

M MODEL FORK POSITIONERS

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INTRODUCTION

This manual includes instructions for the assembly and periodic maintenance of the M model fork positioner, as well as troubleshooting and a list of spare parts.

All the instructions show two measuring standards (metric and US). The instructions in this manual do not replace, but rather add to the need to obey occupational safety and accident-prevention regulations. It is the user company's responsibility to adhere to these regulations.

The user company is, likewise, required to follow all the instructions in this manual, including training its personnel to use and maintain the positioner. The positioner was designed and built according to safety standards; danger stickers on the equipment indicate any potential risks.

SPECIFICATIONS AND USE OF THE EQUIPMENT

The fork positioner is a device that allows shifting and positioning of forks in order to move loads more easily.

It is important to check that the weight and centre of gravity of the load do not exceed the limits marked on the identification plate; if the centre of gravity is moved forward on the shifting plate, the weight of the load must be reduced accordingly.

The equipment is made up of a guiding frame for the forks, with ISO 2328 profile hooks that will be attached to the forklift, with partly incorporated shifting; a hydraulic system for specific movements; sliding fork supports on chrome bars that are driven by opposing linear actuators, the shape and dimensions of which are suitable for the load to be handled.

1. RECOMMENDATIONS FOR USING THE EQUIPMENT

1.1. PROHIBITED MOVEMENTS

- Transporting an unstable or decentralised load; a load that is too bulky, reducing visibility; moving a load with greater weight than the indicated capacity; moving an already deposited load using the load to be deposited; using the attachment when it presents structural defects or operating anomalies.

Executing movements or manoeuvres with load raised high.

Proceeding at high speed on a rough surface or climbing ramps.

Using the forks to jam loads or to move them sideways.

Handling loads which height can interfere with visibility during the manoeuvre.

Transporting people or performing manoeuvres with people within the range of the forklift.

Parking the forklift with engine running and/or load lifted on a rough surface or on climbing ramps.

Picking up the load with just one fork.

Using the shifting motion when the forklift is turning a corner.

Mounting the forks onto the supports without blocking them in their notch.

The tips of the forks must support the last crossbeam of the pallet without sticking out beyond it.

Using the equipment for any purpose for which it was not intended.

1.2. CORRECT MOVEMENTS

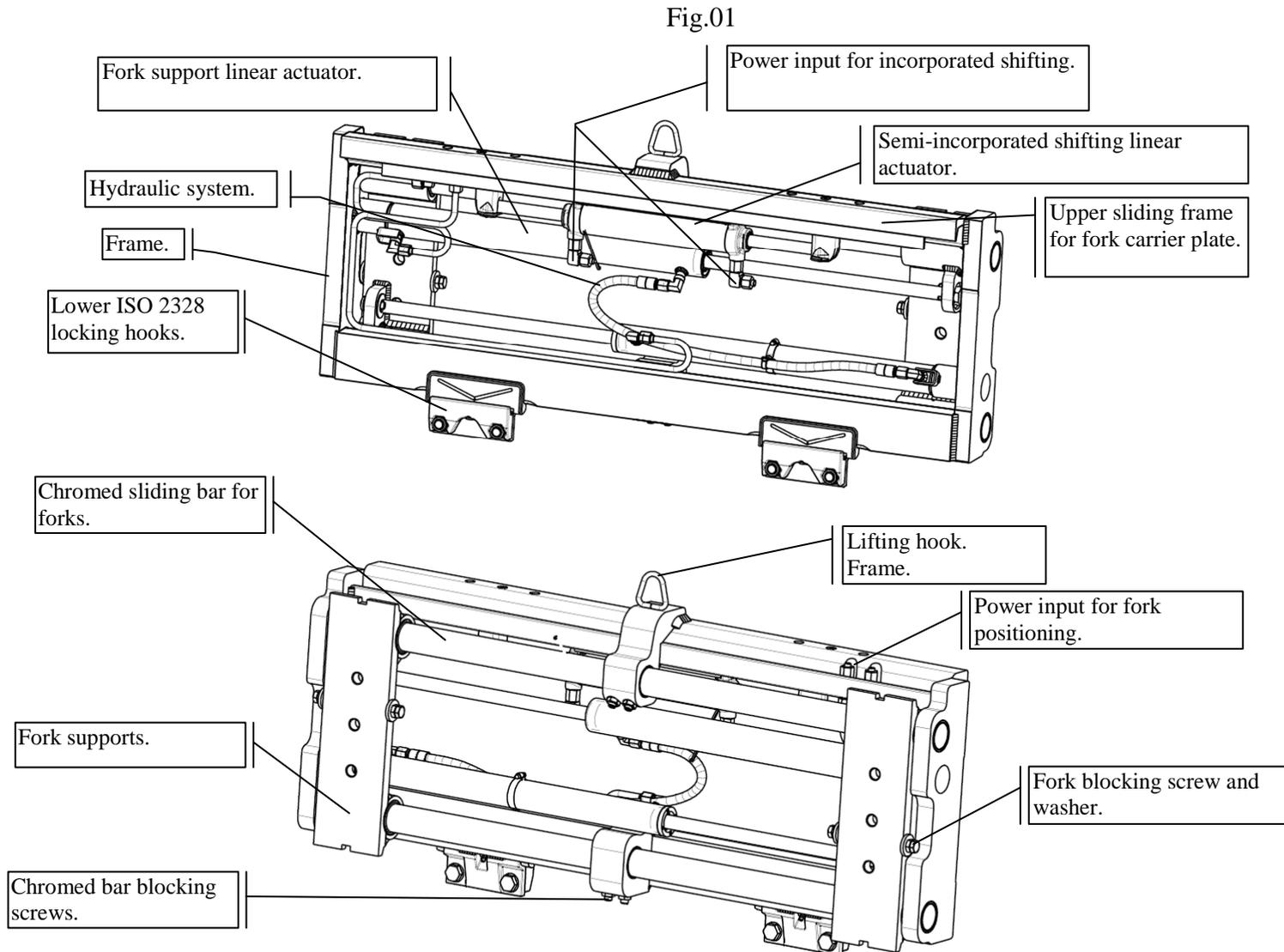
Be careful when taking hold of the load to avoid damage or dangerous shifting of the adjacent loads.

The load must be stable, in crossed layers or tied with straps.

When moving with the forklift, keep the mast tilted (the tips of the forks must point up), the load lifted slightly off the ground and centred, adjusting the speed based on the road surface and any obstacles or the presence of people on route.

The outside measurement of the forks must be 40-80 mm less than the inside measurement of the pallet.

2. ATTACHMENT CONFIGURATION



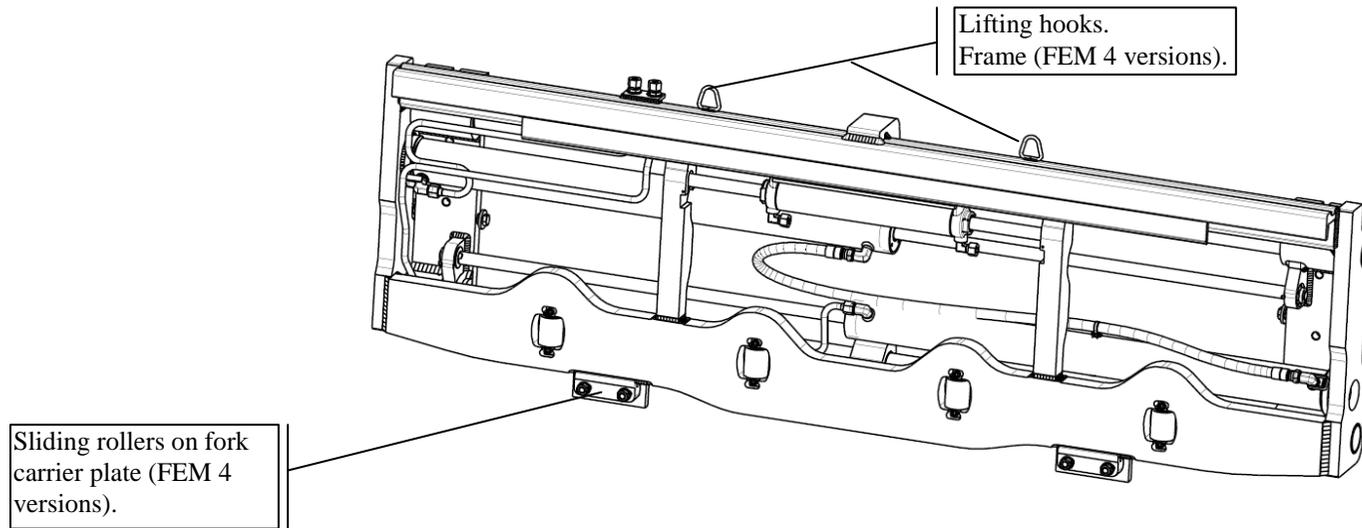


Fig.03

3. INSTALLING THE POSITIONER

3.1. Forklift requisites

- 3.1.1. **Supply pressure**
80 bar – 1180 psi **average running pressure**
250 bar – 3680 psi **maximum**
- 3.1.2. **Oil flow**
For load up to 3600 kg
7 litres/min – 2 GPM **minimum**
9 litres/min – 2.5 GPM **recommended**
For load up to 5000 kg
17 litres/min – 5 GPM **minimum**
22 litres/min – 6 GPM **recommended**
For load up to 8000 kg
28 litres/min – 8 GPM **minimum**
36 litres/min – 10 GPM **recommended**

3.1.3. Forklift plate dimensions

	ISO 2228 Dimension "A"		ISO 2228 Dimension "B"	
	Min.	Max.	Min.	Max.
Class II	380 mm – 14.96 in	381 mm – 15 in	15 mm – 0.59 in	16 mm – 0.63 in
Class III	474.5 mm – 18.68 in	476 mm – 18.74 in	20.5 mm – 0.82 in	21.5 mm – 0.85 in
Class IV	595.5 mm – 23.44 in	597 mm – 23.5 in	24.5 mm – 0.96 in	25.5 mm – 1 in



Fig.04

WARNING: Before installing the positioner, clean the forklift's fork carrier plates and check for damage, dents or deformity. If the forklift plate is damaged or out of shape, it must be replaced before attaching the hooked positioner.

