

# Instruction and parts manual

MHEH (Mast Height Extension)

MHEH-10

MHEH-20

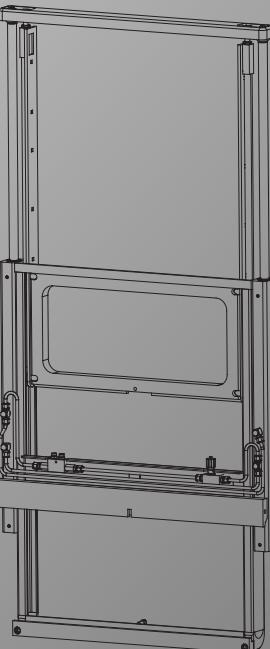
MHEH-30



CE

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# Definitions



## **Warning:**

Text blocks marked by a "Warning" icon (as shown on the left) and starting with the text "**Warning:**" provide information on actions which may result in serious injury.



## **Caution:**

Text blocks marked by a "Caution" icon (as shown on the left) and starting with the text "**Caution:**" provide information on actions which may result in damage to the MHEH, parts of the MHEH or goods.

# Remark

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# (Quality) standards and directives

Meijer Handling Solutions B.V. complies with the following quality standard: ISO 9001.

The MHEH complies with the following standards and directives:

- CE (2006/42/EC) - Machine Directive
- ISO 3834-2 - Quality requirements for fusion welding of metallic materials - Part 2: Comprehensive quality requirements

# Safety

**Warning:**

Do not place attachments in front of the MHEH like side-shift, fork positioner etc., with the exception of regular forklift forks, without the express permission of the original producer.

**Warning:**

Don't use the MHEH in temperatures lower than -30°C / -22°F or higher than 50°C / 122°F.

**Warning:**

Don't let a minor operate the MHEH, only by qualified operators.

**Warning:**

Don't use the MHEH for lifting people or animals.

**Warning:**

Don't stick/hold body parts between the moving frame and the fixed parts of the MHEH.

**Warning:**

Do not modify anything on the MHEH without the express permission of the supplier. Modifications carried out without permission shall void any warranty and CE.

**Warning:**

Do not use a faulty MHEH before it has been either professionally repaired or replaced.

**Warning:**

Do not perform maintenance work if the MHEH is not fully lowered, as the inside frame may suddenly retract.

**Warning:**

Do not operate the MHEH with operating pressures above 250 bar (~3626 psi), as this may cause internal or external leakages.

**Warning:**

Do not operate the MHEH with operating pressures above 250 bar (~3626 psi), as this may severely damage the MHEH or its surroundings when operated.

**Warning:**

To avoid collision between the MHEH and the forklift mast, the MHEH may only be operated when the fork carriage is at its highest position.

**Warning:**

The MHEH must never be hung on a carriage plate that is narrower than the total width of the MHEH.

**Warning:**

Temperature differences can cause pressure to build up in a plugged hydraulic product, which can lead to the plug shooting out of the coupling if the swivel is being removed without releasing the pressure first. In the case of a plugged product, partially loosen the coupling swivels and give the plug a slight tap with a tool (i.e. wrench) until it is loose. At this time oil might flow out of the coupling, releasing any buildup pressure. Next, completely unscrew the swivels and plugs from the product.

**Caution:**

Recalculate and replace name plate for residual capacity of the forklift.

**Caution:**

Hydraulic components can become hot during operation.

**Caution:**

The field of sight is limited if the MHEH is installed.

**Caution:**

The MHEH has a maximum capacity it can lift as can be found on the type plate.

**Caution:**

By use of the MHEH extra height is gained.

**Caution:**

To reduce the risk of severe injury, always drive with the MHEH in the lowest possible position.

**Caution:**

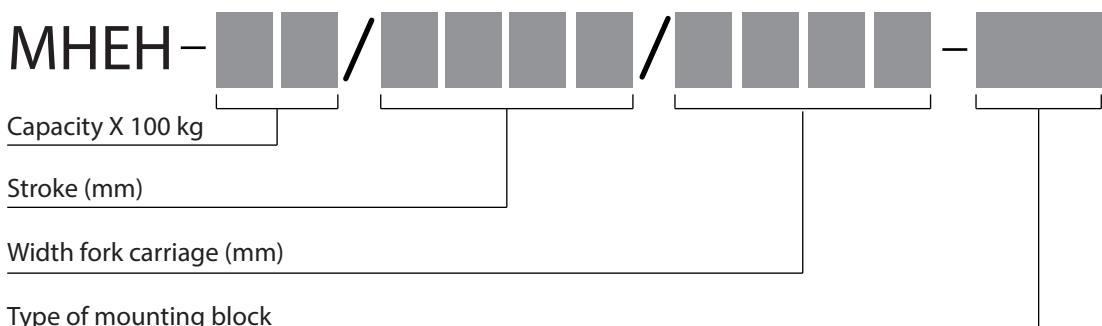
Using the MHEH with operating pressures below 120 bar (~1740 psi) may cause the MHEH to not function properly.

