



MAHAGROUP

# MPJ

Pit Jacks

Original Operating Instructions

BA550001-en

Installation | Operation | Service

MPJ 4.0/750 1S HM  
MPJ 4.0/750 1S HA  
MPJ 16.5/750 1S HM  
MPJ 16.5/750 1S HA  
MPJ 16.5/750 1S FA  
MPJ 16.5/750 1S TA  
MPJ 16.5/750 1S HAE  
MPJ 20/750 1S HM  
MPJ 20/750 1S HA  
MPJ 20/750 1S FA  
MPJ 20/750 1S TA

MPJ 16.5/1200 2S FA  
MPJ 16.5/1200 2S TA  
MPJ 16.5/1200 2S HA  
MPJ 16.5/1200 3S FA  
MPJ 16.5/1200 3S TA

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Dear Customer,

MAHA is one of the world's leading manufacturers of testing and lifting technology and places particular emphasis on quality and performance. The company's concept includes the development, manufacture and sale of products for use in automotive workshops, by vehicle manufacturers and testing organisations.

MAHA's claim is to also be a leader in the areas of reliability, safety and sustainability – this can be seen in many details that have been developed with these aspects in mind.

We are convinced that you will be more than satisfied with the quality and performance of our products for many years. With the purchase of our products you will also receive professional assistance in case of need for service and repair.

Please remember to keep these operating instructions in a safe place. Accurately following their contents will significantly extend the life of your product and also increase its resale value. If you sell your product, please also pass on the operating instructions.

MAHA is constantly working on the further development of all products and therefore reserves the right to make changes, e.g. in shape and appearance, without prior notice.

Extensive accessories, useful assembly material and auxiliary materials are available for our products. For further information, please ask your dealer or your MAHA contact person at any time.

Thank you for choosing a MAHA product!

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# 1 General Safety Instructions

## 1.1 Symbols and Signal Words

### 1.1.1 Personal Injury



#### **DANGER**

indicates an immediate hazard which, if not avoided, will result in death or severe personal injury.

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#### **WARNING**

indicates a potential hazard which, if not avoided, could result in death or severe personal injury.

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#### **CAUTION**

indicates a potential hazard which, if not avoided, could result in moderate or minor personal injury.

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### 1.1.2 Property Damage

#### **NOTICE**

indicates a potentially harmful situation which, if not avoided, could result in damage to the equipment or surrounding objects.

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## 1.2 Basic General Safety Instructions

The following is a list of general safety instructions that must be observed for all work on and with the system. Safety instructions for special work are given at the beginning of the corresponding chapter.

- These operating instructions must be read carefully and understood before work commences.
- Please observe the specific safety information provided for the respective sections of the operating instructions.
- Adhering to the procedures, sequences and corresponding safety instructions is essential.
- A printed copy of the operating instructions must always be kept by the lift.
- The relevant regulations regarding accident prevention and health and safety must be observed.
- Electrical work may only be carried out by qualified electricians.
- No persons may be in the danger zone during the lifting or lowering process.

- When using optional load handling attachments, the corresponding operating instructions must be observed in addition to these instructions.

### **1.3 Safety Instructions for Handling Hydraulic Fluid**

- Wear safety goggles and protective gloves when handling hydraulic oil.
- Do not eat or smoke while working with hydraulic oil.
- Neutralise spilled hydraulic oil with binding agent.
- Immediately absorb any dripping oil with an absorbent cloth.
- Immediately remove soiled, saturated clothing.
- After inhalation: medical treatment in case of complaints.
- After skin contact: Wash skin immediately with soap and water. Consult a physician if skin irritation persists.
- After eye contact: Rinse thoroughly with plenty of water, consult physician.
- After ingestion: Do not induce vomiting. Call a doctor immediately.

### **1.4 What to Do in the Event of Defects or Malfunctions**

- If irregularities occur, fully lower or support the lift immediately.
- Turn off the main switch and secure it against unauthorised use.
- Notify the MAHA Service Center at +49 8374 585-100 or via your contact partner.

### **1.5 What to Do in the Event of an Accident**

- Notify first aiders, the ambulance service and/or immediate care doctor:
  - Where did the accident happen (address, workshop, ...)?
  - What happened?
  - How many are injured?
  - What injuries have occurred?
  - Who is reporting the accident?
- Keep calm and answer questions.

### **1.6 Requirements for the Operating Personnel**

All persons involved in the operation of the equipment must:

- be 18 years of age or older,
- have the mental and physical capacity for their role,
- be demonstrably trained and instructed in writing in the operation of the equipment,
- have read and understood the operating instructions, and in particular the instructions on the procedure in the event of a malfunction,

- show knowledge and experience in handling the equipment and the dangers posed,
- have had certified training regarding safety regulations.

## 1.7 Requirements on Service Personnel

Persons who are entrusted with the installation, maintenance and/or dismantling of the equipment must in addition:

- be demonstrably trained and instructed in the required work,
- can provide evidence of appropriate qualification for work on the electrical system of the equipment (e.g. as a qualified electrician),
- be able to demonstrate expertise for vehicle lifts. This includes sufficient knowledge in the field of lifts and the relevant statutory occupational health and safety regulations, accident prevention regulations and generally accepted rules of technology to be able to assess the safe working condition of the lift to be tested.

Qualified persons shall not only consider the current condition of the lift during the inspection. They must also be able to estimate how the lift and its structural parts will behave under operational conditions in the sequence and how wear, aging and the like will affect the safety of the lift.

## 2 Intended and Improper Use

- Observe the maximum axle load according to the load capacity specification on the type plate of the jack and the load handling attachment!
- The jack is designed for use in automotive workshops for inspection, maintenance and repair of cars, trucks, buses, trailers and agricultural machinery and for lifting aggregates.
- The jack is designed exclusively for lifting and lowering passenger cars and commercial vehicles axle by axle as part of service and repair work.
- The use is allowed only with the load handling attachment suitable for the load.
- The load handling attachment must be suitable for the load and its support points in terms of load-bearing capacity, shape and position of the support.
- Use is only permitted on level, load-bearing ground (floor, pit, guide rail,...) constructed in accordance with the load.
- Maximum permissible inclination in all directions of the rail or floor is 1°.
- Lifted loads must always be safely supported in a suitable manner.  
Pit jacks and gear jacks are lifting devices and are not suitable for holding the load safely for a long period of time
- The jack must not be modified without the express written permission of the manufacturer.



### WARNING

Any use beyond the intended use is improper use, e.g.:

The jacks are not suitable for supporting lifted loads.  
Lifting more than one axle at a time is prohibited.  
Stepping on the load handling attachment is prohibited.  
Riding on the load handling attachment is prohibited.  
Use for other lifting operations is prohibited.  
Lifting with additional lifting gear is prohibited.  
Use in potentially explosive atmospheres is prohibited.  
Outdoor use is prohibited.

---

### **3 Service Lifetime**

In its standard version, this product is designed for 22,000 load cycles based on EN 1493. The maximum period of normal use in relation to the possible product life expectancy shall be evaluated and scheduled by a qualified person during the annual safety inspection.

### **4 Machine Description**

The jacks described here are not used on their own, but always in combination with corresponding chassis.

DIN EN 1494 distinguishes between pit jacks that can be moved in working pits on rails or on the pit floor and may only be moved without a load, and transmission jacks that can also be moved when loaded and whose direction of travel is not restricted.

Within the limits of a reasonable workflow and technical feasibility, the jacks can be combined with different chassis.

There are basically three types of chassis. In addition to three types each of suspended and rail-guided chassis, the free-moving chassis for moving on the hall floor is available for use as a transmission jack.

Suspended and rail-guided chassis can be moved along the guides (rails at the pit bottom or profiles at the pit edge). In the chassis, the jacks can be moved between the left and right pit edges.

Since the freely movable chassis can already be moved in all directions by means of four swivel castors, the jack is firmly mounted on this chassis.

Basically, each jack consists of drive, hydraulic block, oil tank and cylinder.

On the one hand, the jacks are differentiated on the basis of the cylinder stages into single-stage, two-stage and three-stage; on the other hand, according to the drive types hand-hydraulic, pneumatic-hydraulic and electro-hydraulic.

Hand-hydraulic jacks are equipped with a high-pressure or a low-pressure pump, depending on the required load. Compared to the high-pressure hand pump, the low-pressure hand pump has a larger pump cross-section and thus a larger delivery volume. Due to its smaller pump cross-section, the high-pressure hand

pump has the ability to achieve higher hydraulic pressures and thus to lift heavier loads.

In pneumatic-hydraulic jacks, the compressed air drives an air motor, which is firmly bolted to the hydraulic block. This oscillating pressure intensifier conveys the hydraulic oil.

In rapid mode, the hydraulic oil in the tank is pressurised with compressed air, which displaces the hydraulic oil from the tank and allows the lifting piston to reach the load application point more quickly.

The telescoping pit jacks are based on the synchronisation principle of all telescoping stages.

An overflow system is installed for automatic bleeding of the single-stage jacks.

The pump block contains load, suction and overload valves. The low-pressure foot pump is mounted according to the spare parts list. The self-closing lowering valve is also mounted on the pump block.

An attached support plate (claw/gear plate) serves as the load handling attachment.

For special load application points on vehicles, other suitable mounts from our range of accessories can be fitted.

**The safe use of these optional load handling attachments is not part of these operating instructions, but is described in separate operating instructions supplied with the load handling attachment.**

## **5 Safety Features**

### **5.1 Relief Valve**

A pressure relief valve is installed between the pump and the check valve. This DBV limits the hydraulic pressure that can be generated by the pump, preventing excessive loads from being lifted.

The DBV is adjusted to the load and set at the factory. The setting of the DBV must not be changed.

### **5.2 Self-Closing Drain Valve**

With the electro-hydraulic lifter, the lowering valve is opened via the "lower" button. The lowering speed can be regulated via the rotary knob.

The controls are designed to be self-resetting. When the button is released, the lowering valve closes automatically.

All other types are equipped with a drain spindle that opens the drain valve by turning it counterclockwise. When the drain spindle is released, a spring automatically closes the valve.

### **5.3 Overflow Device for End Position Limitation of Cylinders**

The MPJ 1S manual single-stage lifter and pneumatic lifters are equipped with an overflow device. When the end position of a cylinder stage is reached, a bypass opens and prevents the cylinder stage from being extended further and leaving the guide.

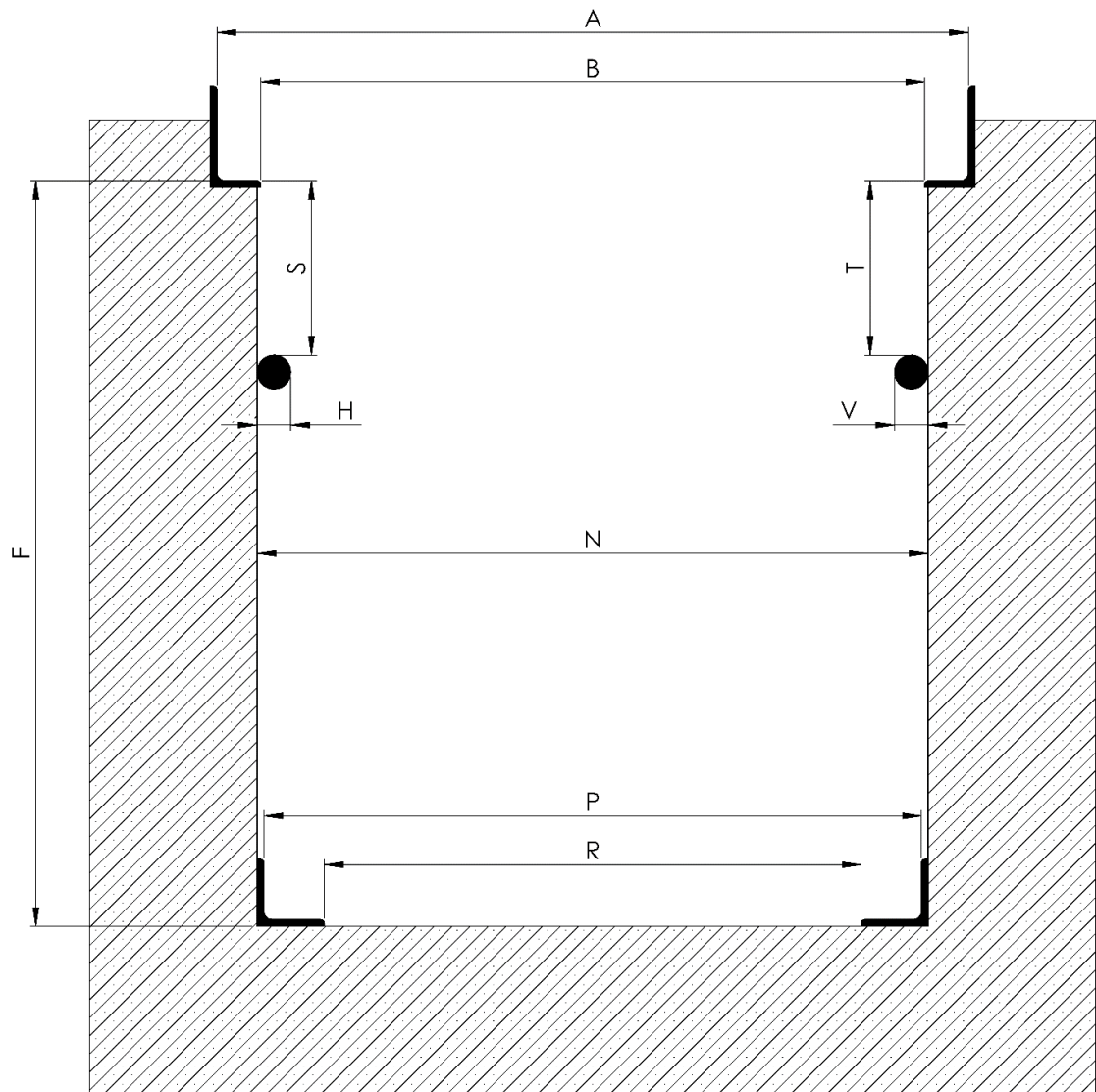
On all other lifters, the travel of the cylinder stages is limited by a mechanical stop.

### **5.4 Main Switch HAE**

The electrohydraulic jack has a main switch. If this is turned to "0", the voltage supply to the lifter is switched off. The main switch here also functions as an emergency stop.

## 6 Technical Data

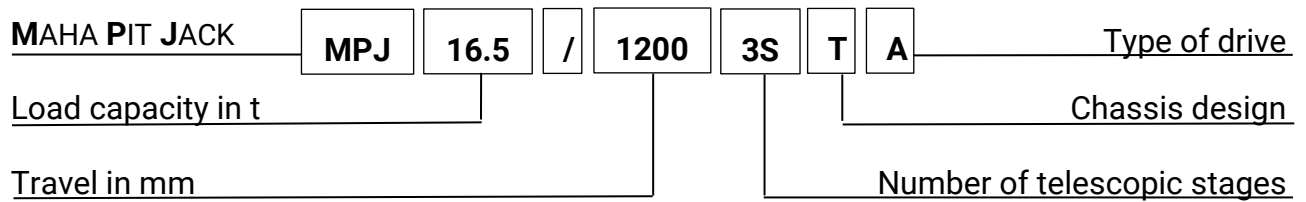
### 6.1 Relevant Pit Dimensions



- A** Outer width of upper pit profile
- B** Clear width of upper pit profile
- S** Depth of pit protrusion left
- T** Depth of pit protrusion right
- H** Width of pit protrusion left
- V** Width of pit protrusion right
- P** Outer width of lower pit profile
- R** Clear width of lower pit profile

- N** Pit width
- F** Pit depth

## 6.2 Nomenclature



### Number of telescopic stages

**xS** Number of telescopic stages

### Chassis design

H Suspended design

F "Floor" = Floor-running, freely movable design

T "Track" = Floor-running, rail-guided design

### Type of drive

M Manual operation with hand pump

A Automatic operation with rapid control and air motor

E Electrohydraulic drive

### 6.3 Pit Jack Data

	MPJ 4.0/750 1S HM		MPJ 4.0/750 1S HA		MPJ 16.5/750 1S HM		MPJ 16.5/750 1S HA		MPJ 16.5/750 1S FA		MPJ 16.5/750 1S TA		MPJ 16.5/750 1S HAE		MPJ 20/750 1S HM		MPJ 20/750 1S HA		MPJ 20/750 1S FA		MPJ 20/750 1S TA		MPJ 16.5/1200 2S FA		MPJ 16.5/1200 2S TA		MPJ 16.5/1200 2S HA		MPJ 16.5/1200 3S FA		MPJ 16.5/1200 3S TA	
Load capacity [kg]	4000				16 500				20 000				16 500																			
Mounting inner diameter (trunnion) [mm]	30				45				45																							
Outside diameter (piston rod) [mm]	45				70				90				70				80															
Dead weight lifter [kg]	75				120				145				120				210				272											
Max. Dead weight with chassis [kg]	210				260		215		410		285		230		215		410		300		510		410		362		572					
Drive 8...max. 10 bar at 350 L/min	-	x	-	x	x	x	-	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Drive 2.5 kW, 3 x 400 V, 50 Hz, 16A	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Operating pressure [bar]	159				254				308				240				195															
Stroke [mm]					750								1200																			
Noise emission [dB (A)]					< 70								< 78																			
Operating temperature [°C]																																
Hydraulic oil type HLP-D					10				22				10																			
Hydraulic oil quantity [liters]	3.3				9.5				14.5				9.5				15.8				28											
Stroke speed [mm/s] load-free									22																							
Lowering speed [mm/s] load-free									31																							

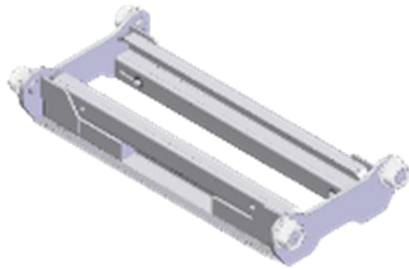
### 6.4 Chassis

The running rails for chassis must be made of solid steel profile. Flat steel, L-, U- or I-profiles are suitable. The running rails must be firmly connected to a load-bearing substrate and must not exceed a maximum slope of 2° in all directions. The two running rails must be straight in themselves and parallel in terms of gauge and slope. A deviation in parallelism of max. 10 mm is permissible.

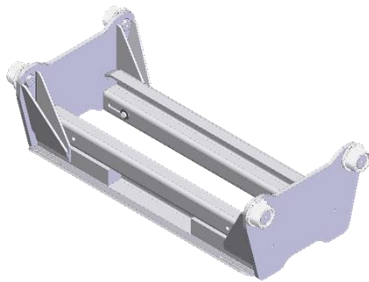
### 6.4.1 Suspended Chassis

Suspended chassis run on steel profiles at the edge of the pit and bear the code letter "H" (cf. Nomenclature). See Annex for detailed dimensions.

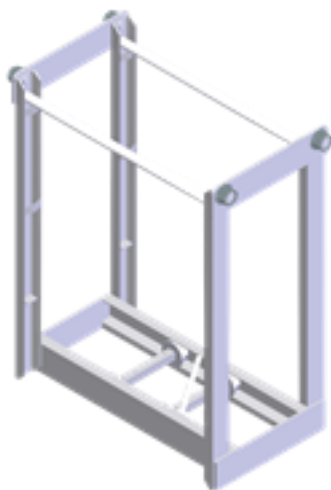
#### Overview



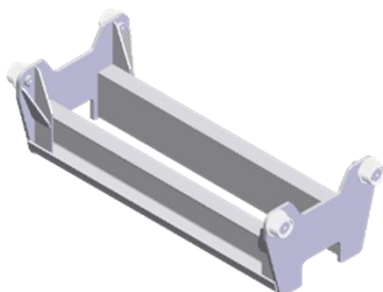
For pit jacks up to and including 16.5 t  
Track width  $\pm 70$  mm adjustable  
Cylindrical or conical rollers



For pit jacks up to and including 16.5 t  
Track width  $\pm 70$  mm adjustable  
Cylindrical or conical rollers



For pit jacks up to and including 16.5 t  
Track width not adjustable  
Cylindrical or conical rollers



For pit jacks up to and including 20 t  
Track width not adjustable  
Cylindrical or conical rollers

## 6.4.2 Rail-Guided Chassis

Rail-guided chassis run on steel profiles on the pit floor and bear the identification letter "T" (cf. Nomenclature). See Annex for dimensions.

### Overview

For pit jacks up to and including 16.5 t

Adjustable track width

Cylindrical or conical rollers

Internal or external rollers (see below)

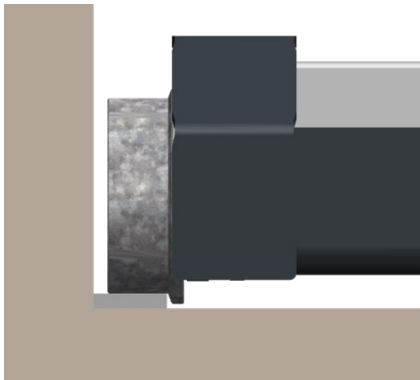


Internal chassis roller

Cylindrical shape

With guide collar

Suitable for flat steel min. 75 x 10 mm

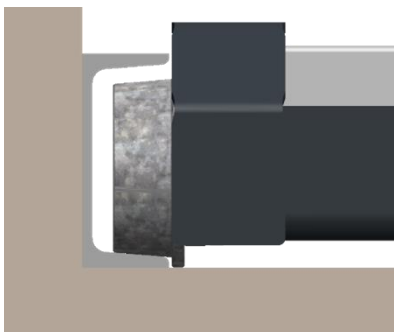


External chassis roller

Cylindrical shape

With guide collar

Suitable for flat steel from 50 x 10 mm

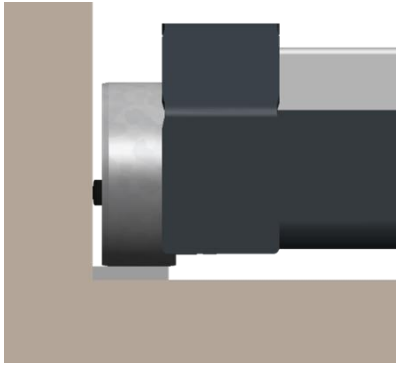


External chassis roller

Conical shape with 8% inclination

With guide collar

Suitable for U-profile from U160



External chassis roller

Cylindrical shape

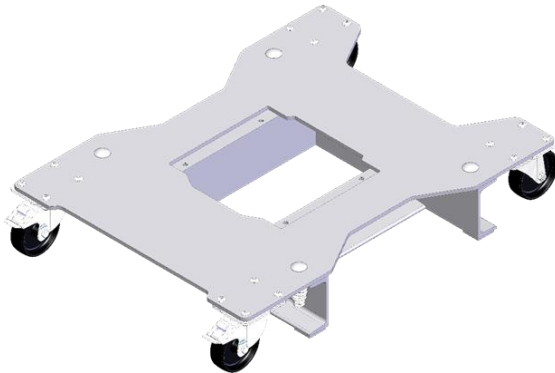
Without wheel flange, only with roller for guidance on the pit wall

Suitable for flat steel from a width of 55 mm

### 6.4.3 Freely Movable Chassis

Freely movable carriages run on the pit floor or outside the working pit and bear the code letter "F" (cf. Nomenclature).

- 2 of the 4 swivel casters are equipped with brake.
- Lowers to the floor from a load of approx. 1000 kg by means of a preloaded spring.

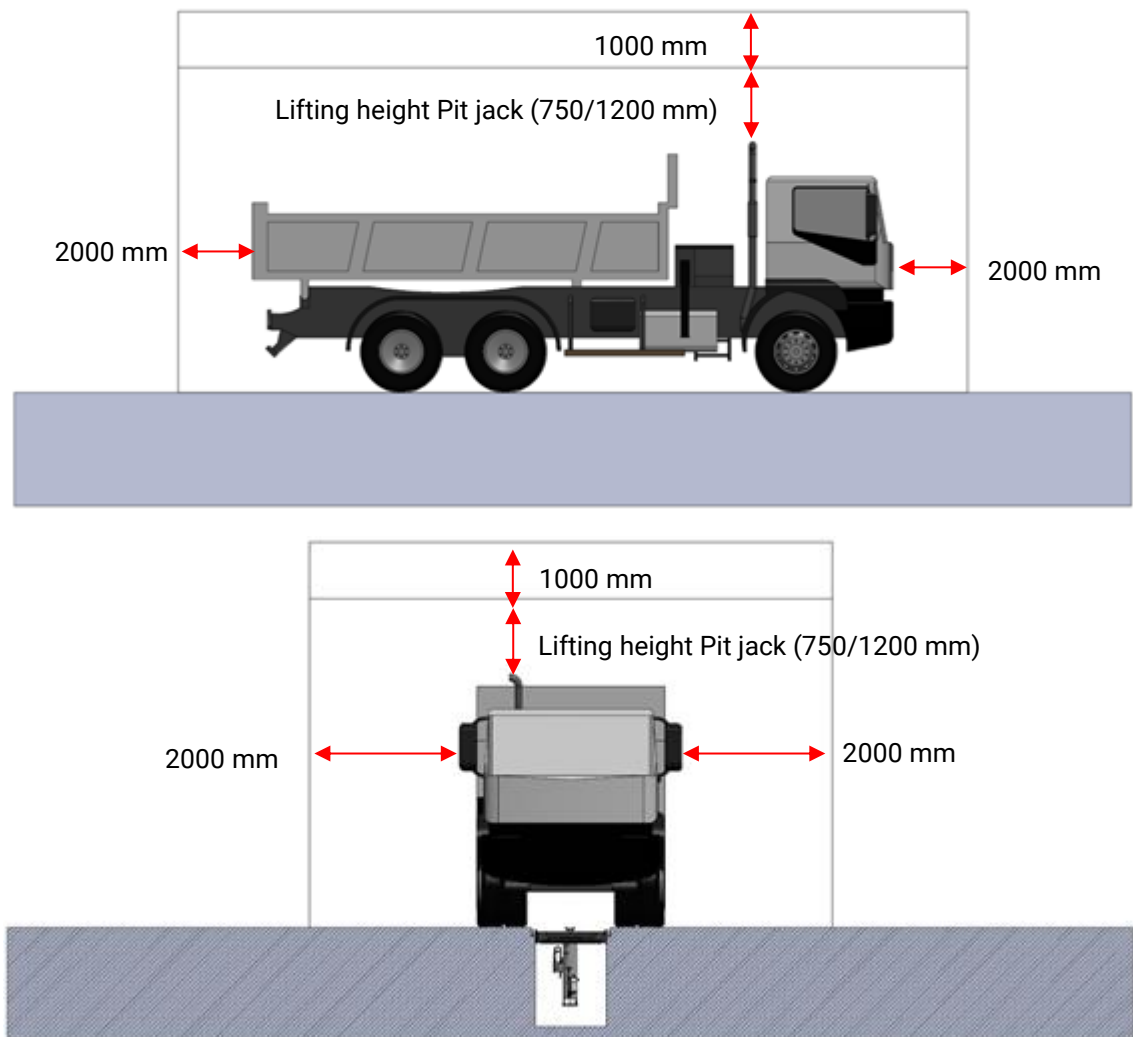


## 6.5 Permissible Pit Jack/Chassis Combinations

Load capacity	Stroke travel	Telescopic stages	Chassis				Drive			Model	
MPJ for cars and vans											
4,0 t	750 mm	1S			H			M			MPJ 4.0/750 1S HM
					H				A		MPJ 4.0/750 1S HA
MPJ for trucks and buses											
16,5 t	750 mm	1S				F			A		MPJ 16.5/750 1S FA
							T		A		MPJ 16.5/750 1S TA
					H			M			MPJ 16.5/750 1S HM
					H				A		MPJ 16.5/750 1S HA
					H				A	E	MPJ 16.5/750 1S HAE
	1200 mm		2S			F			A		MPJ 16.5/1200 2S FA
						T		A		MPJ 16.5/1200 2S TA	
					H				A		MPJ 16.5/1200 2S HA
				3S		F			A		MPJ 16.5/1200 3S FA
						T			A		MPJ 16.5/1200 3S TA
MPJ for heavy goods vehicles											
20,0 t	750 mm	1S				F			A		MPJ 20.0/750 1S FA
							T		A		MPJ 20.0/750 1S TA
					H			M			MPJ 20.0/750 1S HM
					H				A		MPJ 20.0/750 1S HA

## 6.6 Danger Zone

The danger zone is defined as the pit jack incl. test vehicle plus the safety distances specified in the following table.



Spatial limits	Safety distances
Front	Vehicle + 2 m
Rear	Vehicle + 2 m
Lateral	Vehicle + 2 m
Top	Vehicle + Lifting height Pit jack + 1 m

## 7 Transport, Handling and Storage

### 7.1 Safety Instructions



#### WARNING

- Wear personal protective equipment.
  - Standing under a suspended load is prohibited.
  - The transport and storage of packages is only permitted using original transport racks. Observe the max. stacking height.
  - Before removing the packaging straps, secure the packages against falling and maintain a safe distance.
  - Use caution when unpacking the jacks. Rebounding packaging straps can cause injuries!
  - When loading, unloading and transporting the jacks, always use suitable lifting equipment such as crane, forklift truck, etc., and correct load handling and lifting gear.
  - Only use lifting equipment and slings that are suitable in terms of type and permitted load capacity.
  - Always ensure that the parts to be transported are suspended or loaded properly and in a fall-proof manner, taking into account their size, weight and centre of gravity. Observe transport regulations.
  - Strapping of the package is not permitted.
  - Stacking of packages is not permitted.
- 

### 7.2 Scope of Delivery

Each pit jack is shipped from the factory together with the associated carriage in one package as standard. In some cases, the delivery may consist of two packages due to size or weight. These include:

- Pit jack
- Carriage

The number of delivered packages and contents must be checked for damage and completeness according to the order confirmation. Any transport damage must be documented immediately and reported to the delivery carrier.

### **7.3 Packaging Information**

The delivery is always made on europallet (800 mm x 1200 mm).

Max. Dimensions of the package (L x W x H): 1593 x 1026 x 1145 mm

Max. Weight of the package: 572 kg

The center of gravity of the packages is located within the footprint of the Europallet.

### **7.4 Transport and Handling**

Check the scope of delivery for completeness according to the order confirmation. Report any transport damage to the bearer immediately.

As the jacks are shipped on Euro pallets, they can be moved with all standard forklift trucks and crane forks.

