LIFT-TEK ELECAR MASTS
Lift Technologies

MAINTENANCE

& OPERATING

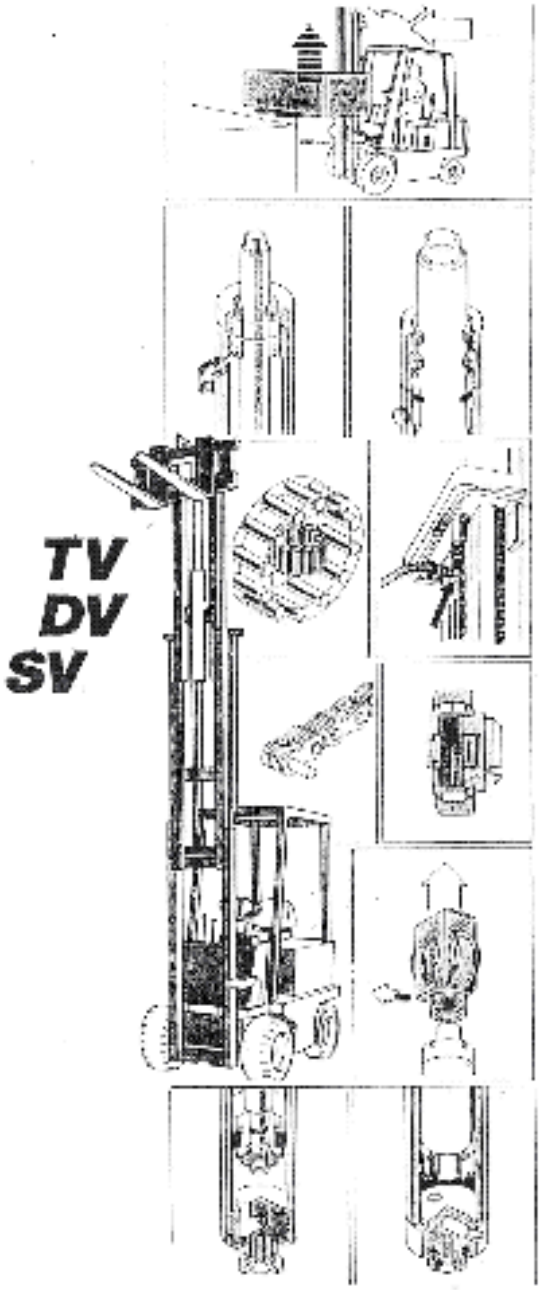
INSTRUCTIONS

FOR LIFT - TEK ELECAR

MASTS

SERIES "F"

12/2009 - REV. 01


TV
DV
SV

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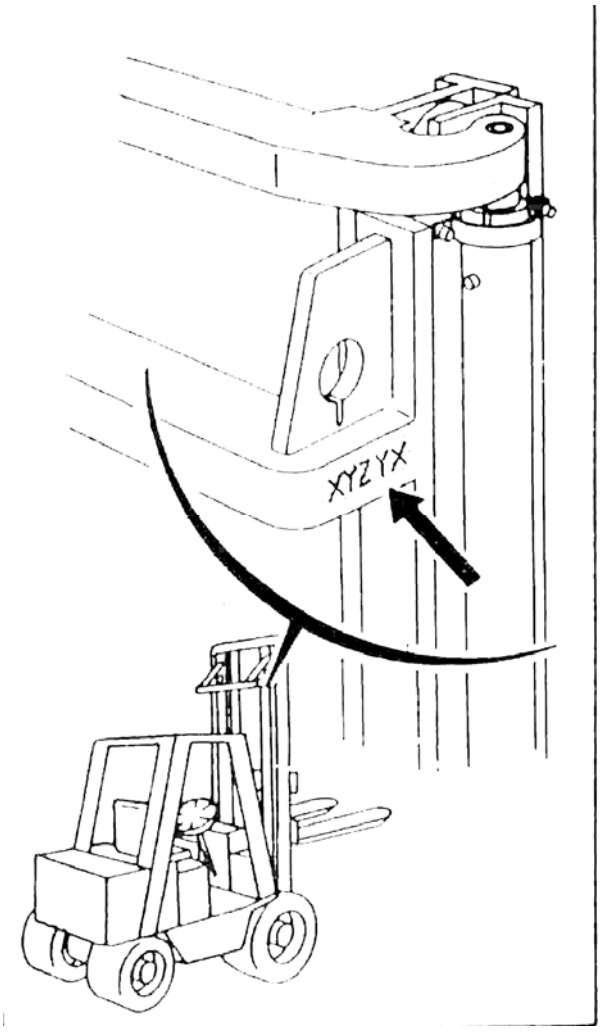
IDENTIFICATION OF THE MAST

The Lift-Tek Elecar mast is stamped with a registration number, for which there are corresponding control and test certificates.

With any request for relative information for a Lift-Tek Elecar product, always use this number.

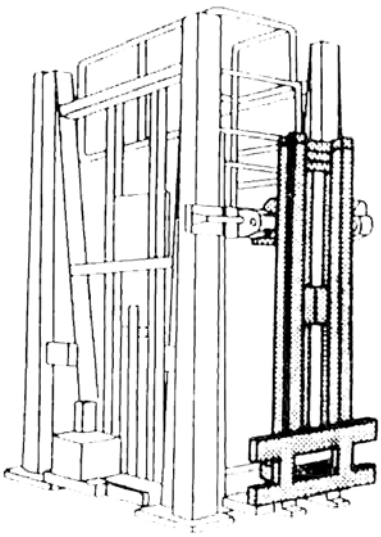


GUARANTEE

The terms and method for the application of the guarantee are illustrated in detail in the booklet “General Conditions of Guarantee” which is supplied separately.

CONDITIONS OF SUPPLY

Each mast that the Lift-Tek Elecar company supplies has been controlled in all components and tested on a test rig.



The results of such final tests are recorded on a test certificate, deposited in our records office.

All successive tests carried out on the mast by Lift-Tek Elecar, or otherwise which have prior authorization from Lift-Tek Elecar, will be registered on this test certificate.

THEREFORE THE SUPPLIED PRODUCT CAN BE MOUNTED WITHOUT ULTERIOR TESTS, ON CONDITIONS, OF COURSE, THAN IT IS NOT SUBMITTED TO ANY TAMPERING.

For the design of the mounting brackets, the Lift-Tek Elecar company offers its customers the possibility to make use of its technical office.
TO THIS PURPOSE, THE CUSTOMER IS RESPONSIBLE TO PROVIDE ALL NECESSARY CONSTRUCTION DETAILS ASSOCIATED WITH THE ORDER AND EVENTUAL PROBLEMS THAT COULD CAUSE DIFFICULTY WITH THE MAST.

HOWEVER, THE CONTROLS OF THE USED PRODUCTS AND THE FINAL TESTS WILL NOT GUARANTEE THE USE OF THE MAST, IF IT IS NOT USED IN THE MOST SCRUPULOUS OBSERVANCE OF THE RULES OF USE AND SAFETY, WHICH ARE STATED IN THIS MANUAL.

ASSEMBLY INSTRUCTIONS ON THE LIFT TRUCK

To mount the mast on the truck proceed as it follows:

Tie the mast with a band on the top crosspieces and raise it in vertical position with a crane.
Bring the mast near the truck with care.
Lean the mounting brackets present on the mast on the brackets on the truck.
Lean the mast to the truck, paying attention not to damage pipes.
Lock the fastening screws mounting brackets - truck brackets, in accordance to the torque indicated on the truck manual.
Bring the tilt cylinders of the truck near the tilt supports present on the mast.
Connect the tilt cylinders to the tilt supports, with hinges and seegers.

IT IS VERY IMPORTANT TO MAKE A CORRECT ADJUSTMENT OF THE TWO TILT CYLINDERS, THAT MUST ARRIVE TOGETHER TO THE END STROKE.

Connect the main feed pipe and eventual auxiliary hoses of the truck to the mast.

USE OF THE FORKLIFT

USE OF THE FORKLIFT IN THE TRANSPORTING MODE.

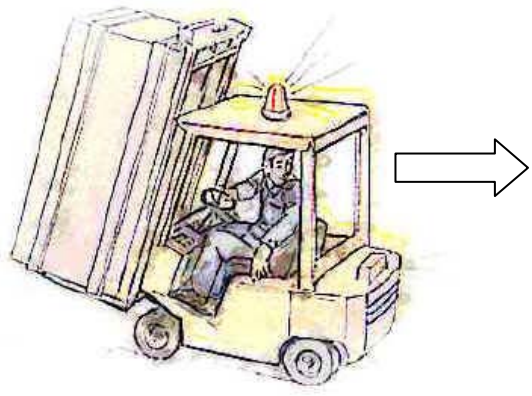
Incline the mast backward and lift the forks about 300mm from the ground.

The forks must be equally spaced about the centre of the fork carriage.

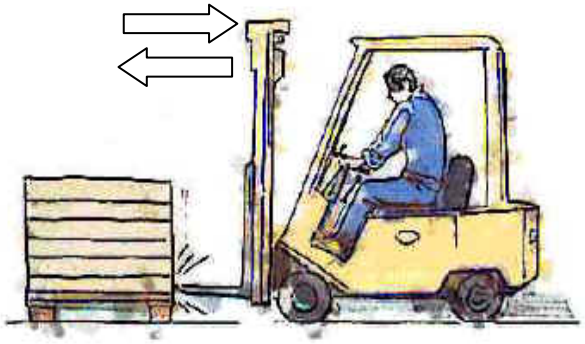
The load must be placed evenly on the forks so that its centre of gravity is central to the mast.

While the truck is moving the sideshift, if fitted, must be in the central position.

If the load obstructs visibility, it will be necessary to proceed in reverse.

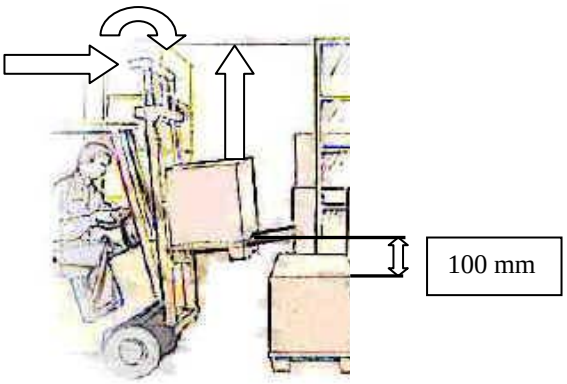


It is prohibited to use the forklift mast to push or haul any weight.



