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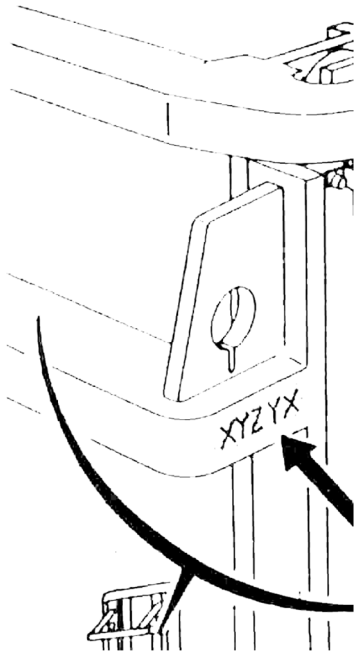
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MAST IDENTIFICATION

The Lift-Tek Elecar mast is marked with a serial number, to which corresponds an inspection and test certificate. For any request or information relating to a Lift-Tek Elecar product, always mention this number.

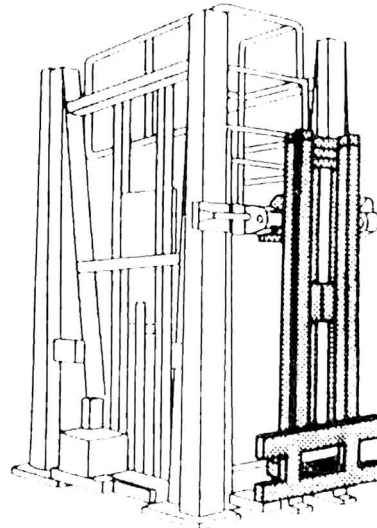


WARRANTY

The terms and modalities of the application of the guarantee are illustrated in detail in the booklet "GENERAL GUARANTEE CONDITIONS" provided separately.

CONDITIONS OF SUPPLY

Every mast that the company Lift-Tek Elecar supplies has been checked in all its components and finally tested on a test bench.




The results of this final test are reported in a test certificate, deposited in the appropriate archive.

Every subsequent intervention carried out on the mast either directly from Lift-Tek Elecar or by anyone else, with the prior authorization of Lift-Tek Elecar, will be registered on this certificate.

THE PRODUCT PROVIDED MAY THEREFORE BE MOUNTED WITHOUT THE NEED FOR MORE TESTING, UNDER THE OBVIOUS CONDITION THAT NO MAJOR MALFUNCTIONS OF ANY KIND OCCUR.

Lift-Tek Elecar offers its customers the services of its own technical office and factory for the realization of the mountings required to mount the mast to the truck.

FOR THAT PURPOSE, THE CUSTOMER SHOULD PROVIDE US WITH ALL CONSTRUCTION DETAILS NECESSARY, COMPLETE WITH THE RELEVANT DIMENSIONS, INCLUDING MAST. THE INSPECTIONS OF THE PRODUCT AND THE FINAL TESTS WILL HOWEVER NOT GUARANTEE THE USE OF THE MAST IF THE STANDARDS FOR ITS USE AND FOR SAFETY, LISTED BELOW, ARE NOT METICULOUSLY OBSERVED.

