Before starting operation carefully read and adhere to this instruction manual and the safety advice!
AMAZONE-rotary cultivators KG are yet other high quality products from the large range of AMAZONE farm machinery. In order to ensure a trouble free operation, we recommend you to carefully read this instruction manual and to adhere to the advice given therein. Please ensure that this instruction manual has been made available to the operator before starting to operate the implement.

This instruction manual refers to
- AMAZONE-rotary cultivators KG 3-2
- with tooth packer roller PW
- with tyre packer roller RP
- with wedge ring roller KW.

We wish you an always successful work with best results.

AMAZONEN-Werke
H. Dreyer GmbH & Co. KG

Hints for this instruction manual
Keep this instruction manual so that it is always at hand. In case you sell your machine, pass on this instruction manual to the next owner.
At the time of printing all data and indications are on their latest state. As AMAZONE is always endeavouring to introduce improvements, we reserve the right for changes at any time without any engagement.
## Contents

<table>
<thead>
<tr>
<th>Para.</th>
<th>Details about the implement</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>Details about the implement</td>
<td>1</td>
</tr>
<tr>
<td>2.1</td>
<td>Range of application</td>
<td>1</td>
</tr>
<tr>
<td>2.2</td>
<td>Manufacturer</td>
<td>1</td>
</tr>
<tr>
<td>2.3</td>
<td>Conformity declaration</td>
<td>1</td>
</tr>
<tr>
<td>2.4</td>
<td>Symbols in this instruction manual</td>
<td>1</td>
</tr>
<tr>
<td>2.5</td>
<td>Details when making enquiries and ordering</td>
<td>1</td>
</tr>
<tr>
<td>2.6</td>
<td>Details about noise level</td>
<td>2</td>
</tr>
<tr>
<td>2.7</td>
<td>Declined use of the machine</td>
<td>2</td>
</tr>
<tr>
<td>2.8</td>
<td>Type plate rotary cultivator KG 3-2</td>
<td>3</td>
</tr>
<tr>
<td>2.9</td>
<td>Technical data</td>
<td>4</td>
</tr>
<tr>
<td>2.10</td>
<td>Hydr. circuit diagram</td>
<td>6</td>
</tr>
<tr>
<td>2.11</td>
<td>Possibilities to use the rotary cultivator</td>
<td>7</td>
</tr>
<tr>
<td>2.12</td>
<td>Range of application of the rotary cultivator</td>
<td>7</td>
</tr>
<tr>
<td>2.13</td>
<td>Way of function of the rotary cultivator</td>
<td>8</td>
</tr>
<tr>
<td>3.0</td>
<td>Safety</td>
<td>1</td>
</tr>
<tr>
<td>3.1</td>
<td>Dangers when not adhering to the safety advice</td>
<td>1</td>
</tr>
<tr>
<td>3.2</td>
<td>Operator qualification</td>
<td>1</td>
</tr>
<tr>
<td>3.3</td>
<td>Symbols in this instruction manual</td>
<td>1</td>
</tr>
<tr>
<td>3.4</td>
<td>Warning pictographs and hint signs</td>
<td>2</td>
</tr>
<tr>
<td>3.5</td>
<td>Safety conscious operation</td>
<td>8</td>
</tr>
<tr>
<td>Section</td>
<td>Title</td>
<td>Page</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>3.6</td>
<td>Safety advice for the operator</td>
<td>8</td>
</tr>
<tr>
<td>3.6.1</td>
<td>General safety and accident prevention advice</td>
<td>8</td>
</tr>
<tr>
<td>3.6.2</td>
<td>General safety and accident prevention advice for implements mounted to the tractor’s three-point hydraulic</td>
<td>9</td>
</tr>
<tr>
<td>3.6.3</td>
<td>General safety and accident prevention advice for pto driven implements</td>
<td>10</td>
</tr>
<tr>
<td>3.6.4</td>
<td>General safety and accident prevention advice for operating the hydraulic system</td>
<td>11</td>
</tr>
<tr>
<td>3.6.5</td>
<td>General safety and accident prevention advice for maintenance- and care</td>
<td>12</td>
</tr>
<tr>
<td>3.6.6</td>
<td>General safety and accident prevention advice when retrofitting electric and electronic devices and/or components</td>
<td>12</td>
</tr>
<tr>
<td>4.0</td>
<td><strong>Putting into operation</strong></td>
<td>2</td>
</tr>
<tr>
<td>4.1</td>
<td>First fitting</td>
<td>2</td>
</tr>
<tr>
<td>4.2</td>
<td>Settings in the field</td>
<td>3</td>
</tr>
<tr>
<td>4.3</td>
<td>Starting to work</td>
<td>3</td>
</tr>
<tr>
<td>4.4</td>
<td>During operation</td>
<td>3</td>
</tr>
<tr>
<td>4.5</td>
<td>After the first 10 hours of operation</td>
<td>4</td>
</tr>
<tr>
<td>4.6</td>
<td>After having finished work</td>
<td>4</td>
</tr>
<tr>
<td>5.0</td>
<td><strong>Mounting to the rear of the tractor</strong></td>
<td>1</td>
</tr>
<tr>
<td>6.0</td>
<td><strong>Pto shaft between tractor and rotary cultivator</strong></td>
<td>1</td>
</tr>
<tr>
<td>6.1</td>
<td>Attaching the pto shaft</td>
<td>2</td>
</tr>
<tr>
<td>6.2</td>
<td>First fitting and matching the pto shaft to another tractor</td>
<td>4</td>
</tr>
</tbody>
</table>
6.3 Putting the pto shaft into operation ........................................................................................ 6
6.4 Taking the universal joint shaft out of operation after work ................................................. 7
6.5 Standstill of the tines during operation ................................................................................ 7
   6.5.1 Pto shaft P500 with cam clutch ...................................................................................... 8
   6.5.2 Full guard of the pto shaft P500 .................................................................................... 9
7.0 Attaching the AMAZONE-rollers and setting the working depth of the rotary cultivator .......... 1
   7.1 Attaching the tooth packer rollers PW 420 and PW 500 and wedge ring rollers KW 450 2
   7.2 Attaching the tyre packer rollers RP and wedge ring rollers KW 580 .......................... 5
   7.3 Setting the working depth of the rotary cultivator ............................................................. 7
8.0 Working and transport position ......................................................................................... 1
   8.1 Bringing the rotary cultivator into working position ......................................................... 1
   8.2 Bringing the rotary cultivator into transport position ....................................................... 2
   8.3 Changing the folding speed of the transport folding frame ............................................. 3
9.0 Gearbox .............................................................................................................................. 1
   9.1 Speed of the tines ............................................................................................................. 1
   9.2 Speed of the tractor pto shaft .......................................................................................... 1
   9.3 Setting the speed on the three-speed shift main gearbox ................................................. 2
10.0 Hinged side plates ............................................................................................................. 1
   10.1 Fitting the side plates ...................................................................................................... 1
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.2</td>
<td>Setting the working depth of the side plates</td>
<td>2</td>
</tr>
<tr>
<td>10.3</td>
<td>Adapting the spring tension to the soil conditions</td>
<td>2</td>
</tr>
<tr>
<td>11.0</td>
<td><strong>Tooth packer roller</strong></td>
<td>1</td>
</tr>
<tr>
<td>11.1</td>
<td>Setting the scrapers</td>
<td>1</td>
</tr>
<tr>
<td>12.0</td>
<td><strong>Seed be preparation with tyre packer-sowing combinations</strong></td>
<td>1</td>
</tr>
<tr>
<td>12.1</td>
<td><strong>Levelling bar for the tyre packer roller</strong></td>
<td>4</td>
</tr>
<tr>
<td>12.1.1</td>
<td>Height adjustment of the levelling bar</td>
<td>4</td>
</tr>
<tr>
<td>12.2</td>
<td>Clearer</td>
<td>5</td>
</tr>
<tr>
<td>12.3</td>
<td>Parking the tyre packer roller</td>
<td>6</td>
</tr>
<tr>
<td>12.4</td>
<td>Exchange of a defective tyre</td>
<td>7</td>
</tr>
<tr>
<td>12.4.1</td>
<td>Re-use and fitting of used tyre bracing rings</td>
<td>10</td>
</tr>
<tr>
<td>13.0</td>
<td><strong>Levelling rod</strong></td>
<td>1</td>
</tr>
<tr>
<td>13.1</td>
<td>Setting the levelling rod</td>
<td>1</td>
</tr>
<tr>
<td>13.2</td>
<td>Taking out of operation</td>
<td>1</td>
</tr>
<tr>
<td>13.3</td>
<td>Fitting the levelling rod</td>
<td>2</td>
</tr>
<tr>
<td>18.0</td>
<td><strong>Transport on public roads</strong></td>
<td>1</td>
</tr>
<tr>
<td>19.0</td>
<td><strong>Maintenance - repairs</strong></td>
<td>1</td>
</tr>
<tr>
<td>19.1</td>
<td>Bolt connections</td>
<td>1</td>
</tr>
<tr>
<td>19.2</td>
<td>Three-speed shift main gearbox</td>
<td>1</td>
</tr>
<tr>
<td>19.3</td>
<td>Angled gearbox</td>
<td>3</td>
</tr>
<tr>
<td>19.4</td>
<td>Checking the oil level in the spur gear trough</td>
<td>4</td>
</tr>
<tr>
<td>19.5</td>
<td>Grease nipples</td>
<td>6</td>
</tr>
<tr>
<td>Section</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>---------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>19.6</td>
<td>Soil tillage tines</td>
<td>8</td>
</tr>
<tr>
<td>19.6.1</td>
<td>Exchanging the soil tillage tines</td>
<td>8</td>
</tr>
<tr>
<td>19.6.2</td>
<td>Welding on new tine tips</td>
<td>10</td>
</tr>
<tr>
<td>19.7</td>
<td>Safety clutch with cam clutch Walterscheid EK 64/2 (in general)</td>
<td>12</td>
</tr>
<tr>
<td>19.7.1</td>
<td>Function</td>
<td>12</td>
</tr>
<tr>
<td>19.7.2</td>
<td>Mounting</td>
<td>12</td>
</tr>
<tr>
<td>19.7.3</td>
<td>Setting the torque</td>
<td>12</td>
</tr>
<tr>
<td>19.8</td>
<td>Removing and installing the tine rotor shafts</td>
<td>14</td>
</tr>
<tr>
<td>19.8.1</td>
<td>Installation plan for the rotor shafts</td>
<td>16</td>
</tr>
<tr>
<td>19.8.2</td>
<td>Removing an external bearing ring</td>
<td>18</td>
</tr>
<tr>
<td>19.8.3</td>
<td>Installing the spur gear housing fastening nuts</td>
<td>19</td>
</tr>
<tr>
<td>19.8.4</td>
<td>Installation after the repairs</td>
<td>20</td>
</tr>
<tr>
<td>19.8.5</td>
<td>Attaching the universal joint shafts to the three-speed shift main gearbox</td>
<td>21</td>
</tr>
</tbody>
</table>
2.0 Details about the machine