# Identification

## Type plate symbols

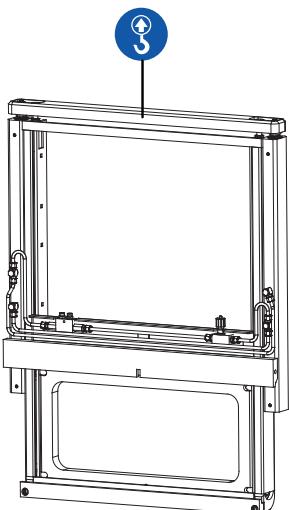
	Type description		Maximum allowed oil pressure
	Serial number		Production year
	Weight		Extra information
	Max capacity		

## Type description



## Hoisting instructions

To lift the MHEH, attach an M16 eye bolt to the connecting profile, located as seen below. Attach hoisting straps to the eye bolt to lift and move the MHEH.



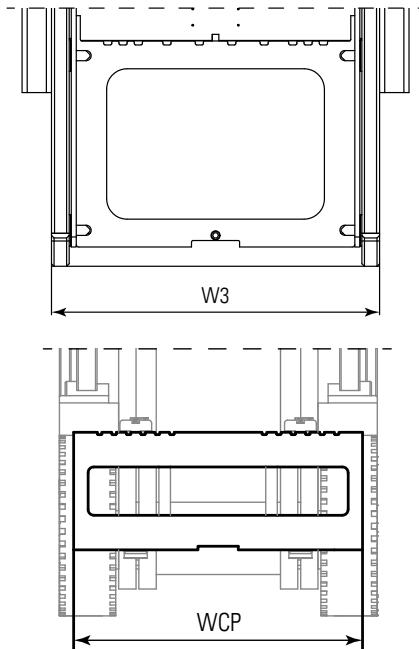
### Caution:

The MHEH may extend during hoisting, when the hydraulic circuit is not fully closed. If it is not closed, close it first, before hoisting.

# Installation on forklift

## 1 Before installing

Check if the lower frame width [W3] is **smaller** than the width of the carriage plate [WCP].

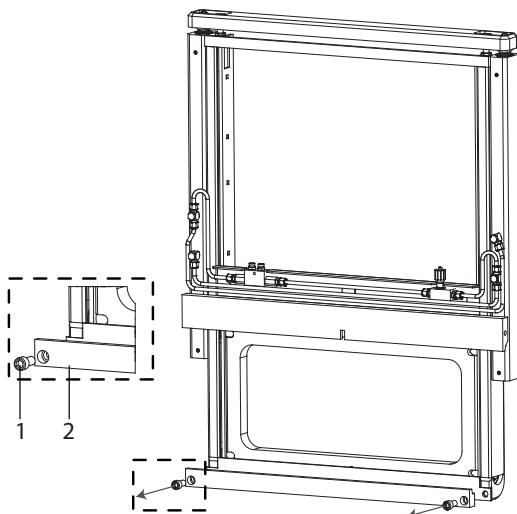


### Warning:

The MHEH must never be hung on a carriage plate that is narrower than the total width of the MHEH.

## 2 Remove lower mounting block

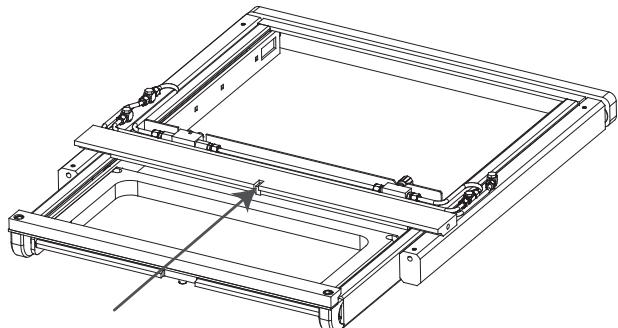
Remove the lower mounting block from the frame.



Required parts de- scription	Article number	Amount
1 Socket screw M16	07160 M16x35	2
2 Mounting block	*	1

## 3 Centre MHEH on carriage plate

Center the MHEH on the fork carriage by use of the positioning nudge.



## 4 Install lower mounting block

To secure the MHEH on the forklift the FEM2 profile must be connected to the fork carriage.

Apply the following tightening torque to secure the screws.

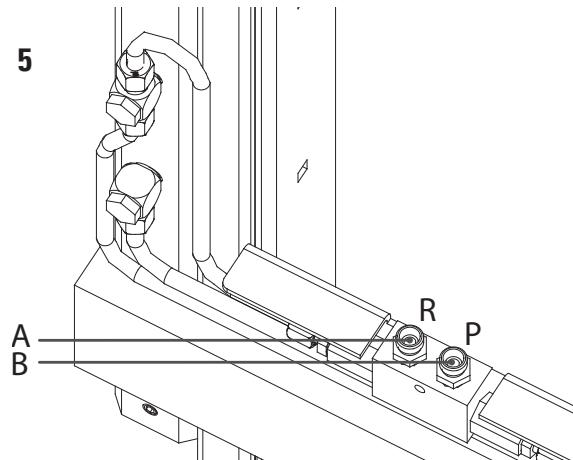
Thread size:	Tightening torque
M16	153 Nm



### Caution:

Recalculate and replace the name plate with the residual capacity of the forklift

## Connect the hydraulics to the forklift



Connect the hydraulic system of the forklift to ports A + B of the MHEH.