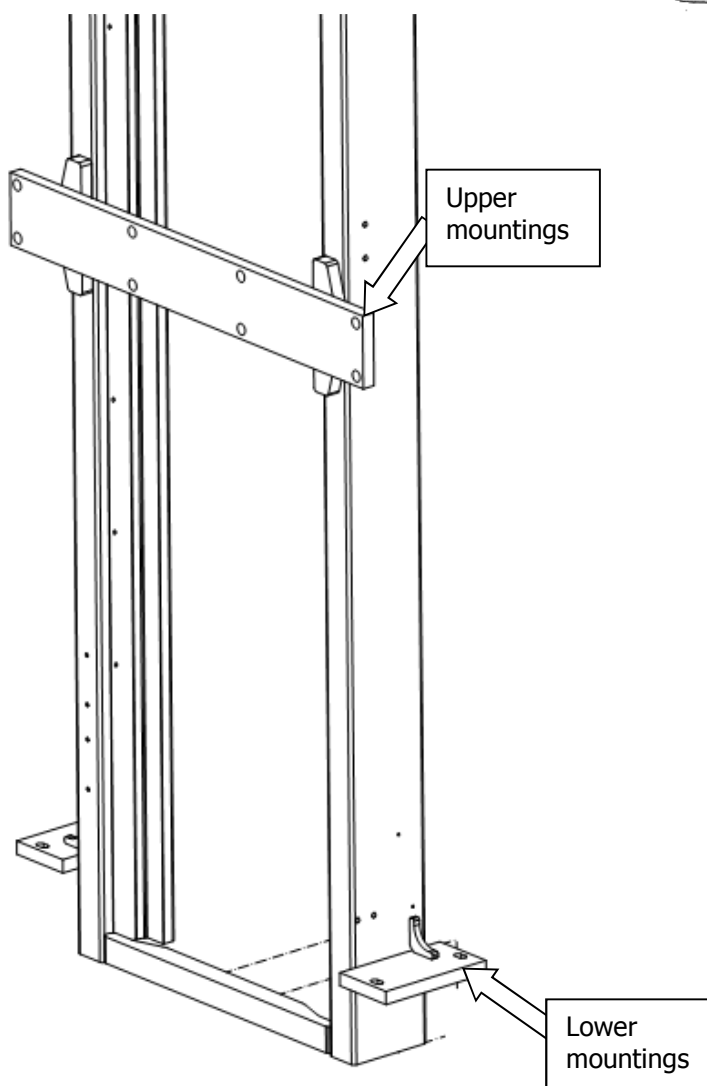
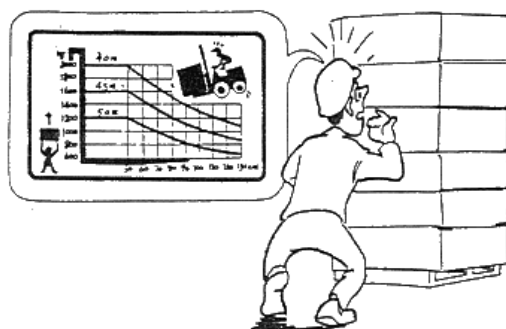
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ASSEMBLY INSTRUCTIONS


To mount the mast on the truck proceed as follows:
 Harness the upright with a band on the upper crossbars and lift the mast with a crane.
 Carefully approach the mast to the truck.
 Position the mast on the truck mounting pins
 Make sure the holes on the lower mountings of the mast are in correspondence with those present on the truck frame.

USE OF TRUCK

Strictly respect the maximum lift capacity values allowed by the diagram on the truck.



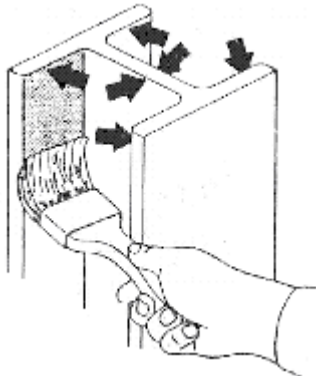
Insert the fixing screws in the holes on the mast and truck connections.
 Tighten the fixing screws between upright and truck frame, according to the torque indicated by the truck manufacturer.
 Finally make the electrical connections from the truck to the electric motor..

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OPERATIONS TO BE CARRIED OUT AFTER
MAST ASSEMBLY

ATTENTION:

Grease the roller tracks where the fork carriage travels inside the mast profiles.



Use graphitized grease for this purpose, avoiding if possible, grease to spray.

ROUTINE MAINTENANCE

Routine maintenance includes the following operations:

GREASING ROLLER TRACKS:

To be carried out every 500 hours / work approx.

MOTOR MAINTENANCE:

Please refer to the relevant paragraphs for the various parts of the motor.

TRANSMISSION MAINTENANCE:


Please refer to the relevant paragraphs for the various parts of the transmission.

GREASING THE WORM SCREW

Please refer to the relevant paragraphs for the worm screw.