2.1 Operational range
In combination with an AMAZONE packer- or wedge ring roller, the AMAZONE rotary cultivator KG is suited for the usual soil tillage operation in agriculture.

2.2 Manufacturer
AMAZONEN-Werke
H. Dreyer GmbH & Co. KG
Postfach 51, D-49202 Hasbergen-Gaste / Germany

2.3 Conformity declaration
The implement combination fulfills the requirements of the EC guide-line Machine 89/392/ED and the corresponding additional guide lines.

2.4 Symbols in this instruction manual
In this instruction manual many warnings, attentions and hints are identified by symbols. The explanation for these symbols please find in the following:

Safety/Warning symbol (DIN 4844-W9)
This symbol is used and will be found in such places of this instruction manual with operator safety hints, not adhering to them would mean that life or health of persons is in danger.

Attention symbol
This symbol will always be found in such places of this instruction manual which should especially be adhered to in order to prevent damage to the implement.

2.5 Details when making enquiries and ordering
When ordering options or spare parts, the implement type and the serial number have to be included.
All components of your implement have carefully been matched in order to provide you with a high safety standard. Please be aware, that any technical deviation from the original state of your implement may affect its safety. This does not only apply to unsuited spare parts but also for options which do not have our approval.

For your own safety we therefore recommend you only to use original spare parts and original options.

Original spare parts and options have been especially designed for your machine and have been checked.

For all spare parts, options and fitting parts which have not been approved by AMAZONE as well as in case of any other arbitrary technical changes, the liability of AMAZONE for resulting damage is ruled out!
2.6 Details about noise level

The tractor operator seat related emission value (sound pressure level) is 74 dB (A), measured when operating with closed tractor cab at the ear of the tractor operator. Measuring implement: OPTAC SLM 5. The value of the sound pressure level mainly depends on the vehicle used.

2.7 Declined use of the implement

The AMAZONE-rotary cultivator has exclusively been designed for the usual soil tillage operation in agriculture in combination with an AMAZONE packer roller or AMAZONE wedge ring roller. Any use beyond the one stipulated above is no longer considered as designed use. The manufacturer does not accept any responsibility for damage resulting from this; therefore, the operator himself carries the full risk. Under „designed use“ also the adhering to the manufacturer’s prescribed operation maintenance and repair conditions as well as the exclusive use of original AMAZONE-spare parts is to be understood.

Any damage resulting from arbitrary changes on the implement rule out the responsibility of the manufacturer.

Therefore, check before any use and also during operation your implement for the proper function.

Claims regarding damage not having occurred on the AMAZONE soil tillage implement would be rejected. Modifications made to the soil tillage implement by the owner/user may result in damage and therefore the manufacturer does not accept liability for such damage.
2.8 Type plate

rotary cultivator KG 3-2

The type plate is of documentary value and may not be changed or disguised!

Insert here the serial-No. of your machine.

Machine type:

AMAZONE
Rotary Cultivator KG ......................

Serial-No.: ......................................

Fig. 2.1
## 2.9 Technical data

<table>
<thead>
<tr>
<th>AMAZONE-Rotary cultivator</th>
<th>KG 403-2 (see Fig. 2.2)</th>
<th>KG 453-2</th>
<th>KG 503-2 (see Fig. 2.5)</th>
<th>KG 603-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working width</td>
<td>4,0 m</td>
<td>4,5 m</td>
<td>5,0 m</td>
<td>6,0 m</td>
</tr>
<tr>
<td>Number of rotors</td>
<td>14</td>
<td>16</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>Length of tines</td>
<td>29 cm</td>
<td>29 cm</td>
<td>29 cm</td>
<td>29 cm</td>
</tr>
<tr>
<td>max. working depth</td>
<td>20 cm</td>
<td>20 cm</td>
<td>20 cm</td>
<td>20 cm</td>
</tr>
<tr>
<td>Net weight of rotary cultivator without roller</td>
<td>1800 kg</td>
<td>2000 kg</td>
<td>2200 kg</td>
<td>2650 kg</td>
</tr>
<tr>
<td>net weight of rotary cultivator with tooth packer roller PW 500</td>
<td>2350 kg</td>
<td>2650 kg</td>
<td>2950 kg</td>
<td>3550 kg</td>
</tr>
</tbody>
</table>
2.10 Hydr. circuit diagram

Connect the hydraulic rams of the transport folding frame following the hydr. circuit diagram (Fig. 2.6) to a double acting tractor control valve.

⚠️ Please observe the safety advice in para. 3.6.4.

Circuit diagram names:
- \( ab \) = implement side
- \( cd \) = tractor side

- \( Q1 \) = tractor control valve, illustrated in position "work"
- \( A \) = hydr. ram left hand side, for transport folding rame KG 3-2
- \( B \) = hydr. ram right hand side, for transport folding rame KG 3-2.

⚠️ Set the tractor control valve \( Q1 \) in floating position as shown in Fig. 2.6 as soon as the rotary cultivator is in working position.
2.11 Possibilities of use of the rotary cultivator

The AMAZONE-rotary cultivator can be used as:

- **as an individual machine** in conjunction with a tooth packer-, tyre packer or wedge ring roller

- **as part of an individual machine** in conjunction with a tooth packer-, tyre packer or wedge ring roller and front seed tank combination with pack top sowing rail module (Fig. 2.7).

The till- and drill combination optimises the loosening of the soil, recompacting and precise seeding in one pass.

2.12 Areas of application of the rotary cultivator

The AMAZONE-rotary cultivator can be used for:

- Seed bed preparation after ploughing, use of a heavy cultivator or a deep cultivator
- Seed bed preparation without prior work
- Stubble tilling without prior work
- Pasture tilling without prior work.

The till- and drill combination optimises the loosening of the soil, recompacting and precise seeding in one pass.
2.13 Working principle of the rotary cultivator

The tines of the rotary cultivator are in the "grip" position. The tines "on grip" rip up and crumble the soil. Tines "on grip" pull the rotary cultivator into the soil. Thus, the rotary cultivator, supported by the packer roller, maintains a constant working depth, irrespective whether the soil has been ploughed or not tilled at all.

Good packing of the rotary cultivator and the packer roller results from three factors:
1. net weight of the packer roller (Fig. 2.8/1).
2. net weight of the rotary cultivator (Fig. 2.8/2).
3. the force with which the tines try to drag themselves into the soil (Fig. 2.8/3).

Tines in the "grip" position have a separation effect: coarse soil particles are transported further than fine particles. The fine soil is concentrated in the lower region of the worked zone while the coarse soil particles remain on the surface (see Fig. 2.19), protecting against panning of the soil.
A wall of soil is thrown up in front of the rotary cultivator, which fills in unevennesses. Straw and other organic matter are mulched near the surface. The tines, manufactured from hardened spring steel, ensure that the soil tillage implement runs quietly. The long tines allow a large clearance height when incorporation straw.