3.2. Recommended hydraulic system

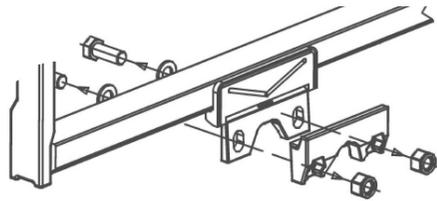
3.2.1. The equipment requires two independent controls and 4 auxiliary power hoses with a minimum diameter of 6 mm (1/4 inch) for loads up to 3600 kg or 9 mm (3/8 inch) for greater loads.

IMPORTANT: all the slide blocks are pre-greased by the manufacturer. The sliding rollers on the lower bar are pre-greased internally and come equipped with a protective screen on both sides to stop the grease from coming out, thereby preventing the rollers from working properly.

3.3. Installing the positioner

Warning: Before any maintenance operation, turn off the forklift and remove pressure from the hydraulic circuit by repeatedly moving the positioner levers in both directions while the forklift is off. Ensure that no one turns the ignition key or moves the forklift's command lever for the entire duration of maintenance.

3.3.1. **Unscrew the lower hooks from the positioner:** for versions with separate shifting ISO 3318 24 mm wrench for class 2, 27 mm for class 3; ISO 3926 14 mm wrench for class 4. For versions without shifting, ISO 3318 19 mm wrench for class 2, 24 mm for class 3 and ISO 3926 17 mm for class 4.



class 4.
Fig.05 (FEM 2 and FEM 3 separate shifting)

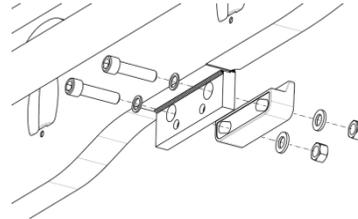
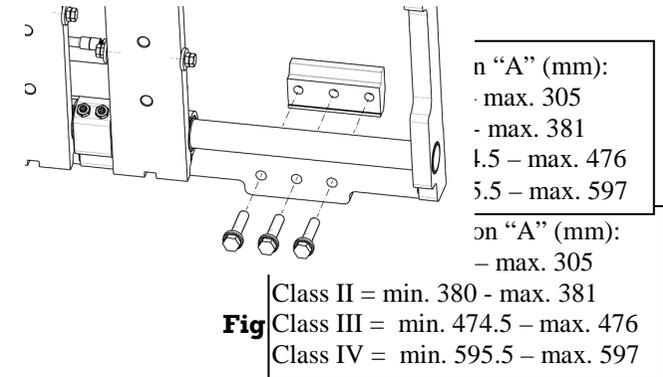


Fig.06 (FEM 4 separate shifting)



Fig

3.3.2. **Set the positioner (after having secured it with suitable ties to a hook and lifting system that can bear a load of 700 kg (1540 lbs) for positioners up to class 3 or 1000 kg (2200 lbs) for positioners in class 4) so that the block or notch of the shifting cylinder (for versions with separate shifting) or of the upper frame (versions without shifting) matching up with the central notch of the forklift's fork carrier plate.**

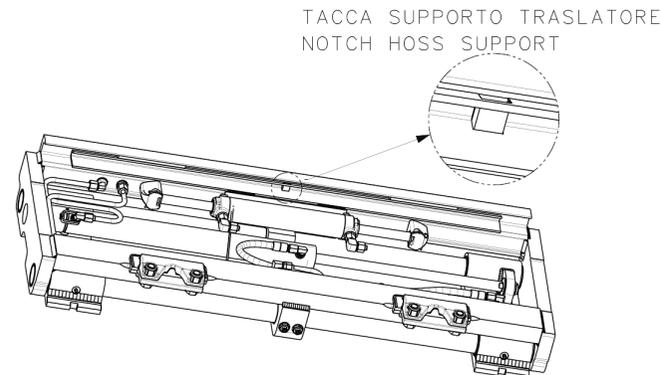
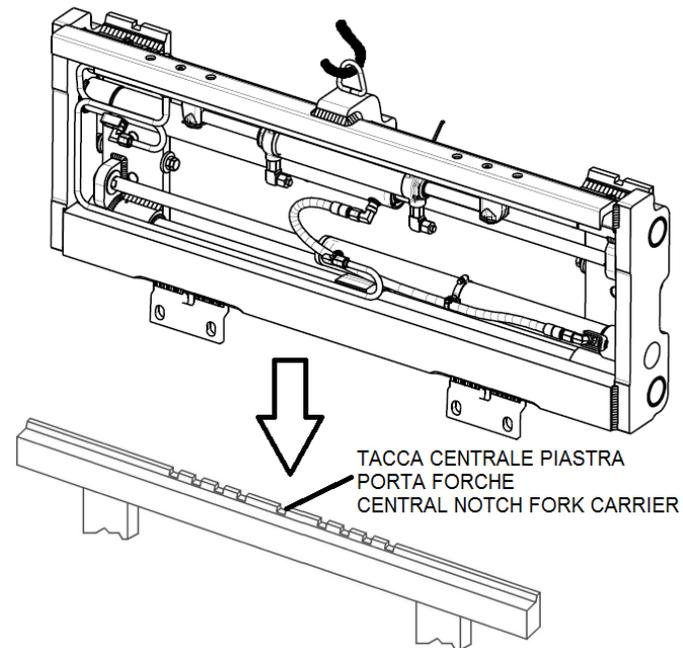


Fig.08

Ensure that the shifter's support and the notch on the forklift's plate match up correctly.

**Fig.09**

3.3.3. Assemble the lower hooks once more as shown in 3.3.1, with the components in the correct sequence as per the diagram 3.3.1. Tighten the screws as prescribed below:

- FEM II: 314 Nm – 233ft-lbs (minimum 240 Nm – 180 ft-lbs)**
- FEM III: 461 Nm – 233ft-lbs (minimum 300 Nm – 220 ft-lbs)**
- FEM IV: 420 Nm – 233ft-lbs (minimum 280Nm – 208 ft-lbs)**

For versions with separate shifting, maintain the required play as shown in the following diagrams and then tighten until the hexagonal screws self-lock against the hook (ISO 3926 8 mm wrench, for class 4 positioners). For versions without shifting, the lower hooks must be locked against the plate, without any play.

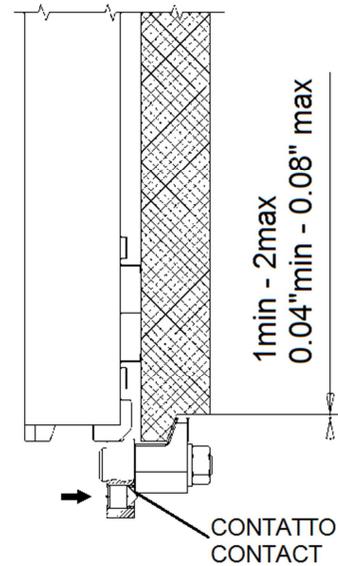


Fig. 010 (FEM IV)

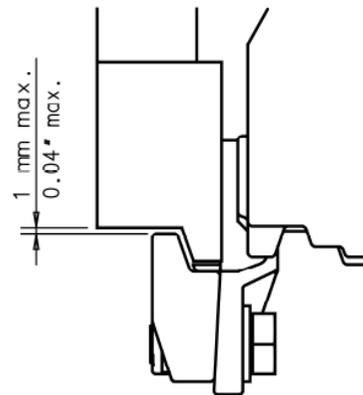
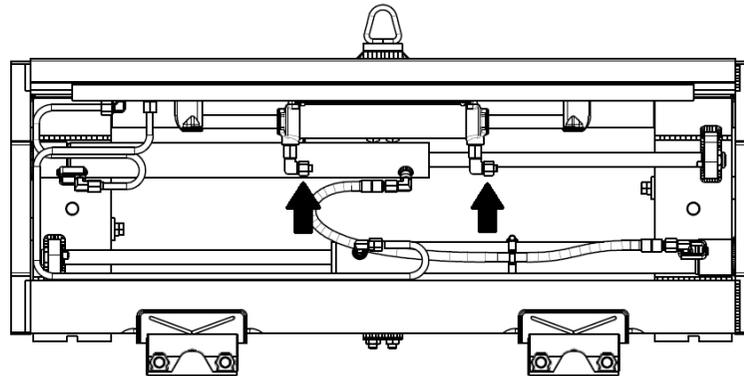
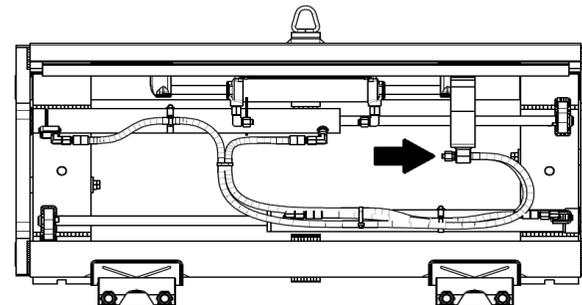


Fig. 011 (FEM II and III)

3.3.4. **Connect the forklift's system to the shifter, if it is present, at the points shown and tighten the fittings according to their specifications. M series positioners can have the following inputs into the shifting cylinder M14x1,5 (ISO 3318 19 mm wrench) or 9/16" 18 UNF for class 2 and 3; M18x1,5 (ISO 3318 27 mm wrench) or 3/4" 16 UNF for class 4.**

**Fig. 012**

Connect the forklift's system to the positioner at the points shown for the positioning of the forks and tighten the fittings according to their specifications. M series positioners can have the following inputs 10L (ISO 3318 19 mm wrench) or 12 L (ISO 3318 22 mm wrench) for class 2 and 3, 15 L (ISO 3318 27 mm wrench) for class 4. JIC inputs are also available.