EXTRAORDINARY MAINTENANCE

Replacement of carriage rollers

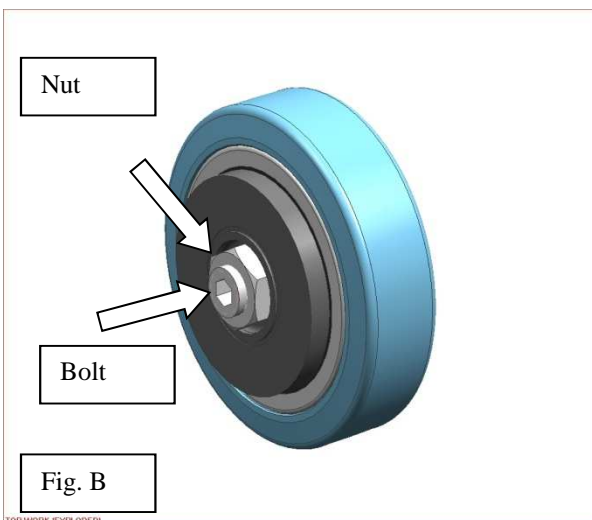
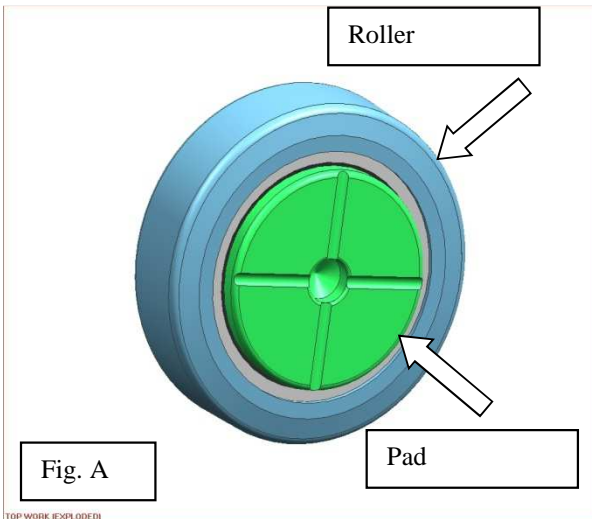
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DESCRIPTION OF CONSTRUCTION COMPONENTS

ROLLERS

The rollers used on Lift-Tek Elecar masts come with an adjustable pad (buffer), in order to be able to bridge the side clearances between the profile and the roller (fig. A, B).

The dimensions of the roller offer an abundant margin to survive eventual accidental overloading's which can occur during the mast's lifetime.



NOTE:


Rollers with adjustable buffers don't require greasing. Only the sliding tracks of the profiles are to be greased. In essence, roller life time depends on the conditions during the use of the mast.

DESCRIPTION OF CONSTRUCTION COMPONENTS

REPLACEMENT OF ROLLERS WITH A BUFFER

After unscrewing the nut and the screw located on the back of the roller (fig. B), which block it in the axial direction, remove the roller with the pad (fig. A).

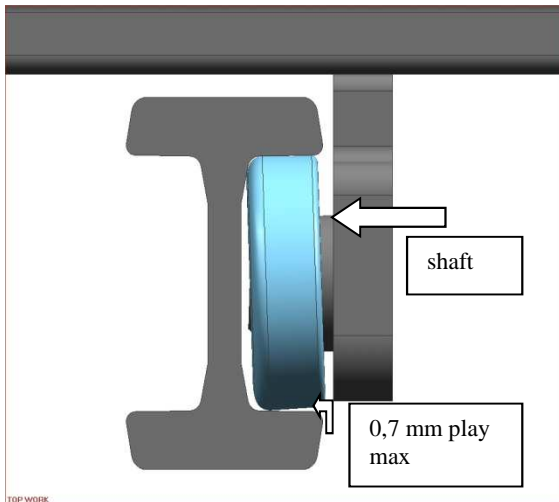
Fit a new roller and a new pad and replace the screw and the nut.

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DESCRIPTION OF CONSTRUCTION COMPONENTS

CLEARANCES BETWEEN ROLLERS AND PROFILE

A radial clearance of max 0.7 mm (standard 0.5 mm) is allowed on Lift-Tek Elecar masts.