The round tine carriers (Fig. 2.10/1) prevent stones from being trapped. The tines are fastened in pockets (Fig. 2.10/2) that are shaped in such a manner that the tines can give way to stones and other obstacles.
3.0 Safety

In order to ensure a trouble-free operation we recommend you to read this instruction manual carefully and always to adhere to the recommendations given herein.

Please ensure that every operator had read this instruction manual before he puts the implement to operation.

In this instruction manual you will find many hints which will help you to achieve a trouble-free operation.

The descriptions are supplemented by many pictures in order to explain to you all functions and to give you hints for the safety and for the operation of the implement under different operation conditions.

Please always follow and adhere to all safety advice exactly.

3.1 Danger when not adhering to the safety advice

Not adhering to the safety advice
- may cause danger as well for persons as also for the environment and the implement.
- will lead to a total loss of any right for claims.

In details, not adhering may - for example - lead to the following danger:
- failure of important functions of the machine
- failure of prescribed methods for maintenance and repair
- Endangering of persons by mechanical affects
- Endangering of the environment by leakages of hydraulic oil

3.2 Operator qualification

The soil tillage implement may only be used, maintained and repaired by persons who have received the appropriate training and are aware of the dangers that such work may involve.

3.3 Symbols in this instruction manual

In this instruction manual many warnings, caution-hints and hints have been signed by symbols. The explanation of these symbols are given in the following:

⚠️ This symbol draws your attention to information given in this instruction manual regarding danger to the life of persons.

⚠️ Attention symbol

gives safety hints. Not adhering to these hints may cause danger for the machine and its function.

❓ Hint symbol

dicates machine specific special information that must be observed for proper operation.
3.4 Warning signs and hint signs on the machine

The warning signs, e.g.:

![Warning sign]

indicate dangerous points on the machine. Observing these signs means safety for all persons using this machine.

The hint signs, e.g.:

![Hint sign]

indicate machine specific special information that must be observed for proper operation.
The fixing points of attention signs and hint signs are illustrated in the Figures 3.1 and 3.2. Please find the explanations for these attention- and hint signs on the following pages. We ask you to observe them and also make other users acquainted with them. Please always keep all attention and hint signs clean and in well readable condition. Please ask for replacement of damaged or missing signs from your dealer and attach to relevant place (picture-No.: = order-No.).
Before starting operation, read adhere to the instruction manual and the safety advice!

Do not touch any moving machine parts. Wait for their standstill!

Only start to operate with the implement with guards fitted.
Do not remove guards when the engine is running.
Switch off the pto shaft before removing the guard. Stop engine and pull off ignition key!

Never touch zone of bruizing danger as long as parts can still be moving.
Advise people to leave the danger area!
Picture No.: MD 079

**Explanation:**
Danger because of flinging foreign particles!
Advise people to leave the danger area!

Picture No.: MD 082

**Erläuterung:**
Sitting or standing on the implement during operation or road transport is not permitted!

Picture No.: MD 084

**Explanation:**
Do not stay or allow persons to stay within the pivoting area of the implement!

Picture No.: MD 087

**Explanation:**
Observe sufficient safety zone from rotating tines when engine is running with pto shaft engaged.

Picture No.: MD 089

**Explanation**
Do not stay within the area of a lifted and unsecured load!
Picture No.: 951790

Explanation
Retighten bolts after some hours of operation!

Picture No.: 911888

Explanation
The CE-sign indicates that the machine meets the EU-guidelines 89/392/EG and the relevant additional guidelines.

Picture No.: 952905

For explanation, please refer to para. 12.4 and para. 12.4.1.

Picture No.: 954946

For explanation, please refer to para. 19.8.5
Picture No.: 955418

For explanation, please refer to para. 9.2

Picture No.: 955717

For explanation, please refer to para. 8.0
3.5 Safety conscious operation

Beside the safety advice in this operation manual your national common working safety and accident prevention advice have to be adhered to.

For road transport observe your national applicable traffic rules.

3.6 Operator safety advice for the operator

3.6.1 General safety and accident prevention advice

Basic principle:

Before using the machine and tractor, always check to ensure that they are safe and comply with traffic regulations!

1. Apart from the notes in these operation instructions, also observe the general regulations regarding safety and accident prevention!

2. The warning and information labels attached to the machine provide important information for safe operation. They are intended to ensure your safety!

3. Observe the appropriate regulations when taking the machine onto public roads!

4. Become acquainted with all installations and controlling devices as well as with their function before beginning with the operation. Doing this during operation would be too late!

5. The clothing of the operator should fit well. Avoid wearing any loose clothing!

6. Keep the implement clean to avoid the risk of fire!

7. Before starting or driving the implement, ensure that there are no persons in the immediate vicinity (especially children). Ensure that you have sufficient visibility!

8. No persons other than the operator may ride on the machine during work; the machine may not be used to transport goods or people!

9. Couple the machine in accordance with regulations and only secure it to the prescribed device!

10. Particular attention must be paid when coupling and uncoupling the machine to and from the tractor!

11. When assembling and disassembling, ensure that the support devices are positioned correctly (stability).

12. Fit counter-weights always as advised to the fixing points provided for that purpose on the tractor!

13. Adhere to the maximum permissible axle loads, total weights and transport measurements!

14. Observe the national traffic regulations with regard to transport dimensions!

15. Fit and check transport gear, traffic lights, warnings and guards!

16. The release ropes for quick coupler must hang freely and in the lowered position must not release by themselves!

17. During driving, never leave the driver’s seat!

18. Travelling behaviour, steerability and braking effectiveness are influenced by integrated and attached devices and ballast weights. Therefore, ensure that the machine has adequate steering and braking effectiveness!

19. When lifting the implement with the rear hydraulics the front axle load of the tractor is reduced. The sufficient front axle load (20% of the tractor’s net weight) has to be observed. (Please adhere to the instruction manual of the tractor’s manufacturer.)
20. When driving on curves, take the width and/or the balance weight of the machine into account.

21. Only put machine to operation with all guards fitted properly!

22. Never stand in the operating area of the machine. Before starting the rotors, ensure that there are no persons in the danger zone of the rotors. Maintain a safety distance. Do not stand in the vicinity of the turning rotors!

23. Loading of the machine is only permitted with stopped engine, removed ignition key and applied parking brake.

23. Do not stand in the turning and swivelling clearance area of the machine!

25. Hydraulic folding frames may only be actuated when no one is standing within the swivel area.

26. To avoid injury, keep clear of all parts actuated by external power (e. g. hydraulically).

27. Before leaving the tractor lower the machine to the ground. Stop engine and remove ignition key!

28. No persons must stand between the tractor and the implement unless the handbrake and/or chocks have been applied to prevent the vehicle from rolling. The engine has to be stopped and the ignition key removed.

3.6.2 General safety and accident preventive advice for implements mounted to the tractor’s three point hydraulics

1. Before mounting and dismounting implements to the three-point hydraulics bring all control levers in such a position that an unintended lifting or lowering is impossible!

2. When fitting to the three-point linkage the mounting categories on the tractor and the implement must coincide!

3. Within the range of the three-point linkage danger of bruizing and shearing!

4. When actuating the control levers for the three-point linkage never step between tractor and implement!

5. In transport position always take care for a sufficient lateral locking of the tractor’s three-point!

6. For road transport with lifted implement the control lever has to be locked against unintended lowering!

7. Mount and dismount implement as prescribed. Check braking systems for function. Mind manufacturer advice!

8. Working implements should only be transported and driven on tractors which are designed to do this!
3.6.3 General safety and accident preventive advice for pto shaft drive

1. Only use pto shafts recommended by the manufacturer!

2. Guard tubes and cones of the pto shaft as well as a tractor- and implement pto guard must be fitted and kept in the correct place!

3. Note the prescribed pto-shaft tube guards in transport- and operating position!

4. Mounting and dismounting pto shaft only with disengaged pto shaft, stopped motor and removed ignition key!

5. Always care for correct fitting and securing of the pto shaft!

6. Prevent pto guard from spinning by fixing the provided chains!

7. Before engaging the pto shaft ensure that the chosen pto-speed of the tractor corresponds to the allowable implement input speed!

8. When using the ground speed related pto shaft note that the speed is related to the forward speed and that the sense of rotation reverses when backing up!

9. Before switching on the pto shaft nobody is allowed to stay in the area of the spinning pto-shaft!

10. Never switch on the pto shaft while the engine is stopped!

11. When operating with the pto shaft nobody is allowed to stay in the area of the spinning pto- or universal joint shaft!

12. Always switch off pto shaft when it is in an adverse position or not needed!

13. Attention! After switching off the pto shaft the mounted implement may still continue to run by its dynamic masses! During this period never come too close to the implement. Begin work only after the implement has come to a full standstill!

14. Clean and grease the universal joint shaft and the pto-driven implement only after the pto shaft and engine have been stopped and the ignition key removed!

15. Deposit removed pto shaft on the provided carrier!

16. After removal of the pto shaft replace protective cap over the tractor’s pto! Never remove the pto shaft cap from machine and tractor!

