Push Pull
T 143S, T 144S, T 144S/180, T 145S, T 146S

- T 143S: Push Pull
- T 144S
  - T 144S/180: Push Pull with sideshift
- T 145S: Push Pull with sheet saver
- T 146S: Push Pull with sheet saver and sideshift

Subject to modifications
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Our service department in Aschaffenburg will be happy to answer your technical questions and to provide additional support.

Technical Support:
0049 (0)6021 865 395
0049 (0)6021 865 284
0049 (0)6021 865 352

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0049 (0) 6021 865251

Orders for spare parts Export:
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0049 (0) 6021 865348

Outside of normal business hours the Kaup – Service Hotline is available to you 365 days a year:
0049 (0) 172 6295 297
Monday - Friday: 5 pm to 7 am
Saturday and Sunday: 8 am to 6 pm

Kaup GmbH & Co KG • Braunstr. 17 • D-63741 Aschaffenburg • email: kaup@kaup.de • www.kaup.de
1. Introduction

1.1 Working with this manual

This operating manual contains important information on how to operate the attachment properly, safely and efficiently.

The operating manual shall be read, understood and applied by all personnel working on or with the equipment, for example:

- Installation and operating the equipment
- Inspection, maintenance and repair
- Transport and disposal

The manual must be kept available for ready reference at the equipment's place of use.

The illustrations in this operating manual may deviate from the actual version of the equipment.

1.2 Warning notes and symbols

The following symbols are used in this operating manual to highlight details of special importance:

- Identifies details relating to do's and don'ts for the purpose of avoiding injury and property damage.

- Specific details relating to the efficient use of the attachment and other advice.

- Lists are denoted by a shadowed box.

- Steps to be performed by the operator are denoted by a black dot.

- In illustrations, particular elements have numbered pointers. Numbers in brackets in the text refer to the corresponding elements.

1.3 Copyright

This documentation including all parts is copyrighted. Any use or change outside the narrow limits of copyright law without permission from KAUP GmbH & Co KG is forbidden and liable to prosecution. This applies, in particular, to reproduction, translation, microfilming as well as storage and processing in electronic systems.
1.4 **CE-Mark**

KAUP-Attachments carry the CE-mark. The EC Declaration of Conformity ensures that the attachment conforms to the EC machinery guideline.

1.5 **Qualified and authorised personnel**

Qualified and authorised personnel are equipped by way of their education and training to perform the tasks assigned to them in accordance with accepted practice and safety regulations. They are assigned tasks by the equipment owner.

1.6 **Warranty claims based on defects**

KAUP shall not be liable for any damage to the equipment resulting from:

- Improper use / operation.
- Modifications to components.
- Inappropriate installation, maintenance, inspection and servicing.
- Assignment of unqualified or non-authorised personnel.
- Claims raised by third parties.

1.7 **Limits of applicable use**

KAUP-attachments are intended for use under the following climatic conditions:

- Average ambient temperature for continuous operation: +25°C
- Allowable maximum ambient temperature, short term (up to 1h): +40°C
- Allowable minimum ambient temperature for attachments intended for indoor use: +5°C
- Allowable minimum ambient temperature for attachments intended for outdoor use: -20°C

Standard models of KAUP-attachments are NOT suitable for:

- Use in cold storage facilities.
- Use in explosive environments.
- Use in conjunction with hydraulic systems involving biological oils.
- Use in rough environmental conditions (e.g. seawater)
- The transport of acidic liquids.
2. Safety aspects

As the user, extend the safety instructions with generally applicable, legal and other measures that ensure a safe and environmentally friendly operation of the attachment.

Pay close attention to all safety- and danger-related signs on the attachment and in this operating manual. Failure to observe these can result in severe injury or even death.

Pay close attention to the operating manual provided by the manufacturer of the fork lift truck.

Keep a safe distance away from moving, reciprocating or rotating parts of the attachment to avoid danger of crushing, pinching or entanglement.

Notify the responsible department/person immediately of changes and faults in operation of the attachment that affect safety.

The attachment shall be shut down.

Use aids to vision (e.g. mirrors, camera, etc.) where goods being transported obstruct vision.

Only allow work on the attachment to be carried out by qualified and authorised persons. Adhere to the legal minimum age in the country of operation!

The attachment should only be used for the purpose intended.

