



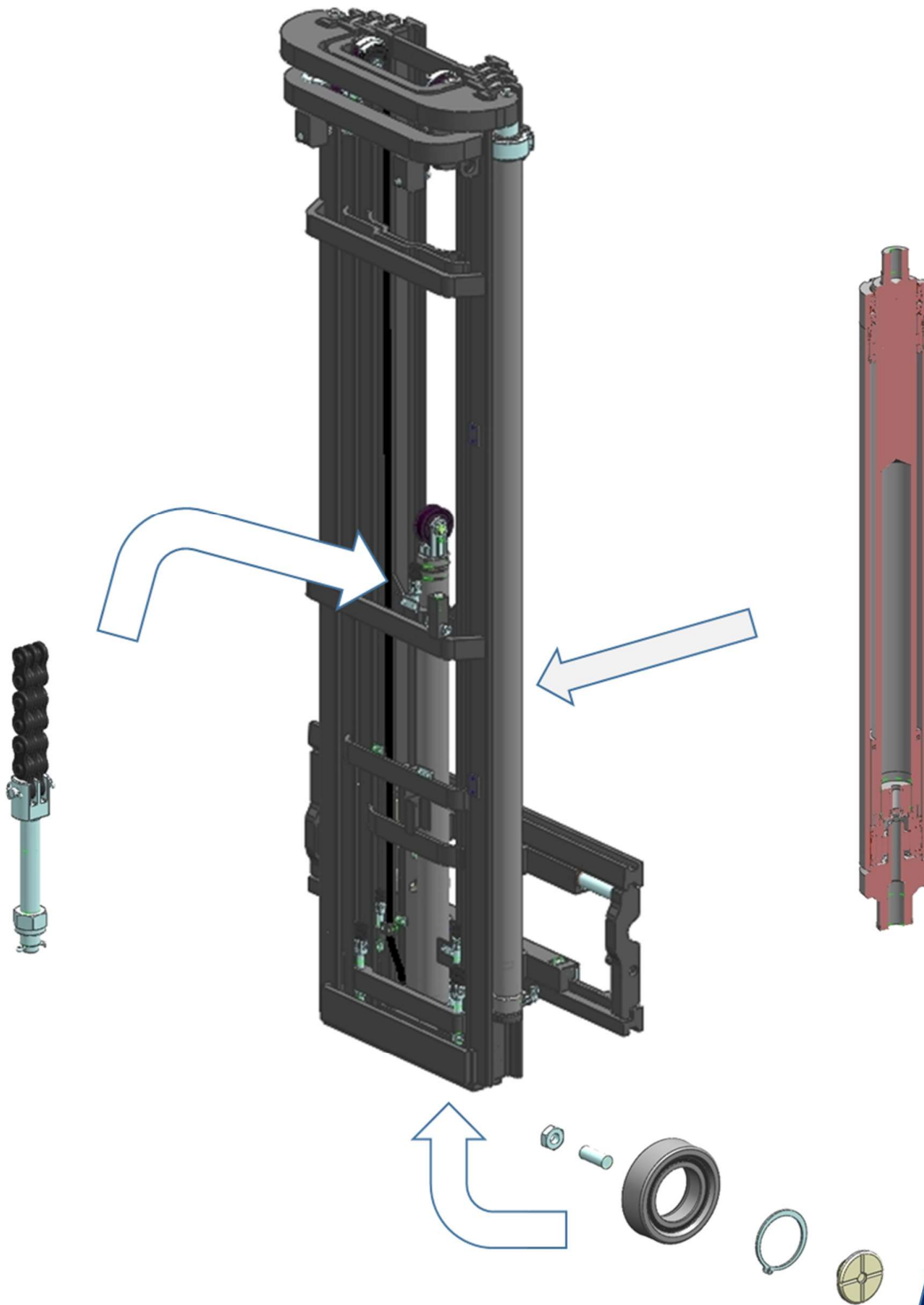
USE AND MAINTENANCE INSTRUCTIONS FOR MASTS

2023 - REV.03

LIFT-TEK
ELECAR **MASTS**
Lift Technologies 

A division of  cascade
CS™





CONTENTS

IDENTIFICATION.....	5
WARRANTY.....	6
CONDITIONS.....	7
TRANSPORT AND STORAGE	7
ASSEMBLY	7
ASSEMBLY OF THE MAST.....	8
OPERATIONS TO BE CARRIED OUT AFTER ASSEMBLING THE MAST ON THE FORKLIFT.....	9
CAUTIONS TO BE OBSERVED DURING ASSEMBLY	10
USING THE MAST.....	11
USING THE MAST DURING THE TRANSPORT MODE	11
USING THE MAST DURING THE STACKING MODE.....	12
SAFETY	13
MAINTENANCE	14
ROUTINE MAINTENANCE.....	14
ADDITIONAL MAINTENANCE	14
CONSTRUCTION	15
BEARINGS	15
REPLACING THE BEARINGS WITH PAD.....	15
REPLACING THE INCLINED BEARINGS	15
CLEARANCES BETWEEN BEARING AND PROFILE	16
MAIN CAUSES OF BREAKAGE OF THE COMBINED BEARINGS	17
MAST PROFILES	18
TOLERANCES	18
RUNNING-IN.....	18
GREASING THE TRACKS.....	18
WEAR OF THE TRACKS.....	19

CONTENTS

CHAINS	20
GREASING THE CHAINS	20
WEAR OF THE CHAINS	21
WEAR OF THE CHAIN ANCHORS	22
ADJUSTING THE FORK CARRIAGE CHAINS ON THE MASTS	22
TENSIONING BARS (TIE RODS)	23
CYLINDERS	24
DISPLACEMENT CYLINDERS	25
PISTON CYLINDERS	26
LEAKAGE IN THE CYLINDERS	27
PROCEDURES FOR CHECKING PISTON CYLINDERS	28
REPLACING	31
REPLACING THE SEALS IN THE PISTON CYLINDERS	31
REPLACING THE SEALS IN THE DISPLACEMENT CYLINDERS	32
HYDRAULIC	33
LB SAFETY VALVES	34
SB FLOW CONTROL VALVES	36
CALIBRATION AND SETTING OF THE HYDRAULIC MAST VALVES	38
OPTIONAL	39
MECHANICAL STOP FOR THE MAINTENANCE OF THE CARRIAGE	39
DISPOSING OF THE MAST	40

IDENTIFICATION OF THE MAST

The Lift-Tek Elecar mast is marked with a serial number that corresponds to a certificate of inspection and testing. The serial number is stamped on an upper crossmember of the mast or on the side, according to the customer's requests.

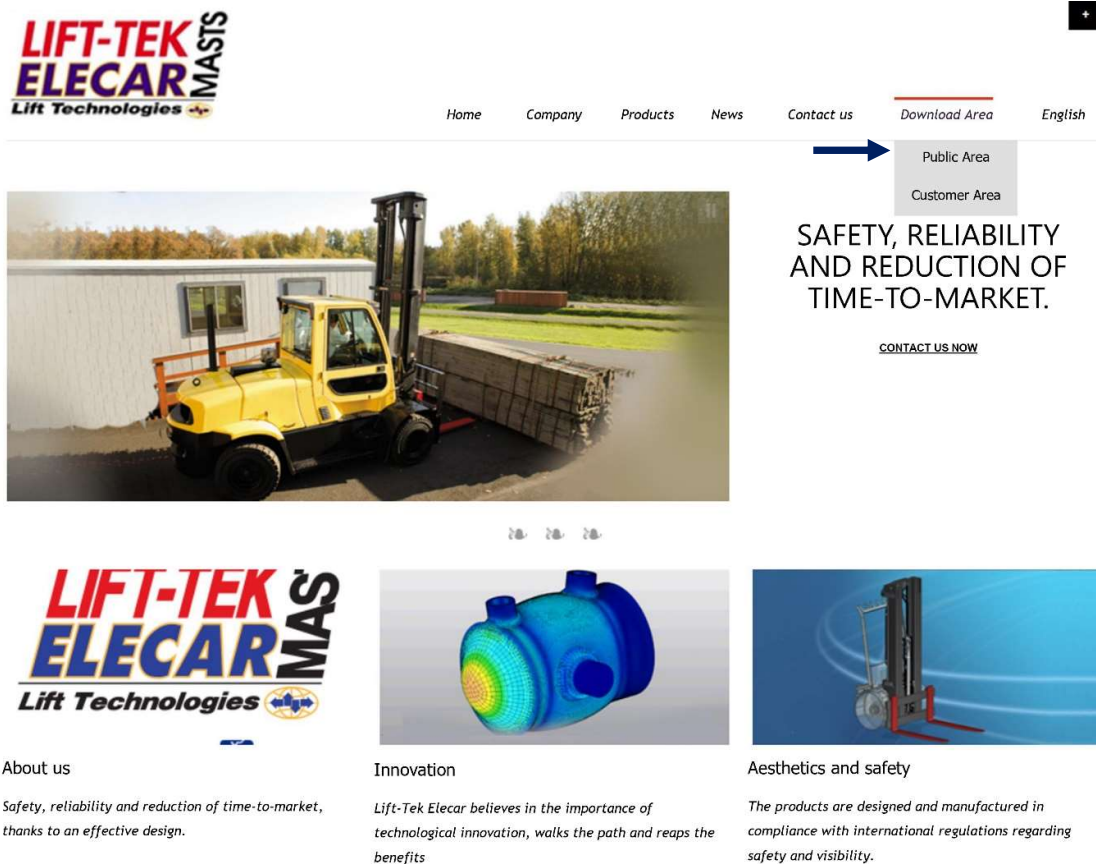
For any request or information relating to a Lift-Tek Elecar product, always quote this number.




WARRANTY

The terms and conditions of application of the warranty are detailed in the “GENERAL WARRANTY CONDITIONS” booklet supplied separately.

You can download the file with the warranty conditions from the relevant download area of our website (www.lift-tekelecar.it).



The screenshot shows the website's navigation menu with the following items: Home, Company, Products, News, Contact us, Download Area, and English. The 'Download Area' menu item is highlighted with a blue arrow pointing to a dropdown menu containing 'Public Area' and 'Customer Area'. Below the navigation is a large image of a yellow forklift carrying a pallet of materials. To the right of the image, the text reads: 'SAFETY, RELIABILITY AND REDUCTION OF TIME-TO-MARKET.' followed by a 'CONTACT US NOW' button.


**LIFT-TEK
ELECAR** MASTS
Lift Technologies 

Home Company Products News Contact us **Download Area** English

Public Area
Customer Area

**SAFETY, RELIABILITY
AND REDUCTION OF
TIME-TO-MARKET.**

[CONTACT US NOW](#)

**LIFT-TEK
ELECAR** MASTS
Lift Technologies 

About us
Safety, reliability and reduction of time-to-market, thanks to an effective design.

Innovation
Lift-Tek Elecar believes in the importance of technological innovation, walks the path and reaps the benefits

Aesthetics and safety
The products are designed and manufactured in compliance with international regulations regarding safety and visibility.

CONDITIONS OF SUPPLY

TRANSPORT AND STORAGE

For transport needs and for greater safety, the masts are shipped in a horizontal position. It is recommended to keep the masts sheltered, in a dry place, free from condensation and/or sudden changes in temperature. To avoid deformation of the lift cylinder seals, it is recommended to proceed with assembly within one month from the date of shipment or to keep the masts in a vertical position. From that moment, to avoid the formation of rust or condensation, it is recommended to carry out 2 lifting cycles once a week. In the event of storage in adverse environmental conditions or for periods longer than one month, it is recommended to carry out the routine maintenance operations as prescribed in this manual. Non-compliant storage methods lead to immediate invalidation of the warranty.

ASSEMBLY

Each mast supplied by Lift-Tek Elecar has been checked in all its components and finally tested on a test bench. The results of this final testing are reported in a test certificate filed in the appropriate archive.

Any subsequent intervention on the mast either directly by Lift-Tek Elecar or by anyone else, subject however to Lift-Tek Elecar's authorisation, will be recorded on this certificate.