17. Remedy of damage is to be undertaken before starting to operate with the implement!
3.6.4 General safety and accident preventive advice when making use of a hydraulic system

1. The hydraulic system is under high pressure!

2. When connecting hydraulic rams and engines the prescribed connection of the hydraulic hoses has to be noted!

3. When connecting the hydraulic hoses to the tractor’s hydraulic take care that the hydraulic is pressureless as well on the tractor- as on the implement side!

4. At hydraulic function connections between tractor and implement, the sockets and plugs should be colour coded in order to avoid misoperation. When mixing up connection, danger of reverse function, e.g. lifting instead of lowering. Danger of accident!

5. Regularly check hydraulic hoses and exchange in case of damages or aging. The replacement hoses have to correspond to the technical demands of the implement manufacturer!

6. When searching for leaks appropriate aids should be used due to danger of injury!

7. Liquids (hydraulic oil) penetrating under high pressure may penetrate the skin and cause severe injuries. In case of injuries immediately see a doctor. Danger of infection!

8. Before starting to do any repair work on the hydraulic system, lower implement, relieve system from pressure and switch off the engine!

9. The period of use of any hose circuit should not exceed six years including a possible storing period of two years in maximum. Also when stored and used properly, hoses and hose circuits age. Therefore, their longevity and period of us is limited. Deviations from the above may be accepted depending on the experience made and the danger potential. For hoses and hose circuits made of thermoplasts other guide lines may prevail.
3.6.5 General safety and accident preventive advice for maintenance, repair and cleaning

1. Repair, maintenance- and cleaning operations as well as remedy of function faults should principally be conducted with a stopped drive and engine. Remove ignition key!

2. Check nuts and bolts regularly for tightness and retighten if necessary!

3. When doing maintenance work on the lifted implement make sure that it is secured by proper supports!

4. When changing operating tools with cutting edges use appropriate tools and wear gloves!

5. Dispose of oil, grease and filters in the appropriate manner!

6. Before doing any repair work on the electric disconnect power supply!

7. When conducting electric welding operations on tractor or on the mounted implement, remove cable from generator and battery!

8. Any spare parts fitted must, in minimum meet with the implement manufacturers’ fixed technical standards. This is, for example, ensured by using original AMAZONE spare parts!

3.6.6 General safety and accident preventive advice when retrofitting electrical and electronical devices and/or components

The implement can be equipped with electronic components and parts the function of which may be affected by electromagnetic transmittance of other implements. Such influences may endanger persons when the following safety advice is not adhered to.

When retrofitting electric devices and/or components on your machine with connection to the on-board-network, the operator/user is responsible for checking whether the installation may cause faults on the tractor electronics or other components.

It has to be observed that the retrofitted electric and electronic parts correspond to the EMV-guide lines 89/336/EU in its valid edition and bear the CE-sign.
4.0 Putting to operation

Carefully read and adhere to the instruction book and safety advice before putting your seed drill to operation!

Acquaint yourself with the correct handling and with the operating devices. Never allow the machine being operated by unacquainted personnel.

Maintain your machine in a good operational order. Changes to the machine not allowed by the manufacturer may endanger the functionality and/or safety and may reduce the life span of the machine. Claims will be rejected in case of operational mistakes.

Liability claims can only be accepted if exclusively original spare parts and wearing parts are used for replacement.

Caution: The implement may only be used with the tool guard tubes (Fig. 10.1/2), side plates (Fig. 10.1/1) and a roller (para. 7.0) fitted!

2. Never stay or allow anyone to stay within the operating area!

3. Sitting or standing on the implement during operation or during transport is not permissible!

4. Danger by flinging foreign particles! Do not allow persons to stay in the danger area!

5. Never leave the operator’s seat during driving!

6. After switching off the pto shaft, danger by gyrating masses. Do not come too near to the implement during this period. Only when the rotors have come to a full standstill and the ignition key has been removed, operations may be executed on the soil tillage implement!

7. Immediately repair any damages before operating again with the implement!

4.1 Initial assembly

Mount the rotary cultivator to the tractor according to para. 5.0 and fasten the following parts:
- Pto-shaft according to para. 6.0
- packer roller according to para. 7.0
- side guide plates according to para. 10.1.

When delivered, the rotary cultivator is equipped with discs fixed between the side guide plate (Fig. 10.2/1) and the swivel arm (Fig. 10.2/2). Remove these discs.
4.2 Settings in the field

1. Bring your cultivator into working position (see para. 8).

2. Set the speed of the tines. Data concerning tine speeds and their adaptation to the soil conditions may be found in para. 9.0.

3. Check working depth of the soil tillage implement and adjust if necessary (please refer to para. 7.3).

4. Adjust working depth and spring tensioning of the side guide plates according to para. 10.2 and para. 10.3.

4.3 Beginning operation

1. Immediately before using the rotary cultivator in the field, it is to be lowered using the tractor’s hydraulic system until the rotary cultivator’s tines are just over the soil but do not touch it. The tractor’s pto shaft is to be brought to the preset speed. While the tractor commences driving, the rotary cultivator is to be lowered entirely.

   For tractors with hydraulically or pneumatically switchable pto shafts, the pto shaft must only be engaged in neutral gear to prevent damaging the universal joint shaft.

2. If the cultipacker roller turns with difficulty during the first use due to, e.g. sticking paint, do not immediately adjust the scraper. Instead, simply pull the roller over firm ground (untilled soil), until the roller turns easily.

4.4 During operation

When turning of lifting the rotary cultivator on headlands, it is to be lifted so far that the tines of the rotary cultivator and the packer roller are just above the soil. If the universal joint shaft is only slightly angled, the universal joint shaft can continue to run. If the rotary cultivator runs noisily when it is raised, the tractor’s pto shaft is to be switched off.

Pay attention to the minimum length of the tines (see para. 19.6). When working at great depth, the tines are to be replaced before they reach the minimum length.

As the wear of the tines increases, the setting of the rotary cultivator’s working depth is to be corrected (see para. 7.3) and the side plates are to be adapted to the new working depth (see para. 10.2).

The tines or the rotors can come to a standstill in stony soil or when a firm obstacle is encountered. To prevent gear damage, the universal joint shafts lateral to driving direction are equipped with an overload clutch. If the rotors come to a standstill, observe para. 6.5.
4.5 After the first 10 operating hours

All bolt connections are to be checked and, if necessary, retightened after the first 10 operating hours.

4.6 After having finished work
Before uncoupling the rotary cultivator off the tractor
- fasten the universal joint shaft according to para. 6.4
- Set down tyre packer roller according to para. 12.3.
5.0 Rear mounting to the tractor

Adhere to the safety regulations according to para. 3.6.2 when mounting the rotary cultivator to the tractor.

Mount the soil tillage implement to the rear three-point linkage of the tractor in the usual manner (see Fig. 5.2), attach the pto shaft according to para. 6.0.

The rotary cultivators KG 3-2 are equipped with top link pins (Fig. 5.1/1) and lower link pins (Fig. 5.1/2) of the cat. III.

Secure the top- and lower link pins using linch pins.

Set the top link so that the rotary cultivator stands horizontally in the working position and the top link runs more or less parallel to the lower link or drops towards the tractor. When the implement is raised using the tractor’s hydraulic system, it tilts forward and the packer roller and the seed rail (if existing) have adequate ground clearance.

If the tractor cannot lift the combination of rotary cultivator, packer roller and seed rail, attach the top link as low as possible to the soil tillage implement and as high as possible to the tractor. This prevents the combination from tilting forward too much when lifting. Less lifting power is required in this case. Check whether the lifting height is sufficient to ensure an appropriate ground clearance.
6.0 Pto shaft between tractor and cultivator

Both machines halves of the rotary cultivator KG 3-2 – divided in its centre – are driven by each one angular gearboxes (Fig. 6.1/1).

The three-speed shift main gearbox (Fig. 6.1/2) transmits the driving power of the tractor’s universal joint shaft to both angular gearboxes.

⚠️ Always ensure that the pto shaft guard (Fig. 6.2/1) is fitted to the three-speed shift main gearbox!
For transmitting the tractor’s universal joint shaft driving power, only use the pto shaft P 600 (Fig. 6.3) to connect with the drive shaft (1 3/4” 20-spline) of the three-speed shift main gearbox.

Seen in driving direction, the pto shaft P 600 turns in clockwise direction.

6.1 Connecting the universal joint shaft

Connect and disconnect the universal joint shaft only if the pto shaft is deactivated, the engine is switched off and the ignition key has been removed!

Always make sure that the universal joint shaft is mounted and secured correctly!

On pto shafts, please observe the prescribed tube overlapping in transport- and working position!

Slide the pto shaft half with the tractor symbol (Fig. 6.3) onto the pto shaft stud of the tractor, and the second pto shaft half (Fig. 6.4) onto the pto shaft stud of your soil tillage implement and hook into the pto shaft carrier (Fig. 6.4/1).

Before the first fitting and when coupling the rotary cultivator to another tractor, please adhere to the advice given in para. 6.2!
The pto shaft P600 is equipped with removable guard cones (Fig. 6.6/1) ausgerüstet.