USE OF THE FORKLIFT.

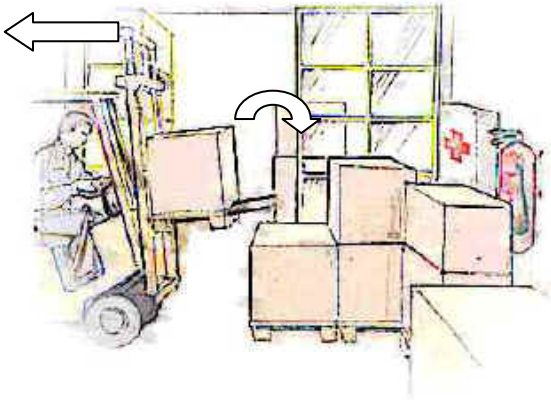
USE OF THE FORKLIFT IN THE STACKING MODE.



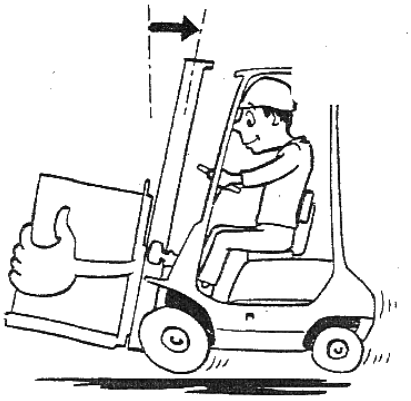
Approach the location of the stack. Put the mast in the vertical position and gradually lift the forks to a height that exceeds the stack level by about 100 mm.

Gradually approach the stack location at a moderate speed, avoiding both sudden starts and stops that could cause excessive dynamic loads.

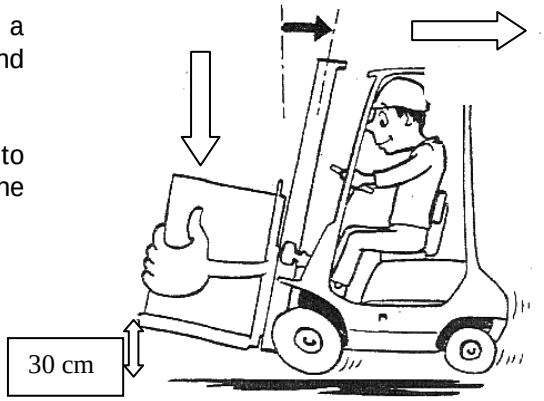
Then move slowly forward bringing the load into position. Slowly lower the mast to deposit the load and finally free the forks.



To remove a stacked pallet, approach the stack, stop the truck with the mast in the vertical position. Lift the forks to the height of the pallet you wish to remove. Insert the forks, apply the brakes, lift the load clear of the stack and carefully apply sufficient backward tilt to stabilise the load.



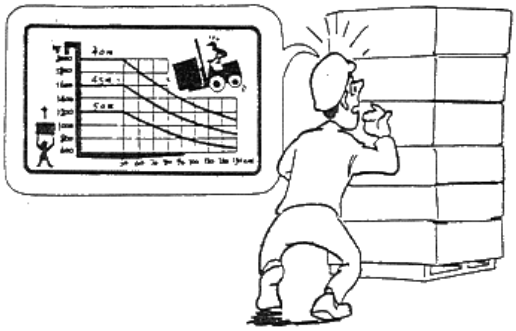
Release the brakes, slowly move backwards, until the pallet is freed from any obstacles. Slowly lower the load to 300 mm from the ground, tilt completely backwards and proceed with moving the load.



USE OF THE FORKLIFT.

USE OF THE FORKLIFT IN THE STACKING MODE.

Scrupulously adhere to the values of maximum load permitted on the truck capacity plate.



Never lift or lower the load while the forklift is moving.

SAFETY RULES

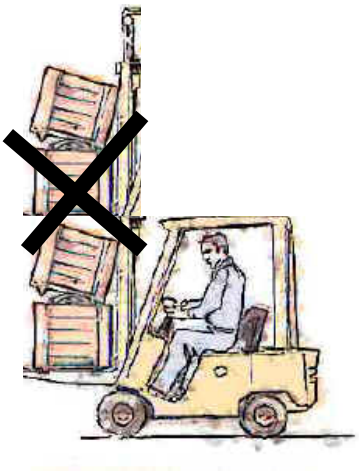
THE FOLLOWING SAFETY RULES MUST BE SCRUPULOUSLY OBSERVED TO PREVENT ACCIDENTS INVOLVING PEOPLE AND DAMAGE TO THE MACHINE:

1) No one must be under the forks during lifting and lowering operation.

2) The transport of people is prohibited.

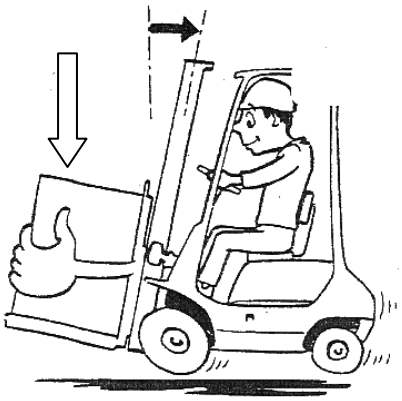
3) Maximum attention must be given to the transport of dangerous materials.

4) The forklift must never be overloaded.

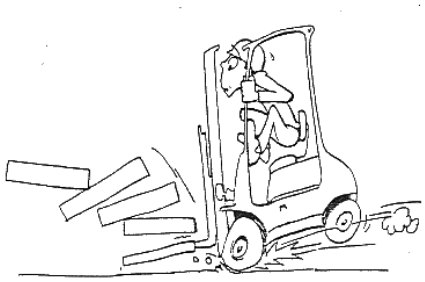


5) Before any movement, always check the stability of the load.

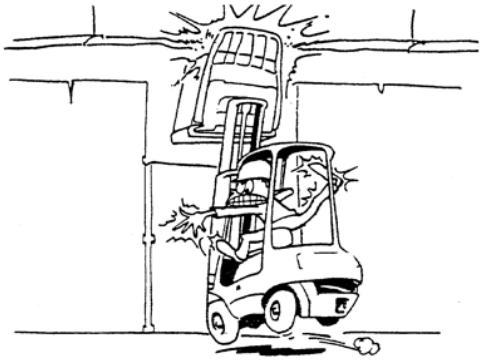
6) During transport, keep the load at the lowest possible height, and correctly positioned.

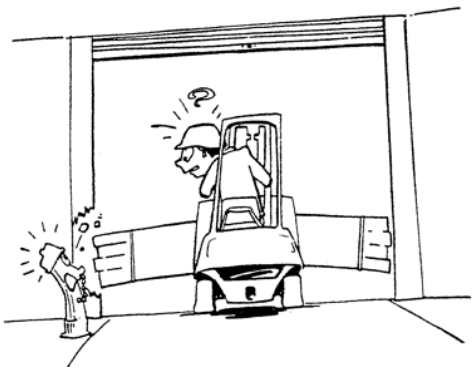


7) Avoid sudden stops, starts and turns.



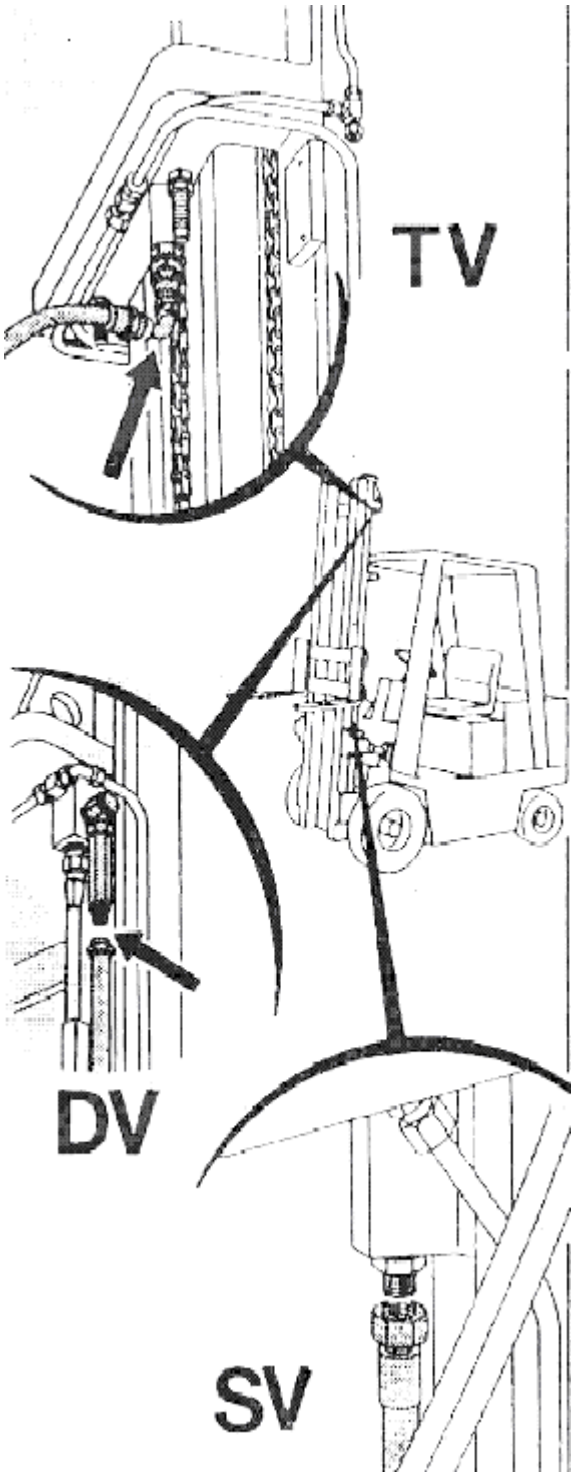
8) Pay attention to the passages under and between gates.



