

# Fork Positioner

## **Fork Positioner**

Instruction manual

---

# Fork Positioner

## Contents

<b>Notice for the reader</b> .....	5
Validity .....	5
Illustrations .....	5
Accentuated text .....	5
<b>Product description</b> .....	6
Product identification .....	6
Scope of delivery .....	6
Standard accessories .....	6
Optional accessories .....	6
Intended use .....	7
Product description .....	7
Functional description .....	7
Possible applications .....	8
Operator classification / qualification .....	8
Period of operation .....	8
Forklift truck requirements .....	9
<b>Safety</b> .....	10
Qualification of personnel .....	10
Overall safety .....	10
Personal safety .....	11
Product safety .....	12
<b>Transport and mounting</b> .....	14
Delivery and transport .....	14
Packaging .....	14
Unpacking .....	14
<b>Mounting / Installation</b> .....	15
Mounting and connection to the forklift truck .....	15
<b>Operation</b> .....	17
Initial operation .....	17
Initial operation .....	17
Pressure setting for attachments with sideshift .....	17
Pressure setting for the fork positioning function .....	18
Conducting a test run .....	18
Continuous operation .....	19
Commissioning .....	19
Handling (continuous operation) .....	19
Operational pauses .....	20
Short pause .....	20
Restarting operations .....	20
Decommissioning .....	20
Decommissioning the attachment .....	20
Removing the attachment from the forklift truck .....	21
<b>Maintenance and servicing</b> .....	22
Preventive measures .....	22
Regular inspections before starting work .....	22
Regular maintenance .....	23
Swivel bearing of the rotator .....	24
Worm gear unit of the rotator .....	25
Sideshift (upper and lower slides) .....	26
Guide system of the load arms .....	27

<b>Disposal</b> .....	28
Disposal of the attachment .....	28
<b>Addendum</b> .....	29
Torque table for bolted fastenings .....	29
Hydraulic circuits .....	29

## Notice for the reader

This document contains information and the code of conduct required for safely operating this attachment. We advise reading this document completely before operating the attachment. Keep this document ready for reference at all times.

In order to operate this attachment effectively, the following aspects are covered in this document:

- Transportation of the attachment, mounting and test operation.
- Working with the attachment.
- Maintaining and servicing the attachment.

### Validity

This document is valid for:

- the operating company.
- all persons working on or operating this attachment.

### Illustrations

Some of the illustrations in this document show the attachment in a simplified or diagrammatic manner.

### Accentuated text

Varying circumstances have been accentuated. Symbols mark important information. The following examples show the principal accents and symbols used:




---

#### **These are health and safety notices!**

- Warning notices point out dangers to life and limb or damage that may occur to the attachment through improper use.
- 

Follow the next steps: = start of an operational sequence

1. Step, the next operational sequence.
2. Step, the next operational sequence.




---

This is an indication of further available information. Such references are intended to help simplify working with the attachment.

---

## Product description

### Product identification

All attachments are clearly marked with an identification label. The identification label is attached to the front right-hand side of the attachment as seen from the operator's driving position.

The identification label bears the following information:

- Manufacturer and address.
- Warning notice concerning load capacity.
- Year of manufacture.
- Type.
- Serial number.
- Load capacity.
- Load centre of gravity.
- Empty weight.
- Centre of gravity.
- Lost load centre.
- Hydraulic operating pressure.
- CE mark.
- Works number, if applicable.



---

The identification plate must be replaced if it is missing or damaged!

---

### Scope of delivery

The fork positioner, called the attachment in the following, is delivered fully assembled and ready to use.

#### Standard accessories

The attachment is delivered without accessories.

#### Optional accessories

Optional accessories and spare parts are obtainable on request.

Further information covering optional accessories can be found in the documentation included with the accessories.

## Intended use

This attachment is an additional accessory for forklift trucks that is used instead of forks for transporting loads.

A different application or an application in excess of the intended rating is not in compliance.

Misappropriate use in particular:

- Any kind of transportation of persons.
- Carrying loads in excess of the maximum stated on the identification label.
- Displacing loads sideways that are not fully lifted off the ground.
- Operating an attachment that is not correctly mounted to the forklift truck.
- Operating a defective attachment.
- Operating an attachment on a defective forklift truck.
- Handling by unqualified persons.