When sliding the universal joint onto a pto shaft, the guard cone can be moved on the pto shaft (see Fig. 6.6) until the universal joint is freed and fitting can be easily be done.

By pressing two push buttons (Fig. 6.5), the guard cone can easily be loosened. Please use a wide screw driver.

As soon as the pto shaft has been connected with the pto shaft and secured properly (please refer to the fitting instructions of the pto shaft manufacturer), slide the guard cone (Fig. 6.7/1) over the universal joint until the guard cone catches on the clamping ring (Fig. 6.6/2).
6.2 First use and adapting the universal joint shaft to another tractor

Before attaching the universal joint shaft, clean and grease the pto shaft splines on the tractor and the machine.

Hitch the soil tillage implement to the tractor. Attach the universal joint shaft halves to the input shaft spline of the rotary cultivator and of the tractor, but do not slide the universal joint shaft tubes into each other.

regarding Fig. 6.8/1:
By holding the two tubes next to each other, check, whether the universal tubes can overlap by at least \( A = 185 \) mm in every position of the soil tillage implement.

regarding Fig. 6.8/2:
When the two universal joint shaft halves are slid into each other, their ends must never touch the yokes of the universal joints. A spacing of at least 10 mm must be maintained.

regarding Fig. 6.8/3: To match the lengths of the universal joint shaft halves, hold them next to each other in the shortest operating position and mark them.

regarding Fig. 6.8/4:
Shorten the inner and outer guard tubes by the same amount.

regarding Fig. 6.8/5:
Shorten the inner and outer sliding profile tubes by the same amount as the guard tube.

regarding Fig. 6.8/6:
Smooth any rough edges and carefully remove any shavings.

regarding Fig. 6.8/7:
Grease the sliding tubes and slide them into one another.

regarding Fig. 6.8/8:
The guard tubes of the universal joint shaft have chains which are to be fastened to the tractor and the soil tillage implement. These chains prevent the guard tubes from rotating when the universal joint shaft is running. Attach the chains to the holes provided so that the universal joint shaft has sufficient room for movement in all operational positions and the guard tubes do not rotate during operation.

Also follow the universal joint shaft manufacturer’s notes regarding assembly and maintenance attached to the universal joint shaft!
Fig. 6.8
6.3 Putting the universal joint shaft into operation

The guard tubes of the universal joint shaft must not rotate during operation. Thus the guard tubes of the universal joint shaft are equipped with safety chains (Fig. 6.9/1) which are to be fastened to the pto shaft covers of the tractor and the gearbox of the soil tillage implement. Pay attention that the universal joint shaft has sufficient clearance in all operational positions.

As soon as the universal joint shaft is connected to the tractor, fasten the universal joint shaft support (Fig. 6.10/1) to the carrier (Fig. 6.10/2) and secure by using a linch pin.

⚠️ The following points must be observed before the pto shaft is engaged:

1. The guard tube and the guard funnel of the universal joint shaft and the pto shaft covers must be attached to both the tractor and the implement and must function correctly!

2. Before engaging the pto shaft, make sure that the pto shaft speed selected on the tractor matches the permissible speed for the implement!

3. Before engaging the pto shaft, make sure that there are no persons in the danger area of the implement!

4. Never engage the pto shaft while the engine is switched off!
To prevent damage, only engage the pto shaft slowly in idling gear or at a low tractor engine speed!

Disengage the universal joint shaft before raising the soil tillage implement, e.g. when turning at the headlands, if the universal joint shaft is angled too much.

Never remove the pto shaft guards of the soil tillage implement or the tractor.

Switch off the engine, remove the ignition key and make sure that the pto shaft is at a standstill before making adjustments, establishing connections or cleaning pto shaft driven implements.

6.4 Taking the universal joint shaft out of operation after work

Before the rotary cultivator is unhitched from the tractor, the universal joint shaft is to be fastened with the universal joint shaft support (Fig. 6.4/1), as illustrated.

6.5 Standstill of the tines whilst working

The tines or the rotors can come to a standstill in stony soil or when a firm obstacle is hit. To prevent gear damage, each angular gearbox is provided with a cam clutch (Fig. 6.12/1) named EK64/2R and EK 64/2L.

If the rotors come to a standstill due to one or both cam clutches being deactivated, stop and reduce the pto shaft speed of the tractor to approx. 300 R.P.M. until the cam clutch(es) engage(s) audibly. Beginnen sich die Kreisel nicht zu drehen, ist die Schlepperzapfwelle auszuschalten und das Hindernis zu entfernen (nur bei abgestelltem Motor und abgezogenem Zündschlüssel).

Switch off the pto shaft and remove the obstacle (only if the engine is turned off and the ignition key removed) if the rotors do not start rotating again. The cam clutch(es) is(are) then immediately ready for use. (please also refer to para 19.7.3).
6.5.1 Universal joint shaft P500 with cam clutch

The three-speed shift main gearbox (Fig. 6.11/1) transmits the driving power of the tractor’s universal joint shaft to both angular gearboxes. (Fig. 6.11/2).

The gearboxes are connected with the universal joint shafts P500. Both universal joint shafts which are attached to the gearbox shafts of the angular gearboxes are equipped with cam clutches (Fig. 6.12/1).

The cam clutches prevent gearbox damage in case of possible power peaks.

In order to avoid mixing up the universal joint shafts after a possible repair work, the cam clutches (Fig. 6.12/1) are marked with an arrow. Both universal joint shafts turn in arrow direction. In top view, both arrows point into driving direction.

The cam clutch on the right hand implement side (seen in driving direction) is named EK 64/2R (Fig. 6.12/1), the one on the left hand implement side is named EK 64/2L.

The use of other overload clutches is not permitted!
When other overload clutches should be used, the necessary safety of the gearbox is no longer ensured.
6.5.2 Full guard of the universal joint shaft P500

The universal joint shaft P500 with full guard avoids the touch with the spinning universal joint shaft.

The guard cones (Fig. 6.13/1) of the universal joint shafts are fixed on both angular gearboxes and on the three-speed shift main gearbox with adapter rings (Fig. 6.14/1). A clamping ring (Fig. 6.14/2) prevents any axially offset of the guard cones.

If, e.g., in case of maintenance work on the universal joint shaft it should become necessary to reach the grease nipples of the universal joints, the guard cones should be moved on the universal joint shaft. By actuating two press buttons (Fig. 6.13) the guard cone is freed and can be axially moved on the universal joint shaft. For actuating the two press buttons, use a wide screw driver.

Before starting work with the rotary cultivator again, observe that the guard cone caught as well on the adapter ring (Fig. 6.14/1) as also on the clamping ring (Fig. 6.14/2).
7.0 Attaching the AMAZONE-rollers and setting the working depth of the rotary cultivator

The AMAZONE-rotary cultivator KG 3-2 must be equipped with two rollers. During operation the rotary cultivator is supported by the packer rollers and thus maintains accurately the set working depth. The AMAZONE-rotary cultivator KG 3-2 can be equipped with the following rollers:
- AMAZONE-Tooth Packer Roller PW 420
- AMAZONE-Tooth Packer Roller PW 500
- AMAZONE-Tyre Packer Roller RP
- AMAZONE-Wedge Ring Roller KW.
7.1 Attaching the tooth packer rollers PW 420 and PW 500 and wedge ring rollers KW450

The rotary cultivator KG 3-2 is divided in its centre. Each half must be equipped with a roller.

Each roller has to be attached to the KG 3-2 with 2 carrying arms (Fig. 7.3/1).

Before attaching the rollers to the rotary cultivator check, whether the
- tooth packer rollers PW 420 are equipped with the carrying arms (Fig. 7.1)
- tooth packer rollers PW 500 are equipped with the carrying arms (Fig. 7.2)
- wedge ring rollers KW 450 are equipped with the carrying arms (Fig. 7.2)
Attach the rollers to the rotary cultivator one after the other. For coupling, park the packer roller on level ground and secure it both at the front and the back against rolling away.

For coupling, park the packer roller on level ground and secure it both at the front and the back against rolling away!

The roller is to be fastened to the soil tillage implement with special care because the roller can fall over with improper support. Risk of injury!!

Couple rotary cultivator implement to your tractor and drive backwards towards the packer roller. Hitch the mounting arms (Fig. 7.4/1) of the roller to the supports (Fig. 7.4/2) of the soil tillage implement using pins (Fig. 7.4/3) and secure by using linch pins (Fig. 7.4/4).

Insert the depth setting pin (Fig. 7.4/5) into the bracings as described in para. 7.3 into the next higher hole above the mounting arms and secure by using linch pins. With these pins the working depth is set later on.

Attach the second roller to the KG 3-2 as described above.

In case you want to use your rotary cultivator as part of a till and drill combination with a sowing rail module, fix the sowing rail module according to its instruction manual.

Set the working depth of your rotary cultivator as described in para. 7.3.
7.2 Attaching the Tyre Packer rollers RP and Wedge ring rollers KW 580

Both machine halves of the rotary cultivator KG 3-2 which is divided in its centre, have to be equipped with a packer roller.

Attach each roller with each 2 mounting arms (Fig. 7.5) on the KG 3-2.