If the mast is subjected to normal use the increase in this clearance over time will be minimal, and at the end of 6,000 / 8,000 hours of operation should arrive at a clearance of max 2 mm.

The increase in the clearance will naturally be higher in the event of heavy duty working conditions or particularly heavy uses, such as:

- Multiple work shifts;
- Use of sidershifters or other attachments;
- Dusty working environments and in the presence of corrosive gases;
- Non centred loads with side forces, even if their weights correspond to or are equal or less than nominal;
- Very wide and off-centre loads;
- Uneven floors and high manoeuvring speed;
- Frontal impacts.

When the clearance has reached the value mentioned above, it is advisable to replace the bearing (advisable but not binding, the decision remains a judgment of the user).


If, on the other hand, the type of work involves bumps or other anomalous operations, the wear will increase at a much more pressing pace, up to being able to provoke breakage of the roller.

When, after having replaced rollers already, the 2 mm clearance is again reached, it is necessary to replace the mast section.

When, due to abnormal use of the mast, (and in particular after violent shocks) the welded shaft is also damaged (usually deformed to an oval), the complete bearing will need to be replaced by removing the weld.

The new shaft must be re-welded.

USE BASIC ELECTRODES.

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DESCRIPTION OF CONSTRUCTION COMPONENTS

MAIN CAUSES OF BREAKAGE OF BEARINGS

SHOCKS.

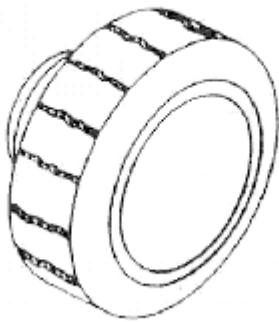
Violent frontal impacts during the forcing of the load can also cause breakage of the rollers.


The outer mantle will show cracks that cut the surface parallel to the axis of the roller.

LOAD DIMENSIONS.

Another possible cause of failure, more difficult to anticipate than others is the use of special equipment for the transport of very long loads (eg carpet booms), even if the weight is less than the nominal load.

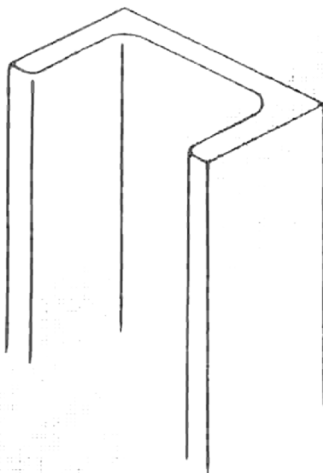
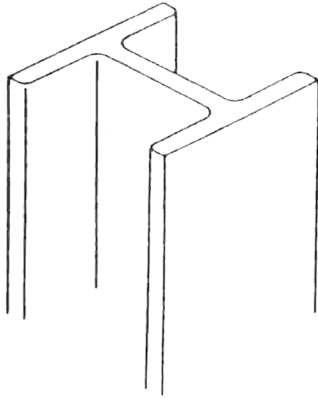
This condition generates oscillations that cause the detachment of the external cemented mantle; in this case circumferential fissures will be visible which will run around the mantle.



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DESCRIPTION OF CONSTRUCTION COMPONENTS

PROFILE MACHINING



TOLERANCES

The strict tolerance of the internal dimension between the roller tracks makes it possible to realize an accurate clearance between profile and mast roller.

In the assembly phase, the clearance is normally less than 0.5 mm.

The maximum limit of acceptability at the origin is 0.7 mm.


RUNNING IN THE PROFILES

In the initial phase of their use, the rollers will cause a greater surface hardness by rolling the tracks, if they work properly.

Index of correct running in is a certain shine that the tracks will show after a few hours of work.

The profile is hot rolled, with very tight tolerances.

Before being used, the profiles are checked, straightness is recalibrated and they are sandblasted to remove the calamine surface, a residue of lamination.