## Product description

The attachment is based on a robust and torsion-resistant body. Incorporated in this basic clamp body are two horizontal chromed guide beams. Mounted on the guide beams are two adjustable load arms which are compliant with ISO 2328 so that standard forks can be used. The forks are additionally bolted to the fork carriers to secure them against sliding off on the sides. On the back, the basic clamp body is bolted to a rotating unit, i.e. a rotator. The latter also consists of a robust basic body. A swivel bearing is bolted to the body of the rotator via its inner ring. A ring gear is mounted on the outer ring of the swivel bearing. A sealing ring between the rotating elements and the body prevents foreign material and moisture from entering and the lubrication grease from leaking from the housing. The rotator housing is fitted with a worm gear at the top that is mounted transverse to the direction of travel seen from the operator's driving position. A hydraulic motor and a clutch brake are flange connected to the worm gear housing.

As an option, the attachment can be fitted with a separate sideshift function.

## Functional description

The load arms are adjusted horizontally by hydraulic cylinders which are operated from the driver's position on the forklift truck.

The hydraulic circuit has an integral lockvalve which holds the load arms in the position to which they have been adjusted. Using a pressure relief valve, the hydraulic pressure levels for closing and opening the load arms can be adjusted.

The rotator enables a 360° rotation of the attachment. The worm gear is horizontally installed between tapered roller bearings transverse to the direction of travel as seen from the operator's driving position and drives the ring gear and thus also the swivel bearing connected to it. The worm gear itself is driven by a hydraulic motor. A hydraulically

vented, spring-loaded clutch brake is connected either between the hydraulic motor and the worm gear or to the worm gear on the side opposite the motor. An overcentre valve with shuttle valve is installed directly on the hydraulic motor or on an adapter plate and connected upstream in the hydraulic circuit.

The shuttle valve controls the oil supply to the brake, so that the latter is released independently from the direction of rotation. If the pressure in the hydraulic system drops below the required release pressure, the clutch brake is activated. It thus represents a safety element in case of hose or tubing rupture or other events that may cause pressure loss.

The overcentre valve prevents unintentional advance rotating movements caused by an unfavorable centre of gravity position of the load. This method of hydraulic restraint of the hydraulic motor allows for a very smooth rotation.

As an option, the entire attachment can be hydraulically side shifted horizontally, transverse to the direction of travel as seen from the operator's driving position, so that approach and manoeuvring inaccuracies caused by the forklift truck operator can easily be compensated for.

### **Possible applications**

This type of attachment may only be used for the transportation of loads that can be carried on forks. Suitable loads are loads to be carried on pallets, in boxes or crates, in tubs, bins or in frames. These loads must have suitable load holding facilities such as pockets or must be elevated to accept the forks.

Other suitable loads are those elevated by chocks or in shelves, such as bar sections, or where the forks can enter the load itself, e.g. large pipes.

It is not allowed to clamp loads of any kind using only the tips of the load arms.

### **Operator classification / qualification**

As an operating company, you must have adequately qualified personnel to operate forklift truck attachments. Further details on this subject can be found in the following chapters of this instruction manual.

In the case of not having qualified personnel or having further doubts on this subject, contact the manufacturer for assistance.

### **Period of operation**

The attachment is designed for uninterrupted operation on forklift trucks.

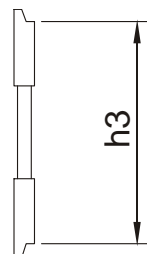


## Forklift truck requirements

The forklift truck carriage dimensions must comply with the ISO Standard 2328.

The following values may help with the orientation:

- Reference dimension h3
- Hydraulic delivery volumes



Reference dimension h3

Category ISO 2328	h3 [mm]	Load lifting capacity [kg/mm]	Oil volume [l/min]
2	381 -1	up to 2200/500	20 ±5
3	476 -1,5	up to 3500/500	30 ±5
3	476 -1,5	up to 4000/600	40 ±5

ISO 2328 dimensions for h3



Smaller hydraulic delivery volumes result in lower speeds. Higher hydraulic delivery volumes result in excessive oil temperatures which will cause greater wear and lower efficiency of the hydraulic system.

## Safety

### Qualification of personnel

All persons working on or with the attachment must be adequately qualified to do so.

Operating personnel:

- Must have adequate instruction in the functional and operational processes.
- Knowledge of responsibilities inherent to executing the required work operations.

Service personnel:

- Well-founded knowledge of mechanical engineering, electrical engineering, and hydraulics.
- Authorisation to commission the attachment according to the relevant standards of safety technology.
- Well-founded knowledge of the structure and functioning of the attachment.

As an attachment operator, you are tasked to ensure that all persons involved in the set-up, operation, servicing, or repair of attachments have thoroughly read and understood the relevant parts of the Operating and Service Instructions.

### Overall safety

This attachment complies with the state of the art of science and technology. It is dependable and safe to operate. Even so, it could still harbour possible dangers to persons, or faults may occur. Attention to the Operating and Service Instructions is therefore mandatory at all times.