For attaching or removing the rollers, always set the mounting arms (Fig. 7.6/1) with two pins (Fig. 7.6/2) and Fig. 7.6/3) on the rollers. Remove the upper pins (Fig. 7.6/3) in case the combination is provided with a pack top sowing rail module and the pack top sowing rail module is attached to the rotary cultivator and the roller (please refer to instruction manual for pack top sowing rail module AS).

Secure the lower pins (Fig. 7.6/2) with each 2 washers (Fig. 7.6/4) to prevent the pins from moving through the slotted holes of the lower three-point linkage.

Attach the rollers one after the other on the rotary cultivator. Park the first roller on level ground and secure the roller, both to the rear and to the front to prevent the roller from rolling away.

Before attaching, support the packer roller especially well and secure against falling over and rolling away.)!

Attaching the packer roller to the soil tillage implement has to be done with special care as the packer roller may fall over in case of improper support. Risk of injury!
Couple the rotary cultivator to your tractor and drive backwards towards the roller. Hitch the mounting arms (Fig. 7.7/1) of the roller to the supports (Fig. 7.7/2) of the soil tillage implement by using pins (Fig. 7.7/3) and secure by using linch pins (Fig. 7.7/4).

Insert the depth setting pin (Fig. 7.7/5), as described in para. 7.3 into the next higher hole above the mounting arm in the supports and secure with linch pins. With these pins the working depth will be set later on.

Attach the second roller to the KG 3-2 as described above.

If you intend to use your rotary cultivator as part of a till- and drill combination with a pack top seed rail module AS, attach the seed rail as described in its instruction manual.

Set the working depth of the rotary cultivator according to para. 7.3.
7.3 Setting the working depth of the rotary cultivator

During operation the rotary cultivator is supported by the packer rollers and thus always maintains an accurate working depth.

To set the working depth lift the rotary cultivator slightly by the tractor's hydraulic 3-point linkage and insert the depth setting pins (Fig. 7.8/1) into the desired hole of the quadrant setting block (Fig. 7.8/2) above the mounting arms (Fig. 7.8/3) and secure using linch pins (Fig. 7.8/4).

Make settings only when the pto shaft is disengaged, the engine is switched off and the ignition key has been removed!

When re-inserting, hold the depth-setting pins (Fig. 7.9/1) in such a way that your hand never gets between the pin and the mounting arm.

The depth setting pins have an eccentric square head, the sides of which are at different distances to the centre of the pins. These sides are marked with the figures “1 - 2 - 3 - 4” (see Fig. 7.9). It must be ensured that the depth setting pins (Fig. 7.8/1) rest in the same position (bearing the same figure) on both mounting arms (Fig. 7.8/3).

The higher the depth-setting pins are inserted into holes of the quadrant setting adjustment blocks and the higher the figures on the sides resting against the mounting arms, the deeper the working depth will be.
The varying spacings on the eccentric square head of the depth setting pin allow a fine tuning for the depth guidance of the soil tillage implement, even in between the individual square holes of the quadrant setting block.

Always secure the depth setting pins using linch pins (Fig. 7.8/4)!

If the working depth is adjusted, check whether the side plates have to be adapted to the new working depth.
8.0 Operating and transport position

The rotary cultivator KG 3-2 (Fig. 8.1) is divided in its centre and attached to a strong pivoting frame (transport folding frame).

Bring the transport folding frame into transport or working position by using the two hydraulic rams.

Connect the hydraulic rams with a double acting control valve, as described in para. 2.9.

8.1 Bring the rotary cultivator into working position

To bring the rotary cultivator from transport to working position, lift the transport folding frame so that there is sufficient clearance between the tines of the rotary cultivator or the coulters of the sowing module (if existing) and the ground, especially in the implement centre after the transport folding frame has been lowered again.

Prior to folding lift the implement sufficiently to avoid danger of damage!

Advise people to leave the danger area!

- Guide the ropes (Fig. 8.2/1) fixed to the locking levers (Fig. 8.2/2) into the tractor cab and unlock the pivoting frame from the tractor cab.
- By actuating the tractor’s control valve, the rotary cultivator is brought into working position.
- As soon as the rotary cultivator is in working position, set the control valve to floating position.
8.2 Bring the rotary cultivator into transport position

Bring the rotary cultivator into working transport position in three steps:

1. step:
Raise the rotary cultivator until the tines of the rotary cultivator or the coulters of the sowing module (if existing) have sufficient ground clearance, especially in the implement’s centre when the transport frame is folded.

Before folding in or out, lift the implement sufficiently to avoid danger of damage!

2. step:
Switch off tractor’s pto shaft, switch off tractor engine and remove ignition key!

By using a spanner (Fig. 8.3/1) turn the drive shaft of the left hand angular gearbox, seen driving direction until the mark is in vertical position towards the gearbox. This ensures the correct position of the universal joints of the pto shafts so that they will not be damaged when the rotary cultivator is folded.

3. step:
By actuating the control valve in the tractor cab, the rotary cultivator (Fig. 8.3/2) is brought into transport position.

Ensure that the locking levers (Fig. 8.4/1) catch and that the tension pulling cables is released.
8.3 Changing the folding speed of the transport folding frame

The transport folding frame with the rotary cultivator being divided in its centre is brought from transport- into working position by two double acting hydraulic rams (Fig. 8.5/1) and vice versa. With the aid of two check valves (Fig. 8.5/2), the lifting speed of the hydraulic rams can be adjusted.

Usually, no settings should be done on the check valves. A higher lowering speed than set by the factory may cause damage on the implement. Should, however, a correction becomes necessary, the opening channel and thus the oil supply to the hydraulic rams can be changed with the aid of an Allen key (Fig. 8.5/3). Before doing this, slacken counter nut (Fig. 8.5/4) and retighten afterwards.

**Increase opening channel:**
- Unscrew Allen screw (Fig. 8.5/3)

**Decrease opening channel:**
- Screw in Allen key (Fig. 8.5/3).

⚠️ The amount of adjustment should always be the same on all four check valves of both hydraulic rams!

⚠️ The adjustment should not exceed 1/4 turn. Thereafter, adjustments have to be checked!
9.0 Gear boxes
Both halves of the rotary cultivator KG 3-2, divided in its centre are equipped with each one angular gearbox (Fig. 9.1/2) a. These gearboxes are connected with a three-speed shift main gearbox attached to the tractor’s universal joint shaft.

9.1 Tine rotor speed
To achieve the desired fineness of the seed bed, the tine rotor speed must be adapted to different soil conditions. The tine rotor speed can be adjusted on the three-speed shift main gearbox (Fig. 9.1/1). An increase in the tine rotor speed causes the power requirements and the tine wear to rise disproportionately. Selecting the correct tine speed reduces the cost of wear and increases efficiency.

Never select a tine speed that is higher than necessary.

9.2 Tractor’s pto shaft speed
The tractor’s pto shaft speed should be set to 1000 R.P.M. A speed of 540 R.P.M. for the tractor’s pto shaft speed causes very high torques on the universal joint shaft. These could cause the friction clutch to wear out rapidly.

The rotary cultivator KG 3-2 should only be used with a tractor pto shaft speed of 1000 R.P.M.
9.3 Setting the speed on the three-speed shift main gearbox

Refer to the speed table (Fig. 9.2) for the desired tine speed (R.P.M.).

The tine rotor speed depends on the shift lever position on the three-speed shift main gearbox and the selected tractor’s pto shaft speed.

Always set the tractor’s pto shaft speed to 1000 R.P.M.

The speed table below the tractor symbol (Fig. 9.2/1) and below the settable tractor’s pto shaft speeds 1000 R.P.M. indicates the three tine speeds which can be set.

For setting the desired tine speed, bring the shift lever (Fig. 9.2/B) on the gearbox into the necessary shifting position.

1. Before moving the shift lever, disengage the tractor’s pto shaft, switch off the tractor engine and remove the ignition key!
2. Wait until the full standstill of the rotors!
3. Do not touch the hot gearbox housing or gear parts with your bare hands!

Wear gloves!

Before starting work ensure that the shift lever has caught properly. (Fig. 9.2/B)!
10.0 Hinged side plates

The side plates (Fig. 10.1/1) ensure that the tilled soil cannot escape laterally or from between the tillage implement and the packer roller. The flow of soil is guided towards the rear so that it falls directly under the culti packer roller.

The working depth of the side plates and the spring tension must be adjusted to the soil conditions, so that the limitation of the soil flow from these plates becomes effective.

⚠️ Make settings on the side plates only when the pto shaft is deactivated, the engine is switched off and the ignition key has been removed!

10.1 Fitting the side plates

Fitting the swivelling arm:
Position the pivot arm (Fig. 10.2/2) approximately vertically and push it into the holder tube until it stops. Lower the pivot arm behind the lock (Fig. 10.2/7). Pull the tension spring (Fig. 10.2/3) according to para. 10.3 and secure by using a counter nut (Fig. 10.2/5).