Lift-Tek Elecar masts are developed and tested in compliance with the requirements of the ISO 3691 standard. With regard to the requirements of paragraph 4.6.3.2 (Lowering Speed Limitation), the factory registration of the safety device mentioned therein is carried out in accordance with the device manufacturer's prescriptions and parameters (see valve manufacturer's documents in the HYDRAULIC VALVES section of the manual) for operation under maximum load conditions.



IT WILL BE THE FORKLIFT MANUFACTURER'S RESPONSIBILITY TO VERIFY THAT THIS GENERIC REGISTRATION IS COMPATIBLE WITH THE OPERATION PRESCRIBED BY THE STANDARDS OR TO INFORM LIFT-TEK ELECAR OF THE NEED FOR A DIFFERENT SETTING VALUE AFTER INSTALLING AND TESTING THE MAST ON THE FORKLIFT.

THE SUPPLIED PRODUCT CAN THEREFORE BE ASSEMBLED WITHOUT THE NEED FOR FURTHER TESTING, PROVIDED, OF COURSE, THAT IT HAS NOT BEEN TAMPERED WITH IN ANY WAY. THE CUSTOMER MUST IN ANY CASE COMPLY WITH THE MACHINERY DIRECTIVE 2006/42/EC.

THE CHECKS ON THE PRODUCTS USED AND THE FINAL TESTS WILL NOT, HOWEVER, GUARANTEE THE USE OF THE MAST IF IT IS NOT USED WITH THE STRICTEST OBSERVANCE OF THE USAGE AND SAFETY REGULATIONS SET OUT BELOW.

ASSEMBLY OF THE MAST ON THE FORKLIFT

To assemble the mast on the forklift, proceed as follows:

1. Harness the mast with a strap on the upper crossmembers and lift it to the vertical position with a bridge crane;
2. Carefully bring the mast towards the forklift;
3. Place the mast's articulation supports on the attachments on the forklift;
4. Rest the mast on the forklift, taking care not to damage the hoses;
5. Tighten the screws fixing the articulation supports - attachments to the axle on the forklift, according to the torque indicated in the forklift manual;
6. Bring the forklift tilt cylinders close to the tilt supports on the mast;
7. Connect the tilt cylinders to the tilt supports with pins and seegers.
8. Test and adjust the lowering limitation device.

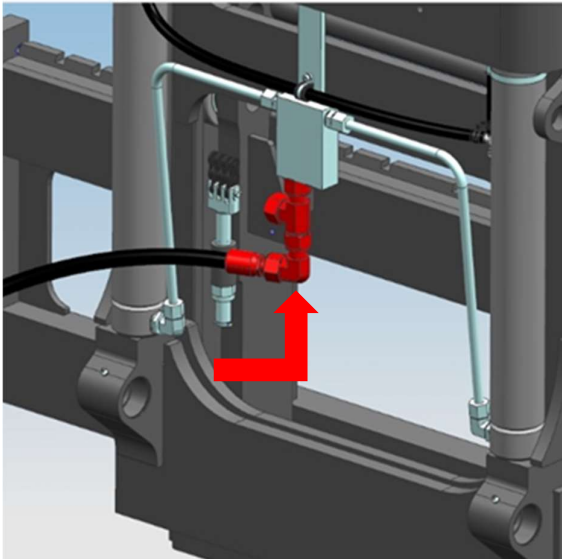
IT IS VERY IMPORTANT TO CORRECTLY ADJUST THE TWO TILT CYLINDERS, WHICH MUST REACH THE END OF THEIR STROKE AT THE SAME TIME.

Connect the main supply hose and any auxiliary equipment hoses from the forklift to the mast.

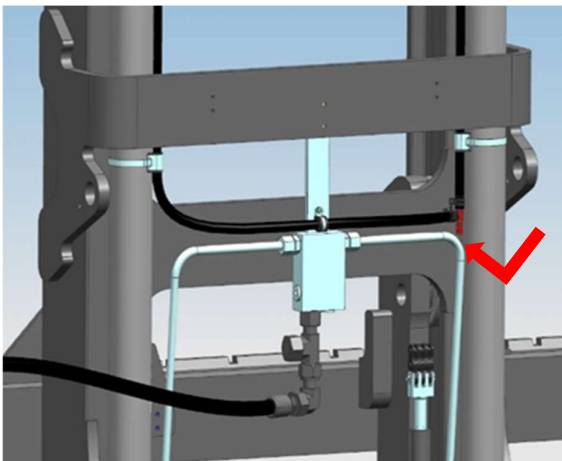
ASSEMBLY OF THE MAST ON THE FORKLIFT

OPERATIONS TO BE CARRIED OUT AFTER ASSEMBLING THE MAST ON THE FORKLIFT

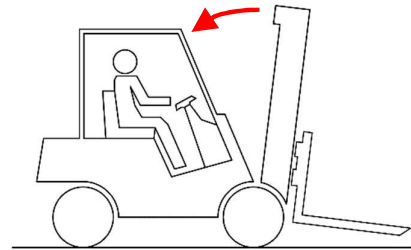
1. Connect the oil supply hose to the appropriate fitting.



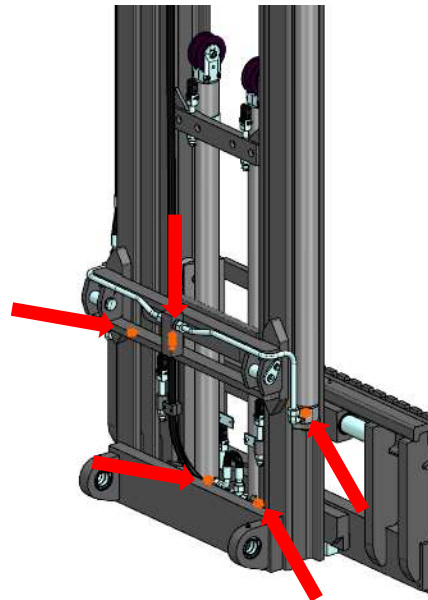
2. Connect the drain hose (if any).



3. Activate the tilt, to make sure there is no interference between the forklift and the mast.



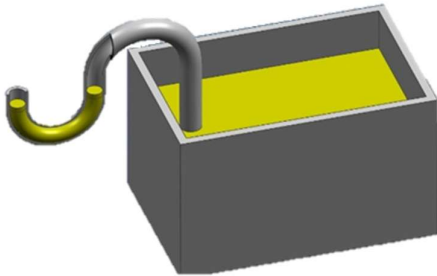
4. Test and adjust the lowering limitation device (the instructions for adjusting the valves are in a dedicated chapter, HYDRAULIC VALVES). These devices are calibrated according to the manufacturer's instructions or otherwise in agreement with the customer. If further adjustments are necessary, contact the Lift-Tek Elecar Technical and After-Sales Department.



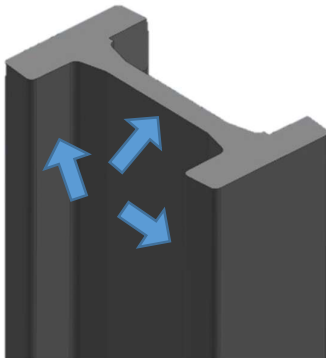
ASSEMBLY OF THE MAST ON THE FORKLIFT

CAUTIONS TO BE OBSERVED DURING ASSEMBLY

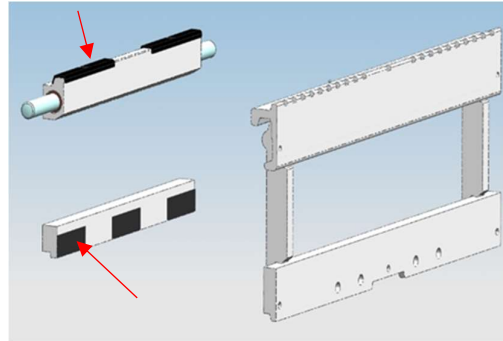
1. The drain hose, if present, must not dip into the tank below the oil level but only touch it.
2. In the loop that the hose necessarily forms before entering the tank, a small quantity of oil must remain, which acts as a siphon and also keeps the internal surface of the cylinder shell moist, when this is completely closed.



3. Grease the tracks of the bearings both where the fork carriage slides and where the masts slide between them. Use graphite grease for this, avoiding spray greases if possible.
4. Send oil to the mast, making the mast perform three or four complete cycles by sending the fork carriage to the end of the stroke.

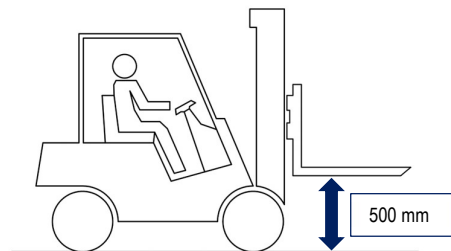


5. Grease the sliding surfaces of the sideshift carriage. If stored horizontally for a long time, the weight of the mast itself may have caused the two surfaces to adhere. It is recommended to disassemble the sideshift, clean and grease the tracks, and



reassemble before putting the mast into service.

6. Bleeding is performed only on displacement-type cylinders
7. Raise the fork carriage by approximately 500 mm.



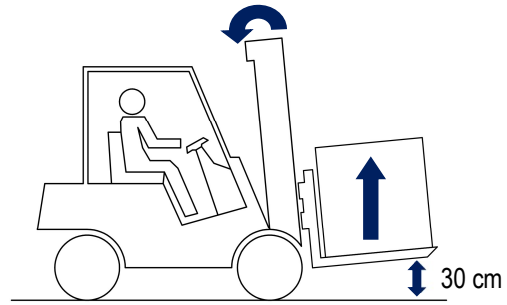
8. Unscrew the screw under the top cap and at the first leak of oil, screw it back on.
9. Place a load on the mast that corresponds to approximately 30% of the nominal load, and check that the lowering is smooth (the cylinder may have been damaged during transport).

MAINTENANCE FOLLOWS THE GUIDELINES OF THE FEM 4.004 STANDARDS, CHAPTERS 5.1 5.5.

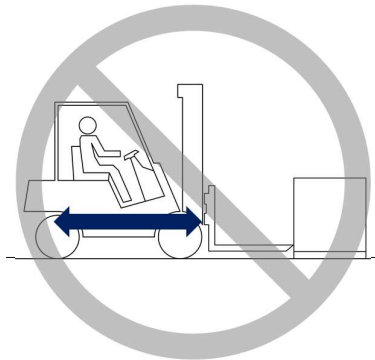
USING THE MAST

USING THE MAST DURING THE TRANSPORT MODE

1. Tilt the mast back and lift the forks approximately 300 mm off the ground.
2. The forks must be centred on their support carriage, i.e. equidistant from the longitudinal axis of the forklift.
3. The load must be centred on the forks so that its centre of gravity falls on the axis of the forklift and the weight is exactly divided between the two forks.
4. During travel, any sideshifter must be in the central position.
5. During the sideshift movement, the load must rest on the front fork level and be approximately 300 mm off the ground, with the mast fully tilted backwards..
6. If the load obstructs visibility during movement, it will be necessary to proceed in reverse.