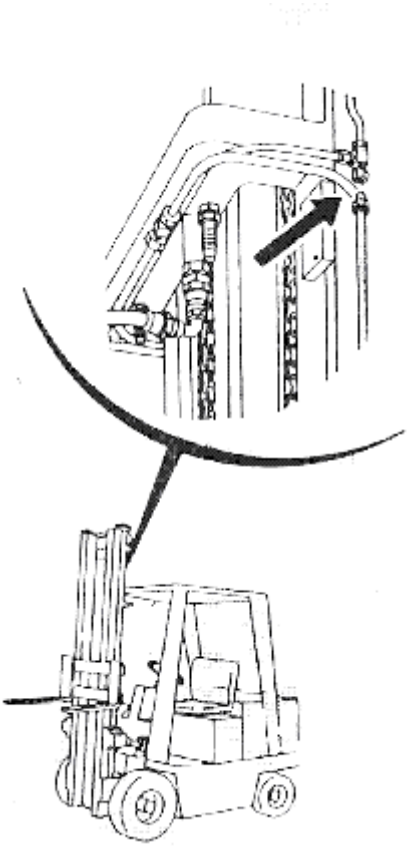


OPERATIONS TO CARRY OUT AFTER MOUNTING THE MAST ON THE TRUCK.

Connect the oil feeding tube to the corresponding connection.



Connect the drainage tube for SV and TV if it is present (the DV type has not it).

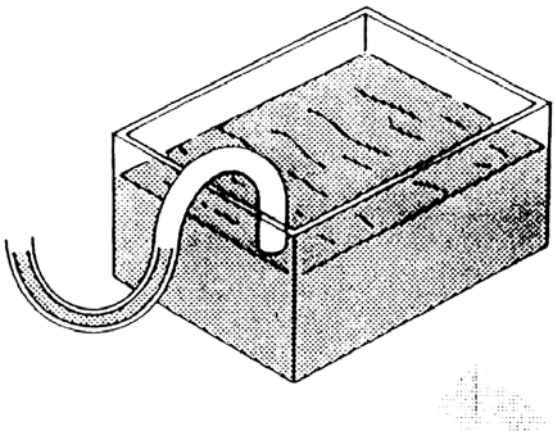


Test the tilt movement to ensure that there are no foul conditions between the truck and mast.

OPERATIONS TO CARRY OUT AFTER MOUNTING THE MAST ON THE TRUCK.

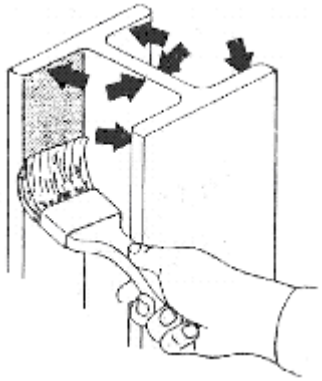
ATTENTION:

A) The drainage tube must not be immersed in the reservoir below the oil level. IT MUST ALWAYS BE ABOVE THE SURFACE.



B) The drainage tube should also form a bend before entering the reservoir in which there should be a small quantity of oil to act as a syphon. This helps to keep the internal surface of the cylinder case wet when it is closed.

The roller surfaces must be greased, both where the fork carriage and the mast run.

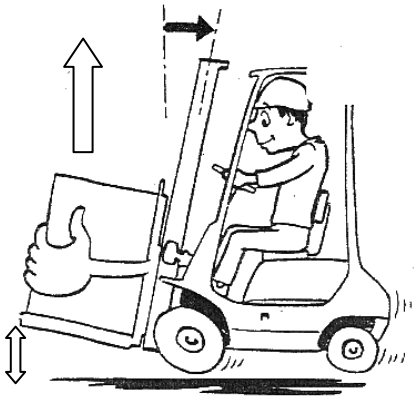


For this purpose use graphite grease, avoiding, if possible, spray greases.

Circulate the oil through the mast system three or four times.

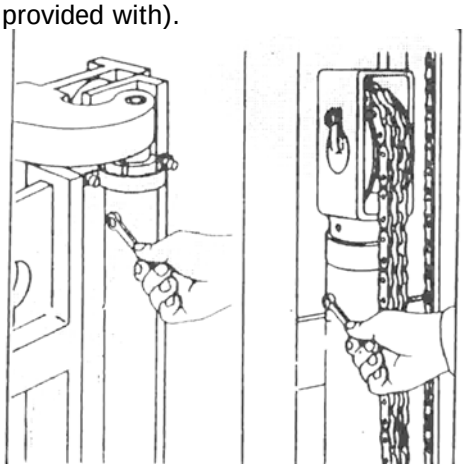
Purge the air from the displacement cylinders. For TV only the central cylinder; for DV the central and lateral cylinders.

Lift the fork carriage about 500 mm.



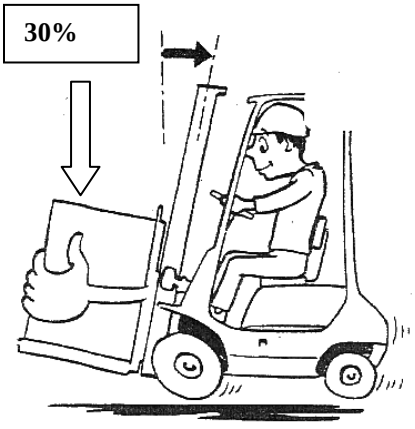
500 mm

Loosen the screw situated below the top cap. At the first sign of oil tighten it (for the mast that are provided with).



Put a load on the forks (30% of the nominal load), check that the descent is regular (during transport the cylinder may have been damaged).

30%



ORDINARY MAINTENANCE

Ordinary maintenance will include the following operations:

ROLLER TRACK LUBRICATION
To be carried out every 200 working hours.

CHAIN LUBRICATION
To be carried out every 200 working hours.

SIDE-SHIFT LUBRICATION (IF FITTED)
To be carried out every 200 working hours.

CHAIN ADJUSTMENT
To be carried out every 200 working hours.

ADDITIONAL MAINTENANCE

REPLACEMENT OF CYLINDER SEALS

REPLACEMENT OF CHAINS

REPLACEMENT OF ROLLERS

ROLLERS

The employed bearings on Lift-Tek Elecar masts are of two types:
1. With adjustable pad, in order to recover the lateral clearances between profile and roller (fig. A, B).
2. Inclined type, in order to support either frontal loads or side loads (fig. C, D).

The dimensioning of the rollers is made with an abundant margin, such as to allow eventual and accidental overloads that can occur during the life of the mast.

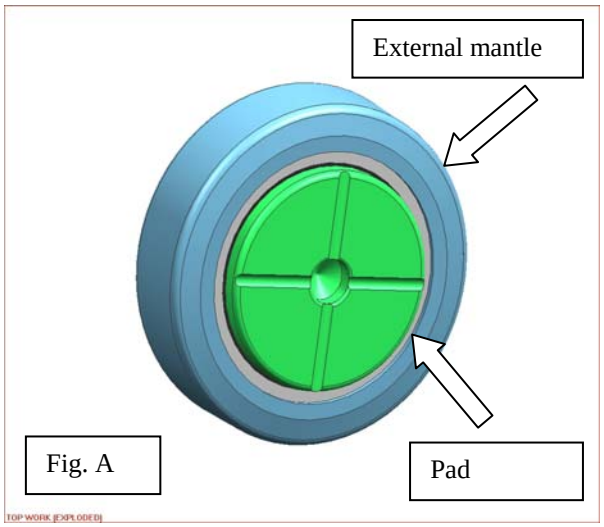


Fig. A

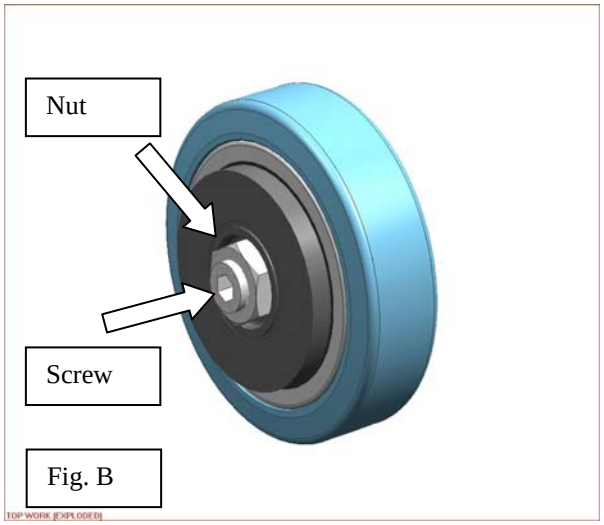


Fig. B

NOTE:
Either the rollers with adjustable pad or those inclined ones are not subject to greasing.
It is only foreseen the greasing of the sliding track on the profiles.
The duration of life of the roller essentially depends on the work conditions of the mast.

DESCRIPTION OF CONSTRUCTIVE COMPONENTS

REPLACEMENT OF ROLLERS WITH PAD

After unscrewing the nut and the screws on the rear of roller (fig. B), which block it in axial sense, preventing of the spillage, remove the external mantle with the pad (fig. A).
Mount a new mantle and a new pad and tighten again the nut and the screw.

REPLACEMENT OF INCLINED ROLLERS

At the moment of the assembly of new rollers, pay attention to their correct positioning (fig. C, D) foreseeing opportune shims under the mantle.

Correct assembly: the roller works on the angle of the profile.

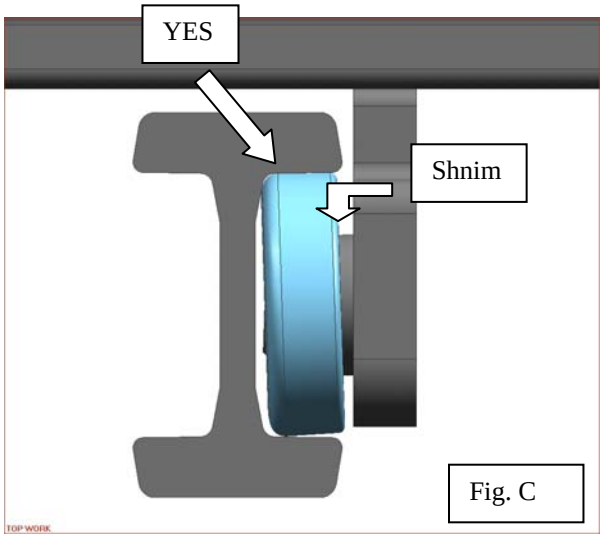


Fig. C

Wrong assembly: the roller does not work correctly.