The manufacturer's Operating and Service Instruction manual provides a code of conduct for the operators of attachments and for all persons involved in the set-up, operation, servicing, or repair of attachments.



WARNING

---

#### **Risk of injury through improper use!**

Be aware that persons may be injured due to improper use. Furthermore, incorrect handling may also cause damage to the load or attachment.

- ➔ Loads shall be picked up so that their centre of gravity is as close to the rotating axis as possible. This way, inadvertent rotation of the load can be avoided.
  - ➔ Always use the attachment for its intended purpose.
-

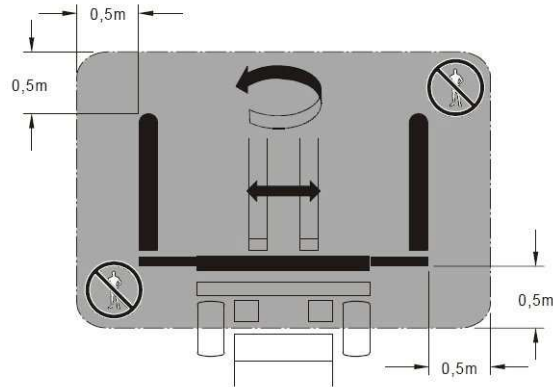
## Personal safety



### Danger to life through crushing and shearing!

When the attachment is moved, persons can be seriously injured by crushing or shearing if caught between the load arms and in other moving parts.

- ➔ The attachment may only be activated when no persons are present within the danger zone!



*Danger zone*



### Crushing hazard

The attachment has a substantial empty weight. This may cause dangerous crushing action during mounting or storage procedures. You may be in danger of being crushed by the empty weight of the attachment.

- ➔ Taking this into consideration, initiate the appropriate safety precautions. Further details on this subject can be found in the following chapters.
- ➔ Always safeguard the attachment against the possibility of it falling over or falling off.



### Toxicity hazards

Lubricants are harmful if brought in direct contact with the skin. Modern lubricants and hydraulic oils are optimized for technical functionality and can cause serious illness if swallowed or if they come into contact with the skin.

- ➔ Avoid all direct contact with lubricants and hydraulic fluids.

## Product safety



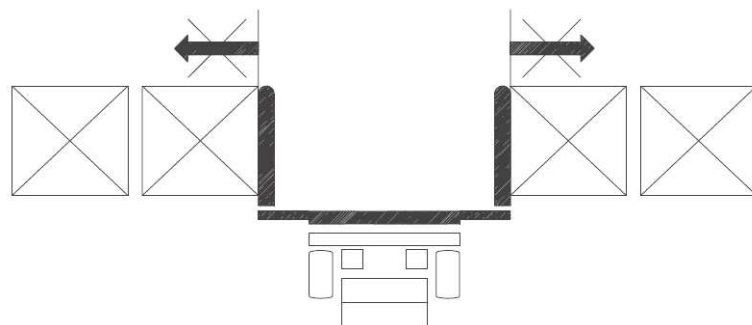
### Damage to the attachment and the load!

Incorrect handling of the attachment can result in damage to the load and the attachment itself.

- ➔ Always position the attachment properly against the load.
- ➔ Always use the attachment and its functions in the correct form and manner.

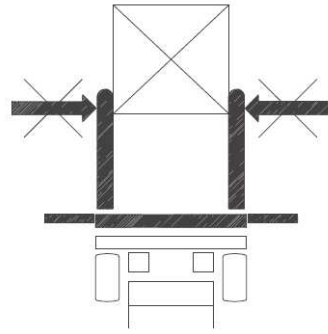
Note the following instructions:

- Ensure that the attachment is mounted securely to the forklift truck.
- When "opening" the attachment, be sure not to shift other loads sideways (Figure „Loads being forced sideways while opening the load arms“). The load arms and attachment are not designed to withstand this kind of overloading, serious damage may be caused to both.
- Do not clamp loads between the fork tips with the "Close" function (Figure „Clamping between fork tips“).
- To ensure safe transport, the load must be picked up so that it is lying flush against the fork backs (Figure „Place load flush against the load contact surface“). If the nominal load is picked up with an increased distance from the load centre of gravity, the attachment is overloaded. Overloading can cause damage to the attachment and the forklift truck. Also, there is an increased risk that the forklift truck may tip over.
- As an option: Do not shift loads sideways with the "Sideshift" function if they are not fully lifted off the ground (Figure „Loads being forced sideways while sideshifting“).
- Abrupt reversals of rotation direction of the rotator are not permissible! This will cause damage to the rotator drive. This also includes jolting movements that are caused by briefly repeating the reversal of the direction of rotation, with the intention of removing residue that may adhere to the inner walls of vessels. Any rotational motion must first be completed, i.e., the rotator must stand still, before rotating it in the opposite direction.