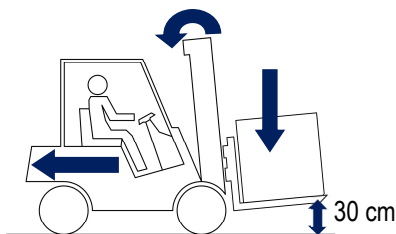
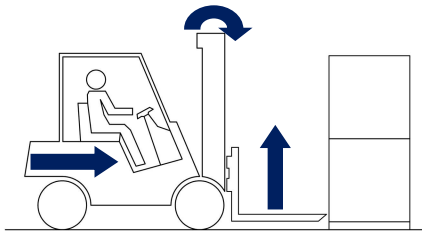
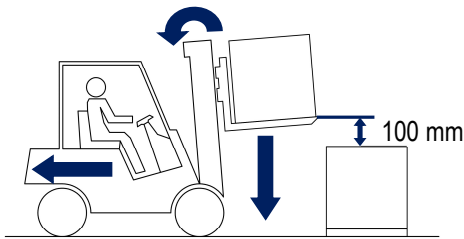


7. It is forbidden to use the forklift, and therefore the mast, to push or tow any weight.



USING THE MAST

USING THE MAST DURING THE STACKING MODE

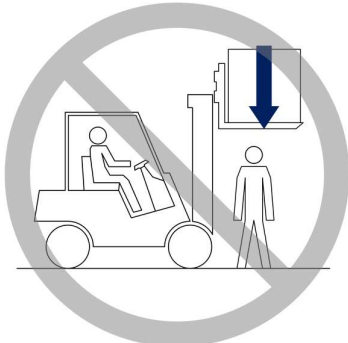


1. Approach the stacking site, put the mast in the vertical position and gradually raise the forks to a height approximately 100 mm above the stacking surface.
2. Gradually approach the stacking site at moderate speed, avoiding both sudden starts and stops that could cause excessive dynamic stresses.
3. Then slowly tilt forward, bring the load into position, slowly lower the mast until the load is resting, and finally release the forks.
4. To remove a stacked pallet, approach the stacking site, stop the forklift with the mast in vertical position, raise the forks to the height of the pallet to be removed, and place the load on the forks, tilting slightly forward if necessary until the pallet rests against the front surface of the forks. Then lift the load 10 – 15 cm and tilt back until the mast is vertical
5. Proceed slowly in reverse until the pallet is clear of the shelving; slowly lower the load to a level 30 cm from the ground, tilt completely backwards and finally proceed to move the load.
6. Strictly comply with the maximum capacity values allowed by the table on the forklift.
7. Never lift or lower the load with the forklift in motion.

SAFETY RULES

The following safety rules must be strictly observed in order to prevent personal injury and damage to the equipment:

- No one must be under the forks during the lifting and lowering operations.



- Transportation of people is not permitted.



- The utmost care must be taken when transporting hazardous materials.
- The mast must never be overloaded.



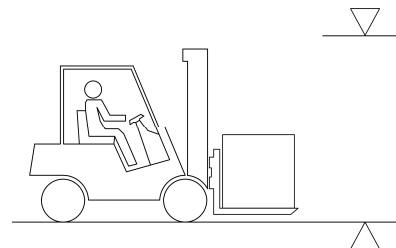
- Before moving, always check the stability of the load.
- During transport, keep the load as low as possible and correctly positioned.



- Avoid abrupt starting, braking and steering.



- Pay attention to the passage under and between the doors.



MAINTENANCE

ROUTINE MAINTENANCE

Routine maintenance involves the following operations:

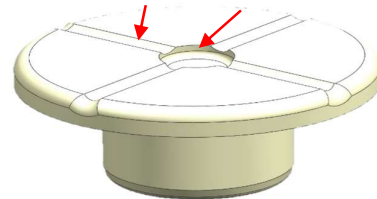
- Bearing greasing: to be carried out every 200 hours of operation.
- Tracks greasing: to be carried out every 200 hours of operation.
- Chain greasing: to be carried out every 200 hours of operation.
- Sideshifter greasing: to be carried out every 200 hours of operation.
- Stroke limit check: to be carried out every 500 hours of operation.
- Tie rods check: to be carried out every 500 hours of operation.
- Chain elongation check: to be carried out every 500 hours of operation (see page 18).

NB: IT IS VERY IMPORTANT TO CARRY OUT A LIFT TO THE MAXIMUM ELEVATION AT LEAST ONCE A WEEK TO ALLOW THE CYLINDERS TO REMAIN OILED INTERNALLY, AVOIDING THE RISK OF RUST IN THE SHELL AND, IN CYLINDERS WITH INTERNAL DRAINAGE, TO ALLOW THE DRAWN OIL TO RETURN TO THE TANK.

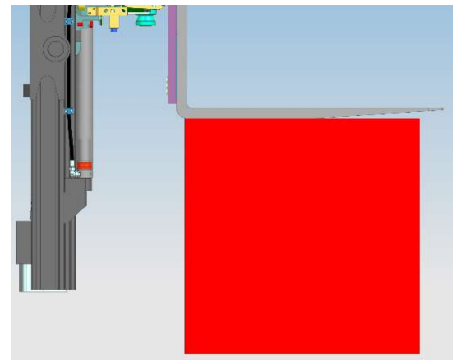
The maintenance times are for guidance and depend on environmental conditions or special uses such as the aggressive work environment of the mast. In this case, it is recommended to halve the maintenance times.

ADDITIONAL MAINTENANCE

- Replacement of cylinder seals (see pages 31 and 32).
- Replacement of chains (see page 21).
- Replacement of bearings (see page 15).
- Replacement of contact pads (replace at 50% wear and in any case when the grooves for the grease disappear).



NB: BEFORE CARRYING OUT ANY MAINTENANCE WITH THE MAST (OR CARRIAGE/EQUIPMENT) RAISED, MAKE SURE A PHYSICAL BLOCK IS PLACED UNDERNEATH TO PREVENT UNCONTROLLED LOWERING, AS SHOWN IN THE FIGURE TO THE SIDE.



CONSTRUCTION COMPONENTS

BEARINGS

Bearings used on Lift-Tek Elecar masts are of two types:

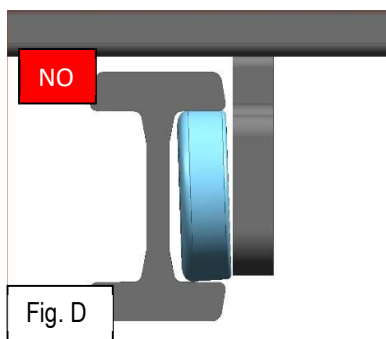
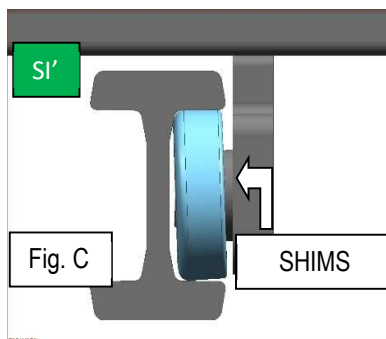
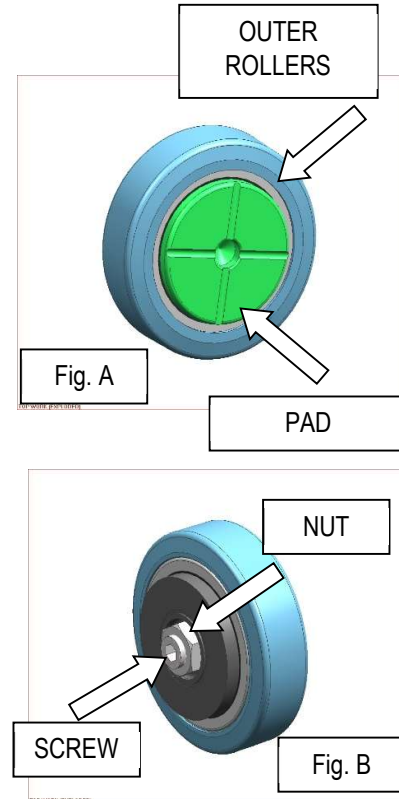
1. with adjustable pad, in order to be able to recover the lateral clearance between profile and bearing (Fig. A, B).
2. inclined, in order to be able to support both front and side loads (Fig. C, D).

The bearing is sized with an abundant margin, such as to support any accidental overloads that may occur during the life of the mast.

NOTE: Neither the adjustable pad bearings nor the inclined pad bearings are subject to greasing. Only the track on the profiles is greased. The life of the bearing essentially depends on the conditions of use of the mast.

REPLACING THE BEARINGS WITH PAD

After unscrewing the nut and screw located on the back of the bearing (fig. B), which block it in the axial direction, preventing it from coming out, remove the outer covering with the pad (fig. A). Fit a new cover and pad and retighten the nut and screw.



REPLACING THE INCLINED BEARINGS

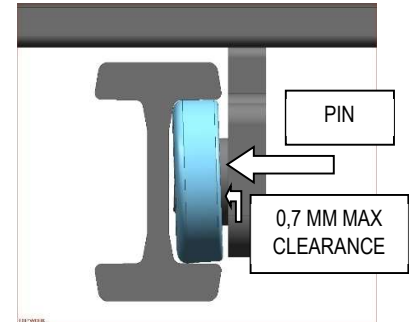
When assembling the new bearings, pay attention to their correct positioning (Fig. C, D) and provide suitable shimming rings under the roller. For correct assembly, the bearing must rest correctly to work on the corner of the profile as in Fig. C.

CONSTRUCTION COMPONENTS

CLEARANCES BETWEEN BEARING AND PROFILE

On Lift-Tek Elecar masts, a maximum radial clearance of 0.7 mm (normal value 0.5 mm) is allowed between the bearing and the profile.

If the mast is subject to normal use, the increase in this clearance over time will be minimal, and after 6,000/8,000 hours of operation it should reach a clearance of maximum 2 mm



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

- Multiple work shifts;
- Use of sideshifts or other equivalent equipment;
- Dusty work environments and when there are corrosive gases;
- Loads with cantilever forces, even if they correspond to equivalent loads lower than the nominal one;
- Very large and off-centred loads;
- Uneven floors and high manoeuvring speeds;
- Frontal impacts.

When the clearance has reached the value above, it is advisable (though not essential, as it is the user's decision), to replace the bearing.

If the type of work, which the system is subject to, does not involve impacts, wear will progress at the same rate it was originated.

If, on the other hand, the type of work involves impacts or other abnormal operations, wear will increase at a much faster rate, even to the point of causing the bearings to break due to shock.

If the clearance of 2 mm is reached again after the bearings have already been replaced once, the mast must be replaced.

Obviously, the most worn mast stage will always be the one the fork carriage slides on; only rarely will wear also affect the other mast stages.

When, the welded pin is also damaged due to abnormal use, and particularly after violent impacts, it is recommended to replace the whole mast stage.

CONSTRUCTION COMPONENTS

MAIN CAUSES OF BREAKAGE OF THE COMBINED BEARINGS

- Impacts: Violent frontal impacts when forking out the load can also cause the bearings to break. The outer roller will have cracks that cut the surface parallel to the rolling axis.

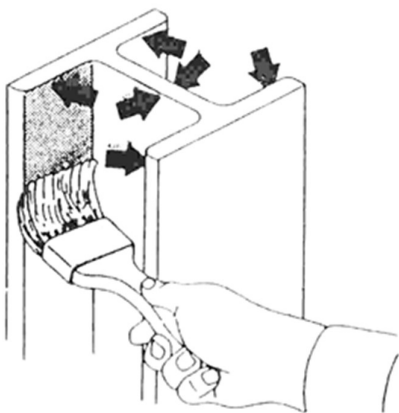
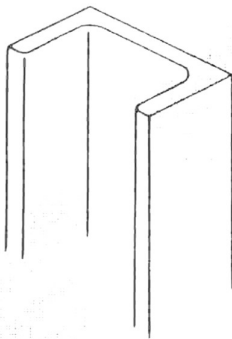
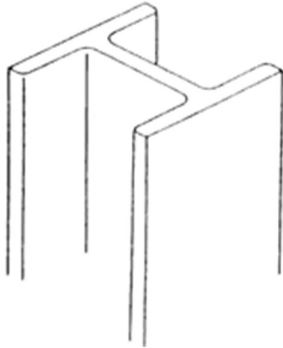


- Load dimensions: another possible cause of breakage, more hidden to prevent than the others, is the assembly of special equipment to carry very long loads (e.g. carpets and rugs), even if their weight is less than the nominal load. This condition generates oscillations that cause the hardened outer roller to detach; in this case, circumferential fissures will appear all the way around the surface.



CONSTRUCTION COMPONENTS

MAST PROFILES



TOLERANCES

The close tolerance of the internal dimension between the tracks allows for an accurate fit between the profile and the bearing. During assembly, the coupling value is normally less than 0.5 mm. The maximum acceptable limit at the beginning is 0.7 mm.

RUNNING-IN

If they function correctly in their initial phase of use, the bearings roll on the tracks, which thus acquire a greater surface hardness. An indication of correct running-in is a certain sheen that the tracks acquire after a few hours of operation.