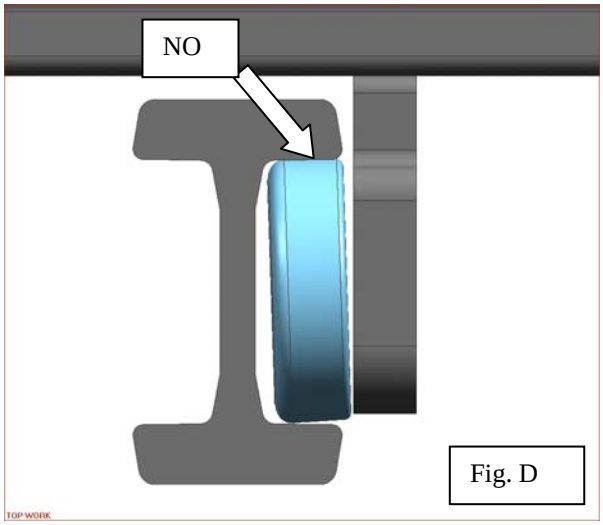
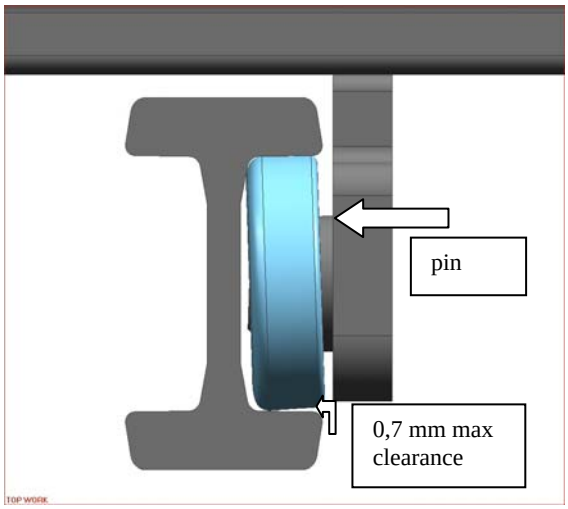


Fig. D

CLEARANCE BETWEEN ROLLERS AND PROFILE.

All Lift-Tek Elecar masts are provided with both front and side clearances between rollers and profile, to a maximum of 0.7 mm (normal value 0.5 mm).



If the mast is subject to a normal use, the increase of such a clearance will be minimum as time passes, and with 6,000/8,000 working hours the clearance should reach a maximum value of 2 mm.

Of course, the clearance increase will be higher under unfavorable work conditions or particularly hard jobs, such as:

- Multiple work shifts:
- Use of side-shifters or other similar attachments;
- A dusty work environment with corrosive fumes;
- Loads receiving strong jolts, even if they correspond to equivalent loads below the nominal capacity;
- Bulky or off centre loads;
- Uneven paving and high manoeuvering speeds;
- Frontal collisions.

When the clearance has reached the above value, it is advisable (although not essential, as the final decision rests with the user), to replace the roller assembly.

In fact, if the work type to which the system is subordinated does not preview hits, the usury will progress with the same rapidity with which it has been created.

Instead if the work type involves hits or other anomalous operations, the usury will increase with a much more high rhythm, until being able to provoke the breach for shock of the rollers too.
When, after the first replacement of the rollers, a clearance of 2 mm is again reached, it is necessary to replace the mast.

Of course, the most used section will always be the one which the fork carriage works on; only very rarely the usury will interest also the others sections.

When, due to abnormal use of the forklift (in particular after violent shocks), the welded pivot also becomes damaged (usually becoming oval) it will become necessary to remove the complete roller and replace it.

The new roller must be re-welded.
In the case of inclined rollers, foreseen opportune shims, so as to keep at minimum value the side clearance.

USE BASIC ELECTRODES.

PRINCIPLE CAUSES OF BEARING BREAKAGE

SHOCKS.

Violent frontal collisions during loading may also cause bearings breakage.

The external surface will show cracks that cut the surface in parallel lines with the rolling axis.

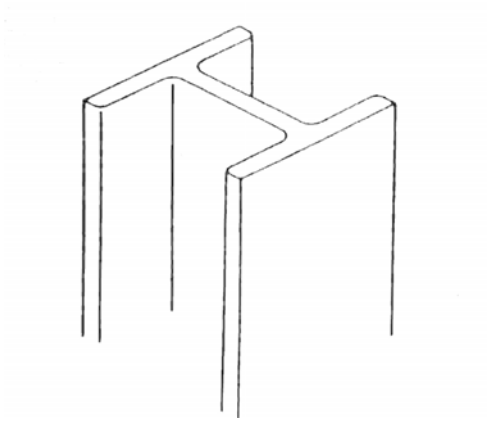
DIMENSIONS OF LOAD

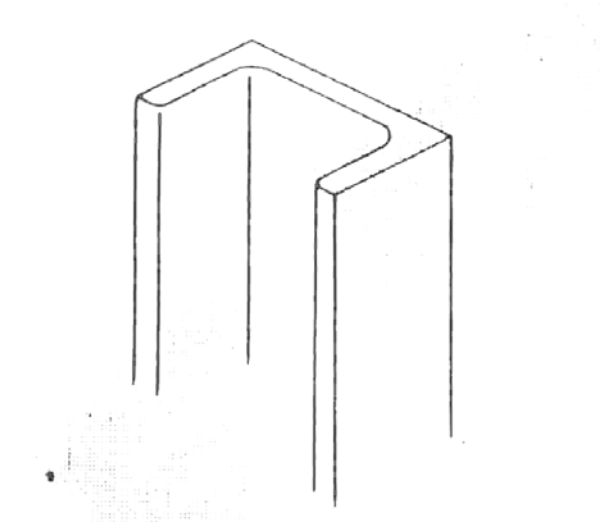
Another possible cause of breakage, more difficult to prevent than the others, is the mounting of special equipment to move very long loads (e.g. carpets and moquettes), even if their weight is less than the nominal load.

This condition creates oscillations that cause the detachment of the external hardened surface: in this case circumferential cracks will appear and will run completely around the roller.

DESCRIPTION OF CONSTRUCTIVE COMPONENTS

MACHINING OF PROFILES





The profile is obtained with hot rolling, with tightest tolerances.

The profile for masts with equal or upper capacity to 16.000 kg is instead obtained by welding.

Before using the profiles, they are tested, their rectangularity is checked and they are sanded to remove the superficial scale, a residual from the rolling procedure.

TOLERANCES

The strict tolerance of the internal dimensions between the running tracks, permits an accurate clearance between the profile and roller.

During assembly, the clearance value is usually lower than 0.5 mm.

The maximum acceptable limit is 0.7 mm.

RUN-IN PERIOD

If the rollers work correctly, in the first phase of their employment they will produce a superficially hard surface on their tracks on the profiles.

An indication of the proper initial use is the shine the tracks assume after a few hours of work.

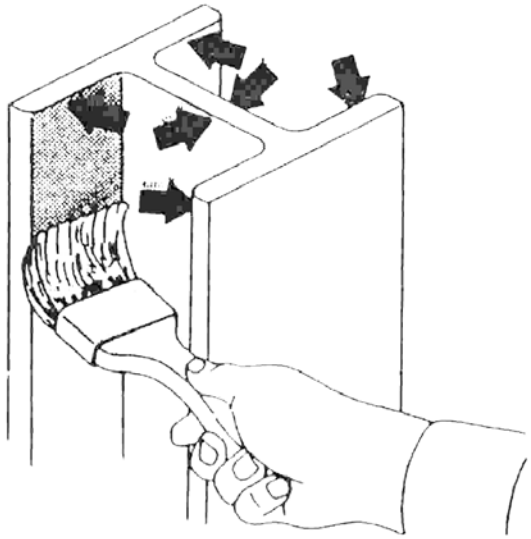
DESCRIPTION OF CONSTRUCTIVE COMPONENTS

GREASING OF THE TRACKS

At the moment to putting in service the mast, the sliding tracks must be greased in order to favour a correct run-in period.
Also later, the tracks will need periodic lubrication.

The frequency of this operation is at the discretion of the user and essentially depends upon the work conditions and the workplace.

A lubrication interval of about 200 hours can be taken as a typical value, under normal work conditions.

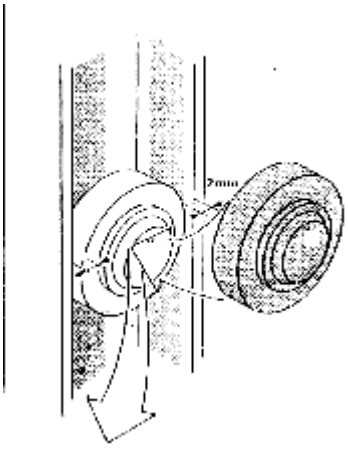


DESCRIPTION OF CONSTRUCTIVE COMPONENTS

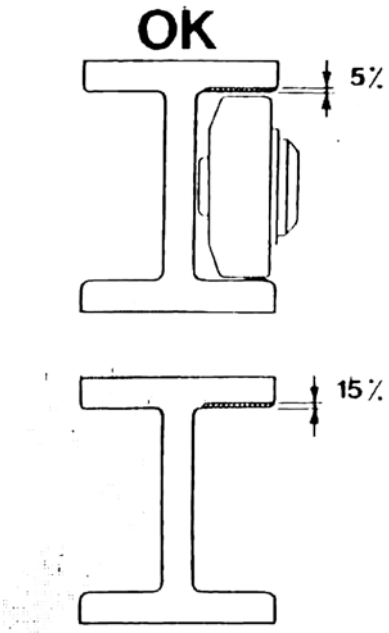
WEAR AND TEAR OF THE TRACKS

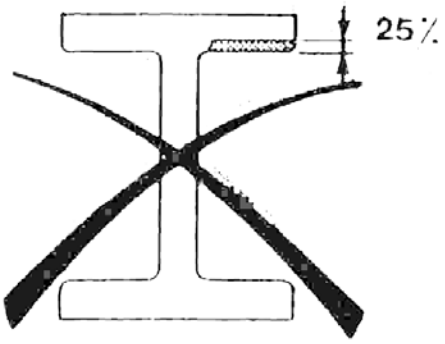
As time passes, there is a certain wearing of the tracks, with a consequential increase of the clearance between roller and profile.

When the clearance reaches a value of 2 mm, it is advisable to replace the standard roller with the oversize version.



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





ATTENTION:
All the used profiles on Lift-Tek Elecar masts work with a safety factor, regarding the enervation, always greater of 2, 3 times.