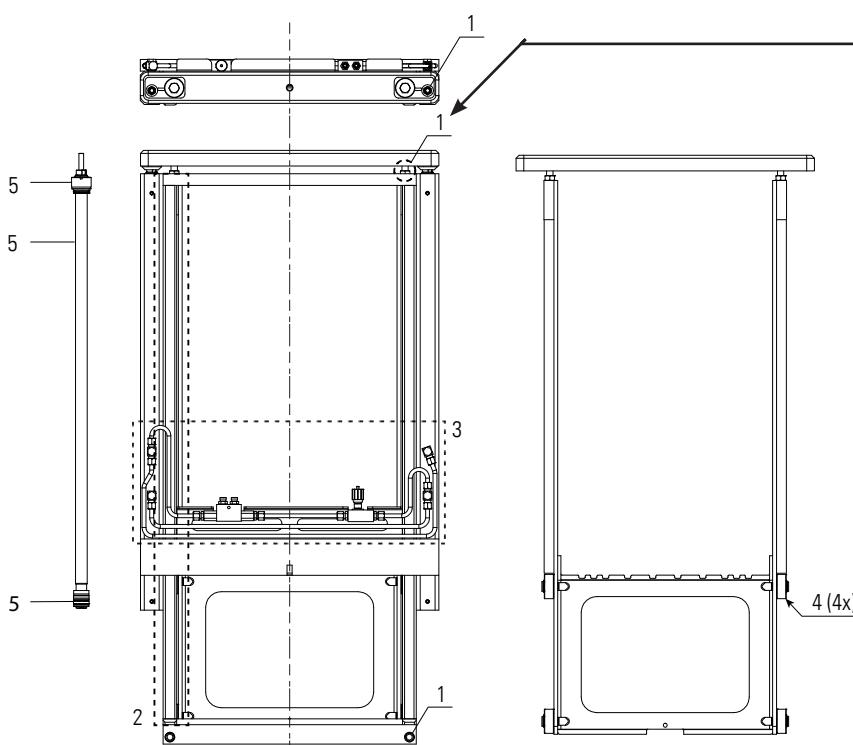
Capacity:	Recommended oil flow [l/min]:	Recommended mini- mum operating pressure [bar]:
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MHEH-10	10	160
MHEH-20	10	160
MHEH-30	10	160

\* Article N° depending on specific model.

# Maintenance schedule

Nº	Description	Every 100 hours	Every 500 hours	Every 1000 hours	Every 2000 hours
1.	Tighten bolts and nuts as specified in figure below.				
2.	Check for adequate lubrication of the contact surfaces of the rollers. Grease if necessary.				
3.	Check all hydraulic tubes for any leakage. Replace worn or kinked hoses and fasten leaking couplings.				
4.	Check all rollers for excessive wear. Replace parts if necessary.				
5.	Check hydraulic components like: seals, pistons and cylinder heads. Replace parts if necessary.				
6.	Check MHEH for damages and deformations.				



## Notes on 'Maintenance Schedule':

- » If defects are detected, solve the problem or replace parts before proceeding to work with the MHEH.
- » Recommended lubricating grease: Novatex EP2 (point 2).
- » In the event of leakage, immediately remove the MHEH from the forklift and contact your supplier (point 3 and 5).
- » See chapter on 'Replacement instructions' for further explanation about replacing parts and required tools.

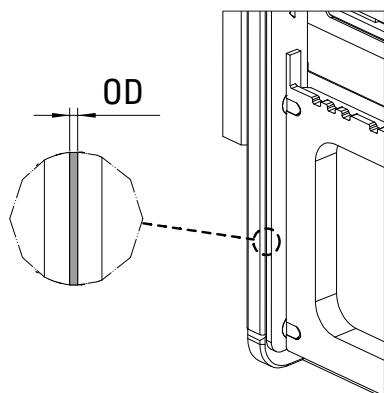
# Replacement instructions

## Replacement instructions rollers

### 1 Disassembling

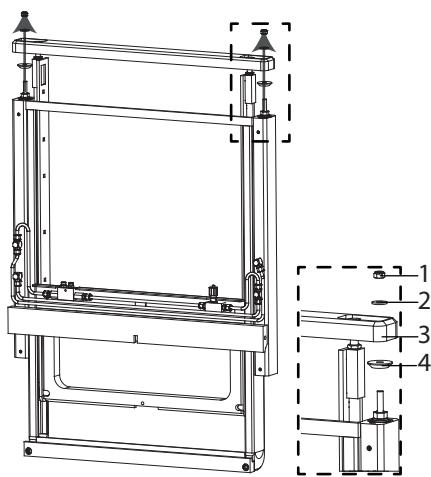
Before disassembling, check the following first.

