

INSTRUCTIONS AND PARTS MANUAL

FOLDING FORKS WITH SINGLE HEIGHT SHIFT SYSTEM



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1. Definitions

This manual uses the following symbols and terms to identify important information related to the correct and safe operation of the KOOI-Reachforks®. “Only applies to:” texts (*italics*) indicate that a text only applies to a certain situation or certain type of KOOI-REACHFORKS®.



PROHIBITED:

Failure to comply with safety warnings **could** result in death or serious injury. This may be direct, or indirect, as a consequence of damage of the machine or its surroundings.



CAUTION:

Failure to comply with safety warnings **could** result in minor or moderate injury. This may be direct, or indirect, as a consequence of damage of the machine or its surroundings.



NOTE:

Provides information or instructions to reduce the risk of machine damage or damage of the surroundings.



TOOLS REQUIRED:

Required tools for described procedure.



OPERATING INSTRUCTIONS:

Identifies the location where instructions can be found.



WEAR PROTECTIVE GLOVES:

When this symbol is used, use of protective gloves is advised, due to for example risk of hands getting stuck between objects, or contact with thermal or chemical materials.



WEAR PROTECTIVE SHOES:

When this symbol is used, use of safety shoes is advised, due to for example risk of falling objects.

2. Note

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3. Foreword

Meijer Handling Solutions is the world's largest manufacturer of hydraulic extendable and retractable forklift truck forks, which are produced under the trade name KOOI-REACHFORKS®. Telescopic forks were introduced in 1980 by KOOI BV, manufacturer of the KOOI-AAP portable forklift truck, although they were manufactured by Meijer BV. Since November 2000, Meijer Handling Solutions (subsidiary of Meijer Holding) has been responsible not only for the production but also the marketing and sales of the telescopic forks.

Congratulations on the purchase of your new hydraulic folding-forks combination, a reliable product that meets the highest standards of quality and user-friendliness. You should familiarise yourself with the correct operating procedures before taking the hydraulic folding-forks combination into service. This manual contains everything you will need to know about the folding-forks combination. It enables you to operate the folding-forks combination optimally. Moreover, our After Sales department is always at your disposal if you should require any technical assistance.

KOOI-REACHFORKS® comply with the following quality standards:

1. ISO 9001 – 2000 – Quality Management System
2. ISO 4406 – Hydraulics – Fluids – Method for Coding Levels of Solid Particle Contamination
3. ISO 2328 – Fork-Lift Trucks – Hook-On type Fork Arms and Fork Arm Carriages
4. CE (2006/42) EEC – Machinery Directive

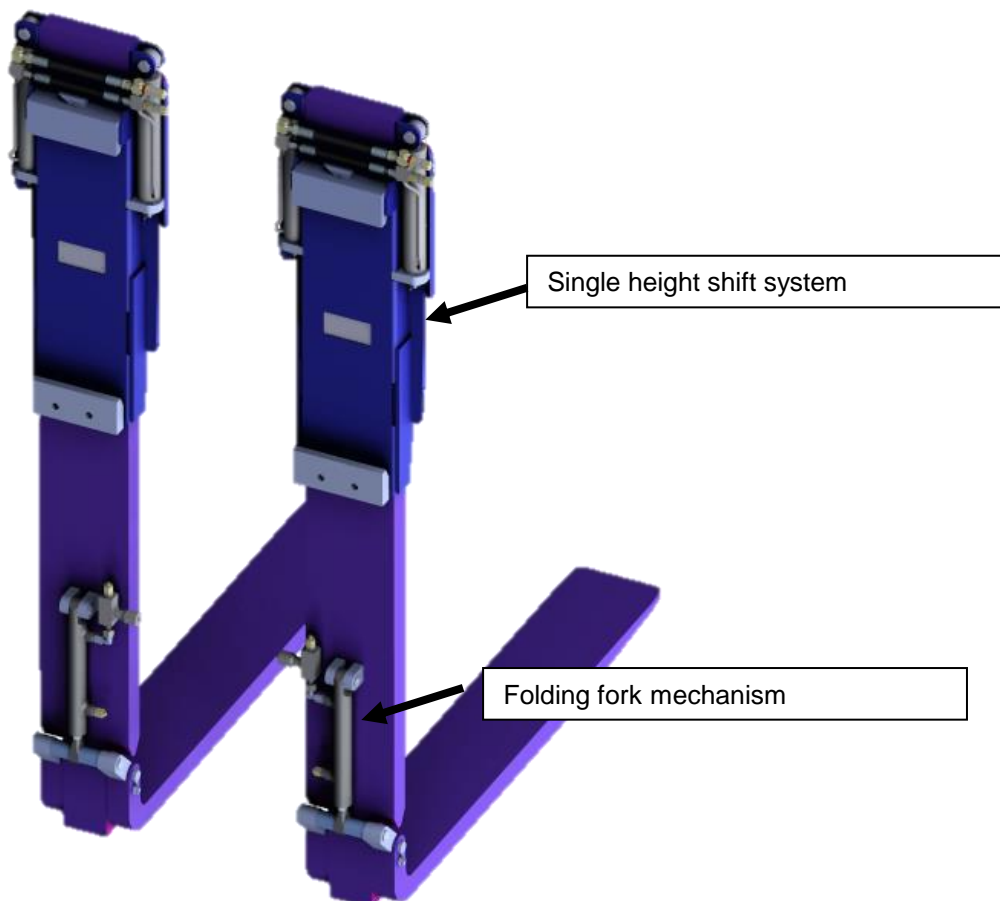
4. Introduction

This system is a combination of hydraulic foldable forklift-truck forks and a single height shift system. They are designed for a maximum service life with a minimum of maintenance. To achieve this, however, it is important that maintenance be carried out in accordance with the manufacturer's instructions. This user manual is intended to familiarise you with the folding-forks combination. We therefore recommend that you study this user manual well before you start assembling the folding-forks combination and subsequently begin working with them.