Dimensions and centre of gravity of the packed pit jacks are shown in section "Packaging information".

### **7.5 Storage**

The packages must be stored in a covered location and protected from direct sunlight. They must be stored at low humidity and at a temperature between +5 °C and +40 °C.

The packages must not be stacked. Packaging waste must be disposed of in accordance with applicable environmental regulations.

## 8 Installation

Air jacks may only be operated with dry, lubricated compressed air according to ISO 8573-1:2010 [1:4:2].

In order to be able to guarantee the required compressed air quality, which is necessary for reliable operation of the lifter, a maintenance unit must be installed in the supply line in the immediate vicinity of the lifter (line length max. 5 m).

See also section "Maintenance unit".

This maintenance unit must consist of compressed air filter, water separator and oil nebulizer. These components are necessary to prevent damage to the lifter, e.g. due to corrosion.

### NOTICE

A refrigeration dryer is not sufficient for compressed air maintenance! A refrigeration dryer cannot filter out the line dirt and does not supply the equipment with the oil film that is important for trouble-free operation.

---

### 8.1 Safety Instructions



#### WARNING

- Installation may only be carried out by authorised and specially trained personnel. Such specialist staff include authorised, trained specialists employed by the manufacturer, the authorised dealers and the relevant service partners.
  - At least one second person must be called in to support the installation work, and if necessary other persons must also be called in.
  - Work on the electrical installation may only be carried out by qualified electricians.
  - Personal protective equipment must be worn during all work.
  - Work may only be carried out with tools suitable for this purpose. For screws and nuts, use a wrench with a suitable width across flats.
  - Where reference is made to the use of special tools, use them.
  - For transport and handling, use lifting gear with suitable load handling attachment (hook with safety flap / latch) and slings (chain slings).
  - When inserting the chassis into the pit, use slings of different lengths if necessary to prevent the chassis from slipping when tilted.
-

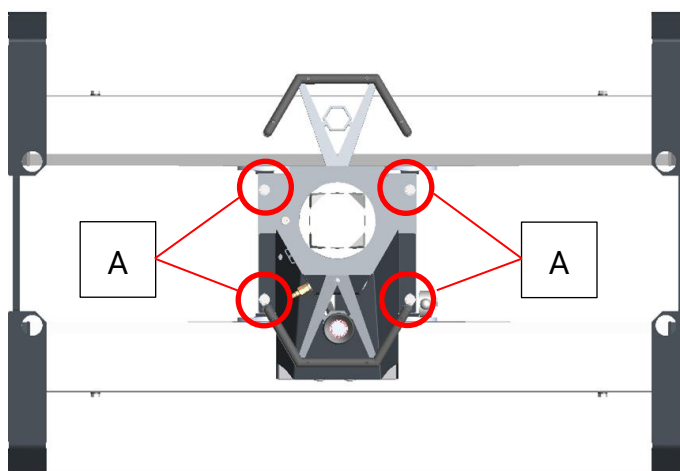
## 8.2 Installation of the Rail-Guided Chassis

- 1 Remove all packaging from the pit jack and chassis.

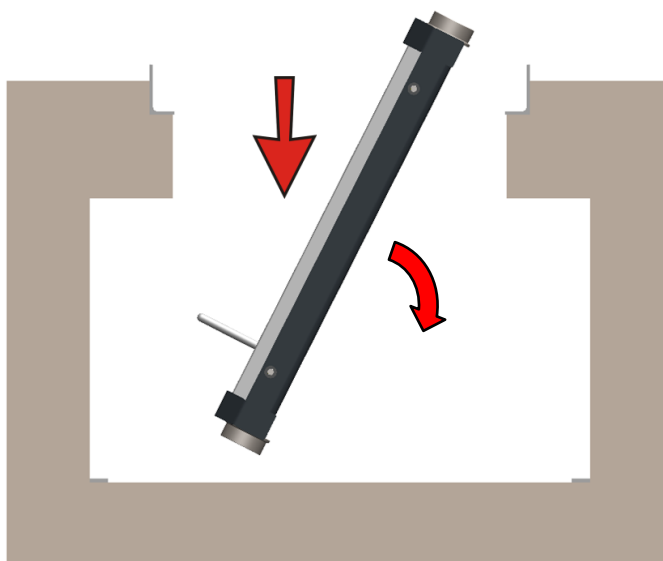
### NOTICE

The chassis is matched to the pit specified in the order. Use in other pits is only permitted after consultation with MAHA.

- 2 For occupational safety reasons, the jack must be disconnected from the chassis during the installation process. To do this, remove all four hex head screws (A). When using the telescopic pit jack, ensure that the cover of the operating unit is secured.
- 3 Using suitable lifting gear, lift out the pit jack in an upright position as it sits in the chassis and set it down on level ground.



- 4 Secure the freely movable pit jack axles against uncontrolled movement in the chassis, for example by fixing them to the side panel with cable ties.
- 5 Lower the chassis into the pit using suitable lifting gear.

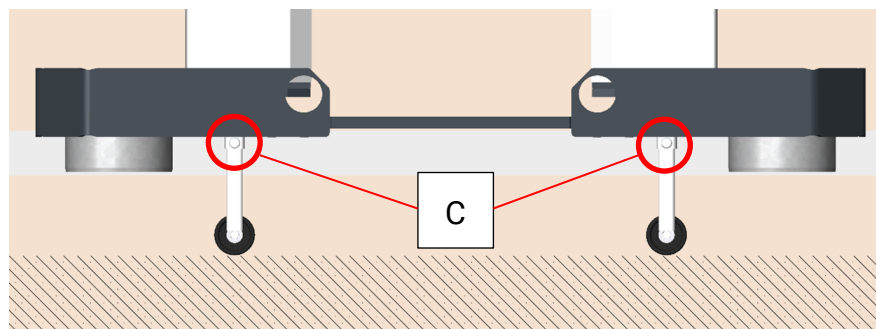


- 6 Set the adjustable side parts of the chassis to the respective pit dimensions. To do this, loosen the hex head screws (B). Make sure that both side

sections are extended to the same distance (see dimension "X"). Secure pull-outs with hex head screws (B) using a tightening torque of  $50 \pm 5$  Nm.



- 7 Lower the pit jack into the pit using suitable lifting gear.
- 8 Mount the pit jack on the chassis in the reverse order to disassembly. Tighten the four hex head screws (A) to fix the pit jack with a tightening torque of  $85 \pm 5$  Nm.  
Note that the collar of the chassis rollers in particular or the entire chassis must be able to move freely over the entire length of the pit.  
For the chassis variant with cylindrical collarless rollers (see section "Rail-Guided Chassis"), now adjust the deflector rollers to the pit width and tighten the screws (C). The chassis rollers must run safely on the rails along the entire length of the pit.

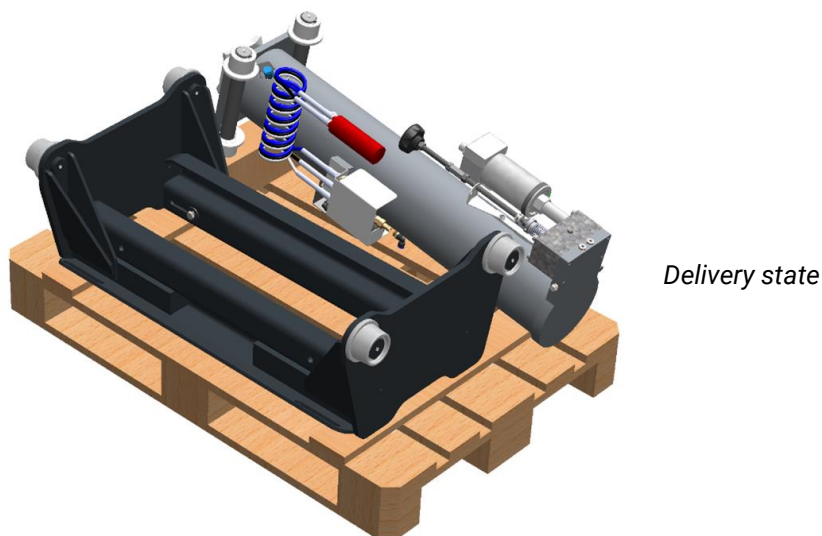


## 8.3 Installation of Pit Jack in Suspended Chassis

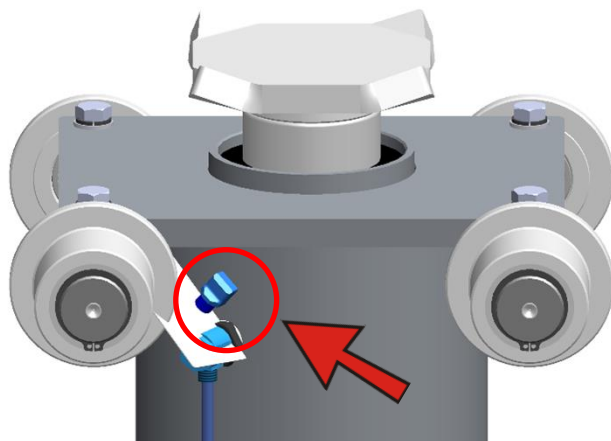
### 8.3.1 Adjustable Chassis up to 16.5 t

Required aids and tools

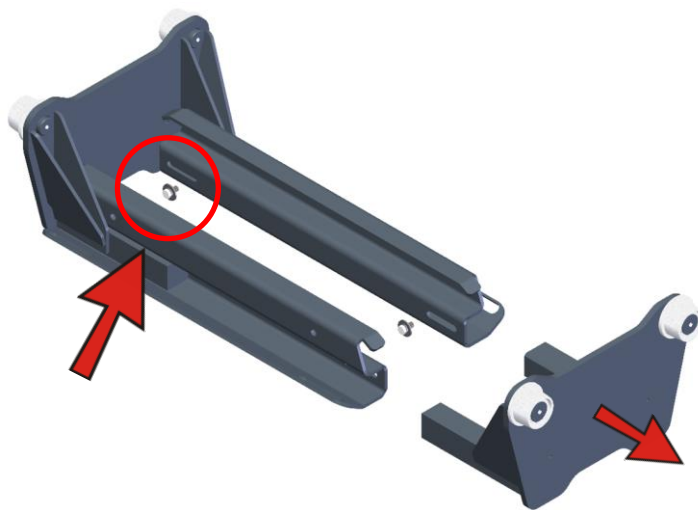
- Lifting gear (overhead crane, forklift, etc.)
- Torque wrench up to and including 85 Nm
- 2 round slings
- Socket wrench with socket A/F 19
- 2 lashing straps



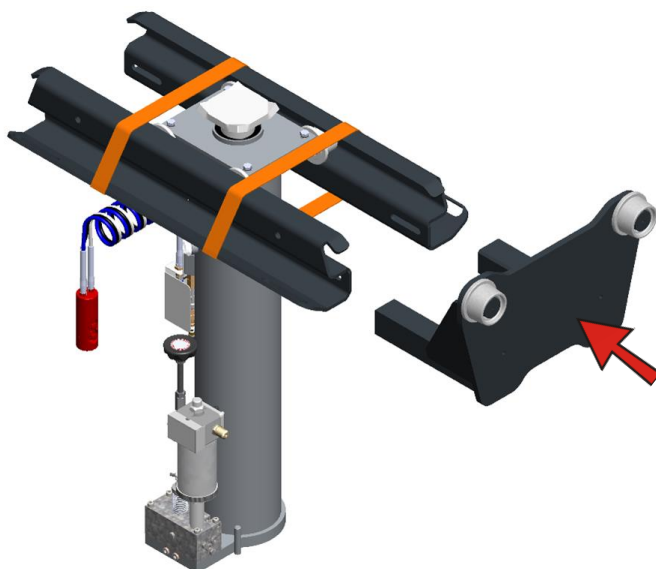
- 1 Attach a round sling tied to the front lifting rollers. Then lift the pit jack off the pallet and place it on **level** ground. Remove the round sling.  
**Attention: Danger of tipping!**
- 2 Remove the transport lock and fit the compressed air line.



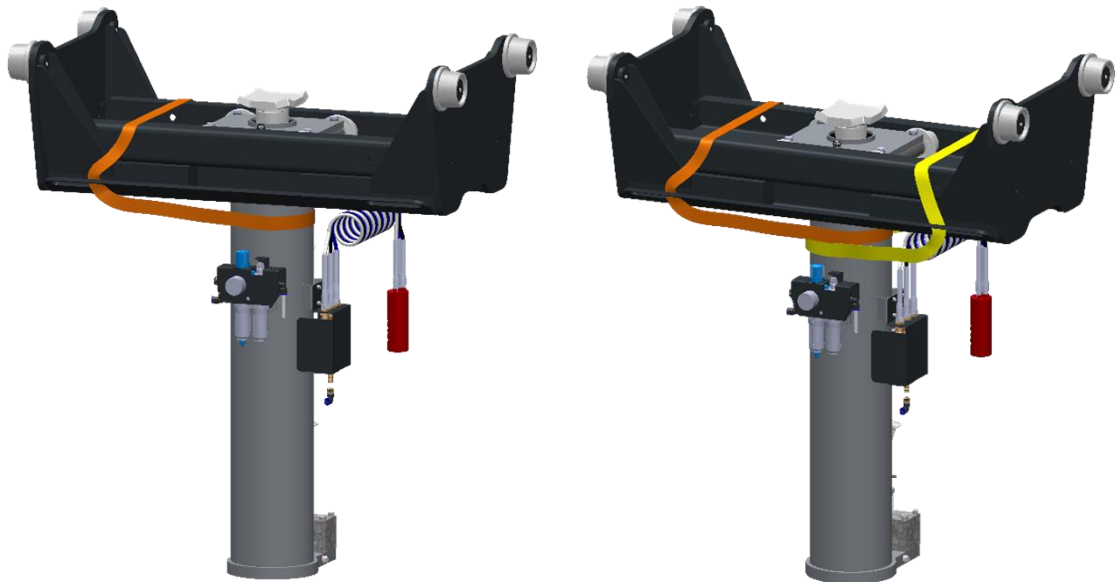
- 3 Remove the four M12 screws including washers from the chassis and store them. Then pull out the side panels using lifting gear and place them next to the pit jack.



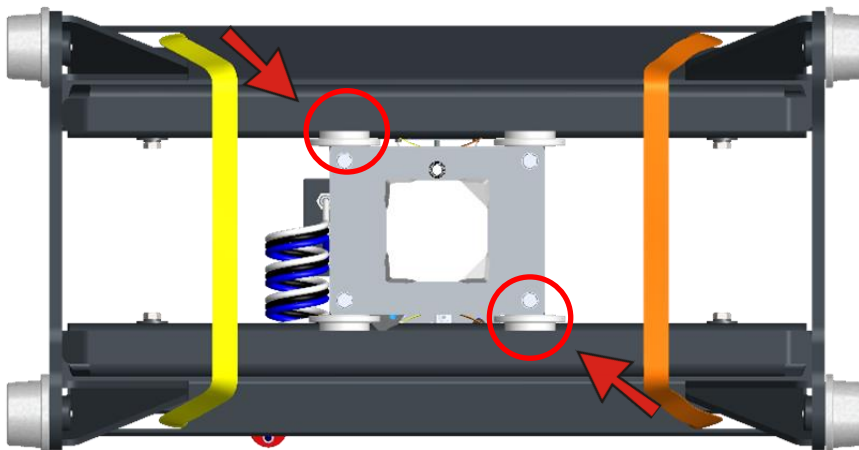
- 4 From this step onwards, at least a second person, and if necessary other persons, must be called in to assist with the installation work. Slide the chassis supports sideways onto the lifting rollers (**Attention: Danger of tipping!**) and secure with lashing straps. Make sure that the lashing straps are positioned as close as possible to the lift.



- 5 Fasten one side panel with a round sling, lift it using lifting gear and slide it laterally with the square pins into the chassis beams as far as it will go. Then replace the previously removed M12 screws including washers and tighten them hand-tight.  
Align already mounted chassis components load-symmetrically on the jack, i.e. the centre of gravity (not the centre!) should be aligned in the middle above the jack. **Attention: Danger of tipping!**
- 6 For the second side panel, repeat the installation procedure as described in step 5. After inserting the second side part, reposition the chassis centrally on the lift.  
The jack is now centred in the chassis and can be secured against slipping. Two lashing straps are recommended, which are guided through the handle openings in the carriers and enclose the lift in opposite directions.

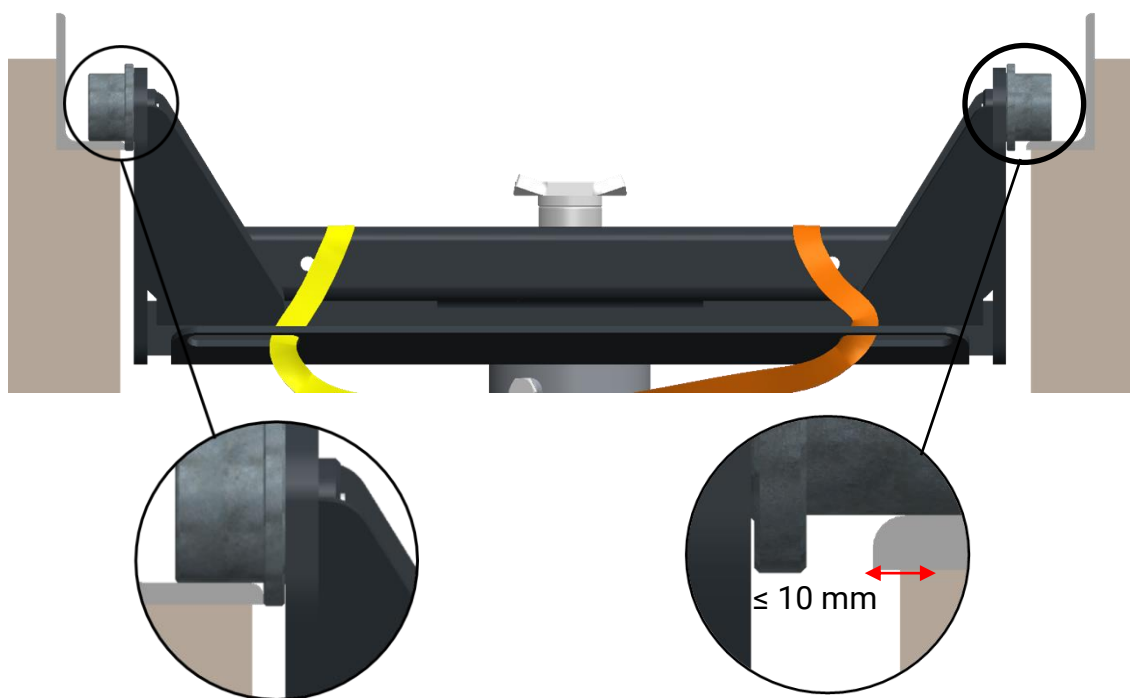


- 7 Attach a round sling diagonally to two jack rollers. Then lift the jack including chassis using lifting gear and lower it into the centre of the pit. The side panels must be inserted for this.



Align the lift in the L-profile or in the U-profile depending on the installation situation. If necessary, the chassis can be tilted for this purpose if the jack has been secured correctly using lashing straps as described in step 6.

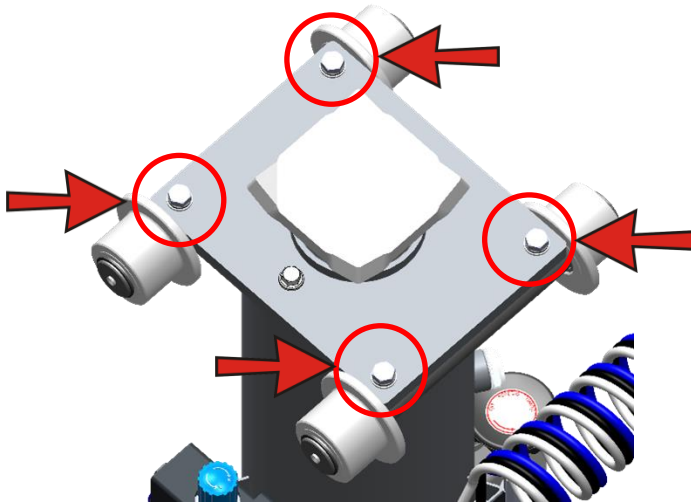
- 8 Loosen the M12 screws on one side panel until the washer can be turned freely. Now pull out the side part until the collars of the chassis rollers are in contact with the pit profile. Repeat the process with the second side panel. Make sure that both side parts are extended to the same length so that the carriers are positioned symmetrically in the middle between the side parts. Tighten the hex head screws on both side parts to a tightening torque of  $85 \pm 5$  Nm. Check the central alignment of the chassis. Remove the round slings and push the jack through the entire working pit. At the widest point of the working pit, the clearance between the roller collar and the pit profile may be 5 mm on both sides (max. 10 mm permissible on one side). Then remove the lashing straps from the lift.



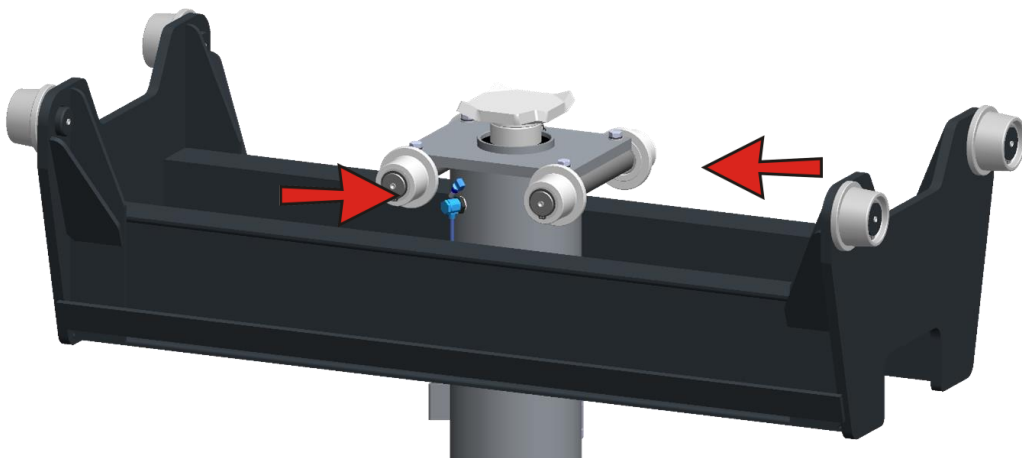
### 8.3.2 Customised Chassis 20 t

The chassis for load capacities of 20 t are welded to size, i.e. no side sections can be moved or beams removed. Observe the installation procedure described in section "Installation of Pit Jack in Suspended Chassis". The same aids and tools are required. Deviating from this, the following assembly steps must be performed.

- 1 Attach the pit jack with a round sling to the front lift rollers. Then lift the pit jack off the pallet and place it on **level** ground. Remove the round sling.  
**Attention: Danger of tipping!**
- 2 Remove the transport lock and install the compressed air line.
- 3 Remove the jack axes including rollers by loosening the four M12 screws on the jack support plate (see Fig.).



- 4 Raise the chassis using a suitable lifting gear so that it cannot tip over and lower it over the pit jack until the top plate is approx. 90 mm above the running surface of the chassis. Then install the jack axes including rollers (see Fig.). Tighten the screws to  $50 \pm 5$  Nm.



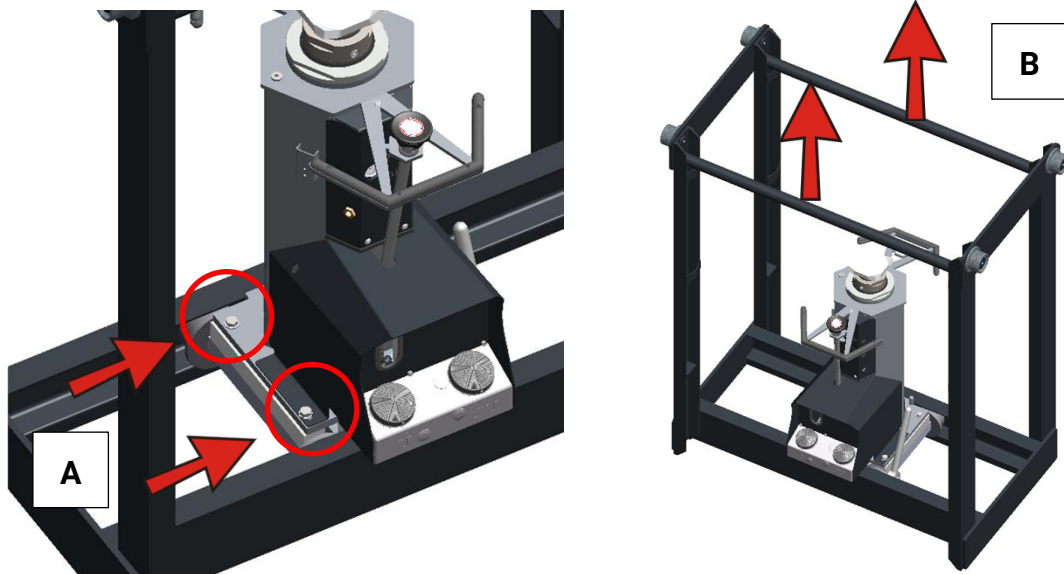
- 5 Raise the chassis so that the jack is still firmly positioned on the ground and the chassis rollers are already in contact with the chassis. Now follow the procedure for securing the jack described in step 6 of section "Installation

of Pit Jack in Suspended Chassis". As the made-to-measure chassis do not have handle openings, we recommend wrapping the side section. Note the central alignment of the lift and the counter-rotation of two lashing straps to prevent the lift from slipping. **Attention: Crushing hazard**

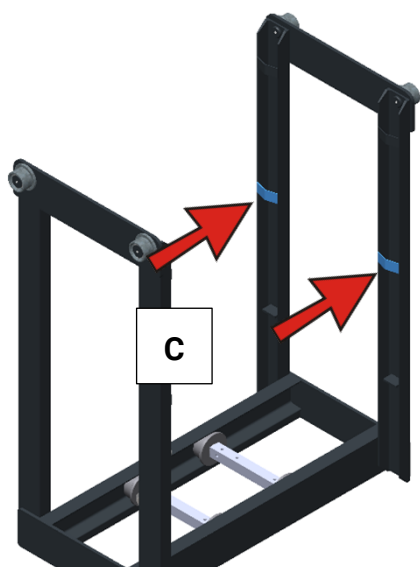
- 6 After securing the jack in the chassis, it can be inserted into the pit (use the existing pit opening). Push the pit jack through the entire working pit. At the widest point of the working pit, the clearance between the roller collar and the pit profile may be 5 mm on both sides (max. 10 mm permissible on one side).

### 8.3.3 Customised Chassis up to 16.5 t for Telescopic Jacks

- 1 Remove all packaging from the pit jack and chassis.
- 2 For safety reasons, the jack must be disconnected from the chassis during the installation process. To do this, remove all four hex head screws (A).
- 3 The two reinforcement tubes (B) can be removed upwards for installation.



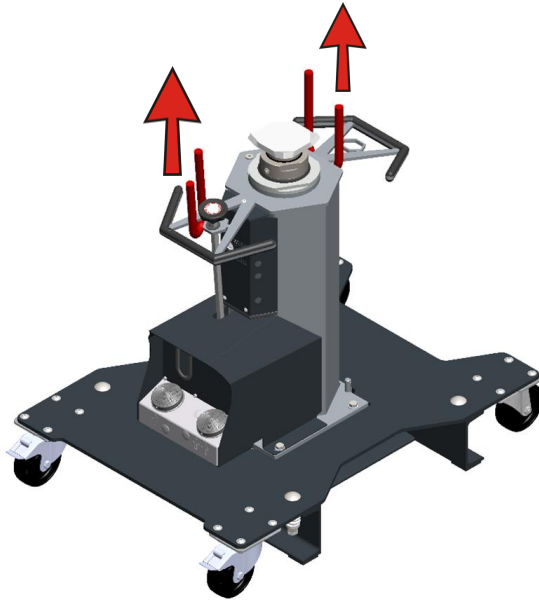
- 4 Using suitable lifting gear, lift out the jack in an upright position as it sits in the chassis and set it down on level ground.
- 5 Secure the freely movable pit jack axles against uncontrolled movement in the chassis, for example by fixing them to the side plates using cable ties.
- 6 Lift the chassis with suitable lifting gear so that it cannot tip over and lower it into the pit. It is recommended to attach the chassis at four points (C) on the inside.



- 7 Lower the pit jack into the pit in an upright position using a suitable lifting gear.
- 8 Mount the jacks on the chassis in the reverse order to that for disassembly. Tighten the four hex head screws (A) to fix the pit jack with a tightening torque of  $85 \pm 5$  Nm.
- 9 Reinsert the reinforcement tubes.
- 10 Push the pit jack through the entire working pit. At the widest point of the working pit, the clearance between the roller collar and the pit profile may be 5 mm on both sides (max. 10 mm permissible on one side).

## 8.4 Floor-Running Chassis

- 1 Pit jack or gear jack are ready mounted in the chassis.
- 2 Remove the packaging and attach two round slings to the head plate of jack incl. chassis (see Fig.).
- 3 Lift the jack from the euro pallet and move it to its destination (pit/floor).



## 9 Optional Equipment

### 9.1 Optional Load Handling Attachments

Attention: For the use of optional load handling attachments, the corresponding operating instructions must be observed in addition to these.

Regardless of the operating instructions for optional load handling attachments, the following safety instructions must always be observed.

- Support tubes must not be extended. Danger of tipping!
- There is a risk of crushing between the edge of the pit and the support bridge.  
Lowering the load with extreme caution
- Support systems may only be removed when the load is free of load and the load is in a safe position
- Observe change in center of gravity of load, e.g. in case of different fuel quantity in asymmetric fuel system. Use suitable load handling attachments as required.
- Observe the operating instructions for all devices and tools used.
- Carefully check the load handling attachment for operational safety.
- Pre-position the reciprocator and load handling attachment at pick-up points.
- Always pick up load securely, without slipping and centered on the center of gravity.
- Position actuators, supports, underlays at support points and, depending on the type, pin support tubes with bolts and secure them with folding cotter pins or place wooden blocks at a minimum distance of 500 mm from each other.
- Lift or lower load slowly and under constant observation.
- Set down the load safely, without slipping and centered on the center of gravity.

