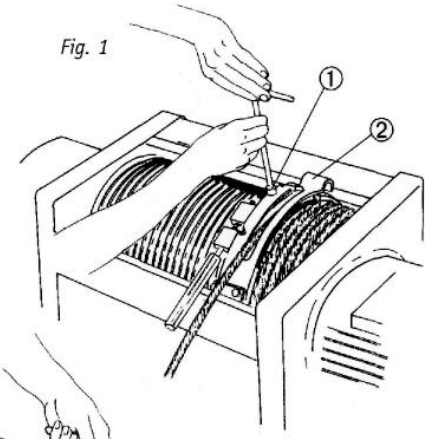


Fig. 2

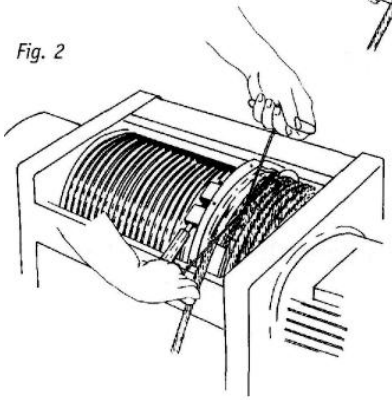
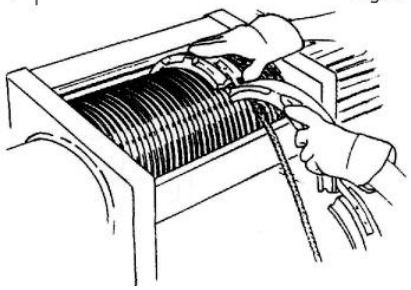


Fig. 3



The removal of the rope guide for hoists type MT and MTL is shown in the figures, whereas for hoist type M it is mirror-inverted in respect to the illustration.

- **Rope removal:** Pull out the wedge (Fig. 4), and then extract the rope end from the socket and pull out the rope from the lower block pulleys and the deflection pulley, if any. Fully unwind the rope from the drum by pressing the "DOWN" button on the pendant, until the end of the drum. Loosen the fastening screws of the rope clamps (Fig. 5).

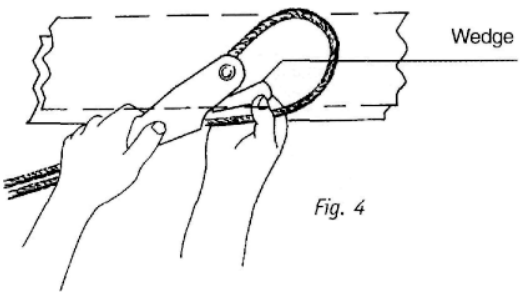
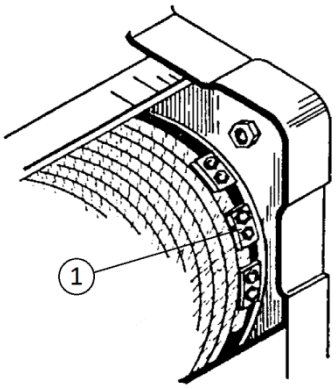


Fig. 4

Figure 5



- **Rope installation-** Insert the rope in the last clamp letting the rope end come out of approximately 40mm. Tighten the clamp screws (figure 5, item 1), pressing the rope until it is definitively clamped. Press the "UP" push-button of the pendant and while holding the rope tight, wind it up to the middle of the drum, to allow the installation of the rope guide ring.

For hoists type MT, the rope winding starts from the motor side with left-hand thread drum, for hoists type M the rope winding starts on the side opposite to the motor with right-hand thread drum.

- **Rope guide installation-** Put the rope guide (figure 6) into the drum grooves. With the special pliers, narrow the ring ends using the 2 holes on the ring ends (figure 7). Install the spring in its slot inside the ring (figure 8) and close it hooking it (figure 9). Fit the rope guide shoe (figure 10) and tighten the screws item 1 (figure 11). After the installation of the rope guide, pass the free rope end through the pulley of the Hook block and then fasten it on the wedge socket, as described in the section "Hook block assembly" 3.7. on page 10 of the installation manual.