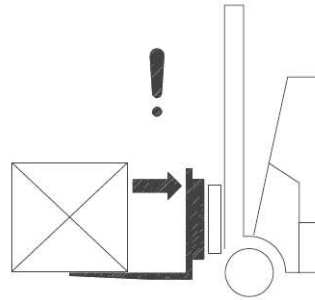


*Loads being forced sideways while opening the load arms*

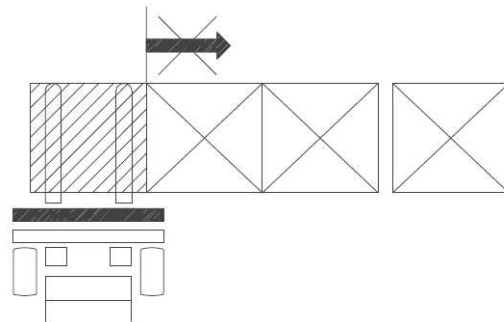
# Fork Positioner



*Clamping between fork tips*



*Place load flush against the load contact surface*



*Loads being forced sideways while sideshifting*

## Transport and mounting

### Delivery and transport

The attachment is delivered on a pallet.

During transportation, the attachment must be either

- on the original pallet.
- securely mounted on the forklift truck.
- hung in appropriate lifting gear, i. e. with ropes or slings.

### Packaging

Generally, the attachment is delivered on a suitable transport pallet and secured with retaining bands, but without any further packaging.

In some cases, foil packaging may be used to avoid corrosion.

### Unpacking



---

#### **Dangers through overturning!**

After the removal of all retaining bands, the attachment is in a free standing state and could possibly tip over.

- ➔ Be sure the pallet with the attachment is on a level surface.
  - ➔ Support the attachment using lifting gear or similar before removing the retaining bands.
- 

Follow the next steps:

1. Remove all existing packaging.
2. Remove the retaining bands.
3. Dispose of any packaging materials in the approved manner.

Further steps are to be taken from the following chapters.

## Mounting / Installation

### Mounting and connection to the forklift truck

Mounting and installation work shall be implemented by competent personnel only.

Requirements:

- Arrange the pallet with the attachment so that the forklift truck can approach it from the back.
- Make sure that the attachment cannot fall over in this position.



### Environmental pollution through lubricants!

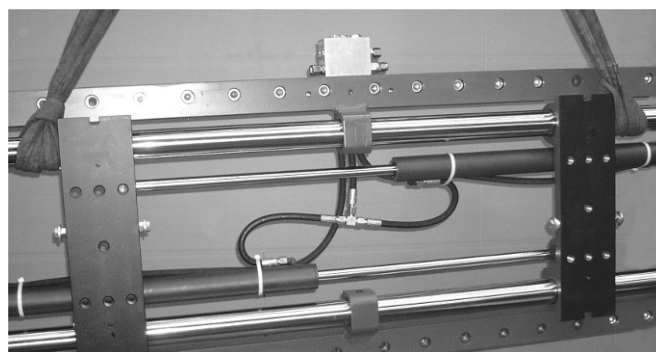
→ Great attention must be paid in stopping hydraulic oil and lubricants from polluting the environment.

Follow the next steps:

1. Hook rope or lifting sling into upper guide beam. As an alternative, ring bolts can be screwed into existing threaded holes, and the equipment can then be lifted using hooks.



*With ring bolts and hooks*



*With lifting slings*

2. Unscrew the lower mounting hooks from the rotator.
3. Optional, applies only to attachments with Sideshift: Place the brass slides symmetrically to the centre notch of the forklift carriage on the upper carriage profile, allowing them to lock into appropriate carriage notches.
4. Approach the center of the freely suspended attachment from behind with the forklift truck.

5. Lower the attachment onto the fork carriage of the truck until the upper mounting hooks have completely closed over the carriage profile. Be sure that the centre locking pin of the attachment locates in the central notch of the carriage.
6. Refit the lower mounting hooks.
7. Screw in the attachment bolts. Tighten with a torque wrench.
8. Connect the hydraulic jumper hoses to the attachment. Hook up the jumper hoses to the corresponding connections of the forklift truck. The connections for the "Rotation" function are located on the terminal block on the hydraulic motor. The connections for the "Fork positioning" function are located on the terminal block on the side of the rotator. The connections for the optionally available sideshift function are located at the center on the Sideshift.