The manufacturer reserves the right to change specifications without prior notice. Because we constantly strive to improve the product, it is possible that the images in this manual do not correspond with the folding-forks combination that you have purchased. It is therefore important to mention the type and serial number when ordering parts or requesting information. Drawings of and specification sheets for the folding forks have been included in the appendices so that you can state the relevant article number when ordering.

4.1. Machine overview

In this manual the following parts of the machine will be referenced. The single height shift system moves the forks up and down. The folding fork mechanism folds the forks in- and outwards.

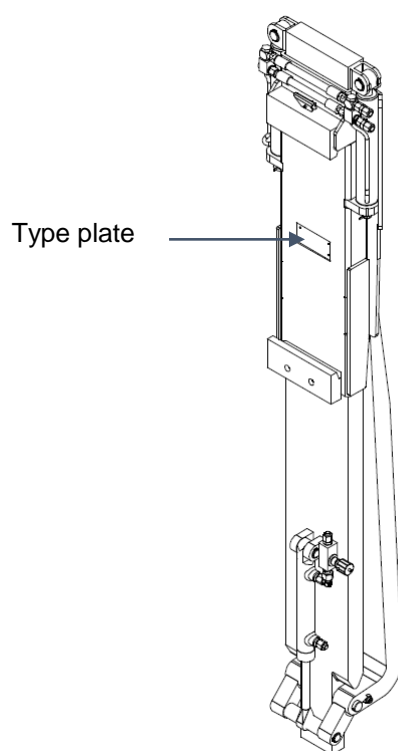


5. Identification

This section explains the information shown on the type plate. This information contains technical specifications for the folding-forks combination and is needed when ordering components. It is therefore important to know what information is shown on the type plate and how it must be used.

5.1. Type data

The following data should be specified when ordering components or requesting information. The serial number and type are shown on the type plate of each (folding) fork (see below).



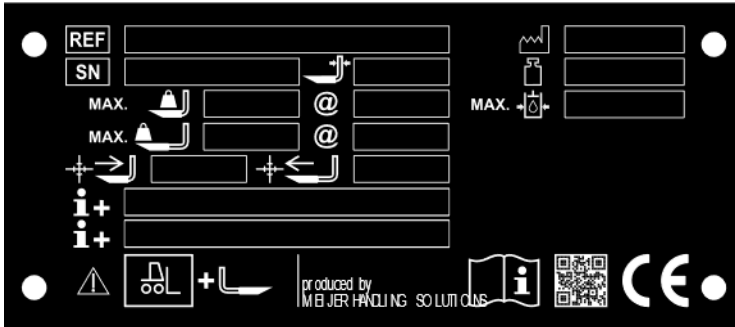
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5.2. Explanation of type plate

The type plate is the small plate that is located on the rear side of every (folding) fork. A type plate is mounted on every fork. Left and Right refer to positions as viewed from the driver's seat of the forklift truck. The type plate contains important information about the technical specifications of the folding-forks combination. Below is an example of a type plate.



REF	Type description		Mass
SN	Serial number	MAX.	Maximum capacity on load center
	Center of gravity	MAX.	-
	-	MAX.	Maximum allowed oil pressure
@	At load center		Production year
	Lost Load Thickness	i+	Extra information



WARNING: Never exceed the maximum truck capacity as seen on the truck type plate. Rated capacity of both truck and attachment is the responsibility of the original truck manufacturer and may be less than the capacity shown on the attachments type plate.

5.3. Load Capacity

The type plate that is mounted at the back of the forks shows, among other things, the maximum load capacity per (folding) fork. Using the loading diagram shown below, one can determine the load-bearing capacity per (folding) fork or per pair of (folding) forks for every load centre distance. Correction factors are shown vertically and load centre distances are shown horizontally, measured in millimetres from the front edge of the fork's back. An example is given on the following page.