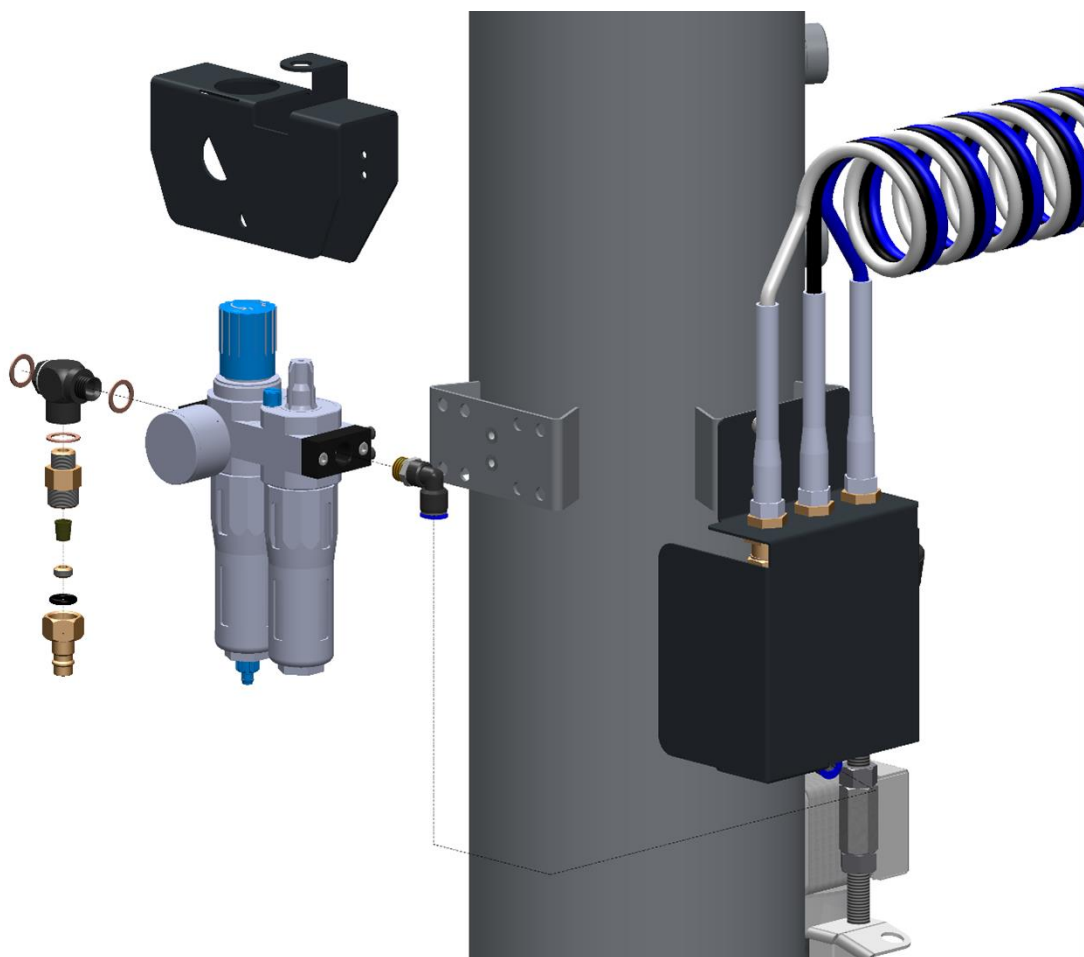
### 9.2 Maintenance Unit

MAHA offers a maintenance unit for its air-powered pit jacks that provides additional support for air quality requirements.

This maintenance unit can be ordered together with the lifter, but can also be retrofitted.

The maintenance unit is mounted directly on the air connection of the pit lift and consists of a filter-pressure-regulator-oiler combination.

A coarse pre-filter at the compressed air inlet is designed to reduce contamination. A clogged pre-filter can lead to a high pressure drop and to a reduced performance of the lifter!



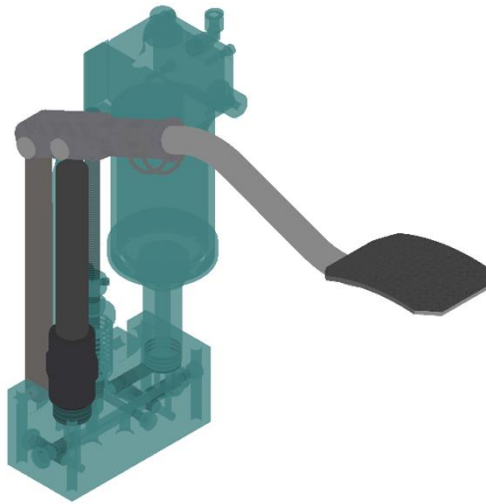
### 9.3 Bleeding Special Accessories

See section "Bleeding".

### 9.4 Foot pump

The manually operated foot pump enables precise positioning of the load handling attachment under the vehicle or transmission.

This option is available to the telescopic lifters. Retrofitting of this option is possible at any time.



## **10      Operation**

### **10.1    Controls**

#### **10.1.1   MPJ 1S**

The MPJ 1S jack series is equipped with either a manual pump or a pneumatic-hydraulic pump.

Both variants allow 2 lifting speeds. The rapid traverse is very suitable for moving the load-handling attachment unloaded to the vicinity of the lifting point.

The manual pump has two pumping pistons for this purpose. The rapid traverse pump displaces a larger volume of oil, but is thus unable to generate the pressure required for the load stroke.

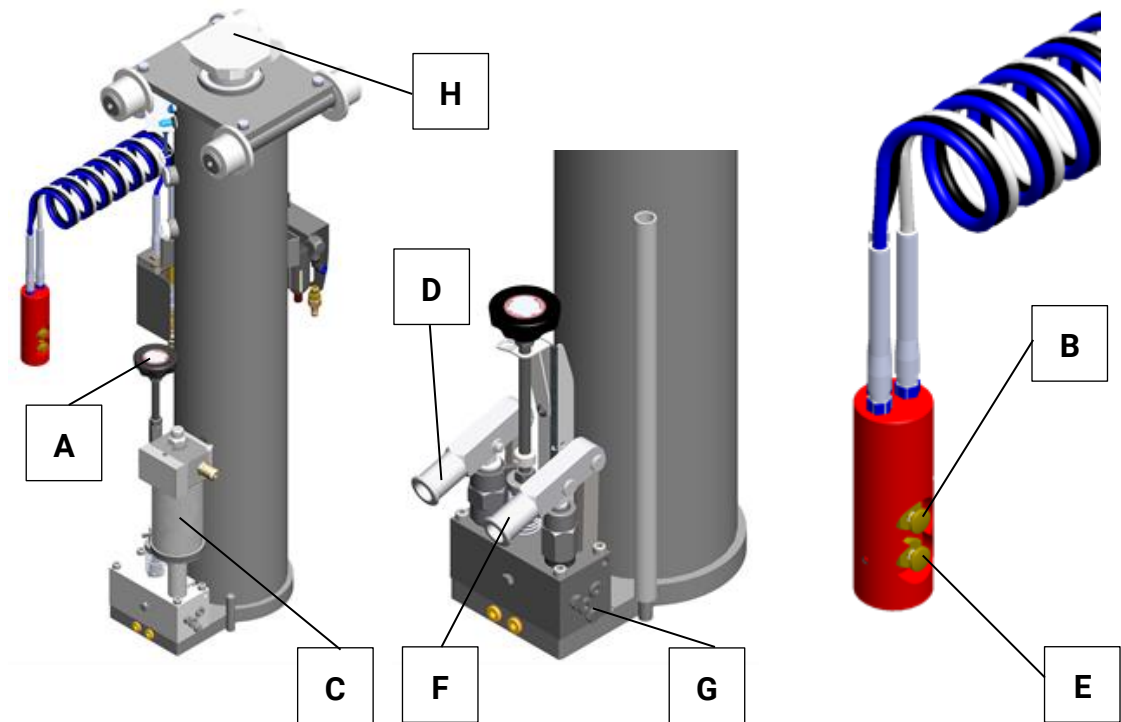
The load lift pump generates the necessary pressure for this, but at the expense of the displaced volume and thus the lifting speed.

Switching from rapid stroke to load stroke is done by repositioning the hand lever

The hydraulic-pneumatic pump is driven by an air motor, which in turn drives an oscillating pump piston. This combination generates the necessary pressure to lift the load

The rapid traverse is realized here by pressurizing the hydraulic oil in the tank with compressed air.

- A      Drain spindle
- B      Rapid control (automatic via control bottle)
- C      Air motor (pneumatically operated)
- D      Rapid control (manually operated)
- E      Load stroke control (automatic via control bottle)
- F      Load stroke control (manually operated)
- G      Pressure relief valve in hydraulic block
- H      Oil dipstick or oil filler plug



### 10.1.2 MPJ 2S | MPJ 3S

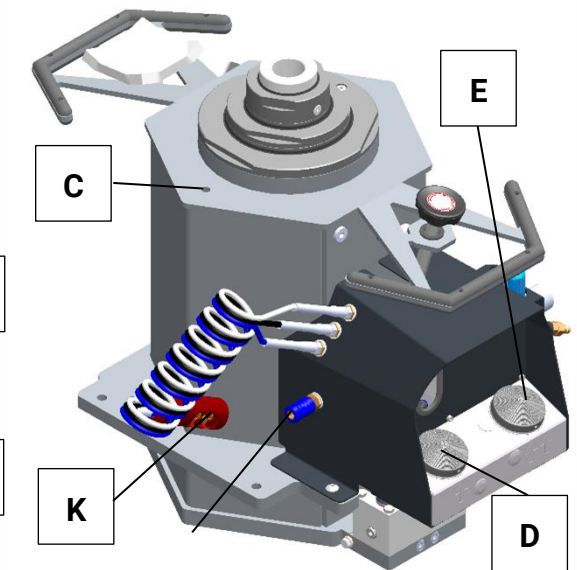
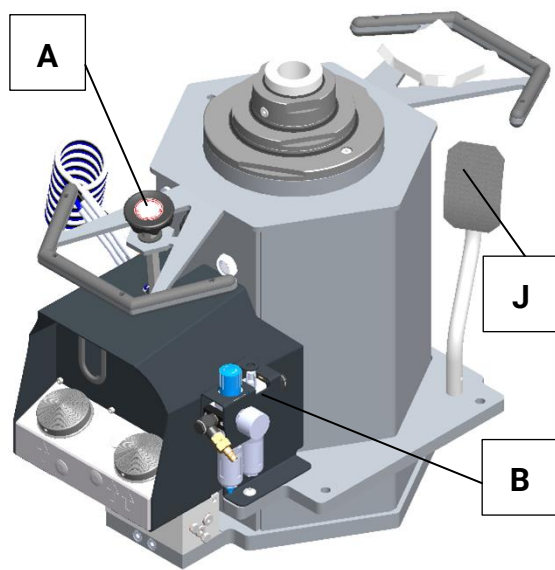
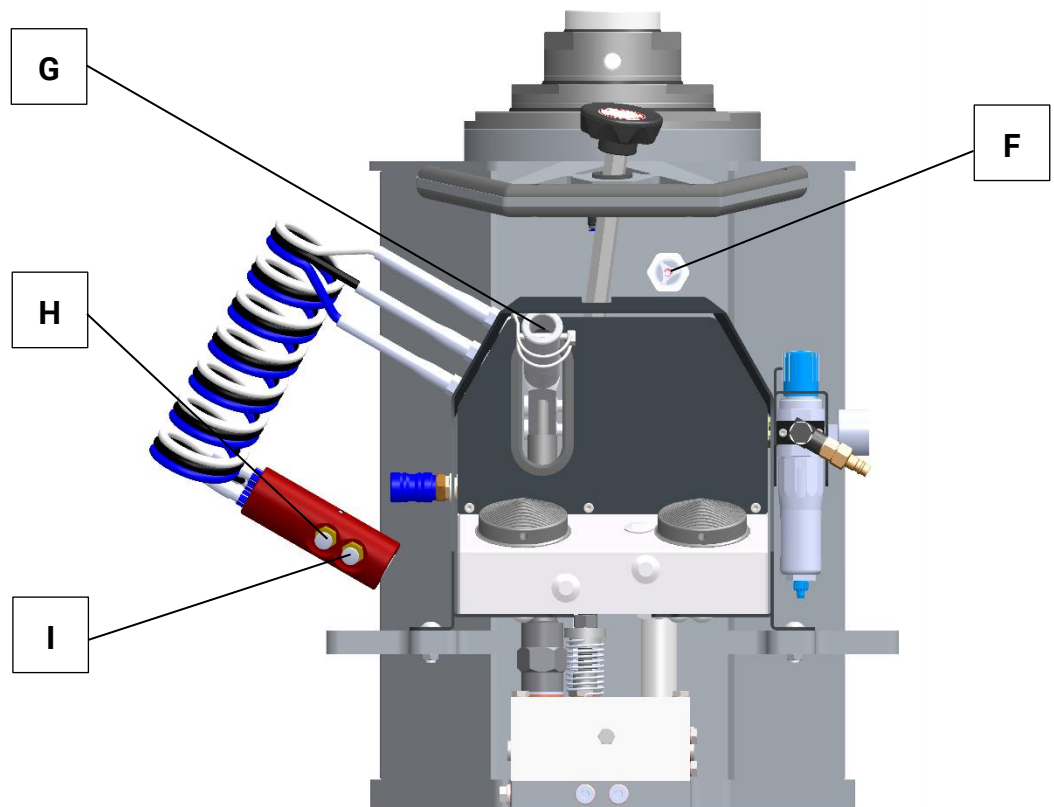
Standard scope of delivery

- A Drain spindle
- B Maintenance unit
- C Oil filler plug
- D Load stroke control (foot operated)
- E Rapid control (foot operated)
- F Oil sight glass

Option

- G Foot pump
- H Rapid control (manually operated)
- I Load stroke control (manually operated)
- J Foot pedal
- K Handheld remote control with magnetic holder
- L Quick coupling

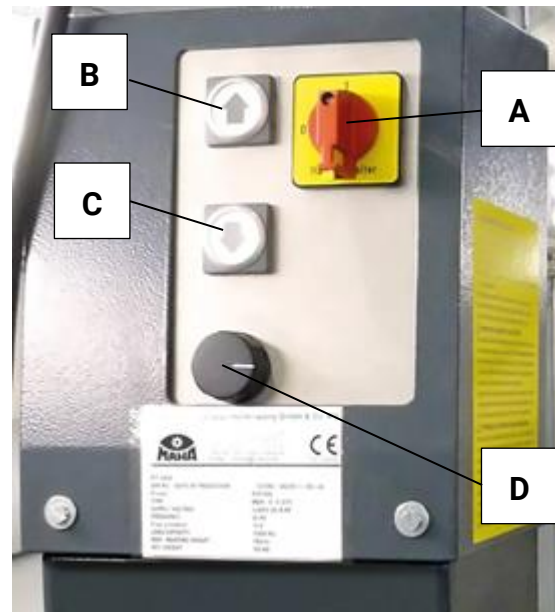
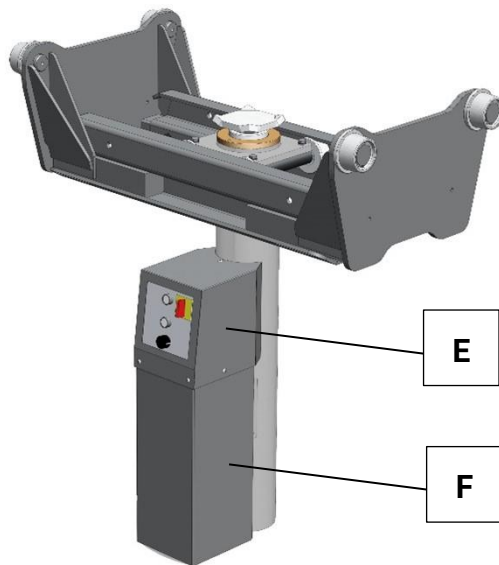
Two-stage and three-stage jacks differ only in the number of lifting pistons, but not in their operation. The following description applies to both versions.



### 10.1.3 MPJ HAE

The electro-hydraulic jack is equipped with a 5 m cable for power supply.  
To operate the jack, an appropriate shock-proof socket is required within reach of this cable.

- |          |               |          |                   |          |                |
|----------|---------------|----------|-------------------|----------|----------------|
| <b>A</b> | Main switch   | <b>B</b> | „Lift" button     | <b>C</b> | „Lower" button |
| <b>D</b> | Potentiometer | <b>E</b> | Sheet metal cover | <b>F</b> | Oil tank       |



## 10.2 General Safety Instructions for Safe Operation



### WARNING

Pit jacks and gear jacks are not suitable for supporting the load over a long period of time. Work under a lifted load may only be carried out using suitable supports.

Safety devices must not be by-passed or rendered unusable in any other way.

Riding with the load or on the load-handling attachment is prohibited

Climbing up the lifted vehicle is prohibited.

Inspection and maintenance intervals must be observed (see section "Inspection and maintenance plan").

Never use additional lifting gear for an already raised load.

Do not place any parts on the jack and the vehicle to be lifted.

Keep the lift and the working area clean. **ATTENTION: Risk of slipping on oily surfaces!**

Protect all parts of the electrical system from moisture.

Be careful when running vehicle engines. **ATTENTION: Risk of poisoning!**

During work breaks and at the end of the working day, the system must be switched off and secured against unauthorised use (e.g. by disconnecting and shutting off the compressed air supply).

If the ground is uneven in the area of the carriage, it must be secured against rolling away.

Load handling attachments must not be deliberately set in vibration.

Since the carriage is not secured against tipping on the ground, side loading is prohibited.

At the end of work, the jacks must be secured against unauthorised use by disconnecting them from the power source. To do this, disconnect the air jacks from the compressed air supply and unplug the electric jacks from the power supply.

The main switch on the electric jack must be set to "0" and additionally secured against being switched back on again, e.g. with a padlock.

---

### 10.3 Positioning



#### WARNING

Before entering the pit, the jacks must be in the lower home position to avoid damage to the jack and vehicle.

Driving in the pit only at walking speed and only if there are no persons in the pit and in the driveway.

The guide rail for jack and for carriage must be free of dirt.

Moving the jack with load may only be carried out in the retracted state. It must be ensured that the load is picked up at the centre of gravity and secured in a suitable manner on the load handling attachment (e.g. by lashing straps).

As standard, the jacks are supplied with a simple support. For loads that cannot be lifted safely with this, MAHA can supply suitable load handling attachments. When using these, the corresponding operating instructions of the accessories must be observed.

---

Move the pit jack under the load in the lowered state.

Move the load handling attachment to the vicinity of the pick-up point and wait for the overrun if necessary.

After checking that a safe pick-up of the load is possible, where available, secure the jack by the brake in the carriage.

After briefly lifting the vehicle free, check that it is securely held. If necessary, lower the vehicle and pick up again.

### 10.4 Switching on



#### WARNING

When positioning the jack at the load, please note that even when the Lift button is released, the cylinder can continue to run and extend due to the system.

---

#### MPJ 1S

The manually operated jack is always ready for use as it is independent of an external power supply.

#### MPJ 2S | MPJ 3S

The pneumatic-hydraulic jack is ready for use as soon as the compressed air supply is connected.

**The specifications regarding compressed air supply must be observed!**

#### MPJ HAE



#### WARNING

Route the cable connection to the socket in such a way that there is no risk of tripping.

---

Ensure that the connection cable is plugged in. Switch on the main switch to make the jack ready for operation. The jack is immediately ready for use.

## 10.5 Raising



### WARNING

The permissible load must not be exceeded.

Load and jack must be observed by the operator during the entire lifting and lowering process. In the event of irregularities, stop the lifting/lowering movement and support the load appropriately.

Maintain a safe distance from the vehicle and lift in all directions.

Keep the movement range of the load and lift free from obstacles. Use a guide if visibility is restricted.

Vehicle doors must be closed during lifting and lowering.

Only loads that are suitable for the load-bearing equipment due to the shape and position of the pick-up points may be lifted.

The load may only be lifted at the component's centre of gravity (axle, gearbox, engine, ...).

The vehicle must be able to roll during the lifting and lowering movement to allow the load to centre itself over the jack.

Use of the jack on a surface with a slope of more than 1° is not permitted.

If there are differences in the height of the pick-up points, height-adjustable supports must be used.

Lifting of vehicles only allowed with undamaged supports. Risk of vehicle falling and causing personal injury.

When installing and removing heavy vehicle components (engine/units), the centre of gravity position may change. In this case, suitable measures (determination of the centre of gravity, control of the pick-up point) must be taken to prevent tipping before the jack is lifted again.

The vehicle or unit must be lashed to the jack if necessary. Shifts in the centre of gravity of the vehicle through installation/removal of heavy vehicle parts may otherwise lead to the vehicle sliding off.

During the lifting and lowering process, no persons or objects may be in the safety area of the load and jack.

Carefully apply the load-handling attachment to the load and lift it free briefly.

After checking the safe pick-up again, lift the load by pressing the "Lift" button.

**The carriage must be free to move in the longitudinal direction of the vehicle to prevent the load from slipping.**

---

### 10.5.1 MPJ 1S

The manually driven jack is operated via plugged pump levers. The distinction between load and rapid stroke is made as described above.

The hydraulic-pneumatically operated jack is lifted by pressing the corresponding button for load or rapid stroke. The pushbuttons are provided with automatic reset. When the buttons are released, the stroke movement stops automatically.

An attached claw serves as a load-handling attachment. For special load application points on vehicles, other suitable mounts from our range of accessories can be fitted (support plate, transmission plate, axle traverse).

### 10.5.2 MPJ 2S | MPJ 3S



#### WARNING

Depending on the air pressure and the stroke height reached, the piston rod extends a little further after the button is released.

Danger of crushing between piston rod/load handling attachment and test vehicle.

---

In the standard version, the jacks are supplied with foot switch control. Here, the actuating elements for load and rapid stroke are located at the foot of the jack under a cover.

The rapid stroke is located on the right side of the actuation field and is marked by a double arrow. It is used to quickly reach the vicinity of the lifting point.

From there, it is possible to continue with the load stroke. This is located on the left side of the actuation field and is marked by a simple arrow.

The sensitive approach to the load lifting point can also be realised by the optional foot pump. For this purpose, the foot pedal (J) can be inserted into the foot pump (G) and secured against unintentional slipping out by means of safety pins.

If the lifter is equipped with an optional manual control, it can also be used for rapid and load lifting. The pushbuttons on the manual control for rapid and load strokes are marked with a single arrow for load strokes and a double arrow for rapid strokes, just like the foot pedals. The rapid traverse is realised here by pressurising the hydraulic oil in the tank with compressed air and passing it through a valve that allows a larger hydraulic flow rate.

A strong magnet in the head of the hand control allows it to be securely attached to flat surfaces of the jack.

The options are not mutually exclusive, so all three actuation options exist when fully equipped. It is ensured by design that none of the three drive options sets another in motion.

**The operator must ensure that only one of the three options is used at a time.**

### 10.5.3 MPJ HAE

#### NOTICE

Drive through quickly and avoid inching operation as far as possible to prevent the motor from overheating.

---

Press button **(B)** to lift.

The respective button is only active as long as it is held down (dead man's switch).

When a run command is triggered, the cylinder runs at a constant speed.

A rapid control does not exist for this jack.

## 10.6 Supporting



### WARNING

Risk of crushing due to lowering of the load onto the supports.

After lifting to working height, the load must be suitably supported.

It is essential to observe the operating instructions for the accessories.

The vehicle must be supported in such a way that shifts in the centre of gravity due to the installation or removal of components do not lead to a crash.

When positioning the load, ensure that it rests securely on the supports.

---

## 10.7 Lowering



### WARNING

Lower the load slowly and carefully to avoid crushing injuries.

Before lowering, lift the load free to remove the supports.

**The instructions and procedure for lifting (at the beginning of this chapter) must also be followed for free lifting.**

Load and lifter must be observed by the operator during the entire lifting and lowering process. In the event of irregularities, stop the lifting/lowering movement and support the load appropriately.

---

### 10.7.1 MPJ 1S



#### WARNING

When lowering, the lowering spindle must be operated slowly and carefully to avoid damage to property and personal injury due to sudden and rapid lowering movements.

---

The load is lowered in both drive variants by turning the lowering spindle counterclockwise. A spring acts as an automatic reset. This closes the lowering valve and stops the lowering movement.

When lowering without load, the lowering spindle can be turned counterclockwise as far as it will go. In the case of automatically operated jacks, this actuates the lowering valve and the piston rod is retracted by means of compressed air.

### 10.7.2 MPJ 2S | MPJ 3S



#### WARNING

When lowering, the lowering spindle must be operated slowly and carefully to avoid damage to property and personal injury due to sudden and rapid lowering movements.

---

Turning the lowering spindle counterclockwise opens the lowering valve. The load pushes the piston down. The further this valve is opened, the faster the load drops.

The lowering spindle has an automatic reset that closes the valve when released and stops the lowering process.

If the load is supported (traverse) and the spindle is unloaded, the dead weight of the piston is not sufficient for the jack to lower completely.

In this situation, if the lowering spindle is turned counterclockwise as far as it will go, the lowering valve also opens and the piston moves all the way down.

### 10.7.3 MPJ HAE



#### WARNING

Before operating the lowering button, make sure that the rotary switch for changing the lowering speed is set to "0".

---

The lowering process is initiated by pressing the corresponding pushbutton.

During the lowering process, the lowering speed can be changed via a rotary potentiometer.

**MAHA strongly recommends that the following procedure be followed when lowering to avoid damage to property and personal injury:**

Set rotary switch to "0".

Actuate lowering button.

Keep button pressed and check lowering speed via rotary potentiometer / rotary knob.

## 10.8 Moving Vehicle Units on the Jack



#### WARNING

Removed units must be secured on the load-handling attachment. If the load cannot be secured by the load-handling attachment itself, other measures must be taken (e.g. lashing straps) to prevent injuries caused by the load falling.

Move the carriage only by the handles and only with both hands!

Avoid jerky movements, also when starting up and braking the jack.

---

Secure the unit on the jack and lower it as far as possible. Use the appropriate load-handling attachment to secure the load. Then release the carriage brake and move the jack smoothly by the handles. Once the jack has reached its destination, secure it against rolling away by applying the carriage brakes.

## 10.9 Removing the Vehicle



## **WARNUNG**

Before removing the vehicle, the jacks must be in the lower home position to prevent damage to the jacks and vehicle.

Drive out the vehicle only at walking speed and only if there are no persons in the pit or on the driveway.

**ATTENTION:** Be careful when running vehicle engines. **Danger of poisoning!**

---

## 11 Troubleshooting



### WARNING

- The relevant health and safety regulations must be observed.
- Wear personal protective equipment.
- Service work may only be carried out by authorised service technicians.
- Repair, maintenance and setup work may only be carried out when the jack is at a standstill. The system must be disconnected from the power supply or the compressed air supply and secured against being switched on again.
- Maintenance and repair work may only be carried out when the lift is load-free.
- Only use original replacement parts.
- Substances that are hazardous to the environment must be disposed of appropriately.
- Do not use high-pressure or steam-pressure equipment or harsh cleaning agents to clean the pit jacks.
- The safety devices of the pit jack must be adjusted by authorised service technicians.
- The safety devices must not be replaced or overridden.

### 11.1 Manual / Pneumatic-Hydraulic Pit Jacks

Trouble	Possible cause	Remedy
Air motor runs (typical noise), but does not lift load	Lowering spindle not fully closed; spring does not close completely	Replace lowering spindle and/or spring; contact service
	Too low oil level on the jack due to transport damage or natural consumption	Refill oil
	Leaky suction valves	Contact service
Air motor runs (typical noise), but does not lift full load	Lowering spindle not fully closed; spring does not close completely	Replace lowering spindle and/or spring; contact service
	Overload valve trips; load too high	Reduce load; observe load capacity
	Leaky load valves	Contact service

<b>Trouble</b>	<b>Possible cause</b>	<b>Remedy</b>
Air motor initially runs at idle stroke (typical noise), but becomes increasingly slower under load and then stops completely	Air motor runs dry; no oil in the maintenance unit	Refill oil
	Air pressure too low; local cause	Contact service
Air motor first lifts the load a certain height and then pumps through empty	Too low oil level on the jack due to transport damage or natural consumption	Refill oil
Air motor first lifts the load a certain height and then becomes slower and slower	Air filter clogged; dirt from the piping system	Cleaning
	Air pressure too low; local cause	Contact service
	Air volume too low; local cause	Contact service
Air motor first lifts the load a certain height and then slows down to a standstill	Air pressure too low; local cause	Contact service
Air motor runs very slowly even when idling	Air filter clogged; dirt from the piping system	Cleaning
	Air motor runs dry; no oil in the maintenance unit	Refill oil
	Air pressure too low; local cause	Contact service
Air motor does not run at all	Air filter completely clogged; dirt from the piping system	Cleaning
	Air motor runs dry, stops; no oil in the maintenance unit	Refill oil
	Air motor defective	Exchange
Air-rapid control does not work	Air filter clogged; dirt from the piping system	Cleaning
	Pneumatic control line clogged or kinked	Contact service
Lifted load lowers	Lowering spindle not fully closed; spring does not close completely	Close lowering spindle; contact service
	Leaky load valves	Contact service

<b>Trouble</b>	<b>Possible cause</b>	<b>Remedy</b>
Piston rods extend slowly at first without load and suddenly become faster	Too low oil level on the jack due to transport damage or natural consumption	Refill oil
Piston rods "chatter"; inaccurate steering	Too low oil level on the jack due to transport damage or natural consumption	Refill oil
	Lack of jack venting	Contact service
Oil loss from piston rods	If within limits, there is no interference	Regularly extend to full stroke
Oil loss from valves	Too much oil from maintenance unit	Set lower
	Oil proliferation due to water from compressed air	Check maintenance unit
Oil leakage at spindle guide	Seal wear	Contact service
Oil leakage at sealing plug	Leaky sealing plugs	Contact service
Oil leakage at air motor	Too much oil from maintenance unit	Set lower
Oil leakage at the pump block	Seal wear	Contact service

## 11.2 Electro-Hydraulic Pit Jacks

Trouble	Possible cause	Remedy
Jack does not respond	No power	Check mains connection
		Check fuses in the control box
Piston rod does not extend	Pump / motor defective	Check pump for running noises
	Control defective	Check connections in the control box (pushbutton) Replace control box (customer service)
Piston rod extends only without load	Air in system	Loosen the venting screw (under the head plate) and press the open button for approx. 1 min (see section "Venting")
	Hydraulic valve / block defective (rare)	Replace hydraulic block (customer service)
Potentiometer shows no effect (check with load)	Potentiometer defective	Replace potentiometer (customer service)
	Amplifier card defective	Replace amplifier card (customer service)
	Valve / coil defective	Replace valve / coil (customer service)
Jack does not retract or retracts with great difficulty	Hydraulic valve / block defective (rare)	See above
	Mech. damage to the jack	Inspect piston rod and guide bushing for visible damage
		Loosen the bleed screw and observe whether the piston rod lowers. Try to turn the piston rod. If the piston rod lowers and can be rotated, there is no mech. Damage before
		Customer service

Trouble	Possible cause	Remedy
	Seal defective, oil leakage at guide bushing	Customer service
Piston rod does not extend completely	Too little oil	Refill oil (HLP-D-22)
	Air in system	See above

## 12 Periodic and Recurring Inspections



### WARNING

All inspections must be carried out in unloaded condition.