1. Move or clamp the carriage board to one side and measure (in mm) the opening distance [OD] between inner frame and outer frame;
2. Move or clamp the carriage board to the opposite side and measure the opening distance from the original side again;
3. Subtract the values from the previous steps and this is the freeplay between carriage board and outer frame.
4. Take note of this value before further disassembling.



### 2 Disassembling the frames

Remove the following parts to disassemble the inner frame.

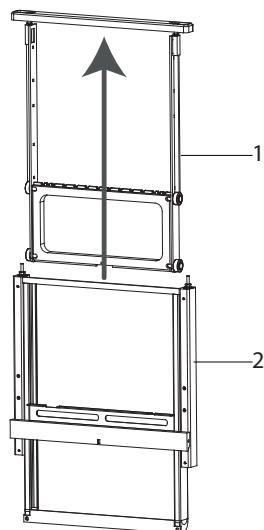


Required parts de- scription	Article number	Amount
1 Nut M12	12300 M12	2
2 Washer M12	SRKB12530301	2
3 Connection profile	*	1
4 Support ring	M00021785	2

\* Article N° depending on specific model.

### 3 Disassemble inner- and outer frame

Disassemble the inner- and outer frame as shown below.



Required parts de- scription	Article number	Amount
1 Inside frame	*	1
2 Outside frame	*	1

### 4 Replace rollers

Before assembling the rollers, calculate the amount of spacers needed per roller by doing the following calculation:

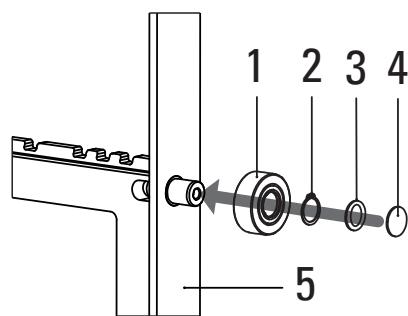
$$\text{Spacers per roller} = \frac{[\text{freeplay as calculated}] - [1 \text{ mm}]}{[0,5 \text{ mm}]}$$

Assemble the rollers, retaining rings, spacers and cam seals as shown below. Repeat for all four roller points. Apply the amount of spacers per roller as calculated above.



#### Caution:

To avoid possible machine malfunctioning, apply the exact same amount of spacers on each roller.



Continued on next page.

## 4 Assembling rollers (cont'd)

Required parts de-scription	Article number	Amount
1 Track roller	M00021307	4
2 retaining ring 25 mm	36000 25	4
3 Spacer 10x22x0,25 mm	10094791	**
4 Guidance cam	M00021306	4
5 Fork carriage MHEH	*	1

\* Article N° depending on specific model.

\*\* Amount needed may differ between models

## 5 Re-assembling

Perform step 3 and 2 in reverse order to re-assemble the MHEH.

## Replacement instructions for parts of the inner frame

### 1 Disassembling the frames

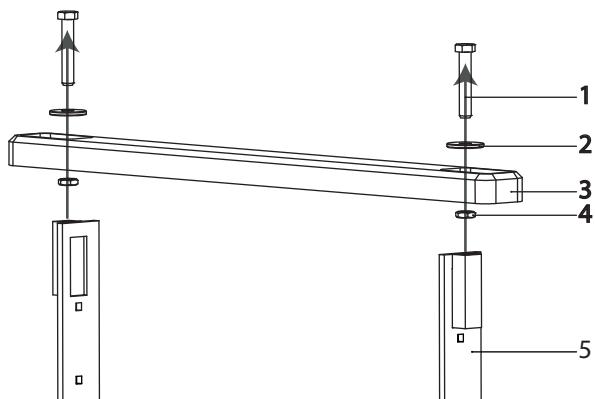
Perform step 2 from 'Replacement instructions rollers'.

### 2 Disassemble inner- and outer frame

Perform step 3 from 'Replacement instructions rollers'.

### 3 Disassembling connection profile

Disassemble components as shown in the image below.



Required parts description	Article number	Amount
1 Bolt M16	01010.160.090	2
2 Washer M16	M00000727	2
3 Connection profile	*	1
4 Nut M16	01300 M16	2
5 Inside frame	*	1

## 4 Replace parts

Replace parts if necessary.

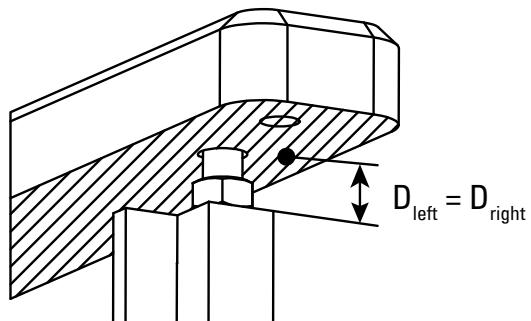
## 5 Re-assembling

perform step 3, step 2 and step 1 in reverse order to re-assemble the inner frame.