Figure 6

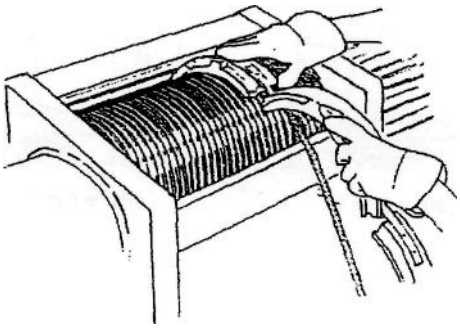


Figure 7

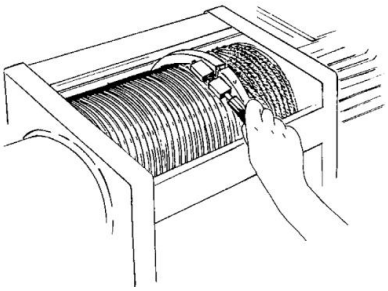


Figure 8

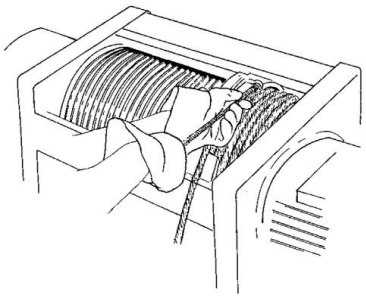


Figure 9

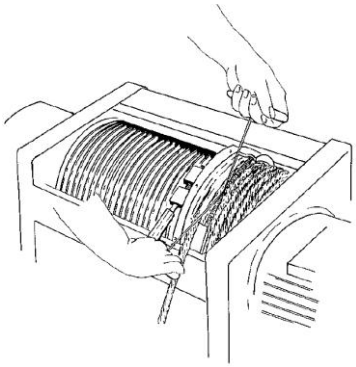


Figure 10

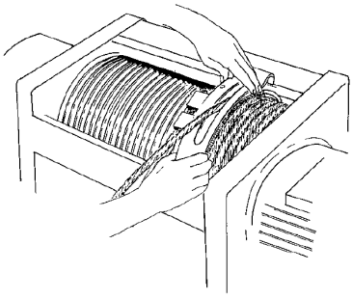
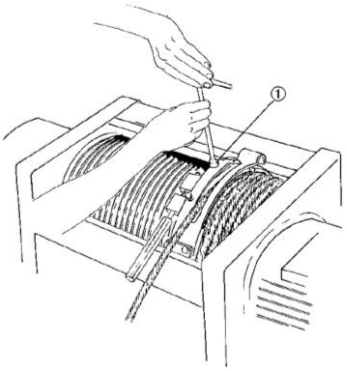


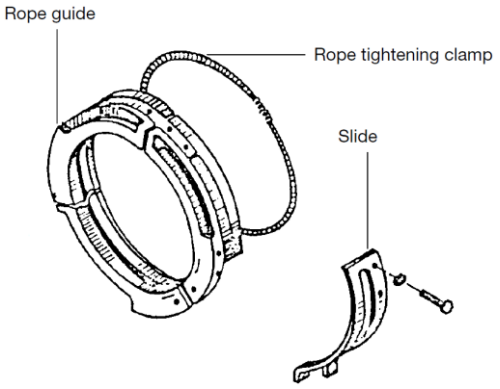
Figure 11



The installation of the rope guide ring for hoists type MT and MTL is shown in the figures, for hoists type M it is mirror-inverted in respect to the illustration.

