



ATiB MATERIAL
HANDLING

USE AND MAINTENANCE MANUAL

GRIPPER ROTATING 360° WITH WELDED FORKS TYPE 301.474.170 |
WITH ROTATING FORKS TYPE 301.474.150 |
WITH 4 FORKS TYPE 301.474.4

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READ THIS USE AND MAINTENANCE MANUAL CAREFULLY BEFORE
COMMISSIONING THE MACHINE

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1 SAFETY REGULATIONS FOR THE OPERATOR



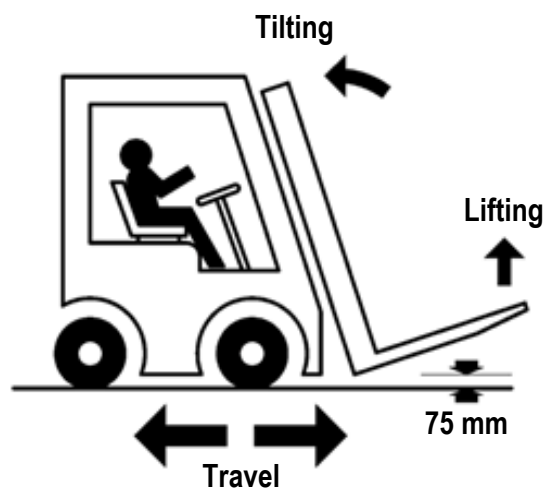
Do not transport passengers



Do not cross the upright



Do not stand under the load



2 INTRODUCTION

2.1 Use and Storage of the Manual

This "Use and Instruction Manual" (hereinafter referred to as the Manual) is issued together with the A.T.I.B. equipment. - "GRIPPER ROTATING 360° WITH WELDED FORKS TYPE 301.474.170 | WITH ROTATING FORKS TYPE 301.474.150 | WITH 4 FORKS TYPE 301.474.4" in accordance with DIRECTIVE 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 17/05/2006 and subsequent additions.

The following indications are essential for correct use of the equipment and must be brought to the attention of the personnel assigned to installation, use, maintenance and repair.

This Manual must be considered an integral part of the equipment and must be kept until it is dismantled in an accessible, protected and dry place and must be available for quick reference.

In the event of loss and/or damage, the user can request a copy from the manufacturer.

The manufacturer reserves the right to modify this manual without prior notice and without the obligation to update previously distributed copies.

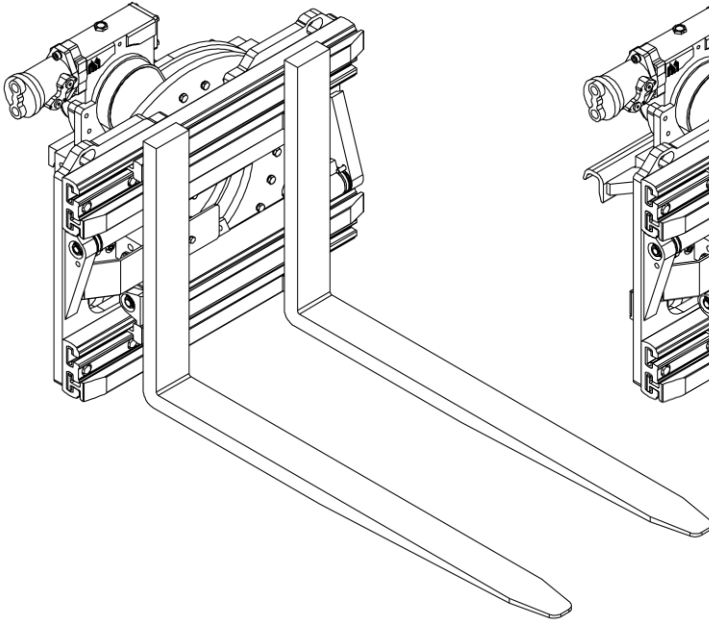
The manufacturer is exempted from any responsibility in the event of:

- Improper use of equipment;
- Use of equipment by untrained personnel;
- Use contrary to any national or international regulations;
- Inadequate scheduled maintenance;
- Unauthorised intervention or modification;
- Use of non-original and/or non-model specific spare parts;
- Full or partial non-compliance with instructions;
- Exceptional events.

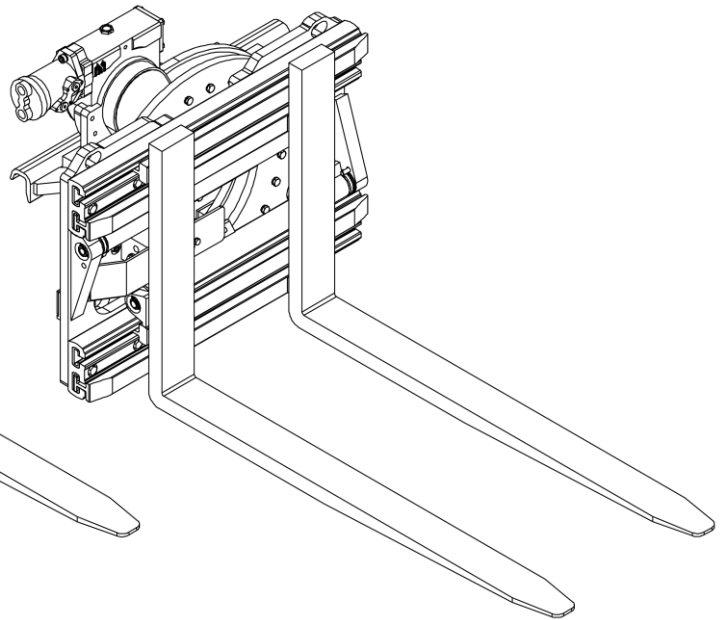
**The nominal capacity of the forklift truck/equipment combination has been set by the original manufacturer of the forklift truck and may be less than that indicated on the equipment plate.
Consult forklift truck plate (Directive 2006/42/EC).**

2.2 Equipment Description

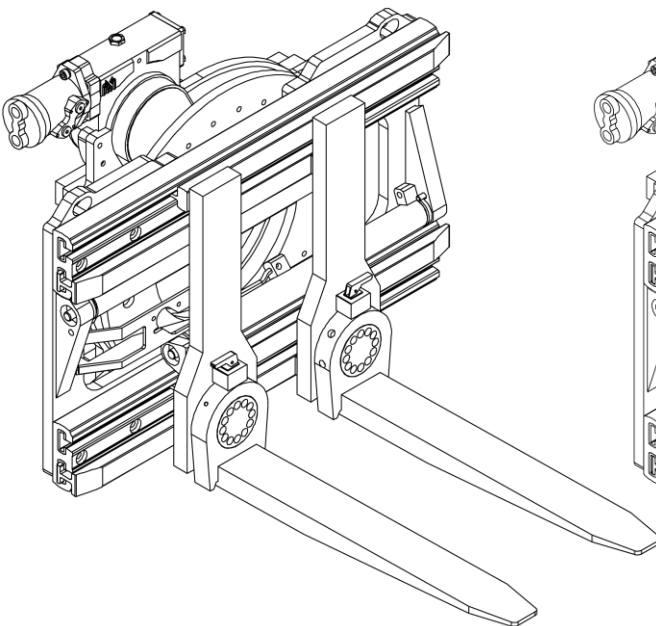
TYPE 301.474.170



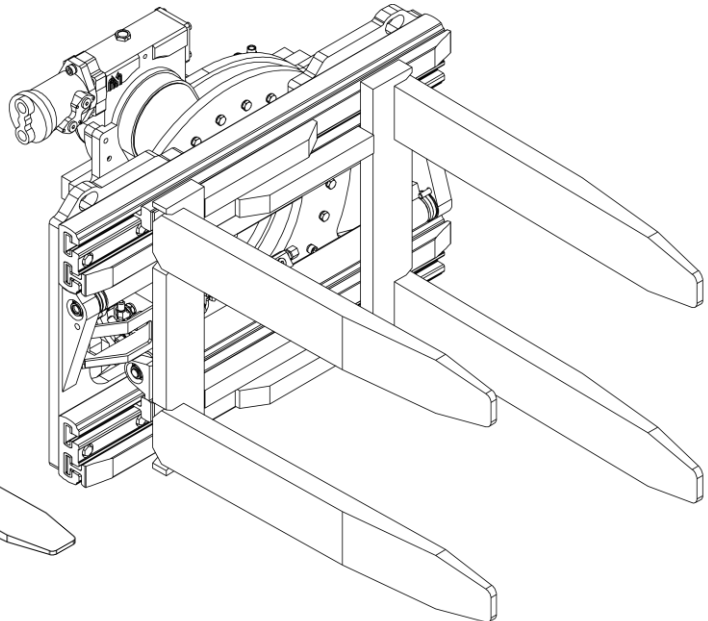
TYPE 301,474,170
WITH SISS



TYPE 301.474.150



TYPE 301.474.4



All the A.T.I.B. equipment - “GRIPPER ROTATING 360° WITH WELDED FORKS TYPE 301.474.170 | WITH ROTATING FORKS TYPE 301.474.150 | WITH 4 FORKS TYPE 301.474.4” are identified by means of an adhesive plate (see *Table 1*) located on the equipment (the location of the rating plate may vary depending on the equipment, see *Figure 1*). Always refer to the serial number.

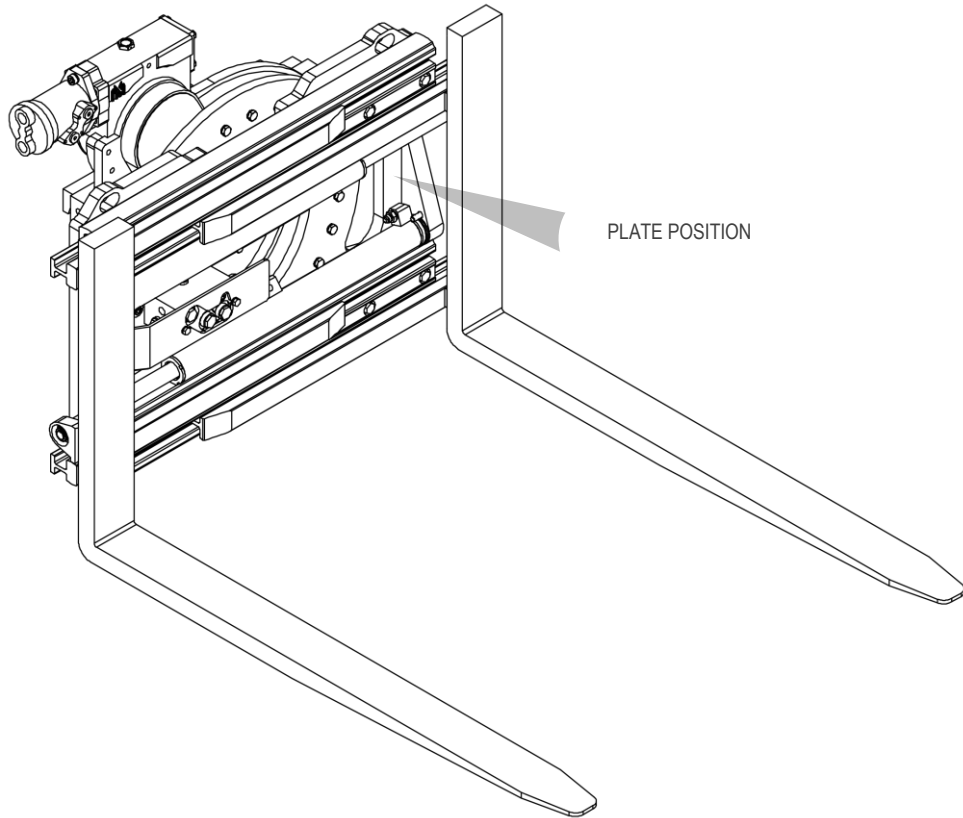


Figure 1



1. TIPO / TYPE	8. PORTATA NOMINALE / NOMINAL CAPACITY	kg/mm	11. COPPIA MAX / MAX. TORQUE	daNm
2. CODICE / CODE	9. PORTATA IN SERRAGGIO / CLAMPING CAPACITY	kg/mm	 	
3. MATRICOLA N° / SERIAL N°				
4. ANNO DI COSTRUZIONE / YEAR OF MANUFACTURE	10. PRESSIONE MAX. DI ESERCIZIO / MAX. OPERATING PRESSURE	bar	A.T.I.B. S.r.l. Via Quinzanese snc, 25020 Dello (BS) - ITALY +39 030 9771711 info@atib.com - atib.com	
5. PESO / WEIGHT	NOTE: OSSERVARE I LIMITI DI PORTATA DELL'INSIEME CARRELLO CON ATTREZZATURA / WARNING: OBSERVE THE NOMINAL CAPACITY OF TRUCK AND ATTACHMENT COMBINED			
6. SPESSORE / THICKNESS				

Table 1

1. TYPE

Indicates equipment model as shown in the catalogue.

2. CODE

Indicates the equipment ordering code.

3. SERIAL N°

It progressively identifies the individual equipment.

In the event that the plate is missing or is damaged, the serial number is also stamped on the profile for connection to the fork-holder plate; for any information always refer to the serial number.

4. YEAR OF MANUFACTURE

Indicates the year of manufacture.

5. WEIGHT

Indicates the weight of the equipment in kg.

6. THICKNESS

Indicates the thickness of the equipment in mm.

7. CENTRE OF GRAVITY

Indicates the distance in mm of the CG centre of gravity of the equipment from the support plane of the fork-holder plate.

8. NOMINAL CAPACITY

Indicates the maximum load applicable to the lifting equipment and the maximum centre of gravity of the load itself.

9. CLAMPING CAPACITY

Indicates the maximum weight that can be lifted via clamping.

10. MAX. OPERATING PRESSURE

Indicates the maximum pressure expressed in bar at which the equipment can work.

11. MAX. TORQUE

Indicates the rotational torque of the equipment.

The A.T.I.B. equipment – “GRIPPER ROTATING 360° WITH WELDED FORKS TYPE 301.474.170 | WITH ROTATING FORKS TYPE 301.474.150 | WITH 4 FORKS TYPE 301.474.4” has been conceived, designed and manufactured to handle loads both on pallets and by clamping, in addition to being able to rotate loads themselves and adjustment of the fork centre distance by means of hydraulic drives.

This equipment must be attached to the forklift truck carriage and connected to the distributor via a hydraulic circuit.

The equipment is able to perform the following functions:

- Rotation: relative rotation between the parts attached to the fork carriage and those attached to the lifting equipment is achieved by means of a hydraulic motor integrated into the gearbox;
- Load clamping: relative movement of gripping and handling of loads is achieved by means of two hydraulic cylinders acting directly on the forks.

Optional additional functions:

- SISS (SEMI-INTEGRAL SIDESHIFT): semi-integral sideshift motion between the parts attached to the fork carriage and those attached to the lifting equipment is carried out by means of a hydraulic cylinder;
- ISS (INTEGRAL FORK SETTING): integral sideshift motion is carried out by a special valve and uses the same cylinders that carry out the clamping.

Fork carriage coupling components are manufactured in accordance with ISO 2328.

3 INSTALLATION

Checking the Nominal Capacity of the Equipment

To check the nominal capacity of the clamp, refer to the clamp's rating plate (See *Table 1* on page 6).



Ensure that the driver of the forklift truck is aware of the maximum capacity of the equipment so that they do NOT constitute a hazard to themselves or to persons working in proximity.

The forklift truck manufacturer is responsible for calculating the residual load capacity of the truck/equipment combination.

Checking the Operating Pressure and Oil Flow Rate

A.T.I.B. recommends observing the hydraulic flow rates and operating pressures provided in *Table 2*, to optimise operation of the equipment and avoid issues during work or commissioning. Values are for indicative purposes only and may vary depending on the equipment.