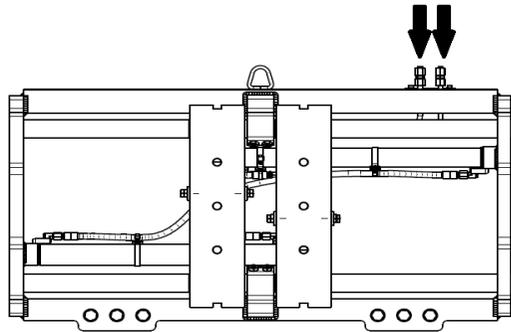
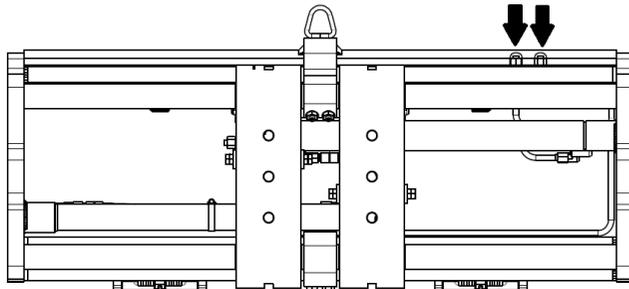


Fig. 013 – Standard position fork positioning inputs versions with separate shifting

Fig. 015 – Standard position fork positioning inputs versions without shifting

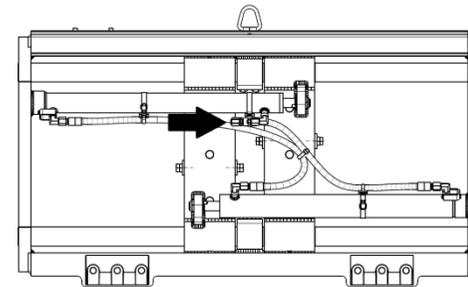


Fig. 014 – Fork positioning inputs position at centre of frame versions with separate shifting

Fig. 016 – Fork positioning inputs position at centre of frame versions without shifting

3.3.5. Position the supports around the middle and remove the washers and side screws (ISO 3318 18 mm wrench or 24 mm if class 4) (phase 1 Fig.017). Insert the fork on the side and slide it onto the support (it is also possible to open the support slightly to slide in the fork) (phase 2 Fig. 017); ensure the fork positioner's block is inserted correctly in the support's notch. Replace the washer, screw and nut for blocking the side and the fork screws (ISO392617 mm wrench) (phase 3 Fig. 017), tightening these to 680 Nm - 500 ft-lbs.

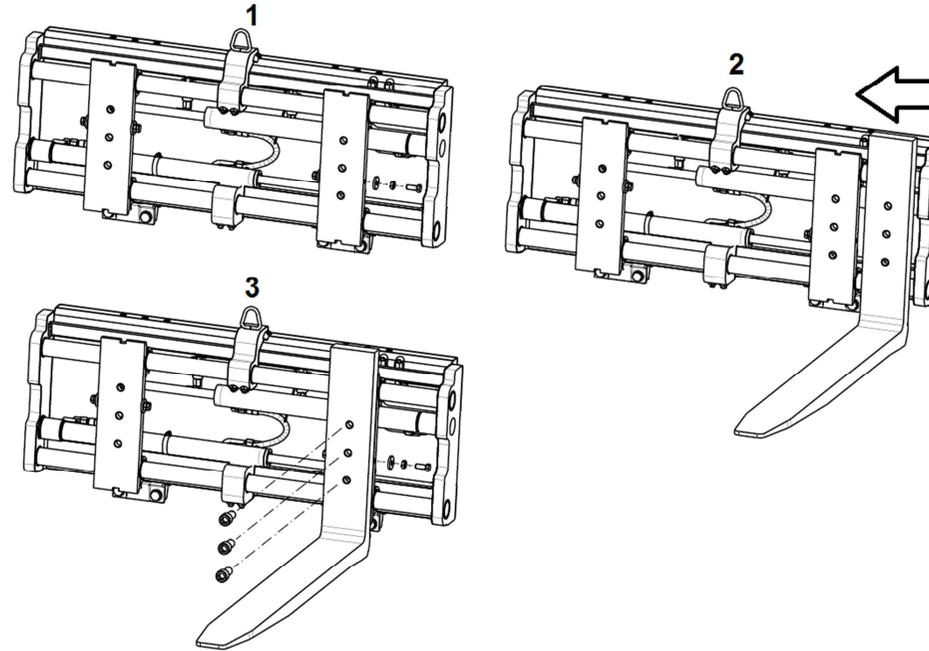


Fig. 017

IMPORTANT NOTE FOR FEM 4 POSITIONERS WITH SEPARATE SHIFTING: after installing the class 4 positioners with separate shifting, check that the procedure was done correctly by doing 5 complete shifts without loading the forks and checking for the following:

Case 1

Fork carrier plate, standard forklift (rectangular):

If your forklift's fork carrier plate is standard, i.e. rectangular, when completely shifted to the side, the middle of the roller must stop at least 15 mm (0.6") before the edge of your forklift's fork carrier plate. In this case, the positioner can be used.

If this is not the case, the positioner is **NOT** compatible with your forklift's fork carrier plate and therefore **CANNOT** be used.

Case 2

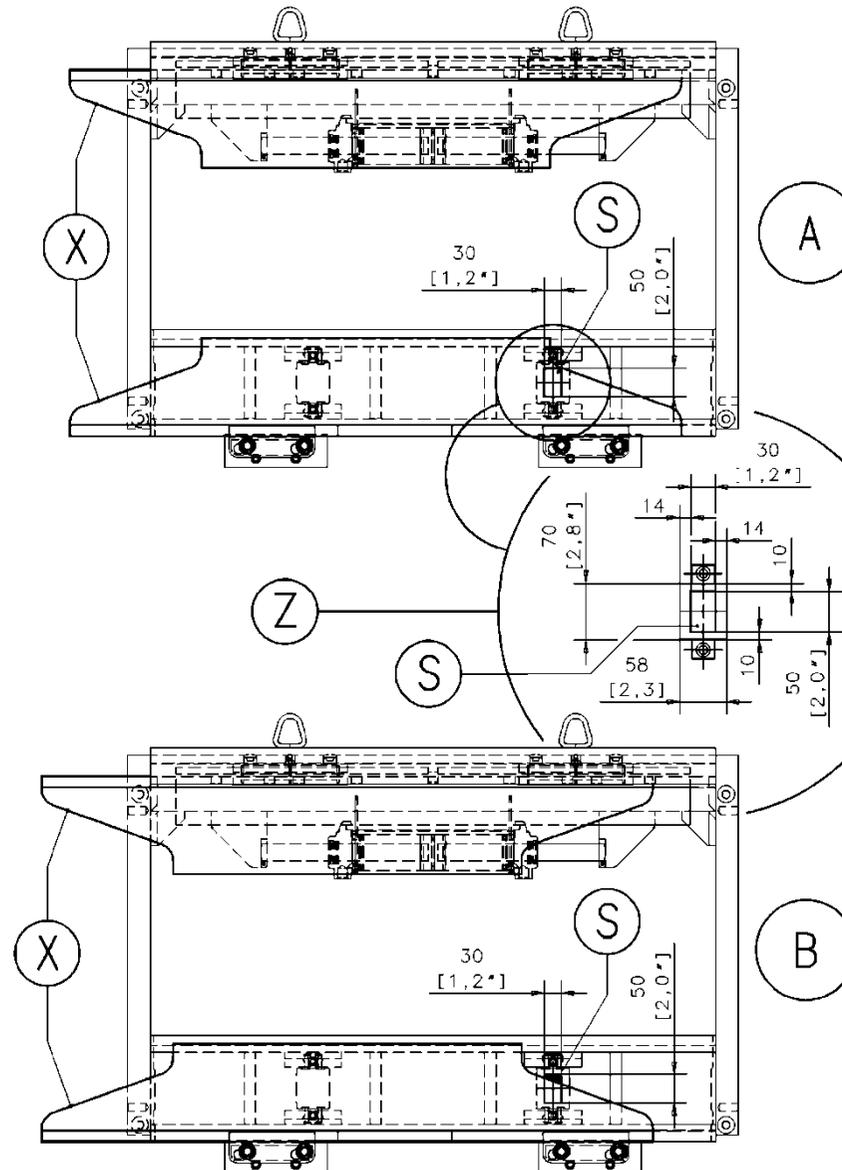
Fork carrier plate, shaped forklift:

If your forklift's fork carrier plate is shaped, as shown by the "X" in the diagram below, you will need to check that the attached positioner, when completely shifted to the side and mounted on plate "X" matches up to figure "A". Area "S", measuring 50 mm (2") x 30 mm (1.2"), projecting onto the roller must be completely covered by the edge of your fork carrier plate on forklift "X". In this case, the positioner can be used.

If your positioner is completely shifted in respect to your fork carrier plate and it falls within case "B", i.e. the area "S" measuring 50 mm (2") x 30 mm (1.2") projecting onto the roller is **NOT** completely covered by the edge of your fork carrier plate on forklift "X", then the positioner is **NOT** compatible with your fork carrier plate.

Note: In the following diagram, "Z" regard to the roller.