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Irrespective of the periodic inspections, subsequent inspections must be carried out by the operator and user at the specified intervals. Of course, the operator can entrust external experts with these inspections during the year. The same applies to the rectification of any defects identified.

### 12.1 Daily before Starting Work

To ensure the safety of the system during operation, the following visual and functional checks must be carried out daily before starting work or beginning a shift.

#### 12.1.1 Electrical Connections (Model MPJ HAE)

Cables and plugs must be checked for visible damage. If cracks on plugs or cables, bent contact pins on the plug, damaged sheathing of the cable or similar defects are visible, the affected component must be replaced immediately by a qualified electrician.

**The jack must be secured against use until the repair is completed.**

#### 12.1.2 Compressed Air Hoses

Dangerous situations can arise due to loosening hose connections or porous compressed air lines or malfunctions due to leakage in the air lines and connections. To avoid this, compressed air hoses and their connections must be checked visually and for audible leakage.

Defective components and connections must be repaired professionally without delay.

#### 12.1.3 Leakage

The jack must be checked daily for oil leakage. Check for unusual oil leakage at the piston seal. Leaking seals must be replaced immediately. If oil leaks from the screw connections on the hydraulic block, the screw connections must be retightened.

If oil leakage can still be detected, contact our customer service and secure the jack against further use.

#### 12.1.4 Function of Drain/Lock Screw

To check, open the drain screw and release it abruptly. The screw must return to the closed state automatically. The screw closes completely when it cannot be tightened any further.

**Do not apply too much force during closing to avoid damaging the valve seat.**

In this connection, check the coil spring for correct fit and damage.

## 12.2 Weekly

### 12.2.1 Piston Rod

The piston rod must be extended empty once a week (see also “Maintenance”) to bleed the jack.

In this course, the piston rod must be inspected for damage. Damaged piston rods lead to leakage at seals.

Damage to the piston rod allows cleaning agents and salt water to penetrate unhindered. Contamination in the hydraulic system leads to undetected damage inside the jack.

### 12.2.2 Load Support Pins

In the course of the inspection of the piston rod, the support of load handling attachments must also be checked.

The locating hole must be free of contamination and, like the pin on the load handling attachment, must not show any wear or deformation.

Worn or deformed locating holes and pins prevent safe working with the load handling attachment. They must be reworked or repaired before further operation of the jack.

## 12.3 Every 6 Months

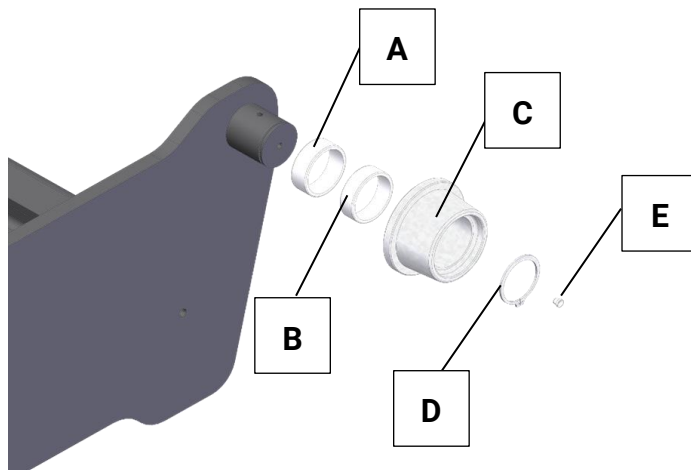
### 12.3.1 Oil Level Check

#### NOTICE

For measuring and refilling, the piston rod must be **fully retracted** and the pit jack must be disconnected from the air and power supply.

- **MPJ 1S**  
The oil level must be between the two notches when the dipstick is screwed in. If there is only one notch on the dipstick, this marks the maximum oil level, while the lower end of the dipstick marks the minimum oil level.
- **MPJ 2S | 3S**  
The oil level must cover the oil sight glass at least halfway. If no oil can be seen in the sight glass, hydraulic oil must be topped up.
- **MPJ HAE**  
The oil filler cap or dipstick is located under the sheet metal cover, in the area of the operating elements. To check the oil level, it is necessary to remove the sheet metal cover.  
The oil level must be between the two notches when the dipstick is screwed in. If there is only one notch on the dipstick, this marks the maximum oil level, while the lower end of the dipstick marks the minimum oil level.

### 12.3.2 Rollers



- A** Needle bearing
- B** Needle bearing
- C** Chassis roller
- D** Circlip
- E** Lubricating nipple, funnel inside and outside

Track rollers must receive special attention, as they must support the entire load on the one hand and ensure easy movement of the jack and the chassis on the other.

Rollers must therefore be inspected for deformation and damage to the tread (flaking, flattening, etc.) and the wheel flange (chipping, burrs, etc.). The needle bearings must also be checked for smooth running and quiet operation by turning the rollers.

Damaged rollers and needle bearings can no longer perform their task reliably and must be replaced. Rollers and needle bearings must be replaced together to avoid premature failure.

### 12.3.3 Moving Parts

All moving parts on the jack and chassis must run smoothly. This includes not only the above-mentioned rollers.

If necessary, lightly oil or grease the contact points. Dirt and corrosion can impair movement and must be removed.

### 12.3.4 Pit Jack Brake

The pit jack brake prevents unintentional movements of the jack in the chassis.

The brake must be applied for checking. The function is correct if the two flange rollers on the brake axle of the jack are pressed against the tread profile in such a way that movement is prevented without the brake lever contacting the structure.

If necessary, the brake must be readjusted as described in section “Adjusting the Pit Jack brake”.

#### **12.3.5 Prefilter**

Pneumatically operated pit jacks have a prefilter at the compressed air inlet, which is necessary to protect the control system.

To check, disassemble the compressed air coupling and the internal Allen threaded pin behind it. Now the filter can be removed and checked for dirt and damage. If necessary, clean with compressed air or replace if damaged, see spare parts list.

### **12.4 Annual Inspection**

Country-specific requirements exist for the regular inspection of lifting equipment. These generally require an inspection of the safe operating condition after 12 months at the latest.

Irrespective of these regulations, the following items must be checked at least every 12 months and corrected if necessary.

#### **12.4.1 Fittings**

All fastening screws on the jack and chassis must be checked for secure fit with a torque wrench and retightened.

The tightening torques can be found in the corresponding section in the Annex.

#### **12.4.2 Rollers on Pit Jack and Chassis**

Check the rollers on the jack and chassis as described in section “Rollers” and replace them if necessary.

## 13 Servicing

Regular maintenance ensures the function and operational safety of the lift and contributes to its value retention.

In order to ensure the safe operation and function of the lift, maintenance must be carried out at the latest after the intervals of the maintenance plan to the extent described.

Maintenance work may only be carried out by specially trained and authorised personnel. Such specialist staff include authorised, trained specialists employed by the manufacturer, the authorised dealers and the relevant service partners.

### 13.1 Safety Instructions



#### WARNING

- All maintenance work must be carried out in unloaded condition
  - Personal protective equipment, in particular safety goggles, safety shoes and gloves, must be worn.
  - Pit jack is fully retracted, freely accessible without load and cleaned
  - The pit jack must be disconnected from the compressed air supply.
- 

### 13.2 Washing / Cleaning / Oiling

Residues of underbody sealant and other impurities can destroy the seals. Regularly remove dirt from the piston rod. Also pay attention to the area of the seal.

Do not use harsh cleaners for cleaning

Do not use abrasive cleaning agents to clean the piston rod and seal.

After washing, oil all bare and all moving parts to prevent corrosion and flash rust.

### 13.3 Idle Stroke

The pit jack must be extended to full lifting height at least once a week and pumped through a few times (3-4 pump strokes) with the drain spindle closed. As a result, it is automatically vented.

### 13.4 Maintenance Unit

Once a week, the water separator of the maintenance unit must be emptied and cleaned to prevent water from entering the oil circuit.

In the course of this, the air oiler of the maintenance unit must be checked and oil topped up if necessary.

For the air lubricator we recommend hydraulic oil in the viscosity range according to ISO 3448 - ISO class VG 32.

## 1.1 Lubricating

The rollers are mounted on needle bearings on the suspended and rail-guided carriages. These must be relubricated every six months to remove any water and dirt that may have penetrated and to supply the bearings with unused lubricant.

For this purpose, grease nipples are fitted to the axles via which the bearings can be supplied with multi-purpose grease.

While turning the track roller, continue to pump grease until fresh lubricant comes out.

Wipe off escaping grease with a paper towel and dispose of both together in an environmentally friendly manner.

## 13.5 Changing Hydraulic Oil



### WARNING

- Use personal protective equipment!
- Immediately absorb dripping quantities with oil binding agent or absorbent cloth.
- Dispose of cloths contaminated with hydraulic oil in an environmentally friendly manner.

---

### NOTICE

- The pit jack must be unloaded, freely accessible and cleaned for maintenance.
- Replace the hydraulic oil depending on aging, water absorption and contamination, but after six years at the latest.
- Only use hydraulic oil of the same specification for refilling:
  - MPJ 1S, MPJ 2S, MPJ 3S ..... HLP-D 10
  - MPJ HAE ..... HLP-D 22

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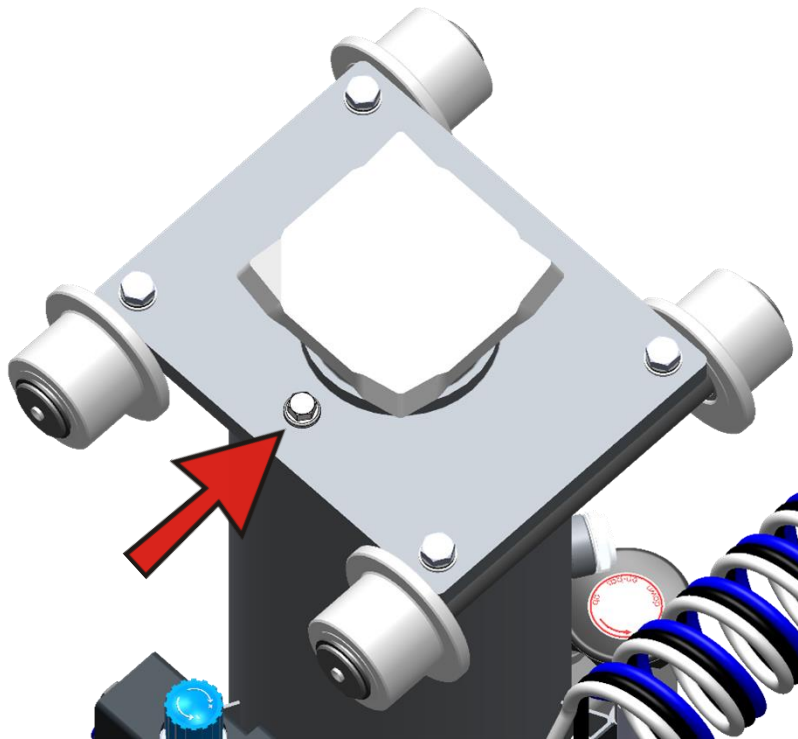
### 13.5.1 MPJ 1S

#### NOTICE

Information on the oil specification and quantity can be found in the Annex. To ensure function and reliability, the use of alternative hydraulic oil must be verified by MAHA.

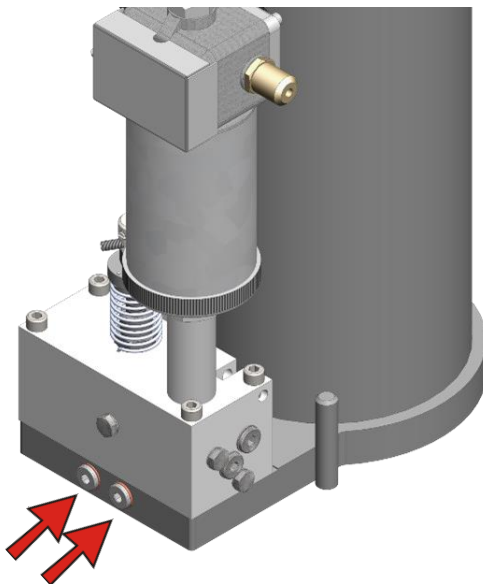
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The oil filler plug is located on the top plate, see Fig.



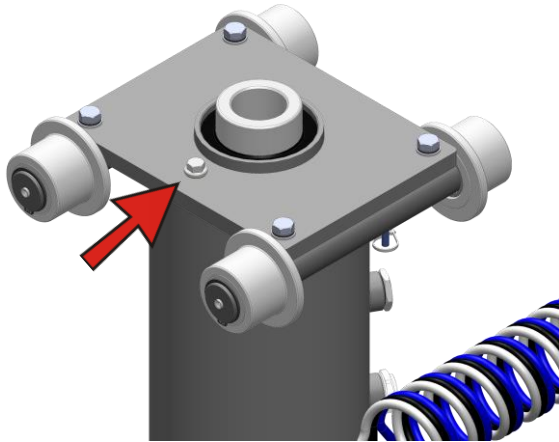
#### **Draining hydraulic oil**

- Provide an oil-tight container.
- Remove screw plugs and sealing rings (see following Fig.), and drain hydraulic oil into oil-tight container.
- Close the screw plugs using new sealing rings.



### Filling hydraulic oil

Fill in the required quantity of hydraulic oil via the oil filler plug (see Fig.). Close the oil filler plug with a new sealing ring.

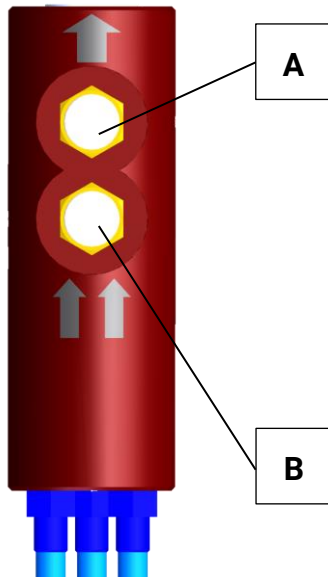


### Bleeding the hydraulic system

The oil level must be checked and hydraulic oil topped up if necessary. The target level of the hydraulic oil is between the two notches of the dipstick when retracted. If there is only one notch on the dipstick, this marks the maximum oil level, while the lower end of the dipstick marks the minimum oil level.

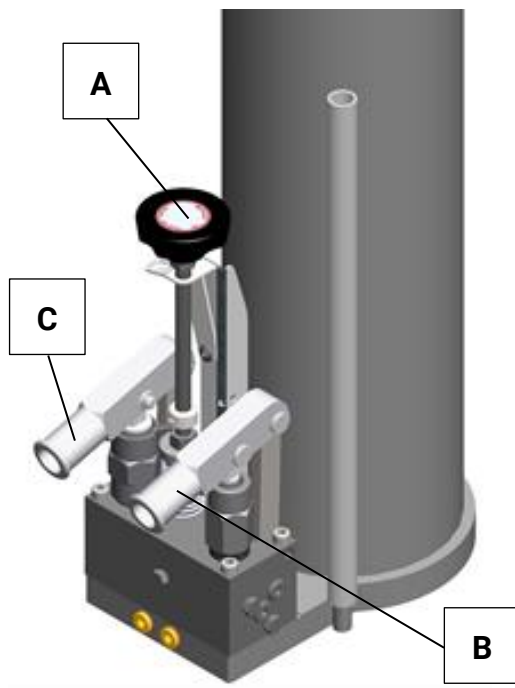
### Bleeding by remote control

- 1 Use the rapid stroke (B) (remote control) to control the jack until it has moved approx. 100...200 mm.
- 2 Immediately afterwards, actuate the load stroke (A) and also perform the stroke movement approx. 100...200 mm with the remote control without pause.
- 3 Now actuate the rapid stroke (B) again and move the jack to the mechanical stop. Jack is now fully extended.
- 4 Actuate the load stroke (A) at the mechanical stop and wait for approx. 10...20 pump pulses of the pneumatic air motor. (Air which is located under the piston rod in this case is removed via a hydraulic valve).
- 5 Lower the jack to the starting position.
- 6 Repeat the procedure until the piston rod moves smoothly.



### **Venting by means of hand pumps**

- 1 Pump up the jack using the rapid stroke (C) until the jack has moved approx. 100...200 mm.
- 2 Immediately afterwards, pump up the load stroke (B) and also perform the stroke movement for approx. 100...200 mm without pausing.
- 3 Now actuate the rapid stroke (C) pump again and move the jack to the mechanical stop. Jack is now fully extended
- 4 Actuate the load stroke (B) pump at the mechanical stop and perform approx. 10...20 pumping strokes.
- 5 Switch to rapid stroke (C) pump and perform approx. 10...20 pumping strokes.
- 6 Lower the jack to the home position using the drain plug (A).
- 7 Repeat the procedure until the piston rod moves smoothly.



### 13.5.2 MPJ 2S | MPJ 3S

#### NOTICE

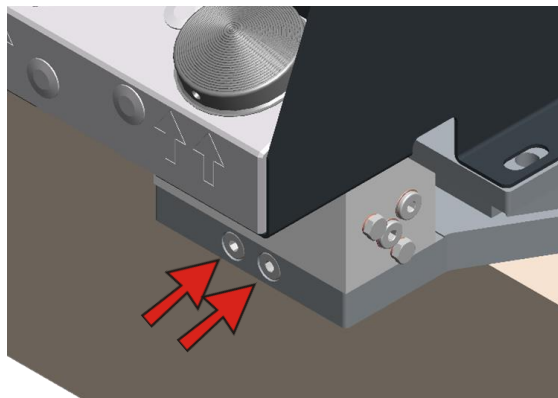
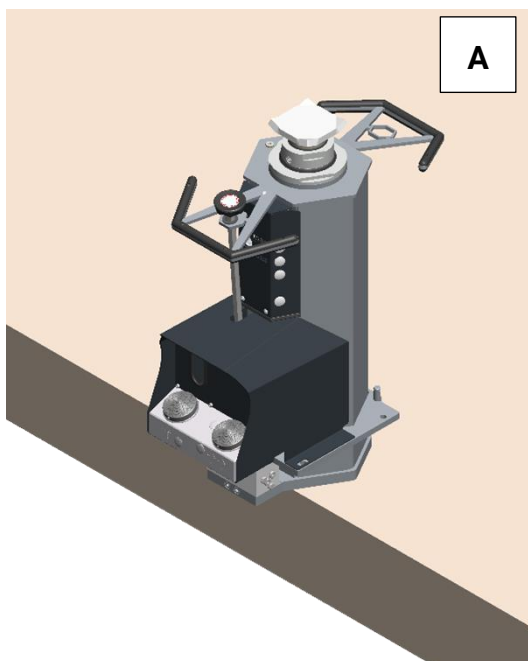
Information on the oil specification and quantity can be found in the Annex. To ensure function and reliability, the use of alternative hydraulic oil must be verified by MAHA.

#### Tools required

- Collection container for waste oil 40 L
- Transparent collection container 5 L
- Allen keys A/F 5, A/F 6
- Bleeding block, see section “Bleeding hydraulic system MPJ 2S | MPJ 3S”

#### Draining hydraulic oil

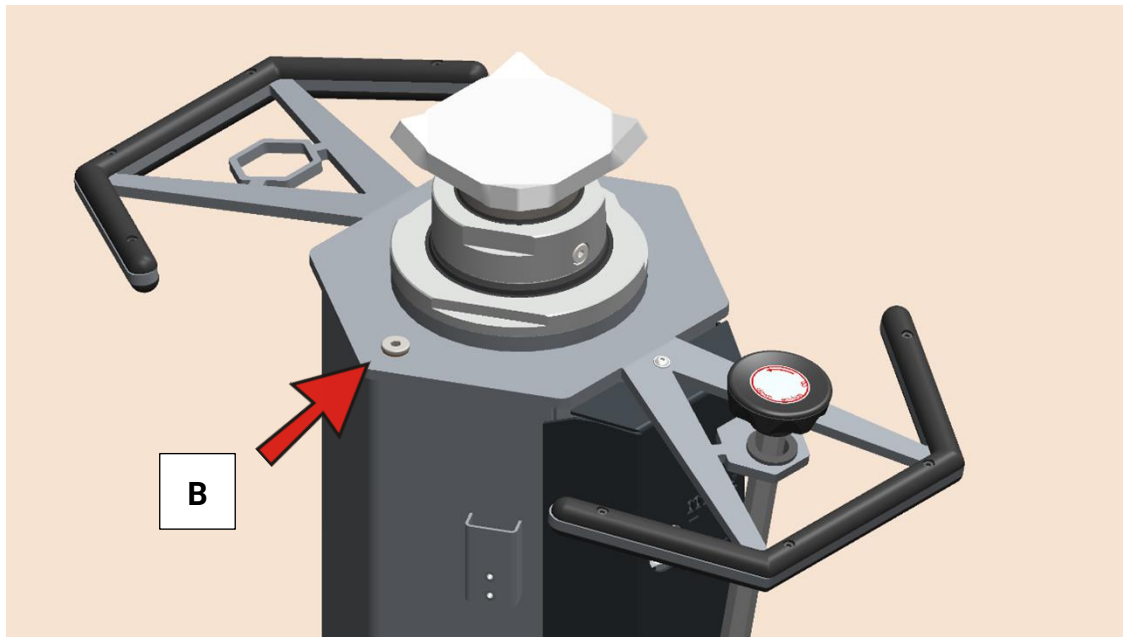
- Immediately absorb dripping quantities with absorbent rag.
- Bind larger quantities with oil binding agent.
- Dispose of rags or saturated binder properly.
- Lift the jack out of the chassis and place it safely on elevated level ground. Disassembly in reverse order as described in the chapter Installation.
- Place collection container underneath.
- Remove screw plugs and sealing rings and drain hydraulic oil (A).
- Seal the screw plugs with new sealing rings.



## Filling hydraulic oil

### Step 1:

- 1 Remove screw plug M14x1.5 (B).
- 2 Fill in the following partial quantities (for oil quantities see also Annex):  
**2S**..... 11.5 L  
**3S**..... 18.5 L
- 3 Close the oil filler opening with the screw plug.



### Step 2:

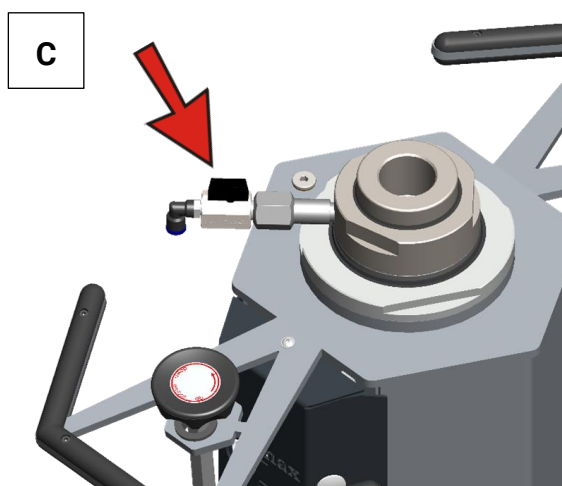
- 1 Place a cloth around the piston rods below the bleeder screw.
- 2 Remove the screw plug incl. USIT sealing ring.
- 3 Immediately afterwards, screw in the bleeder valve and tighten it by hand. Make sure that the bleeder valve is closed. (A small amount of hydraulic oil may escape during this process.)
- 4 Connect the pit jack to the compressed air supply.
- 5 Actuate the **rapid stroke** and extend it to the end stop. Wait approx. 10 seconds until no more escaping air can be heard.
- 6 Disconnect the pit jack from the compressed air supply.
- 7 Remove the filler plug, top up with the second partial quantity of hydraulic oil and screw the filler plug back in as described above.  
**2S**..... 8.5 L  
**3S**..... 21.5 L
- 8 Connect the bleeder valve (C) with a pneumatic hose, outer diameter 8 mm (calibrated). The recommended hose length is 1.25 m. The open end of the hose must be fed into the transparent collection container.
- 9 The bleeder valve (C) can now be unlocked and the hydraulic system can be flushed using the **load stroke**. **Load stroke** must be actuated continuously.



## CAUTION

Under no circumstances should the rapid stroke be actuated, as this would cause air to enter the hydraulic lifting system.

- 10 For pit jack **2S**, 4.2 liters and for pit jack **3S**, 12 liters must be discharged while actuating the load stroke.
- 11 As soon as the specified quantity has been removed, the bleeder valve is closed first and the operation of the load stroke is terminated immediately afterwards.
- 12 Retract the jack completely. Make sure that the oil sight glass is half covered when the jack is retracted. Top up oil if necessary. (The pit jacks have an oil reserve of at least 10% of the operating volume, see DIN EN 1494:2009 5.5.3.6).
- 13 Remove the hose from the bleeder valve (C) and allow the residual oil in the hose to run into a container.
- 14 Place a cloth underneath the screwed-in bleeder valve (C).
- 15 Remove the vent valve (C) and screw in the screw plug immediately afterwards. Minimum installation torque of the screw plug is 7.1 Nm.

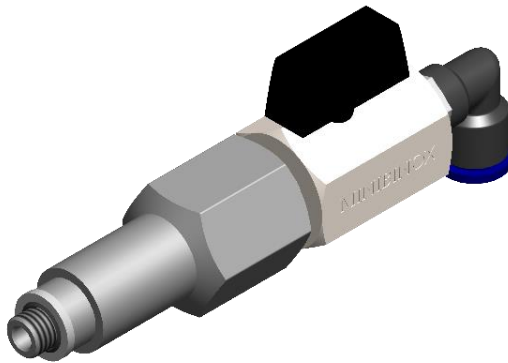


## Bleeding the hydraulic system

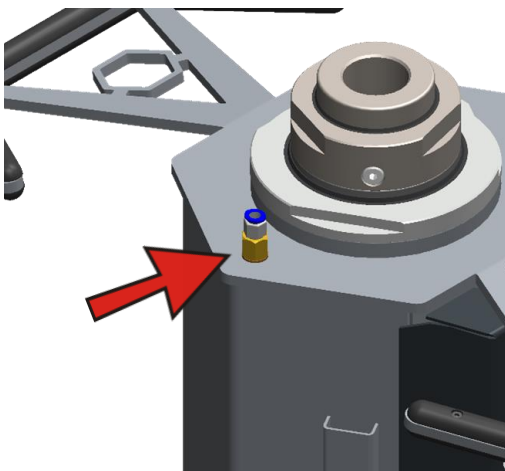
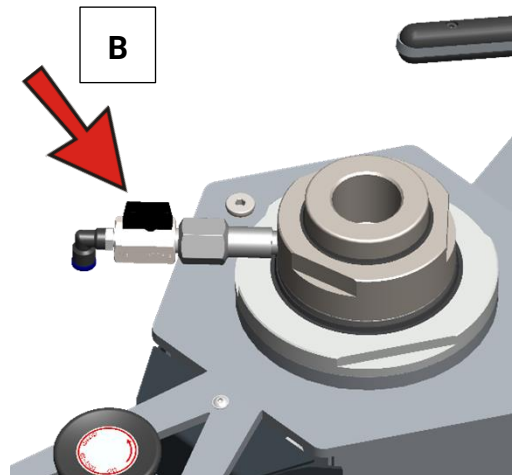
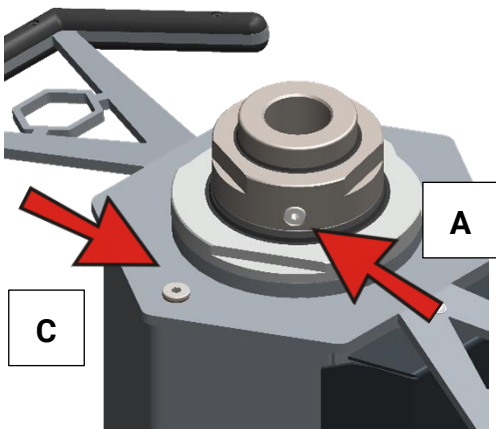


### WARNING

- Use personal protective equipment!
  - Pit jack is unloaded, freely accessible and cleaned!
  - The pit jack is fully retracted and load-free!
  - The pit jack must be disconnected from the compressed air supply.
- 



Bleeder block



- 1 Check the oil level and top up with hydraulic oil if necessary. The target fill level of the hydraulic oil is in the center of the oil sight glass when retracted.

- 2 Check the condition of the hydraulic oil via the oil sight glass and replace if necessary (see section "Changing the hydraulic oil").
- 3 Place a cloth around the piston rods below the G1/8" screw plug. The screw plug including the USIT sealing ring can then be removed (A). Immediately afterwards, screw in the bleeder valve (B) and tighten it hand-tight. Make sure that the bleeder valve is closed. A small amount of hydraulic oil may escape during this process.
- 4 Remove the screw plug of the oil filler neck (C).
- 5 Then screw in the threaded sleeve (M14 x 1.5a x G 1/4i) and a straight plug connection (R 1/4 x Ø 8 mm). Tighten hand-tight with socket wrench attachment A/F 14 (D).
- 6 The bleeder valve must now be connected using a pneumatic hose with an outer diameter of 8 mm (calibrated). The recommended hose length is 1.25 m. A transparent hose must be used to assess the hydraulic oil.
- 7 Check again that the bleeder valve is closed.
- 8 Connect the pit jack to the compressed air network. Actuate the rapid stroke and extend to the end stop. Wait approx. 10 seconds until the pneumatic overpressure has been released (acoustic test).
- 9 The bleeder valve can now be unlocked, and the hydraulic system can be bled and flushed using the load stroke. Load stroke must be actuated continuously.