Fitting the side plates:
Bolt on the side plates (Fig. 10.2/1) as described in para. 10.2.
10.2 Setting the working depth of the side plates

When the seed bed is prepared after ploughing, the side plates (Fig. 10.2/1) are to be bolted in such a way that they move through the soil at a maximum depth of 1 to 2 cm.

This setting can also be used for incorporation straw. If, under unfavourable conditions, the side plates push the straw together, the plates should be set at an angle, e.g. the front higher than the back or all the way up.

10.3 Adapting the spring tension to the soil conditions

The hinged side plates can move upwards to avoid obstacles. The side plate’s own mass and a strong tension spring (Fig. 10.2/3) return the side plate to its working position. The spring has been set at the factory for the use on light to medium soils. The spring tension must be increased on heavy soils and decreased for incorporating straw. The tension can be adjusted using the tensioning bolt (Fig. 10.2/4 Before every adjustment, loosen the counter nut (Fig. 10.2/5) and retighten when finished.

Fig. 10.2
11.0 Tooth packer rollers

The tines of the soil tillage implement break up and loosen the soil. AMAZONE tooth packer rollers (Fig. 11.1) pack and till the soil and precisely control the working depth of the rotary cultivator.

Due to the fine seed bed, the seed drill can run smoothly during the sowing process which leads to precise maintenance of the sowing depth for the seed.

For the rotary cultivator KG 3-2 tooth packer rollers are available in two sizes (PW 420 and PW 500).

The AMAZONE tooth packer roller PW 420 with a roller diameter of 420 mm is suited for heavy soils.

For combination of rotary cultivator KG 3-2 and the sowing rail module AS, we recommend the AMAZONE tooth packer roller PW 500. With its roller diameter of 500 mm, this roller is suited for all kinds of soil and is especially useful for varying soil types.

11.1 Setting the scrapers

Low adjustable scrapers (Fig. 11.3/1), made of spring steel prevent the roller from jamming. The scrapers have been set at the factory for light and medium soils. In case of very sticky soils, the scrapers must be set according to the soil conditions (close setting). However, the „close setting“ is only necessary if the soil coating the roller drum is thicker than 2 mm.

The position of the scrapers should be adjusted to offset wear. Heavily worn scrapers must be replaced.

⚠️ Standing on the culti packer roller during operation is prohibited!
Resetting the scrapers

- Raise the soil tillage implement using the tractor’s hydraulic system and then lower the entire weight of the culti packer roller onto a block of wood (Fig. 11.2/1) placed beneath the middle of the roller. The frame of the culti packer roller thus bends as it would during operation when the soil tillage implement is supported on the culti packer roller.

- Adjust the position of the scrapers (Fig. 11.3/1) so that they touch the roller drum and secure in place by tightening the previously slackened locking bolts (Fig. 11.3/2). The scrapers (Fig. 11.3/1) should only slightly contact the roller drum.

Close setting:

- Slacken all of the locking bolts (Fig. 11.3/2) and slide the scrapers (Fig. 11.3/1) towards the rear of the slotted hole until they stop.

- Slacken the bolts (Fig. 11.3/3) and, according to the soil conditions, slide the scraper holders (Fig. 11.3/4) evenly upwards and retighten.

- Adjust the scrapers (Fig. 11.3/1) so that they touch the roller drum and secure in place by tightening the fixing bolt (Fig. 11.3/2). The scrapers (Fig. 11.3/1) should only slightly contact the roller drum.

Attach scrapers with hard metal coating with a gap of 0.5 mm towards the drum and tighten with the fixing bolts. The scrapers with hard metal coating may not touch the roller drum to avoid damage of the roller drum.
12.0 Seed bed preparation with tyre packer-sowing combinations

In conjunction with the AMAZONE rotary cultivator the soil will first be tilled and loosened and afterwards re-compacted by the tyre packer roller. The rotary cultivator is resting on top of the tyre packer roller and this way maintains accurately the working depth. The re-compaction by the tyre packer this way will even be increased.
For re-compacting the soil, automobile tyres without tubes and without air pressure are slid over the roller drum. Each tyre is positioned on the drum by two bracing rings (Fig. 12.1/4). The shape of these bracing rings and the flexibility of the tyre results in differently re-compacted zones in the soil:

**Zone 1: Hardly any re-compaction**
(Fig. 12.1/1),
Here the clods are not crushed. This area of soil will be used for covering the rows of seed. The crumbling structure of the soil is maintained.

**Zone 2: slight re-compaction**
(Fig. 12.1/2),
In this area no seed will be placed.

**Zone 3: high re-compaction**
(Fig. 12.1/3),
In this area the soil is highly re-compacted by the bracing rings (Fig. 12.1/4). The coulters embed the seed into this highly re-compacted soil (see Fig. 12.2). The extremely good soil texture is responsible for the quick and even germination of the seed.

In the highly re-compacted strips of soil the coulters of the sowing rail module require a high coulter pressure to achieve the desired sowing depth. By the high coulter pressure, disturbing factors such as stones or clods will hardly impair the sliding of the coulters. Low placed coulter pivoting points additionally result in the especially smooth running of the coulter. This results in an especially even sowing depth and a correspondingly uniform plant development. This again is one of the most important preconditions for a targeted guidance of the crop growth.

This germination conditions for the seed result from the ideally structured seed bed and from the high re-compaction in the strips into which the coulters place the seed.
Fig. 12.1

Fig. 12.2
12.1 Levelling bar for the tyre packer roller

The tyre packer roller is equipped with a levelling bar (Fig. 12.3/1). The levelling bar in front of the tyre packer roller removes slight, possibly still existing undulations of the soil. The loose soil in front of the tyre packer roller is at the same time pre-compacted by the levelling bar. The height of the levelling bar should be set in such a way that the levelling bar is at maximum half covered by any rigs of soil.

Set the levelling bar in such a way that it always can give way upwards.

12.1.1 Height adjustment of the levelling bar

For the height adjustment, briefly lift the levelling bar on both (Fig. 12.3/2) and insert the clip pins (Fig. 12.3/3) into the desired holes above the brackets (Fig. 12.3/4) into both adjusting rods (Fig. 12.3/5) and slip over the securing loop.

Please regularly check whether the levelling bar is still in a position to easily move upwards. Otherwise, the bearing (Fig. 12.3/6) should be checked and freed if necessary.
12.2 Clearer

The tyres of the tyre packer roller usually keep themselves clean of sticking soil. When the tyre is lifted from the soil, the tyre casing is expanded and the sticking soil flakes.

Scrapers are not necessary. In order to avoid, however, soil from collecting between the tyres, clearer (Fig. 12.4/1) are fitted here. The clearer have been fitted in such a way that the spacing between roller and clearer is about 5 mm. The sticking soil is removed without braking the tyre packer roller.

Fig. 12.4
12.3 Parking the tyre packer roller

For parking the tyre packer roller after operation, we recommend you to support the roller to avoid damage on tyres and tyre bracing rings.

When in combination with a sowing rail module, please use for parking the supports for the sowing rail module (Please see sowing rail module instructions).

If the combination consists only of the rotary cultivator and the tyre packer roller it can be parked on the levelling rod. (Fig. 12.5/1). Briefly lift the combination using the tractor’s hydraulic system. Briefly lift the levelling rod on the grips of the right hand and left hand adjusting rod and loosen the clip pins. Lower the levelling rod and reinsert the clip pins (Fig. 12.5/2) into the first hole below the mountings (Fig. 12.5/3) and secure.

Carefully lower the combination to avoid damage to the levelling rod.

Before uncoupling the combination from the tractor, the depth control pins (Fig. 12.6/1) should be inserted just above the carrying arms so that the combination cannot drop backwards.

When reinserting the depth control pins (Fig. 12.6/1) hold it only in such a way, that you never get your hand between the pin and the carrying arm. After any reinserting secure the pin by using a clip pin.
12.4 Exchanging a defective tyre

To avoid sand or dirt entering the inside of the tyres, the tyre packer roller should be carefully cleaned before exchanging any tyre.

- Uncouple seed rail module (if existing)
- Secure the roller by chocks against unintended rolling away
- Remove the roller frame. To do this, the 5 hex. bolts (Fig. 12.7/1) should be unbolted on each side
- Raise roller frame with the aid of the tractor hydraulics from the roller.
The equal tyre spacing on the roller is achieved with plastic spacing rings (Fig. 12.9/1). Approximately in the centre of the roller, a round steel ring (Fig. 12.9/2) which can be seen from outside, is welded to the roller. For this reason, not all tyres may be pushed to one side of the roller drum for removal.