Never work on or with attachments while under the influence of drugs, alcohol or medicines which affect reaction time.
3. Design

A push-pull consists of a carrying plate (1) and a frame (2) for holding the swing system (3), which is operated with hydraulic cylinders (4). The clamp blade system (5) is integrated in the push grate (6). A pallet retain (7) is optionally available. Attachment to the lift truck is via upper side shift components (8) and lower brackets (9) with integrated support rollers or upper brackets (10) and lower brackets (11).

3.1 Proper use of the equipment

Push-pulls are designed to take loads on slip-sheets made of cardboard or plastic, to transport them and to load containers or trucks with them.

Proper use of the machine and/or equipment includes the following:

- Observance of the operating manual at all times.
- Observance of the technical data on the identification plate on the attachment.
- Adherence to the specified inspection and maintenance instructions.
3.2 Improper use

- Exceeding the allowable load capacity and load centre.
- Dragging or pushing loads with the attachment.
- Transporting persons with the load or load handling devices.
- Mounting auxiliary equipment on the attachment such that the original mode of usage is changed, (e.g. fork extensions) must be authorised by the manufacturer.

4. Installation and checking out

4.1 Installation

Installation and commissioning should be performed by qualified and authorised personnel only.

Pay attention to a sufficient load-carrying capacity of the lifting means.

The following are examples of preferred lifting means:

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Part-no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 kg/M16</td>
<td>9710160008</td>
</tr>
<tr>
<td>1200 kg/M16</td>
<td>0360010201</td>
</tr>
<tr>
<td>2000 kg/M16</td>
<td>0360010301</td>
</tr>
</tbody>
</table>
- Hoist the attachment at the positions indicated (1).
- Demount the lower hooks (2).
- Mount the attachment on the fork carriage of the lift truck (3).
- Check that the attachment is correctly seated in the centre lock (4).
- Mount the lower hooks (2), tightening the screws (5) with a torque of 190 Nm.
- Connect the hose lines (6) to the hydraulic connectors on the lift truck.

Before initial operation, check the functions and the identification of the attachment with the movement directions of the operating elements (operating lever, joystick, etc.).

Mount the residual carrying capacity notice and identification of the operating elements (if not already present) of the combination of lift truck/attached equipment on the lift truck.
4.2 Checking out

KAUP-attachments are delivered pre-lubricated. If the attachment has been in storage for a longer period, we recommend that it be lubricated again before being placed in service. See 6. Maintenance and onwards.

Failure of the safety devices (e.g. the pressure relief valve and the non-return valve) and incorrect connection of the controls to the actuators can cause malfunctioning of the attachment and damage to it. After mounting and before initial operation, check the functions and the identification of the attached equipment with the movement directions of the operating elements (operating lever, joystick, etc.).

4.2.1 Bleeding the hydraulic system

- Start the lift truck.
- Move the sideshifter repeatedly in both directions to maximum extent.
- Move the push-pull backwards and forwards several times up to the limit stop.
- Inspect the hydraulic connections for leakage.

4.2.2 Adjustment after entry into service

The hydraulic system is under pressure. During work on hydraulic components oil spurting out can cause injuries. Unload the system in accordance with the operating instructions of the lift truck manufacturer. In the case of injuries caused by high pressure oil, inform the works physician and seek out a specialist immediately.

5. Operation

5.1 General

At least once per working shift, the machine and equipment must be inspected for visible damage and defects. Repeat faults to your superior and have them rectified without delay.

Be aware of persons present in the area where you are working or driving and ensure that they are not endangered.

Do not transport any load exceeding that specified on the residual load plate for the particular combination of lift truck and attachment.

Note the carrying capacity of the attachment on the type plate.
5.2 Load handling

- Drive the lift truck forward to load, tilt mast forward, grip the edge of slipsheet, pull loads back and drive lift truck forward at same speed meanwhile.
- Always transport pallets, boxes and containers using both forks.
- Pull the load picked up back to the limit stop.
- Raise the load about 300 mm and tilt the mast backwards.
- Centre the load to the middle of the lift truck during take-up and transport.
- Note the change in the centre of gravity of the load when moving the load. **Stability of the lift truck!**
- When unloading, tilt mast forward, push loads out and drive lift truck backward at same speed meanwhile.

5.3 Driving

- Ensure that the slip-sheets and packaging are in an acceptable condition.
- Do not drive with the mast tilted forward.
- **Only drive with the load back to the limit stop!**
- Take care when driving that neither the attachment nor the load comes into contact with the ground.
- Ensure that multiple items stacked on top of one another are securely fastened.

6. Maintenance and servicing

6.1 General

Regular maintenance is essential to ensure reliable operation and long service life of the KAUP attachment.