## 6 Assembling connection profile

Adjust the height [D] between the connection profile and the inside frame, so the connection profile runs parallel to the upper side of the inner frame. The following rules must hereby be applied:

- » The difference in height between the left side of the frame and right side must be at most 1 mm.
- » The heights for left and right must be between 20 and 30 mm.



### Caution:

Not complying to these rules may lead to an increased rate of fatigue and may lead to a shorter lifetime.

## 7 Secure connecting profile

Apply torque and Loctite 243 (blue Loctite) to secure the nuts (as seen in the following image). Apply on both sides of the frame.

### Thread size: Tightening torque

M16 153 Nm



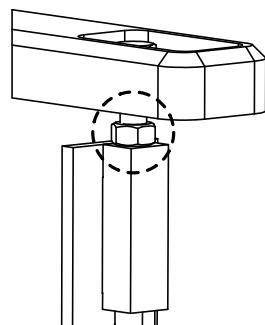
### Caution:

Not applying the appropriate torque and Loctite may over time lead to a height difference between both sides, which will lead to an increased rate of fatigue and a shorter lifetime.



### Caution:

The nuts prevent loosening of the bolt. Place and secure the nuts as illustrated on the right.



# Replacement instructions for hydraulic cylinders

## 1 Disassembling the frames

Perform step 2 from 'Replacement instructions rollers'.

## 2 Disassemble inner- and outer frame

Perform step 3 from 'Replacement instructions rollers'.

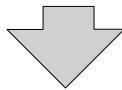
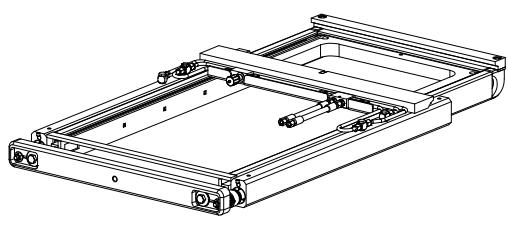
## 3 Place MHEH on it's back

Before assembling the MHEH, hoist the MHEH on it's back and place it on a worktable. See 'hoisting instructions' for instructions.



### Warning:

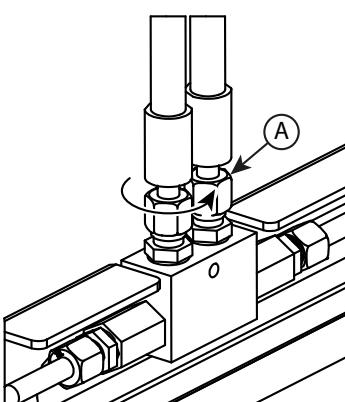
Always place the MHEH front side facing downwards to prevent damage to the hydraulics.



## 4 Vent the hydraulic system

Loosen the hose connectors [A] slightly so that the pistons do not create a vacuum when removing the hydraulic parts.

**Tools required:** Open-ended spanner 22 mm.

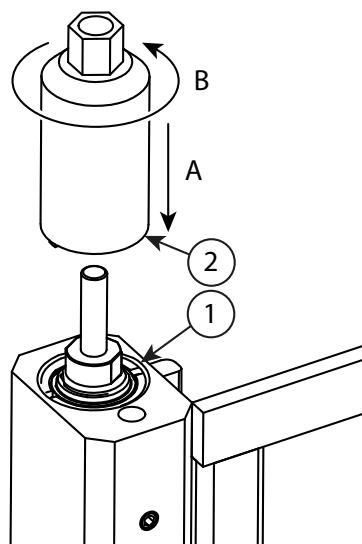


## 5 Remove hydraulic cylinders

Place a drip tray below the MHEH. Unscrew the cylinder head [1] using a cylinder head spanner [2] and a ratchet.

**Tools required:** Cylinder head spanner, 22 mm ratchet.

Cylinder head spanners are only available from Meijer Handling Solutions B.V. (Art. N° M00028333).



## 6 Remove hydraulic cylinders

Pull the entire hydraulics set consisting of the piston, cylinder head and piston rod out of the MHEH.



### Caution:

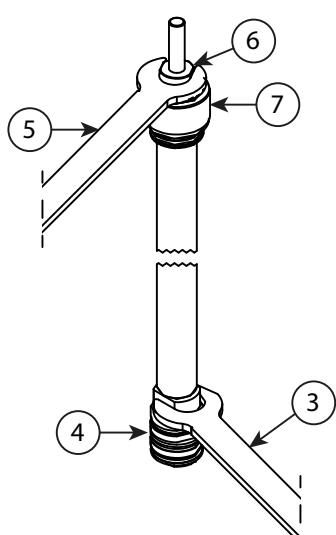
Take care with the surface of the piston rod. Even some minor damage to the surface can cause leakage.