#### CAUTION

Under no circumstances should the rapid stroke be actuated, as this would cause air to enter the hydraulic lifting system.

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- 10 Bleed the air until no air bubbles can be seen in the hydraulic oil (transparent hose). The hydraulic oil should run back into the tank clear and without air bubbles. The recommended bleeding time is at least 1 minute.
- 11 If the hydraulic oil is now free of air bubbles, the bleeder valve is closed first and then the load stroke is stopped immediately.
- 12 Fully retract the pit jack and then extend it again. Repeat the bleeding process.
- 13 Fully retract the pit jack.
- 14 Remove the hose from the bleeder valve and allow any residual oil in the hose to run back. Remove the straight screw-in fitting and screw in the screw plug.
- 15 Place a cloth underneath the screwed-in bleeder valve.
- 16 Remove the bleeder valve and screw in the screw plug immediately afterwards. Minimum installation torque of the screw plug is 7.1 Nm.

### 13.5.3 MPJ HAE

#### NOTICE

Information on the oil specification and quantity can be found in the Annex.

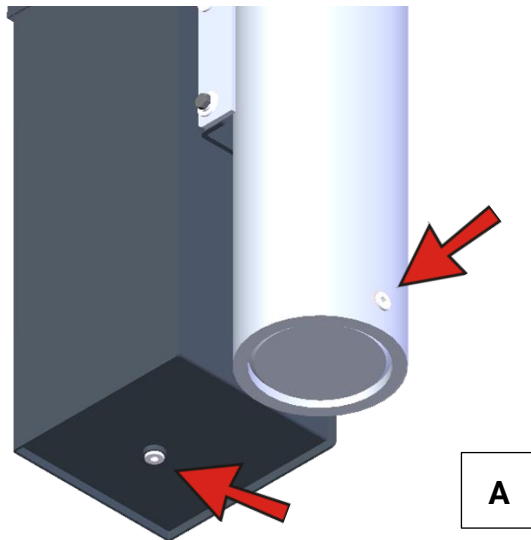
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To ensure function and reliability, the use of alternative hydraulic oil must be verified by MAHA.

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### Draining hydraulic oil

- The pit jack must be disconnected from the power supply.
- Provide a 20 L collection container for waste oil.
- Open the oil drain plugs and drain the waste oil into the collection container (A).
- Close the oil drain plugs with new seals.



### Filling hydraulic oil

- 1 Remove the sheet metal cover (B) and open the oil filler cap underneath.
- 2 Fill the first part of 10 liters of hydraulic oil and move the jack to 2/3 of the lifting height.
- 3 Then fill in another 5 liters of hydraulic oil.
- 4 Close the oil cover and install the sheet metal cover.

### Bleeding the hydraulic system

- 1 Move the jack to the end stop and now carefully open the screw (C) while actuating the stroke command.
- 2 The screw (C) must be opened gradually and in quarter turns at the most until it can be heard that air / air-oil is escaping.
- 3 Any air present is fed back into the tank via the line (blue). Close screw (C) again and release lift button.  
**Important:** While the screw (C) is open, the stroke key must be pressed continuously.
- 4 Retract the jack completely and then extend it again. If the piston rod moves smoothly, the bleeding is complete.
- 5 A slight jerking (in the millimeter range) of the piston rod can be quite normal; this may occur during a seal set change and normalizes within a few operating hours.
- 6 If the piston rod still does not move smoothly, the bleeding process must be repeated until a smooth movement is achieved.



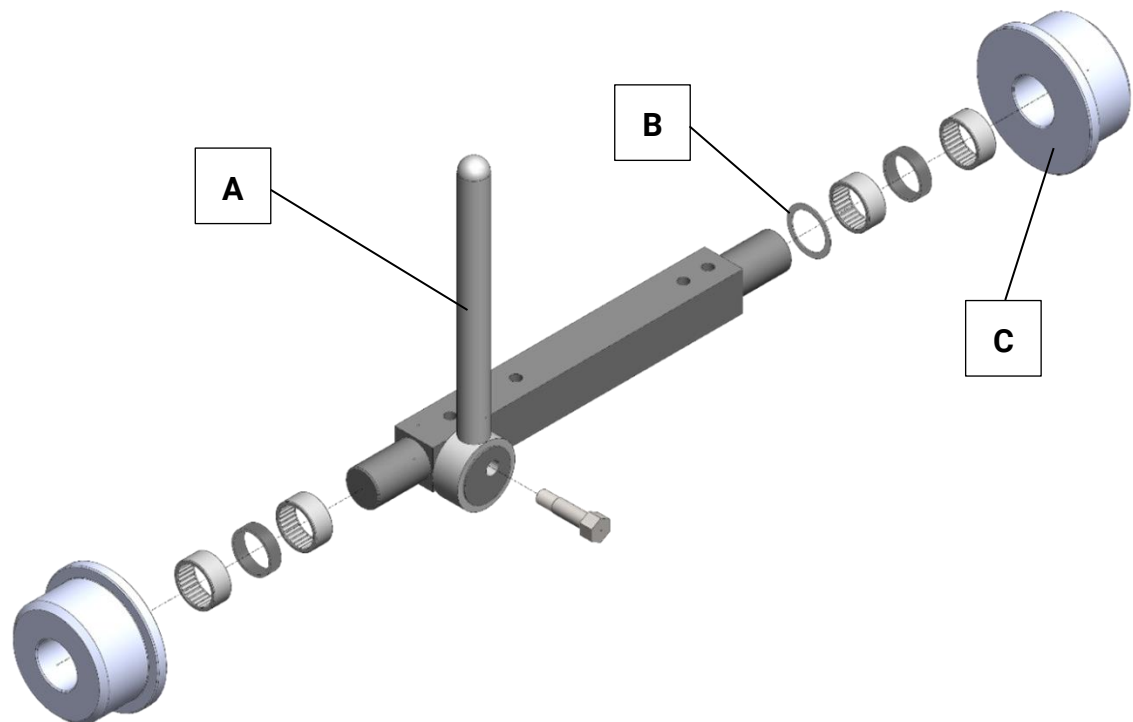
### CAUTION

The bleeding process will cause the hydraulic oil to heat up. The surface temperature of the oil tank should not exceed 55°C in this case. Allow hydraulic oil to cool and continue bleeding process at a later time.

Observe the tightening torque of the screw (C) of 85 Nm!

---

## 13.6 Setting the Pit Jack Brake



**A** Pit jack brake

**B** Shim

**C** Pit jack roller

The brake is used to fix the pit jack in the chassis.

The brake lever moves an eccentric. This in turn presses on the back of one of the four rollers. This causes the two rollers of this jack axle to spread into the chassis, thus braking the rollers of a jack axle and preventing the movement of the jack in the chassis.

The effectiveness of the pit jack brake is based on the limited displacement path and the defined clearance between the pit jack rollers and the guide of these in the chassis.

The clearance of the pit jack rollers in the chassis must be set to min. 1 mm and max. 2 mm.

**The shims may only be added (in the picture on the right) on the opposite side of the pit jack brake.**

On the second, unbraked, jack axle, the same number and thickness of shims must be placed underneath on the same side in each case to prevent skewing and jamming of the jack in the chassis.

Shim washers may already be present in the as-delivered condition in order to ensure the effectiveness of the brake despite production-related tolerances.

Due to overstressing by the lever or wear on the eccentric, it may be necessary to restore the functional clearance by means of additional washers.

## 14 Repairs



### WARNING

Service and repair work on the lift may only be carried out by authorised and trained specialist personnel!

The lifting system and its components were extensively tested during development and before marketing. Original spare parts correspond in quality and condition to those of a new lifting system. To ensure the operational safety and the longevity of your system, we recommend the exclusive use of original spare parts.

After repair or replacement of load-bearing parts, we recommend performing a function test with load to check correct assembly, the free movement of all parts and possibly the settling behavior.

For these tests, we recommend using a typical vehicle to be lifted, with a dead weight of approximately 75% of the rated load.

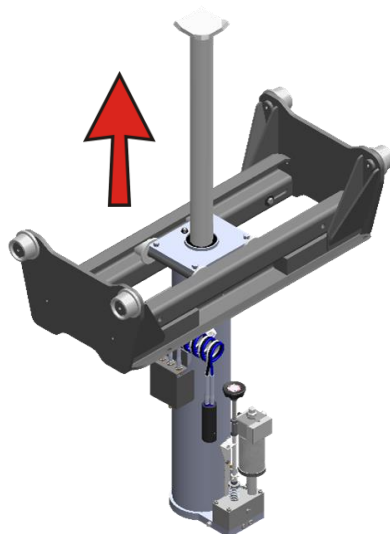
**The nominal load specified on the type plate must not be exceeded under any circumstances!**

Overload tests to verify the strength of the load-bearing parts were carried out as part of the conformity assessment procedure. The load-bearing capacity of the system and the relevant components was verified up to 1.5 times the nominal load.

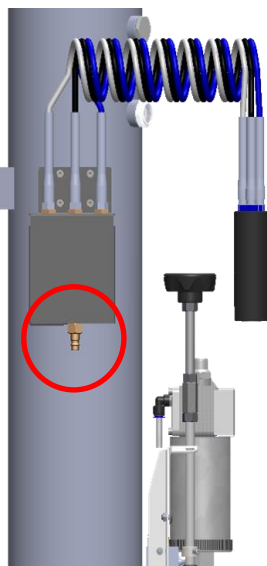
**Exceeding the nominal load can lead to pre-damage of components and thus to increased wear and premature failure.**

### 14.1 Replacing the Seal Kit MPJ 1S

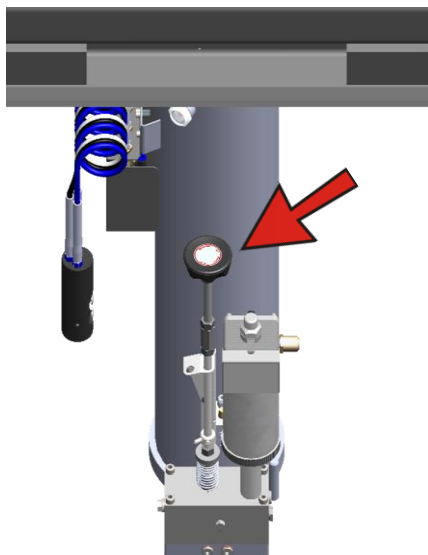
- 1 Personal protective equipment must be worn.
- 2 Pit jack is unloaded, freely accessible and cleaned.
- 3 Fully extend the jack without load.



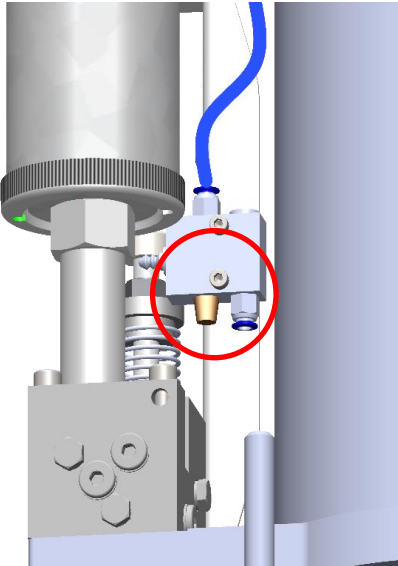
- 4 Disconnect the pit jack from the compressed air supply.



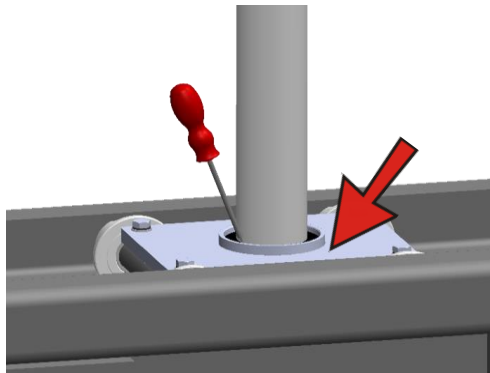
- 5 Open the drain spindle slightly until the piston rod can be turned by hand (the piston rod may drop slightly).



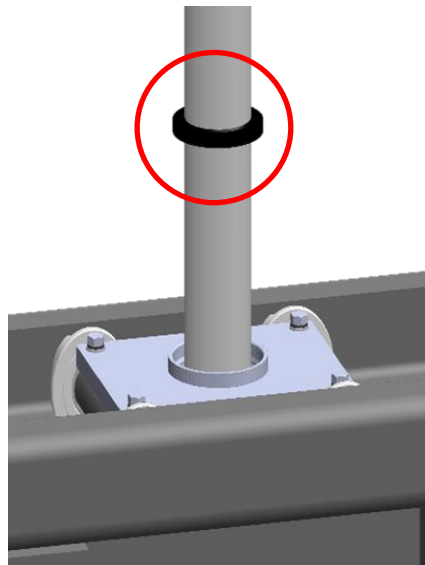
- 6 Disconnect the pneumatic control line from the valve (valve is located behind the drain spindle and the air motor).



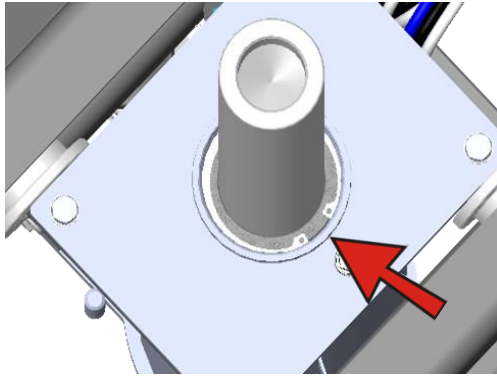
- 7 Place an oil-tight container under the hose.
- 8 Remove the scraper using a slotted screwdriver. Scraper is destroyed in the process.



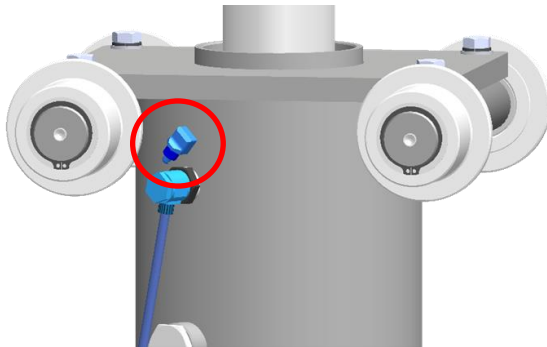
- 9 Push the scraper upwards.



- 10 The retaining ring can then be removed with pliers.



- 11 Remove the pneumatic control line on the pit jack, which is located directly below the head plate.

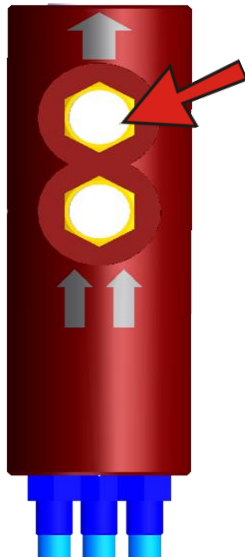


- 12 Connect the jack to the compressed air supply and actuate the load stroke.

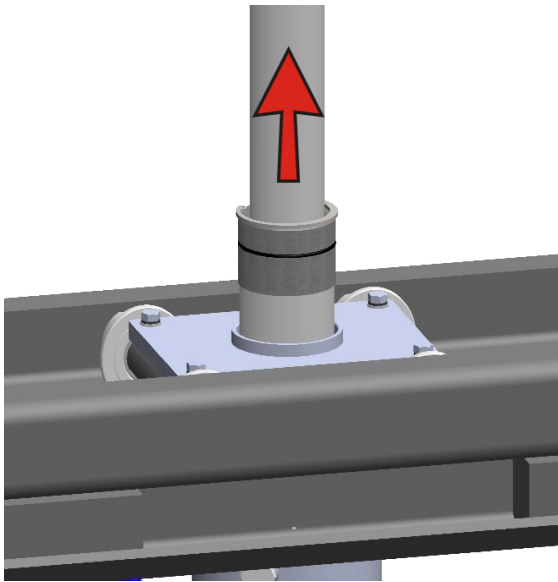


### **WARNING**

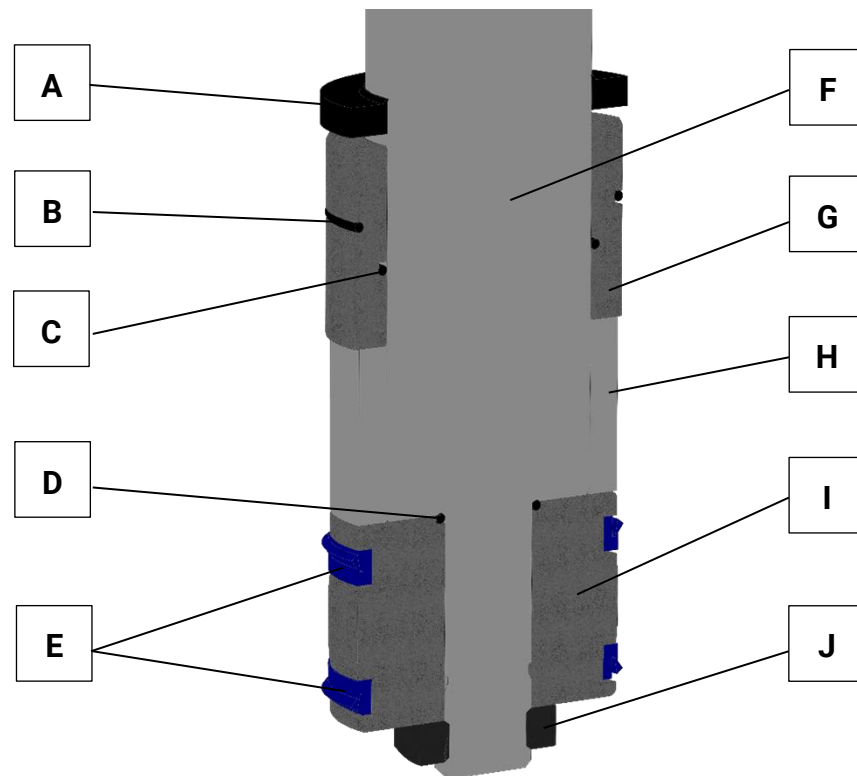
Danger due to incorrect operation!



- 13 Extend the piston rod using the load stroke, as shown in the following Fig. Hold the piston rod firmly. Another person must be consulted for support. Pull out the piston rod with a gentle stirring motion. After dismantling the piston rod, the pit jack must be disconnected from the compressed air supply again.



14 The seal kit must be replaced as originally installed. The structure of the sealing package with full equipment is shown here as an example.

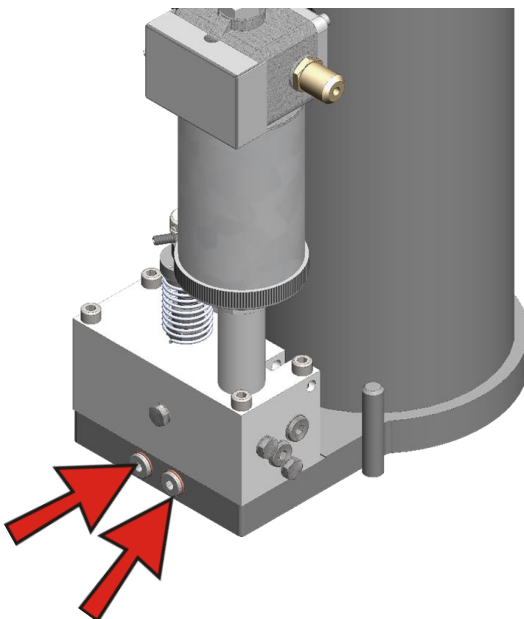


<b>A</b>	Scraper NDA.07009510	<b>F</b>	Piston rod
<b>B</b>	O-ring NDO.08603	<b>G</b>	Guide bushing
<b>C</b>	O-ring NDO.07003	<b>H</b>	Spacer bushing
<b>D</b>	O-ring NDO.03003	<b>I</b>	Piston
<b>E</b>	Slotted rings NDN.08009010	<b>J</b>	Hex nut A/F 46

- 15 To replace the seal kit, the hex nut A/F 46 must be removed (remove or install using an impact wrench). The piston, the spacer bushing and the guide bushing can then be removed. Make sure that the components are dismantled downwards.
- 16 If components (piston, piston rod, ...) need to be replaced, this can be done now. Before the new seals are fitted, all components must be cleaned and checked for damage.
- 17 Only fit all seals using suitable tools (without sharp edges!).
- 18 Push all components (guide bushing, spacer bushing, piston) onto the piston rod from below and secure with hex nut A/F 46.
- 19 Operate the drain spindle and allow the oil to run back into the pit jack.



- 20 Then check the hydraulic oil by opening the two screw plugs and collecting the hydraulic oil in a white container. Check the hydraulic oil for discoloration, dirt particles, foaming and water content.



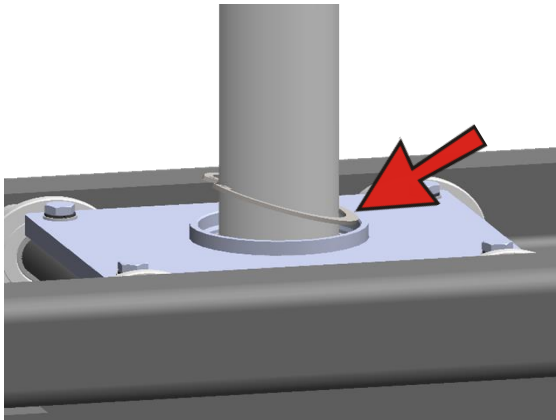
- 21 Clean the cylinder tube of the pit jack with clean cloths, then screw in the screw plugs with new seals.

- 22 The piston rod with the hydraulic components can then be carefully reinserted into the pit jack. Make sure that the piston rod is inserted vertically into the jack.



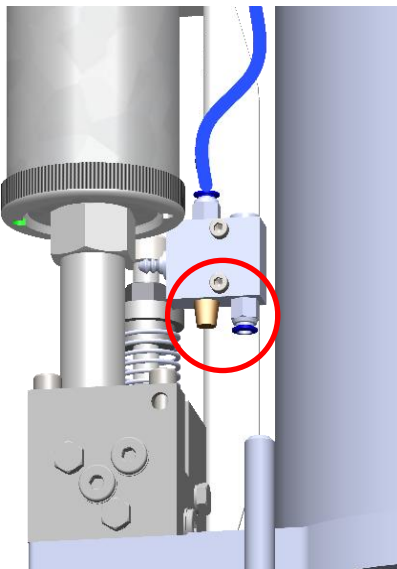
- 23 As soon as the seals in the cylinder tube are tight, the drain spindle of the pit jack must be actuated so that the piston rod in the pit jack can be lowered. Lower the piston rod to approx. half the lifting height.

- 24 Then refit the circlip.

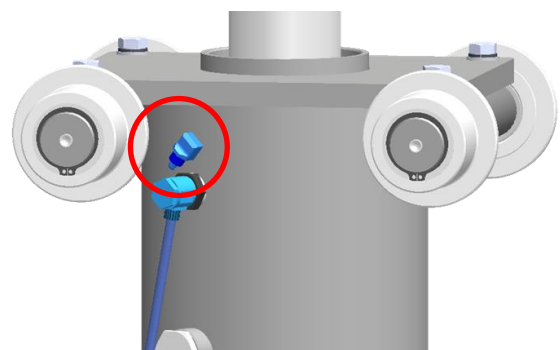


- 25 The scraper can then be refitted.

- 26 Refit all pneumatic control lines that were previously removed.



26

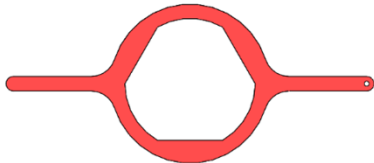


- 27 Bleed the pit jack, see section "Bleeding the hydraulic system".

## 14.2 Replacing the Seal Kit MPJ 2S | 3S

### 14.2.1 Tools Required

Special tools (see table) are required for disassembly of the MPJ 2S and MPJ 3S pit jack.



Mounting wrench for guide bushing level 3  
Material number: 1283817



Mounting wrench for guide bushing stage 2  
Material number: 1283278



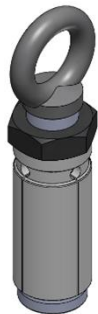
Mounting wrench for guide bushing stage 1  
Material number: 1283279



Threaded mandrel for telescopic stage 2  
Material number: 1281312



Threaded mandrel for telescopic stage 3  
Material number: 1281309



Mounting aid:  
Clamping mandrel for piston rod  
Material number: 1280356



Mounting aid:  
Cone for telescopic pit jack  
Material number: 1413766



Mounting aid:  
Sleeve 1 for telescopic pit jack  
Material number: 1413767



Mounting aid:  
Sleeve 2 for telescopic pit jack  
Material number: 1413768



Mounting aid:  
Calibration sleeve for telescopic pit jack  
Material number: 1413769

- Hexagon wrench A/F 3, A/F 5, A/F 6, A/F 8
- Open-end wrench A/F 17, A/F 27, A/F 46
- Soft-face hammer, steel tube Ø15-25, approx. 500 mm long
- Screwdriver
- Circlip pliers, angled

### 14.2.2 Overview of Components for Seal Kit

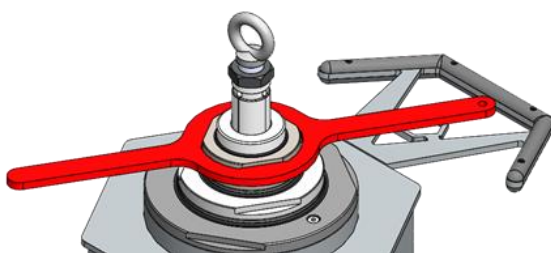
Telescopic stage	Description	Dimensions
Stage 1 for 2S/3S	Scraper	80x88x7
	Rod seal	80x90x11
	Guide band	80x85x25
	O-ring	Ø100x2
Stage 2 for 2S/3S	Scraper	115x127x10
	Rod seal	115x125x13
	Guide band	115x120x25
	O-ring	Ø150x3
	Guide band	140x135x25
	Piston seal	140x119x8,1
	O- ring	Ø116,84x6,99
Stage 3 for 3S	Scraper	170x182x10
	Rod seal	170x190x16
	Guide band	170x175x25
	O- ring	Ø230x3
	Guide band	220x215x25
	Piston seal	220x199x8,1
	O- ring	Ø196,22x6,99

Drain the hydraulic oil (see sections "Replacing the hydraulic oil" to "Replacing the hydraulic unit").

### 14.2.3 Work Sequence for Seal Kit Replacement MPJ 2S | 3S

#### Work steps Stage 1

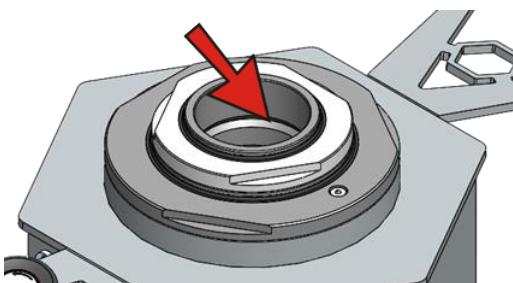
- 1 Fit the installation wrench and the mandrel for the piston rod.



- 2 Using a lifting device, pull the piston rod upwards at the eyebolt with a slight pull (approx. 20 mm). Lifting the jack off the ground should be avoided.
- 3 Then remove the upper screw plug.



- 4 Pull the piston rod upwards a further 200 mm. The guide bush can then be unscrewed using the installation wrench. Loosen the guide bush by tapping lightly (with a rubber hammer) on the installation wrench.
- 5 Completely pull out the piston rod including piston and guide bush and carefully place on a clean surface. Siphon the hydraulic oil out of the opening.



- 6 The guide bush can be pulled off upwards.

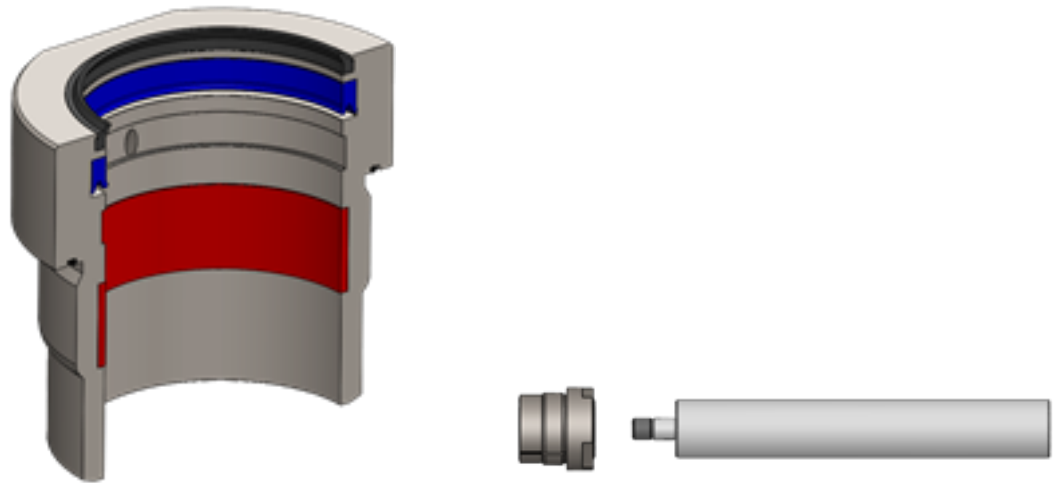


- 7 Loosen the piston using an impact wrench, nut A/F 46 and cylinder head screws with A/F 10.



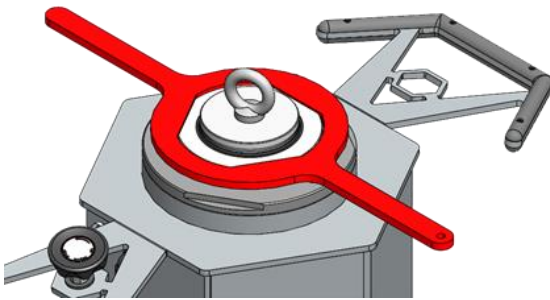
- 8 Fit a new set of seals to the cleaned guide bush. To keep the O-ring in position, we recommend applying multi-purpose grease to the groove for the O-ring. Generously coat the area inside the guide bush with hydraulic oil and

push it onto the piston rod from below. Then refit the piston including the four cylinder screws (minimum installation torque 108 Nm) and M30x1.5 nut using an impact wrench.