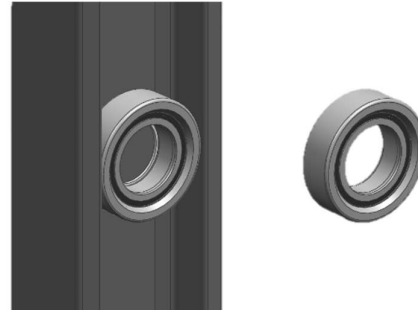
GREASING THE TRACKS

When installing the mast, the tracks must be greased to facilitate correct running-in. The tracks will also need to be periodically greased thereafter. How often this operation is repeated is at the user's discretion, and depends essentially on the conditions of use and the working environment. A greasing interval of about 200 hours can be considered a guide value for an average working condition.

CONSTRUCTION COMPONENTS

WEAR OF THE TRACKS

Over time some wear occurs on the tracks, with a consequent increase in the clearance between bearing and profile. When the clearance has reached 2 mm, it is advisable to replace the standard bearing with the larger 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 flange is reduced by about 15% of the initial value.



PLEASE NOTE:

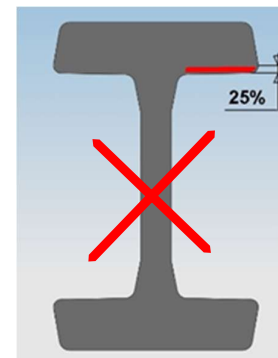
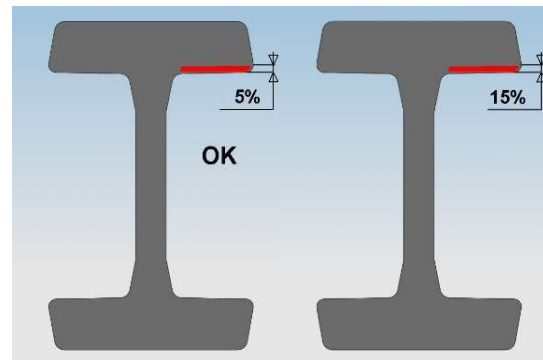
All the profiles used on Lift-Tek Elecar masts work with a safety factor that is always greater than 2.3 times the yield strength.

Here are the recommended minimum thickness values for the profile flanges:

G15 SV/DV/TV	minimum thickness 15 mm
G20 SV/DV/TV	minimum thickness 15 mm
G30 SV/DV/TV	minimum thickness 16 mm
G45 SV/DV/TV	minimum thickness 18 mm
G50 SV/DV/TV	minimum thickness 22 mm

With these values, which are only rarely reached during the normal life of a mast, the safety factor is reduced by approximately 12%. The wear values are neither the same on all masts nor uniform on the various points of the same mast. The profiles which the fork carriage slides on will always be more worn than the others, especially in the lower section with respect to the intermediate and upper one.

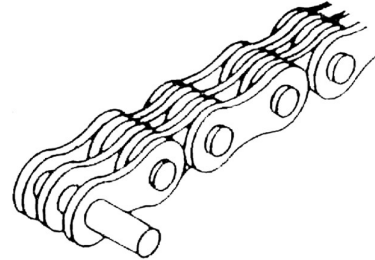
ANY CORRECTIVE INTERVENTION ON THE PROFILE CAN ONLY BE PERFORMED WITH PRIOR AUTHORISATION FROM LIFT-TEK ELECAR. ALWAYS AVOID DRILLING AND MILLING THE PROFILE.



CONSTRUCTION COMPONENTS

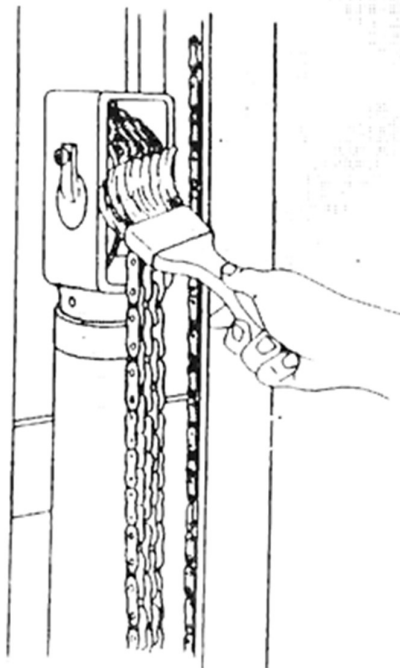
CHAINS

The chains used on Lift-Tek Elecar masts are of the FLEYER type and have the characteristics of a top-quality product. They are used by Lift-Tek Elecar to withstand stresses considerably lower than their breaking load. They normally work at a load corresponding to 20-25% of the nominal load, which in turn is always lower than the test breaking load. Test certificates issued by the manufacturer are provided upon request.



GREASING THE CHAINS

Essential element for a long life of the chains and their lubrication. Periodic lubrication is therefore required, with a brush or spray cans, using SAE 20 oil in winter and SAE 40 oil in summer. How often this operation is repeated also depends very much on the type of work and the environmental conditions. Continuous work cycles, with frequent jerks, and uneven terrain that impose strong dynamic stresses on the load will obviously require more frequent lubrication of the chain..

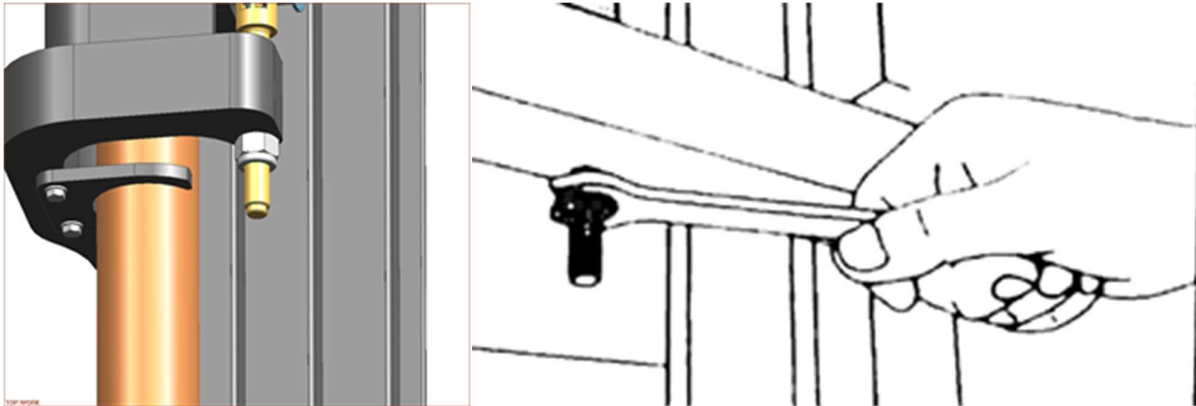


CONSTRUCTION COMPONENTS

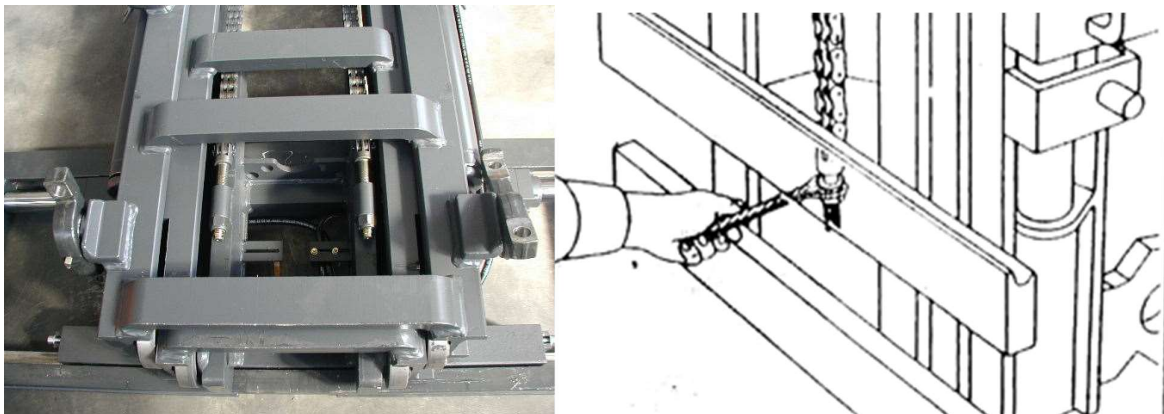
WEAR OF THE CHAINS

With use, the chains can become elongated. This elongation can be recovered by adjusting the adjustable chain anchors. They are located on the fork carriage and on stages of the DV, TV and QV masts as well. However, if the thread of the chain anchors has been used up completely, a link will need to be removed.

Chain anchor on the stages:

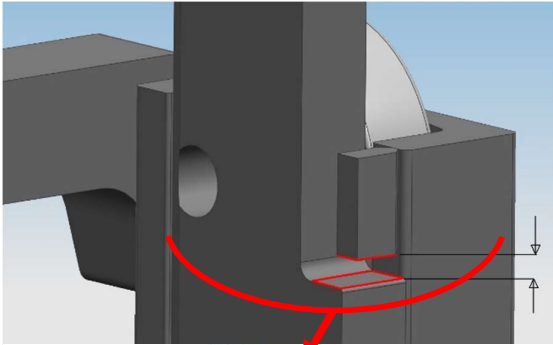


Chain anchor on the carriage:



The maximum possible recovery of chain elongation is 3%. Once this value is exceeded, the chain itself must be replaced. The elongation value of 3% is reached when the detected measurement of 32 steps corresponds to the nominal measurement of 33 steps.

CONSTRUCTION COMPONENTS



WEAR OF THE CHAIN ANCHORS

The chain anchors, made of strongly alloyed steel, is also subject to wear over time. It is therefore necessary to periodically check for any ovalisation of the hole or wear. It is advisable to replace the chain - chain anchor unit at the same time and use only original Lift-Tek Elecar spare parts..



ADJUSTING THE FORK CARRIAGE CHAINS ON THE MASTS

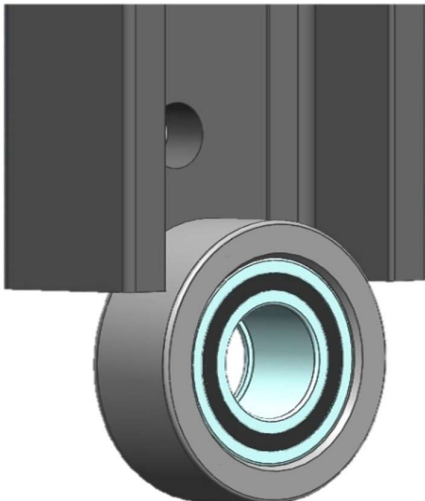
The chain must be adjusted in such a way that the upper and lower limit switch blocks are never engaged. The construction type of the mast entails a residual clearance of approximately 5 mm between both the upper and lower limit switches when the chain is correctly adjusted.

Therefore, remove the forks and adjust the chains so that there is a clearance of approximately 5 mm between the lower limit switch of the fork carriage and the one on the internal mast.

Send the central cylinder to the end of its stroke and check that there is also a minimum clearance of 1 mm between the upper limit switches (with the load, the clearance value will tend to increase, reaching 5 mm).