## 7 Remove piston

Clamp the piston rod at the rod end [6; see following image], not on the piston rod itself to prevent damage (see also step 4). Use 27 mm [3] and 24 mm [5] open-ended spanners to loosen the piston [4]. If the piston cannot be loosened, heat the piston with a burner.

**Tools required:** Open-ended spanner 27 mm and 24 mm.

**Note:** When heating the piston with a burner, it must be replaced due to the damage to the seals caused by heating.



### Caution:

Do not use a burner in an area not equipped or intended for this purpose because of the fire hazard.

## 8 Clean thread surface

Remove remaining adhesive residue from the piston rod thread, then clean the piston rod and thread using Loctite 7063 (see [www.loctite.com](http://www.loctite.com)).

## 9 Replace parts

Replace piston, cylinder head or piston rod if necessary.

## 10 Re-assemble cylinder

Slide the cylinder head onto the piston rod.

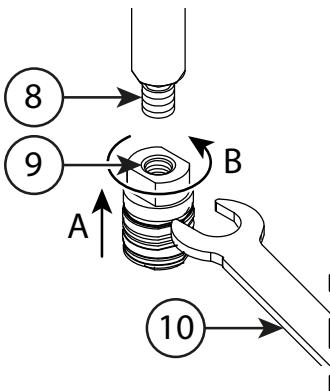
Clean the piston thread [9] with Loctite 7063. Apply Loctite 270 to the thread [8] of the piston rod. See step 5 for notes on clamping the piston and piston rod. Use a torque wrench 27 mm (10) to tighten the piston onto the piston rod to a torque of 100 Nm.

**Tools required:** Loctite 2701, Loctite 7063, torque wrench 27 mm.



### Caution:

Do not damage the cylinder head seals during assembly as this can result in leakage. Pay particular attention when sliding the cylinder head over the thread of the piston rod.



## 11 Remount cylinder(s)

Smear Copaslip (see [www.kroon-oil.com](http://www.kroon-oil.com)) onto the thread of the cylinder head. Line up the hydraulic set with the cylinder and use a hammer to tap it carefully into the bore. Screw the cylinder head tight using the cylinder head spanner (see step 5) and a torque wrench. Use a torque of 90 Nm.

**Tools required:** Hammer, Copaslip, cylinder head spanner, 22 mm torque wrench.



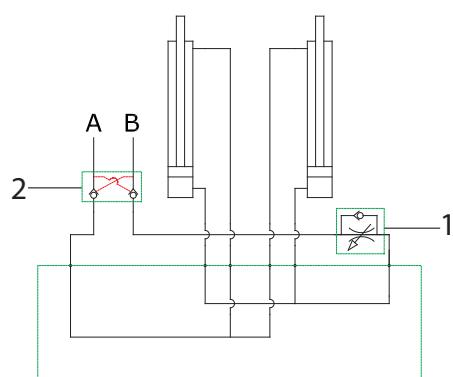
### Caution:

Do not damage the piston or cylinder head seals during assembly as this can result in leakage.

## 12 Re-assemble MHEH

Perform step 2 and step 1 in reverse order to re-assemble the MHEH.