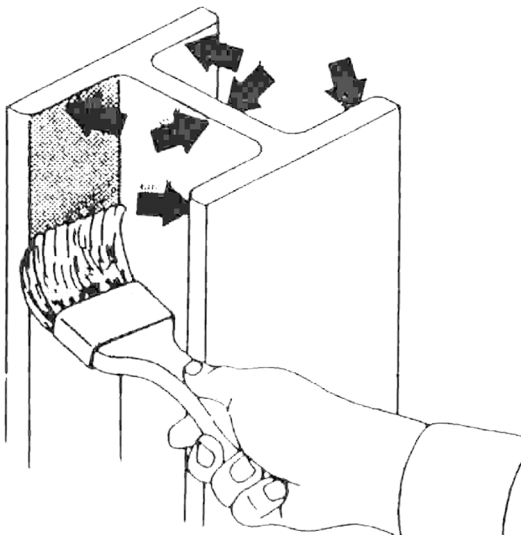
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DESCRIPTION OF CONSTRUCTION COMPONENTS

GREASING OF THE TRACKS

When the mast is installed, the roller tracks must be greased to facilitate the correct running-in. Also later the tracks will have to be greased periodically.

The frequency with which to repeat this operation is at the discretion of the user, and Essentially depends on the conditions of use and the work environment. A greasing interval of about 200 hours can be considered a guideline value for an average work condition.

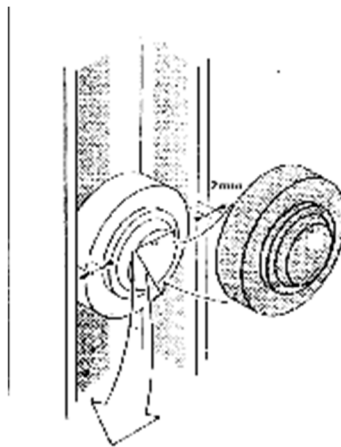


DESCRIPTION OF CONSTRUCTION COMPONENTS

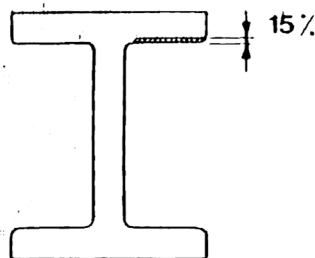
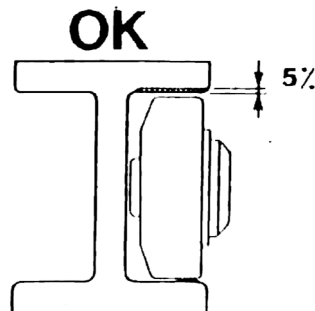
WEAR OF THE PROFILES


Over time there is some wear of the tracks, with a consequent increase in the play between roller and profile.

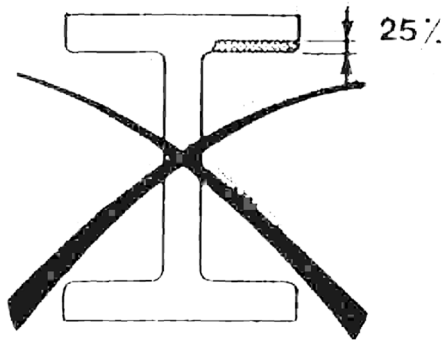
When this play has reached a value of 2 mm, it is better to replace the standard roller with an oversized one.



The wear of the profile will begin to have a certain effect, and, consequently, to reduce the safety factor but only when the thickness of the profile wing will be reduced by about 15% of the initial value.



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DESCRIPTION OF CONSTRUCTION COMPONENTS

I componenti impiegati sui montanti Lift-Tek Elecar rispondono alle caratteristiche di prodotti di prima qualità.

THE ELECTRIC MOTOR.

An accurate maintenance program will result in getting the best use of the machine at a minimum operating cost.

It is advisable to follow at least the following basic maintenance schedule, intended for normal use of the machines, while periodically recording the results..

CAUTION:

The safety factor relative to the yield strength for all profiles used on Elecar Lift-Tek masts is always greater than 2.3.

Here are the recommended minimum thickness values for profile wings:

F45 MONO minimum thickness 22 mm

F30SV minimum thickness 20.5 mm

With these values, which only rarely reached during the normal life of a mast, the safety factor is reduced by about 12%.

The wear values are neither equal on all masts or uniform on the various points of the same mast.