TYPE and ISO	FLOW RATE (l/min)			Operating pressure Maximum (Bar)
	minimum	maximum	recommended	
301.474.170 ISO II	10/ 10	40/ 60	20/ 25	175
301.474.170 ISO III	15/ 10	40/ 60	25/ 25	175
301.474.170 ISO IV	15/ 15	40/ 60	30/ 30	175
301.474.150 ISO II	10/ 10	40/ 60	20/ 25	175
301.474.150 ISO III	15/ 10	40/ 60	25/ 25	175
301.474.4 ISO II	10/ 10	40/ 60	20/ 25	175
301.474.4 ISO III	15/ 10	40/ 60	25/ 25	175

Table 2

Values in bold refer to flow rates of the rotating function.



OBSERVE THE INDICATED MAXIMUM OPERATING PRESSURES

3.1 Installation Procedure

3.1.1 Installing the Equipment

1. Prior to installation, check the condition of the fork carriage, ensuring that the lower profile is smooth.
2. Also make sure that the profiles of the fork-holder plate are not deformed, in order to ensure good coupling with the equipment.
3. Check the condition of the pipes, replacing those in a poor condition.

N.B. Although only type 301.474.170 is shown in the following installation step, the procedure for installing the equipment on the forklift truck is identical for the other types.

4. Remove the lower couplings from the equipment (see *Figure 2*).

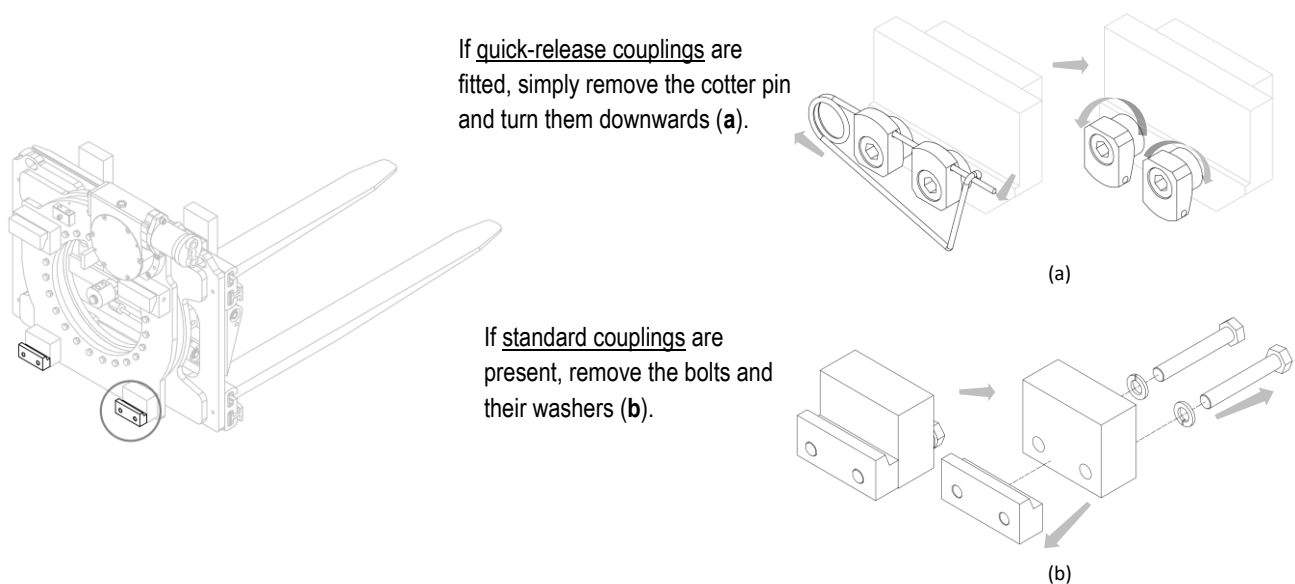


Figure 2

5. For handling, use straps or chains suitably sized in relation to the weight of the equipment as indicated on the plate (see *Figure 1* and *Table 1* on page 6).

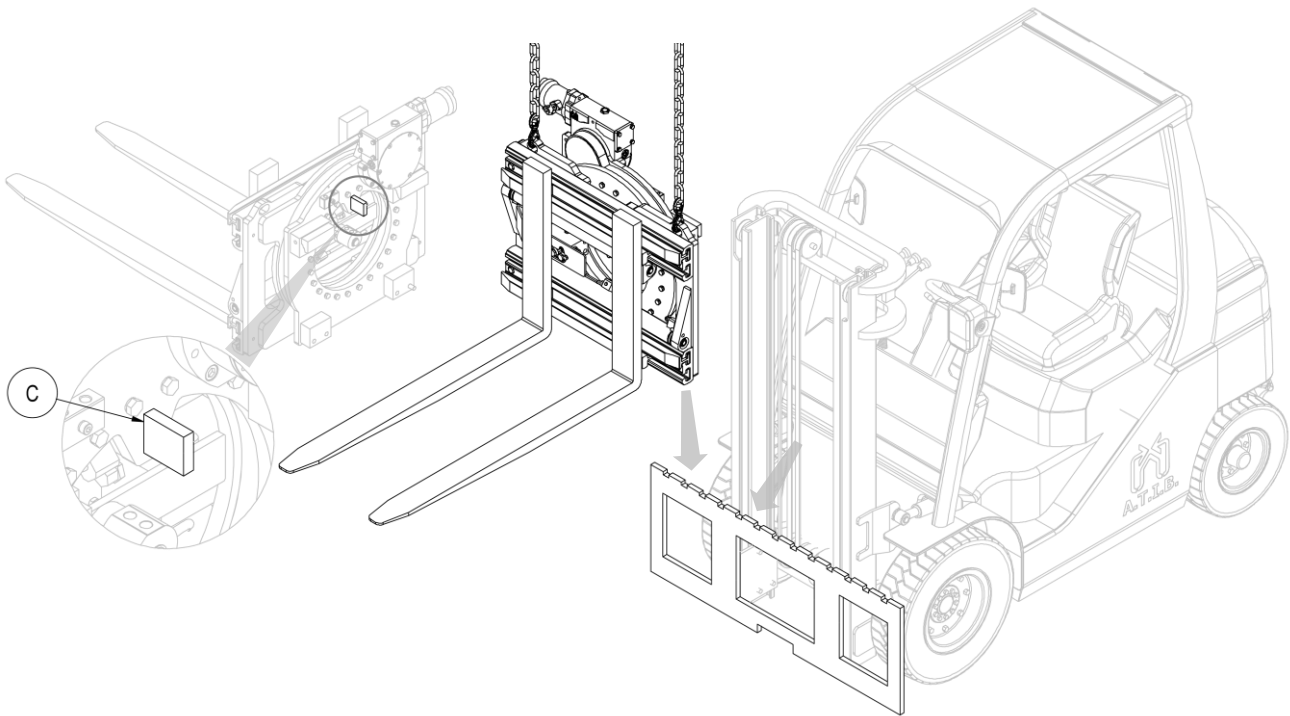


Figure 3

6. Using an overhead crane or hoist of sufficient capacity, place the equipment on the fork carriage, taking care to engage the centring pin **C** in its central notch (see *Figure 3*).

7. Screw on the 2 lower couplings **G** in such a way that their bodies also remains coupled to the lower part of the fork carriage **P** (with max. clearance of 1.5 mm, see detail *Figure 4*), tightening with the torque indicated in *Table 3*.

CLASS	THREAD	TIGHTENING TORQUE
ISO II	M12	90 Nm
ISO III	M14	140 Nm
ISO IV	M16	220 Nm

Table 3

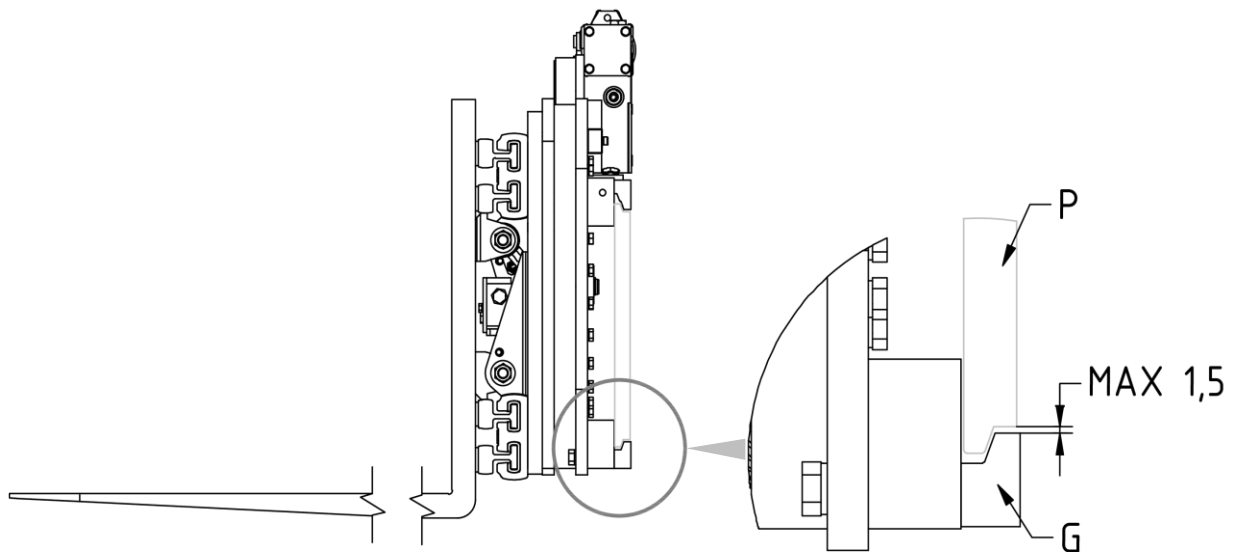


Figure 4

8. Lubricate the contact surfaces (see chapter *Lubrication* on page 46).

9. **N.B.** With the equipment mounted, replace the blind iron oil filler plug (F) with the plastic one supplied (P), which includes a breather (see *Figure 5*).

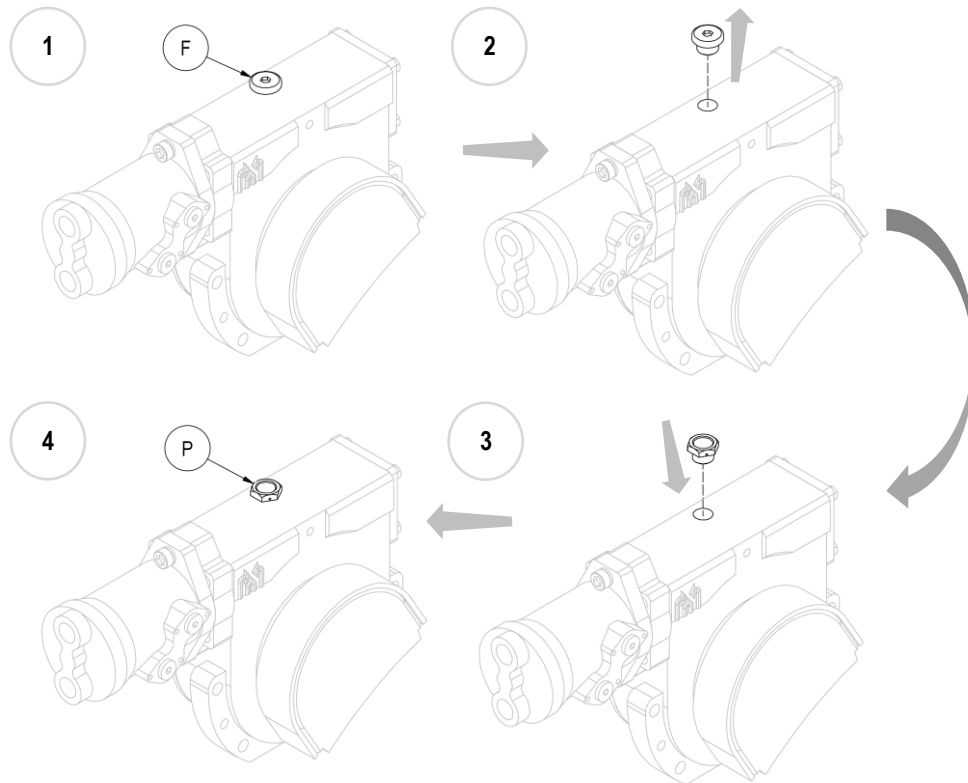


Figure 5

10. Connect the hydraulic circuit, ensuring that the operating pressure of the lines is greater than or equal to that indicated on the rating plate (see *Figure 1* and *Table 1* on page 6).

3.1.2 Installing the Equipment - With Siss

WITH SISS

1. Prior to installation, check the condition of the fork carriage, ensuring that the lower profile is smooth which may otherwise affect the sliding of the lower pads.
2. In addition, ensure that the fork carriage profiles are not deformed in order to facilitate good coupling with the sideshift equipment.
3. Check the condition of the pipes, replacing those in a poor condition.

N.B. Although only type 301.474.170 is shown in the following installation step, the procedure for installing the equipment on the forklift truck is identical for the other (WITH SISS) types.

4. Obtain the dual coupling **A** (with its sliding bushes and sideshift cylinder), and position it on the upper profile of the fork carriage, taking care to fit the centring pin **C** into its central notch (see *Figure 6*).