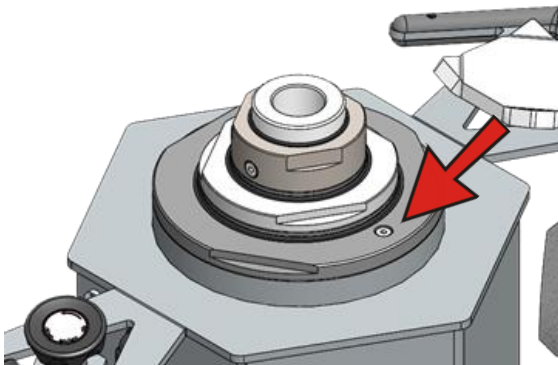


### Work steps Stage 2

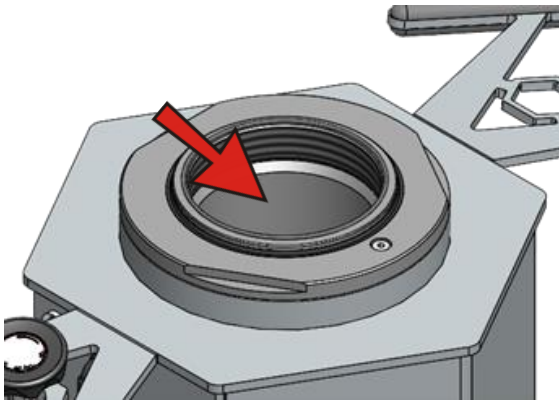
- 1 Fit the installation wrench and screw in the threaded mandrel.



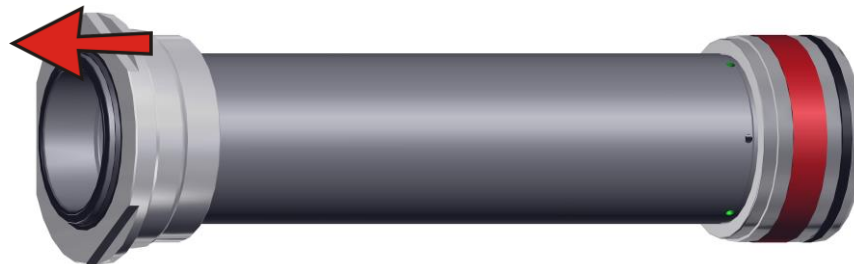
- 2 Using a lifting device, pull the cylinder tube upwards at the eyebolt with a slight pull (approx. 10 mm). Lifting the jack off the ground should be avoided.
- 3 Then remove the screw plug in the lower guide bush. Only with MPJ 16.5/1200 3S!



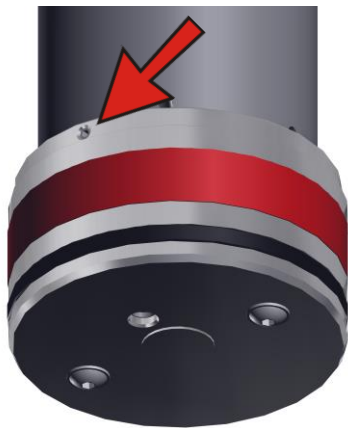
- 4 Pull the piston rod up a further 200 mm. The guide bush can then be unscrewed using the installation wrench. Loosen the guide bush by tapping lightly (with a rubber hammer) on the installation wrench.
- 5 Completely pull out the piston rod including piston and guide bush and carefully place on a clean surface. Siphon the hydraulic oil out of the opening.



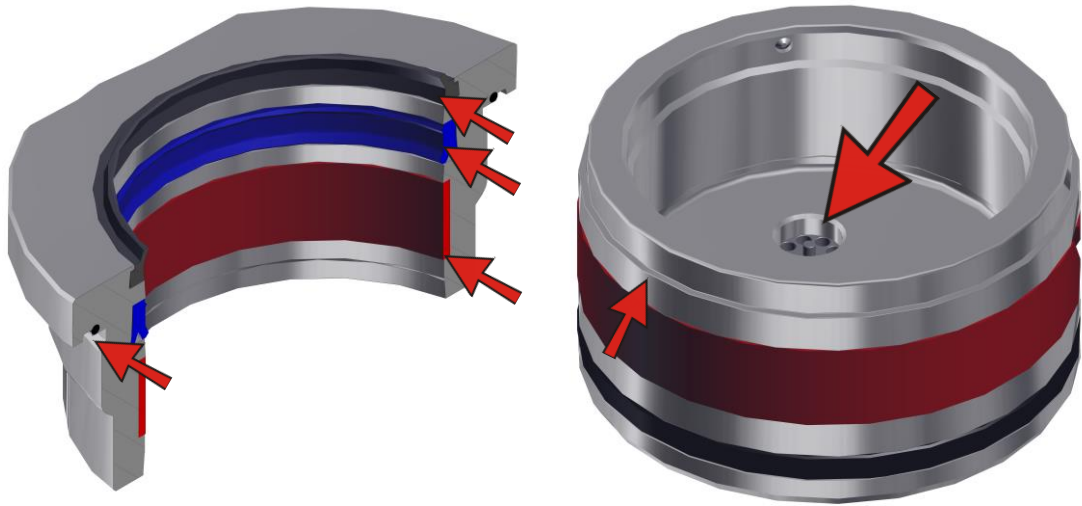
- 6 The guide bush can be pulled off upwards after the threaded mandrel has been removed.



- 7 To remove the piston, first remove the threaded pin. The piston can then be unscrewed. If this does not come loose, there are two M8 threads in the piston crown for attaching a dismantling aid.



- 8 Fit a new set of seals to the cleaned guide bush and piston. To keep the O-ring in position, we recommend applying multi-purpose grease to the groove for the O-ring. Fit the piston seal (140x119x8.1) using the suitable mounting aids. First insert the O-ring (116.84x6.99) into the seal seat. Place the cone against the bevel of the piston. Evenly expand the piston seal on the cone using the sleeves and fit it into the seal seat on top of the O-ring. Then use the calibration sleeve to check for correct shape and position of the piston seal. To ease the installation, we recommend to heat the piston seal to approx. 80 °C before this work step.



### NOTICE

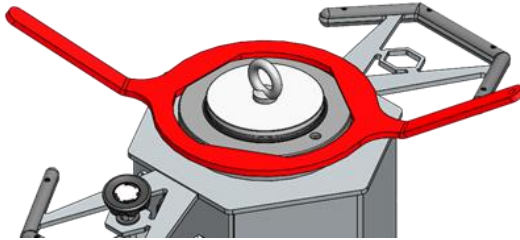
In the illustration on the right, a non-return valve can be seen inside the piston, see large arrow. Check for damage and contamination.

- 9 Generously coat the area inside the guide bush with hydraulic oil and push the guide bush onto the cylinder rod from below. Then tighten the piston hand-tight and secure with a threaded pin. If present, ensure that the two M8 flat head screws are screwed back into the cylinder base (only required for MPJ 16.5/1200 3S).

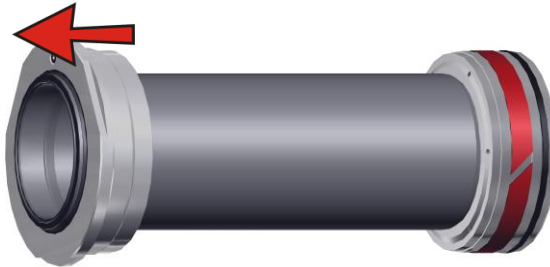


### Work steps Stage 3

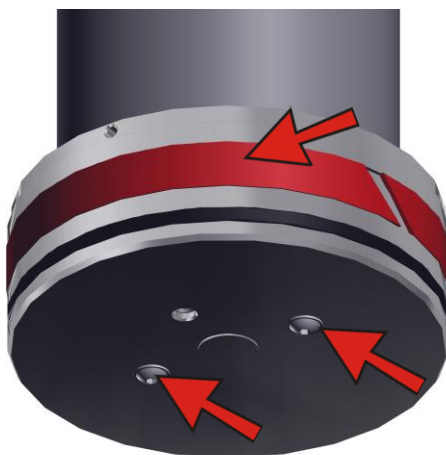
- 1 Fit the installation wrench and screw in the threaded mandrel.



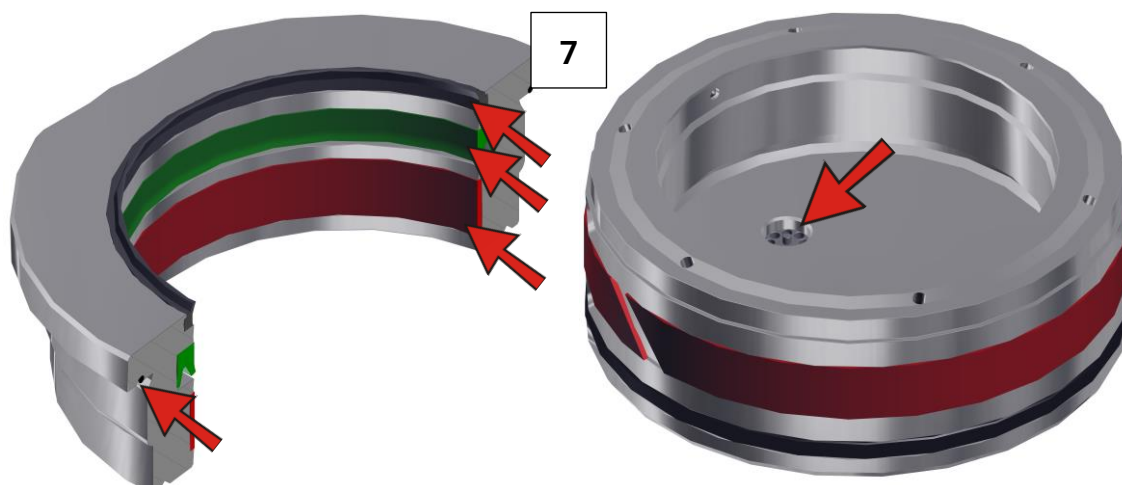
- 2 Using a lifting device, pull the cylinder tube upwards at the eyebolt with a slight pull (approx. 200 mm). Lifting the jack off the ground should be avoided.
- 3 The guide bush can then be unscrewed using the installation wrench. Loosen the guide bush by tapping lightly (with a rubber hammer) on the installation wrench.
- 4 Completely pull out the piston rod including piston and guide bush and carefully place on a clean surface.
- 5 The guide bush can be pulled off upwards after the threaded mandrel has been removed.



- 6 To remove the piston, first remove the threaded pin. The piston can then be unscrewed. If this does not come loose, there are two M8 threads in the piston crown for attaching a dismantling aid.



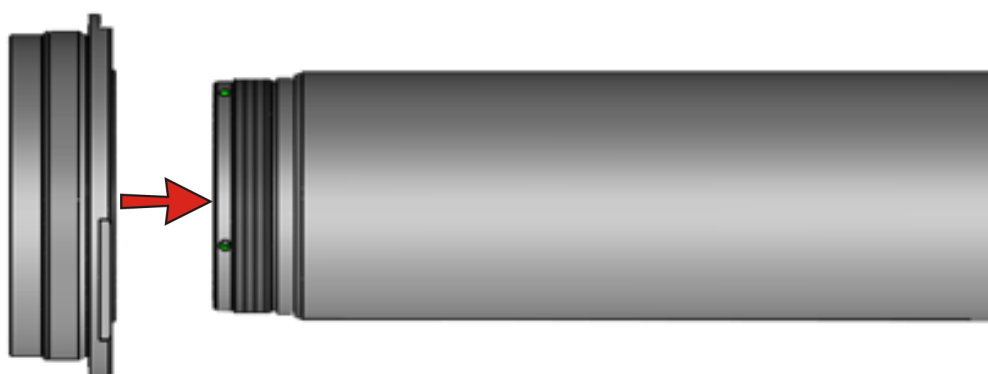
- 7 Fit a new set of seals to the cleaned guide bush and piston. To keep the O-ring in position, we recommend applying multi-purpose grease to the groove for the O-ring.



### NOTICE

In the illustration on the right, a non-return valve can be seen inside the piston, see large arrow. Check for damage and contamination.

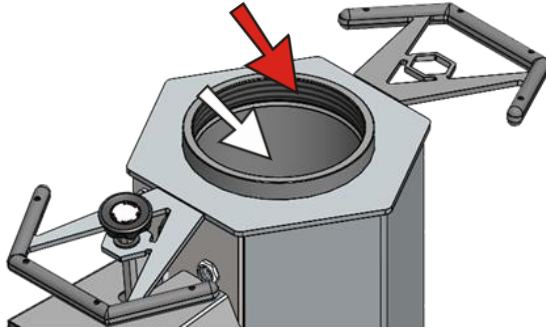
- 8 Generously coat the area inside the guide bush with hydraulic oil and push the guide bush onto the cylinder rod from below. Then tighten the piston hand-tight and secure with a threaded pin. If present, ensure that the two M8 flat head screws are screwed back into the cylinder base (only required for MPJ 16.5/1200 3S).



#### Work step 4: Inserting stages 1 to 3

Before inserting the stages, ensure that the interior is clean and that the cylinder tube is thinly coated with hydraulic oil. Never insert the sections into the pit jack by hand. Always use suitable lifting gear!

- 1 When inserting in the groove ring area (on the piston), ensure that the groove rings do not come into contact with the thread of the cylinder tube. This also applies to all other stages!



- 2 Starting with the largest stage, insert all stages into the pit jack one after the other. Make sure that the screw plugs on the largest and smallest guide bushes are not fitted. (The screw plugs on the pit jack for draining the oil are open!)
- 3 When inserting the stages, ensure that the groove rings in the pistons are generously coated with hydraulic oil!



Stage 3

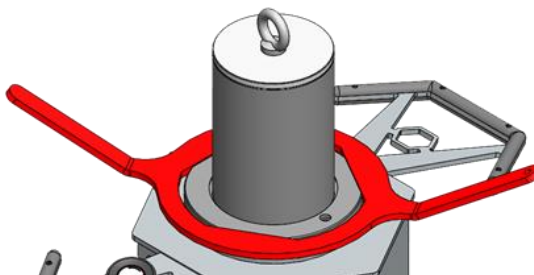


Stage 2

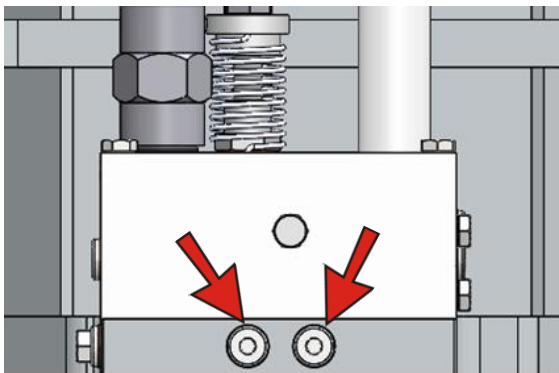


Stage 1

- 4 Using lifting gear, position the cylinder tube or piston rod including guide bush piston and installation wrench on the eyebolt above the pit jack and carefully insert it into the pit jack. To make it easier to screw in the guide bush, do not lower the stages completely into the pit jack.



- 5 Tighten the guide bush hand-tight using the installation wrench and then fix it in place with a light tap (rubber hammer) on the installation wrench.
- 6 Lower the stage completely and remove the installation wrench and threaded mandrel.
- 7 Insert the remaining stages into the pit jack as described above.
- 8 Install the screw plugs on the largest and smallest guide bush. Minimum installation torque of the screw plug is 7.1 Nm. Tighten the screw plugs on the pit jack base plate. Make sure that new copper sealing rings are used!

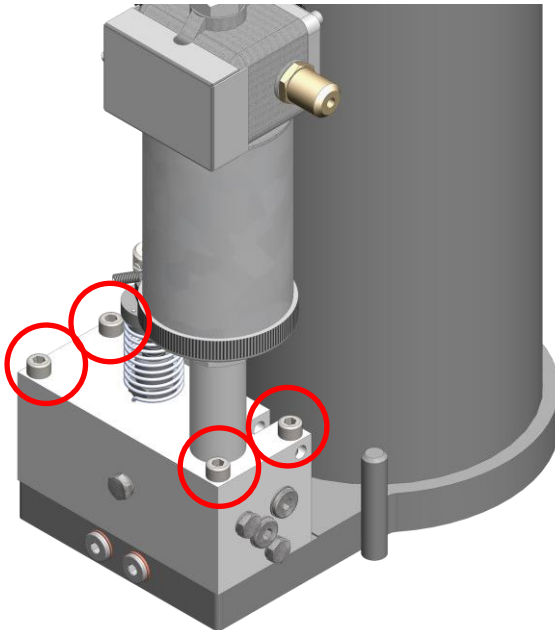


- 9 Then carry out the initial filling and bleeding of the pit jack, see sections "Filling with hydraulic oil" to "Bleeding the hydraulic system".

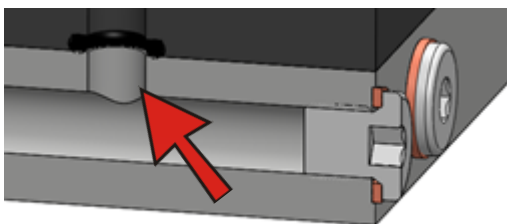
## 14.3 Replacing the Hydraulic Unit

### 14.3.1 Replacing the Hydraulic Unit MPJ 1S

- 1 When replacing the hydraulic unit, the hydraulic oil must also be changed at the same time. Carry out section "Changing the hydraulic oil MPJ 1S". The hydraulic oil must be drained for further steps.
- 2 Remove the four screws from the block (hex head screw A/F 13 / cylinder head screw A/F 6). The hydraulic block can then be removed.



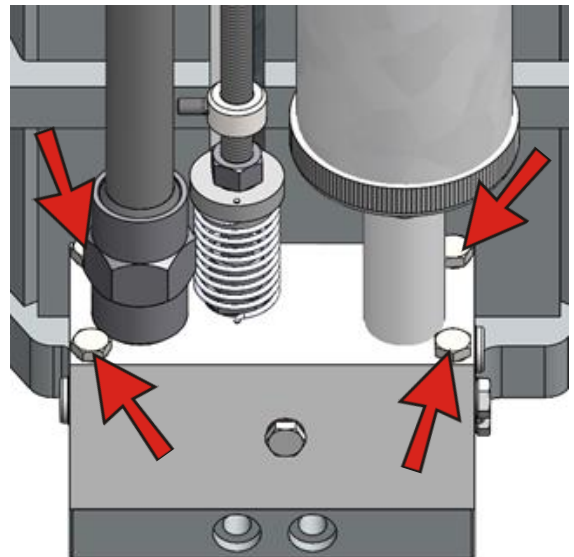
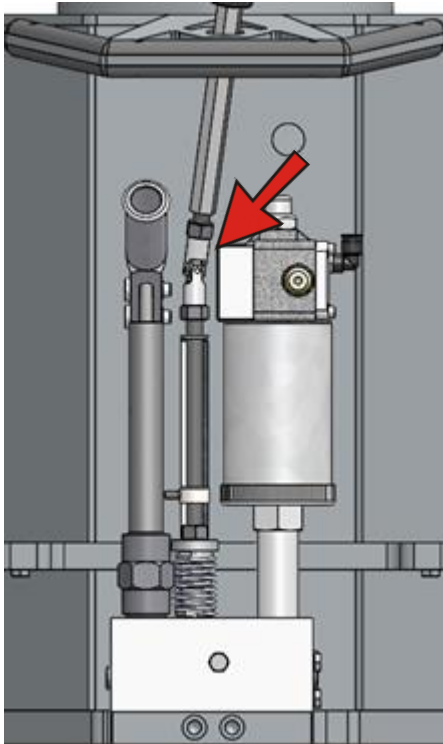
- 3 Clean the surface under the hydraulic block and fit the new hydraulic block in reverse order. Pay particular attention to the O-rings between the pit jack base plate and the hydraulic unit!



- 4 Continue in section "Changing the hydraulic oil MPJ 1S".
- 5 Carry out section "Bleeding the hydraulic system MPJ 1S".

### 14.3.2 Replacing the Hydraulic Unit MPJ 2S | 3S

- 1 When replacing the hydraulic unit, the hydraulic oil must also be changed at the same time. Carry out section "Changing the hydraulic oil MPJ 2S | 3S". The hydraulic oil must be drained for further steps.
- 2 Remove the cover (if necessary, mark the air hoses to avoid confusion).
- 3 Remove the joint of the drain spindle using A/F 17 and then remove the four screws on the block using A/F 13. The hydraulic block can then be removed.
- 4 Clean the surface under the hydraulic block and fit the new hydraulic block in reverse order. Pay particular attention to the O-rings between the pit jack base plate and the hydraulic unit!



- 5 Refit the joint and cover and reconnect all air hoses.
- 6 Complete section "Changing the hydraulic oil on the MPJ 2S | 3S".
- 7 See section "Bleeding the hydraulic system MPJ 2S | 3S".

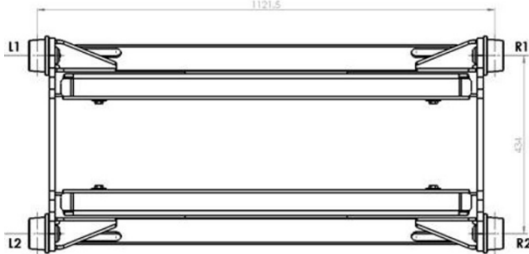
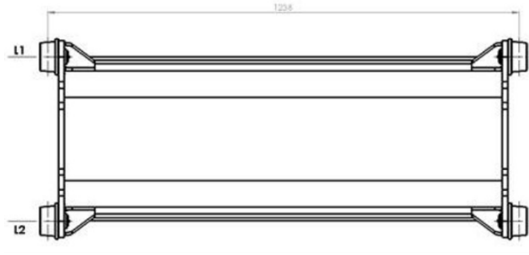
## 15 Annex

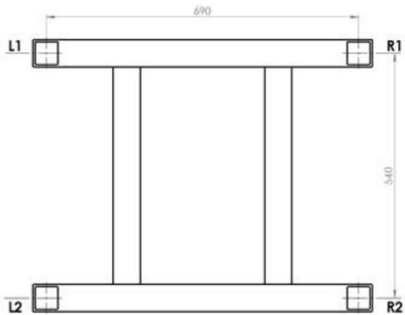
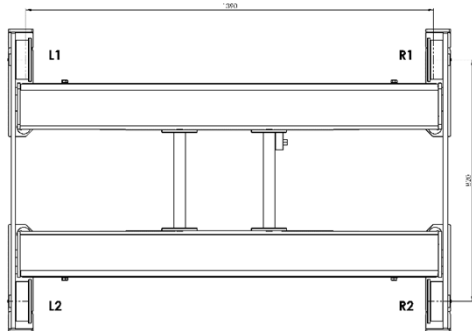
### 15.1 Tightening Torques

Tightening torques for all screws without torque specification:

Thread	Strength class	Tightening torque
M5	8.8	6 Nm
M6	8.8	10 Nm
M8	8.8	25 Nm
M10	8.8	50 Nm
M12	8.8	85 Nm

### 15.2 Load Application of the Chassis

Pit jack model	F.L1 [kN]	F.L2 [kN]	F.R1 [kN]	F.R2 [kN]	Load application
*MPJ 4.0/750 1S H	26.93	26.93	5.32	5.32	Chassis roller
*MPJ 16.5/750 1S H	76.05	76.05	16.16	16.16	Chassis roller
					
*MPJ 20.0/750 1S H	93.04	93.04	17.56	17.56	Chassis roller
					
MPJ 16.5/750 1S F	44.91	46.61	44.91	46.61	50 x 50 mm
MPJ 20.0/750 1S F	54.28	56.32	54.27	56.33	50 x 50 mm

					
MPJ 16.5/750 1S T	15.83	3.9	116.54	28.73	Chassis roller
MPJ 20.0/750 1S T	16.38	10.39	118.98	75.45	Chassis roller
					

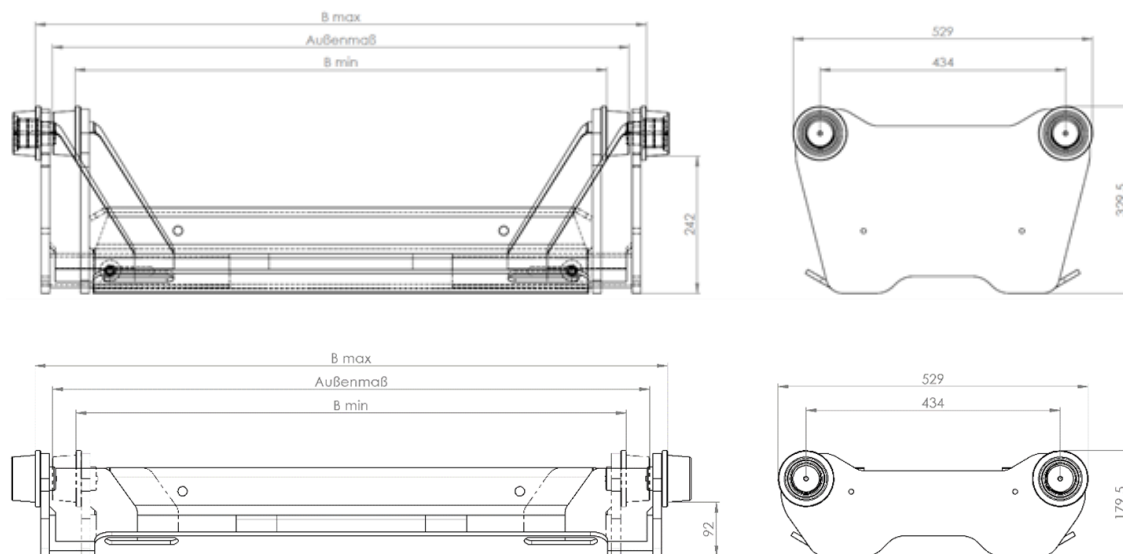
\*Worst Case assumption:

FGH 14.P-120 without offset; extensions approx. 14 mm extended to a total width of B dimension = 1083 mm. Maximum asymmetrical force transmission via rollers into the foundation.

### 15.3 Filling Quantities of Hydraulic Oil

Pit jack model	Hydraulic oil	Filling quantity [L]
MPJ 4/750 1S	HLP-D 10	3.3
MPJ 16.5-20/750 1S		9.5
MPJ 16.5/750 2S		15.8
MPJ 16.5/750 3S		28
MPJ 16.5/750 1S HAE	HLP-D 22	15

## 15.4 Dimensions of Adjustable Chassis



B min...B max [mm]	Outer dimension (pushed together) [mm]
580...720	660
640...780	720
700...840	780
760...900	840
820...960	900
880...1020	960
940...1080	1020
1000...1140	1080
1060...1200	1140

## 15.5 Overview of Chassis Rollers









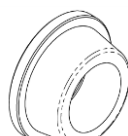
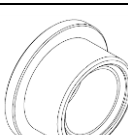
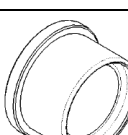
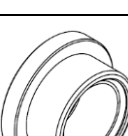
Illustration	Mat. no.	Description	Shape	Inclination	Ø at collar	Tread	Collar Ø	Collar width	Characteristics/ Special feature
				%	[mm]	[mm]	[mm]	[mm]	
	1267244	Chassis roller 6-30T	conical	8	80	40	95	10	Standard
	1267245	Chassis roller Rd 95x50	cylindrical	—	74	40	95	10	VZ
	1267253	Chassis roller 6-30T	conical	14	80	40	95	10	I-profile with 14% inclination
	1128378	Chassis roller Rd 95x48	cylindrical	—	90	44,5	-	-	Difference dimension B > 10 mm; w/o collar
	1267257	Chassis roller Rd 95	conical	8	80	30	95	10	Tread 30 mm

Illustration	Mat. no.	Description	Shape	Inclination	Ø at collar	Tread	Collar Ø	Collar width	Characteristics/ Special feature
				%	[mm]	[mm]	[mm]	[mm]	
	1267255	Chassis roller 6-30T	conical	8	80	30	95	20	Collar 20 mm
	1267254	Chassis roller 6-30T	conical	8	80	35	95	15	Collar 15 mm
	1267252	N02.31-13	conical	8	66	30	80	10	Roller for U80 profiles
	1267249	Chassis roller	conical	14	80	30	95	10	I-profile with 14% inclination
	1267248	Chassis roller Rd 95x45	cylindrical	—	74	35	95	10	Tread 35 mm
	1267246	Chassis roller 6-30T	cylindrical	—	69	40	80	10	Tread 69 mm Collar 80 mm
	1128392	Chassis roller Rd 95x60	cylindrical	—	74	30	95	15	Tread 35 mm Collar 15 mm

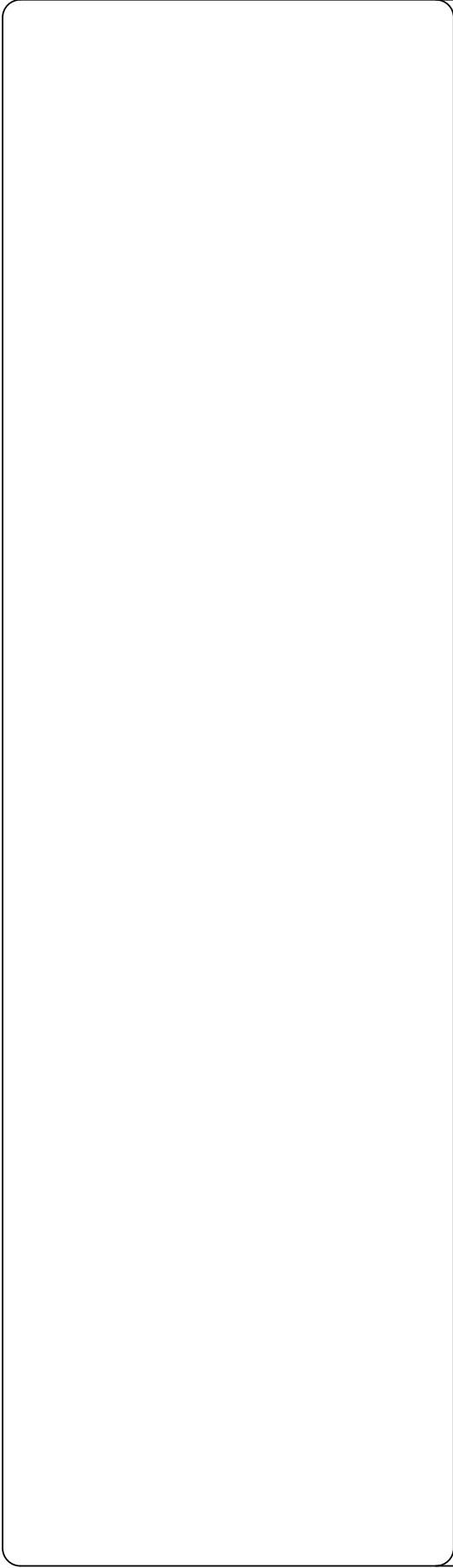
- 15.6      Electric Circuit Diagram MPJ HAE**
- 15.7      Hydraulic Circuit Diagrams**
- 15.8      Operating Instructions for Maintenance Unit**
- 15.9      Declaration of Conformity**

See following page(s).