Here a list of minimal values for advice thickness for the wings of the profiles:

E15 SV/DV/TV	minimal thickness	15 mm
E20 SV/DV/TV	minimal thickness	15 mm
E30 SV/DV/TV	minimal thickness	16 mm
E45 SV/DV/TV	minimal thickness	18 mm
E50 SV/DV/TV	minimal thickness	22 mm

With those values, than only very rarely they are caught up during the normal life of a mast, the safety factor is reduced of approximately 12%.

The wear values are neither equal on all masts nor uniform on several points of a mast.

In fact the profiles on which the carriage works will be more and more worn in comparison with the others, in particular way on the lower section in comparison with the intermediate and the upper ones.

WARNING

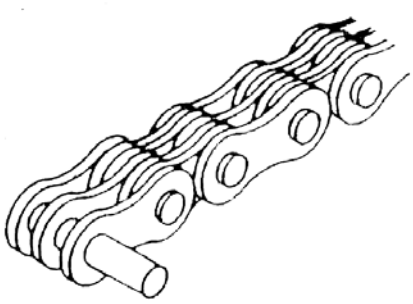
ANY MODIFICATION TO THE MAST MAY ONLY BE CARRIED OUT AFTER AUTHORIZATION FROM LIFT-TEK ELECAR.

AVOID ALWAYS MAKING DRILLING AND COUNTERSINK OPERATIONS ON THE PROFILE.

IN CASE OF WELDING, USE ALWAYS BASIC ELECTRODES.

DESCRIPTION OF CONSTRUCTIVE COMPONENTS

CHAINS

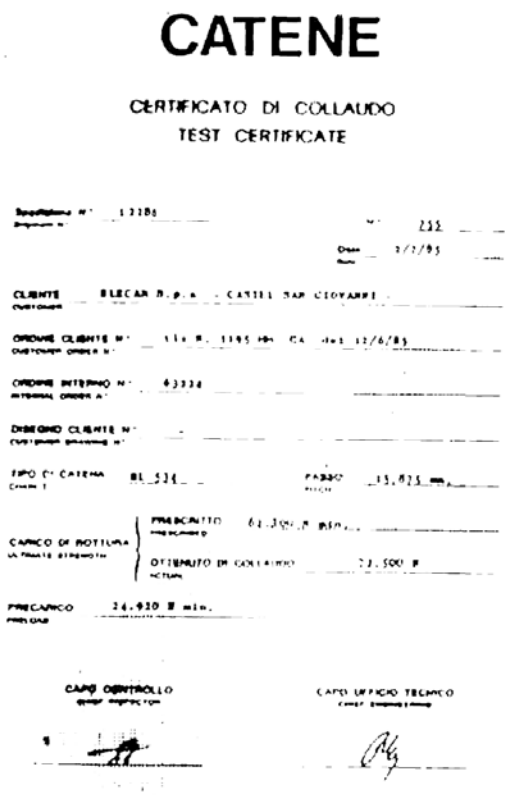


The used chains on Lift-Tek Elecar masts are FLEYER type and have the characteristics of a high quality product.

They are used by Lift-Tek Elecar to withstand loads remarkably lower than their breaking point.

They usually work with a load that is 20-25% of their nominal load, which is always lower than the testing breaking point.

Testing certificates from the manufacturer are available on request.



CATENE

CERTIFICATO DI COLLAUDO
TEST CERTIFICATE

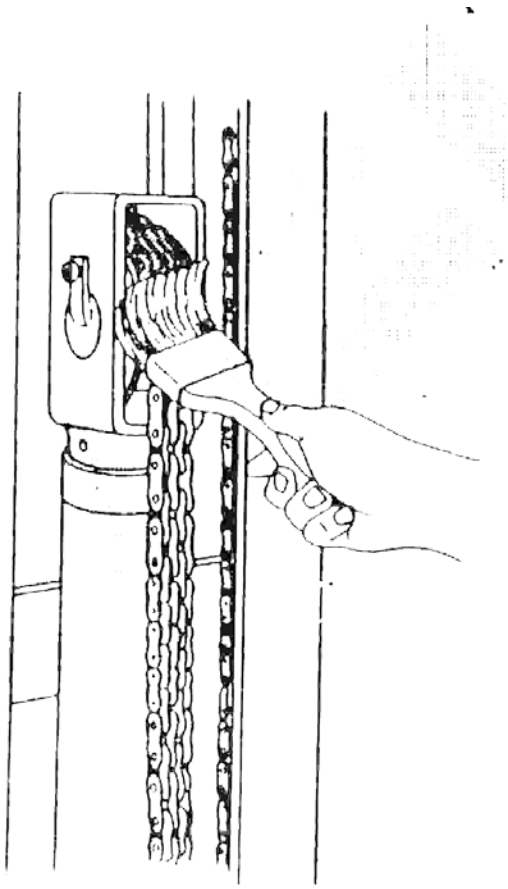
LUBRICATION OF THE CHAINS

Lubrication is essential for a long life of the chains.

A periodic lubrication is necessary, to be done with a brush or spray bottles.
Use SAE 20 oil in the winter and SAE 40 oil in the summer.

Also the frequency of this operation depends very much on work conditions.

For instance, long shifts with frequent tears and/or uneven ground surfaces that cause strong dynamic movements of the load will obviously require more frequent lubrications of the chain.

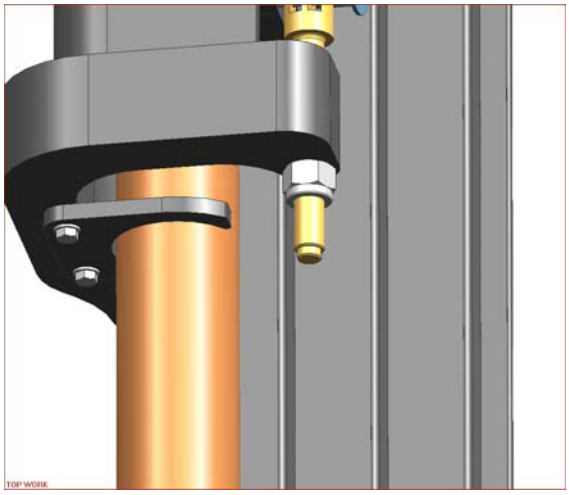


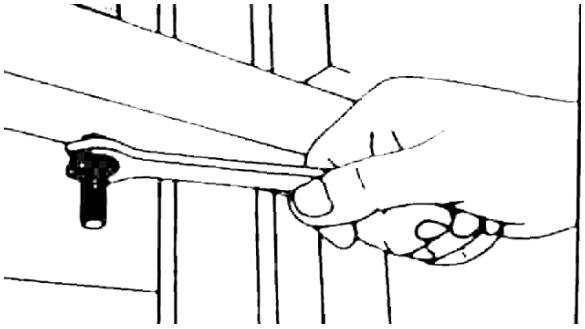
DESCRIPTION OF CONSTRUCTIVE COMPONENTS

WEAR OF CHAINS

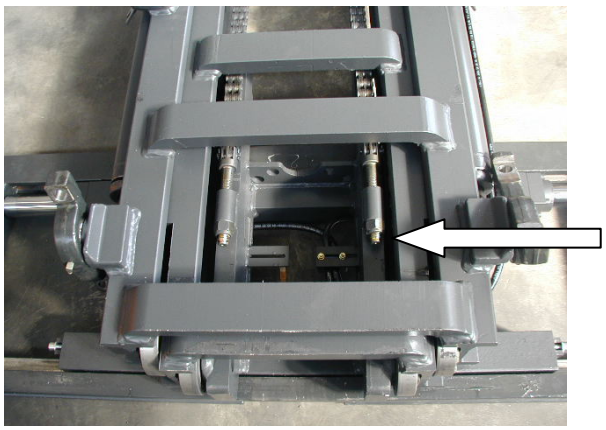
With use, the chains might become stretched.
Such lengthening can be recuperated by adjusting the chain anchors.
They are positioned on the carriage and on DV, TV and QV masts on the stages too.
If however the full length of the chain anchor has been completely used, it will be necessary to remove a link.

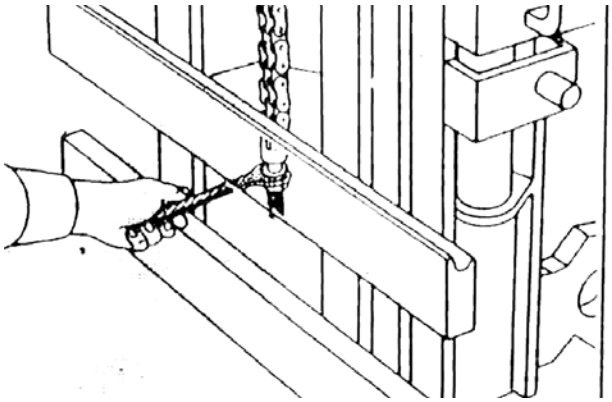
Chain anchor on stages:





Chain anchor on carriage:





The maximum possible adjustment of the lengthening chain is 3%. When this value has been passed it will be necessary to replace the chain.

The lengthening value of 3% is met when the measurement of 32 links corresponds to the nominal value of 33 links.

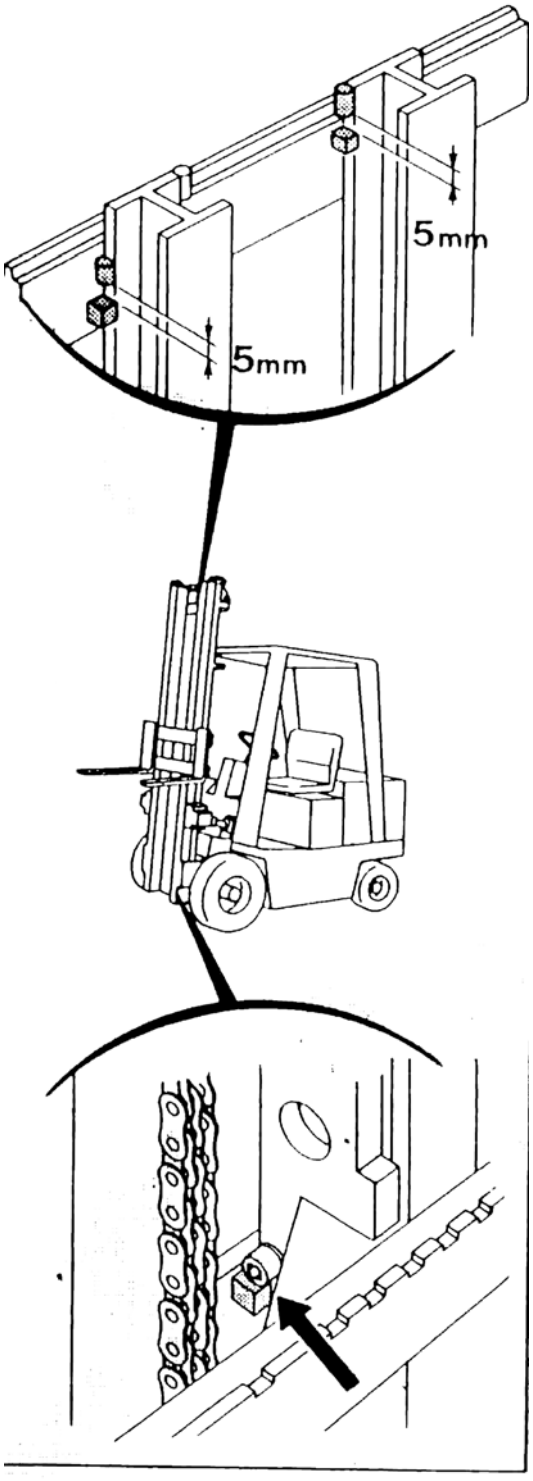
WEAR OF CHAIN ANCHOR

Also the chain anchor, which is made in strongly durable steel, is submitted to wear and tear as times passes.
It is therefore necessary to check periodically the eventual ovalisation of its hole or its wear.