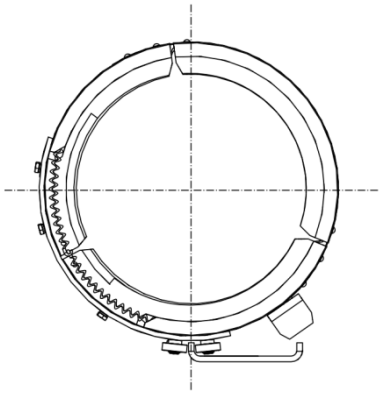
Rope guide for hoists type M

Figure 12



Rolling rope guide for hoists

Figure 13



4.9.6. LIFTING BRAKE FAN

Removal and installation:
First make sure that there is not load applied, loosen the screws item 1 (figure 16), remove the brake housing item 2 (figure 14) and remove the brake adjusting ring nut item 3 (figure 14) with the special wrench (figure 15). Remove the brake fan item 4 (figure 16) with a puller. Install the new fan pushing it forward with a lead mallet, install the brake housing item 2 (figure 14) and the screws item 1 (figure 14), and then perform the adjustment as shown in the section "Brake fan adjustment".

Figure 14

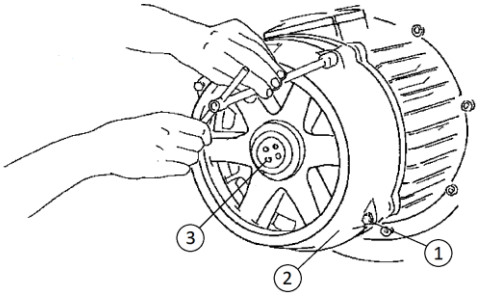


Figure 15

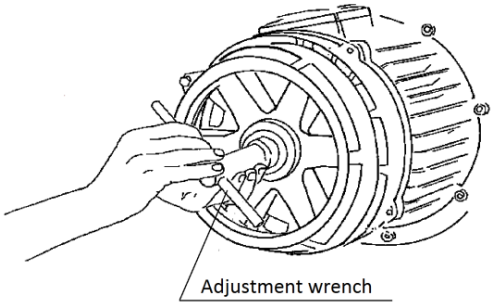
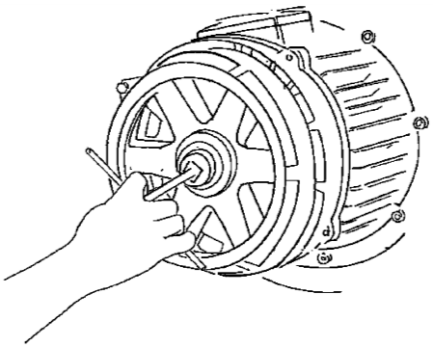


Figure 16



4.9.7. TROLLEY TRAVEL BRAKE

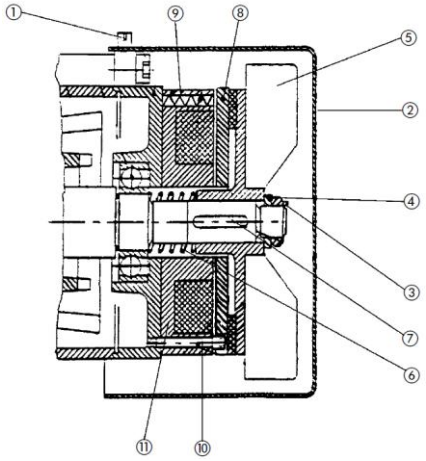
Brake fan removal: Loosen the screws item 1, remove the cover item 2, loosen the screw item 3 and the nut item 4, pull out the brake fan item 5.

Brake fan installation: Check the right location of the spring item 6 and the key item 7, install the brake fan item 5, tighten the nut item 4 and the screw item 3, position the cover item 2 and tighten the screws item 1.

NB: *Check that the brake stops correctly, in this case adjust it.*

Electromagnet removal: Follow the same rules as in the above section "Brake fan removal", then pull out the movable keeper item 8, the springs item 9 and loosen the screws item 10. Disconnect the feeding cables of the electromagnet item 11 from the motor terminal block.

Electromagnet installation: Connect the electromagnet feeding cables item 11 following the rules in page 36. Install the electromagnet item 11, tighten the screws item 10, fix the spring item 9, install the removable keeper item 8 and check the right location of the spring item 6 and of the key item 7. Install the brake fan item 5, tighten the nut item 4 and screw item 3, install the cover item 2 and tighten whole unit with the screws item 1.