## Schematics hydraulics

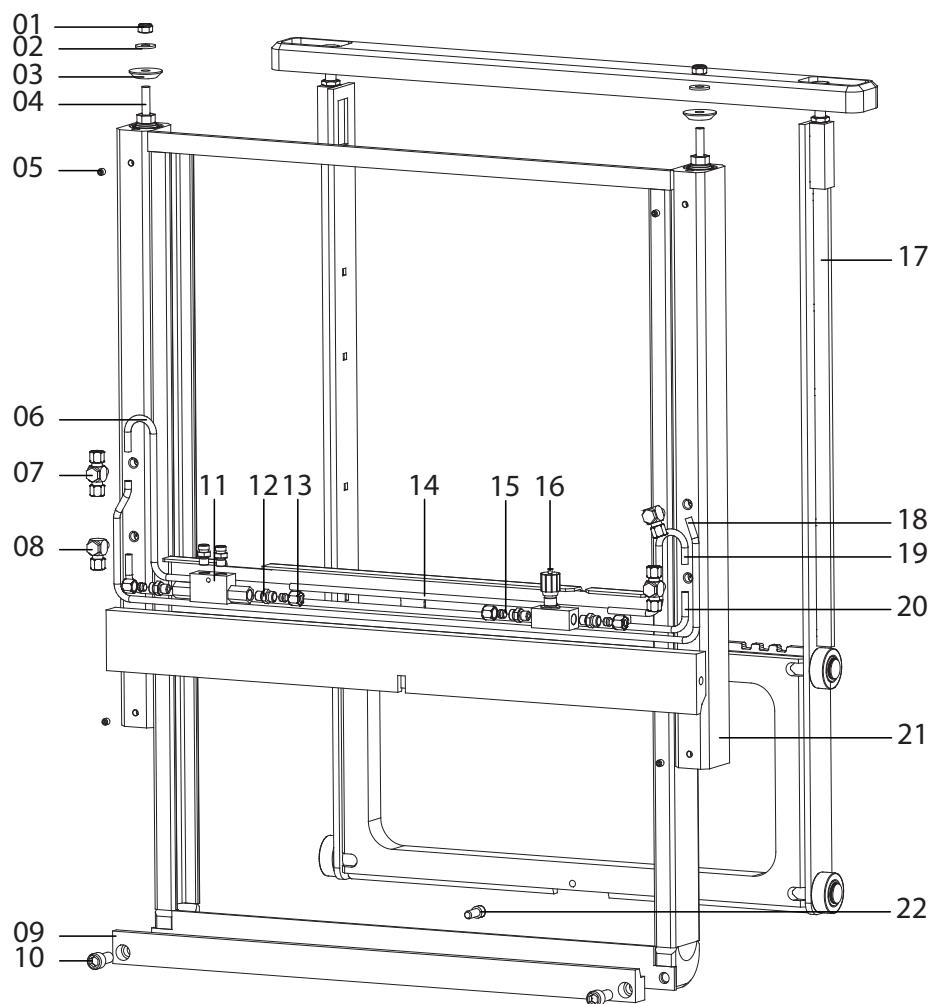


POS	Description	Article number	Amount
nr.			
1	Flow control valve	M00013020	1
2	Double acting non-return valve	M00013160	1

# Troubleshooting

Observation	Symptom	Possible cause	Possible solution
Oil leak	Oil leak between cylinder head and piston rod	Bent piston rod Scratched/damaged piston rod	Replace piston rod and cylinder head
	Oil leak between cylinder head and fork blade.	Leaking piston seal	Replace cylinder head
		Leaking O-Ring	Replace cylinder head
	Oil leak at connector	Leaking copper ring	Replace copper ring
		Loose connector	Tighten connector
Puddles of oil on the floor around MHEH	Oil lekkage	Damaged or worn tubes	Replace tubes, refill reservoir
		Damaged coupling(s)	Replace coupling(s), refill reservoir
		Damaged valve	Replace valve, refill reservoir
MHEH moves irregular	Slowdown when lifting load, then back to normal speed	Air in hydraulic system	Bleed air from the hydraulic system by moving the MHEH up and down, without load, several times
	MHEH lowers a bit without being operated		
Fork carriage is tilting	Cylinders not moving in unison	A piston seal is leaking	Replace the piston with the leaking seal
		The length of the piston rods is unequal	Install piston rods of equal length
	Fork carriage moves without being operated	Flow of hydraulic oil is not between 5-15 L/min	Please contact your supplier.
		There is air in the hydraulic system	Bleed the system.
Fork carriage is not moving down	Fork carriage can only move up	A piston seal is leaking	Replace the piston with the leaking seal
		The double acting non-return valve is leaking	Inform your forklift supplier.

## Appendix: Sparepart lists MHEH



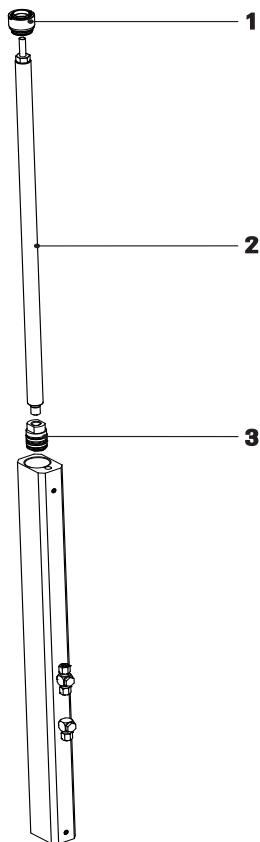
Pos N°	Description	Article N°	Total Qty
1	Nut M12	12300 M12	2
2	Whasher M12	SRKB12530301	2
3	Support ring	M00021785	2
4	Pistonrod MHEH	*	2
5	Plug 1/8	RE0016000	4
6	Tube 10L C	*	1
7	Banjo coupling T M14	RE0017025**	2
8	Banjo coupling M14	RE0017026**	2
9	Mounting block	*	1
10	Socket screw M16	07160 M16x35	2
11	Double acting non-return valve	M00013160	1
12	Coupling G3/8 10L	M00004208	6
13	Nut 10L	RE0017040	4
14	Tube 10L E	*	1
15	Cutting ring	MSE-0612200200	4
16	Flow control valve	M00013020	1

17	Inside frame	*	1
18	Tube 10L A	*	1
19	Tube 10L D	*	1
20	Tube 10L B	*	1
21	Socket screw M12x30	07160 M12x30	1
22	Outside frame	*	1

\*Article N° depending on specific model. Please provide serial number when ordering.

\*\* Consult with your supplier, if parts needs replacement.