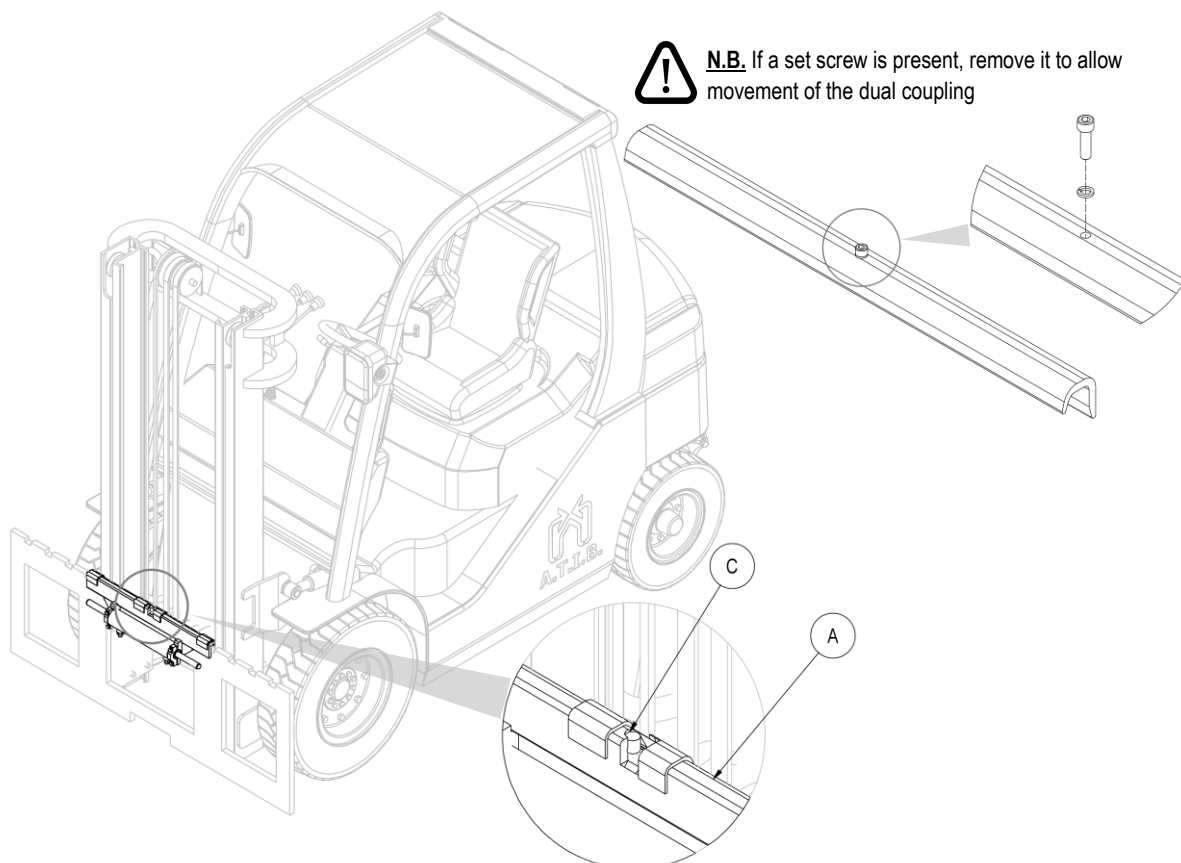


Figure 6

5. Remove the lower couplings from the equipment and grease the sliding gibs (see *Figure 7*).

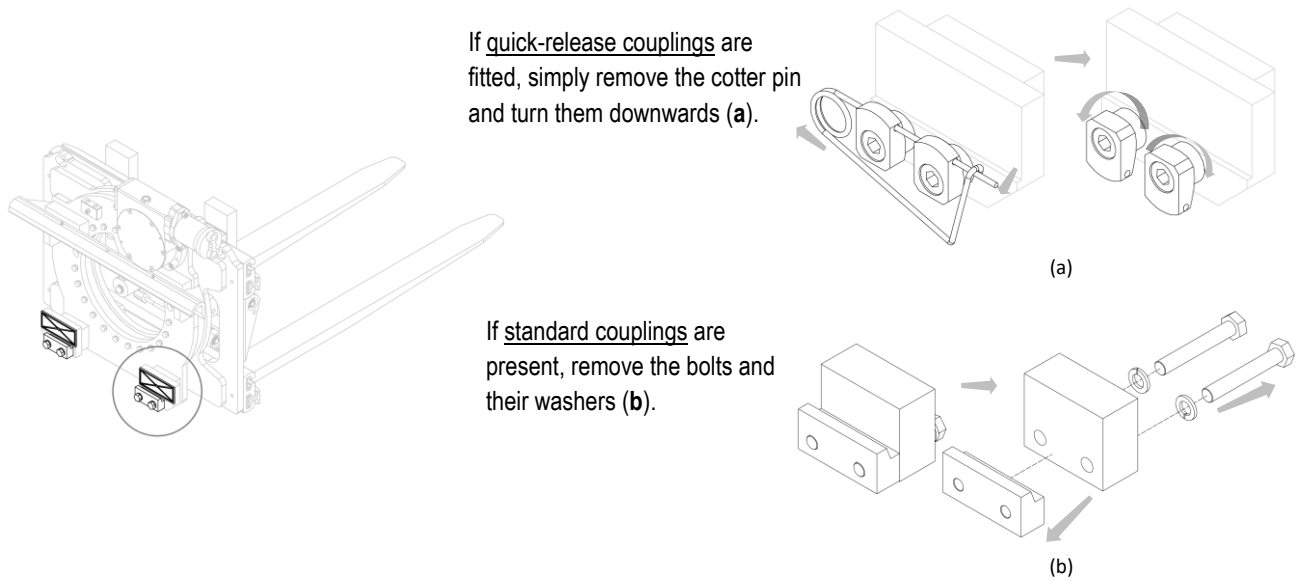


Figure 7

6. For handling, use straps or chains that are suitably sized in relation to the weight of the equipment as indicated on the plate (see *Figure 1* and *Table 1* on page 6).
7. Using an overhead crane or hoist of sufficient capacity, place the equipment on the dual coupling, taking care to position it correctly (see *Figure 8*).

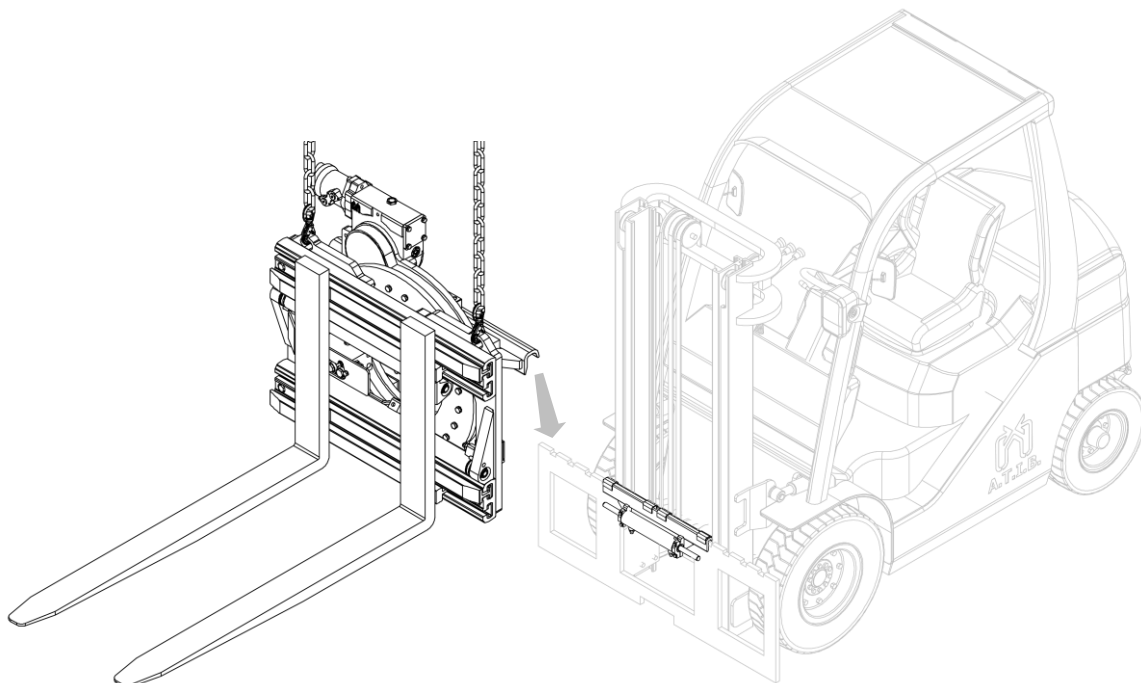


Figure 8

8. Screw on the 2 lower couplings **G** in such a way that their bodies also remains coupled to the lower part of the fork carriage **P** (with max. clearance of 1.5 mm, see detail *Figure 9*), tightening with the torque indicated in *Table 4*.

CLASS	THREAD	TIGHTENING TORQUE
ISO II	M12	90 Nm
ISO III	M14	140 Nm
ISO IV	M16	220 Nm

Table 4

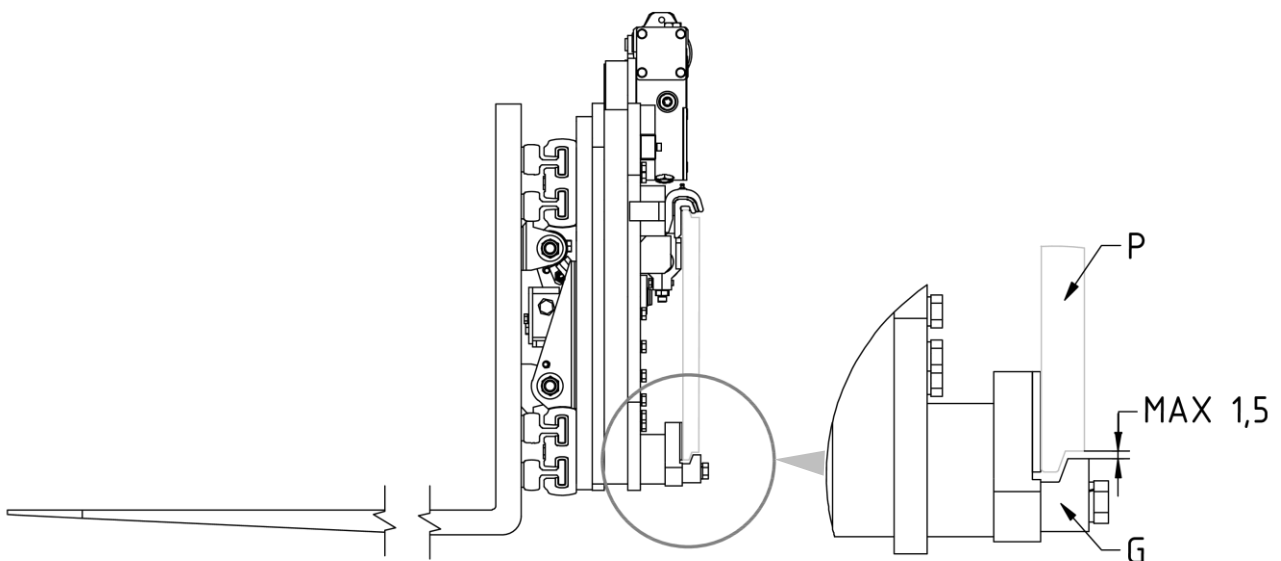


Figure 9

9. Lubricate the contact surfaces (see chapter *Lubrication* on page 46).

10. **N.B.** With the equipment mounted, replace the blind iron oil filler plug (F) with the plastic one supplied (P), which includes a breather (see *Figure 10*).

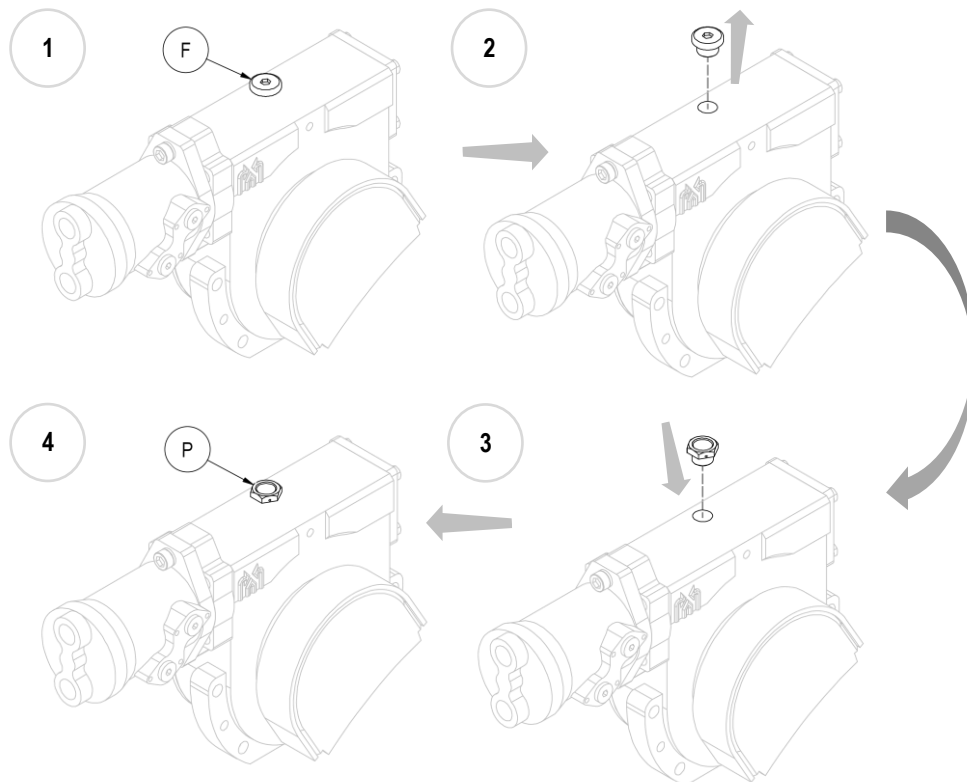


Figure 10

11. Connect the hydraulic circuit, ensuring that the operating pressure of the lines is greater than or equal to that indicated on the rating plate (see *Figure 1* and *Table 1* on page 6).

3.2 Assembling the Aluminium Profiles

ALUMINIUM

1. Release the pressure from the hydraulic system and disconnect the lines.
2. Install the aluminium profiles one at a time, using the bolts provided (see *Figure 11* and *Figure 12*).

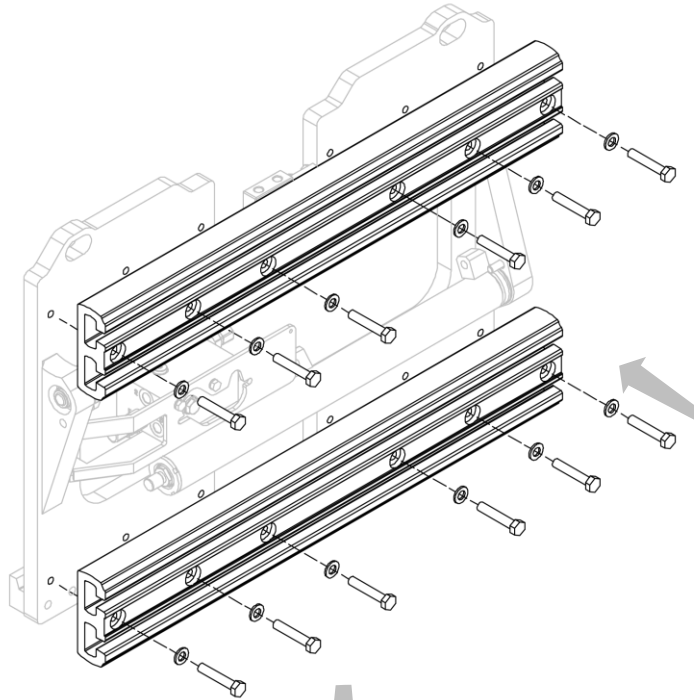


Figure 11

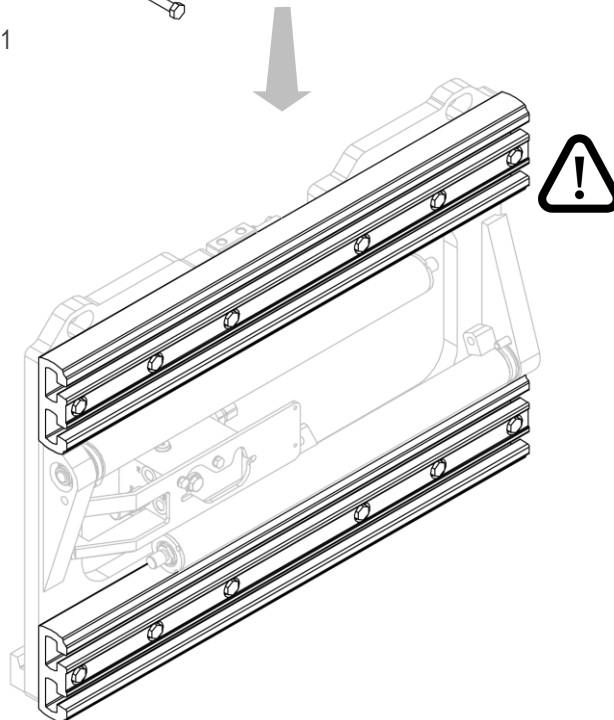


Figure 12

3.3 Assembling the Nylon Bushes

NYLON BUSHES

1. Release the pressure from the hydraulic system and disconnect the lines.
2. Insert the nylon bushes and secure them using the grub screws provided (see *Figure 13* and *Figure 14*).