4.10. ADJUSTMENTS
4.10.1. ADJUSTMENT OF BRAKE FOR CONICAL LIFTING MOTOR

This step must be performed with standstill hoist and without load.

Loosen the screws item 1 and remove the grille item 2 (figure 17). With the brake applied measure at any point between the brake fan (figure 18) and a surface of the bell. After this measurement, axially push the fan inside the motor as use a lever and make another measurement, recording the difference (figure 18). If the difference is greater than the rated values (0.8/1.2mm) proceed as follows:

Loosen the screws (figure 19) and then turn the adjusting ring nut clockwise to take up any axial shifting greater than the rated value, bearing in mind that one complete turn of the ring nut corresponds to 2 mm (figure 20). After this take up operation, repeat the measurement with the brake released (figure 18), checking that the axial shifting is within the rated value, then put back the screws and the grille in their positions (figure 17).

If the measure indicated is not reached with the above operation, it is necessary to replace the fan.

Figure 17

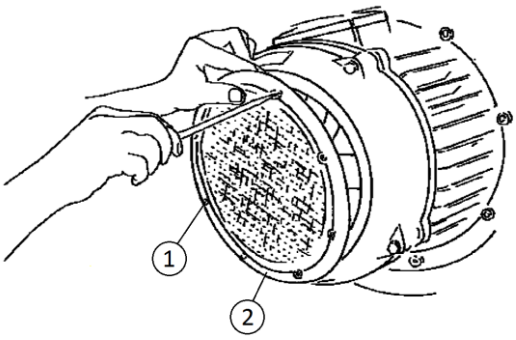


Figure 18

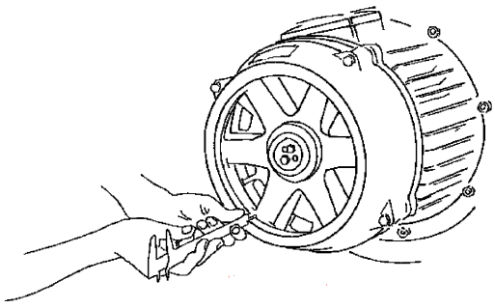


Figure 19

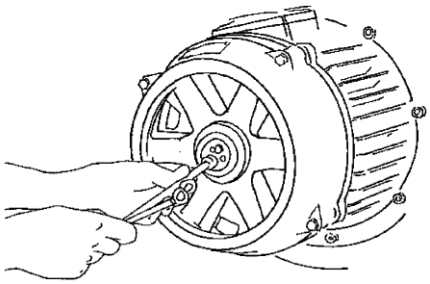
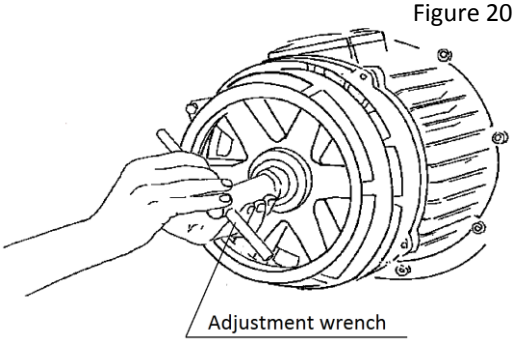


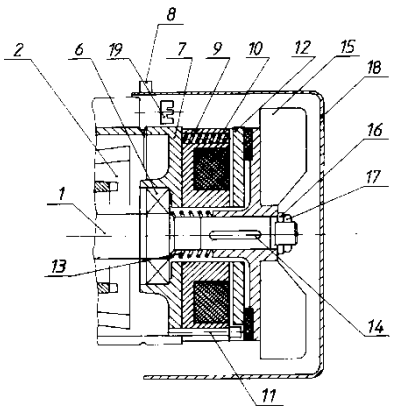
Figure 20



ATTENTION: *The brake does not function property with an axial shifting over 2.5mm. The maximum permissible axial shifting of the rotor during the operation is 2.5mm.*

4.10.2. ADJUSTMENT OF BRAKE FOR CYLINDRICAL LIFTING MOTOR

The construction of the brake is shown on the figure below. The air gap is adjusted in the following manner:



- Remove the cover 18
- Turn the nut 17 clockwise (if the air gap will is to increase) or counterclockwise (to decrease). The air gap shall be within the range 0.5-0.8mm for lifting motors and 0.3-05mm for travel motors (measured between the core 9 and anchor 12)

Brake disassembly:

- Remove the housing 18
- Unscrew the nut 17 and the washer 16
- Remove the fan 15, paying attention not to breake the fan vanes.
- Remove the anchor 12 and spring 10
- Remove the magnetic core 9 after unscrewing the bolts 11.
- Cleaning of brake details: The electrical details and units - with air-blast, mechanical details and units - with white spirit, degrease the brake disk and lining.

Brake installation

- Install the magnetic core 9 to the flange 7 by tightening the three screws 11 through the relevant holes. Beware not to mount the bolts through the holes for the springs.
- Place the springs 10 into the holes of the electromagnet 9
- Attach the anchor 12 to the magnetic core, taking care for the 3 grooves not to appear on the guide screws 11
- Install the fan 15 to the motor shaft
- Position the washer 16 and slightly tighten the nut 17
- Check the anchor 12 for displacement relative to the guide screws 11 and tighten the nut 17 until the air gap reaches the range 0.5-0.8mm.
- Assemble the housing 18
- Restore the electric scheme

4.11. TROUBLESHOOTING

The following tables show the possible malfunctions of the single functions of the trolley/hoist. In tab. 11 are listed the faults, the relevant function and the possible cause.

Table 11

No:	Fault	Cause	Correction
1	2	3	4
1	Equipment won't switch on Operational circuit comutation equipment does not actuate	1. A safety fuse of the reducing transformer has burnt. 2. Mains lead fuse has burnt. 3. Breakage in the operational circuit. 4. Contactor coil burnt or ruptured. 5.End limit switch activated or blocked	1.1. Replace it with a new one. 2.1. Replace it with a new one. 3.1. Check the the wiring diagram (Fig.10-15) and recover the broken circuit. 4.1. Replace it with a new one 5.1. Check it and recover its normal position
2	With pressed control button the lifting motor does not rotate	1. Conical brake has stuck 2. Mechanical blocking in the electric hoist or the motor	1.1. Take off the fan grid and press several times the shaft with switched off and unloaded hoist 2.1. Disassemble and remove the item blocking the motor.
3	Fuses burn out when the motor is switched on	1. Winding insulation damaged to frame mass. Check with a megaohm-meter 2. Insulation damaged between phases	1.1. Contact PODEM and order a new motor. Re-wind 2.1. Contact PODEM and order a new motor. Re-wind
4	Electric motor does not start and does not rotate when loaded	1. Only two of the phases are in action 2.Working voltage is lower than minimum required	1.1. Check the mains 1.2. Check the operation of the contactors. Change the contact bridges or the contactor springs if necessary 1.3. Check the state of the stator coil 2.1. Check the supply voltage by voltmeter
5	Motor get overheated	1. Rated load is exceeded 2. Voltage is asymmetric 3. Voltage is above admissible ratings 4. Heavier operation mode in effect	1.1. Observe the prescribed load ratings 2.1. Switch off the hoist until symmetry resumes 3.1. Follow the prescribed ratings 4.1. Observed the prescribed operation modes
6	Electric motor goes on working with push button switched off	1. Contactor's contact tips have welded 2. Contactor's magnet system has stuck 3. Push button contacts have welded	1.1. Replace the contact bridges 2.1. Check the counteracting springs and clean the magnet's front surfaces 3.1. Replace them with new ones
7	Electric motor is unusually noisy	1. Bearings have worn out	1.1. Replace them
8	Limit switch does not actuate properly by not switching off the main contactor	1. Incorrect phasing of the supply cable 2. Limiting rackets on the bar have loosened 3. Contactor for relevant direction has stuck 4. Limit switch has blocked	1.1. Exchange any two of the phases 2.1. Adjust and tighten the limiting rackets 3.1. Remove the sticking and replace the contactor, if necessary 4.1. Check the limit switch. Mend it, if possible, otherwise replace it.