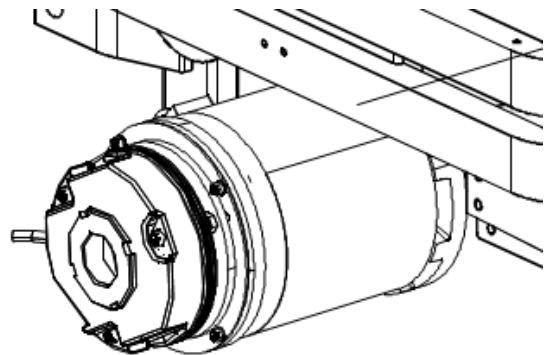
The profiles on which the fork carriage slides will in fact wear more than others, particularly more in the lower section than in the intermediate and superior sections.

CAUTION:

ANY CORRECTIVE INTERVENTION CARRIED OUT ON THE PROFILE WILL BE EXECUTED ONLY AFTER AUTHORIZATION OF LIFT-TEK ELECAR.

HOWEVER, DRILLING AND MILLING OF THE PROFILE SHOULD ALWAYS BE PREVENTED.

In case of welding, always use BASIC ELECTRODES..



See the maintenance intervals below for the various parts of the motor.


THE COLLECTOR:

Frequency: every 500 hours

Check for eccentricity.

Check that the collector is clean and that there are no traces of burns on the slats, clean eventually the collector in the way as reported below.

The collector should be kept as clean as possible using a sturdy rag.

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Frequency: every 1000 hours.

Do not use oil or other lubricants, keep the narrow slits between adjacent lamellas clean.

In regular service conditions, a uniform film of graphite and copper oxide (patina) is deposited on the surface of the collector, after and no more than 100 hours of operation. Its presence is a guarantee of regular operation and a good conservation of the collector.

If surface defects or an oval form of the collector become visible during the life of the motor, dismantling and edge chamfering of the slats is recommended.

These interventions must be performed exclusively by specialized personnel.

The reduction of the collector diameter, due to these corrections may also require a new adjustment of the brush holders and therefore a verification of the "neutral point".

BRUSHES:

Frequency: every 500 hours.

Check the brushes and their connections.

Preventive maintenance is recommended at least every six months, checking in particular:

1. The correct positioning of the pressure finger on the brush heads.
2. The sliding of the brushes in their drawers.
3. The pressure exerted on the brushes, the value of which should be around 200/250 grams / cm². Verification must be performed with
a special dynamometer.
4. Brush wear.

The speed of brush consumption depends on the electrical and mechanical stress.

The brushes must be replaced when their lengths are about 15 mm.

The new brushes will always have to be adapted to the collector surface with fine grain abrasive sandpaper or suitable pumice stone.

N.B. It is essential that the replacement brushes are both of the same brand and of the same original quality, so that serious inconveniences are avoided.

Check for wear and play in the drawer.

Depending on the application, the brushes last from 18 to 36 months.

ROLLERS:

Frequency: every 1500 hours.

Check the temperature, for the presence of vibrations and of noise.

INSULATION:

Frequency: every 500 hours (250 in very humid environments)

Check the insulation value with the Megger, especially in damp environments.

The value must never be less than 2 megaohms.

SCREWS:

Frequency: the first 200 hours

Check that there are no loose screws.

Check that electrical connections make good contact.


Insufficient contacts can give rise to localized overheating.

WINDINGS:

Frequency: every 1000 hours.

General cleaning.