**MAHA**  
**Maschinenbau Haldenwang GmbH & Co. KG**  
Hoyen 20  
D-87490 Haldenwang  
Germany

Equipment designation: Lifter  
Drawing number : 232.01.004573C



Dieser Schaltplan wurde für den maximalen Ausbau der Maschine erstellt. Optionsbedingt können Abweichungen zwischen Steuerung und Schaltplan vorhanden sein.  
This circuit diagram is intended for machines equipped with all options. Options appearing in the circuit diagram need not necessarily be present in the control unit.

Power supply : 3x400V, N, PE, 50Hz  
Fuse protection : K16A

Created on : 07.02.2006 by: OLM  
Last modified : 21.06.2017 by: APR

Serial Number





## Information to the electrical diagram

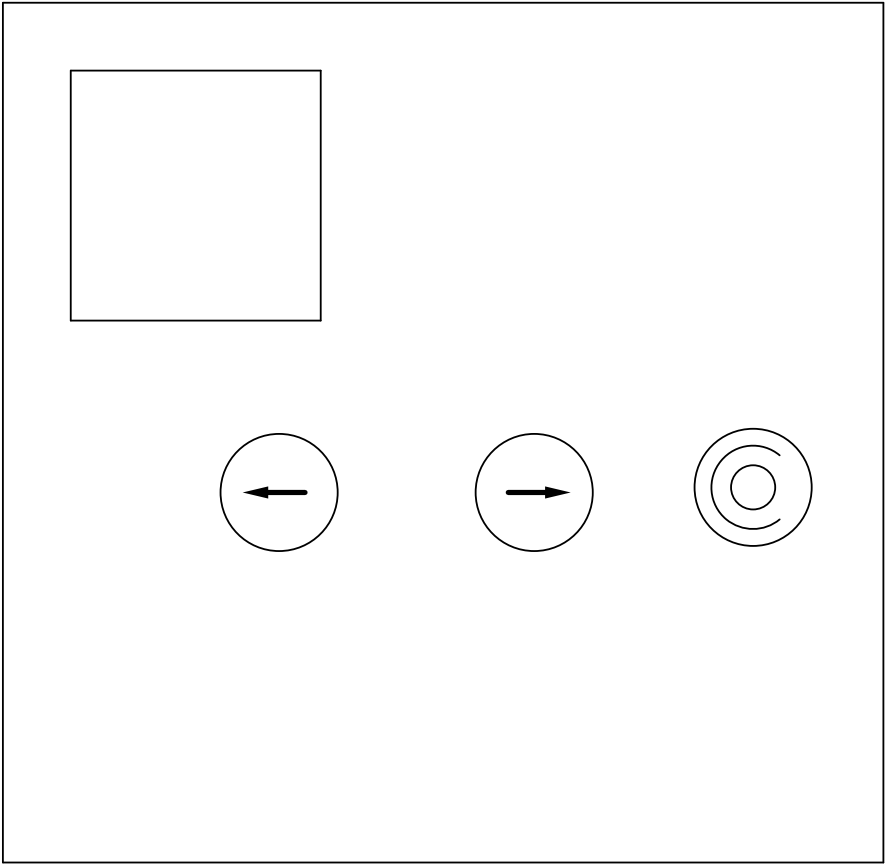
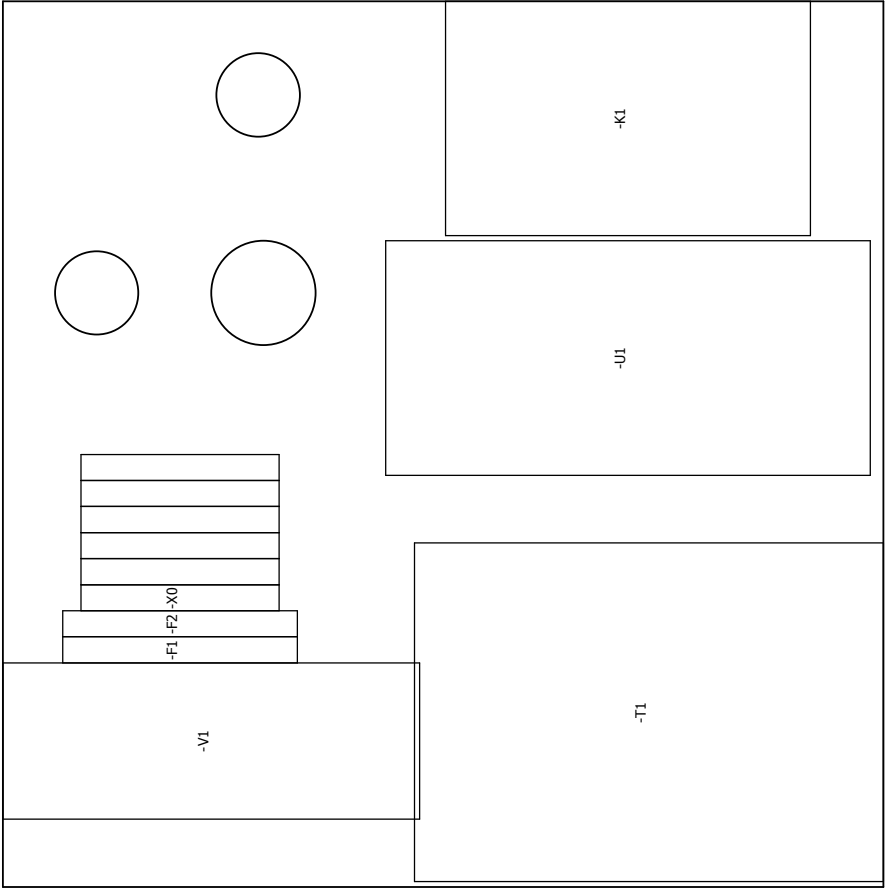
- All wiring are conceived for a control cabinet interior temperature of 45°C (113°F)

- NOTE!

All operational funds attached before the main switch must be wired with the warning color orange!

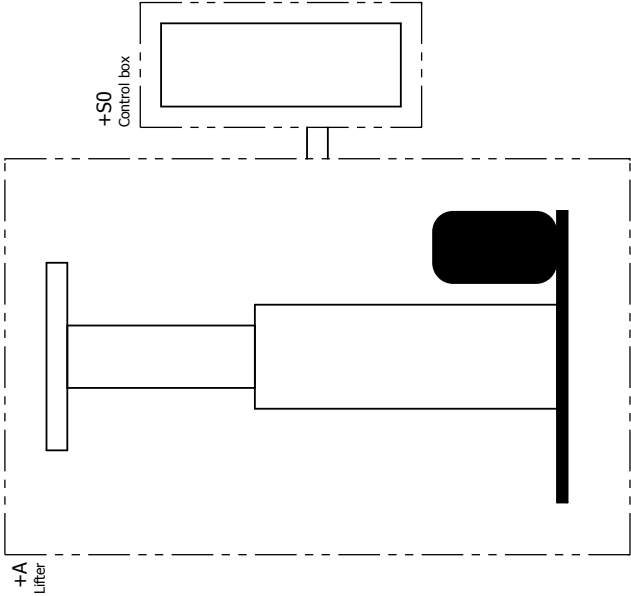
## Legend of the color of conductor

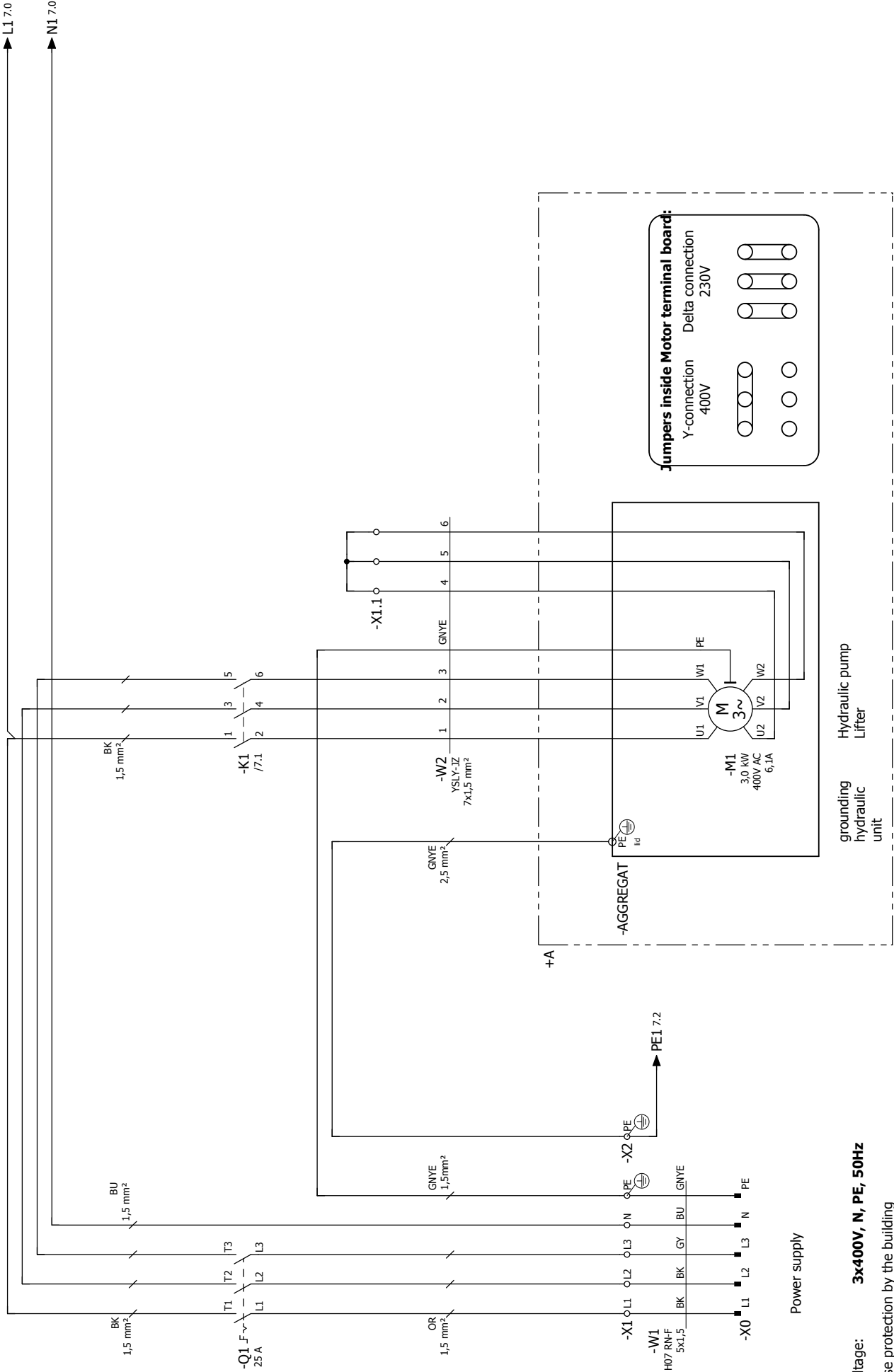
BK = Schwarz / Black / Noir / Nero  
BN = Braun / Brown / Maron / Marone  
RD = Rot / Red / Rouge / Rosso  
OG = Orange / Orange / Orange / Arancia  
YE = Gelb / Yellow / Jaune / Giallo  
GN = Grün / Green / Vert / Verde  
BU = Blau / Blue / Bleu / Blu  
VT = Violett / Violet / Violet / Viola  
GY = Grau / Grey / Gris / Grigio  
WH = Weiss / White / Blanc / Bianco  
PK = Rosa / Pink / Rose / Rosa



overview:

Lifter





voltage: **3x400V, N, PE, 50Hz**

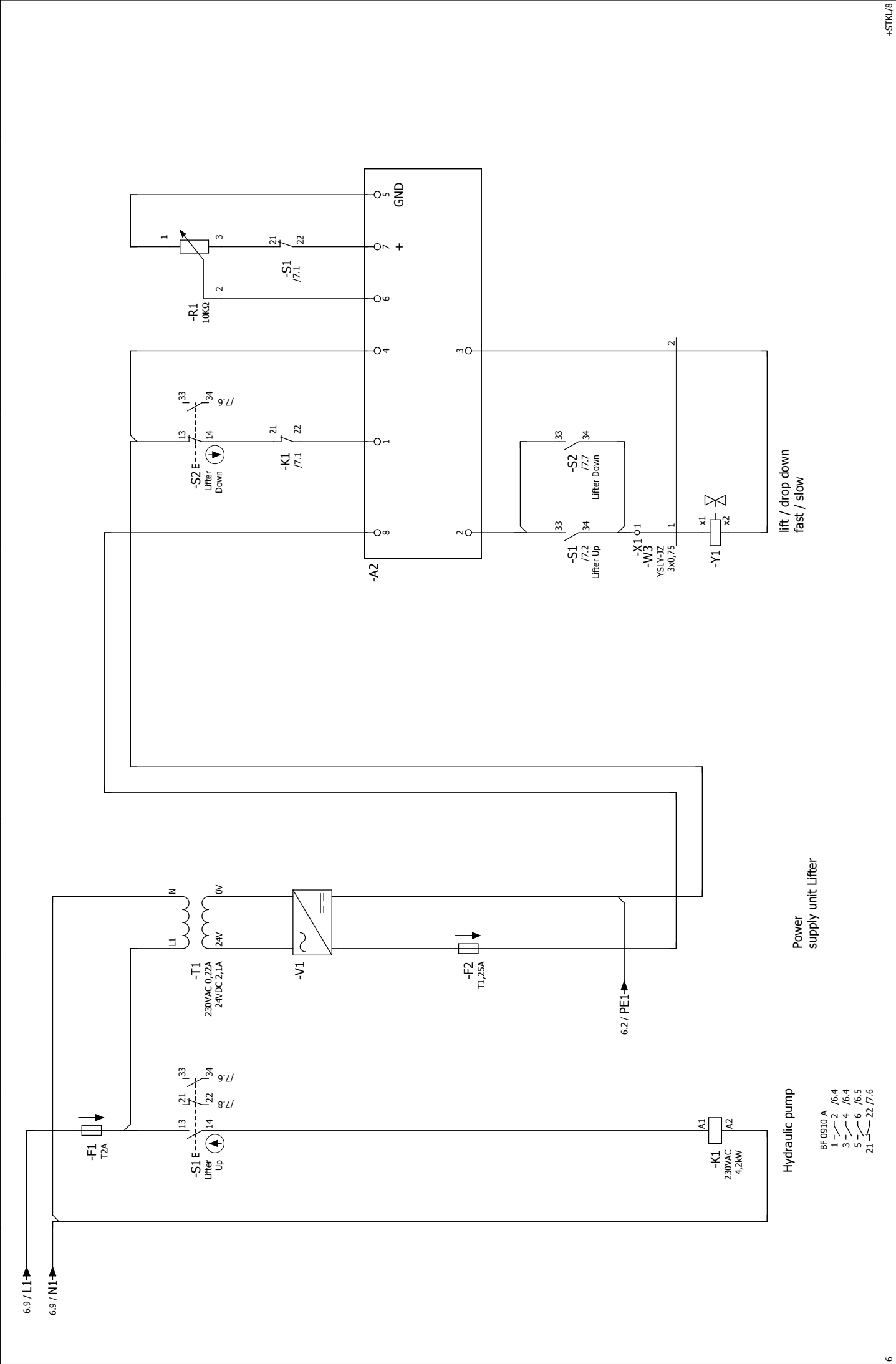
fuse protection by the building contractor: **K16 A**

P total : approx **3,0 kW**  
I total : approx **7,8 A**

**Jumpers inside Motor terminal board:**

Y-connection  
400V

Delta connection  
230V



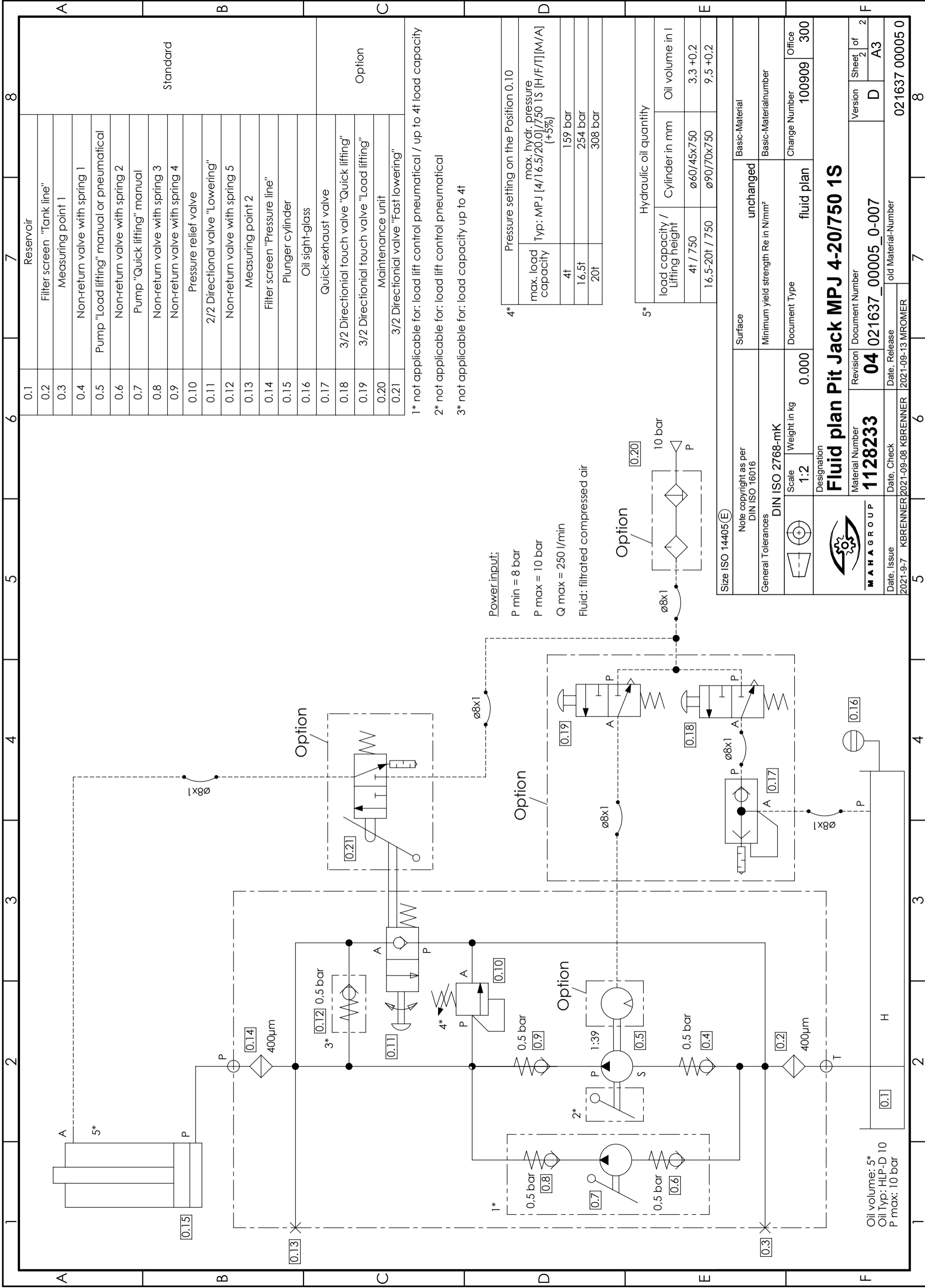
Parts list

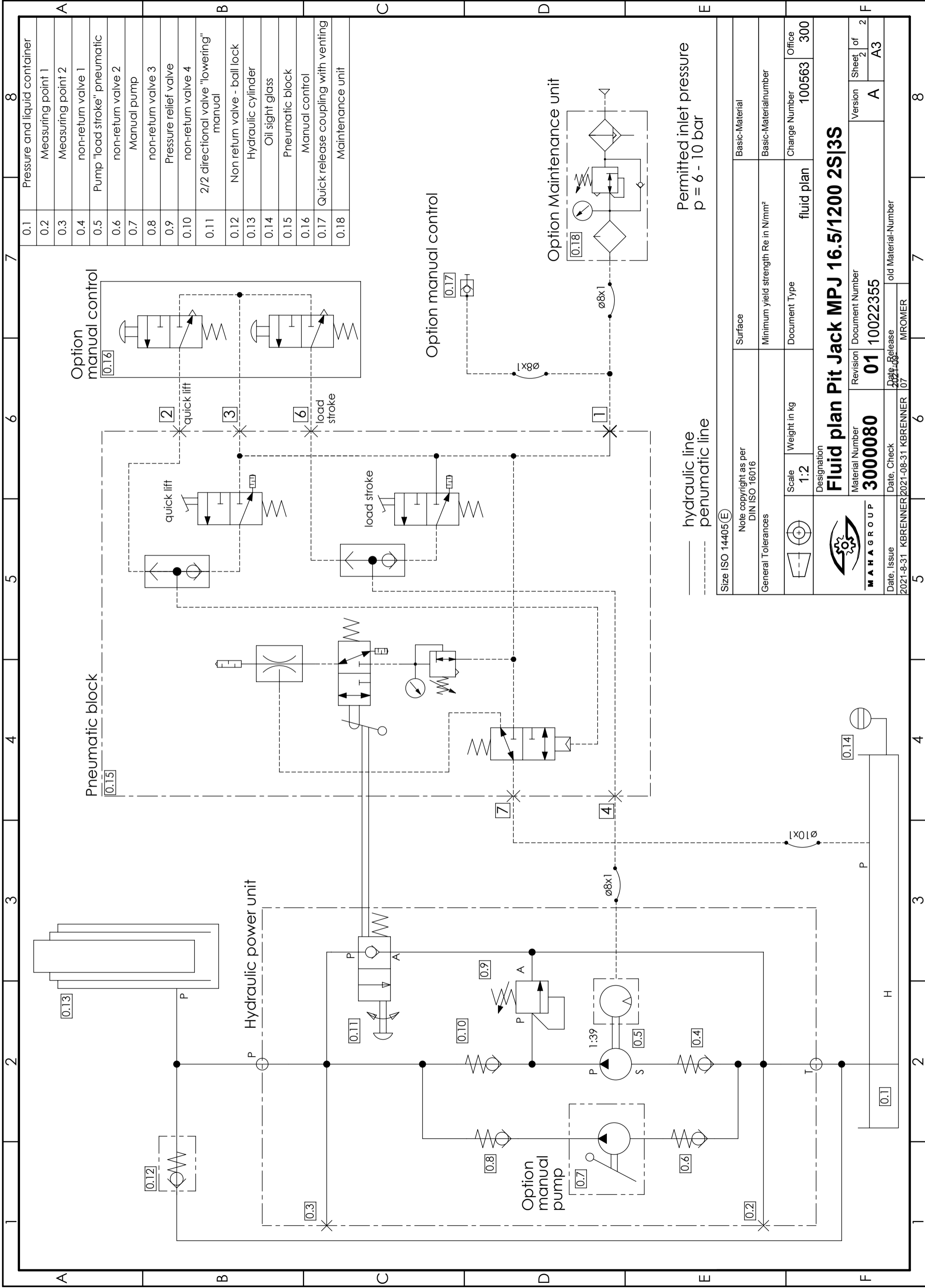
MAHA\_hsc001

<i>BMK</i> <i>Placement</i>	<i>Quantity</i> <i>ME</i>	<i>designation</i>		<i>Type number</i> <i>Order number</i>	<i>manufacturer</i> <i>supplier</i>	<i>MAHA-Part No.</i>
A2 =Z5+S0/7.5	1			EV1M2-12/24 EV1M2-12/24	Hawe Boßert Electronic GmbH	53 9037
F1 =Z5+S0/7.1	1	Fused terminal		M4/8 SF KLEMME-20	Entrelec Boßert Electronic GmbH	53 9026
F1 =Z5+S0/7.1	1	miniature fuse		T 2,0 A	Bürklin OHG	53 3148
F2 =Z5+S0/7.3	1	Fused terminal		M4/8 SF KLEMME-20	Entrelec Boßert Electronic GmbH	53 9026
F2 =Z5+S0/7.3	1	end plate for fuse clip		ABP ABSCHLUSSPLATTE01	Entrelec Boßert Electronic GmbH	53 9030
F2 =Z5+S0/7.3	1	Fuse T 1,25 A				53 3058
K1 =Z5+S0/7.1	1	main contactor 4,2 kW 220-230V 50-60 Hz		BF 0910 A NESÜ.BF9.10	LOVATO electric Boßert Electronic GmbH	53 9004
Q1 =Z5+S0/6.0	1 Stück	main switch 25A 4 pole		NLT25A/4ZM/Z20/F908 50 1002	SONTHEIMER Elektroschaltgeräte GmbH SONTHEIMER Elektroschaltgeräte GmbH	50 1002
S1 =Z5+S0/7.1	1			M22-D-X 51 0500	Moeller GmbH	51 0500
S1 =Z5+S0/7.1	1			M22-XD-S-X7 51 0592	Moeller GmbH	51 0592
S1 =Z5+S0/7.1	1			M22-A 51 0561	Moeller GmbH	51 0561
S1 =Z5+S0/7.1	2 Stück	Contact NO		M22-K10 51 0555	Moeller GmbH	51 0555
S1 =Z5+S0/7.1	1			M22-K01 51 0556	Moeller GmbH	51 0556
S2 =Z5+S0/7.6	1			M22-D-X 51 0500	Moeller GmbH	51 0500
S2 =Z5+S0/7.6	1			M22-XD-S-X7 51 0592	Moeller GmbH	51 0592
S2 =Z5+S0/7.6	1			M22-A 51 0561	Moeller GmbH	51 0561
S2 =Z5+S0/7.6	1 Stück	Contact NO		M22-K10 51 0555	Moeller GmbH	51 0555
S2 =Z5+S0/7.6	1			M22-K01 51 0556	Moeller GmbH	51 0556
T1 =Z5+S0/7.3	1	power supply with rectifier		NR.TRNT5 NET.TRNT50	Ulmer Transformatoren GmbH Boßert Electronic GmbH	NET.TRNT50
V1 =Z5+S0/7.3	1	rectifier 3A		universal-LP04 GLEICHRICHTER01	Boßert Electronic GmbH Boßert Electronic GmbH	52 1004
W2 =Z5+S0/6.4	1 m	Cable Adern nummeriert		YSLY-JZ 7 X 1,5 53 1257		53 1257
X0 =Z5+S0/6.0	1 Stück	Ceconstecker 16A		CT 516/6H 53 0078		53 0078

+S0/7







# FESTO

Postfach 6040  
D-73726 Esslingen  
Telefon (0711)347-0

Quelltext: deutsch  
Version: 9712c  
Teile-Nr.: 380645

## Bedienungsanleitung

### Proportionalöler Typ LOE-...-D-...

Einbau und Inbetriebnahme nur von autorisiertem Fachpersonal, gemäß Bedienungsanleitung. Diese Produkte sind ausschließlich zur Verwendung mit Druckluft vorgesehen. Zur Verwendung mit anderen Medien (Flüssigkeiten oder Gasen) sind sie nicht geeignet.

#### 1 Funktion und Anwendung

Der LOE-... führt der Druckluft eine fein dosierbare Ölmenge zu. Die Druckluft strömt durch eine Düse. Der entstehende Unterdruck fördert Öl bis zum Schauglass. Die fallenden Öltröpfen werden von der durchströmenden Luft zerstäubt.

#### 2 Produktübersicht (und Komponenten)

- Beachten Sie, daß beim Zusammenbau mit anderen Wartungsgeräten strömungsbedingte technische Daten der Kombination von denen der Einzelgeräte abweichen. Technische Daten vorkonfektionierter Kombinationen sind dem Katalog oder der Bedienungsanleitung zum Typ FRC-...-D-... zu entnehmen.

#### 3 Voraussetzungen für den Produkteinsatz

Allgemeine, stets zu beachtende Hinweise für den ordnungsgemäßen und sicheren Einsatz des Produkts:

- Halten Sie die angegebenen Grenzwerte ein (z.B. für Drücke, Kräfte, Momente, Massen, Temperaturen).
- Berücksichtigen Sie die vorherrschenden Umgebungsbedingungen.
- Beachten Sie die Vorschriften der Berufsgenossenschaft, des Technischen Überwachungsvereins oder entsprechende nationale Bestimmungen.
- Entfernen Sie Schutzvorrichtungen wie Kartonagen, Folien und Transportstopfen in Recycling-Sammelbehältern.
- Belüften Sie Ihre gesamte Anlage langsam.
- Dann treten keine unkontrollierten Bewegungen auf.
- Verwenden Sie das Produkt im Originalzustand ohne jegliche eigenmächtige Veränderung.

#### 4 Einbau

##### mechanisch

- Verwenden Sie Absperrventile, um den Öler bei Bedarf drucklos zu schalten.
- Beachten Sie die Durchflußrichtung. Diese ist an dem Hinweispfeil abzulesen.
- Berücksichtigen Sie genügend Platz unterhalb der Ölerschale (mind. 150 mm), um die Ölnachfüllung zu ermöglichen.
- Justieren Sie den LOE-... aufrecht stehend (± 5 °).

Bei Einbau in die Rohrleitung:

- Drehen Sie die Rohrleitungen in die Anschlußflansche. Die Gewinde sind abzudichten.
- Bei Zusammenbau des LOE-... mit einem bereits vorhandenen Wartungsgerät: siehe Bedienungsanleitung LR-.../LFR-.../LF-...-D-....

##### pneumatisch

- Sorgen Sie für kurze Leitungen zwischen Öler und Aktoren. Dadurch ist ein gleichmäßiger Ölnebel in der Druckluft gewährleistet.