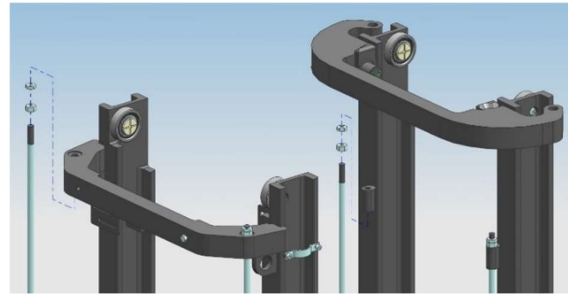
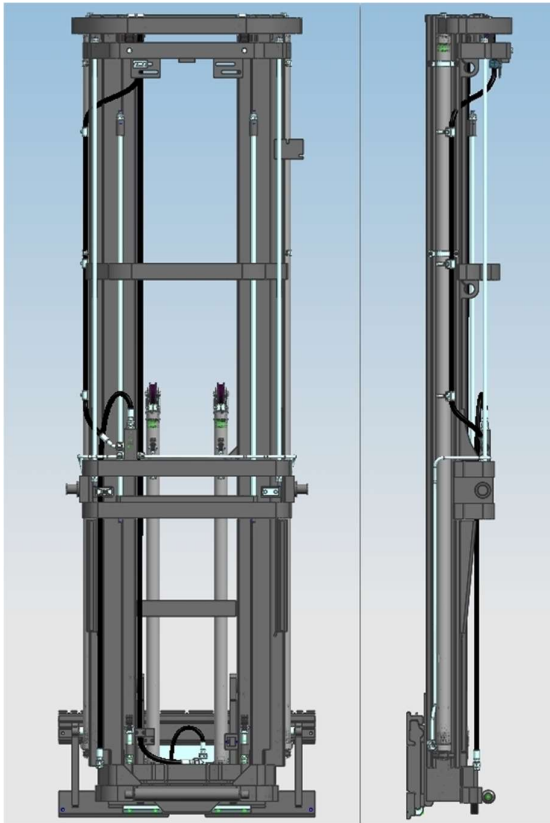
Bear in mind that if this intervention is not carried out periodically and instead the limit switches are allowed to be engaged (a common occurrence in equipment without forks), they will end up deforming and the lower bearing of the fork carriage could come out of the mast.

Check that the chains working in parallel always have the same tension: if not, act on the appropriate chain anchor using the locking nut.



CONSTRUCTION COMPONENTS

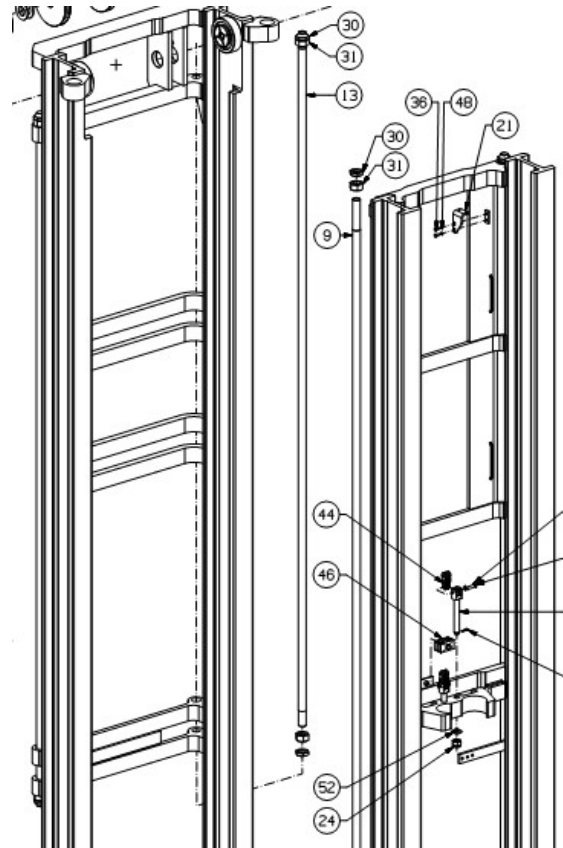
TENSIONING BARS (TIE RODS)



Tie rod M24 x 2 tightening torque = 150 Nm

The tensioning bars are steel threaded rods that help counteract the bending of the mast, making it more stable.

They do not require special checks or maintenance but must be periodically checked (see table "Routine maintenance"), paying attention to the tightening torque of the nuts, which will be closely linked to the diameter of the tie rods.



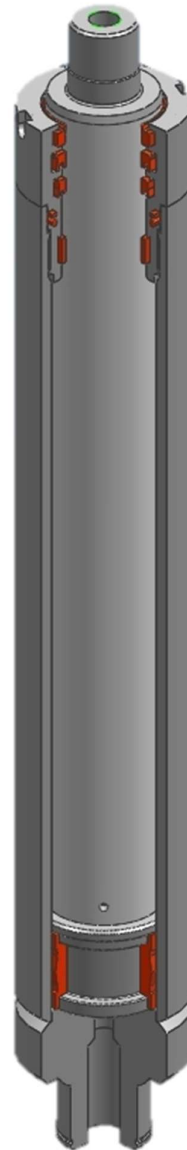
CONSTRUCTION COMPONENTS

CYLINDERS

The cylinders used in the visibility series are of two types:



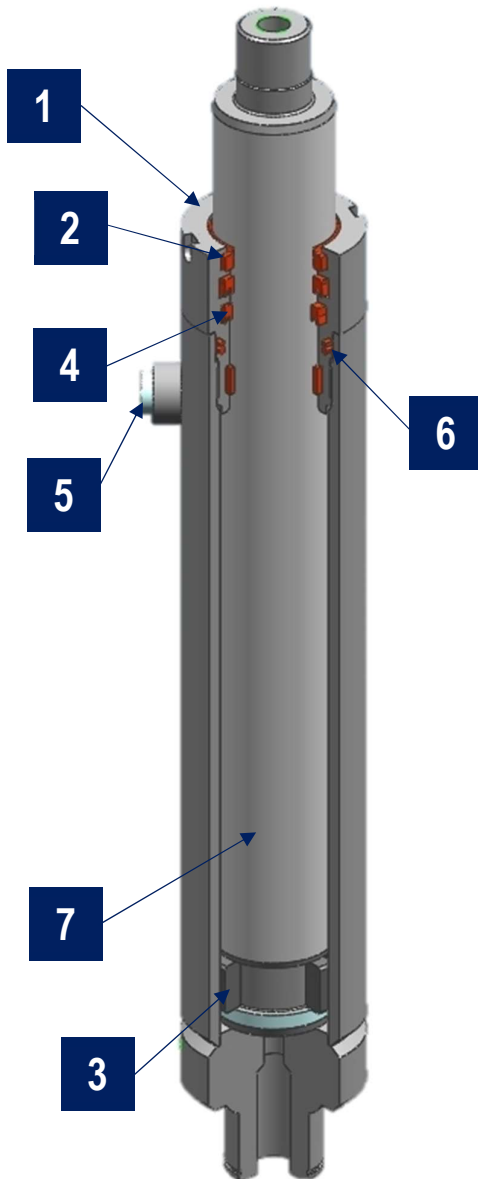
Displacement: with seal made on the rod.



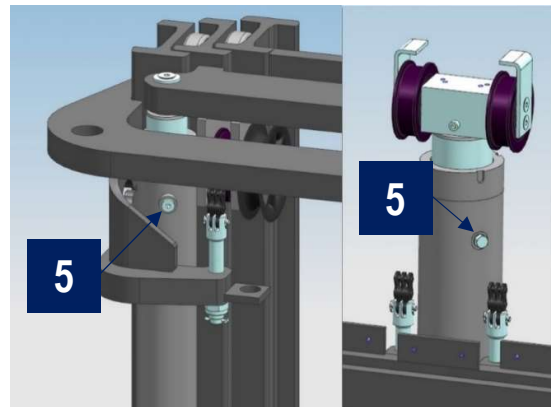
Piston: with seal made on the shell.

CONSTRUCTION COMPONENTS

DISPLACEMENT CYLINDERS

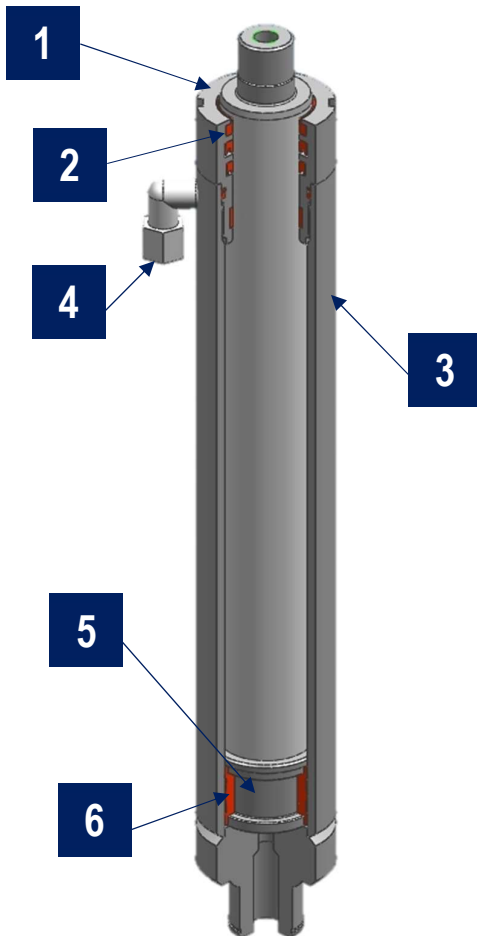


On these cylinders, the sealing is achieved by means of a gasket (4) housed in the cap (1), which also houses the dust scraper (2), the static sealing O-ring (6) and any guide made of anti-friction material when the cap itself does not perform this function. The seat of the other guide (3) is obtained in the rod (7). Notches are made on the guide (3) to allow the passage of oil to every part of the chamber. The dust scraper (2) prevents dirt from getting under the gasket (4). This type of cylinder requires the bleed screw (5) to allow the air that accumulates in the system to escape.

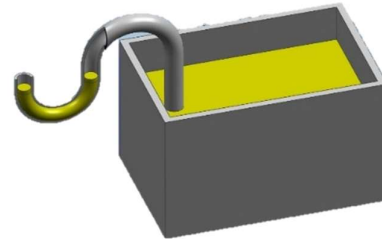


CONSTRUCTION COMPONENTS

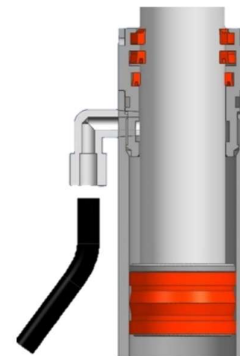
PISTON CYLINDERS



In these cylinders, the sealing is achieved by means of a gasket (6), inserted on the piston (5), which works on the internal surface of the case (3). The internal surface of the case is carefully polished, guaranteeing the gasket a long life. The rod guide is formed, by the cap (1) and the piston (5), by means of anti-friction rings. Sometimes, however, the detail (1) is made entirely of cast iron and the ring is no longer necessary. The dust scraper (2) prevents dirt and water from getting inside the cylinder.



The drain hose must reach the tank, but always remain above the oil level. Otherwise, during the mast lowering the cylinder could suck in a large quantity of oil which, on the ascent, would have to be expelled through the drainage fitting. This would create a strong back pressure that would damage the dust scraper and detach the drain hose. As already reported in the instructions for putting into service, it is good for a little oil always to remain in the loop that the drain hose forms before entering the tank.



In cylinders equipped with damping system, it is necessary to add ¼ litre of oil to the upper part of the piston.

CONSTRUCTION COMPONENTS

LEAKAGE IN THE CYLINDERS

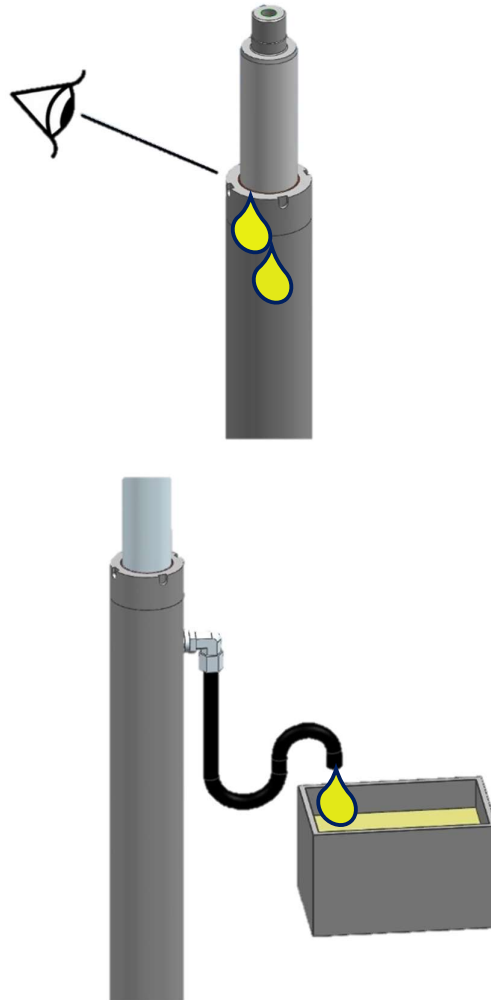
Leaks in the displacement cylinders exit to the outside. It will therefore be very easy to recognise a damaged gasket and know when it needs to be replaced.