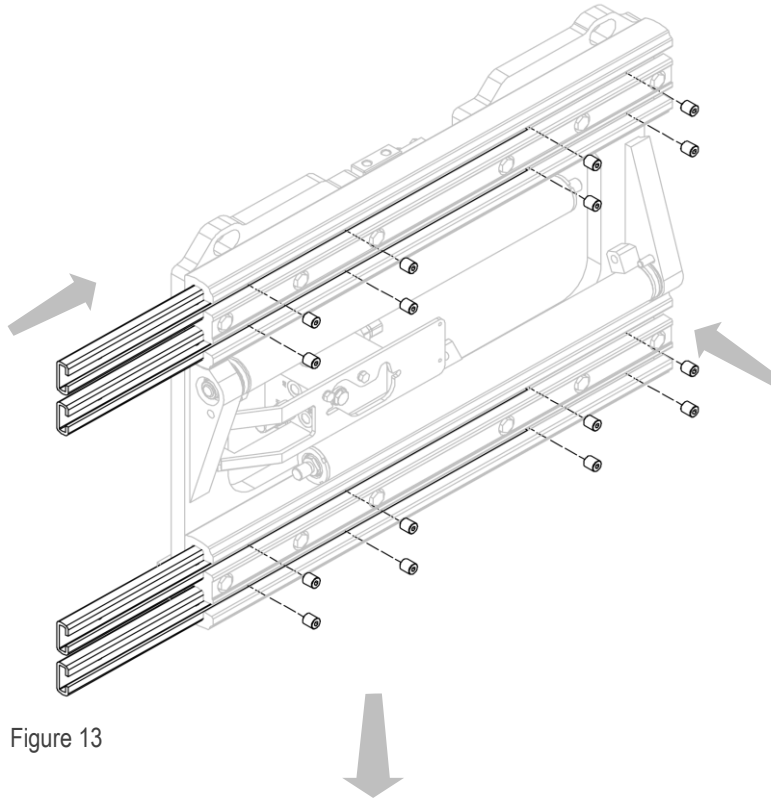


Figure 13

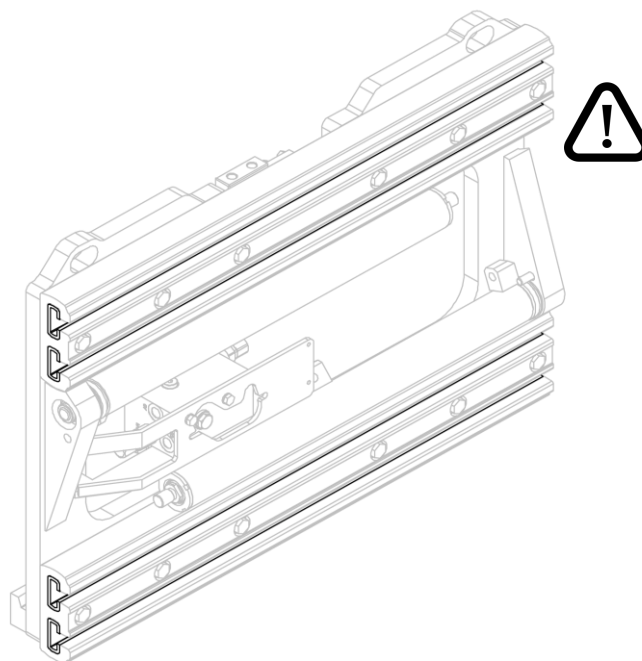


Figure 14

3.4 Assembling the Forks

3.4.1 Installing the Forks onto the Equipment

N.B. Although only type 301.474.170 is shown, the procedure for installing the forks on the equipment is identical for the other versions.

1. Release the pressure from the hydraulic system and disconnect the lines.
2. Insert the fork assembly + forks into their housings and secure them to the cylinders using the nuts (see *Figure 15* and *Figure 16*).

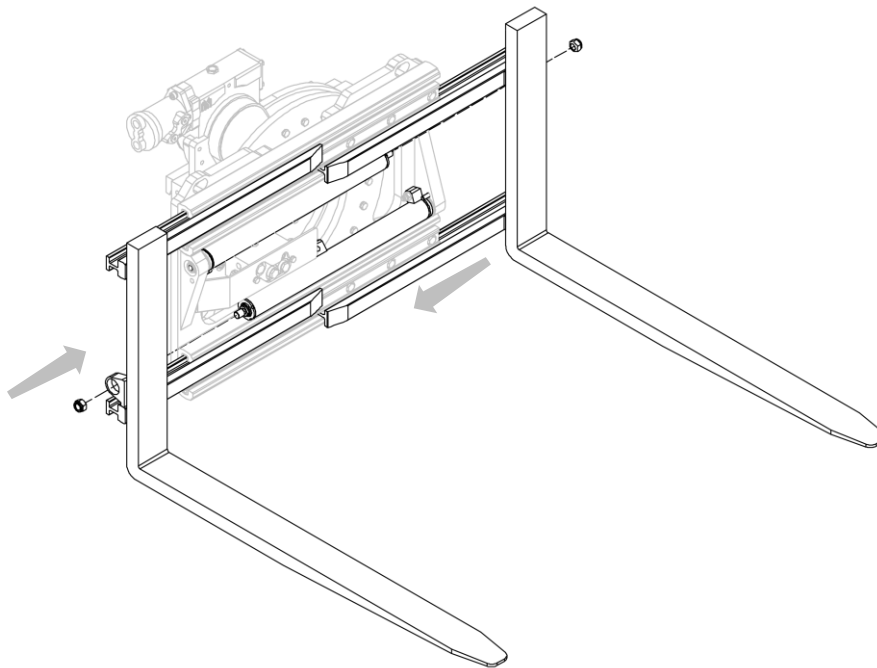


Figure 15

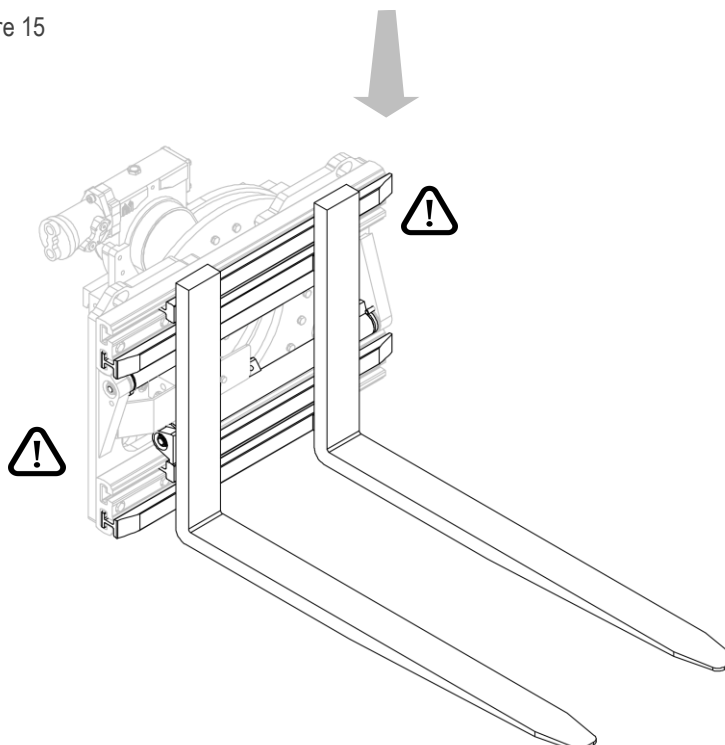


Figure 16

3.4.2 Fork Rotation – TYPE 301.474.150

ROTARY FORKS

1. Release the pressure from the hydraulic system and disconnect the lines.

2. Use *Figure 17* and *Figure 18* as guides.

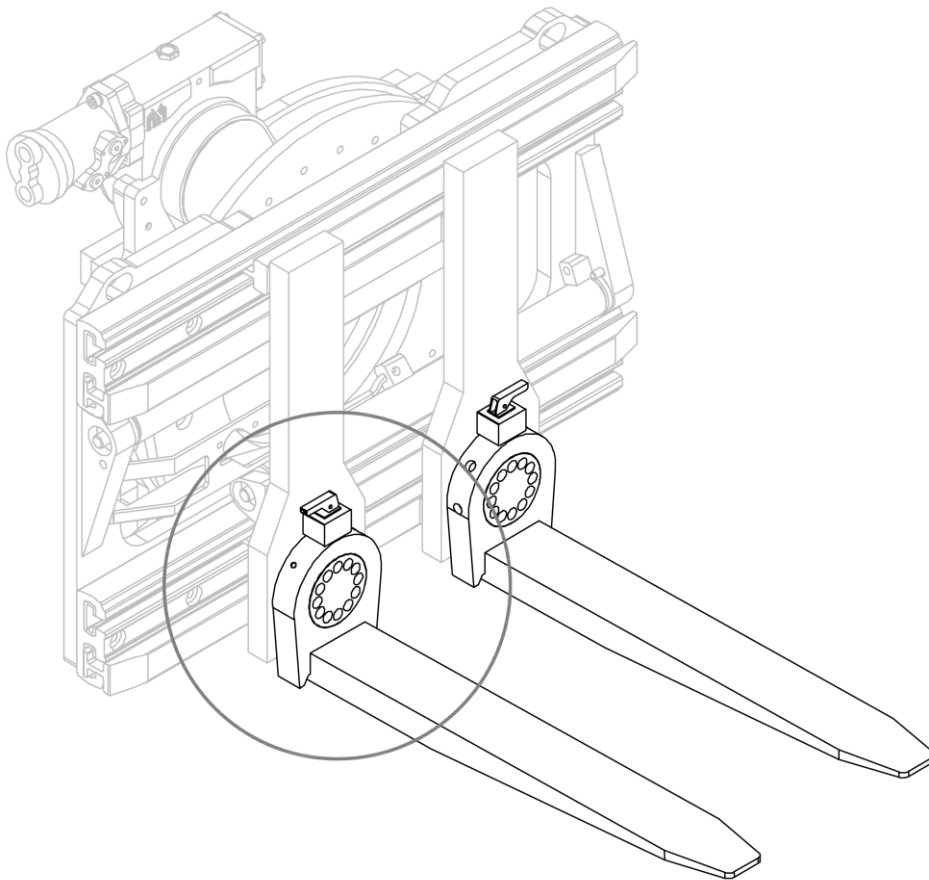


Figure 17

3. Open the fork-stop ratchets → 2.
4. Rotate the forks to the desired position (45/90°) → 3.
5. Close the ratchets and check that the forks are properly secured → 4.