#### 5 Inbetriebnahme

- Drehen Sie die Ölerschale gegen den Uhrzeigersinn herunter.
- Füllen Sie die Ölerschale mit Festo Spezialöl auf.

Andere zulässige Öle mit geeigneter Viskosität sind im Festo-Hauptkatalog unter den Stichworten "Druckluftöler" bzw. "Öler" aufgeführt.
- Drehen Sie die Ölerschale wieder fest.
- Belüften Sie Ihre Anlage langsam.
- Drehen Sie die Regulierschraube im Schauglas bis die gewünschte Ölmenge eingestellt ist. Bei Drehung gegen den Uhrzeigersinn nimmt die Tropfenzahl zu, bei Drehung im Uhrzeigersinn nimmt die Tropfenzahl ab. Der Ölbedarf ist stark anlagenabhängig.

Richtwerte:  
ca. 1 Tropfen Öl/ 1000 l/min. Luftdurchsatz: **leichter Ölnebel**  
ca. 12 Tropfen Öl/ 1000 l/min. Luftdurchsatz: **starker Ölnebel**.

Bei reduziertem Durchfluß und Druckluftschwankungen verändert sich die Tropfenmenge automatisch (Proportional-Öler).
- Schauen Sie an der entferntesten Entlüftungsbohrung der Anlage, ob feiner Ölnebel ankommt. Die richtige Einstellung des LOE-... zeigt sich nach einiger Zeit durch leichte Färbung auf weißem Papier.

#### 6 Wartung und Pflege

Bei Ölstand an Ölerschale-Unterkante:

- Füllen Sie Festo Spezialöl nach. Dies kann unter Druck vorgenommen werden.
- Entlüftungsschraube (neben dem Schauglas) soweit öffnen, bis kein Luftgräusch mehr hörbar ist.
  - Ölerschale gegen den Uhrzeigersinn (von unten gesehen) herunterdrehen.

- Ölerschale mit Festo Spezialöl auffüllen.

Andere zulässige Öle mit geeigneter Viskosität sind im Festo-Hauptkatalog unter den Stichworten "Druckluftöler" bzw. "Öler" aufgeführt.
- Ölerschale wieder festdrehen.

Dabei ist der richtige Sitz des O-Rings im Gehäuse zu beachten.
- Entlüftungsschraube wieder zudrehen.
- Öltröpfenmenge kontrollieren.

Diese braucht in der Regel nicht nachgestellt werden.

##### Reinigung

- Verwenden Sie ausschließlich die angegebenen Reinigungsmittel:

Bauteil	Reinigungsmittel
Ölerschale	Seifenlauge (max. +60°C); Waschbenzin (aromatenfrei)

#### 7 Bei Leckagen in der Anlage

- Sorgen Sie für Abhilfe. Sonst kann sich der LOE-... während längerer Stillstandszeiten selbständig entleeren.

#### 8 Ausbau und Reparatur

- Entlüften Sie die gesamte Anlage und das Gerät.

Bei Ausbau aus der Rohrleitung:

- Entfernen Sie die Montageschraube an den Anschlußflanschen.
- Ziehen Sie den LOE-... zwischen den Flanschen heraus.

Sie können die Anschlußflansche in der Rohrleitung belassen.

#### 9 Störungsbeseitigung

Störung	mögliche Ursache	Abhilfe
Keine Ölförderung	Regulierschraube geschlossen	Regulierschraube öffnen
	Ölspiegel zu niedrig	Öl nachfüllen
Öl kommt nicht am Verbraucher an	ungünstige oder zu lange Leitungsführung	LOE-... möglichst nahe an Verbraucher setzen, gerade Leitungsführung

#### 10 Technische Daten

max. zul. Vordruck p <sub>1</sub>	16 bar
Medium	40 µm gefilterte Druckluft
zul. Temperaturbereich	-10° C ... +60° C (Lagerung, Medium, Umgebung)
Einbaulage	aufrecht stehend (±5°)
Mindestdurchfluß für Ölerfunktionsbeginn	> 3 l/min bei LOE-...-D-MINI > 8 l/min bei LOE-...-D-MIDI >10 l/min bei LOE-...-D-MAXI
Öleinfüllmenge	max. 45 ml bei LOE-...-D-MINI max. 110 ml bei LOE-...-D-MIDI max. 190 ml bei LOE-...-D-MAXI
Werkstoffe: Gehäuse Anschlußflansch Schutzkorb Innenteile Schale Dichtungen	GD-Zn Al / GD-Zn Al POM, PA PC (Makrolon) NBR

## Operating Instructions

### Proportional lubricator Type LOE-...-D-...

Fitting and commissioning to be carried out by qualified personnel only in accordance with the operating instructions. These products are specifically designed for compressed air use only. Use with any other fluid (liquid or gas) is a misapplication.

#### 1 Function and application

The LOE-... feeds a finely metered amount of oil to the compressed air. The compressed air flows through a nozzle. The vacuum thus arising conveys oil up to the oil level indicator. The falling oil droplets are atomised by the air flowing through.

#### 2 Summary of product (and components)

- Please note that, when combined with other maintenance units, the technical flow specifications of the combination will differ from that of the individual units. Technical specifications of ready-made combinations are to be found in the catalogue or operating instructions for type FRC-...-D-....

#### 3 Conditions of use

These general conditions for the correct and safe use of the product must be observed at all times:

- Please adhere to the limits indicated (e.g. for pressures, forces, torques, weights and temperatures).
- Please observe the prevailing ambient conditions.
- Please comply with national and local safety laws and regulations.

- Remove all the individual packaging materials. They can be disposed of in recycling containers.
- Slowly pressurize the complete system.

This will prevent sudden uncontrolled movements from occurring.
- Unauthorized product modification is not permitted.

#### 4 Fitting

##### mechanical

- Use shut-off valves to operate lubricator in absence of pressure, if required.
- Please note the direction of flow.This is shown by the arrows.
- Allow sufficient space below lubricator bowl (at least 150 mm) for refilling with oil.

- Adjust the LOE-... when it is standing upright (±5°).

Installing in fixed pipework:
- Screw the piping into the connecting flanges. The threads must be sealed.
- In connecting together the LOE-... with another maintenance unit: see "Operating instructions" of LR-.../LFR-.../LF-...-D-... .

##### pneumatic

- Ensure that the tubing between the lubricator and the actuator is as short as possible.

Only in this way is even oil mist in the compressed air guaranteed.

#### 5 Commissioning

- Unscrew the lubricator bowl by turning it in an anti-clockwise direction.
- Fill the lubricator bowl with Festo special oil.

Other permitted oils with suitable viscosity are listed in the Festo main catalogue under Compressed air/lubricator or Lubricator.
- Screw in the lubricator bowl again.
- Slowly pressurize the system.
- Turn the regulating screw in the oil level indicator until the desired amount of oil is set. By turning in an anti-clockwise direction you can increase the number of drops; by turning in a clockwise direction you can reduce the number of drops. The oil requirement depends to a large extent on the type of system.

Recommendations:  
Approx. 1 drop of oil per 1000 l/min. airflow: **light oil mist**.  
Approx. 12 drops of oil per 1000 l/min. airflow: **heavy oil mist**.  
If the air flow is reduced, the number of drops will also be reduced automatically (proportional lubricator).
- Check at the most remote exhaust port of the system to see if there is a fine oil mist. If the LOE-... is correctly set, the oil mist will slightly discolour white paper held in front of the lubricator.

#### 6 Maintenance and care

Oil level on lower edge of oil bowl:

- Refill with Festo special oil. This can be done under pressure.

- Open the vent screw next to the oil level indicator until the noise of the air can no longer be heard.
- Unscrew the lubricator bowl also by turning in an anti-clockwise direction (see from below).
- Fill the lubricator bowl with Festospecial oil.

Other permitted oils with suitable viscosity are listed in the Festo main catalogue under Compressed air/lubricator or Lubricator.
- Screw on the lubricator bowl again.

Please note here the correct seating of the O-ring in the housing.
- Tighten the vent screw again.
- Check the number of oil drops.

This does not usually need to be adjusted.

##### Cleaning

- Use only the specified cleaning agents.

Component	Cleaning agent
Lubricator bowl	soap suds (max. +600C); Petroleum spirit(free from aromatics)

#### 7 Leaks in the system

- Please see that leaks are eliminated, otherwise the LOE-... may empty itself automatically after long periods out of use.

#### 8 Dismantling and repair

- Exhaust all of the equipment and the device.

Removing from the tubing

- Remove the mounting screw on the connecting flanges.
- Pull the LOE-... out between the flanges.

You can leave the connecting flange in the tubing.

#### 9 Eliminating faults

Fault	Possible cause	Remedy
No oil supply	Regulating screw closed	Open regulating screw
	Oil level too low	Refill oil
Oil does not reach the consuming device	Piping too long or otherwise unsatisfactory	Place LOE-... as close as possible to the consuming device, use straight tubing

#### 10 Technical specifications

Max. permitted primary pressure p <sub>1</sub>	16 bar
Medium	40 µm filtered compressed air
Permitted temperature range	-10°C ... +60°C (storage, medium, ambient)
Fitting position	standing upright (±5°)
Minimum flow for start of lubricator function	> 3 l/min at LOE-...-D-MINI > 8 l/min at LOE-...-D-MIDI >10 l/min at LOE-...-D-MAXI
Oil filling quantity	max. 45 ml at LOE-...-D-MINI max. 110 ml at LOE-...-D-MIDI max. 190 ml at LOE-...-D-MAXI
Materials: Housing Connecting flange Protective cover Interior parts Bowl Seals	GD-Zn Al / GD-Zn Al POM, PA PC (Macrolon) NBR

## Bruksanvisning

### Proportionell smörjanordning Typ LOE-...-D-...

Montering och idrifttagning får endast utföras av auktoriserad fackkunnig personal i enlighet med denna bruksanvisning. Dessa produkter är endast avsedda för användning med tryckluft. De lämpar sig ej för användning med andra medier (vätskor eller gaser).

#### 1 Funktion och användning

LOE-... tillför tryckluften en findoserbar mängd olja.

Tryckluften strömmar genom ett munstycke. Det uppkomna undertrycket transporterar oljan till siktglaset. De fallande oljedropparna finfördelas av den genomströmmande luften.

#### 2 Produktöversikt (och komponenter)

- Beakta att flödesberoende tekniska data hos kombinationen avviker från data för de enskilda enheterna.

Tekniska data för färdiglevererade kombinationer framgår av katalogen eller bruksanvisningen till Typ FRC-...-D-... .

#### 3 Förutsättningar för användning av produkten

Allmänna anvisningar som alltid skall beaktas för korrekt och säker användning av produkten:

- Upprätthåll angivna gränsvärden (t.ex. för tryck, kraft, moment, massor, temperaturer).
- Ta hänsyn till rådande omgivande förhållanden.
- Beakta de lokala och nationella skyddsföreskrifterna.

- Avlägsna allt förpackningsmaterial och lämna det i möjligaste mån till återvinning.

- Pålufta hela anläggningen långsamt.

Då uppträder inga okontrollerade rörelser.
- Använd produkten i originalskick utan egna modifieringar.

#### 4 Montering

##### mekanisk

- Använd avstängningsventiler för att vid behovs koppla smörjaren trycklös.
- Beakta flödesriktningen. Den framgår av pilarna.
- Ta hänsyn till utrymmesbehovet under oljekoppen (min. 150 mm) för att möjliggöra oljepåfyllning.
- Justera LOE i lodrätt läge (± 5 °).

Montering i fast rörledning:

- Skruva fast rören i anslutningsflänsarna. Denna anslutning skall tätas.
- Vid montering av LOE-... på en redan befintlig luftberedningsenhet: se driftsinstruktion LR-.../LFR-.../ LF-...-D-....

##### pneumatisk

- Se till att ledningarna mellan smörj- anordningen och rörliga delar är så korta som möjligt.

Endast på detta sätt uppnås en jämn oljedimma i tryckluften.

#### 5 Idrifttagning

- Skruva loss oljekoppen genom att vrida den moturs.
- Fyll oljekoppen med Festo specialolja.

Andra tillåtna oljetyper med lämplig viskositet finns listade i Festos huvudkatalog under sökorden "tryck-luftssmörjning" och "smörjanordning".
- Skruva fast oljekoppen igen.
- Pålufta anläggningen långsamt.
- Vrid reglerskraven (siktglaset) till dess att önskad oljemängd har ställts in. Vid vridning moturs ökar droppantalet, vid vridning medurs minskar droppantalet. Oljebehovet är starkt beroende av anläggningen.

- Riktvärden:  
1 droppa olja/ 1000 l/min luftflöde: **lätt oljedimma**  
12 droppar olja/ 1000 l/min luftflöde: **kraftig oljedimma**  
Vid reducerad genomströmning minskas droppmängden automatiskt (proportionell smörjanordning).
- Kontrollera vid anläggningens mest avlägsna avluftningshål om en fin oljedimma når dit. Rätt inställning av LOE-... visar sig efter en tid genom lätt färgning av ett vitt papper.

#### 6 Underhåll och skötsel

Vid oljenivå vid oljekoppens underkant:

- Fyll på Festo specialolja. Detta kan utföras under tryck.

- Öppna avluftningsskraven (@ siktglaset) tills inget pysljud hörs längre.

- Skruva loss oljekoppen genom att vrida den moturs (sett underifrån).

- Fyll oljekoppen med Festo specialolja.

Andra tillåtna oljetyper med lämplig viskositet finns listade i Festos huvud katalog under sökorden "tryckluftssmörjning" och "smörj-anordning".
- Skruva fast oljekoppen igen.

Kontrollera att O-ringen placerats rätt i huset.
- Skruva åt avluftningsskraven igen.
- Kontrollera antalet oljedroppar.

Detta behöver normalt inte justeras.

##### Rengöring

- Använd endast angivna rengöringsmedel:

Komponent	Smörjmedel
Oljekopp	vatten eller såpslösning (max. +60 °C); Tvättbensin (aromatfri)

#### 7 Läckor i systemet

- Se till att läckor elimineras, annars kan LOE-... tömma sig själv under längre tids stillestånd.

#### 8 Demontering och reparation

- Avlufta hela systemet och aggregatet.

Demontering ur rörledningen:

- Avlägsna monteringsskravena från anslutningsflänsarna.
- Dra ut LOE-... mellan flänsarna.

Anslutningsflänsen kan lämnas i rörledningen.

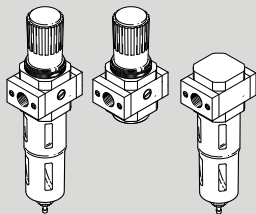
#### 9 Åtgärdande av fel

Fel	Möjlig orsak	Åtgärd
Ingen oljetransport	Reglerskraven stängd	Öppna reglerskraven
	Oljenivån för låg	Fyll på olja
Oljan kommer inte fram till förbrukaren	Olämplig eller för lång ledningsdragning	Placera LOE-... så nära förbrukaren som möjligt, rak ledningsdragning

#### 10 Tekniska data

Max till. primärtryck p <sub>1</sub>	16 bar
Medium	40 µm filterrad tryckluft
Till. temperaturintervall	-10 °C ... +60 °C (lagring, medium, omgivning)
Monteringsläge	Upprättstående (±5°)
Minimiflöde för smörjfunktionsstart	> 3 l/min för LOE-...-D-MINI > 8 l/min för LOE-...-D-MIDI >10 l/min för LOE-...-D-MAXI
Oljepåfyllningsmängd	max. 45 ml för LOE-...-D-MINI max. 110 ml för LOE-...-D-MIDI max. 190 ml för LOE-...-D-MAXI
Tillverkningsmaterial: Hus Anslutningsfläns Skyddskorg Inre detaljer Oljekopp Tätningar	GD-Zn Al / GD-Zn Al POM, PA PC (Makrolon) NBR

LFR(S)-/LR(S)-/LF(M.../X)-...-D  
Filter regulator, Pressure regulator, Filter



**FESTO**

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Instructions | Operating

8121613  
2019-11k  
[8121615]



Translation of the original instructions

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1 Further applicable documents

All available documents for the product → [www.festo.com/pk](http://www.festo.com/pk).

2 Safety

2.1 Safety instructions

- Only use the product in original status without unauthorised modifications.
- Only use the product if it is in perfect technical condition.
- Observe labelling on the product.
- Take into consideration the ambient conditions at the location of use.
- Prior to mounting, installation and maintenance work: Switch off compressed air supply and secure it from being switched back on.
- Observe tightening torques. Unless otherwise specified, the tolerance is ± 20 %.

2.2 Intended Use

Type	Product	Intended Use
LFR(S)-...-D-MINI/MIDI/MAXI	Filter regulator	<ul style="list-style-type: none"><li>– Regulates the compressed air in the subsequent string to the set outlet pressure p2.</li><li>– Smoothes out pressure fluctuations.</li><li>– Removes dirt particles and condensate from the compressed air.</li></ul>
LR(S)-...-D-MINI/MIDI/MAXI	Pressure control valve	<ul style="list-style-type: none"><li>– Regulates the compressed air in the subsequent string to the set outlet pressure p2.</li><li>– Smoothes out pressure fluctuations.</li></ul>
LF-...-D-MINI/MIDI/MAXI	Filter	Removes dirt particles and condensate from the compressed air.
LFMA-...-D-MINI/MIDI/MAXI	Micro filter (0.01 µm)	Removes dirt particles and oil drops from the compressed air.
LFMB-...-D-MINI/MIDI/MAXI	Fine filter (1 µm)	
LFX-...-D-MINI/MIDI/MAXI	Active carbon filter	Removes gaseous oil components from the compressed air.

Tab. 1 Intended Use

2.3 Training of Qualified Personnel

Installation, commissioning, maintenance and disassembly should only be conducted by qualified personnel.  
The skilled personnel must be familiar with the installation of pneumatic control systems.

3 Further information

- Accessories → [www.festo.com/catalogue](http://www.festo.com/catalogue).
- Spare parts → [www.festo.com/spareparts](http://www.festo.com/spareparts).

4 Service

Contact your regional Festo contact person if you have technical questions  
→ [www.festo.com](http://www.festo.com).

5 Product Design

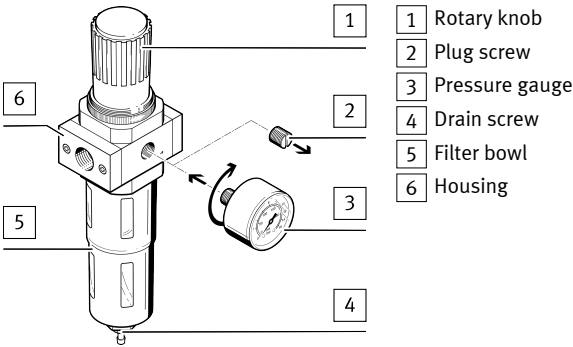


Fig. 1 Product design of filter regulator LFR(S)

6 Mounting

6.1 Mounting Clearances

- Maintain sufficient space around the product.
  - Space required above the product: 80 mm
  - Space required under the product: 90 mm
  - Space required left and right of the product: 90 mm

6.2 Preparation

1. Observe the mounting position → 13 Technical Data.
2. Note the flow direction of flow as shown by the numbers on the housing [6]: from 1 to 2.
3. Mounting accessories: → [www.festo.com/catalogue](http://www.festo.com/catalogue).

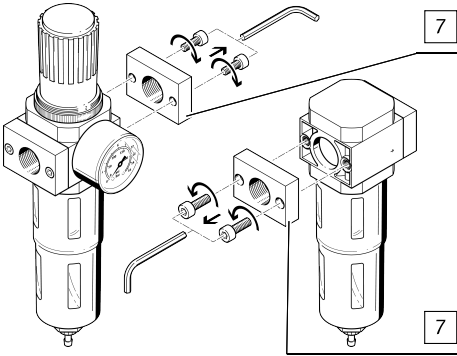
6.3 Assembly of a Filter Combination

- Observe the sequence along the flow direction.
  - Fine filter LFMB (1 µm), micro filter LFMA (0.01 µm), active carbon filter LFX.

6.4 Mounting the Pressure Gauge PAGN

1. LFR(S)/LR(S)-...-O:
  - Remove the plug screw [2] on the pressure gauge connection or on the alternative connection on the back of the device.LFR(S)/LR(S) with pressure gauge in scope of delivery:
  - When using an alternative connection on the back of the device: use a plug screw.
2. Turn pressure gauge [3] clockwise to the stop. The pressure gauge seal is pre-assembled on the threaded connection journal. To align the pressure gauge, the pressure gauge can be turned back by a maximum of one rotation.

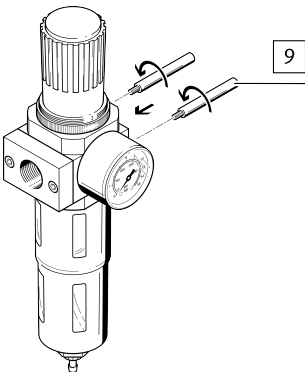
6.5 Assembly



[7] Sub-base

Fig. 2 LFR(S)/LR(S)

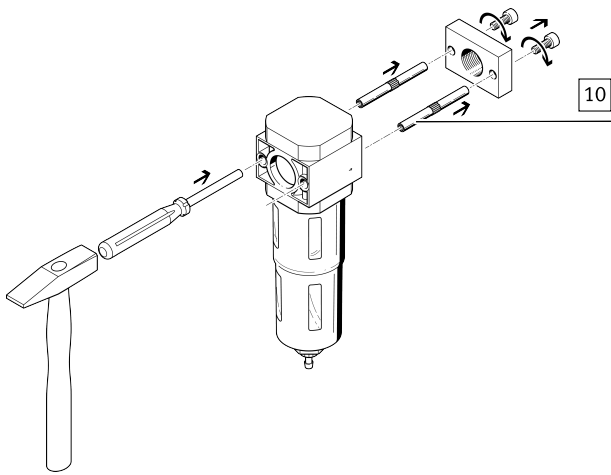
1. If available: remove sub-base [7] from both add-on products on the sides to be fitted together.



[9] Threaded bolt

Fig. 3 LFR(S)

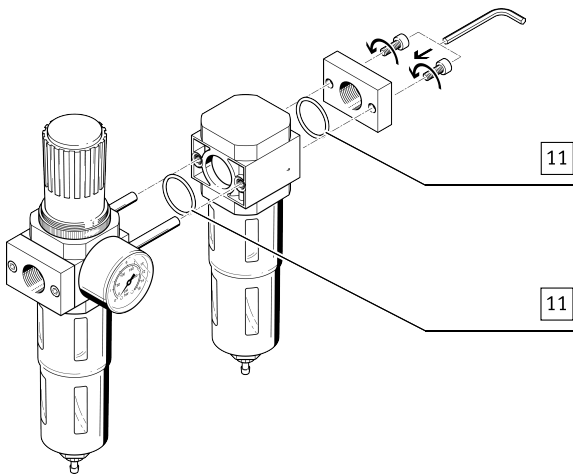
2. Screw in threaded bolt FRB-D [9]. Tightening torque: 2.5 – 0.5 Nm



10 Spacer bolts

Fig. 4 LR(S)

3. Remove the sub-base on the respective add-on product. Drive out the corresponding spacer bolts [10]. Driving action in flow direction.



11 Seal

Fig. 5 LFR(S)/LR(S)

4. Mount the add-on product with the sub-base. There must be one seal [11] each between the add-on products and the sub-base.

## 7 Pneumatic Installation

1. Fittings, seals, suitable hoses: accessories → [www.festo.com/catalogue](http://www.festo.com/catalogue).
2. Screw fittings into the pneumatic ports.
3. Push suitable hoses into the fitting up to the stop.
  - Position hoses axial to the pneumatic ports.
  - Do not exceed the minimum bending radius for the hoses.

## 8 Setting the Outlet Pressure

1. Unlock rotary knob [1] (pull).
2. Turn the rotary knob completely in the – direction.
3. Exhaust system slowly: turn the rotary knob in the + direction until the desired pressure is reached.  
Maintain permissible pressure regulation range → 13 Technical Data.  
The input pressure p1 should always be at least 1 bar higher than the set outlet pressure p2.
4. Lock the rotary knob [1].

## 9 Maintenance

### 9.1 Draining the Condensate

#### Manually Draining the Condensate

If the condensate reaches a level approx. 10 mm below the filter element:

1. Turn drain screw [4] anticlockwise as seen from below.  
The condensate flows out.
2. Turn drain screw clockwise as seen from below.

#### Automatic Draining of the Condensate LFR(S)/LF...-...-A

The filter drains automatically.

### 9.2 Changing the Filter



Replace the filter cartridge if the flow rate is reduced even though the pressure setting is unchanged.

1. Exhaust compressed air from the product.

2. Unscrew the filter bowl [5].
3. Disassemble the old filter cartridge:
  - LFR(S)/LF: unscrew the filter plate and remove the filter cartridge.
  - LFM.../LFX: unscrew the filter cartridge.
4. Install new filter cartridge:
  - LFR(S)/LF: place filter cartridge on the filter plate. Screw filter plate in until it stops.
  - LFM.../LFX: hold filter cartridge at the bottom. Screw filter cartridge in until it stops.
5. Screw in filter bowl. Tightening torque: MINI: 2 Nm, MIDI/MAXI: 2.5 Nm.

### 9.3 Cleaning

- Clean the outside of the product as required with a soft cloth.  
Permissible cleaning agents:
  - Soap suds (max. +60 °C)
  - Petroleum ether (free of aromatic compounds)

## 10 Fault Clearance

Error description	Cause	Remedy
Low flow rate (operating pressure breaks down with air consumption)	Constriction in the supply line	Check supply line
	Filter cartridge is dirty	Replace filter cartridge → 9 Maintenance.
Pressure increases above the set working pressure	Valve disc defective at sealing seat	Replace product
Audible, continuous blowing noise at rotary knob	Valve seat damaged	Replace product
Blowing noise can be heard at the drain screw.	Drain screw leaking	Replace product or filter bowl

Tab. 2 Fault Clearance

## 11 Disassembly

1. Exhaust the complete system and product.
2. Release interlock at the fittings by pressing it and pull out hose assembly.
3. Release fittings at the connecting flanges and unscrew.

## 12 Disposal

### ENVIRONMENT!

Send the packaging and product for environmentally sound recycling in accordance with the current regulations → [www.festo.com/sp](http://www.festo.com/sp).

## 13 Technical Data

Product		LFR(S)	LR(S)	LF	LFM	LFX
Mounting position	[°]	Vertical +/-5				
Temperature ranges						
Temperature of medium	[°C]	-10 ... +60			1.5 ... 60	5 ... 30
Ambient temperature	[°C]	-10 ... +60				
Operating medium						
Compressed air to ISO 8573-1:2010		[-:9:-]			[6:8:4]	[1:4:2]
Input pressure						
Without fully automatic condensate drain	[MPa]	≤ 1.6				
	[bar]	≤ 16				
	[psi]	≤ 232				
With fully automatic condensate drain	[MPa]	0.2 ... 1.2				
	[bar]	2 ... 12				
	[psi]	29 ... 174				
Pressure regulation range						
For LFR(S)/LR(S)-...-D-7	[MPa]	0.05 ... 0.7				
	[bar]	0.5 ... 7				
	[psi]	7 ... 101				
For LFR(S)/LR(S)-...-D	[MPa]	0.05 ... 1.2				
	[bar]	0.5 ... 12				
	[psi]	7 ... 174				

Tab. 3 Technical Data



# Original-EG-Konformitätserklärung Original EC Declaration of Conformity

CE550001-de-en



MAHA GROUP

## MAHA Maschinenbau Haldenwang GmbH & Co. KG

erklärt hiermit als Hersteller in alleiniger Verantwortung, dass nachstehend bezeichnetes Produkt in Konzeption und Bauart den grundlegenden Sicherheits- und Gesundheitsanforderungen der hier genannten Richtlinien entspricht.

Bei Änderungen am Produkt, die nicht von oben genannter Firma genehmigt wurden, verliert diese Erklärung ihre Gültigkeit.

herewith declares as a manufacturer its sole responsibility to ensure that the product named hereafter meets the safety and health regulations both in design and construction required by the directives stated below.

This declaration becomes void if any change is made to the product that was not approved by named company beforehand.

### Typ | Model

MPJ 4.0/750 1S HM	MPJ 16.5/1200 2S FA
MPJ 4.0/750 1S HA	MPJ 16.5/1200 2S TA
MPJ 16.5/750 1S HM	MPJ 16.5/1200 2S HA
MPJ 16.5/750 1S HA	MPJ 16.5/1200 3S FA
MPJ 16.5/750 1S FA	MPJ 16.5/1200 3S TA
MPJ 16.5/750 1S TA	
MPJ 16.5/750 1S HAE	
MPJ 20.0/750 1S HM	
MPJ 20.0/750 1S HA	
MPJ 20.0/750 1S FA	
MPJ 20.0/750 1S TA	

### Seriennummer | Serial Number

### Bezeichnung | Designation

Grubenheber Pit Jack

### Richtlinien | Directives

2006/42/EG 2006/42/EC

### Normen | Standards

DIN EN 1494

### Bevollmächtigter für die Zusammenstellung der technischen Unterlagen

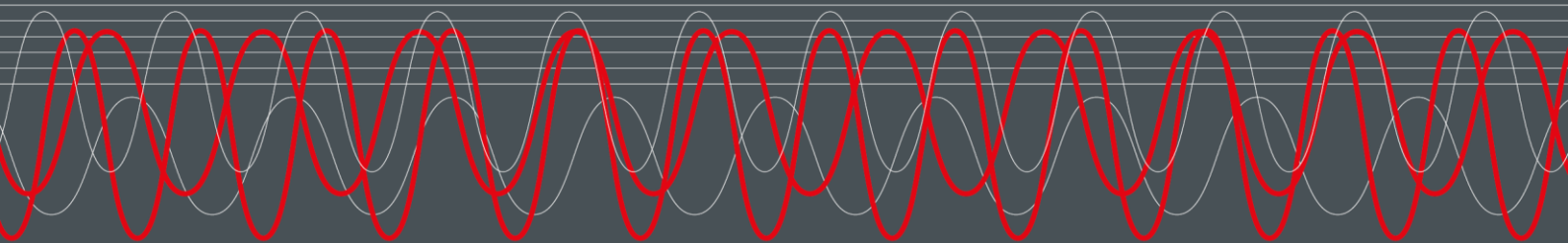
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Haldenwang, 2024-03-01

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