Once these checks have been done conforms to the standards, you can perform 5 shifts with a full load on the forks.



indicates the position of area "S" with

and you have ensured that everything perform 5 shifts with a full load on the

Fig. 018

4. DAILY CHECKS

At the start of every work shift, check the following and inform maintenance personnel of any problems:

- **check the tightness of the nuts fastening the rod and bottom of the movement cylinder supports;**
- **check the tightness of the nuts fastening the forks;**
- **check for any leaks from the movement cylinder supports;**
- **check that the supports' chromed sliding bars are clean;**
- **the centre tooth of the upper slide block guide must fit in the centre notch of the forklift's fork carrier plate;**
- **check for any leaks from the shifting cylinder;**
- **check the correct positioning and fastening of the slide blocks and lower hooks.**

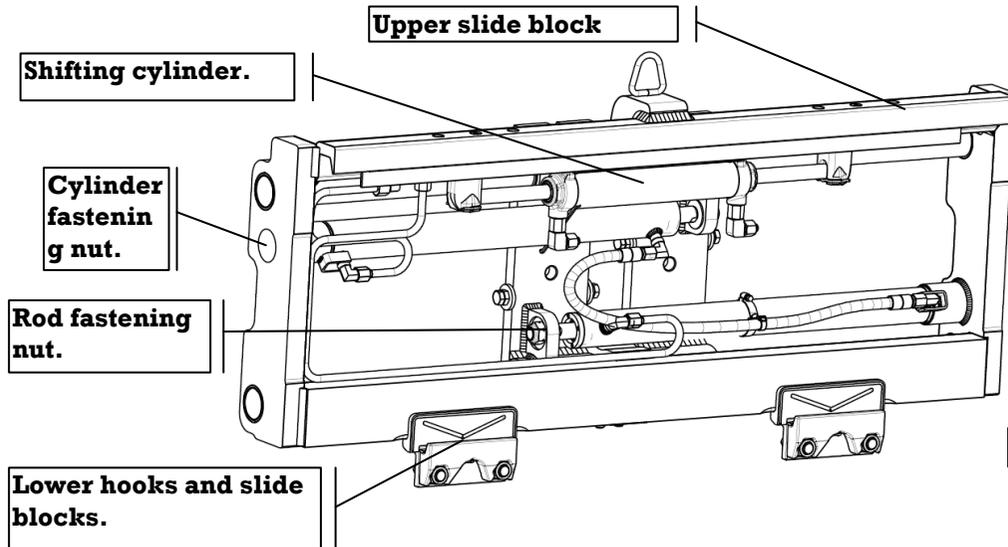


Fig. 019

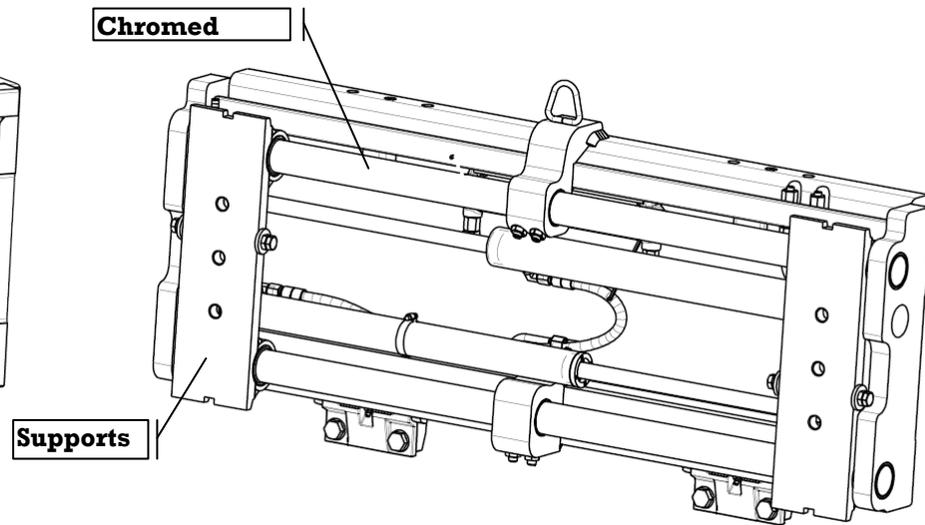


Fig. 020

5. PERIODIC MAINTENANCE

5.1. 100 hours

Check the tightness of screws "a" on the lower hooks and rollers, if they are present (for tightness see 3.3.3); check for any damage on the hoses or the hydraulic system's fittings and that the fittings are tightened correctly. Check the tightness of the nuts fastening the forks. Check for play between the forklift's lower bar and the lower hooks of the shifter as described in 3.3.1. In the event that there is too much play, adjust the hooks and tighten the screws as described in 3.3.1.

5.2. 500 hours

In addition to the checks in 5.1:

Grease the sprocket bushings "g", grease the upper and lower slide blocks "b" and "c" and check that the rollers work correctly, if present. If the rollers do not work correctly, replace them with new ones. For positioners for class 2 and 3 (without rollers): apply grease to the lower bar of the forklift where the slide blocks move. Warning: Do not grease the lower bar for positioners in class 4 (with rollers).

5.3. 1000 hours

In addition to the checks in 5.1 and 5.2:

Check the condition of the hydraulic actuators "d"; any oil leaks from the cover and the condition of the chromed surface of the rod. Check the condition of the chromed bars "e".

Check the thickness of the upper sliding blocks; if thinner than 4mm (0.15 in) replace them as described in 5.2. Check the thickness of the lower sliding blocks; if thinner than 5mm (0.2 in) replace them as described in 5.2.

Check that the lower rollers work correctly, if present. If the rollers do not work correctly, replace them with new ones. Check the condition of the lower rollers. If they are damaged, replace them with new ones. Warning: Do not grease the lower bar.

Check and if necessary replace the support bushings "f", if thinner than 1.5 mm as described in 7.4.

5.4. 2000 hours

In addition to the checks in 5.1, 5.2 and 5.3:

Replace the upper and lower sliding blocks as described in 7.2. Replace the self-locking nuts that fasten the lower hooks (positioners for class 2 and 3, without rollers).

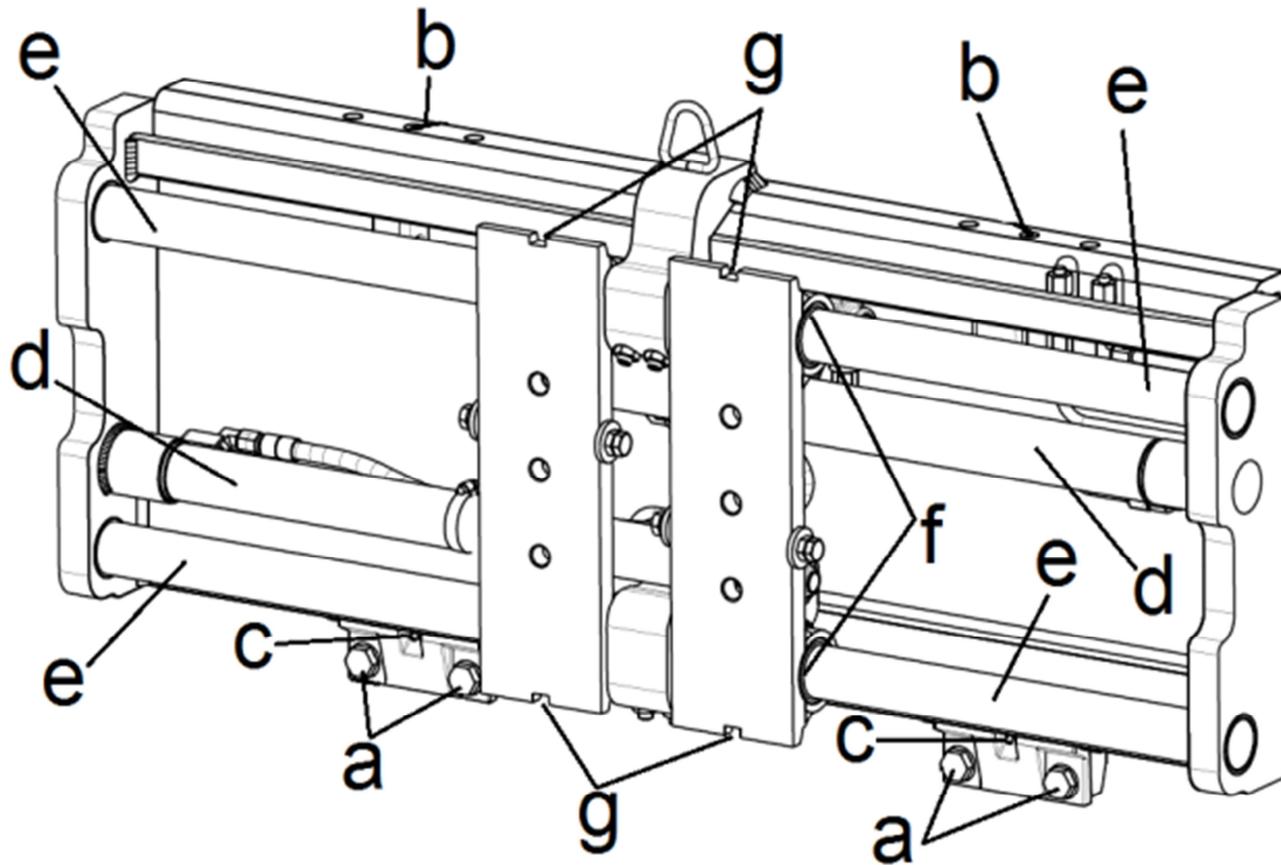


Fig. 021

6. HYDRAULIC DIAGRAM

6.1. Versions with separate shifting

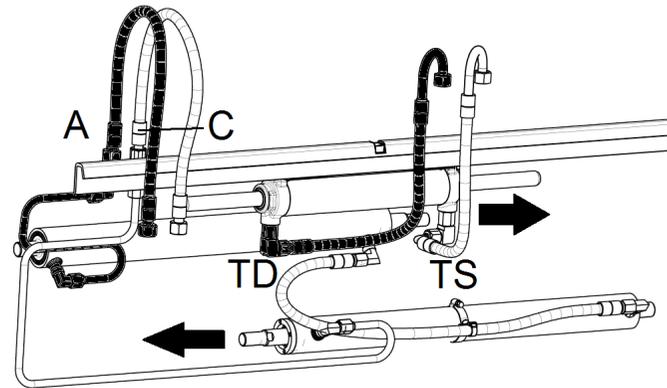


Fig. 022 – Hydraulic system for versions with separate shifting with fork power inputs in standard position

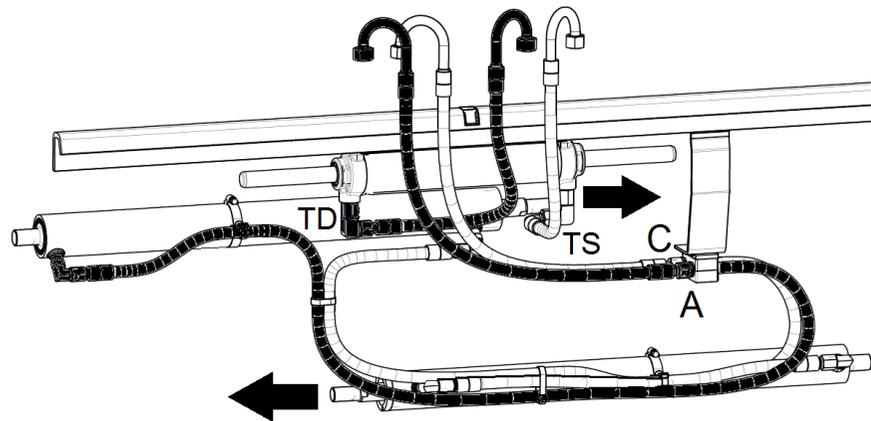


Fig. 023 – Hydraulic system for versions with separate shifting with fork power inputs positioned in the middle of the frame