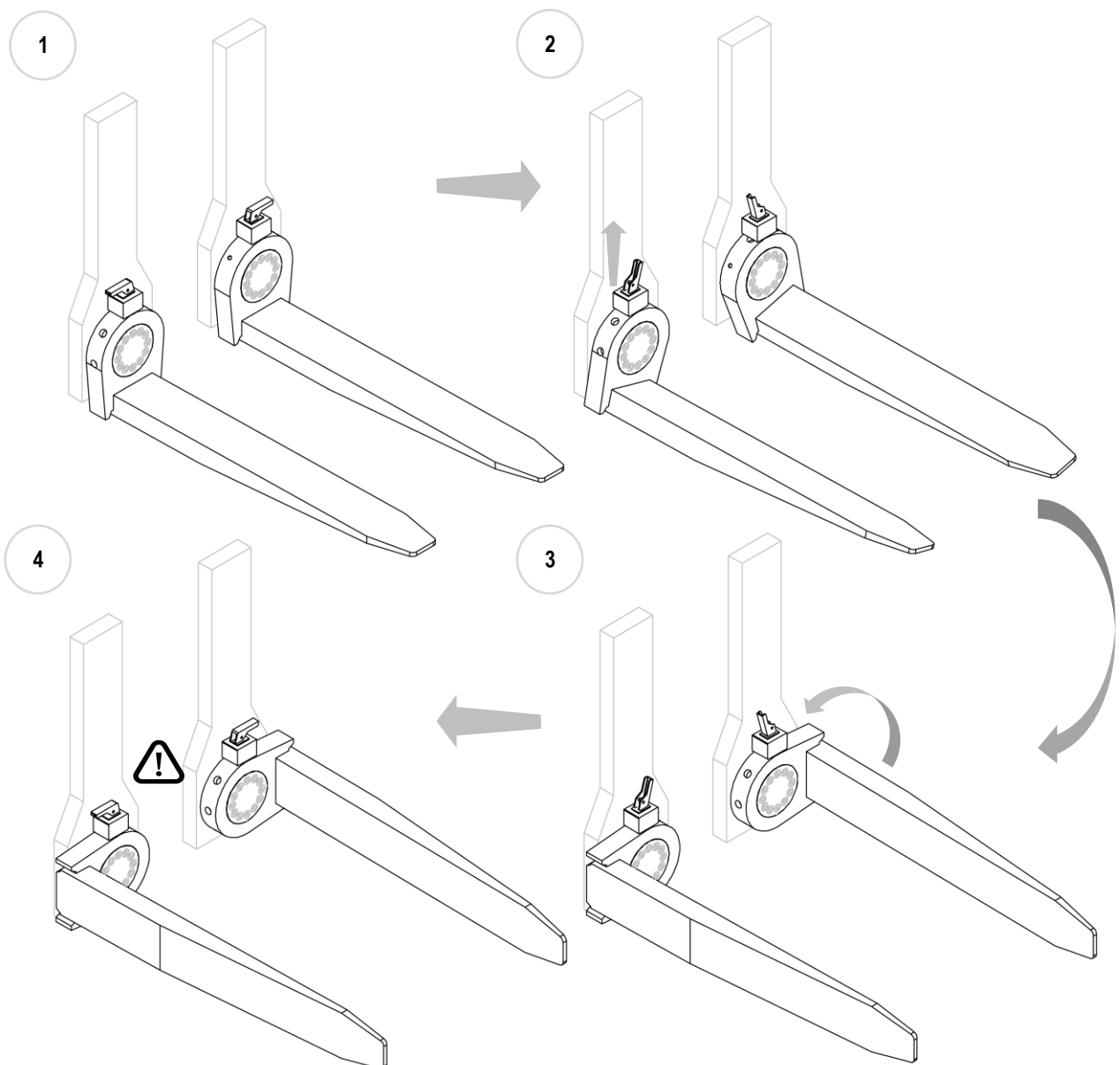


Figure 18

4 HYDRAULIC SYSTEM

4.1 Hydraulic system - Standard

STANDARD

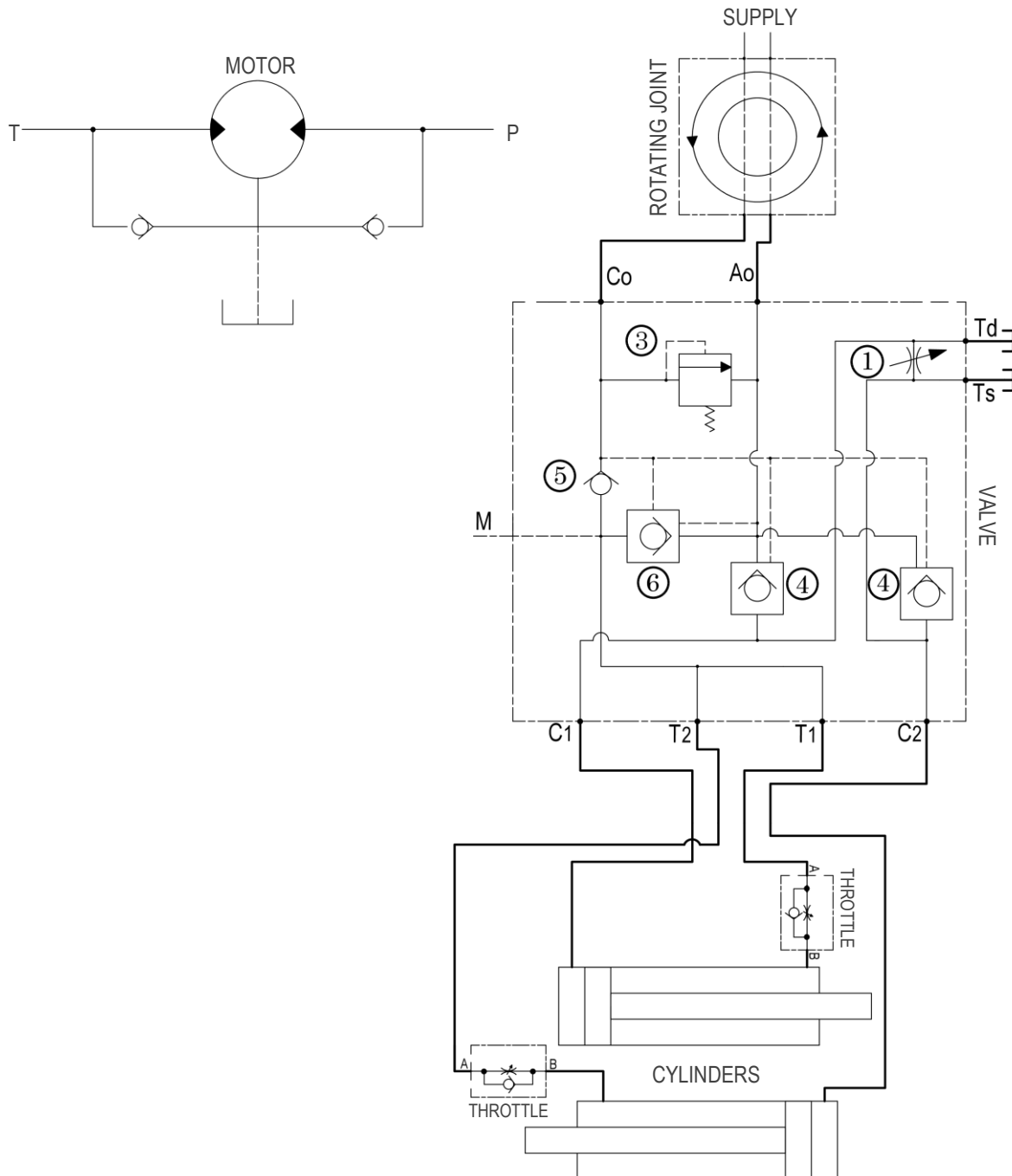


Figure 19

4.2 Hydraulic System – With Siss

WITH SISS

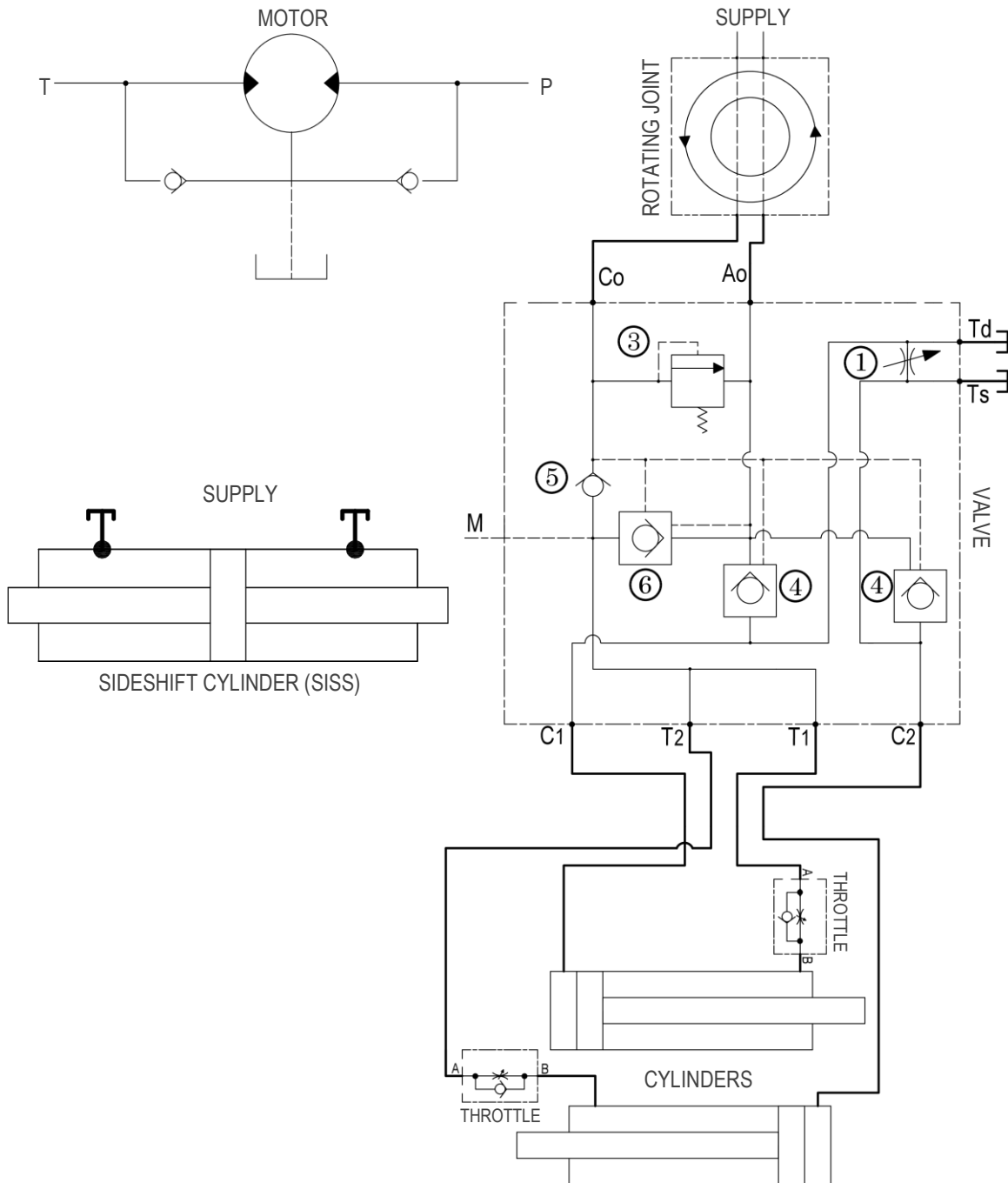


Figure 20

4.3 Hydraulic System - With Iss

WITH ISS

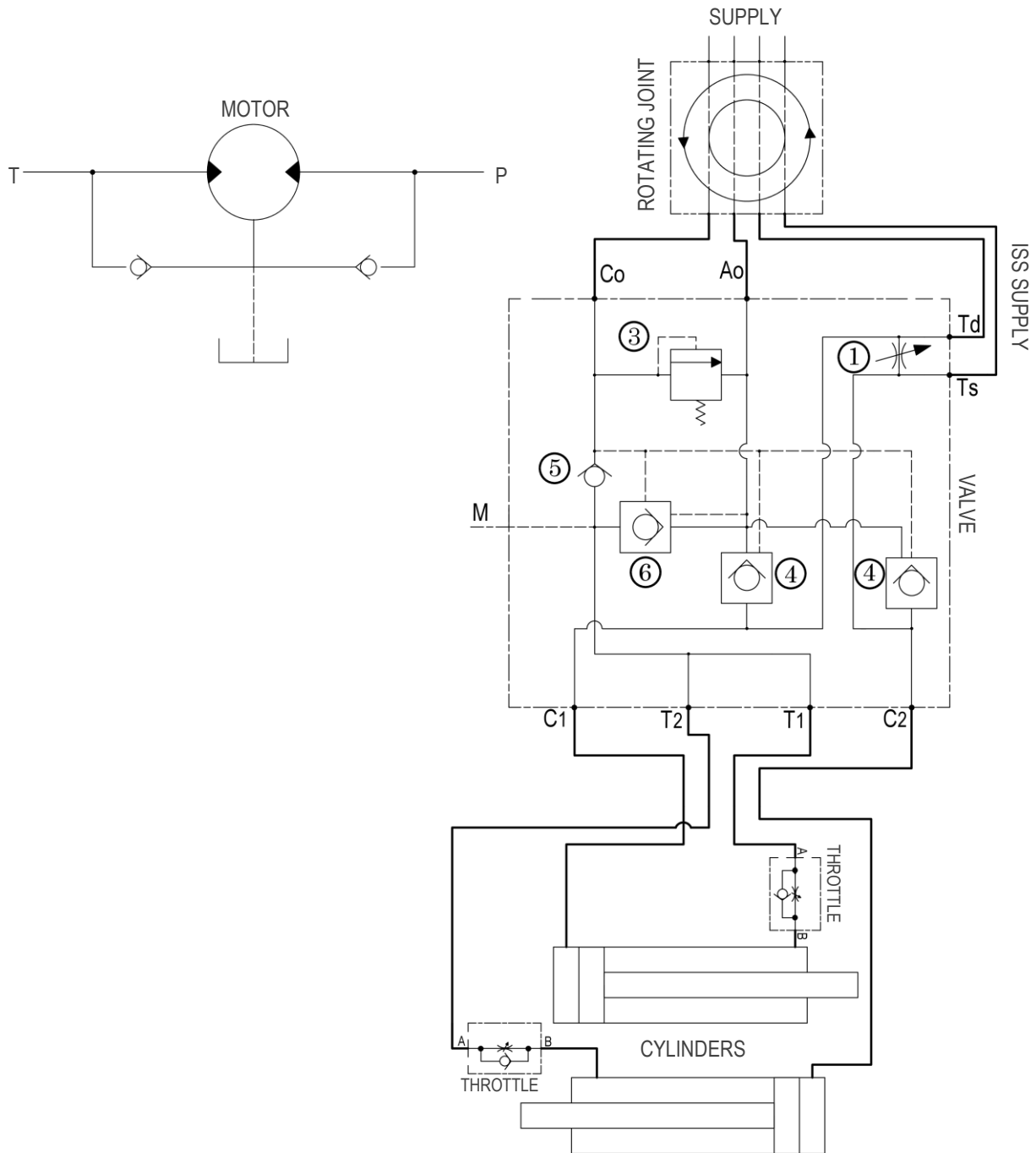


Figure 21

5 RULES GOVERNING USE

Before using the equipment, check the tightness of the piping and the correctness of assembly and also the connection by performing a dozen preliminary operations.

The following instructions must be followed when using the equipment:

1. Observe the capacity limits of the equipment.
2. Do not operate the equipment when persons or animals are within range of the forklift truck.
3. Do not attempt to move loads sideways by dragging them across the floor.
4. Do not exceed the maximum pressure indicated on the rating plate.
5. Operate the equipment from the forklift truck driver's seat using only a single operator.
6. Operate the control lever gently, avoiding water hammer as far as possible.
7. All operations relating to installation, use and maintenance must be carried out by specialist personnel using suitable equipment for the type of work to be carried out.
8. Carry out maintenance and/or repairs with the forklift truck stationary and the hydraulic circuit inactive, using appropriate means of protection (gloves, safety shoes, etc.).
9. Only operate cylinder rods when they are correctly fitted on the equipment;
The rods may otherwise be ejected at great speed by the elevated oil pressures.

The weighted sound pressure level is less than 70 dB (A).

If the equipment is subject to slight errors in the synchronisation of movement between the two forks, operator intervention is required to nullify the displacement differences, which will increment over time.

The operator simply needs to hold one of the two forks at the end of the opening or closing stroke for the time required for the other fork to recoup the accumulated difference in displacement.

All A.T.I.B. equipment is designed and manufactured with a load positioned (with respect to its centre of gravity) at a certain distance from the vertical plane of the fork.

If the distance of the centre of gravity from the vertical part of the fork needs to be increased, the weight of the load must be reduced.

In this case, consult the chart shown in *Figure 22* where, as the distance from the centre of gravity increases (x-axis line), a multiplicative factor is included for load reduction purposes (y-axis line).

The multiplicative factor, obtained on the basis of the desired centre of gravity position, will be multiplied with the nominal capacity of the equipment. The product of this multiplication will be the actual transportable load.

The continuous line is to be considered for equipment declared with a 500mm centre of gravity load.

The dashed line is to be used for equipment declared with a 600mm centre of gravity load.

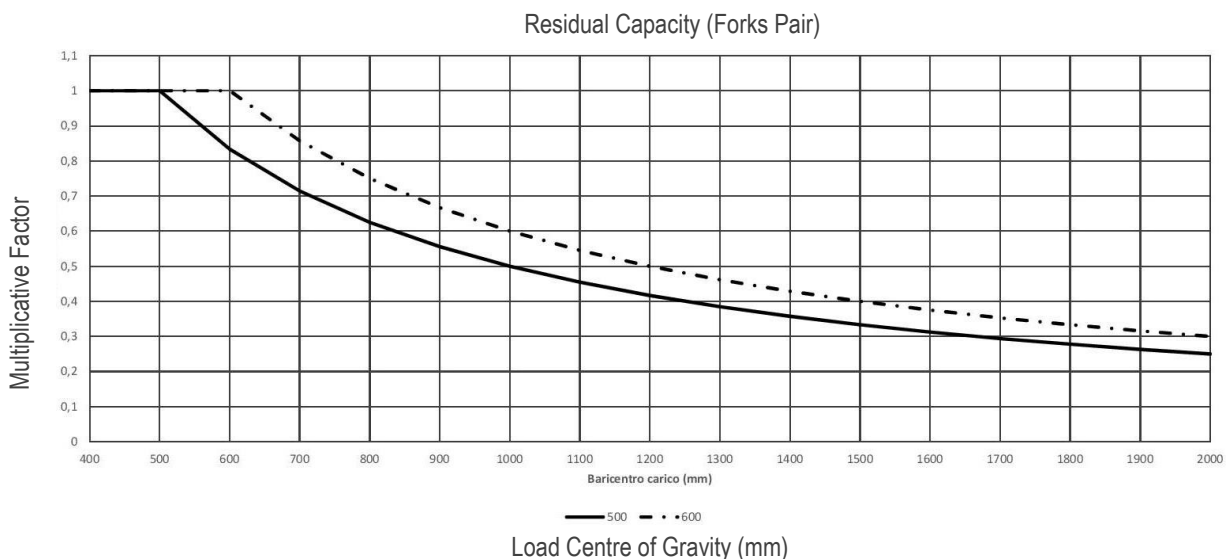


Figure 22

NOTE: calculations are valid only for “stable” loads. Contact the manufacturer for transporting liquid containers.



The attainable sideshift may compromise the stability of the forklift truck.



It is advisable to consult the manufacturer of the forklift truck to check the residual capacity of the forklift truck-equipment assembly.



The condition of the road surface, the speed at which the load is handled and the elevation may all affect the load's grip, which must be taken into account on a case-by-case basis.



Displacing the load whilst in motion is prohibited.
Handling the load with the mast raised off the ground is only permitted when returning the load to the centre of the mast.

The nominal capacity of the forklift truck/equipment combination is established by the original manufacturer of the forklift truck and may be less than that indicated on the equipment plate.

Consult forklift truck plate (Directive 2006/42/EC).