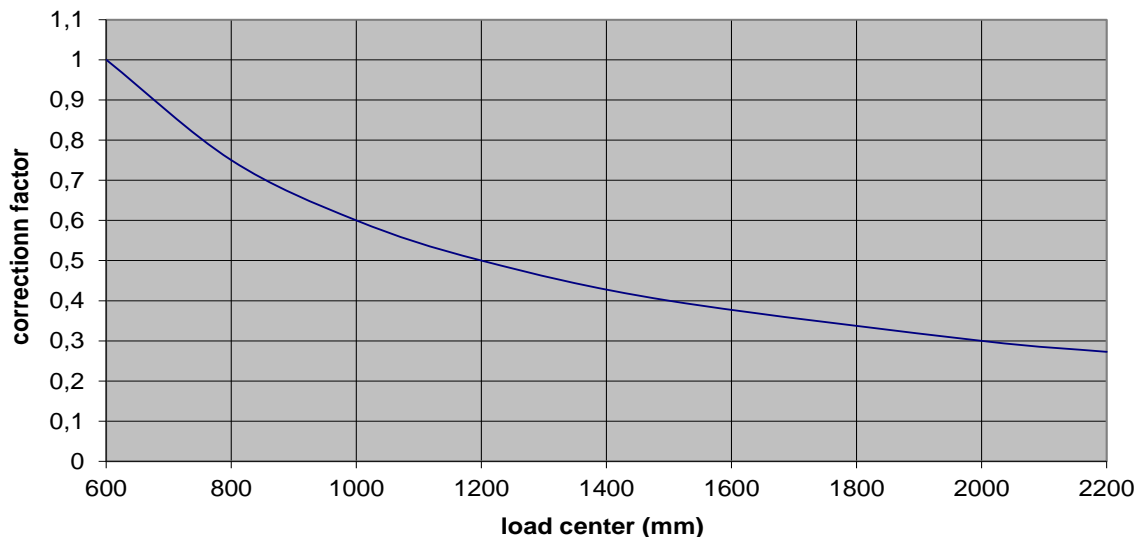


Figure 4.3 Correction factors for the maximum load-bearing capacity for a given load centre

As an example, we take folding forks with a maximum load-bearing capacity of 2100 kg, with a load centre of 600 mm. From this, it follows that the maximum load capacity of a single folding fork is $2100 / 2 = 1050$ kg with a load centre positioned at 600 mm. If the load is picked up more on the tip of the forks, then one should use Figure 4.3 to calculate the new maximum load capacity for the load centre in question. If the load centre is at 800 mm, for example, then Figure 4.3 shows that a correction factor of approximately 0.73 should be applied. The maximum capacity of this telescopic fork with a load centre at 800 mm is thus $1050 \times 0.73 = 766.5$ kg.

The maximum capacity of the folding-forks combination is dependent on the weakest set of forks. As an example, we take a set of folding forks with a maximum capacity of 2100 kg, in combination with a set of fixed forks with a capacity of 4000 kg. The maximum capacity when using two forks is then 4000 kg. The maximum capacity when using four forks is then $2 \times 2100 = 4200$ kg.



WARNING:

Figure 4.3 is only applicable to the folding-forks combination. The residual load capacity of the forklift truck with the folding-forks combination must be provided by an official forklift truck dealer.

6. Safety

Safety starts with the forklift truck driver. We therefore recommend that the driver of the forklift truck be in possession of recognised certification as a forklift truck driver.

PROHIBITED:



1. Never fold the folding forks up or down if a load is being carried.
2. Do not load the folding-forks combination in excess of the manufacturer's specifications regarding lifting capacity and load centre (see Section 4).
3. Do not walk or stand under the folding forks
4. While driving, never drag the folding-forks combination over the ground.
5. Working on the machine is not permitted while raising or lowering the forks.
6. Never allow anyone to ride on the folding-forks combination or the load.
7. A defective folding-forks combination must be taken out of service until they have been repaired or replaced by a qualified technician.
8. Before working on the folding-forks combination, ensure that the forklift truck is switched off and that the hydraulic system is depressurised (take key out of ignition).
9. Always keep the outside of the forks free of grease and oil.
10. Never stand within range of a folding fork.
11. Never stand near a moving folding fork.
12. Do not reach through the mast of the forklift truck.
13. Do not weld anything onto the machine without the express permission of the supplier. Welding carried out without permission shall void any warranty.
14. Do not use the machine in areas where the temperature is below -20°C (-4°F) unless otherwise agreed with the manufacturer.

CAUTION:

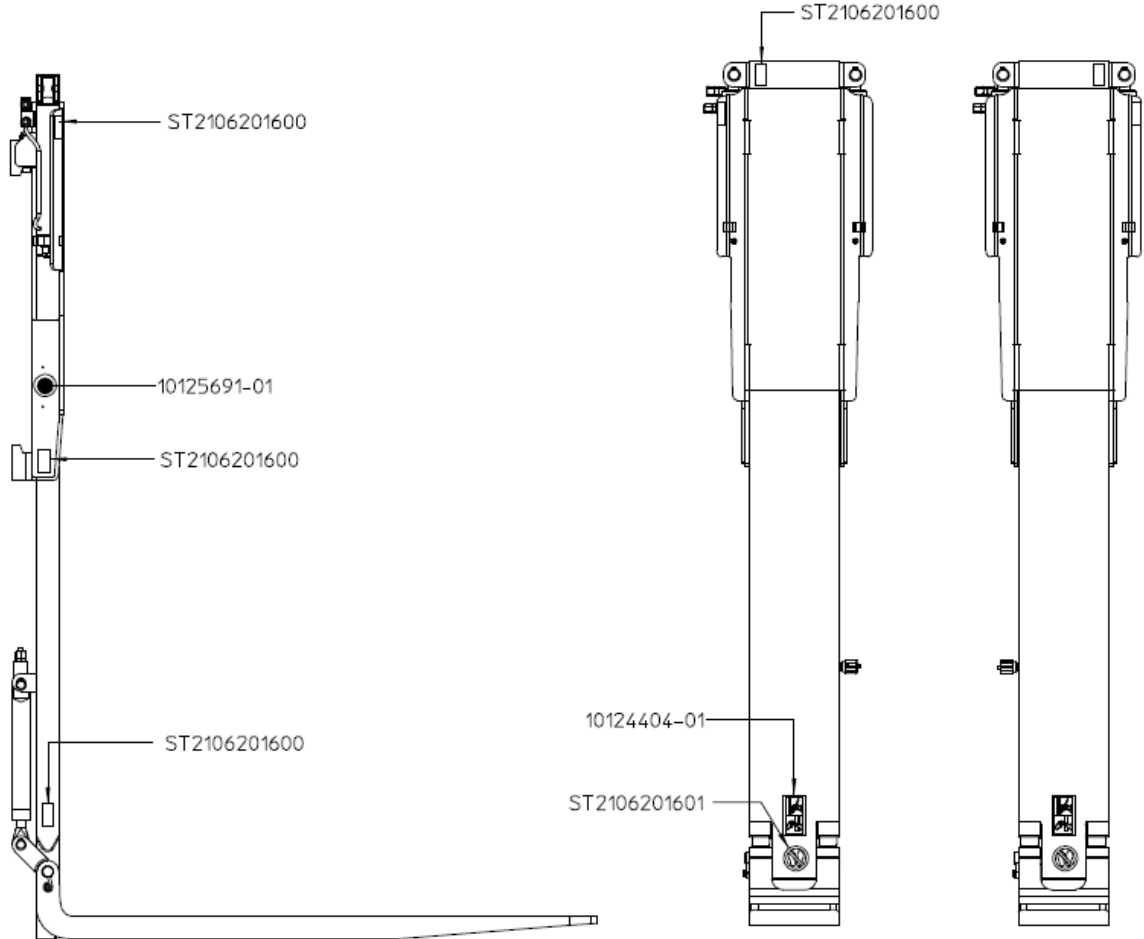


1. Never exceed the forklift truck's maximum load capacity, regardless of the stated load capacity of the folding-forks combination.
2. When leaving the forklift, the engine must be switched off and the handbrake applied.
3. Bear in mind the space above and beneath the forks
4. The load must be distributed as evenly as possible on the forks
5. Always drive with the forks in the lowest possible position.
6. Ensure that dismantled forks cannot turn over by depositing the fork back on the ground.
7. Do not carry out maintenance work on the machine whilst there is pressure in the hydraulic system (remove key from forklift ignition switch).

All the above points should be read and understood by the forklift truck driver.

6.1. Markings

The below markings are used on the forks. Replace labels if not legible. NOTE: labels are mirrored on each fork.



Description:	Article:	Quantity:
Caution: no hand hold	ST2106201600	8
Read the manual	10125691-01	2
Risk of injury from crushing	10124404-01	2
Do not walk or stand here	ST2106201601	2



WARNING:

Risk of injury when labels are missing or not legible. Replace labels when they are missing or not legible.

7. Usage Instructions

The folding-forks combination is easy to mount and to disassemble. The folding-forks combination mounted on the forklift truck must be properly adjusted to the purpose for which they are intended. The ultimate load capacity must be calculated by an accredited forklift truck dealer. The load capacity shown on the lift truck's type plate must be adjusted to reflect the new combination of forklift truck and folding-forks combination. It is strongly recommended that forklift truck drivers be properly trained in the use of the folding-forks combination.



WARNING:

While driving and while picking up a load, contact between the folding-forks combination and the ground must be avoided as much as possible. This prevents wear and tear on the underside of the forks.



WARNING:

The folding mechanism cannot be used to move loads upwards or downwards.

7.1. Protecting the folding-forks combination

In order to prevent the folding-forks combination from coming into contact with the ground, we recommend placing a plastic bush on the lifting cylinder in such a way that the folding-forks combination cannot quite touch the ground. The lifting chains of the forklift truck may also be shortened slightly, which has the same effect. Always consult your dealer or the manufacturer before carrying out such modifications.

8. Assembly, testing and dismantling Instructions

This section deals first of all with a number of precautions that must be heeded when working with the folding-forks combination. In 7.2, the assembly instructions are provided. Section 7.3 explains what can be done to limit wear and tear on the underside of the folding-forks combination.

8.1. Precautions

There are a number of precautions which must be observed during assembly activities, inspection or maintenance of the folding-forks combination.



WEAR PROTECTIVE SHOES:

The use of safety shoes is advised to reduce risk of injury from falling objects.



WEAR PROTECTIVE GLOVES:

The use of safety gloves is advised to reduce risk of injury when performing the following tasks.

1. During all activities on the folding-forks combination, the forklift truck must be switched off and the key removed from the ignition.
2. The forklift truck's hydraulic system should be fully depressurised whenever maintenance is being performed.
3. Position the folding-forks combination at the correct ergonomic height to prevent back complaints.
4. Wear proper work clothing, shoes and safety glasses.
5. Welding work on the folding-forks combination may never be performed without written permission from the manufacturer. If the welding work is nevertheless carried out on the forks without written permission, the guarantee on the folding-forks combination becomes null and void.

8.2. Commissioning

In order to achieve the best results, you should follow the assembly instructions given below.