REGULATION OF THE CHAINS ON CARRIAGES ON MASTS.

The chain must be regulated in such a way that the upper and lower stoppers never resulted engaged.

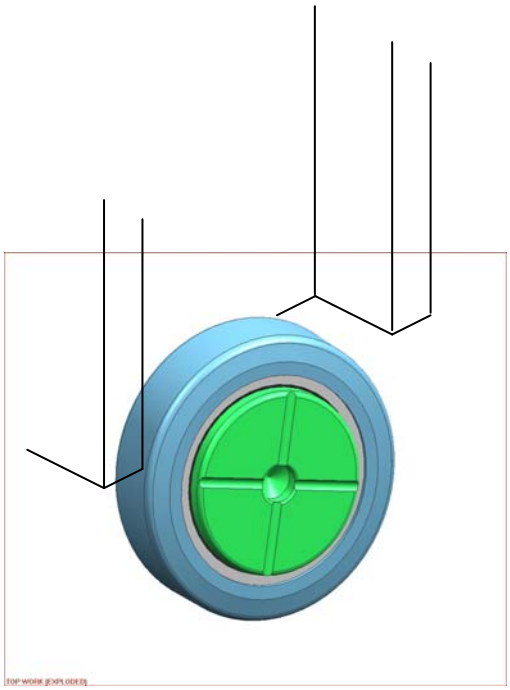
The type of mast construction, when the chain is correctly regulated, foreseen a residual clearance of about 5 mm either on upper stoppers or lower stoppers.



Therefore remove the forks and adjust the chains in such a way that between the lower stopper of the carriage and that one on the inner stage a clearance of 5 mm is present.

Send to end of stroke the central cylinder and verify also between the upper stoppers a minimal clearance of 1 mm is present (with the load, the value of the clearance will tend to increase, carrying itself to 5 mm).

Keep in mind that, if this intervention is not completed periodically and it is allowed instead the stoppers come engaged (common case in the presence of attachment without forks), these will finish with becoming deformed and the lower roller of the carriage can go out from the mast.



On the other hand, if too much clearance is allowed between the lower stoppers, the upper ones could bind too much causing large loads on themselves, the chain and in the cylinder

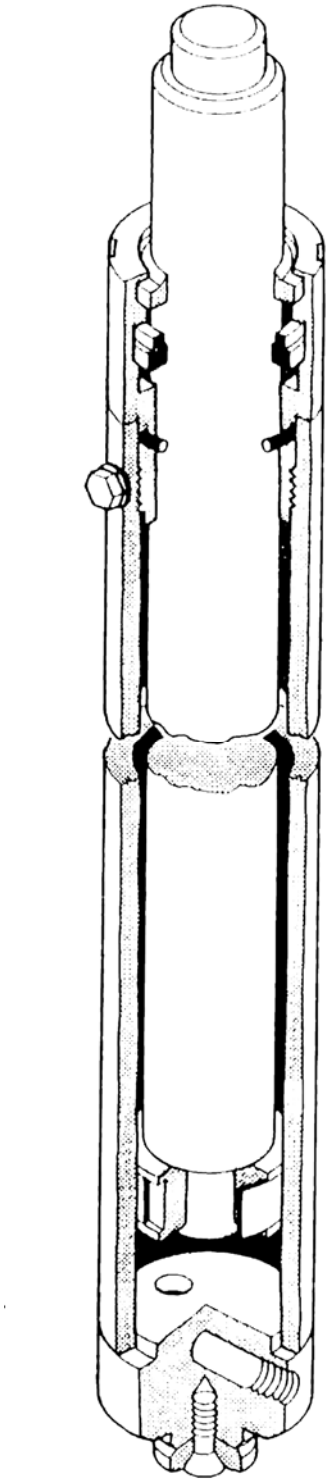
Check the chains that work in parallel way have always the same tension: in contrary case, act on the appropriate chain anchor by blocking nut.

DESCRIPTION OF CONSTRUCTIVE COMPONENTS

CYLINDERS.

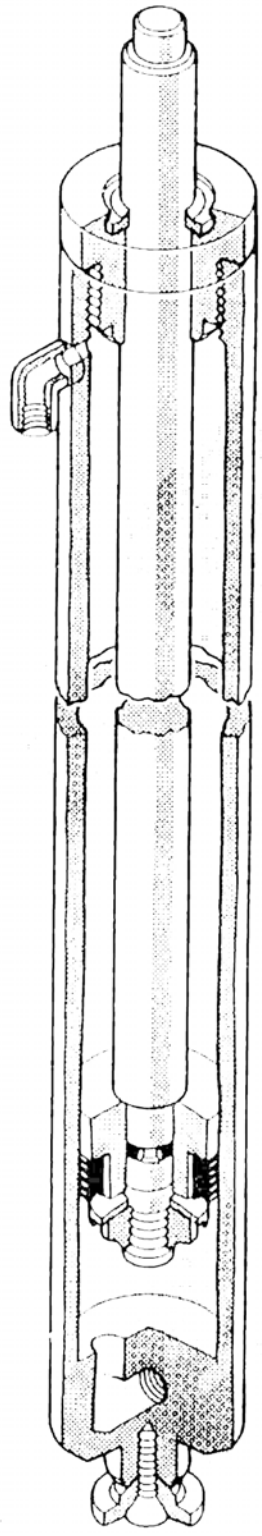
The cylinders which are used on the visibility series, are of two types:

DISPLACEMENT
With the seal in the cylinder plug



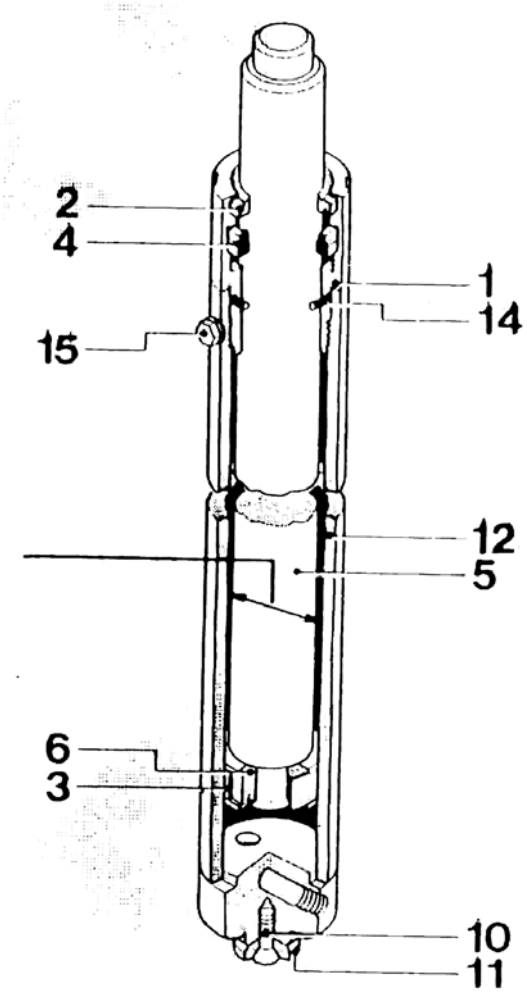
PISTON

With the seal on the piston.



DESCRIPTION OF CONSTRUCTIVE COMPONENTS

DISPLACEMENT (With the seal in the cylinder plug)

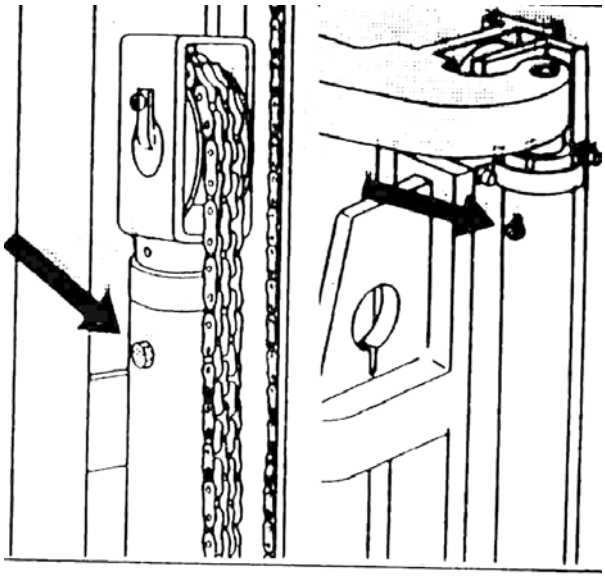


In these cylinders the seal is obtained by means of a seal (4) housed in the cap (1), in which the dust scraper (2) is also located.
Also here are the O-ring (14) and the guide made of antifriction material (when it is not, the cap itself provides this friction).

On the piston (6) there is also the seat of the other guide (3).

The dust scraper (2) stops dirt infiltrating under the seal (4).