5.1 Integral Sideshift

This is the type most frequently used in “GRIPPER ROTATING 360° WITH WELDED FORKS TYPE 301.474.170 | WITH ROTATING FORKS TYPE 301.474.150 | WITH 4 FORKS TYPE 301.474.4” and uses the same cylinders that sideshift the forks. The stroke depends on the opening and will be equal to zero in maximum opening and minimum closing. **Since the stroke of the equipment may be higher than that defined by the stability regulations of forklift trucks (100 + 100 mm up to 6300 kg capacity and 150 +150 mm for higher capacities) and can, therefore, generate issues regarding lateral stability and premature wear of the upright profiles, it will be necessary to check feasibility with the forklift truck manufacturer.**

Sideshift with a given load will be the minimum between the following two values:

1. Maximum opening (A max) less load width (Lc) divided by two. $[(A \text{ max} - Lc) / 2]$
2. Load width (Lc) less minimum opening (A min) divided by two. $[(Lc - A \text{ min}) / 2]$

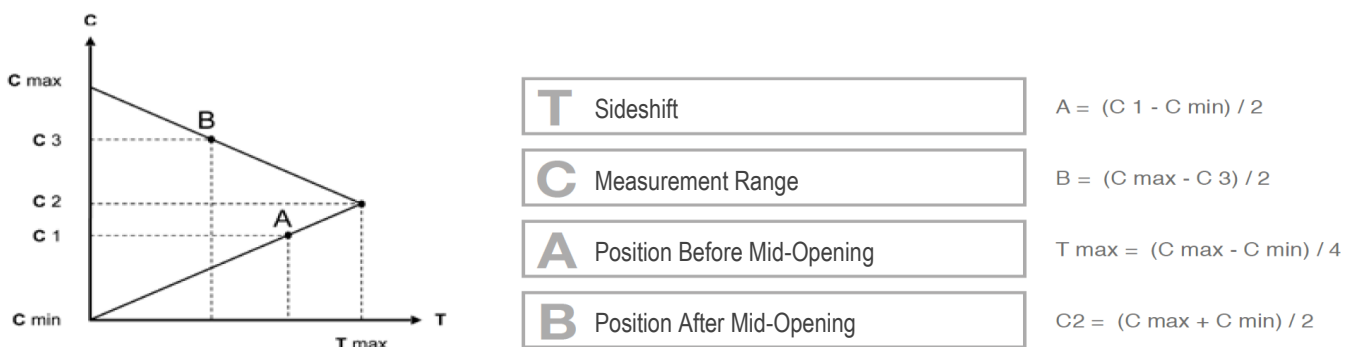


Figure 23



Off-centre sideshift of the load is only permitted on the ground. In this case, a loss of clamping force may occur, which may result in load loss. As a precaution, the centre of gravity of the equipment can be assumed to move laterally by the value of the sideshift (per side). If the precise value is required, consult the manufacturer of the equipment.

5.2 Handling Loads

The minimum transportable dimensions must be greater than the minimum grip. Depending on the load to be transported, this difference may vary and must be evaluated on a case by case basis by the operator.



Avoid handling and/or sideshift of the forklift truck/equipment with a load that is excessively high off the ground, as this may affect its stability.



Avoid displacing/handling unstable loads.



Avoid displacing/handling loads with an uncentred centre of gravity.

6 PERIODIC MAINTENANCE

Failure to comply with the rules and intervals established for maintenance will compromise the correct operation of the equipment and will void the conditions of the warranty.

All maintenance operations must be carried out with the forklift truck stationary and the hydraulic circuit disconnected and depressurised. The entire maintenance area must be barricaded using regulation protection devices and, if the cylinders require disassembly, a tray or container must be provided to catch the oil present in the cylinder.

To prevent issues when using the equipment, A.T.I.B. recommends changing the hydraulic oil and filters regularly and keeping the system as clean as possible during maintenance operations.

⚠ ATTENTION ⚠

Hydraulic parts may be very hot. Use suitable protective equipment.

Watch out for leakage. High-pressure oil can injure eyes and skin. Wear protective eyewear that includes side shields.

Do not remove valves, lines or other potentially pressurised parts when this is active.

6.1 Maintenance Every 100 Hours

1. Check the condition of the hydraulic connections (lines and fittings), replacing worn parts if necessary.
2. Check tightening torque of the bolts of the lower retaining couplings of the equipment, ensuring that it is as indicated in *Table 3* (page 12) and in *Table 4* (page 16) and, if necessary, adjust the bolts holding them in place.
3. Check clearance between the lower part of the fork carriage and the lower equipment couplings, ensuring that it is as shown in *Figure 4* (page 16) and in *Figure 9* (page 16) and, if necessary, adjust the bolts holding them in place.
4. Clean and lubricate all sliding parts (see *Figure 38* and *Figure 39* on page 46).

6.2 Maintenance Every 300 Hours

1. Check condition of bushes and sliding gibs. If excessively worn component are detected, A.T.I.B. recommends replacing the entire component assembly in question.
2. Carry out the additional operations listed in the previous point (*Point 6.1*).

6.3 Maintenance Every 1000 Hours

1. Check condition of bushes and sliding gibs. If excessively worn component are detected, A.T.I.B. recommends replacing the entire component assembly in question.
2. Carry out the additional operations listed in the previous points (Points 6.1 and 6.2 on page 31).

6.4 Maintenance Every 2000 Hours

1. Carry out a thorough inspection of the equipment. If possible, this should be carried out by qualified personnel who are able to identify any issues that may compromise the safety and efficiency of the equipment. There may be a number of defects, such as the following:
 - Check condition of all equipment components (cylinders, couplings, seals, fittings, grease nipples, etc.) to ensure that they are in good condition and replace any worn parts.
 - Check condition of sliding and working surfaces and replace if damaged.

For further potential issues (and their solutions), refer additionally to *Table 5* on page 45.

2. Dismantle cylinders and check condition of piston rods and seals. If a damaged or excessively worn seal is detected, A.T.I.B. recommends replacing the entire seal assembly.
3. Replace seals in the event of oil leakage and replace rods if they are scratched (cylinders should always be tested when inserted into the equipment to prevent sudden ejection of rods).
4. Carry out the additional operations listed in the previous points (*Points 6.1, 6.2 and 6.3*)

N.B. Reduce intervals in the event of use under particularly harsh conditions

6.5 Rotation Device Maintenance

6.5.1 Maintenance Every 200 Hours

1. Check the hydraulic connections, replacing any worn parts.
2. Check the tightening torque of the bolts of the lower retaining hooks of the equipment and of the slewing ring wheel fastening bolts.
3. Check the oil level of the reduction gearbox using the inspection cap and, if lower than 1/2 the cap, top up with AGIP BLASIA 307 using the oil filler plug.
4. Grease the device, slowly rotating the equipment, the use of high pressure lithium soap grease AGIP GR MU/EP2 (dropping point 205°, ASTM penetration at 235° 250/300).

6.5.2 Maintenance Every 2000 Hours

1. Remove the rotating body by unscrewing the bolts of the slewing ring and replace the felt seals, fitting the new ones with adhesive such as BOSTIK 5242C after cutting them down to size.
2. Check the wear on the slewing coupling components and, if necessary, dismantle and replace as described in point *Disassembling the Slewing Ring*.
3. With the rotating body dismantled, check that the pinion has no worn teeth due to excessive use. If it does, replace.
4. If there is excessive clearance between the pinion and the crown gear, replace the helical gear in the gearbox and/or the pinion.
5. Carry out a full gearbox oil change.

7 DISASSEMBLY PROCEDURE

All maintenance operations must be carried out with the forklift truck stationary and the hydraulic circuit disconnected and depressurised. The entire maintenance area must be barricaded using regulation protection devices and, if the cylinders require disassembly, a tray or container must be provided to catch the oil present in the cylinder.

7.1 Removing the Equipment from the Forklift Truck

1. Release the pressure from the hydraulic system.
2. Remove the lower couplings from the assembly (see *Figure 2 and Figure 7* on page 10 and 15).
3. For handling, use straps/chains that are suitably sized in relation to the weight of the equipment as indicated on the plate.
4. Then lift the equipment using an overhead crane or hoist of sufficient capacity and remove it from the forklift truck (see *Figure 3 and Figure 8* on page 11 and 15).

7.2 Removing the Forks from the Equipment

FORKS

N.B. Although only type 301.474.170 is shown, the procedure for removing the forks from the equipment is identical for the other types.

1. Release the pressure from the hydraulic system and disconnect the lines.
2. Remove the forks after unscrewing the nuts securing them to the cylinders (see *Figure 24* and *Figure 25*).

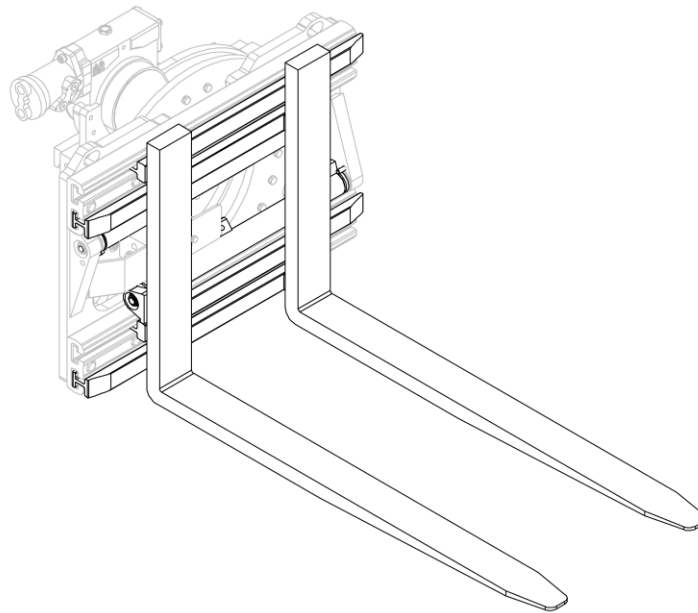


Figure 24

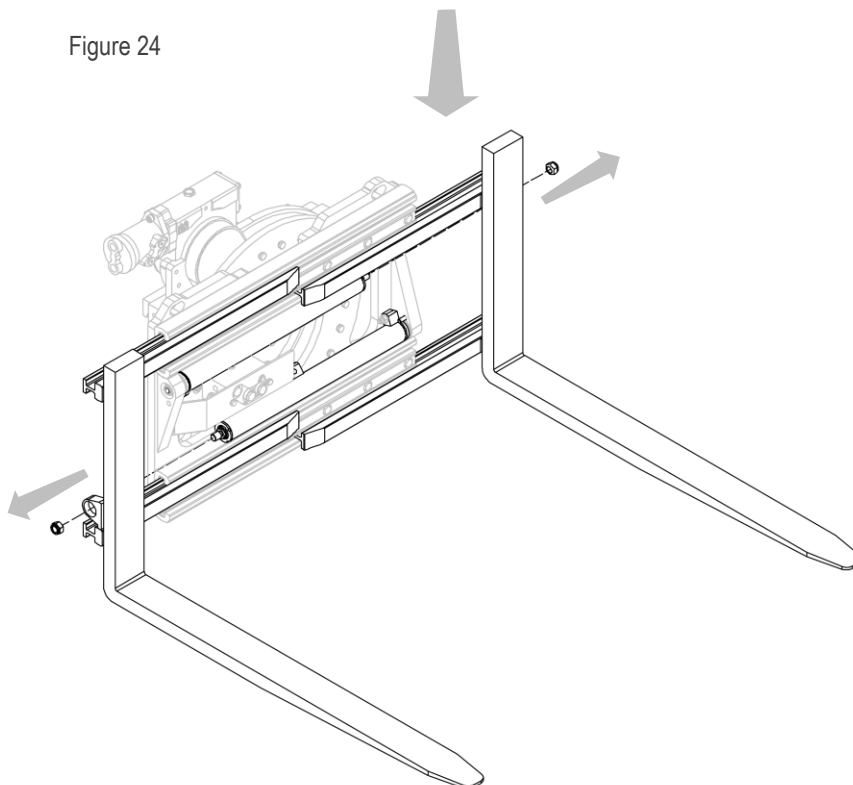


Figure 25

7.3 Disassembling the Nylon Bushes

NYLON BUSHES

1. Remove the forks from the equipment, see chapter 7.2 on page 35.
2. Release the pressure from the hydraulic system and disconnect the lines.
3. Remove the nylon bushes after unscrewing the corresponding grub screws (see *Figure 26* and *Figure 27*).

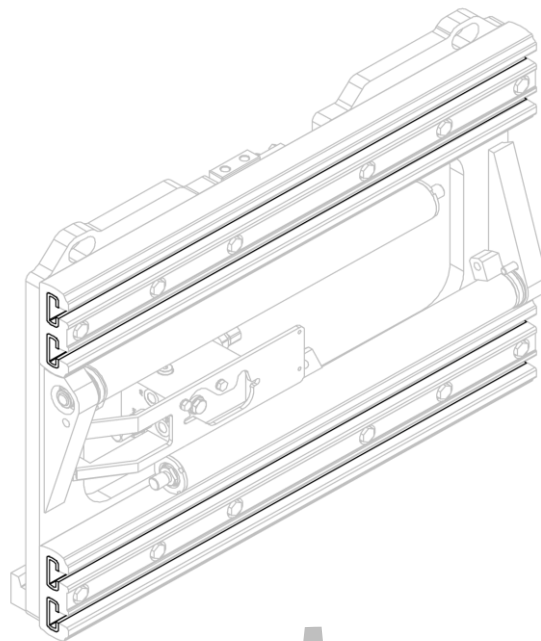


Figure 26

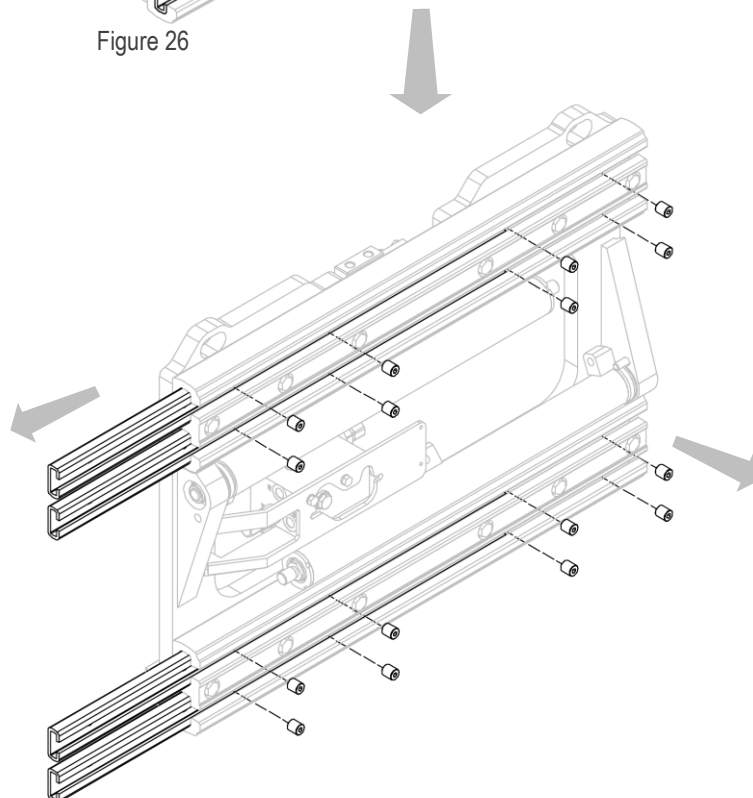


Figure 27

7.4 Disassembling the Aluminium Profiles

ALUMINIUM

1. Release the pressure from the hydraulic system and disconnect the lines.
2. Remove the aluminium profiles, one at a time, after unscrewing the bolts (see *Figure 28* and *Figure 29*).