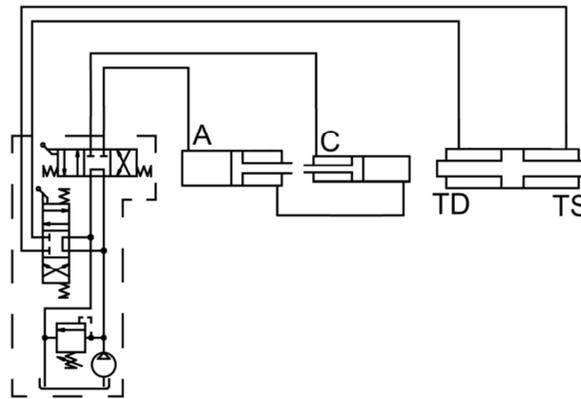


Fig. 024 – Hydraulic diagram for versions with separate shifting

6.2. **Versions without shifting**

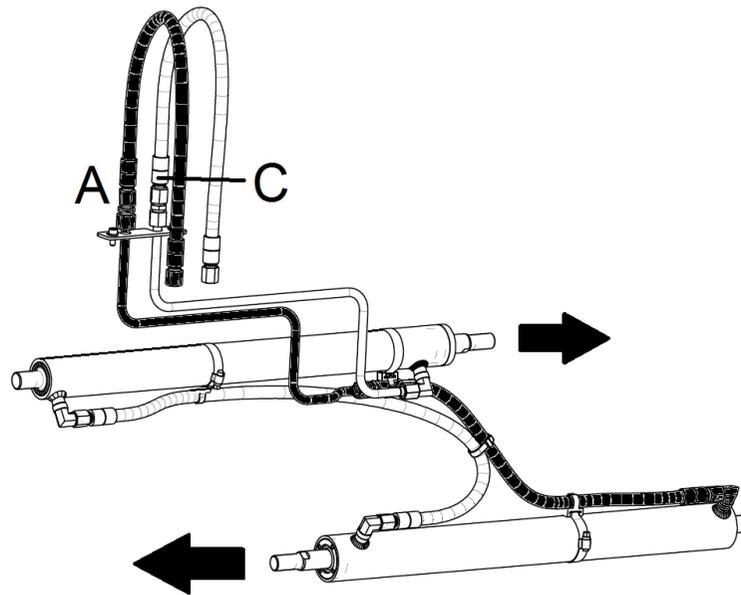


Fig. 025 – Hydraulic system for versions without shifting with fork power inputs in standard position

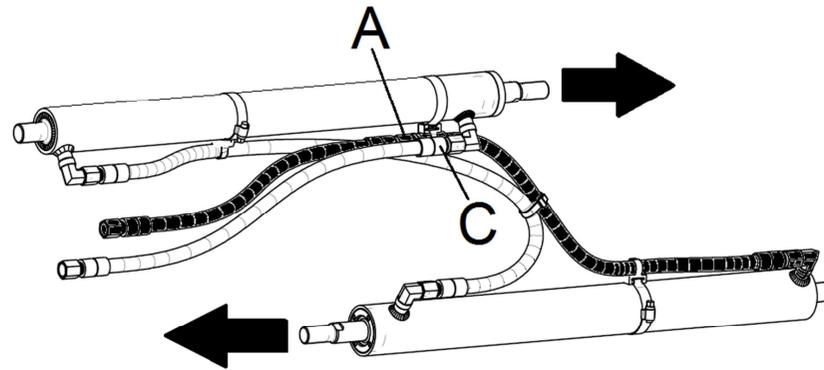


Fig. 026 – Hydraulic system for versions without shifting with fork power inputs positioned in the middle of the frame

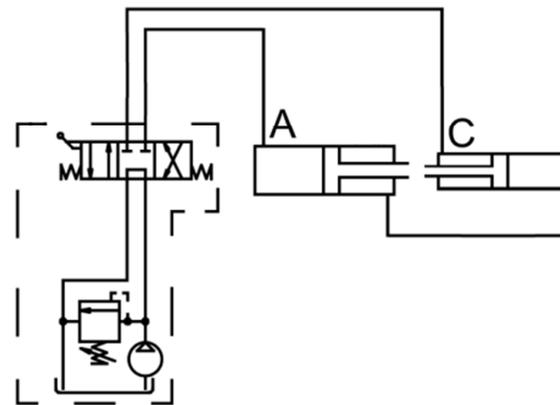
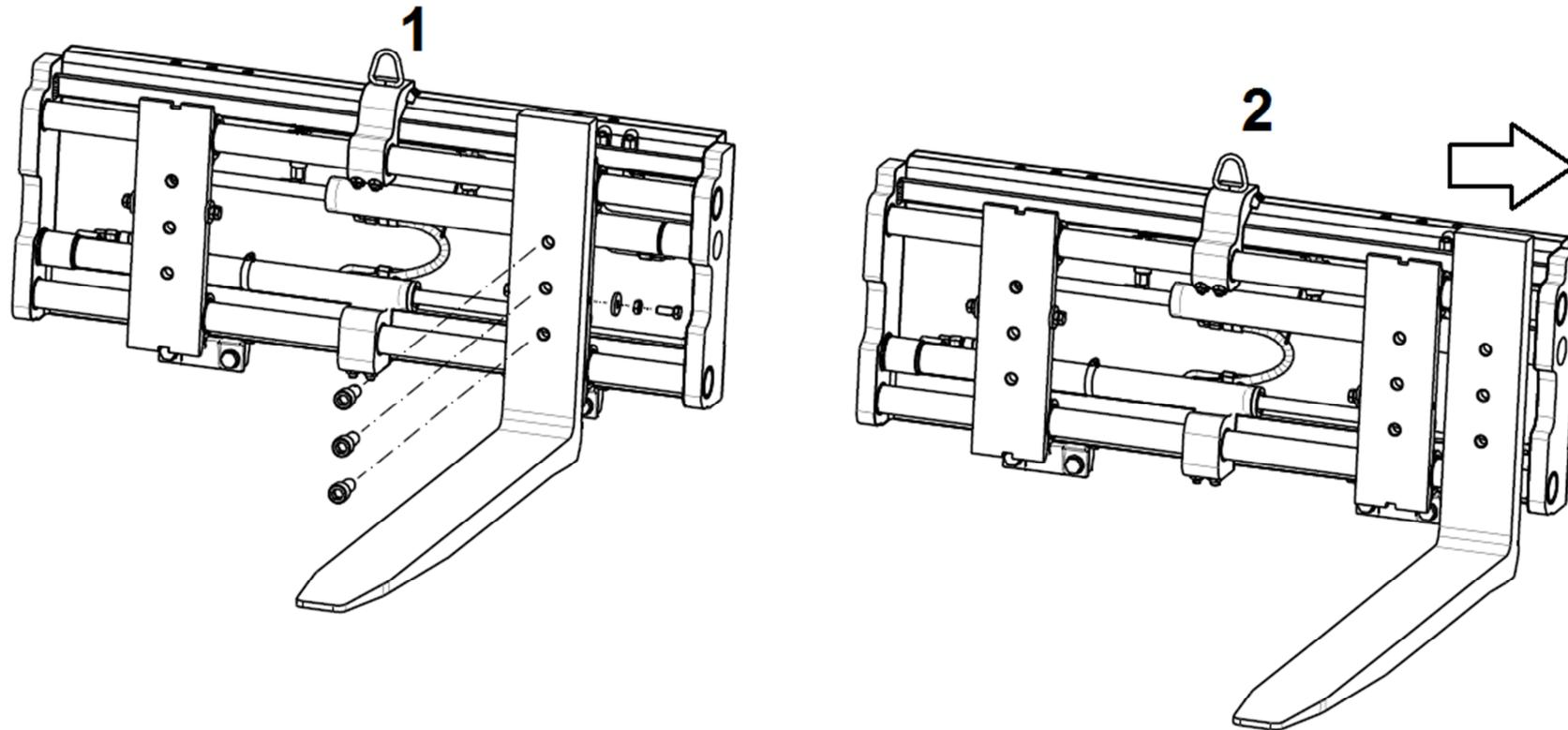


Fig. 027 – Hydraulic diagram for versions without shifting

7. EXTRAORDINARY MAINTENANCE**7.1. Removing the positioner.**

Warning: Before any maintenance operation, turn off the forklift and remove pressure from the hydraulic circuit by repeatedly moving the positioner levers in both directions while the forklift is off. Ensure that no one turns the ignition key or moves the forklift's command lever for the entire duration of maintenance.

7.1.1. Remove the forks (for the required wrench, refer to 3.3.5.)**Fig. 028**

7.1.2. Removing the lower hooks.

For positioners in class 2 and 3 with a load up to 3600 kg -7900 lbs, remove split pins “a” that block the shifting cylinder on the moveable frame as indicated in Fig. 029. For positioners in class 3 with a load of 5000 kg (11000 lbs) and class 4, remove the pins that block the cylinder on the moveable frame as indicated in Fig. 030. Thereafter, remove the lower hooks (for the required wrench, refer to 3.3.1.)