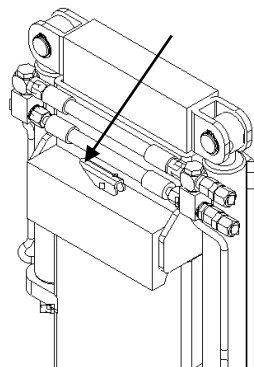
1. When the fork is folded down and the fork back rests on the fork blade, remove the couplings so excess oil can escape.



NOTE:

Use a dripping tray to catch any oil that may spill.

2. Prepare the lifting device for large loads, e.g. indoor crane and lifting straps. The work must be carried out by 2 people.
3. Move the fork carrier to the vertical position and move it to a height that allows for safe and comfortable assembly of the folding fork arm with single height shift system.
4. Remove the locking screw on the assembly side of the fork carrier.
5. Open the locking device of upper hook of the single height shift system (see the next image). To do so, pull the lever of the locking device vertically upwards using appropriate force.



- Secure the forks with the lifting device (e.g., using an indoor crane and lifting straps) by attaching a lifting strap. Raise it to a height that allows for the fork carrier to be enclosed by both hooks.

**WARNING:**

Risk of hands being crushed when aligning the single height shift system with folding forks. Operate with caution.

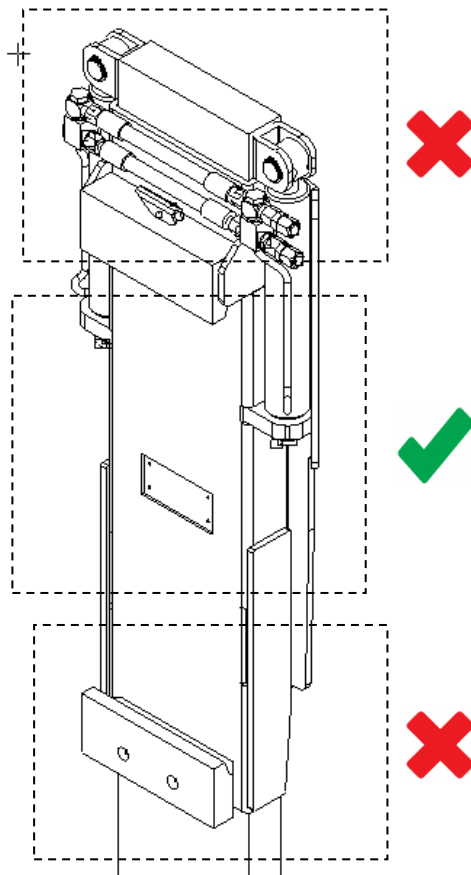
**NOTE:**

An 'L' and an 'R' are stamped on the type plates of the folding-forks combination. Mount these folding forks respectively left and right, as viewed from the driver's seat in the forklift truck

- Grip the single height shift system with folding forks at the middle of the frame (see image below!) and fork blade with someone else to assist you and carefully slide it onto the fork carrier from the outside using appropriate force. Ensure that the upper and lower hook of the folding fork arm encloses the profile of the fork carrier.

**WARNING:**

Risk of hands and/or fingers being crushed or cut when holding the single height shift system at the wrong position. See the next image for correct holding positions.



8. Repeat the procedure for the second folding fork arm. Carry out assembly from the other side of the fork carrier.
9. Align both folding fork arms evenly to the center of the fork carrier at the required width.
10. Lock the folding fork arms by closing the lever. Ensure that they are locked properly by checking if the lever is down.



WARNING:

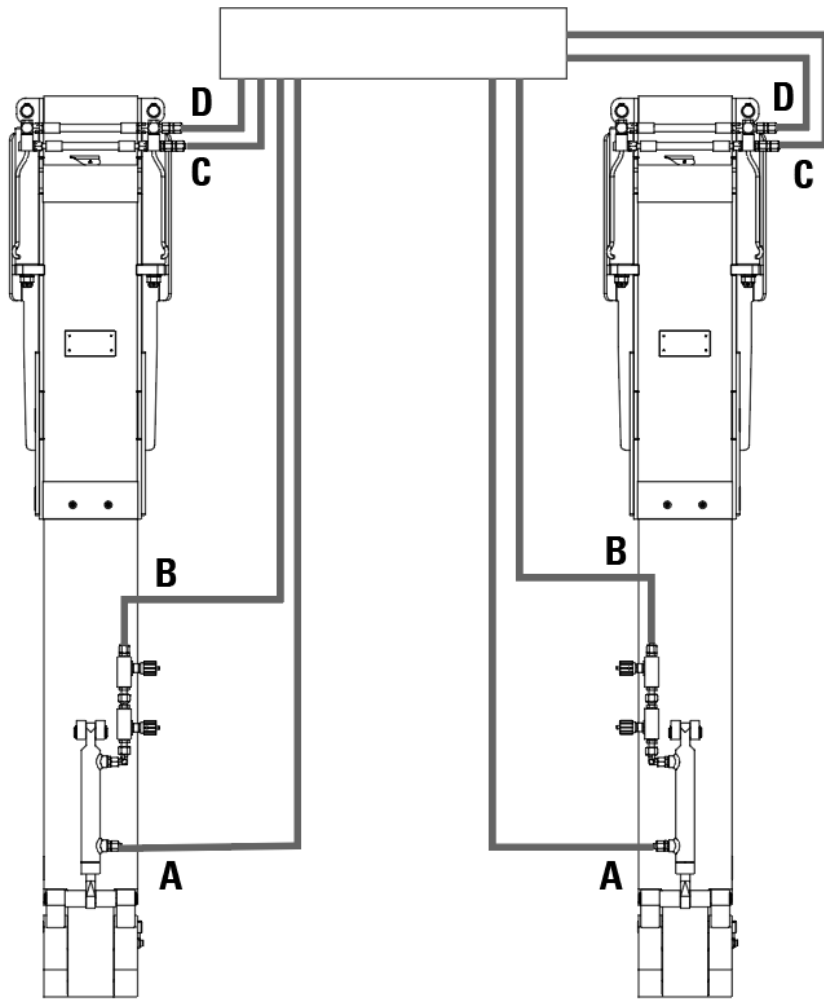
Risk of injury or death from load falling of the forks, when locking device isn't properly engaged when using the forks. This is due to the risk of forks sliding of the carriage plate.