In the case of piston cylinders, however, the leaks are led to the tank by the drain hose, and are not as easy to recognise.

Instead, you will notice a slow lowering of the load.
The presence of oil in the drain hose of sealed cylinders does not necessarily mean there are leaks.

The drain hose is normally bent like a siphon and, even if it does not dip into the tank, it accumulates a certain quantity of oil: this can be sucked in when the cylinder is lowering and then expelled when it is lifting, thus giving the impression of a leak.

To check for any actual leaks, follow the procedures below for checking sealed cylinders.

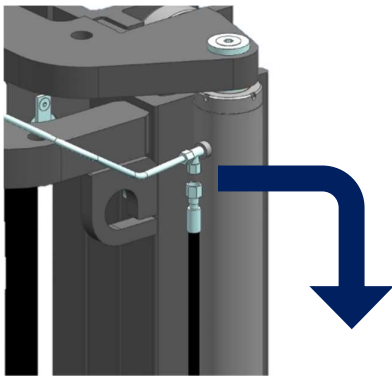


CONSTRUCTION COMPONENTS

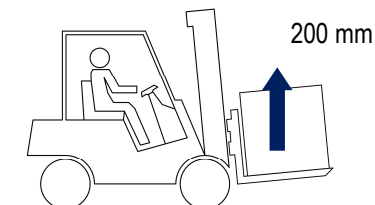
PROCEDURES FOR CHECKING PISTON CYLINDERS

Static check:

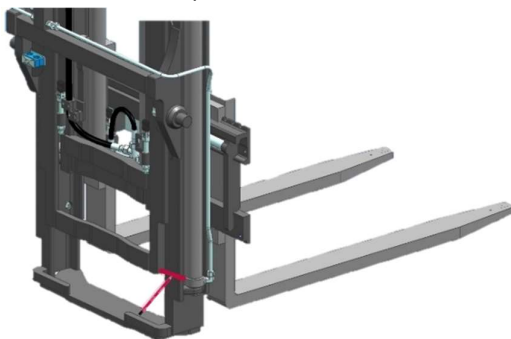
1. Remove the drain hose.



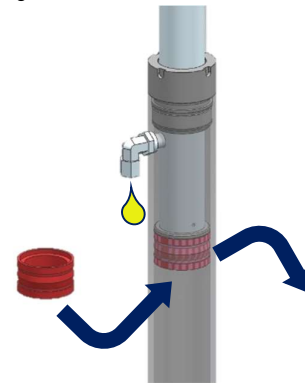
2. Send the cylinder to the limit switch several times, so that any oil contained in it can escape.
3. Apply a load on the forks and lift it, so that the cylinder makes a stroke of at least 200 mm.



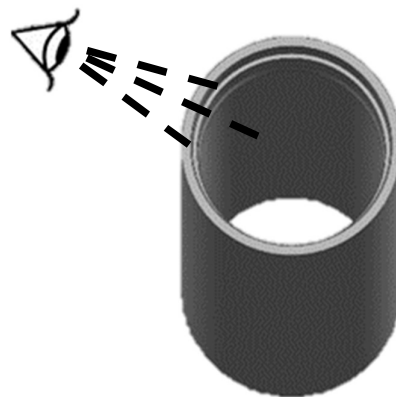
4. Trace a reference of the position reached by the inner mast with respect to the outer mast.



5. After about 20 minutes, check how much the load has dropped (a drop of a few millimetres is to be considered natural, as there are always leaks in the distributor).
6. At this point, send the cylinder to the end of the stroke: if there is no oil leakage from the drainage fitting, it means that the load has only been lowered for the leakage due to the distributor, and that the gasket is in good condition..



If you notice any leaks, the gasket must be replaced. On this occasion, check the inside of the cylinder.



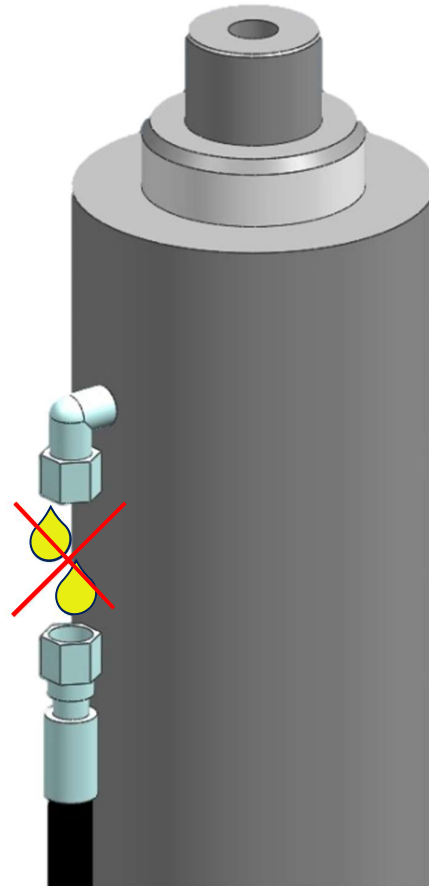
CONSTRUCTION COMPONENTS

PROCEDURES FOR CHECKING PISTON CYLINDERS

Dynamic check:

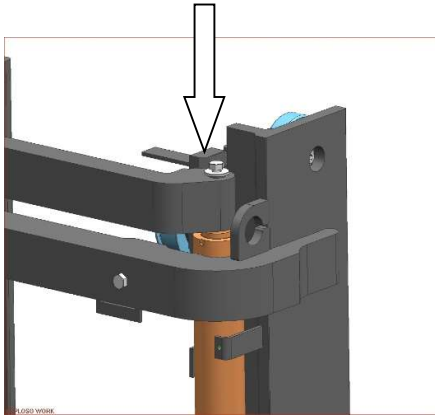
To be carried out after a positive result of the static check and also after the gasket has been replaced

1. The check must also be carried out in this case with the drain hose removed, if present.
2. Send the cylinder to the end of the stroke several times, so that any oil contained in it can escape.
3. Apply a load to the forks and make them rise and fall for about 20 minutes, being careful never to go to the end of the stroke.
4. Finally send the cylinder to the end of the stroke.
5. If there are still leaks, this means that the cylinder is damaged and needs to be replaced.

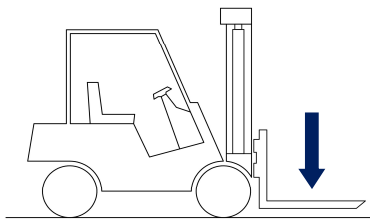


DISASSEMBLING SIDE CYLINDER

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

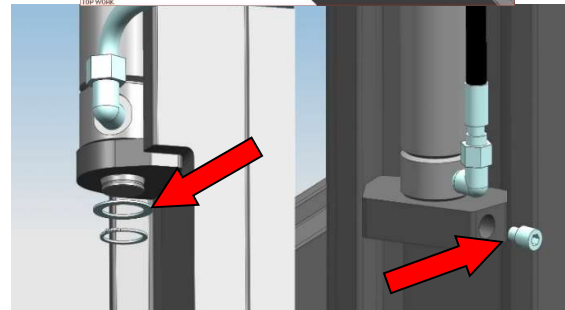
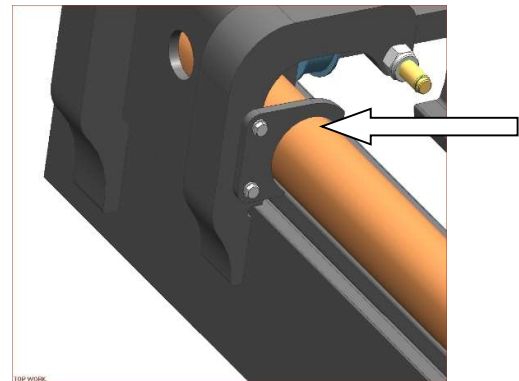


Unscrew the anchor screw that secures the rod to the crossmember. Remove the drain hoses.
 Hydraulically lift the inner mast to which the rod is connected by about 200 mm.
 If the mast is of the DV and TV types, the central cylinder will raise first, which will lift the fork carriage for the entire free lift. Once the free lift is finished, the side cylinders will raise.
 Apply a retainer between the lower part of the inner mast to which the cylinder is anchored and the ground.

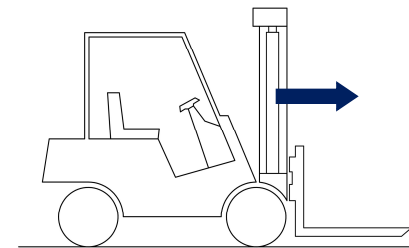


Lower the mast until it rests on the retainer. When the inner mast rests on the retainers, it will stop and any free lift cylinder will retract (only for DV, TV, QV models); finally the rods will retract.
 If this does not happen, help them by pushing them down.

The cylinder shell is held on the outer mast by a clamp at the top and by a screw at the bottom.
 Remove the above anchors and the supply hoses.



Remove anchors and supply hoses.



Remove the cylinder. Sometimes the attachments of the mast to the forklift hold the cylinder laterally against the profile of the mast: in this case, before carrying out this procedure, increase the opening of the mast as much as is necessary to extract the cylinder.

REPLACING SEALS

REPLACING THE SEALS IN THE PISTON CYLINDERS

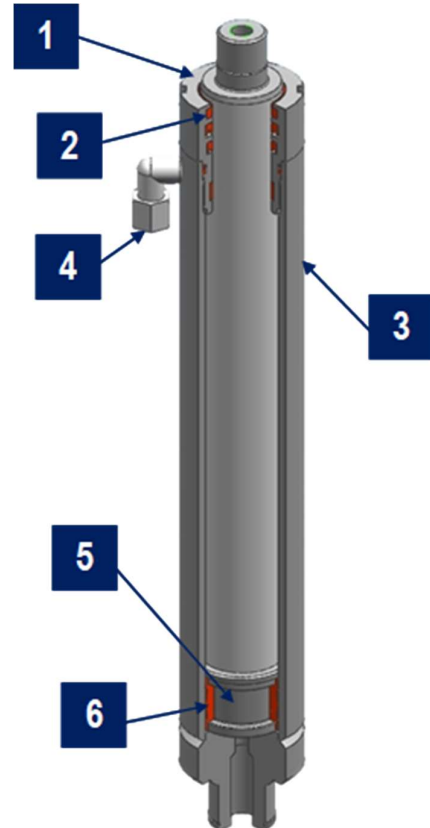
If a seal needs to be replaced, follow the procedure below:

1. Unscrew the cap (1) using the appropriate wrench. Avoid striking with awls.
2. Remove the rod (5).
3. Replace the seals (6) and (2).
4. Insert the rod (5), using the appropriate bushing according to the cylinder and the type of mast, taking the utmost care not to damage the internal surface.
5. Thoroughly degrease the cap (1).
6. Apply a couple of drops of sealant to the cap thread (1).
7. Screw the cap back on.

WHEN REPLACING THE SEALING GASKET, ALSO REPLACE ALL THE OTHER ITEMS IN THE KIT.

Carry out a complete lift cycle (free lift and stage lift) for the mast at least once a week to allow the expelled oil to return to the tank in cylinders with internal drainage (piston cylinders).

NB: IT IS VERY IMPORTANT TO LIFT THE MAST TO MAXIMUM ELEVATION AT LEAST ONCE A WEEK, TO ALLOW THE CYLINDERS TO REMAIN OILED INTERNALLY AND TO AVOID THE RISK OF RUST ON THE SHELVES DUE TO HUMIDITY IN THE ENVIRONMENT.



REPLACING SEALS

REPLACING THE SEALS IN THE DISPLACEMENT CYLINDERS

In the displacement cylinders, all the seals are housed in the cap (1), so generally it is not necessary to disassemble the cylinder from the mast.