- Ensure that maintenance and servicing are performed by qualified and authorised personnel only.
- Lubrication and cleaning work on the attachment may also be performed by the lift truck operator.
Perform maintenance and servicing work only when the attachment is parked securely on a stable, level foundation. For installing and removing, it is recommended to use a pallet to take the attachment. The attachment can thus be securely placed and transported.

Pay attention to a sufficient load-carrying capacity of the lifting means.

Replace missing or defective warning signs on the attachment.

Do not use third party spare parts. Through poor quality or incorrect matching they can result in a risk of accident. The EC Declaration of Conformity by the manufacturer becomes invalid and you assume full responsibility in the case of accident. Use only original spare parts from the manufacturer.

The hydraulic system is under pressure. During work on hydraulic components oil spurting out can cause injuries. Unload the system in accordance with the operating instructions of the lift truck manufacturer. In the case of injuries caused by high pressure oil, inform the works physician and seek out a specialist immediately.

Screw connections can loosen due to vibration of the attachment. During routine maintenance check that screw connections are correctly torqued and replace screws which are visibly damaged.

Note the following tightening torques which are valid for screws with connecting surfaces according to ISO 4762, ISO 4014, ISO 4032 etc.:

<table>
<thead>
<tr>
<th>Screw/bolt rating</th>
<th>8.8</th>
<th>10.9</th>
<th>12.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>M6 thread</td>
<td>9.3Nm</td>
<td>14Nm</td>
<td>16Nm</td>
</tr>
<tr>
<td>M8 thread</td>
<td>23Nm</td>
<td>33Nm</td>
<td>39Nm</td>
</tr>
<tr>
<td>M10 thread</td>
<td>45Nm</td>
<td>66Nm</td>
<td>77Nm</td>
</tr>
<tr>
<td>M12 thread</td>
<td>77Nm</td>
<td>115Nm</td>
<td>135Nm</td>
</tr>
<tr>
<td>M16 thread</td>
<td>190Nm</td>
<td>280Nm</td>
<td>330Nm</td>
</tr>
<tr>
<td>M20 thread</td>
<td>385Nm</td>
<td>550Nm</td>
<td>640Nm</td>
</tr>
</tbody>
</table>

Failure of the safety devices (e.g. the pressure relief valve and the non-return valve) and incorrect connection of the controls to the actuators can cause malfunctioning of the attachment and damage to it.

After mounting and before initial operation, check the functions and the identification of the attached equipment with the movement directions of the operating elements (operating lever, joystick, etc.).

6.2 Significant modification

Significant modifications are, for example, those which affect the stability, performance, speed and strength of components.

The EC Declaration of Conformity is invalidated by a significant modification of the attachment.

Modifications to the attachment may only be made with prior approval by the manufacturer.
6.3 Schedule for routine maintenance and lubricants

<table>
<thead>
<tr>
<th>Lubricants approved and recommended by KAUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greases</td>
</tr>
<tr>
<td>Lithium soap grease NLGI Class 2</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Complex soap grease NLGI Class 2</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Teflon spray</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

The specified maintenance schedules can change as a result of the operating conditions such as extreme cold, heat and dust or poor ground conditions and this must be taken into account by the owner.

With other loads, such as fork arms with a length of over 2,400 mm or raised load centres, amended/shorter maintenance intervals should be agreed by the user with the manufacturer.

6.3.1 Mounting

Daily

Check all lines, hoses and connections for leakage and damage.
After 50h / every 500h thereafter

Check screws:
- (1) on the carrying plate (2) and spacer (3).
- (4) on the hook (5) and spacer (3).
- (6) on the upper hook (7).
- (8) on the lower hook (9).
- (10) on the sideward component (11).

Replace loose or damaged screws. Torque the screws as specified in Chapter 6.1 General.

Weekly

Grease:
- sliding pieces (13) by way of the greasing nipples (12).
- supporting rollers (15) by way of the greasing nipples (14) as necessary.

Every 200h

Check wear on:
- sliding pieces (13).
- supporting rollers (15) in the hooks (9).
- bumper (16).

As necessary

Renew worn sliding pieces (13) by removing the hooks (9). Demount the push-pull in the reverse sequence as described in Chapter 4.1. Replace the sliding pieces (13). During installation pay close attention that the sliding pieces (13) are seated correctly. Mount the push-pull afterwards as described in Chapter 4.1.