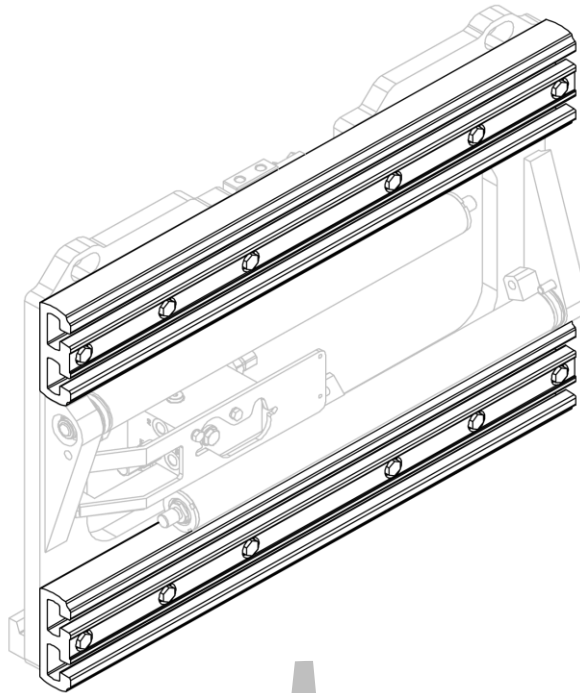


Figure 28

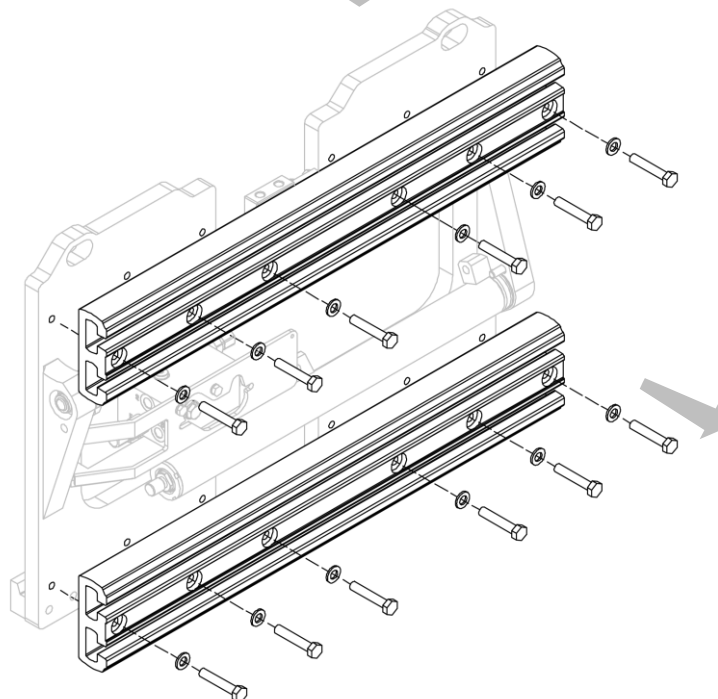


Figure 29

7.5 Removing the Fork Cylinders from the Equipment

FORK CYLINDERS

N.B. Although only type 301.474.170 is shown, the procedure for removing and disassembling the fork cylinders is identical for the other versions.

1. Open the cylinders.
2. Release the pressure from the hydraulic system and disconnect the lines.
3. Remove the nuts **D** that secure the cylinders to the forks (see *Figure 30*).

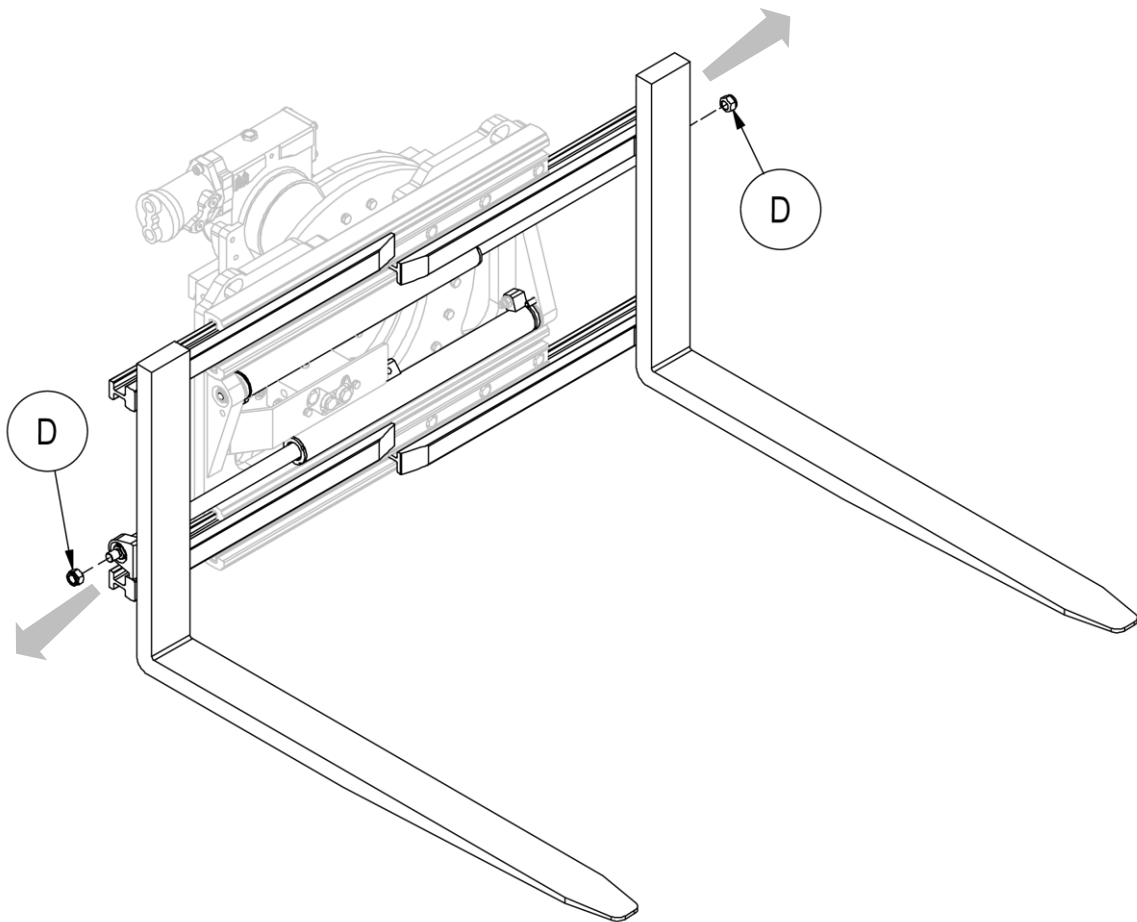


Figure 30

4. Reconnect the hydraulic system.
5. Close the cylinders.

6. Release the pressure from the hydraulic system and disconnect the lines.
7. Remove, one at a time, the nuts **D** that secure the cylinders to the equipment assembly and remove the cylinders themselves, taking care not to damage them (see *Figure 31*).

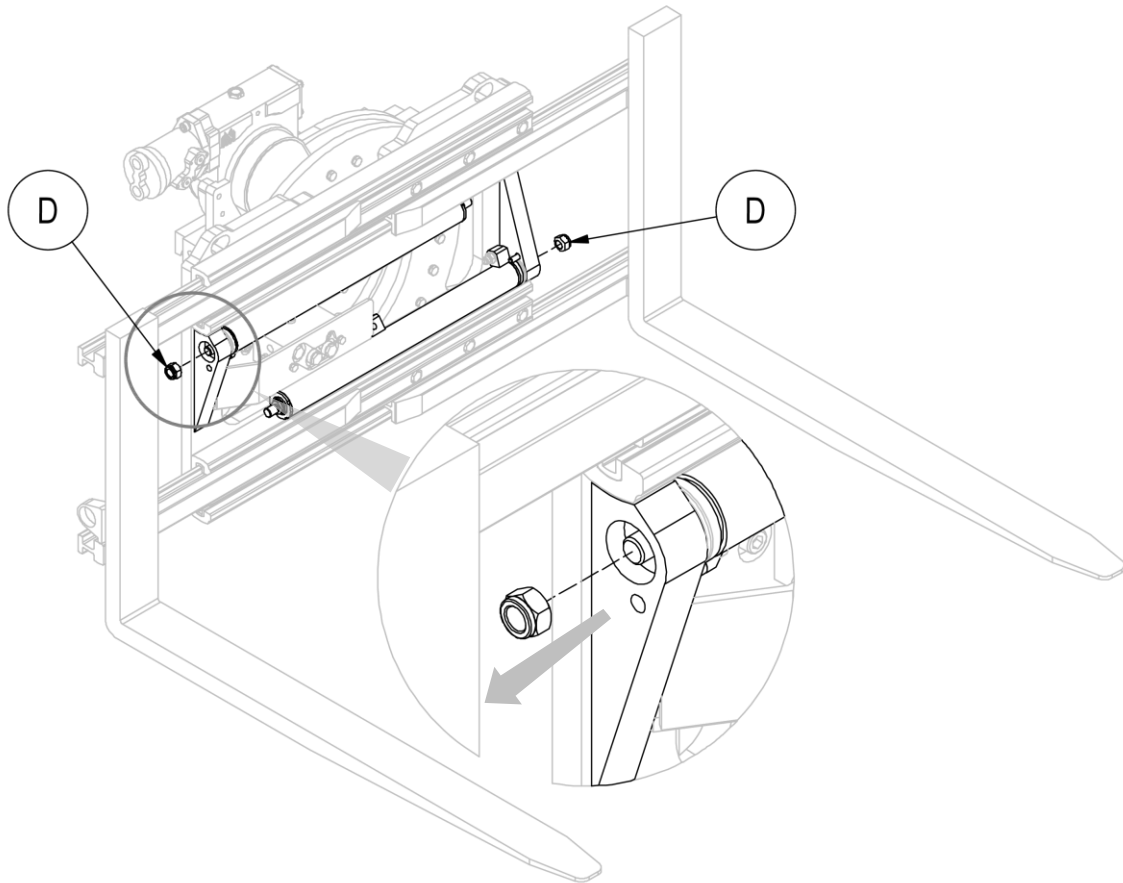


Figure 31

7.5.1 Disassembling and Reassembling the Fork Cylinders

If the entire cylinder needs to be replaced, reassemble following the instructions listed in the previous point. If any cylinder components need to be replaced, proceed as indicated below:

1. Clamp the cylinder body in a vice using soft jaws (taking care not to deform the liner).
2. Use a C-hook spanner to remove cap **T**.
3. If the cap will not unscrew, slightly heat the area of the thread in question to facilitate unscrewing.
4. Unscrew rod **C**.
5. Disassemble/separate the rest of the components and seals (this will be easy and rather intuitive at this stage).
6. Replace damaged parts and reassemble by repeating the above steps in reverse order, taking care to relock the cylinder cap using medium strength threadlocker.
7. If a damaged seal is found, it is advisable to replace the entire seal assembly.
8. Use *Figure 32 as a guide*.

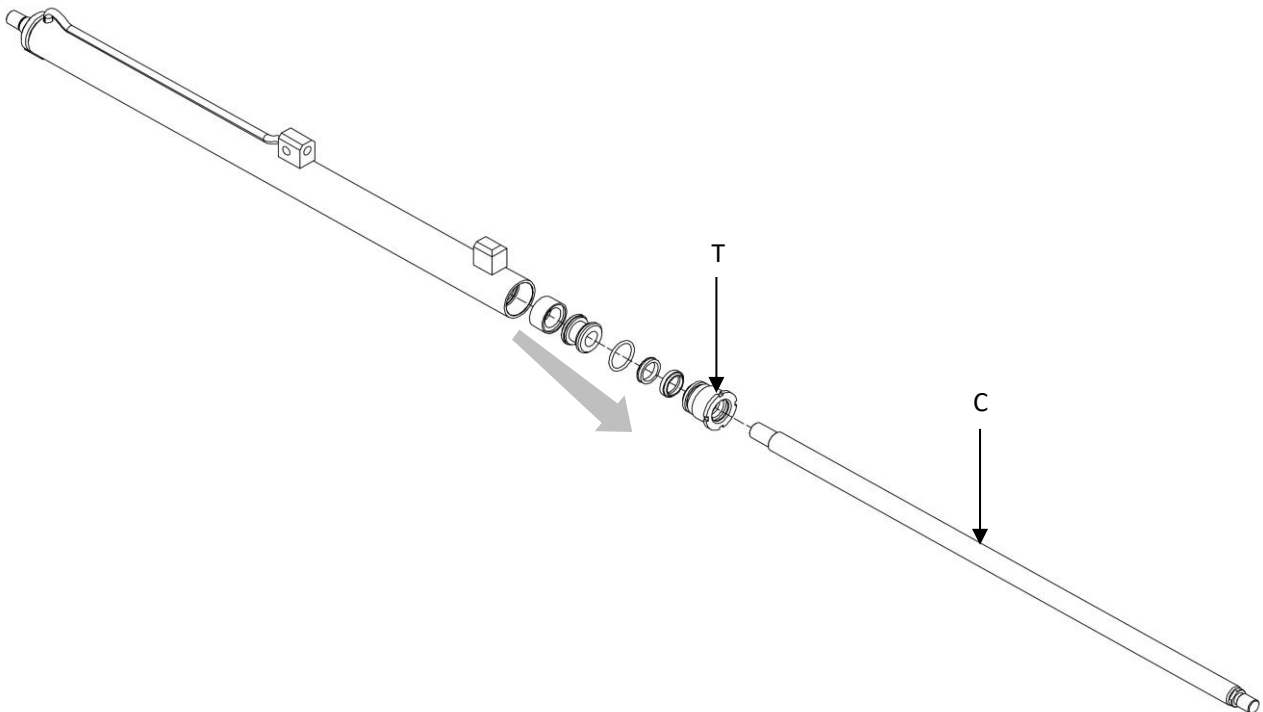


Figure 32

7.6 Removing the Sideshift Cylinder (siss)

SIDESHIFT CYLINDER

N.B. Although only type 301.474.170 is shown, the procedure for removing and disassembling the sideshift cylinder is identical for the other versions.

1. Release the pressure from the hydraulic system and disconnect the lines, ensuring that a tray or container is made available beneath the fittings to catch the oil in the cylinder.
2. Remove the equipment from the forklift truck (see *Removing the Equipment from the Forklift Truck* on page 34).
3. Remove the cylinder from its housing after removing the front half-collar and the associated bolts and spring washers/pins and snap rings that secure it.
4. Use *Figure 33* as a guide.

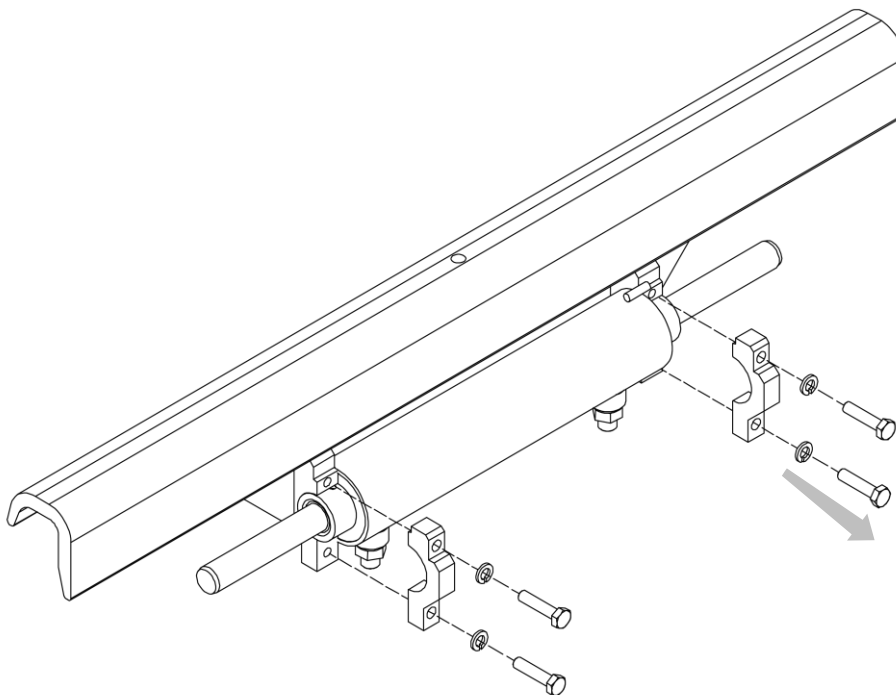


Figure 33

7.6.1 Disassembling and Reassembling the Sideshift Cylinder

If the entire cylinder needs to be replaced, reassemble following the instructions listed in the previous point in reverse order (using the new cylinder). If any cylinder components need to be replaced, proceed as indicated below (see *Figure 34*):

1. Place the cylinder on a horizontal surface.
2. If only the rods need to be replaced, simply remove them from the cylinder cap.
3. If seals and/or other parts need to be replaced, the cap must be unscrewed using a C-hook spanner.
4. If the cap will not unscrew, slightly heat the area of the thread in question to facilitate unscrewing.
5. Replace damaged parts and reassemble by repeating the above steps in reverse order, taking care to relock the cylinder cap using medium strength threadlocker.
6. If a damaged seal is found, it is advisable to replace the entire seal assembly.