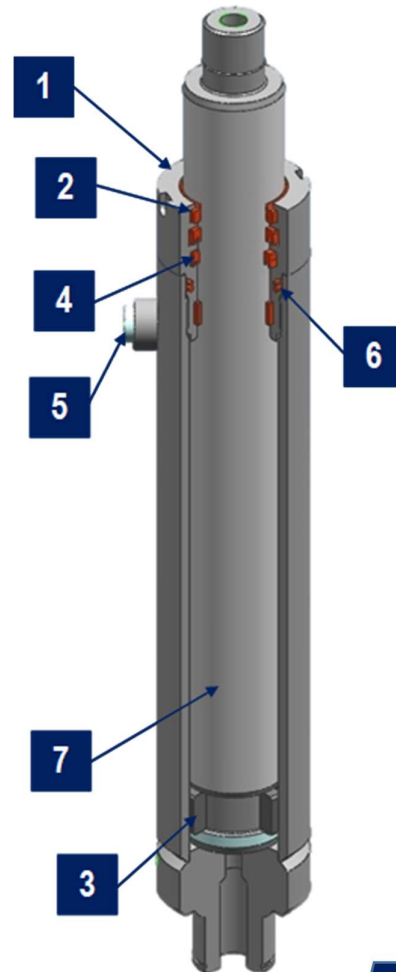
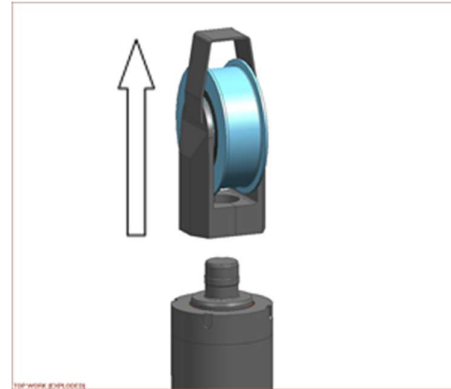
In the case of the central cylinders, it will be necessary to remove the chain and unscrew the hose pulley support.

In case of side cylinders, it is enough to work on crossmember that the rod pushes on, detached by 200/300 mm.

Follow the procedure below:

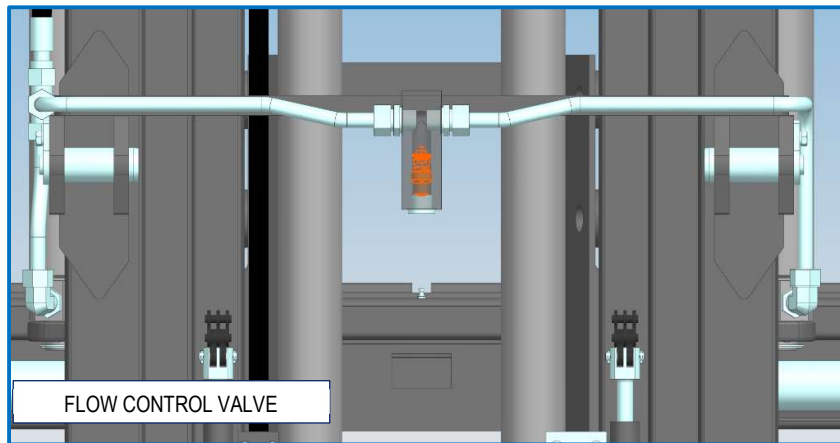
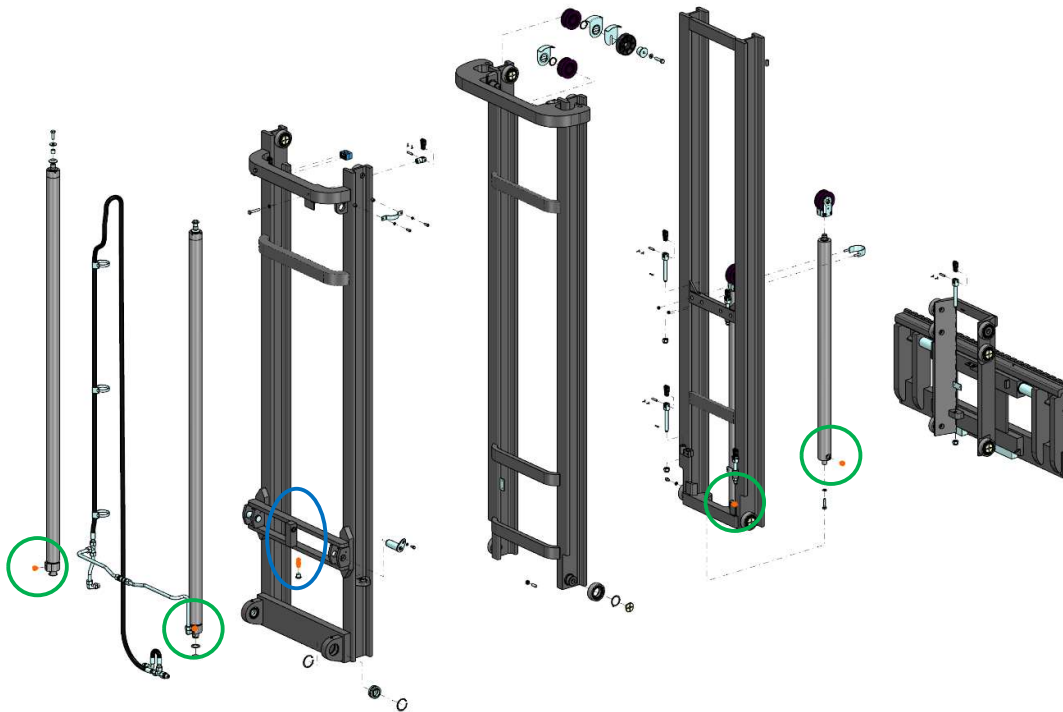
1. Unscrew the cap (1) using the appropriate wrench (avoid striking with awls).
2. Replace the gaskets (2), (4) and (6).
3. Screw the cap (1) back on.
4. Screw the rod back onto the crossmember.
5. Operate the mast.
6. Bleed the air through the vent screw (5).

NB: IT IS VERY IMPORTANT TO LIFT THE MAST TO MAXIMUM ELEVATION AT LEAST ONCE A WEEK, TO ALLOW THE CYLINDERS TO REMAIN OILED INTERNALLY AND TO AVOID THE RISK OF RUST ON THE SHELVES DUE TO HUMIDITY IN THE ENVIRONMENT.



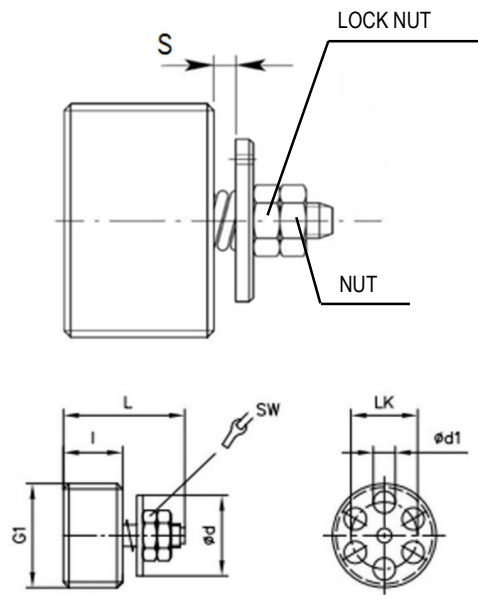
HYDRAULIC VALVES

The safety devices that regulate or prevent the uncontrolled lowering of the mast installed on the mast are hydraulic valves positioned at the base of cylinders or in the supply block of the mast. These devices are calibrated according to the manufacturer's instructions or otherwise in agreement with the customer. If further adjustments are necessary, contact the Lift-Tek Elecar Technical and After-Sales Department.



HYDRAULIC VALVES

LB SAFETY VALVES



This valve is used against the breakage of LB-type hoses and offers a high level of safety in the event of pressure peaks. It triggers in the event of a flow rate greater than it was previously set for. Large flow rates cause a disc resiliently lifted from the valve seat to be pushed against the body seat by hydrodynamic forces and the valve to close. The valve settings are shown in the diagrams below from the supplier HAWE. They are positioned at the base of the lift and free lift cylinders.

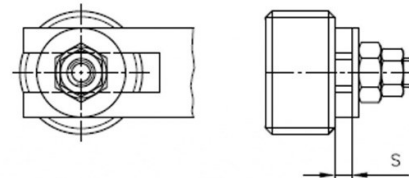
SW - key opening

Prepare suitable mounting tools for the holes.

Type	G1	L	I	Ød	Ød1	LK	SW	Tightening moment max. Lock nut MA (Nm)	Tightening moment max. Fruit MA (Nm)
LB 1 C	G 1/4 A	17.5	8.1	9.5	2.4	8.5	5.5	1.25	8
LB 2 C	G 3/8 A	21	10.6	12.5	3.5	11	5.5	1.25	12
LB 3 C	G 1/2 A	25	12.1	15	4.5	13	7	3.10	18
LB 4 C	G 3/4 A	30.5	17.1	17.5	6	16	7	3.10	23
LB 5 C	G 1 A	38	22.1	26	7.5	19.5	7	3.10	25

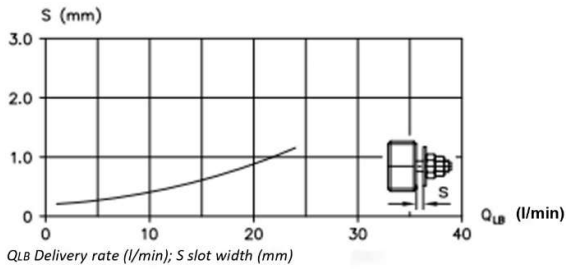
Adjusting the valve

- ▶ After loosening the nuts with two identical gauges or fork gauges, select slot width S.
- ▶ Tighten the nuts slightly by hand.
- ▶ Remove the gauges and carefully lock the nuts together.
/ Valve adjusted.

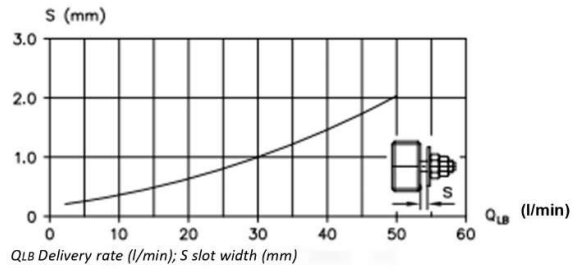


HYDRAULIC VALVES

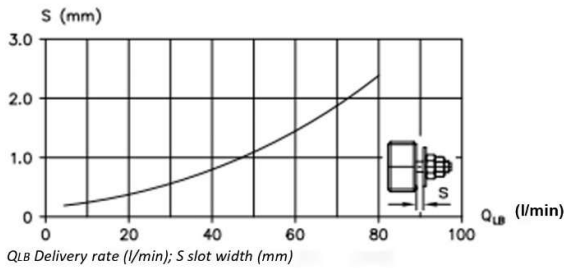
LB 1 C..



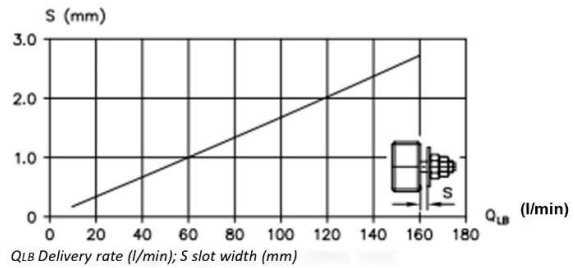
LB 2 C..



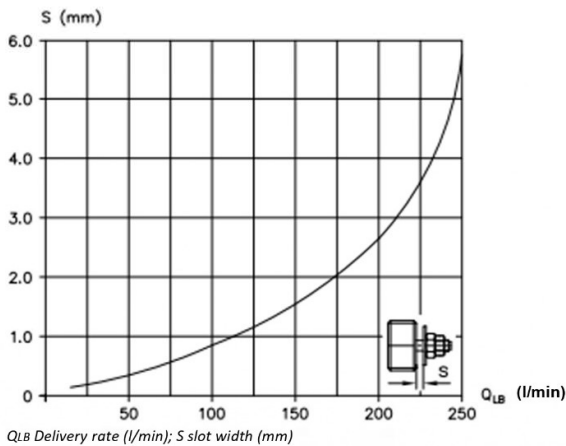
LB 3 C..