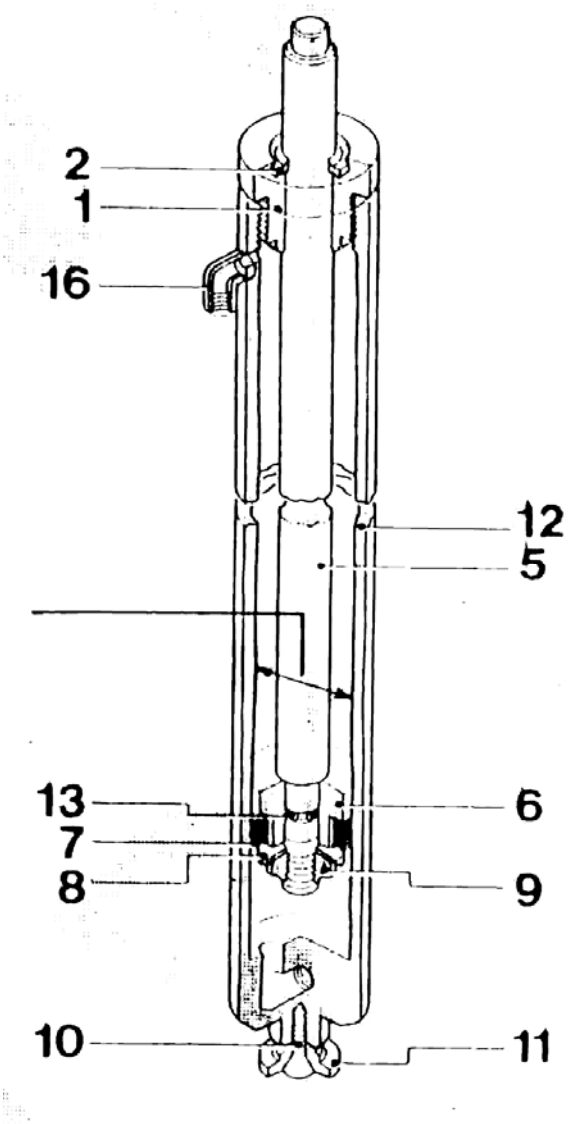
This type of cylinder needs a purge screw (15) to allow the exit of the air that accumulates in the system.



Cap.

DESCRIPTION OF CONSTRUCTIVE COMPONENTS

PISTON (With the seal on the piston)



In these cylinders the seal is obtained by means of a seal (7), inserted on the piston (6), that works on the internal surface of the body (12).

The internal surface of the body is carefully polished, in fact its roughness values are between 0.18 and 0.25 microns. This guarantees the long life of the seal.

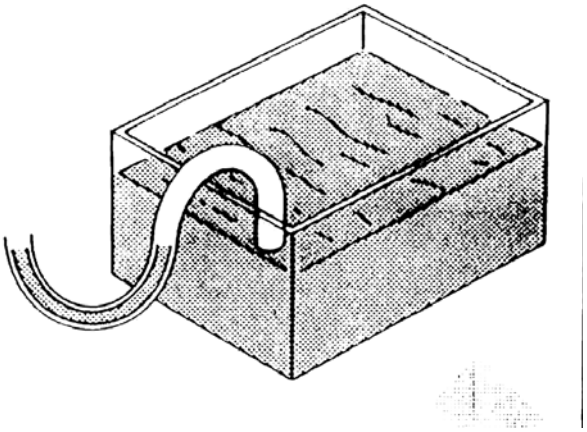
The rod guide is obtained by the cap (1) and the piston (6), by means of antifriction rings.

Sometimes, instead, the piece (1) is made totally from cast iron and the ring is not necessary.

The O-ring (13) maintains the static seal between the piston and the rod.

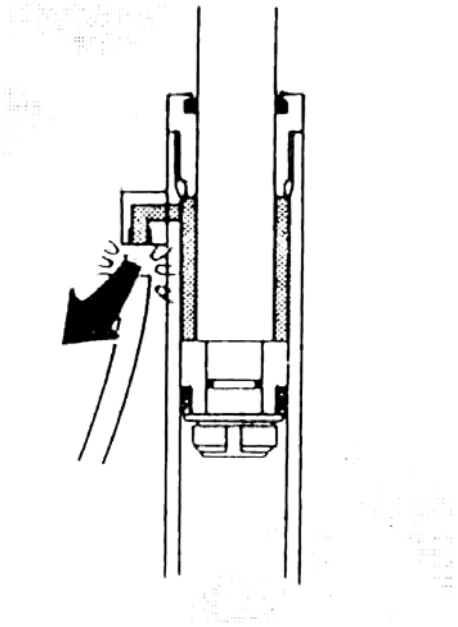
The dust scraper (2) stops the dirt and water from seeping into the cylinder.

The little seepage that might occur is directed to the reservoir (tank) by means of the drainage tube joined to the body (16).



The drainage tube must reach the tank, yet always remain just above the oil level.

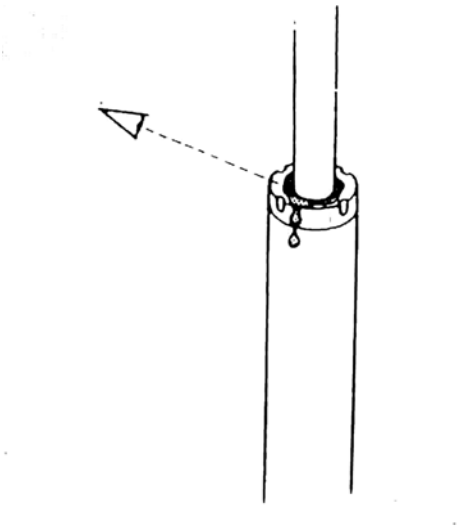
Otherwise the cylinders could, during the descent phase, syphon a large quantity of oil, that in the ascending phase, must be expelled through the drainage connection. This would create a strong counter pressure that would damage the dust scraper and would disconnect the drainage tube.



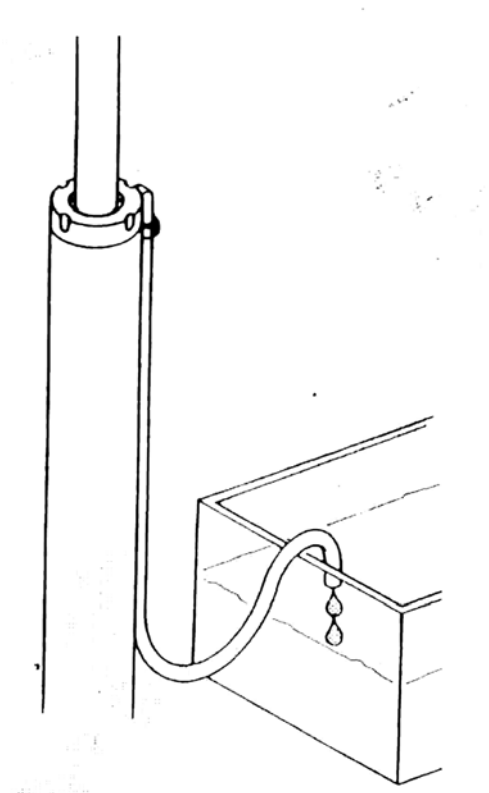
As already mentioned in the initial use instructions, there must always be a small amount of oil in the bend of the drainage tube just before it enters the tank.

LEAKS IN THE CYLINDERS

Leaks in the displacement cylinders occur toward the outside. Therefore it will be very easy to recognise a damaged seal and to know when a replacement is necessary.



With the piston cylinders, the leaks are conducted to the reservoir by the drainage tube, and are not so easy to detect.



Instead it will be noticeable by a slow descent of the load. The presence of oil in the drainage tube of the holding cylinders does not necessarily mean that leaks are present.

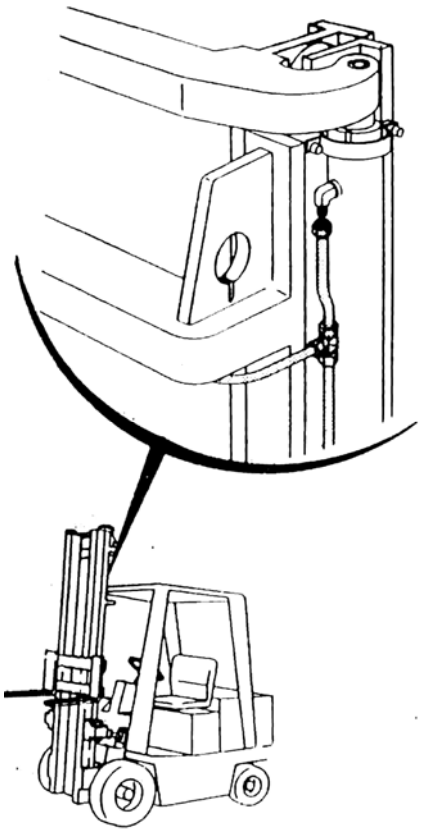
The drainage tube may in fact accumulate a certain amount of oil from the thank that could be expelled during lifting giving the impression of a leak.

In order to check the eventual real leaks, make the described items in the following check procedures for piston cylinders.

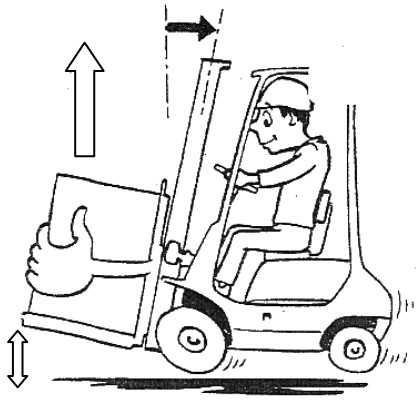
TEST PROCEDURES FOR THE LATERAL CYLINDERS

STATIC TEST

Remove the drainage tube.



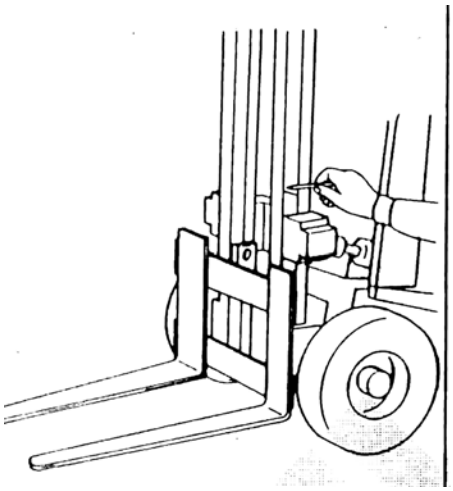
Repeatedly operate the cylinder to the end of stroke, so that all the oil may be expelled.