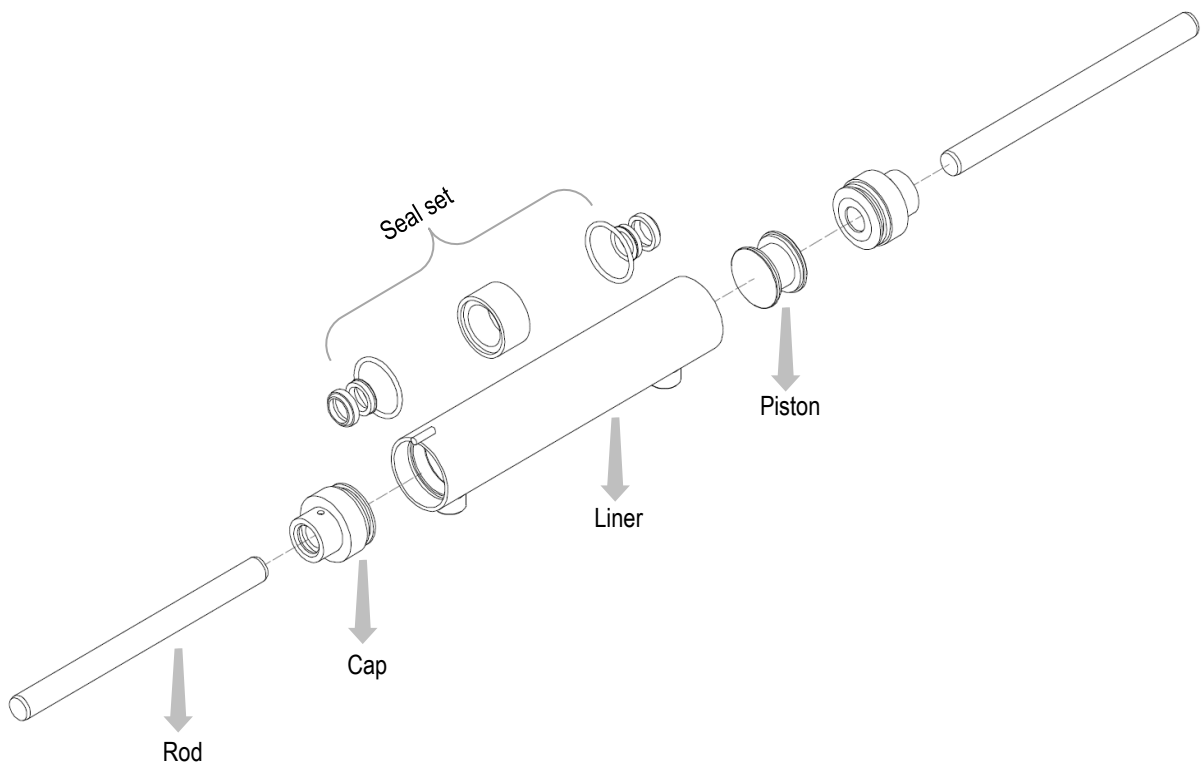


Figure 34

7.7 Disassembling the Slewing Ring

1. Release the pressure from the hydraulic system and disconnect the lines.
2. Remove the equipment from the forklift truck (see *Removing the Equipment from the Forklift Truck*).
3. Remove the gearbox and motor from the equipment (see Point 3 of chapter *Disassembling the Gearbox and Motor*).
4. Remove forks, cylinders and aluminium profiles.
5. Remove the front part of the rotating body, ensuring that all parts are supported to carry out the procedure in safety (see *Figure 35*).
6. To remove the slewing ring **R**, the bolts on the rear of the equipment must also be removed (see *Figure 35*).
7. Remove the slewing ring and insert a new one if necessary.
8. Reassemble following the instructions listed above, remembering to replace the felt seals **G** with new ones, which must be fitted using adhesive such as BOSTIK 5242C.

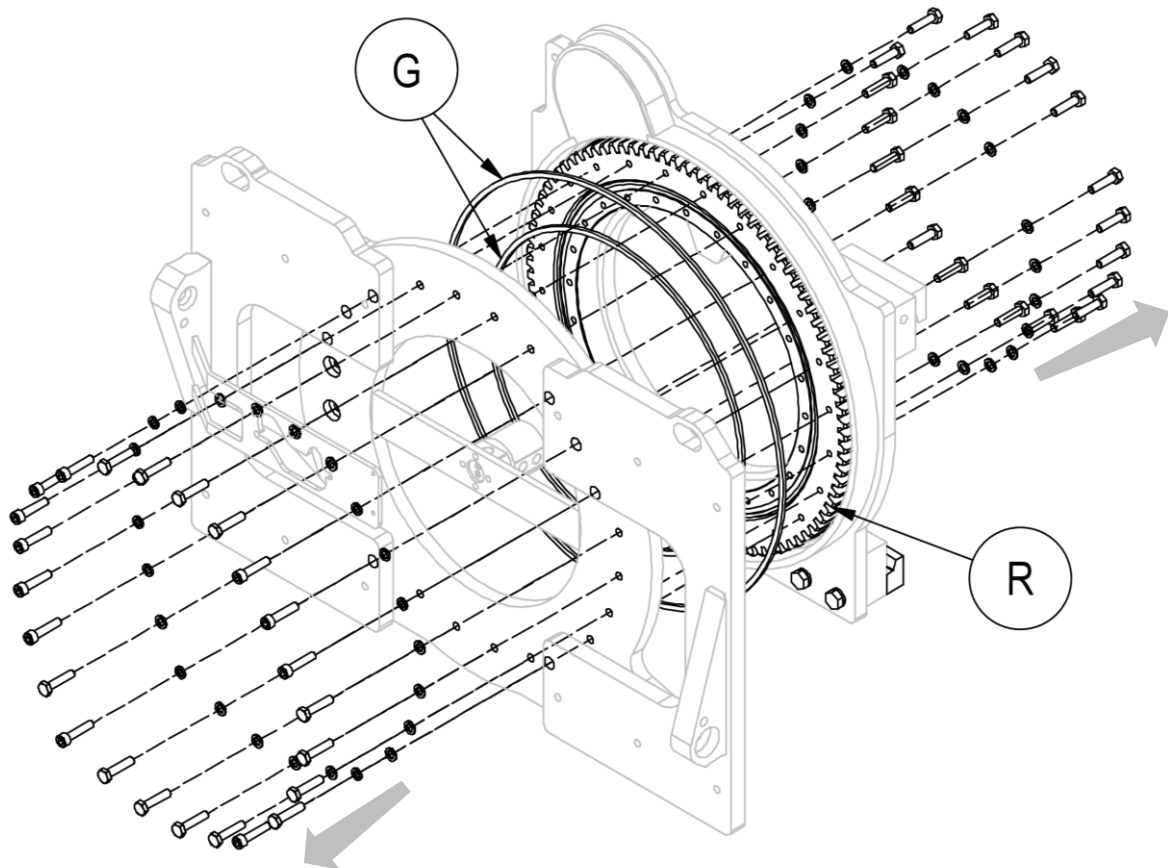


Figure 35

7.8 Disassembling the Gearbox and Motor

1. Release the pressure from the hydraulic system and disconnect the lines.
2. Remove the equipment from the forklift truck (see *Removing the Equipment from the Forklift Truck*).
3. Remove the gearbox-motor pair from the equipment assembly, after removing the corresponding bolts (see *Figure 36*).

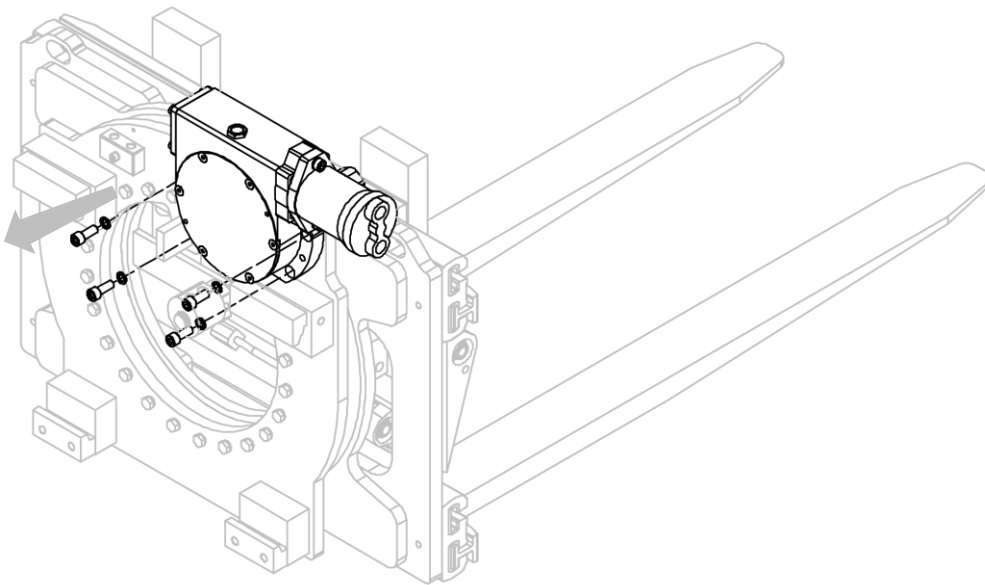


Figure 36

4. Separate the motor from the gearbox, after having removed the bolts that secure it (see *Figure 37*).

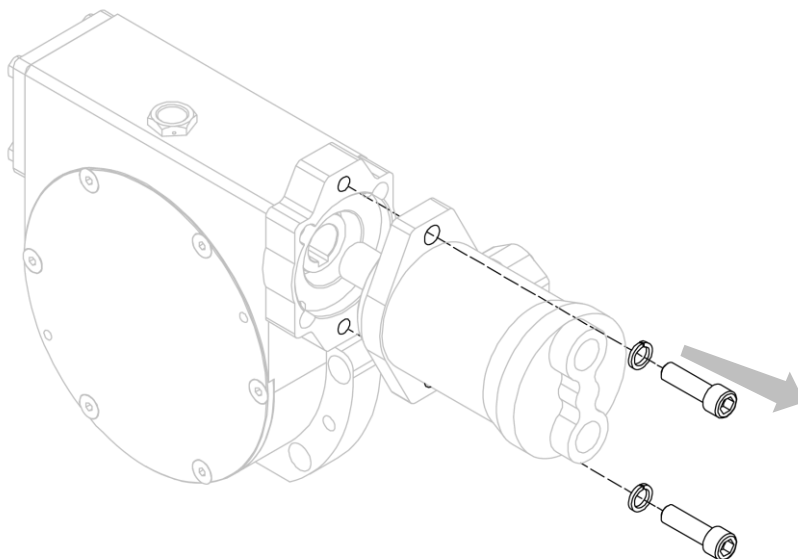


Figure 37

8 TROUBLESHOOTING

8.1 Probable Faults and Solutions

FAULT	CAUSE	SOLUTION
Insufficient clamping force	Calibration of the maximum pressure valve too low	Increase the pressure without exceeding the maximum limit
	Insufficient pressure	Contact the forklift truck manufacturer
	Worn pump	Replace it
	Worn cylinder seals	Replace them
	No oil in the tank	Fill up
Pressure drop on clamped load	Oil leakage through pipes and fittings	Tighten the fittings or replace them
	Oil leakage from the cylinders	Replace the seals or, if necessary, the cylinders
	Load loss in sideshift	Lower sideshift pressure
	Load loss	Check fork camber
Slow opening and closing	Low oil flow rate	Check the tank level and/or the pump Constrictions in the system: search for them and remove them
	Insufficient pressure	Adjust the calibration of the maximum pressure valve
	Mechanical deformations of some parts	Repair or replace
	Worn cylinder seals	Replace them
	No oil in the tank	Fill up
	Air in hydraulic system	Purge system
Erratic displacement	Worn gibs or sliding rollers	Replace
	Excessive friction between sliding parts	Clean and grease sliding parts
	Worn cylinder seals	Replace them
	Rotation trigger	Reduce load eccentricity
	No oil in the tank	Fill up
	Rotation device	Noise and/or vibrations
Hydraulic motor worn out		Replace motor

Table 5

For further issues, contact A.T.I.B. S.r.l.

8.2 Lubrication

1. Lubricate sliding components using grease nipples.
2. Lubricate gibs and sliding surfaces (e.g. nylon bushes).
3. Also lubricate slewing ring using grease nipples.

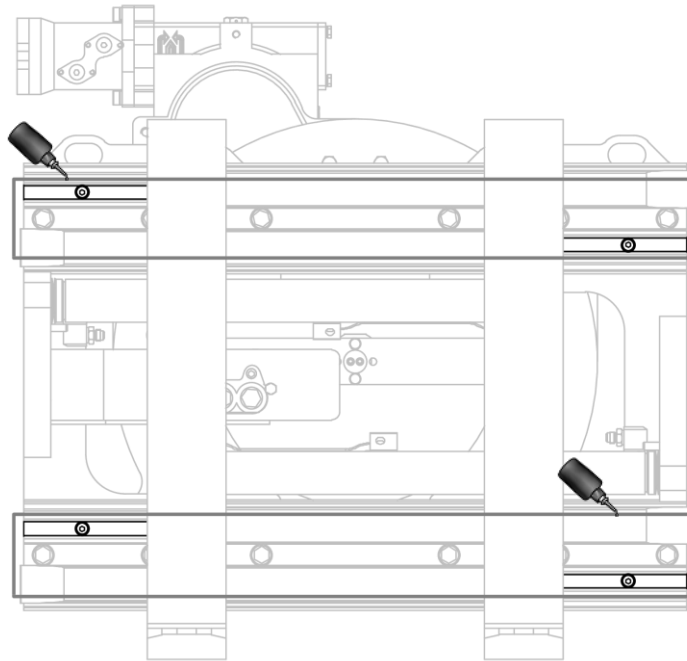


Figure 38

WITH SISS

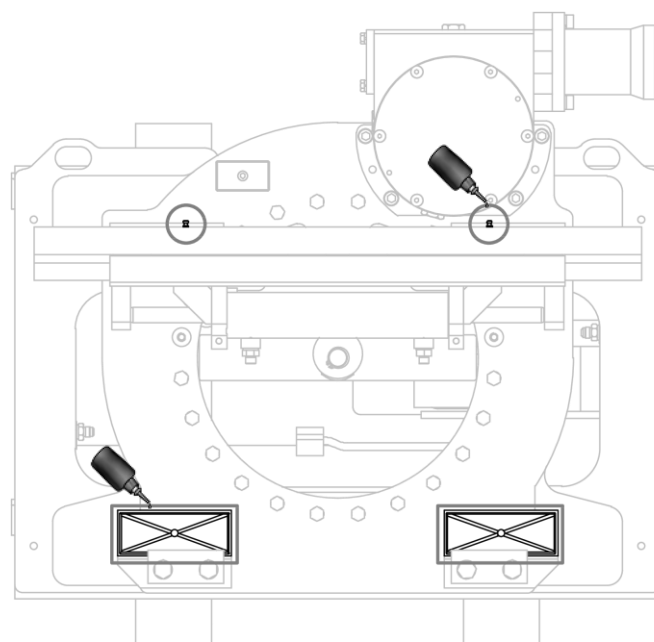


Figure 39

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