Replace defective supporting rollers (15) in the hooks (9) by removing the screws (8). Tilt the complete push-pull forwards from the fork carriage of the lift truck with suitable lifting equipment. Remove the bolts (14) in the hooks (9), remove the defective supporting rollers (15) and replace them with new ones. Remount the complete push-pull in the reverse sequence.
6.3.2 Swing bearing without sheet saver

6.3.3 Swing bearing with sheet saver
Daily

Check all lines, hoses and connections for leakage and damage.

After 50h / every 500h thereafter

Check screws:
- (1) with washer (2) on the bearing (3) and base plate (4).
- (5) at the bolt (6).
- (7) on the sheet saver (8) and frame (9).

Replace loose or damaged screws. Torque the screws as specified in Chapter 6.1 General.

Every 200h

Check wear on:
- sliding pieces (10).
- bushes (15).

As necessary

Renew worn sliders (10) by demounting the nut (11) for the cylinder (12) on the retainer (13). Pull out the frame (9) upwards. Replace worn sliders (10) on the guide profiles (14). Remount the frame (9) and nut (11) on the retainer (13) of the cylinder (12).

After installing or removing a cylinder (12), always check the clearance between the cylinder mount and nut of the cylinder (16). Cylinders are installed with axial clearance of 1.5 to 2 mm.

Renew worn bushes (15) by removing the screw (5). Pull the bolts (18) out to the side. Replace worn bushes (15) and remount bolts (6) with screws (5).
6.3.4 Swing system

Daily

Check all lines, hoses and connections for leakage and damage.

After 50h / every 500h thereafter

Check screws:
- (1) and washer (2) at the bolt (3).
- (1) and washer (2) at the bolt (4).
- (7) at the bolt (8).
- (11) on the fork head (12).
- on the ball-and-socket joint (15).
- (17) on the bolt (18).

Replace loose or damaged screws. Torque the screws as specified in Chapter 6.1 General.
Weekly

Grease:
- bush (5) by way of the greasing nipples (19).
- bush (10) by way of the greasing nipples (9).
- roller (14) by way of the greasing nipples (13).
- bearing (15) by way of the greasing nipples (16).

Every 200h

Check wear on:
- bolts (3, 4, 8, 18).
- bushes (5).
- bearing (10).

As necessary

Renew worn bushes (5) or bolts (3, 4) by demounting the screw (1), washer (2) and nut (6). Pull the bolts (3, 4) out to the side. Replace worn pieces. Remount bolts (3, 4), bush (5), washer (2), screw (1) and nut (6).

Renew worn bearings (10) or bolts (8) by removing the screw (7). Pull the bolts (8) out to the side. Replace worn pieces. Remount the bolt (8), bearing (10) and screw (7).

Renew worn bolts (18) by demounting the screw (17). Pull the bolts (18) out to the side. Replace worn pieces. Remount the bolts (18) and screw (17).
6.3.5 Pushing grate and clamp blade

**Daily**

Check all lines, hoses and connections for leakage and damage.

**After 50h / every 500h thereafter**

Check screws:
- (1) on the wear strip (2) and push grate (3).
- (5) on the vulcollan bar (4) and clamp blade (6).
- (7) on the guide (8) and push grate (3).

Replace loose or damaged screws. Torque the screws as specified in Chapter 6.1 General.

**Every 200h**

Check wear on:
- bar (2).
- vulcollan bar (4).
As necessary

Renew the worn strip (2) or Vulkollan bar (4) by loosening the screw (9) on the pivot bearing. Insert a screwdriver (10) into the hole (11) on the piston rod. Now rotate the piston rod to the right until the push grate moves beyond the tip of the carrying plate (12). Renew the strip (2) or Vulkollan bar (4) by removing screws (1) or (5) first and then remounting it. Rotate the piston rod back to the left until the push grate is back in its original position and tighten the screw (9) on the pivot bearing.

6.3.6 Identification plate and caution board
## Operating Manual

### Number Description KAUP order number

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
<th>KAUP order number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Identification plate</td>
<td>only by quality department</td>
</tr>
<tr>
<td>2</td>
<td>Before putting into operation carefully read and take note of the operating and security instructions.</td>
<td>0100016401</td>
</tr>
<tr>
<td>3</td>
<td>Never reach into the unit as long as parts could still be moving due to the danger of squashing or shearing.</td>
<td>0100016601</td>
</tr>
<tr>
<td>4</td>
<td>Use suspension point!</td>
<td>0100015001</td>
</tr>
<tr>
<td>5</td>
<td>KAUP – order number</td>
<td>without, engraved in the material</td>
</tr>
</tbody>
</table>

### Troubleshooting

Troubleshooting should only be performed by qualified and authorised personnel.