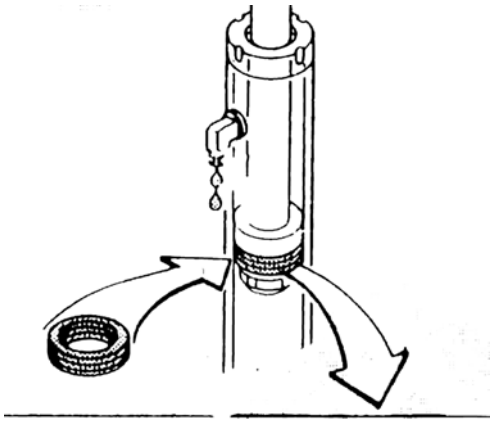
200 mm

Put a load on the forks and lift it, so that the cylinder completes a stroke of at least 200 mm.

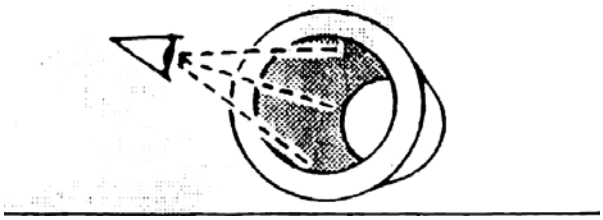
Mark the position reached by the mobile mast compared with the fixed mast.



After about 20 minutes, check how far the load has descended. A few millimeters is normal as there is always some leakage in the truck control valve.
Now operate the cylinder to the end of stroke. If there is no oil expelled at the drainage connection, this means the seals are in good condition and that the load has lowered due to the control valve leakage.



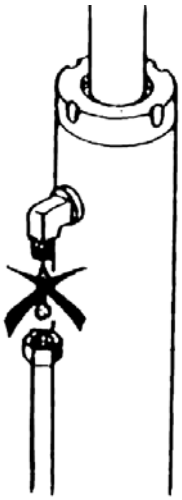
If oil is expelled, replace the seal. In this case inspect the bore of the cylinder.



TEST PROCEDURE FOR THE LATERAL CYLINDER

DYNAMIC TEST

To be carried out after a good result of the static test and also after the replacement of the seals.



Always remove the drainage tube, if it is present.

Repeatedly operate the cylinder to the end of stroke, so that all the oil is expelled.

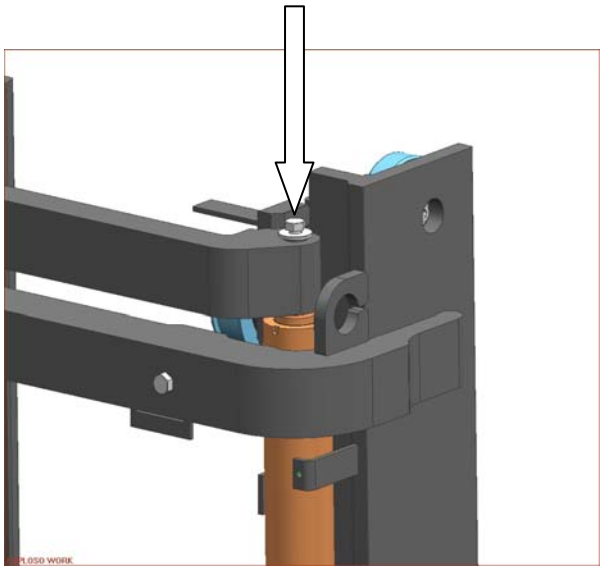
Put a load on the forks and make it go up and down for 20 minutes, paying attention that it never reaches the end of stroke.

Finally send the cylinder to the end of stroke.

If leaks are still present, it means that the cylinder must be replaced.

DISMOUNTING THE LATERAL CYLINDERS FROM THE MAST.

The rod of the cylinder is normally anchored to the crossmember on which it pushes by means of a screw situated on the head.

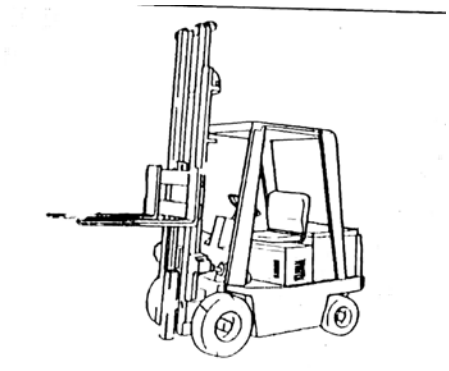


Unscrew the anchor screw that holds the rod to the crossmember. Remove the drainage tubes.

Hydraulically lift the mobile mast about 200 mm to which the rod is connected.

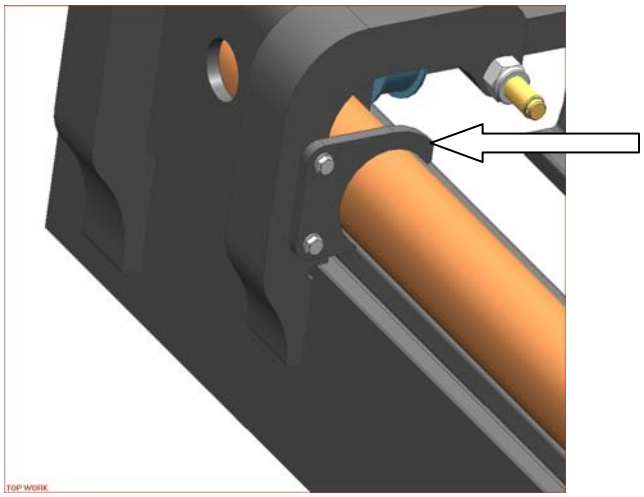
If the mast is DV and TV types, the central cylinder will start as first and will lift the carriage for the entire free lift height; once finished the free lift height, the lateral cylinders will open.

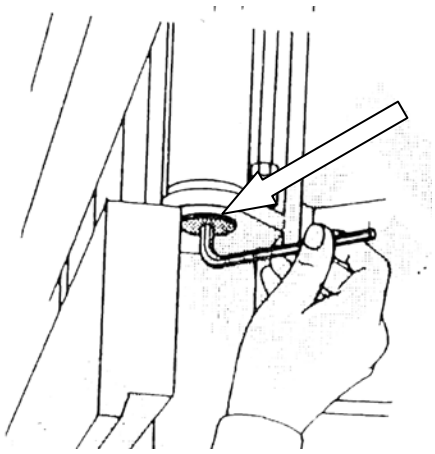
Put a support between the lower part of the mobile mast, to which the cylinder is anchored, and the ground.



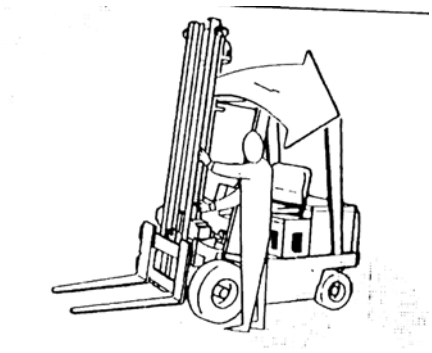
Lower the mast up to when it rests on the support.
When the mobile stage has rested itself on the support, it will stop and the eventual free lift cylinder will lower (only for DV, TV, and QV models).

The cylinder shell is attached to the fixed stage by means of a little band on the upper part and a screw on the lower one.





Remove the mentioned above anchors and the feeding tubes.



Remove the cylinder.
Sometimes the mast mounting brackets prevent removal of the cylinders in this way.
In these cases the masts must be separated by a greater amount to allow the cylinders to be removed more or less vertically.

REPLACEMENT OF THE SEALS IN THE LATERAL CYLINDERS.

When it is necessary to replace the seals, observe the following procedure:

Unscrew the cap (1) by means of the proper tool. Avoid hitting it with pointed objects.

Pull out the rod (5).

Unscrew the metal ring (9).

Dismantle the piston (6).

Substitute the parts (13. 7 and 2).

Reassemble the piston (6) and retighten the metal ring (9).

Remount the rod (5), using the proper seal loader, in according to the cylinder type and the mast type, and following the indicated instruction.

Remove all grease and oil traces from the cap (1).

Apply two drops of sealer on the thread of the cap (1).

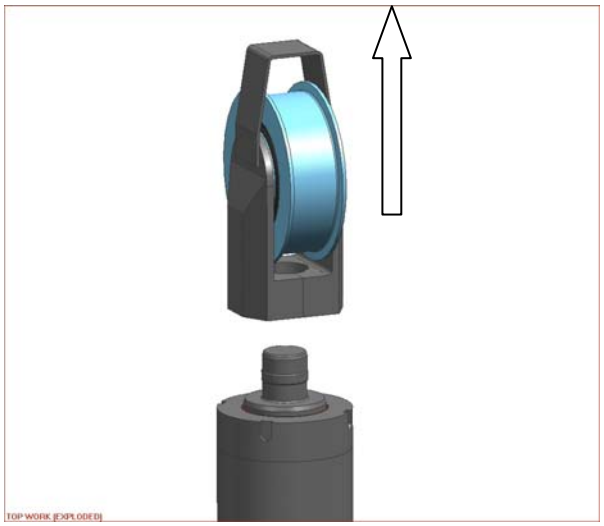
Retighten the cap.

NOTE: WHEN THE SEAL IS REPLACED, ALSO SUBSTITUTE ALL OTHER PARTS CONTAINED IN THE KIT.

REPLACEMENT OF THE SEALS IN THE DISPLACEMENT CYLINDERS

In the displacement cylinder all seals are located in the cap (1). Therefore it is not generally necessary to dismantle the cylinder from the mast.

In the central cylinders it will be necessary to remove the chain and unscrew the chain sheave holder assembly.



In the lateral cylinders it is sufficient to work with the crossmember on which the rod pushes, detached by 200/300 mm.

Observe the following procedure:

Unscrew the cap (1) with the proper tool. (Avoid hitting it with pointed objects).

Replace the seals (2, 4 and 14).

Retighten the cap (1).

Retighten the rod on the crossmember.

Open the mast.

Purge the air through the vent screw (15), as previously described.

DISPOSAL AT END CYCLE.

For a proper disposal of the mast at the end of its useful life and minimize environmental impact, make a collection of different parts, separating the different components:

- Iron
- Hoses
- Hydraulic oil
- Grease
- Cylinders' seals
- Plastics

Dispose of the parts so separated according to the laws in individual countries in terms of waste disposal.