11. Fit the locking screws on the fork carrier again.
12. Lower the fork carrier to the base position.
13. Connect hydraulics as follows (see next image). :



WARNING:

Use appropriate markings when using switches to switch between functions, like switching between height shift function, folding the fork or using the left or right fork. This is to reduce risk of accidentally folding forks up when they are loaded, or using the height shift function for the right fork instead of the left fork and vice versa. Above risks involve injury due to load falling off.

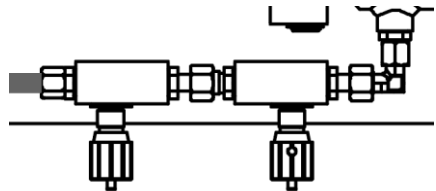


A	Retract (folding forks down)
B	Extend (folding forks up)
C	Extend (forks up)
D	Retract (forks down)



NOTE:

Check whether the throttles are installed like on the right. Note they are installed in opposing directions. When they aren't installed properly, the fork blades can ascend or descent too quickly.



14. Make sure that the hydraulic connections have been properly tightened.
15. The maximum permitted operating pressure on the folding-forks combination is 250 bar.

8.3. Testing – Before use



WARNING:

Always perform checks or adjustments when folding forks are fully lowered. Risk of severe injury or death due to blade falling down.



WARNING:

Always perform checks or adjustments when the single height shift system is fully lowered. Risk of severe injury due to forks dropping to the ground.



PROHIBITED:

Do not stand near the machine when testing. Risk of severe injury or death due to fast and/or unexpected movements of the fork blade.



PROHIBITED:

Do not place body parts between fork back and fork blade when adjusting the throttle valves. Crushing danger when accidentally folding the fork blade in or out.



WARNING:

Risk of injury when standing too close to the machine when testing. When the fork blade moves too fast, the machine can move.

1. When previous steps for commissioning are followed, position the forklift with single height shift system with folding fork combination at a place with no risk of people coming near the forks.
2. Raise and lower the fork a few times to bleed any air from the system.
3. Fold the folding-forks downwards by operating the corresponding lever. Maintain this for 30 seconds.
4. Fold the folding forks up and down several times.
5. Check that hoses are unobstructed at all points and that the system has no leaks

8.4. Dismounting, dismantling



WARNING:

Risk of injury from oil leakage under high pressure, when removing or unscrew the couplings from the folding forks when blade is not fully down.

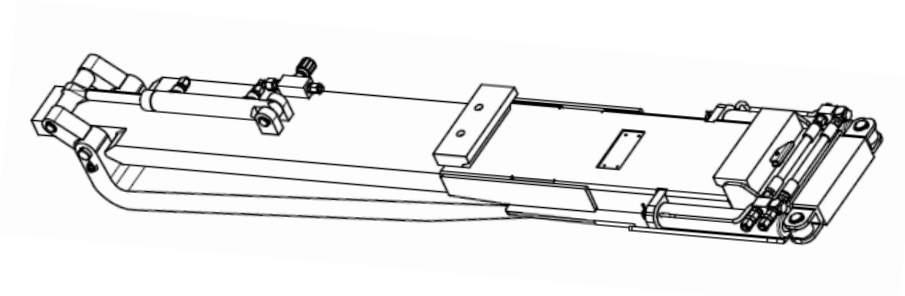
1. The folding forks need to be fully down before disconnecting the folding forks from the forklift
2. Disconnect the folding forks from the forklift.



NOTE:

Use a dripping tray to catch any oil that may spill.

3. Perform step 2 to 7 from paragraph 8.2 in reverse order to remove forks from the forklift
4. Fold the fork back to the ground until it rests on the fork blade. See also the next image.



5. After removing the folding-forks combination from the carriage plate, the connectors of the folding forks combination must be plugged in order to prevent contamination of the hydraulic system.

9. Inspection and Maintenance

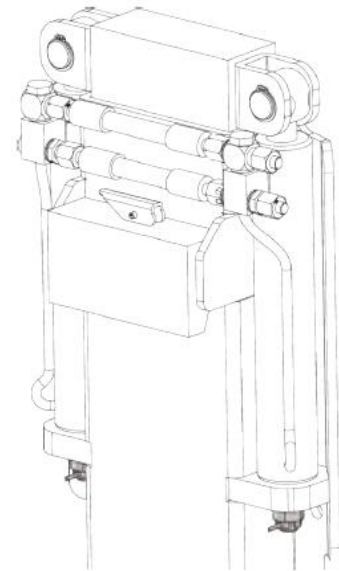
The folding-forks and single height shift system combination operate with a closed, self-lubricating hydraulic system.