## Operation

### Initial operation

#### Initial operation

Follow the next steps:

1. Check the oil level in the forklift truck, as the attachment withdraws a certain volume of hydraulic oil from the truck tank.
2. When necessary, top up the hydraulic oil.
3. Take all functions, that being all hydraulic cylinders, to the end of their travel.
4. Keep the hydraulic pressure constant for 10 seconds for each function.
5. Inspect all hydraulic couplings for leakage.
6. When necessary, retighten any leaking hydraulic couplings.

#### Pressure setting for attachments with sideshift

The working pressure for the side shifting function is only preset during the final inspection at the factory. The diversity of hydraulic systems and forklift trucks and the different performance rates of these systems, requires individual pressure settings. In general, the max. pressure must not exceed 150 bar. This max. pressure is not always necessary to ensure proper function, rather, the pressure setting should be adjusted to the level required for the actual job. The pressure adjusting screw for the side shifting function is located between the hose connections to the forklift truck. After unscrewing and removing the protective cap, the hydraulic pressure can be adjusted with a hexagon socket spanner. Rotating the adjusting screw clockwise increases the pressure, rotating counter-clockwise reduces it.

Requirements:

- Pick up a permissible load using the attachment. However, if the forklift truck rating plate specifies a lower load capacity, only loads to or below this specification may be transported!

Follow the next steps:

1. Rotate the pressure adjusting screw counter-clockwise all the way back.
2. Now actuate the side shifting function.
3. Then, slowly rotate the pressure adjusting screw clockwise until the load is moving sideways at a slow but adequate speed.
4. Secure the adjusting screw with the lock nut and screw the protective cap back on.

### Pressure setting for the fork positioning function

The working pressure for the fork positioning function is only preset during the final inspection at the factory. The diversity of hydraulic systems and forklift trucks and the different performance rates of these systems, requires individual pressure settings. In general, the max. pressure must not exceed 120 bar. The pressure adjusting screw is located on the terminal block on the side of the rotator. After unscrewing and removing the protective cap, the hydraulic pressure can be adjusted with a hexagon socket spanner. Rotating the adjusting screw clockwise increases the pressure, rotating counter-clockwise reduces it.

Follow the next steps:

1. Rotate the pressure adjusting screw counter-clockwise all the way back.
2. Now actuate the fork positioning function.
3. Slowly rotate the pressure adjusting screw clockwise again until a pressure of 120 bar is achieved.
4. Secure the adjusting screw with the lock nut and screw the protective cap back on.

### Conducting a test run

During the test run, the verification of the load bearing capacity is to be carried out using the maximum load stated on the identification label of the attachment. However, if the forklift truck rating plate specifies a lower load capacity, only loads to or below this specification may be transported!

Requirements:

- Choose a suitable load for the test run.
- The load chosen must be of the same type as the load to be transported during normal daily operations. The load must not fall off when the rotation function is actuated, rotating the attachment 360°.

Follow the next steps:

1. Move the load arms to their respective limits and maintain the hydraulic pressure for approx. 10 seconds.
2. As an option: actuate the side shifting function and maintain the hydraulic pressure for approx. 10 seconds.
3. Pick up the waiting load with the load arms. Lift the load until it can be rotated through 360° with sufficient ground clearance.
4. Rotate at least 5 times in each direction under full load. Before reversing direction, ensure that the rotator is at a full stop!
5. Inspect all hydraulic elements and connections for leaks.
6. If all functions work correctly and no hydraulic leaks are detected, the attachment may now be put into operation.

Should the equipment not function properly, or if leakage is found in the hydraulic system, please inform the supervising office!

## Continuous operation

### Commissioning

Regular checks before starting work:

- Inspect the complete hydraulic system for leaks.
- Inspect for damage to hydraulic cylinders and fittings such as hoses, pipes, valves and connectors.
- Inspect for wear and cracks in the load arms.
- Inspect for deformation of any parts; indication of a possible accident.
- Ensure that the attachment is well seated on the forklift truck and that the retaining bolts for the upper and lower hooks are screwed in tightly (see addendum; Torque Table).

If damage is detected:

- By no means is the attachment to be used!
- Inform the appropriate supervisor responsible immediately!

### Handling (continuous operation)

The attachment on its own, not attached to a forklift truck, cannot be activated and can therefore not be operated.

Because of the wide variety of forklift trucks and the differing operating functions etc., it is necessary that the operating instructions for these functions be taken from the forklift truck instruction manual.




---

### Danger to life

- Adhere to all safety regulations.
  - Pay attention to this instruction manual.
- 

The attachment may only carry loads that do not exceed the maximum load in relation to its load centre stated on the attachment identification label.

If lower load capacities are stated on the rating plate for forklift trucks with attachments, then these specify the maximum loads to be carried.

Suitable load types and their handling can be found in the chapter "Product description".

In case of a collision, the parts must be inspected by a competent person without delay. Deformation and cracks can lead to secondary damage.