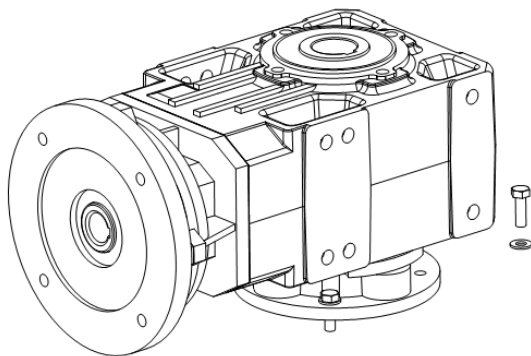
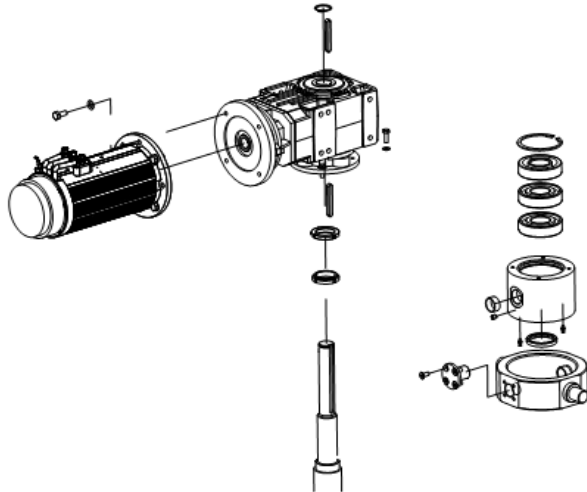
Check that the insulation to ground is greater than or equal to 2 megaohms, if not, consult the manufacturer.

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DESCRIPTION OF CONSTRUCTION COMPONENTS

TRANSMISSION/GEARBOX.

To keep the efficiency of the gear box at a maximum, carry out the programmed maintenance operations. A good maintenance results in better performance, longer life and constant safety.



See the maintenance intervals below for the various components of the reducer.

Frequency: every 1000 hours
 Components: External seals and gaskets.
 Action: Oil level check. Visual check for search of possible leaks.
 Action: Eventual maintenance or replacement of components.

Frequency: every 3000 hours
 Components: For gear boxes with reaction arm: bushings in polymeric material.
 Action: Check that they are not aged or chapped.
 Action: Replacement if their effectiveness is compromised.

Frequency: every 5000 hours
 Components: Seals and gear box gaskets.
 Action: Accurate wear check of possible aging of external seals.
 Action: In case of wear or aging replacement of seals.

LUBRICATING OIL REPLACEMENT

Depending on the temperature reached by the lubricant, replacement must be carried out at the intervals indicated here:


Oil temperature T (° C)	Hours
T < 65	25.000
65 ≤ T < 80	15.000
80 ≤ T ≤ 95	12.500

Place a container of adequate capacity under the drain plug.
 Remove the fill and drain plugs and allow the oil to flow out.
 To facilitate the this operation it is advisable to drain the oil when it is hot.

Wait a few minutes until all the oil is gone, then screw the drain plug back on after having replaced the relative gasket.

Fill in new oil up to the middle of the cap. (sight glass).
 Screw in the filler cap after having replaced the relative gasket.

If a leak has occurred:
 Before restoring the quantity of oil, the cause of the defect must be identified with certainty, before the gear box is returned to service.

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RECOMMENDED LUBRICANTS

Grease:

Kluber Asonic GHY 72
(for bearings/rollers)
Shell TVX Compound B
(for gears lubricated with grease)
Shell Tivela 00
(Alternative for gears lubricated with grease)
Klüberpaste 46 MR 401
(to facilitate the cylindrical couplings)
ITP Fuoro carbon gel 880
(to grease seals/scrapers)

Oil:

Shell Tivela Oil SC 320
Aral Degol GS 320
IP Telium Oil VSF 320 (or Agip)
Kluber Klubersynth GH 6 320
Total Carter SY 320
Mobil Glygoyle HE 320

CHECK EFFICIENCY STATUS.

Clean the gearbox and motor surfaces eliminating any dust on the housings.
Check that the noise at constant load does not present intensity variations.
Excessive vibrations or noise may indicate a gear consumption or failure of a bearing.
Check current and voltage, comparing them with the nominal values reported on the motor license plate.
Check the friction surfaces and wear of the braking gasket of any self-braking motor and, if necessary, adjust the air gap.
Check that there are no lubricant leaks from gaskets, plugs and boxes.
Inspect the bolted joints, checking that they are not worn, deformed or corroded and tighten them without ever exceeding the advised torque levels.

CLEANING.

Clean the gear box from dust and eventual machining residues.
Do not use solvents or other incompatible products with construction materials and do not direct a high pressure water jet on the gear box.

PAINT.