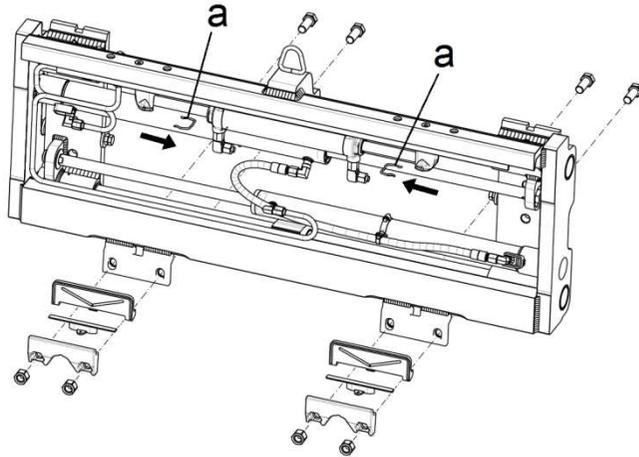


Fig. 029 – Positioners in class 2 and 3 with load up to 3600 kg-7900 lbs

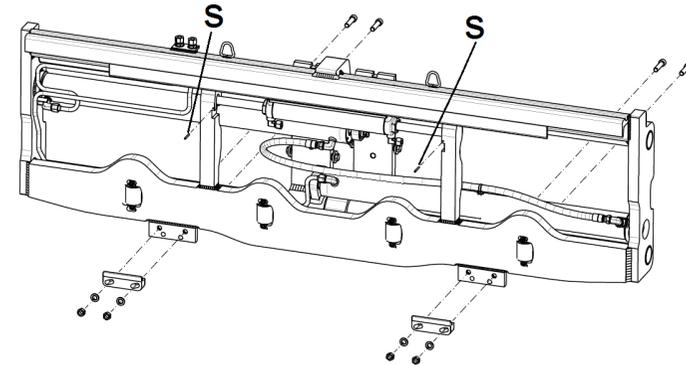


Fig. 030 – Positioners in class 4

7.1.3. **Remove the moveable frame from the FEM plate with a hook and lifting system that can bear a load of 700 kg (1540 lbs) for positioners in class 2 and 3 or 1000 kg (2200 lbs) for positioners in class 4. If 2 lifting eyelets are present, use both of them to lift the equipment so that it remains balanced.**

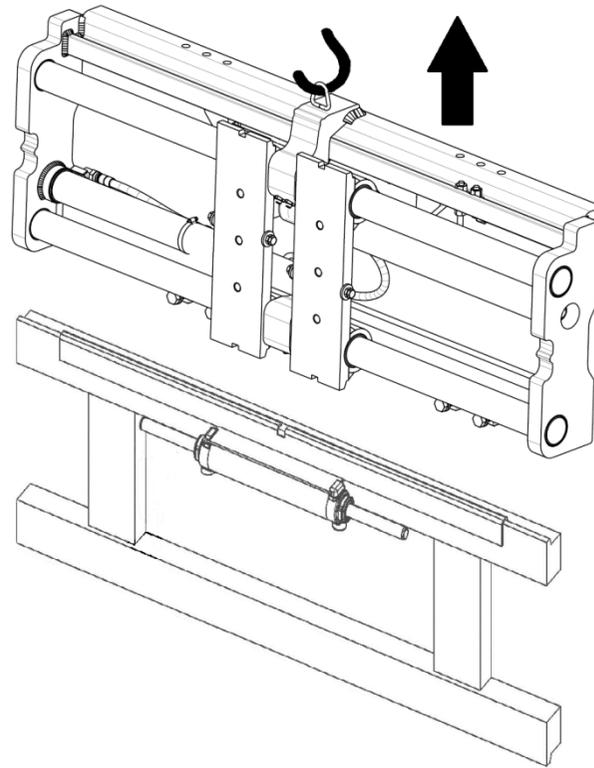
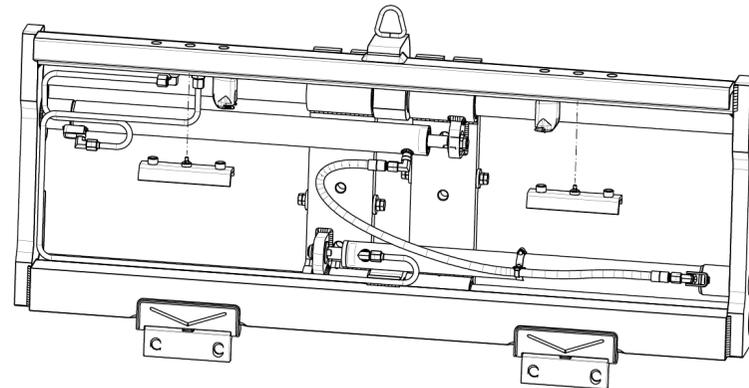
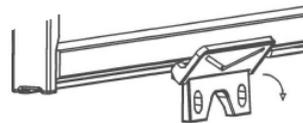


Fig. 031

7.2. Replacing slide blocks and rollers**7.2.1. Follow the instructions in 7.1****7.2.2. Remove the upper slide block(s) as indicated****Replace with new ones ensuring that the pegs of the block(s) fit correctly into the right place on the moveable frame. Grease with good quality grease.****Fig. 032****7.2.3. Replacing lower sliding blocks (positioners in class 2 and 3)****Remove the lower blocks as per Fig. 033. Mount the new blocks and grease with good quality grease.****Fig. 033****7.2.4. Replacing lower rollers (positioners in class 4)****Remove the lower rollers as shown in fig. 034, with ISO 3926 8 mm wrench. Mount the new rollers placing them correctly in the right place.****The roller's pin has a flat side ("LA") that must make contact where the lower roller lies (see diagram). Tighten the screws "VT1", tightening to 50 Nm – 38 Ft-lbs. Use "Loctite 243" threadlocker on the "VT1" screws.**

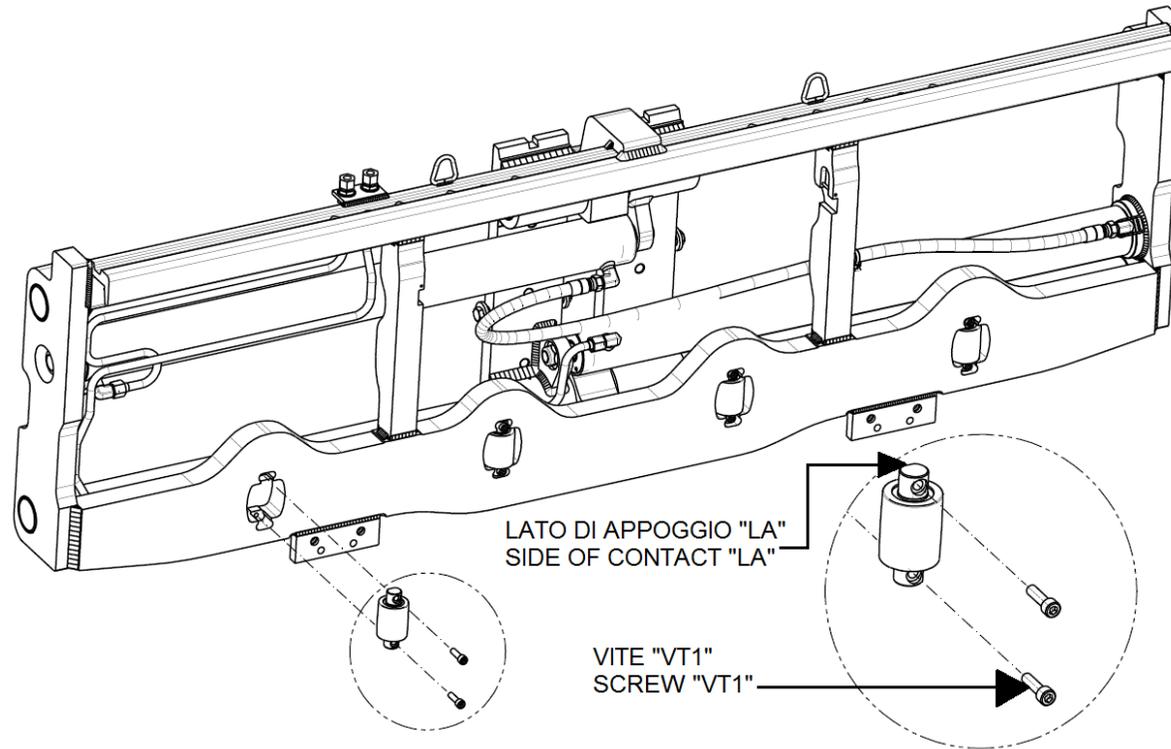


Fig. 034

7.2.5. **Follow the steps starting from 3.3.2.**

7.3. Dismantling the shifting cylinder (for versions with separate shifting)

Warning: Before any maintenance operation, turn off the forklift and remove pressure from the hydraulic circuit by repeatedly moving the positioner levers in both directions while the forklift is off. Ensure that no one turns the ignition key or moves the forklift's command lever for the entire duration of maintenance.

- 7.3.1. Follow the instructions in 7.1.
- 7.3.2. Remove the hoses.
- 7.3.3. Remove the cylinder from the support.

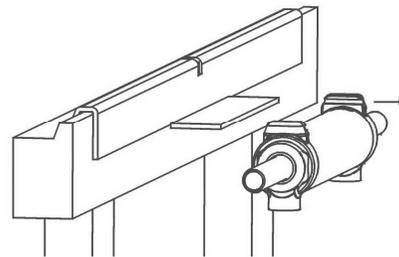


Fig. 035

- 7.3.4. Block the housing and loosen the cap with a wrench until the retaining ring comes out.
- 7.3.5. Remove the retaining ring.
- 7.3.6. Remove the cap.

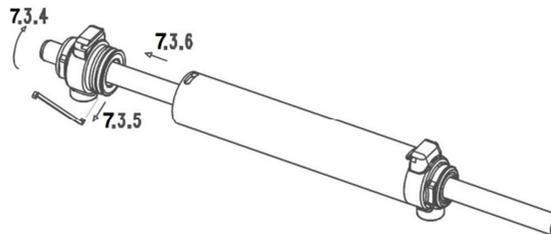


Fig. 036

7.3.7. To replace the cylinder, follow the above instructions backwards. At the end of the steps, replace the positioner on the forklift's plate starting from 3.3.2.

WARNING: When replacing the seals, follow the correct order of assembly.