## Operational pauses

### Short pause

A short pause can be defined as switching off the forklift truck to end a working day or before the start of a work break. In these or similar cases, follow the instructions in the forklift truck instruction manual.



### Dangers caused by falling or slipping loads!

No loads may be resting on the load arms while the attachment is standing idle.

- ➔ Observe the instructions in the forklift truck instruction manual.
- ➔ Depressurise the attachment hydraulic system (see forklift truck instruction manual).

### Restarting operations

See section „Commissioning“ (Page 19).

## Decommissioning

The attachment is decommissioned e.g. if it is removed from the forklift truck to reinstall it or to mount it to a different forklift truck at a later time.

### Decommissioning the attachment

Requirements:

- a suitable vessel is at hand to catch escaping hydraulic oil.
- either sawdust or a similar binding agent is at hand to absorb leaked hydraulic oil.
- a suitable transport pallet is at hand.

Follow the next steps:

1. Remove dirt and potentially leaked or spilled used lubricant from the attachment using a pressure washer. Do not point the water jet directly at the sealing elements.
2. Leave the attachment to dry in the open air or speed up the procedure by using compressed air.
3. Apply fresh lubricant specified for this purpose to all parts requiring lubrication (for suitable lubricants, see chapter "Maintenance and servicing").
4. Take all relevant moving parts through their movements to disperse the lubricant evenly.
5. Spray all blank metallic parts of the attachment with a commercial preservative intended for this purpose.
6. Switch off the forklift truck.
7. Relieve the hydraulic system pressure (see the instructions in the forklift truck manual).



## Removing the attachment from the forklift truck

### **Risk of injury through hydraulic oil spillage!**

When hydraulic connections are removed or opened, hydraulic fluid can leak. Spilled hydraulic fluid causes increased slip hazards. Skin contact may cause chemical burns.

→ Wear your personal protective gear.

Follow the next steps:

1. Disconnect the hydraulic jumper hoses from the forklift truck.
2. Catch any leaking hydraulic oil with an appropriate vessel.
3. Any spilled hydraulic oil must be bound using the appropriate binding agent and disposed of in accordance with regulations.
4. Remove the bolts on the lower mounting hooks.
5. Place the attachment on the transport pallet and unhook it from the upper mounting hooks of the attachment by inclining the mast forward and lowering the carriage.
6. Secure the attachment on the pallet e. g. by tying it down to prevent it from accidentally falling over.
7. To safeguard against loss, refit the lower bolts and mounting hooks.
8. Store the attachment in a dry place and cover it using a suitable covering.

## Maintenance and servicing

Service and repairs at regular intervals are the vital key to prolonging the useful life of the attachment.




---

### Danger to life!

Escaping jets of high pressure hydraulic oil can cause serious injuries if the hydraulic circuit is not first depressurised before working on it!

→ Always depressurise the hydraulic circuits before performing work on the hydraulic system.

---




---

### Breakdown!

→ Repairs to major functional elements such as hydraulic cylinders and valves must only be carried out by persons trained to do so.

---

### Preventive measures

A higher rate of wear, possibly causing corrosion to the guide profiles, will result from attachments operating in extremely dirty environments, this can also have negative effects on other blank metallic surfaces, e. g. piston rods, causing leaks around the packing seals.

Quite often, dirt collecting on the attachment is caused by the front wheels of the forklift truck, which throw up dirt and grit from the road surface. It is therefore advisable to fit the truck with suitable mudguards.

### Regular inspections before starting work

The following points must be accounted for before starting work:

- Leakage in hydraulic cylinders, valves and the various other hydraulic connections.
  - Deformation and cracks in the load arms.
  - The correct mounting of the attachment on the forklift truck and especially the fastening bolts for the mounting hooks.
- 



If damage is detected, inform the appropriate supervisor responsible immediately!

---

## Regular maintenance

Lubrication and maintenance intervals are dependant on the workload of the application and external influences, e. g. the effects of dust and dirt, fluctuations in temperature, and weather conditions.

Follow the next steps:

1. Remove dirt and soiled lubricant adhering to the outside of the attachment by using a pressure washer. Do not point the water jet directly at the sealing elements.
2. Leave the attachment to dry in the open air or speed up the procedure by using compressed air.
3. Inspect the attachment for leaks in hydraulic cylinders, valves and the various other hydraulic connections.
4. Inspect the load arms and the main frame for deformation and cracks.
5. Inspect all fastening bolts to check tightness, use a torque wrench if necessary (a torque table can be found in the addendum).
6. Apply fresh lubricant specified for this purpose to all parts requiring lubrication (for suitable lubricants, see above).
7. Take all relevant moving parts through their movements to disperse the lubricant evenly.
8. Spray all blank metallic parts of the attachment with a commercial preservative intended for this purpose.