4.12. REMOVAL - NEW DESTINATION

Should it become necessary to remove the trolley/hoist from its working position for extraordinary maintenance operations (repairs/replacements), or to install it in a new location, reverse the procedures described under "Mounting", section 3.5. on pages 8-9 and sections 3.6 - 3.7 on pages 9-10.

This operation must be carried out by specialists and specially trained staff, with adequate tools and personal safety devices, as required by the standards. Should the user sell the trolley/hoist to another user (resale of equipment to third persons) it is advisable to inform the manufacturer of the new destination, place and address of the new user, in order that Podemcrane AD can send updated information, if any, in connection with the hoist and/ot this manual.

4.13. RESTORATION AND STORAGE

Before putting in service a trolley/hoist which has been stored for a long time, following steps must be carried out:

Mechanisms:

- Check for any lubricant leaks and replace any faulty seal
- Top up the lubricants
- Check that the mechanisms are properly fastened to the structure
- Remove any trace of rust from the sliding parts of the control devices
- Check the rope for integrity and clean and lubricate it, the pulley grooves and the drums
- Lubricate the thrust bearing of the hooks and the unpainted mechanical components (shafts, couplings, control rods)
- Eliminate water deposits in hole components of the structure and of the mechanisms

Electric system

- Eliminate any condensation inside the motors sucking it from the open terminal boxes. Dry blow with air
- Check the brakes for the integrity and function. Restore the proper air gap.
- Check the limit switches for integrity and function
- Verify the integrity of the parts and the electric and electronic components. Eliminate any condensation, wipe dry the contacts of the electromagnetic switches and protect all components with a suitable spray for electrical equipment. Carefully clean and apply a film of Vaseline on the mating surfaces and
- Perform an electric strength test at 2000V, taking care to isolate any rectifier bridge or electronic circuit. Check the trailing cables for smooth running. Carefully check the function of the pendant.

4.14. DISPOSAL/SCRAPING

If the hoist/trolley have to be scrapped, their parts must be disposed of in different ways according to the different characteristics thereof (e.g.: metal, oils and lubricants, plastic and rubber, etc.), possibly, entrusting specialized authorized disposal companies, and in any case observing the law requirements for the disposal of solid industrial waste.

5. MAINTENANCE REGISTER
5.1. MAINTENANCE REPORTS

In these maintenance reports the user must record all performed maintenance steps at monthly, six-monthly and yearly listed in tables 6, 7, 8 on pages 29, 30 and 31 noting the results and possible comments. The report must state clearly the name of the maintenance worker and date of the maintenance step.

5.1.1. MAINTENANCE REGISTER CONFIGURATION

The register consists of pages number equal to the number of components listed alongside.

List A (recommended monthly, six-monthly maintenance)

- Ropes
- Hook
- Brakes
- Fastening bolts
- Electric equipment
- Limit switches

List B (recommended yearly maintenance)

- Rope guide
- Gearbox
- Wheels
- Stoppers
- Bottom block
- Rope pulleys
- Overload device

The use of non-genuine spare parts invalidates the guarantee, and compromises the proper and safe operation of the hoist.