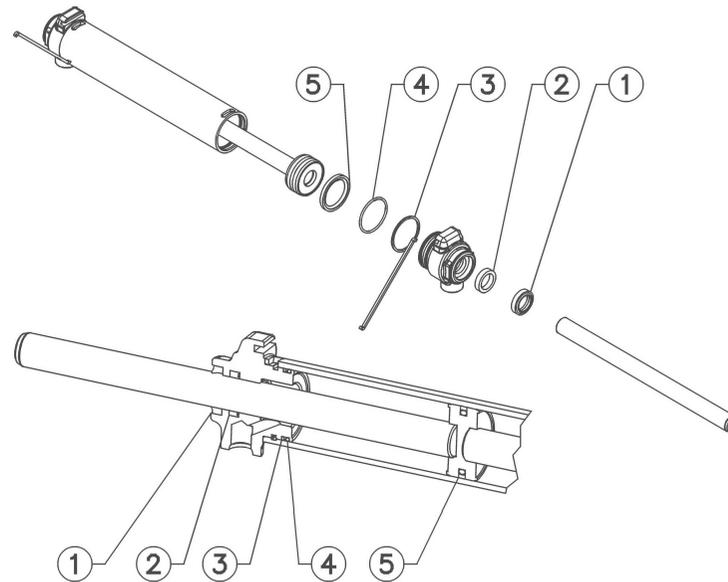


Fig. 037

7.4. Removing the chromed bars and the fork supports

7.4.1. **Remove the forks as described in 7.1.1.**

7.4.2. **Move the supports to the middle.**

7.4.3. **Remove the nuts from the cylinder rod "a", Fig. 038 (ISO 3318 19 mm wrench loads up to 3.6 t, 22 mm for 5 t and 27 mm for class 4 to block the rod, and ISO 1174 27 mm socket wrench loads up to 3.6 t, 30 mm for 5 t and 36 mm for class 4, to loosen the nut).**

7.4.4. **The cylinder rods must be in the minimum closure position.**

7.4.5. **Before any maintenance operation, turn off the forklift and remove pressure from the hydraulic circuit by repeatedly moving the positioner levers in both directions while the forklift is off. Ensure that no one turns the ignition key or moves the forklift's command lever for the entire duration of maintenance.**

7.4.6. **Remove the screws and nuts from the chromed bars "b", Fig. 038, from the central steam heads (ISO 3318 19 mm wrench for the nuts and ISO 3926 6 mm wrench for the screws).**

7.4.7. **Remove the chromed bars, sliding them out to the side, and the fork supports.**

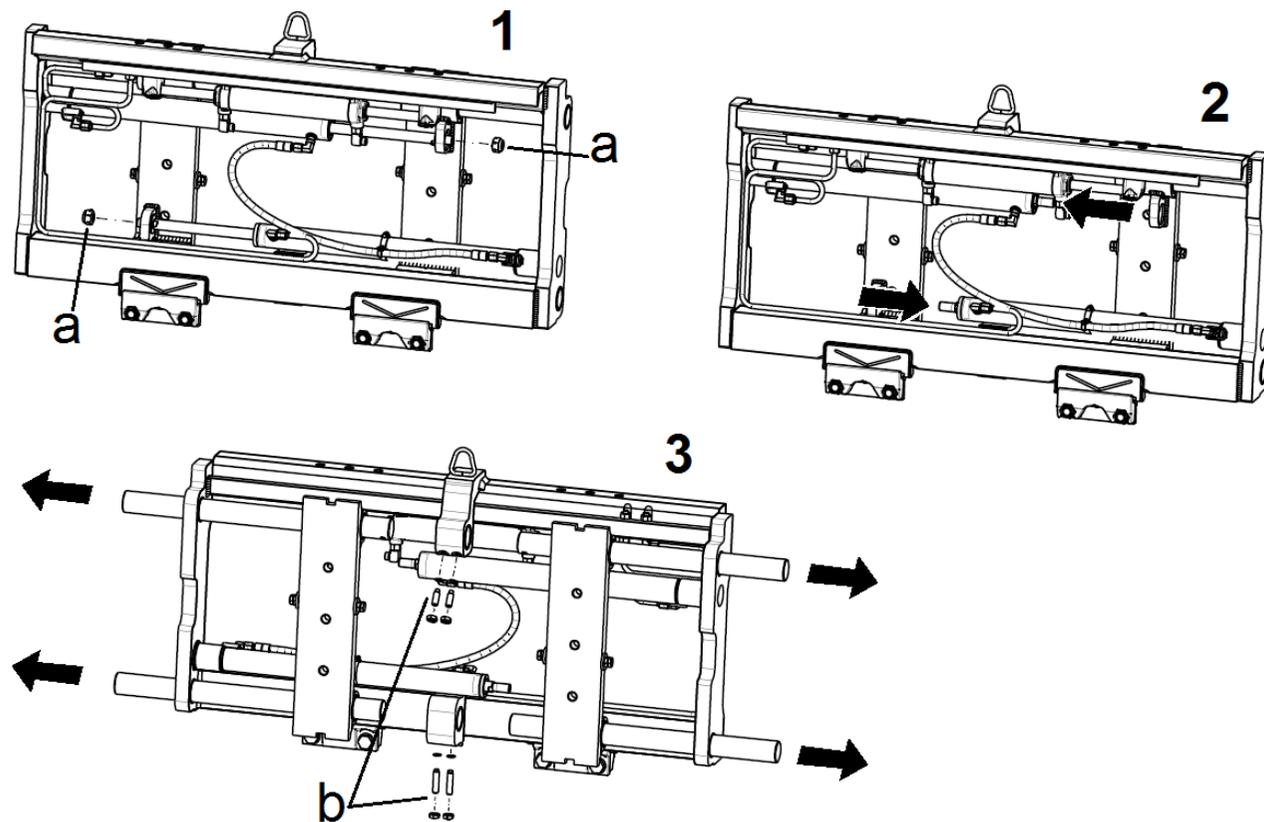


Fig. 038

7.4.8. It is now possible to replace the frame bushings (on the side shoulders and the central steam heads), and the bushings and scrapers of the fork supports, if the bushings themselves are thinner than 1.5 mm.

7.4.9. To replace the chromed bars, follow the above instructions backwards.

WARNING: When replacing bushings and scrapers, mount them as shown in Fig. 039.

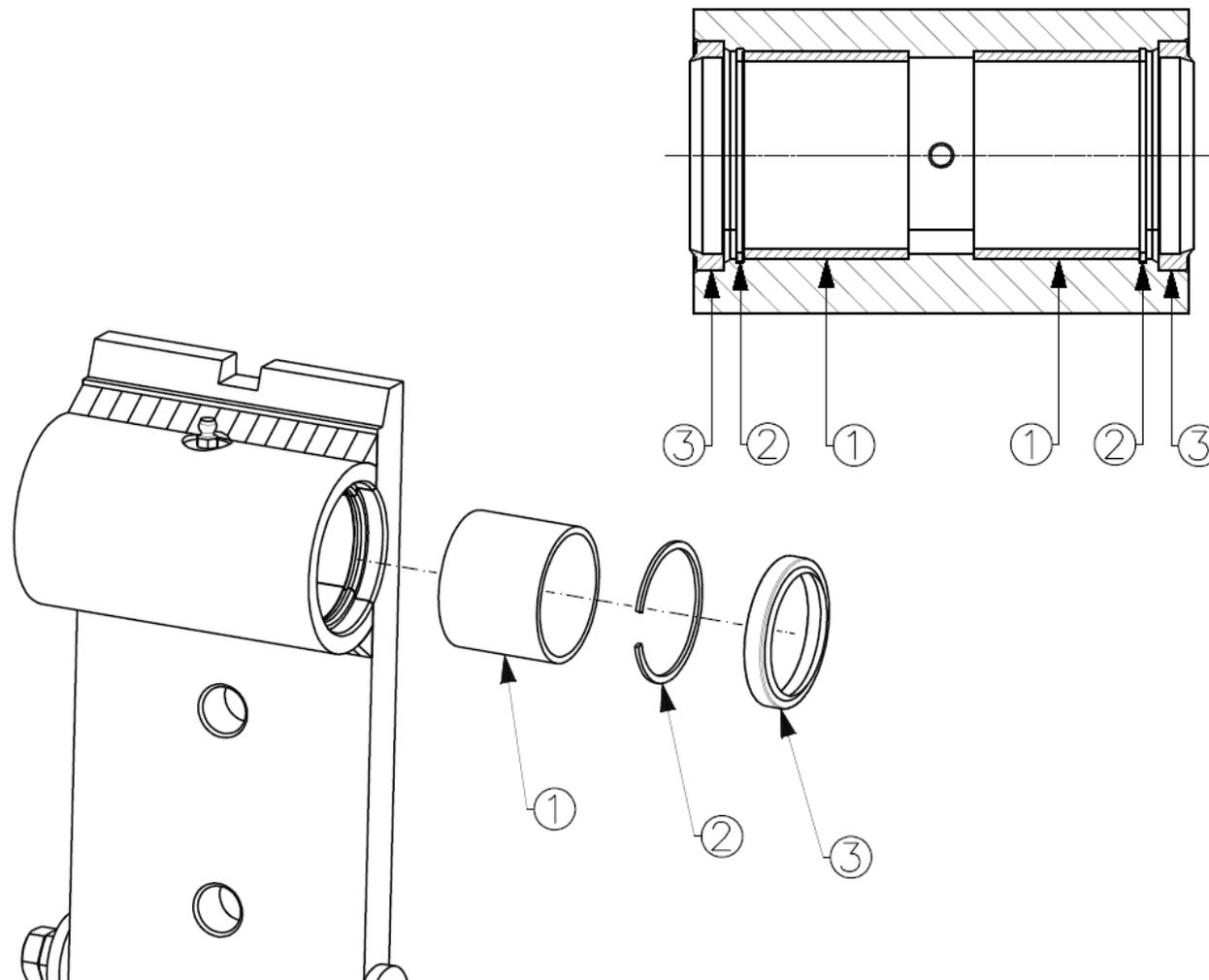


Fig. 039

7.5. **Removing the fork positioning cylinders**

7.5.1. **Remove the forks as described in 7.1.1.**

7.5.2. **Move the supports to the middle.**

7.5.3. **Remove the nuts from the cylinder rod "a", Fig. 040 (for the wrenches refer to 7.4.3.).**