---

Always give the type and serial number (see product identification label) when technical assistance or spare parts are required!

---

## Swivel bearing of the rotator

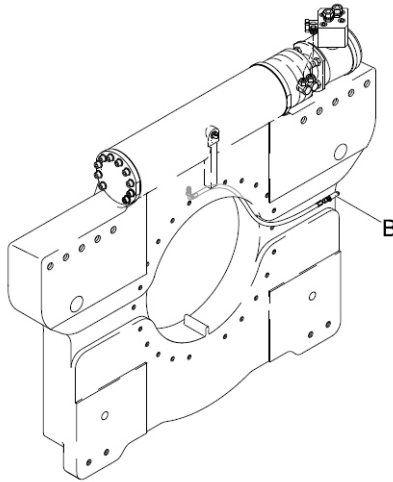
Under normal working conditions, it is recommended to apply fresh lubricant every 1000 hours of operation.

Recommended lubricants:

- Lithium-saponified greases for roller bearings: e.g. Shell Alvania R3

Follow the next steps:

- ➔ To apply lubricant, rotate the rotator slowly and in a controlled fashion.



*Lubrication point B*



## Worm gear unit of the rotator

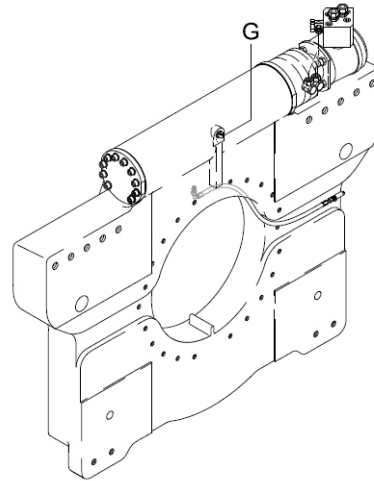
Under normal working conditions, it is recommended to apply fresh lubricant every 1000 hours of operation.

Recommended lubricants:

- Sodium-saponified gear lubricants with good high-pressure and high-temperature characteristics, e.g. AVIA Lithoplex 1-2 EP (-15 °C to 160 °C).

Follow the next steps:

- ➔ To apply lubricant, rotate the rotator slowly and in a controlled fashion.



*Lubrication point G*

## Sideshift (upper and lower slides)

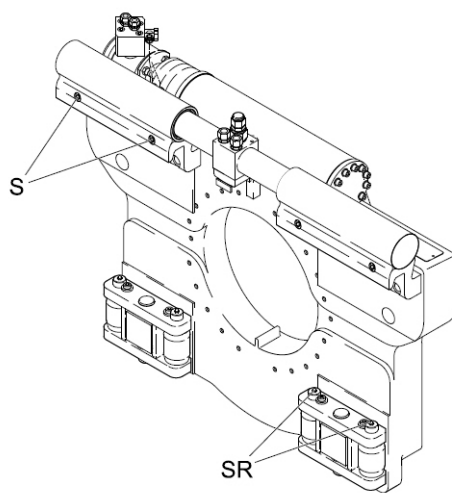
Avoid letting these slides run dry, as it will result in increased wear. Depending on the version, the lower part of the attachment is supported by slides or rollers which rest against the forklift truck carriage. The rollers can either be lubricated via grease nipples, or they may have a low-maintenance lubricant reservoir.

Recommended lubricants:

- Category 2 multi-purpose grease

Follow the next steps:

- ➔ During lubrication, actuate the side shifting function and move it to each extreme end of its travel.



*Lubrication points S and SR*

## Guide system of the load arms

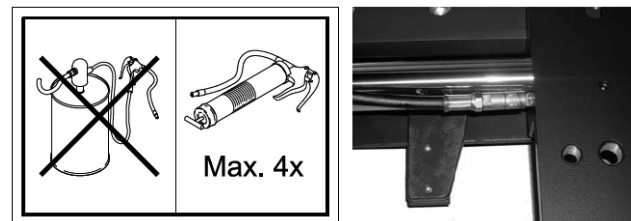
Use a manual grease press only (max. 4 strokes) to apply lubricant to the bearings on the fork carriers. The use of high pressure grease presses is not permitted, as that would risk pushing out bushes and wiper rings.

Recommended lubricants:

- S2 (synthetic high-performance grease)
- Interflon fin grease MP 2/3
- Do NOT use heavy duty grease containing graphite!

Follow the next steps:

1. After applying lubricant, actuate the fork positioning function to disperse the lubricant evenly throughout the system.
2. Spray all blank metallic parts with a commercial preservative intended for this purpose.