Very little work is required to keep the single height shift system and folding-forks combination in good condition. However, it is important that maintenance be performed in a timely and correct fashion.

Check the single height shift system and folding-forks combination every day for signs of damage or oil leaks. Any damage or leaks found should be reported to the person responsible. When carrying out work on the folding-forks combination, the forklift truck must be switched off, with the key removed from the ignition and the system depressurised.

Consult the maintenance schedule for additional inspection work. Under some circumstances (in exceptionally dirty environments, for example), it may be necessary to amend the maintenance schedule. In such cases, seals will have to be replaced more often: in particular, the wiper ring.

At least once a year, a specialist must test the folding-forks combination in accordance with ISO 5057 standards. The results of the test should be recorded in a logbook.



NOTE:

Never overtighten the castellated nuts beneath the cylinders when replacing parts. Use the point at which the split pin can be inserted through the threaded end as a reference point for tightening the nut.

9.1. Maintenance Schedule

Table 8.1 lists which components must be inspected, what actions must be undertaken and how frequently these must be performed. The item numbers of the description correspond to the telescopic fork in Figure 8.1 (Page 16).

Description	Daily	Weekly	Half-yearly or every 1000 hours	Annually or every 2,000 hour	Executor:
1 Check for leaks					Carrier vehicle driver or maintenance personnel
2 Check forks in accordance with ISO 5057 standards					Specialist
3 Check cylinders					Maintenance personnel or specialist
4 Check hoses					Carrier vehicle driver or maintenance personnel
5 Check complete single height shift system					Specialist

Table 8.1 Maintenance schedule

For more information about Novatex EP 2 and Rando HD 32, please visit www.texaco.com.

Below is a more detailed explanation of the maintenance schedule given in Table 8.1.

1. In the event of a cylinder housing leakage, disconnect the forks from the forklift truck immediately and contact your supplier. In the event of connector leaks, either tighten and/or replace attachments.
2. Inspect the wiper rings and cylinder heads at the top of the cylinder for signs of wear and leakage.
3. Inspect hoses for signs of wear. Replace ageing hoses immediately or if the insert is visible, otherwise every six years.
4. The height shift system should be inspected thoroughly by a specialist once a year in accordance with ISO 5057 standards.

9.2. Fault table for folding-forks combination

Symptom	Possible cause	Possible solution
Left or right fork folds without the operating lever being used	Air trapped in system	Fold the forks in and out 10 times.
	One of the pistons is leaking	Replace the leaking cylinder
Forks move on their own	Leaking operating valve	Check with your forklift truck supplier
	Air in system	Operate several times
Forks do not descend equally	Piston leakage	Replace the cylinder
Both forks descend without being operated	Leakage in the operating valve	Check with your forklift truck supplier
Cylinders leak oil	Connections leaking	Retighten or replace
	Cylinder head damaged	Replace cylinder
One fork point is hanging lower than other(s)	One of the forks has been deformed by overloading	Disconnect it from the fork carriage immediately and contact your forklift truck supplier
Fork drops when loaded	Leaking piston seal(s)	Replace cylinders

Table 8.2 Fault table for folding forks

9.3. Instructions for replacing hydraulic cylinders

1. Perform the steps for dismantling if not already (see paragraph 8.4).
2. Remove the split pins from the castellated nuts on the base of the cylinders
3. Suspend the single height shift system from a crane
4. Unscrew the castellated nut at the base of the cylinder
5. Lower the single height shift system frame until the cylinders are free at the bottom.
6. Unscrew and remove the hydraulic hoses
7. Remove the lock rings at the base of the cylinder
8. Pull out the pin from the fork at the top of the cylinder. The cylinder is now disconnected.
9. Replace the cylinder
10. Suspend the cylinder from its pin in the fork at the top of the fork's back
11. Secure the lock rings at the base of the cylinder
12. Raise the single height shift system until the cylinders are inside the frame and the screw

- thread emerges through the slots at the bottom
13. Thread the castellated nuts onto the threaded ends of the cylinders, ensuring that the cylinders can move freely (do not overtighten the castellated nuts)
 14. Insert the split pins through the castellated nuts
 15. Reconnect the hydraulic hose
 16. Perform the steps for commissioning and testing (see respectively paragraph 8.2 and 8.3) to test the cylinders before use.



TOOLS REQUIRED:

Wrench 24 mm or 1"
Wrench 19 mm or 3/4"
Snap ring plier

9.4. Instructions for replacing components

9.4.1. General procedure

1. Perform the steps for dismounting (see paragraph 8.4).
2. Remove the retaining rings from the axles which connect the cylinder with the fork.
3. Remove these axles.
4. The hydraulic cylinder can now be removed.
5. Replace the components which are to be replaced.
6. Place the eye of the cylinder base between the topmost eyes on the fork's back.
7. Push the axle (diameter 20 mm and length 70 mm) through the topmost eye and position the retaining rings.
8. Place the eye of the cylinder head between the eyes of the fork blade, with a spacer on both sides.
9. Now push the axle (diameter 20 mm and length 120 mm) through the eye of the fork blade and the spacers and position the retaining rings.
10. Perform the steps for commissioning (see paragraph 8.2)
11. Perform the steps for testing (see paragraph 8.3).