6. DESIGNATION OF HOIST TYPE MT/M/MTL

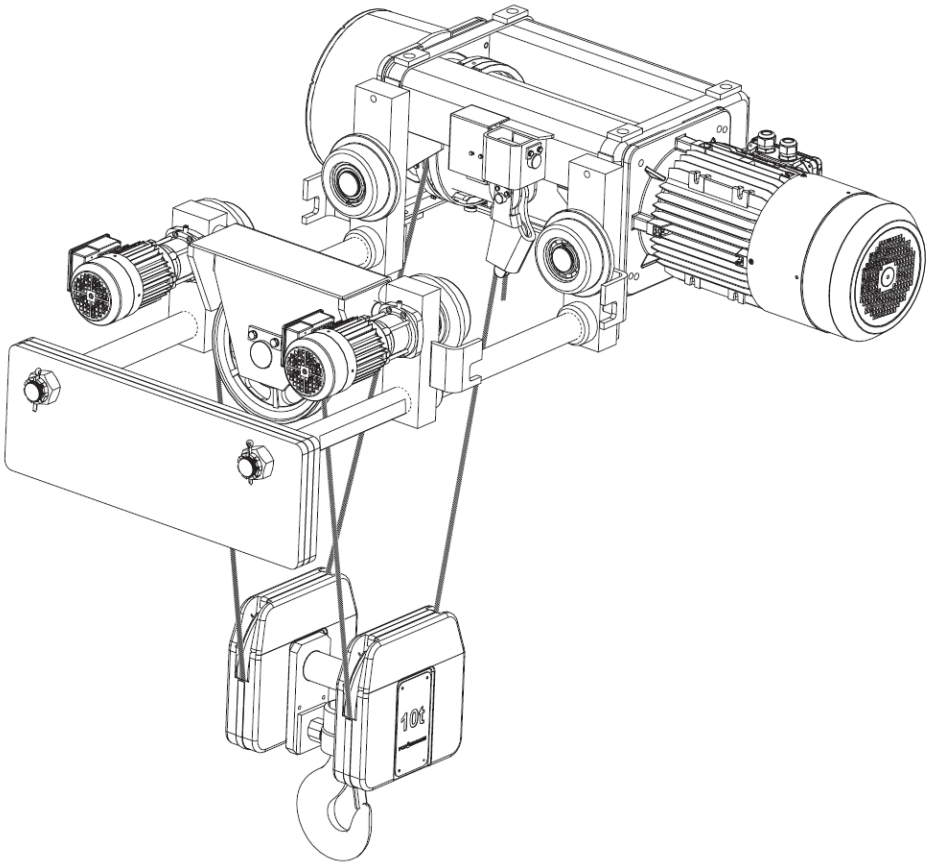
-Old designation

52	MT	312	H10	V1	2/1	M E K C	20/5
Electrical equipment code	**Hoist type**	**Hoist size**	**Hook travel, m**	**Lifting speed, m/min**	**Reeving**	**Modification**	**Trolley speed m/min**
20 – Emergency stop and thermal protection	**MT**	**305**		**V1**	**2/1**	**M** – Micro lifting speed	**12**
21 – Emergency stop, thermal protection and latch key	**MTL**	**308**		**V2**	**4/1**	**E** – Electrical trolley	**15**
42 – Overload device	**M**	**312**		**V3**	**4/2**	**N** – Normal headroom	**20**
44 – Overload device and thermal protection		**316**				**C** - Second brake	**20/5**
52 – Overload device, emergency stop and latch key		**525**					**20/6**
53 – Overload device, emergency stop, thermal protection and latch key		**740**					**12/4**
		750					**15/5**
		950					
		963					
		980					
		1100					
		1125					

- New designation

1	MT	312	H10	V8	2/1	M	N	53	20/6
Load capacity, t	**Hoist type**	**Hoist size**	**Hook travel, m**	**Lifting speed (m/min)**	**Reeving**	**Type of lifting speed**	**Suspension type**	**Electrical equipment code**	**Trolley speed (m/min)**
1	**MT**	**305**	**H7**	**V4**	**2/1**	**M** – Micro lifting speed	**N** - Normal headroom	**20** – Emergency stop and thermal protection	12
2	**MTL**	**308**	**H10**	**V8**	**4/1**	**S** – Single speed	**F** - Foot mounted	**21** – Emergency stop, thermal protection and latch key	15
1.6	**M**	**312**	**H13**		**4/2**	**I** - Inverter control	**LB** - Low headroom with balance wheel	**42** – Overload device	20
2.5		**316**	**H14**				**LC** - Low headroom with counterweight	**44** – Overload device and thermal protection	20/5
3.2		**525**	**H20**					**52** – Overload device, emergency stop and latch key	20/6
5		**740**	**H26**					**53** – Overload device, emergency stop, thermal protection and latch key	12/4
10		**750**							15/5
16		**950**							
32		**963**							

NOTES:



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