*Lubrication of bearings on the fork carriers*

## Disposal

After the expiration of the assigned working period or working life has been reached, the attachment may be decommissioned and scrapped.

### Disposal of the attachment

Follow the next steps:

1. Decommission the attachment (see chapter „Decommissioning“ (Seite 20)).
2. Take appropriate measures to ensure that the attachment is kept from being used again.
3. Dismantle the attachment professionally.
4. Separate all individual parts and scrap them according to the materials used.
5. Dispose of all surplus fluids according to regulations.

## Addendum

### Torque table for bolted fastenings

When tightening cylinder head and hexagon type bolts, the correct torque must be obtained by using a torque wrench.

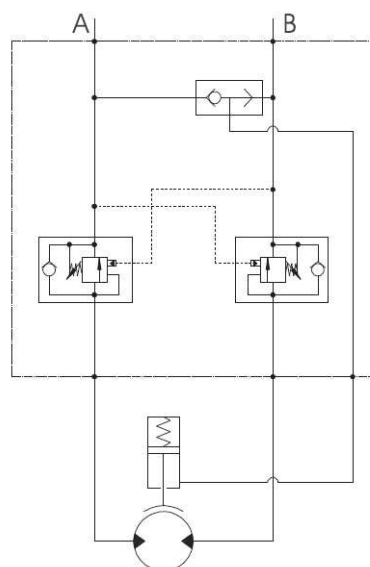
The necessary torque requirements are classified by bolt sizes and strengths in the table below.

Old and used bolts must always be replaced with new ones.

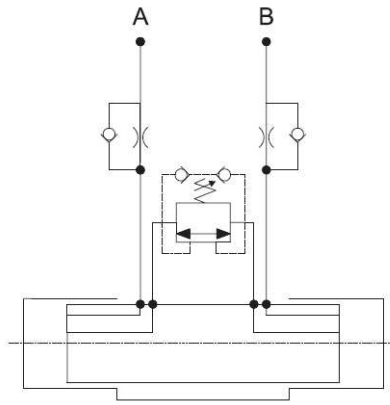
Threads	Strength category			For Verbus Ripp 100 bolts
	8,8	10,9	12,9	
M4	3.1 Nm	4.5 Nm	5.3 Nm	---
M5	6.1 Nm	8.9 Nm	10.4 Nm	10 Nm
M6	10.4 Nm	15.5 Nm	18 Nm	18 Nm
M8	25 Nm	37 Nm	43 Nm	37 Nm
M10	51 Nm	75 Nm	87 Nm	80 Nm
M12	87 Nm	130 Nm	150 Nm	120 Nm
M14	140 Nm	205 Nm	240 Nm	215 Nm
M16	215 Nm	310 Nm	370 Nm	310 Nm
M18	300 Nm	430 Nm	510 Nm	---
M20	430 Nm	620 Nm	720 Nm	---
M22	580 Nm	830 Nm	970 Nm	---
M24	740 Nm	1,060 Nm	1,240 Nm	---
M27	1,100 Nm	1,550 Nm	1,850 Nm	---
M30	1,500 Nm	2,100 Nm	2500 Nm	---

*Tightening Torque Values*

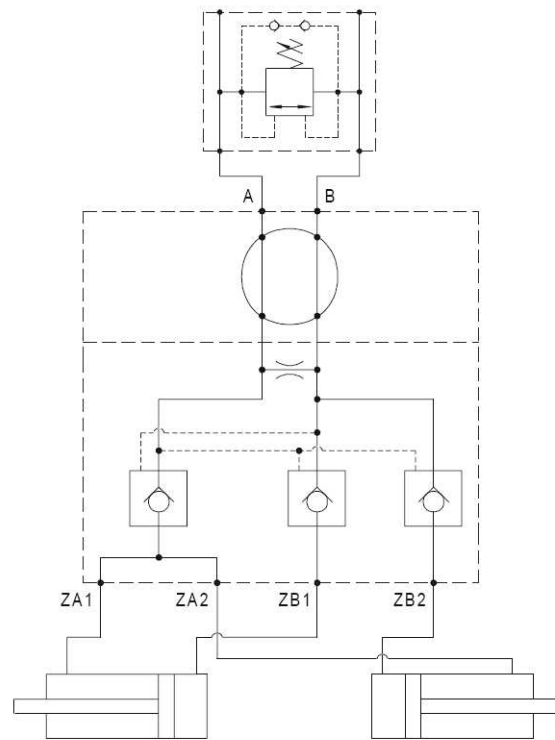
### Hydraulic circuits



*Rotation function*



*Side shifting function (optional)*



*Fork positioning function*

# Fork Positioner