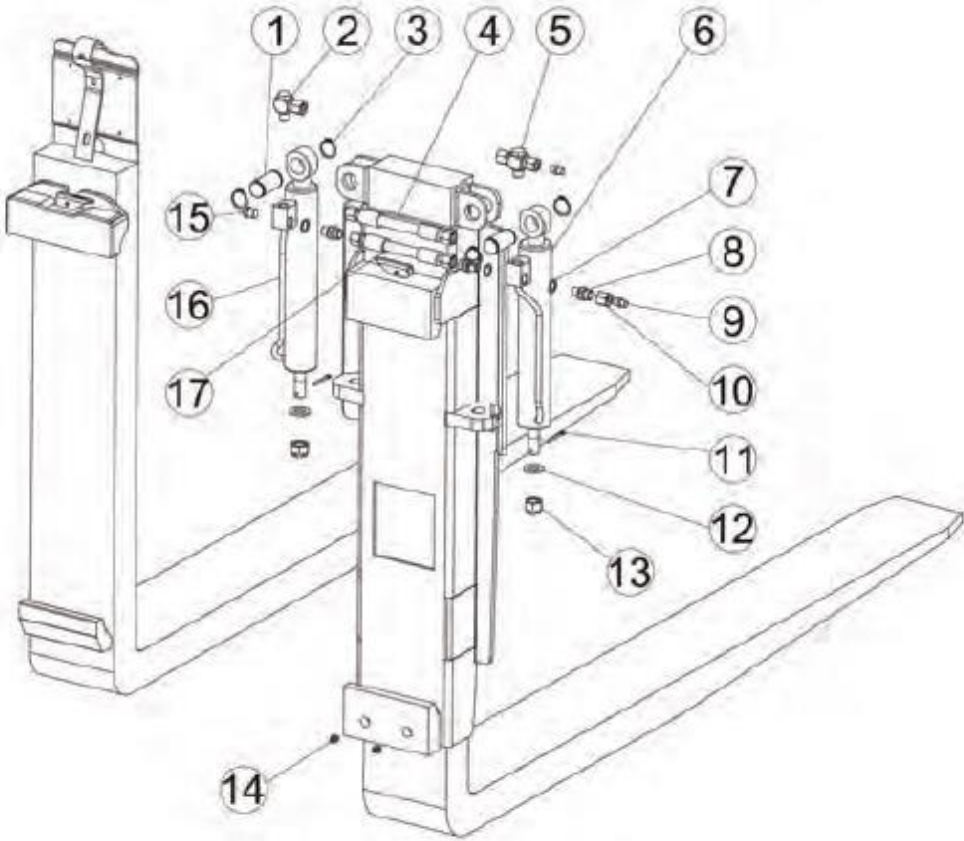
9.5. Ordering Components

When ordering stop rings for the top blocks (stop pin, catch, spiral clamping bushes for catch and compression spring), axles or hydraulic cylinders, you must also specify the serial number of the fork.

Appendices

Appendix 1	Spare parts single height shift system	23
Appendix 2	Spare parts folding fork mechanism	25

Appendix 1 Spare parts single height shift system



Part no.	Part description	Article code	Quantity
1	Axle	RE0069045053	2
2	Banjo L coupling 10L	RE0017026	1
3	Retaining ring	36000 25	4
4	Upper hydraulic hose	*	1
5	Banjo T coupling 10L	RE0017025	1
6	Right cylinder	RE00702830200	1
7	Copper ring	RE0018000	3
8	Straight male stud coupling	RE0017003	3
9	Plug 10L	RE0017041	2
10	Nut coupling 10L	RE0017040	1
11	Split pin	39350 4x32	2
12	Washer	38130 M16	2
13	Castle nut	12010 M16	2
14	Grease nippel	72210 R1/8-180	2
15	Plug	RE0016006	1
16	Left cylinder	RE00702820200	1
17	Lower hydraulic hose	*	1

* Hydraulic hoses:

Article numbers depend of the width of the fork back of the fork in the SHSSL.

Width fork back	Article number upper hydraulic hose	Article number lower hydraulic hose
120	RE00580530180	RE00580530170
150	RE00580530210	RE00580530200
200	RE00580530260	RE00580530250

Appendix 2 Spare parts folding fork mechanism

Nr.	Description	Article number:	Quantity:
1	Straight male stud coupling G3/8 10L	M00004208	2
2	Throttle	M00013020	2
3	Straight male stud coupling 3/8 10L	M00013680	2
4	Elbow coupling 10L	RE0017087	2
5	Swivel nut 10L	RE0017040	2
6	Straight male stud coupling G1/4 10L	RE0017064	2
7	Complete straight male stud coupling G1/4 10L	RE2017039	2
8	Distance bush	M00033682	4
9	Retaining ring 20 DIN 471	36000 20	4
10	Axle D20 L200	M00033683	2
11	Retaining ring 20 DIN 471	36000 20	4
12	Axle D20 L70	RE0069052	2
13	Cylinder	RE00700290130	2