<table>
<thead>
<tr>
<th>Fault</th>
<th>Possible cause</th>
<th>Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reach Fork</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pushing out and in</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Movement too slow</td>
<td>Insufficient fluid flow from truck's hydraulics</td>
<td>Increase flow rate of truck's hydraulics</td>
</tr>
<tr>
<td><strong>Clearance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Swing system</td>
<td>Pivot bearing worn</td>
<td>Replace pivot bearing</td>
</tr>
<tr>
<td></td>
<td>Pin worn</td>
<td>Replace pin</td>
</tr>
<tr>
<td><strong>Oil leakage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ At cylinder</td>
<td>Screw fitting is leaking</td>
<td>Tighten / seal screw fitting</td>
</tr>
<tr>
<td></td>
<td>Sealing kit defective</td>
<td>Replace sealing kit</td>
</tr>
<tr>
<td></td>
<td>Piston rod scored</td>
<td>Replace piston rod and sealing kit</td>
</tr>
</tbody>
</table>
## Faults and Corrections

<table>
<thead>
<tr>
<th>Fault</th>
<th>Possible cause</th>
<th>Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sideshifter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When shifting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>❑ Too slow</td>
<td>Pressure supplied by the FFZ too low</td>
<td>Increase pressure at the FFZ</td>
</tr>
<tr>
<td></td>
<td>Bore of the throttle valve is too small</td>
<td>Re-bore the throttle valve or replace it with a larger one</td>
</tr>
<tr>
<td>❑ Jerky shifting action</td>
<td>Supporting roller defective</td>
<td>Replace supporting roller</td>
</tr>
<tr>
<td></td>
<td>Supporting roller not properly lubricated</td>
<td>Lubricate supporting roller</td>
</tr>
<tr>
<td></td>
<td>Sliders not properly lubricated</td>
<td>Lubricate sliders</td>
</tr>
<tr>
<td>❑ Supporting roller does not rotate</td>
<td>Supporting roller defective</td>
<td>Replace supporting roller</td>
</tr>
<tr>
<td></td>
<td>Supporting roller not properly lubricated</td>
<td>Lubricate supporting roller</td>
</tr>
<tr>
<td>❑ Housing scrapes on the conduit</td>
<td>Slider is worn</td>
<td>Replace sliders</td>
</tr>
</tbody>
</table>

## Oil leakage

<table>
<thead>
<tr>
<th>Fault</th>
<th>Possible cause</th>
<th>Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>❑ Leaking</td>
<td>Screw fitting is leaking</td>
<td>Tighten / seal screw fitting</td>
</tr>
<tr>
<td></td>
<td>Sealing kit defective</td>
<td>Replace sealing kit</td>
</tr>
<tr>
<td></td>
<td>Piston rod scored</td>
<td>Replace piston rod and sealing kit</td>
</tr>
</tbody>
</table>

## Solenoid valve

<table>
<thead>
<tr>
<th>Fault</th>
<th>Possible cause</th>
<th>Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>❑ Not functioning</td>
<td>Solenoid coil defective</td>
<td>Replace solenoid coil</td>
</tr>
<tr>
<td></td>
<td>No power to the magnet</td>
<td>Inspect power cable and connections</td>
</tr>
</tbody>
</table>

### 8. Disposal

Prevent environmental damage by disposing of the following items properly in accordance with relevant national regulations:

- Hydraulic fluids, greases, lubricants and soiled working materials (Cleaning rags, etc.)
- Packaging material (Pallets, straps, cartons and plastic sheeting)

After decommissioning, the attachment should be disposed of in accordance with local legislation and regulations.

### 9. Transport

During transport of the attachment, care should be given to using appropriate means of support (e.g. pallets). These must not be damaged. The attachment must be secured against slipping or tipping over on the support.
10. Decommissioning and storage

If the attachment is to be stored for an extended period, the hydraulic connectors must be sealed against contamination and damage. Store the attachment in a clean, dry environment.

11. EC Declaration of Conformity (Summary)

KAUP GMBH & Co. KG • Braunstraße 17 • D-63741 Aschaffenburg

we hereby declare that the machinery

<table>
<thead>
<tr>
<th>Model:</th>
<th>Push-Pull</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type:</td>
<td>T 143S, T 144S, T144S/180, T145S, T146S</td>
</tr>
</tbody>
</table>

conforms to the latest valid version of the Machinery Directive 2006/42/EG.

The person authorised to compile the technical documents:

see EC-Declaration of Conformity

KAUP GmbH & Co. KG