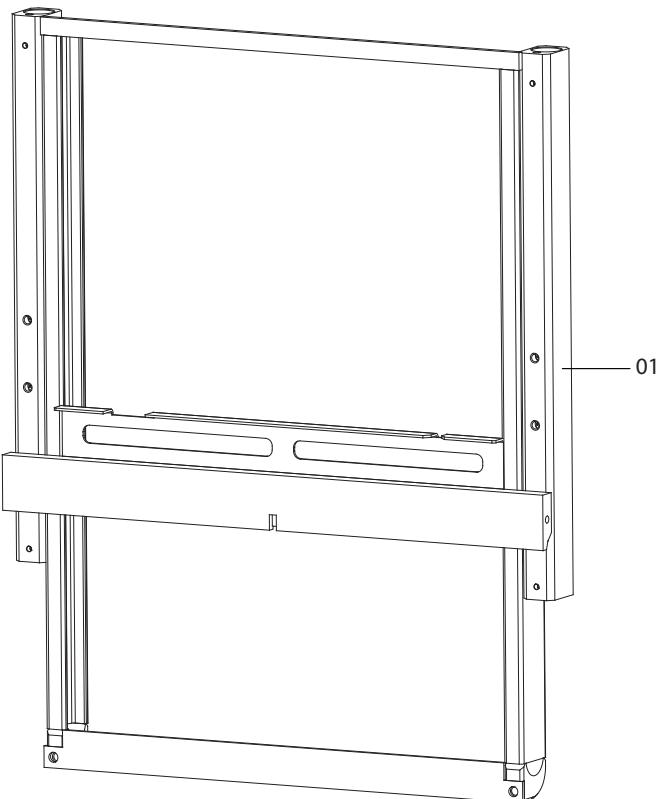
## Part list hydraulics set



Pos N°	Description	Article number	Amount
1	Cylinder head ø 40 (for piston rod ø 30)	M00025528	2
2	Piston rod ø 30	*	2
3	Piston ø 40 (for piston rod ø 30)	RE2008015	2

\* Article N° depending on specific model. Please provide serial number when ordering.

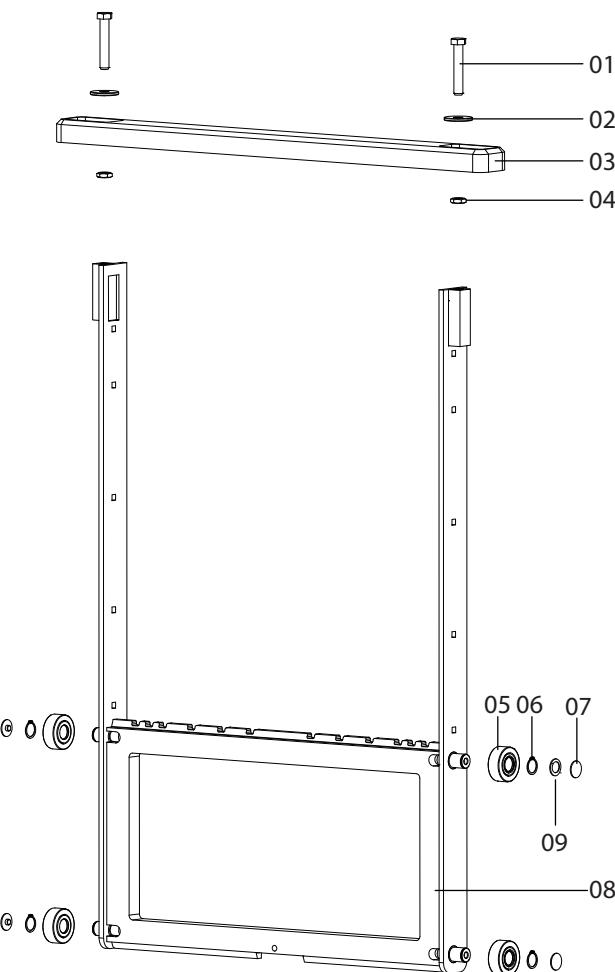
## Part list outside frame



Pos Nº	Description	Article Nº	Total Qty
1	Outside frame	*	1

#Article Nº depending on specific model. Please provide serial number when ordering.

## Part list assembly inside frame



Pos N°	Description	Article N°	Total Qty
1	Bolt M16	01010.160.090	2
2	Whasher M16	M00000727	2
3	Connection profile	*	1
4	Nut M16	01300 M16	2
5	Track roller	M00021307	4
6	retaining ring 25mm	36000 25	4
7	Guidance cam	M00021306	4
8	Fork carriage MHEH	*	1
9	Spacer 10x22x0,25 mm	10094791	**

\* Article N° depending on specific model. Please provide serial number when ordering.

\*\* Amount needed may differ between models

# Production and safety standards

Meijer Handling Solutions B.V. requires its products to be of the highest quality and we can only guarantee this by complying with all applicable international standards and regulations like:

## **ISO 9001**

Quality management systems - Requirements.

## **ISO 3834-2**

Quality requirements for welding. Fusion welding of metallic materials.

## **CE**

Machine Directive (2006/42/EC)



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