LB 4 C..

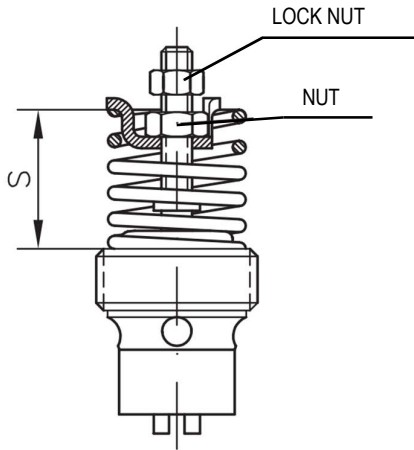


LB 5 C..

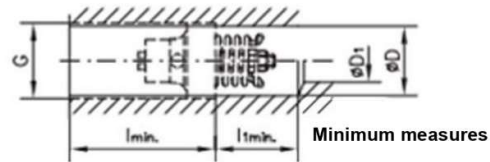
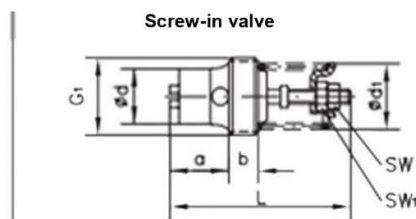


HYDRAULIC VALVES

SB FLOW CONTROL VALVES



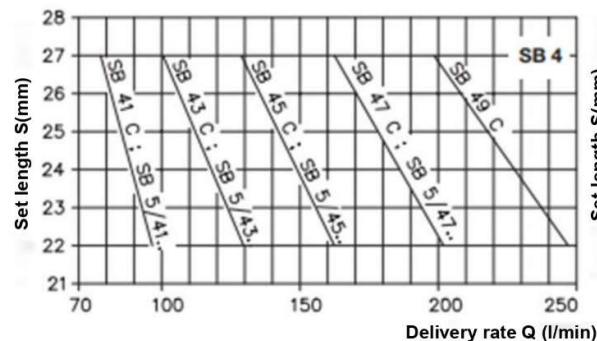
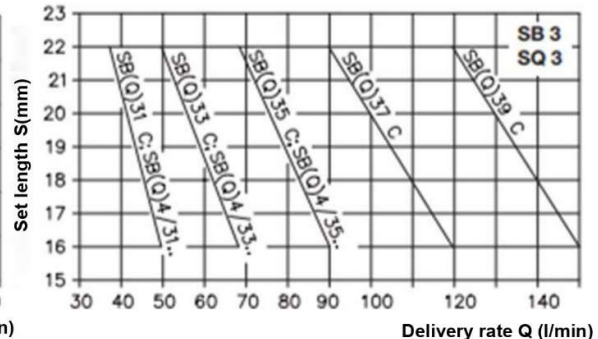
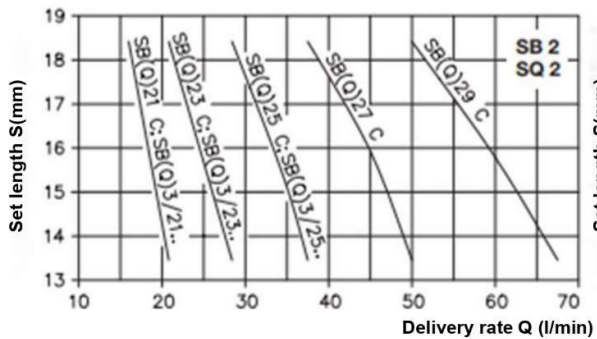
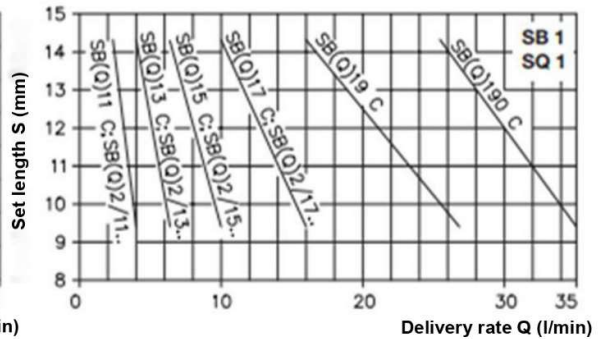
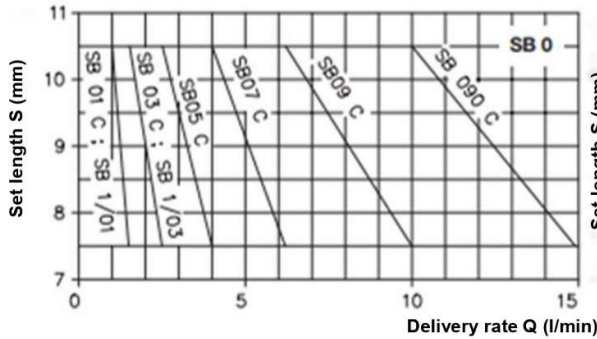
This valve is used to regulate the flow rate and thus control the lowering speed of single-acting consumers. The minimum lowering speed is prescribed in the ISO3681 standard. The valve settings are shown in the diagrams below from the supplier HAWE. It is located inside the mast's hydraulic supply block.



Type	G ₁	L	a	b	d	d ₁	SW	SW ₁	G	D	D ₁	l _{min}	l _{1min}	tightening mom. (Nm)
SB 0	G 1/4 A M 14x1.5	39	12.5	7	10	10.5	4.5	5.5	G 1/4 M 14x1.5	11.75	5	33	22	6
SB 1 SQ1	G3/8A M 16x1.5 M 18x1.5	43	13.5	7	11.5	13.5	6	7	G 3/8 M 16x1.5 M 18x1.5	15.25	8	34	26	8
SB 2 SO 2	G 1/2 A M 20x1.5 M 22x1.5 7/8-14 UNF-2B	49	16	8	15	18	6	7	G 1/2 M 20x1.5 M 22x1.5 7/8-14 UNF-2A	19	12	40	30	12
SB 3 SO 3	G3/4A M 27x2	61	21	10	20	23	6	7	G3/4 M 27x2	24.5	16	51	29	15
SB 4	G 1 A M 33x2	78	25	15	26	28.5	7	8	G1 M 33x2	30.5	20	65	40	20
SB 5	G 1 1/4 A M 42x2	94	31	21	33	34.5	9	10	G1 1/4 M 42x2	39.5	25	78	42	25

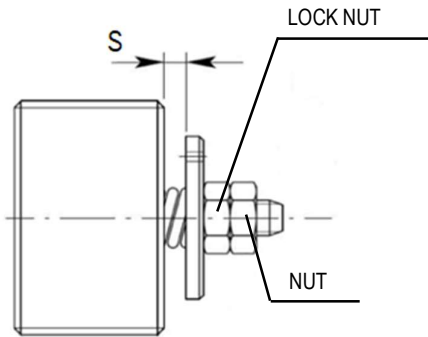
maximum
tightening
moment for screw-
in valve in
connection with
drilling by the
customer and
valve body

HYDRAULIC VALVES

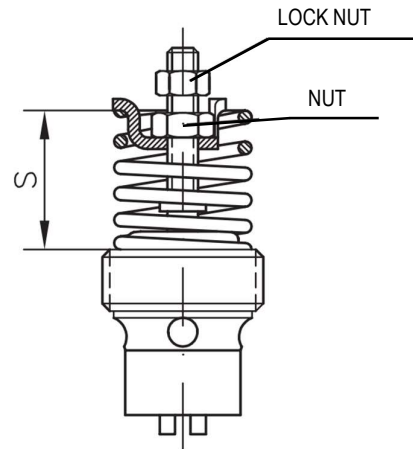


HYDRAULIC VALVES

CALIBRATION AND SETTING OF THE HYDRAULIC MAST VALVES



LB SAFETY VALVE

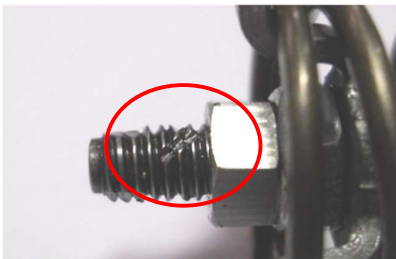


SB FLOW CONTROL VALVE

1. Loosen the lock nut.
2. Screw or unscrew the nut until the required "S" dimension is obtained.
3. Check the dimension with the gauge.

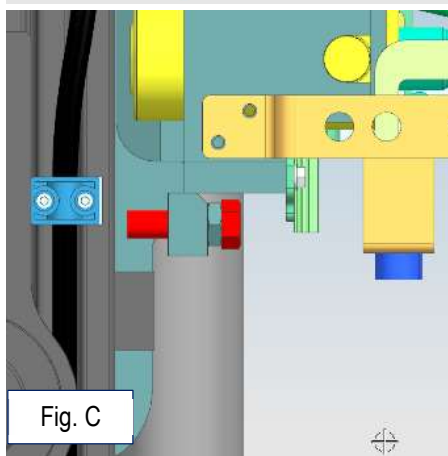
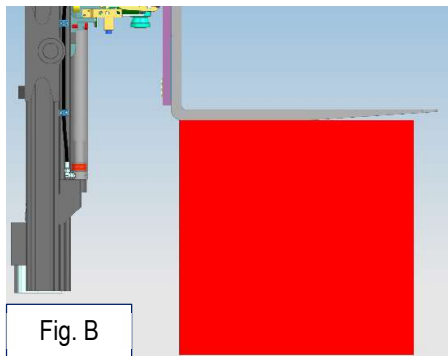
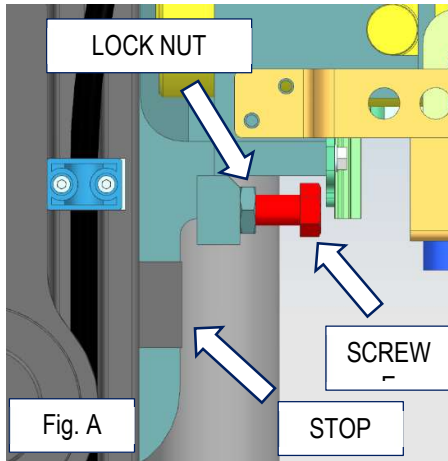


4. Lock the lock nut.
5. Score the valve thread with the nippers supplied in order to prevent the two nuts from unscrewing.



OPTIONAL

MECHANICAL STOP FOR THE MAINTENANCE OF THE CARRIAGE



Upon request, there may be a mechanical stop for the carriage or equipment; this stop is to be used only for routine maintenance.

The mechanical stop appears as a screw mounted on the carriage which in ordinary working conditions does not intercept the mast profile.

Before performing maintenance, follow the steps below:

1. Raise the carriage and forks off the ground;
2. Place an additional stop under the forks in order to avoid sudden descents, as in Fig. B. This stop serves to prevent the uncontrolled lowering of the carriage. This protection may not be sufficient to block the mast stages as well. It is therefore also necessary to place a block under the stage, if it is necessary to have the mast raised and not just the carriage with the forks. If the mast does not have forks/equipment, place the stop in Fig. B directly under the carriage;
3. Unscrew the lock nut and adjust the screw as in Fig. C.

Once the maintenance operations have been carried out, return the screw to its initial position as in Fig. A and tighten the lock nut. After performing this operation, it is possible to remove the additional stop positioned under the stages, the carriage and the forks.

DISPOSING OF THE MAST

To correctly dispose of the mast at the end of its life cycle and to minimise the environmental impact, differentiate the collection of the various parts by separating the different components:

- iron
- hoses
- hydraulic oil
- grease
- cylinder seals
- plastic

Dispose of the various parts thus separated according to the waste disposal laws in force in the country.