The cast iron casing is magnetized and sprinkled with thermosetting powders based on polyester resins and is then heated in the oven to be fixed.
No paint whatsoever is then applied to the aluminium casing.
If the gear box needs to be painted, protect the license plate and the identification and sealing rings in advance to avoid contact with the solvent.

PARTS REPLACEMENT.

Do not hesitate to replace the inspected part or component, if it is not able to offer sufficient guarantees of safety or reliability.
Never perform improvised repairs.
The use of non-original spare parts may compromise a good gear box operation.

DESCRIPTION OF CONSTRUCTION COMPONENTS

WORM SCREW

SUPPLY CONDITIONS.

The worm screw unit is supplied already with a first coat of grease.
This lubrication allows the relubrication with grease or oil.
Pay attention to mixability or compatibility with the lubricant to be used..


LUBRICATION

For the worm screws, the provisions and standards apply as those for rolling bearings.
The loss of lubricant is greater than the lubricant loss of roller bearings, because in this case there is an axial movement between screws and spiral.

LUBRICATION WITH OIL

The temperature is of great importance, with consequences for the length of the screw. This has repercussions for the functional precision of the unit's worm screw and ball bearings.
An advantage of oil lubrication compared to grease is the lower heat development.

The commercially available mineral oils that are generally suitable for rolling bearings can be used.

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In practice, oils are used with ISO viscosity VG 68 to ISO VG 460 approx.
 In general, especially for slow moving screws, oils with high viscosity (eg ISO VG 460) are to be preferred.
 With minimum quantities one can reach an oil discharge frequency at maximum every 10 hours.
 See table below for quantity and frequency.

Oil relubrication screw diam. xx mm / step 20 mm:
 - quantity: 0,800 ml / 10 h
 - millions of revolutions: 1
 - distance: 20 km



LUBRICATION WITH GREASE

Grease lubrication offers the advantage first of all that the screw only needs to be re-lubricated after a long period.
 This means that in many cases the additional relubrication can be avoided.

The amount of grease has to be determined in such a way that the empty space in the spiral is filled about halfway.
 All high quality grease that are used for rolling bearings can be used.

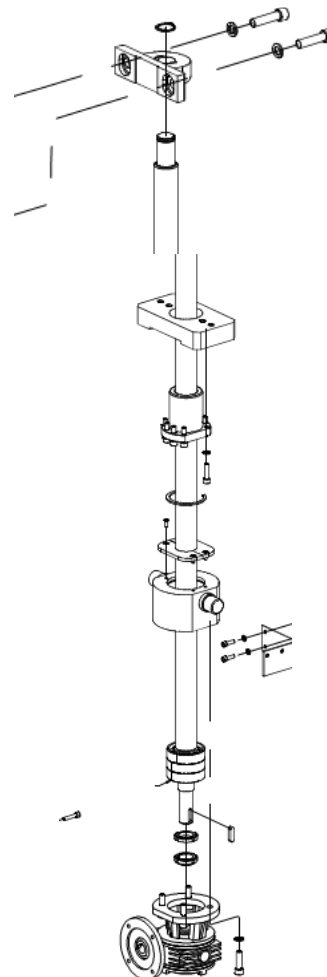
Follow the lubricant manufacturer's instructions: greases with solid additives (eg graphite or MoS₂) should not be used.


Examples of greases:
 Rexroth Dynalub 510
 Kluber Tribo Star Synth 2 EP

The relubrication interval depends on many factors such as the degree of dirtiness, the temperatures during use, loads, etc.

The following data should be considered as guidance.

Grease lubrication screw diam. xx mm/step 20 mm:
 - grease amount: 19.2 g
 - millions of revolutions: 10
 - distance: 200 km



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DISPOSAL OF THE MAST AT THE END OF THE CYCLE.

For proper disposal of the mast at the end of its life cycle, minimizing the environmental impact, proceed to a collection station for differentiated garbage collection, separating the various parts and different components:

- iron
- aluminium
- hydraulic oil
- grease
- seals and reducer gaskets
- plastic
- electric motor brushes
- electrical windings

Dispose of the various parts thus separated according to laws in force in the individual States regarding the disposal of waste.