7.5.4. **The cylinder rods must be in the minimum closure position.**

7.5.5. **Before any maintenance operation, turn off the forklift and remove pressure from the hydraulic circuit by repeatedly moving the positioner levers in both directions while the forklift is off. Ensure that no one turns the ignition key or moves the forklift's command lever for the entire duration of maintenance.**

7.5.6. **Detach the flexible and rigid hoses from the cylinders (ISO 3318 17 mm wrench for loads up to 3.6 t, 22 mm for 5 t, 27 mm for class 4).**

7.5.7. **Remove the nuts from the bottom of the cylinders, "b", Fig. 040 (ISO 1174 30 mm socket wrench for loads up to 3.6 t, 41 mm for 5 t, 50 mm for class 4).**

7.5.8. **Remove the cylinders.**

7.5.9. **To replace the cylinders, follow the above instructions backwards.**

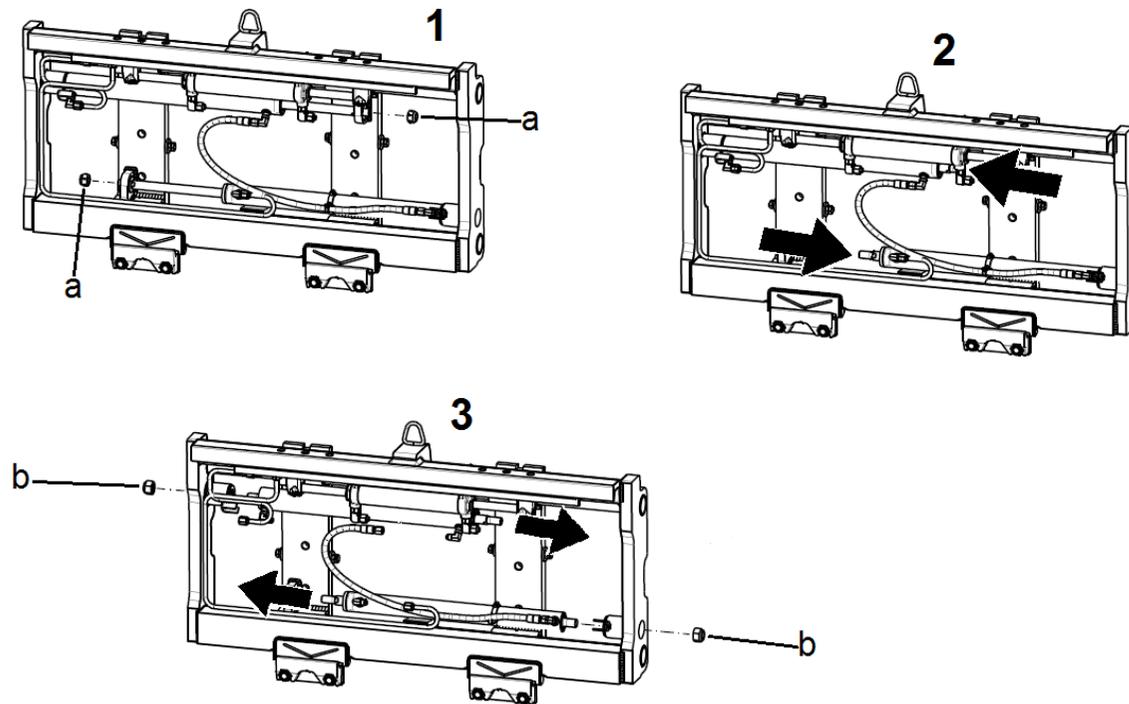


Fig. 040

7.6. Replacing the seals of the fork positioning cylinders

7.6.1. Remove the cylinders as shown in 7.5.

7.6.2. Remove the cylinder cap with a wrench.

7.6.3. Place the seals as shown in Fig. 041.

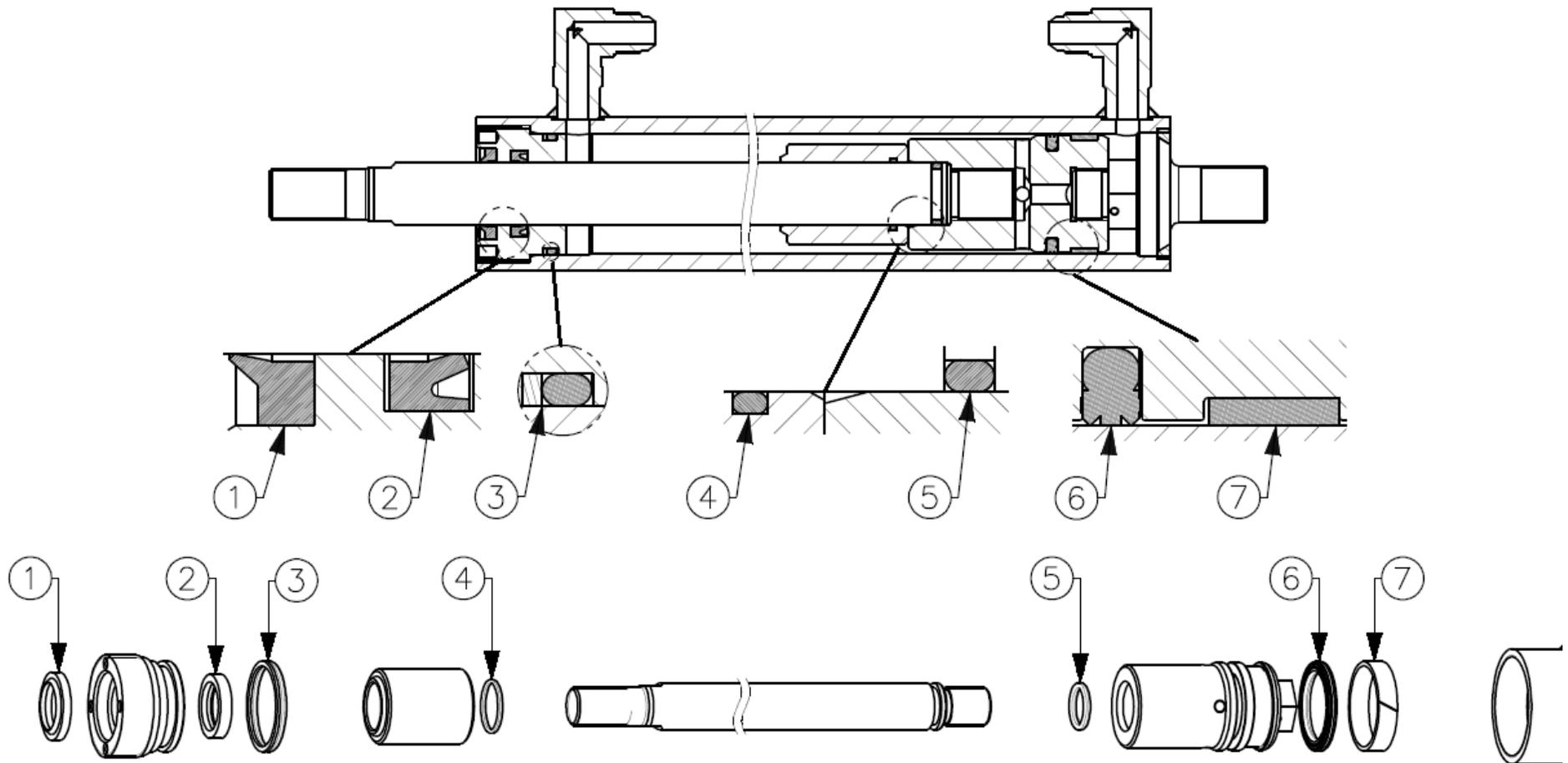


Fig. 041

8. TROUBLESHOOTING

8.1. Side shifting does not occur

- Check that the supply pressure conforms to the requirements in 3.1.1 and the load conforms to the requirements in 3.1.2.
- Check that the moveable frame of the positioner is not out of shape due to bumping.
- Check that the play between the lower hook and the forklift's bar is correct (3.3.3)
- Check that there are no oil leaks from the shifting cylinder's hydraulic system.

8.2. Side shifting occurs too slowly

- Perform all the checks in 8.1
- Check the oil level in the forklift's tank.
- Check the wear of the sliding blocks, see 5.3

8.3. Side shifting is irregular

- Check that there is no air in the hydraulic system
- Check the wear of the sliding blocks, see 5.3

8.4. The jaws do not open and close

- Check that the supply pressure conforms to the requirements in 3.1.1 and the load conforms to the requirements in 3.1.2.
- Check that there are no obstructions or leaks in the positioning cylinder hydraulics
- Check that there are no obstructions, breakages or leaks in the positioning hydraulic cylinders
- Check the condition of the support chromed bars and check that there are no deformities.

8.5. The jaws open and close too slowly

- Perform all the checks in 8.1
- Check the oil level in the forklift's tank.
- Check the wear of the support bushings, see 5.4

8.6. The jaws open and close irregularly

- Check that there is no air in the hydraulic system
- Check the wear of the support bushings, see 5.4

9. WARRANTY

All the products by BOLZONI S.p.A are provided with a 12-month warranty, when used for 8 hours per working day beginning from the date of shipment. If used for more than 8 hours per day, the warranty period will be reduced proportionally.

The guarantee is limited to the replacement of parts at the Bolzoni SpA factory and is valid only for those parts that the company recognises to be defective owing to material or processing faults and does not include the labour cost or transfer cost for the replacement of such parts.

In the case where the equipment has been used inappropriately, has been placed in operation without following the instructions provided by BOLZONIS.p.A or if replacement parts have been installed that were not made by BOLZONIS.p.A, the warranty is void.

BOLZONI S.p.A. products are not guaranteed for uses beyond the performance indicated on the plates and in the documentation.

All equipment produced by BOLZONI S.p.A. is covered by insurance for any damage caused to third parties owing to defective parts or the incorrect operation of the same; damage deriving from the incorrect or improper use of the platforms is excluded.