- Unbolt the roller end plate (Fig. 12.9/4). In order not to "edge" the roller end plate, slacken the six hex. bolts M 16 (Fig. 12.9/5) one after the other with each one turn. Remove tyres (Fig. 12.9/6) and spacing rings (Fig. 12.9/1) together with the defective tyre from the roller drum. You may replace the defective tyre with bracing tyres and inner ring for a completely assembled tyre (see table). Or you can re-use the two bracing rings (Fig. 12.9/7) and the inner ring (Fig. 12.9/8) and order only one tyre without bracing rings and without inner ring (see para. 12.4.1). The tyre width depends on the number of coulters of your seed drill. Each two coulters work in the re-compacted trace of one tyre. Small row spacings (10 cm) require narrower tyres than larger row spacings (12.5 cm). The rollers are equipped with new car tyres 155/70 SR 13 (10 cm) or 165/70 SR 13 (12.5 cm). In any case, it is not permitted to use these tyres on motor vehicles.
### Tyre notations and order numbers

<table>
<thead>
<tr>
<th>common tyre notation</th>
<th>with 2 bracing rings and one inner ring</th>
<th>without bracing rings and without inner ring</th>
</tr>
</thead>
<tbody>
<tr>
<td>155/70 SR 13</td>
<td>Order-No.: 953 820</td>
<td>Order-No.: 339 511</td>
</tr>
<tr>
<td>165/70 SR 13</td>
<td>Order-No.: 953 821</td>
<td>Order-No.: 337 511</td>
</tr>
</tbody>
</table>

Before sliding the tyres on the roller drum, each tyre should be filled with 0.5 l frost-proof lubrication liquid (Order-No. 050 770).

(This hint, see Fig. 12.10, is fixed to your tyre packer roller).

Never use any oil containing lubrication agent.

- Slide pre-assembled tyres (Fig. 12.9/6) and spacing rings (Fig. 12.9/1) onto the roller drum.

- Before fitting the last tyre, the mounting ring (Fig. 12.9/9) should be slid onto the roller drum to facilitate the mounting of the last tyre. For this, the mounting ring should be in line with the outer edge of the last tyre.

- Set the roller end plate (Fig. 12.9/4) onto the roller drum and insert the bolts (Fig. 12.9/5) by hand into the threaded holes. To avoid the roller end plate edging, the bolts should not be fully tightened individually but consecutively one after another by each one turn until fully tightened.
12.4.1 Re-use and fitting used tyre bracing rings

The two bracing rings (Fig. 12.9/7) and the inner ring (Fig. 12.9/8) should be removed from the defective tyre simply by cutting it apart.

On an original spare tyre, a 3 to 5 mm wide ring (Fig. 12.11) was cut off by the factory to enable an easier sliding of the tyre onto the roller drum.

In case you purchase the tyres from a tyre dealer, ensure that the tyres are not older than 4 years and that they have been checked for tightness. Cut off a 3 to 5 mm wide inner ring (Fig. 12.11) from the tyre.

(This hint, see Fig. 12.12, is fixed to your tyre packer roller.)

Insert both bracing rings (Fig. 12.13/1) and the inner ring (Fig. 12.13/2) into the tyre. Before fitting, apply a slip additive to the sides of the tyre and warm up the bracing rings (Fig. 12.13/1) in water of a temperature of max. 60°. Heated bracing rings can then easier be bent and thus better be inserted into the tyres.
13.0 Levelling rod

The levelling rod (Fig. 13.1/1) eliminates prevailing soil undulations, e.g. in front of the wedge ring roller (Fig. 13.1/2). Remaining clods on extremely heavy soils are crumbled.

The levelling rod eliminates the danger, that, e.g. the tooth packer roller comes to a standstill on extremely loose, dry and light soils. The levelling rod pre-compacts loose soil and the slip of the tooth packer roller is reduced.

13.1 Setting the levelling rod

Set the levelling rod by using the two cranks (Fig. 13.2/1) in such a way that the earth ridges cover the levelling rod half way.

After setting, secure the cranks (Fig. 13.2/1) by using a hinge pin (Fig. 13.2/2) to prevent the levelling rod moving out of place during operation.

13.2 Putting out of operation

Crank the levelling rod upwards if not needed, raise on the handle (Fig. 13.3/6) and lock the spindle guide tube (Fig. 134.3/3) in the lower hole (Fig. 13.3/10). Secure the pin after any inserting.
13.3 Fitting the levelling rod

Bolt two consoles (Fig. 13.3/1) equipped with rubber buffers (Fig. 13.3/2) to the soil tillage implement.

- Lock the spindle guide tubes (Fig. 13.3/3) by using pins (Fig. 13.3/4) and secure by using linch pins. During operation lock the spindle guide tubes in the upper hole (Fig. 13.3/5) (please also refer to para. 13.2).

- Raise the levelling rod on its handle (Fig. 13.3/6) and insert the setting spindle (Fig. 13.3/7).

- Bolt the chain (Fig. 13.3/8) by using a drilling screw (Fig. 13.3/9) onto the spindle guide tube.
18.0 Transport on public roads

When travelling on public roads, the tractor and the soil tillage implement or the till- and drill combination must comply with your national traffic regulations. The owner and operator of the vehicle are responsible for conforming with the legal requirements stipulated by national traffic regulations.

The following points must be observed:

1. The transport width of 3 m must not be exceeded.
   Bring rotary cultivator into transport position according to para. 8.

2. As standard, the Pack Top sowing rail module AS is equipped with a traffic kit. This also contains the two rear warning plates with the traffic light unit (Fig. 18.1/1)

After work has been finished and the rotary cultivator combination been folded, the arms (Fig. 18.2/1) with the traffic lights and the warning plates must be brought into road transport position:
- remove the pin (Fig. 18.3/1) which is secured by a linch pin and
bring the arm (Fig. 18.4) with the warning plates and the traffic lights into transport position, and

lock the arm by inserting the pin (Fig. 18.4) slackened before and secure by using a linch pin.
- Swivel the extra coverage harrow inwards (Fig. 18.6) and secure by using a belt (Fig. 18.7).
- Plug traffic light cable into the tractor’s plug and check traffic lights for function. Guide the cables in such a way that damage is avoided.

3. Check an attach further transport equipment, as e.g. positioning lights and laterally fitted reflectors (yellow).

4. The maximum speed is 25 k.p.h. Especially on roads in bad condition, drive with a considerably lower speed.

5. The tractor’s front axle load must be at least 20% of the tractor’s unladen weight when transporting the implement or the combination. Otherwise, the tractor’s steering is detrimentally affected. If necessary, weights must be attached to the front of the vehicle. The permissible load on the tractor’s rear axle must not be exceeded.
6. Riding and transporting objects on the implement is forbidden!

7. The vehicle’s driving, steering and braking behaviour is affected by attached implement and ballast weights. It must be ensured that the vehicle steers and brakes correctly.

8. On curves, take the wide load and balance weight of the implement into account.

9. When driving on roads with raised implement, the operating lever must be locked to prevent lowering.

10. When the implement is in its transport position, always ensure that any excessive lateral movement of the tractor’s three-point link arm is prevented.

Please observe these notes. They are intended to help prevent accidents on public roads.
19.0 Maintenance - Repairs

Observe the safety advice as given in para. 3.6.5!

19.1 Bolt connections
Check all bolt connections after the first 10 operating hours and tighten, if necessary.

19.2 Three-speed shift main gearbox

Oil level
The oil level in the three-speed shift main gearbox (Fig. 19.1) must always be checked when the rotary cultivator is in a horizontal position. After removal of the oil level gauge window (Fig. 19.1/1) the oil level must be visible on the lower edge of the opening.

First gear oil change in the three-speed shift main gearbox after 50 operating hours, then every 400 operating hours.

Drain the gear oil using the oil drainage screw (Fig. 19.1/2), collect in a suited container and dispose as prescribed.

Add new oil to the gearbox through the channel of the breather screw (Fig. 19.1/3).

Gear oil type:
SAE85W90 API-GL5
at random
TITAN RENEP 8090 MC
Quantity: 8,0 l
When adding gear oil, ensure that it is clean and that during filling no dirt gets into the gearbox housing.) and check breather screw (Fig. 19.1/3) for firm seating.

The three-speed shift main gearbox is equipped with a breather screw (Fig. 19.2/1). Ventilation must always be provided; otherwise, the transmission may become leaky!
19.3 Angular gearbox

The oil level in the angular gearbox (Fig. 19.3) must always be checked when the implement is in a horizontal position. After removal of the oil gauge screw (Fig. 19.3/1) the oil level must be visible on the lower edge of the opening.

First gear oil change in the angular gearbox after 50 working hours. Then after every 400 operating hours.

Drain the gear oil using the oil drainage screw (Fig. 19.3/2), collect in a suited container and dispose as prescribed.

Add new oil to the gearbox through the channel of the breather screw (Fig. 19.3/3).

Type of gear oil: SAE90 API-GL4
Quantity: 4,0 l

When adding gear oil, ensure that it is clean and that during filling no dirt gets into the gearbox housing.) and check breather screw (Fig. 19.3/3) for firm seating.

The three-speed shift main gearbox is equipped with a breather screw (Fig. 19.3/3).

Ventilation must always be provided; otherwise, the transmission may become leaky!
19.4 Checking the oil level in the spur gear housing

The oil level in the spur gear housing is to be checked every 100 operating hours.

Changing the oil is not required.

For checking the oil level
- remove the inspection cover (Fig. 19.4/1) with the breather tube (Fig. 19.4/2).
- the teeth of the spur gears must be half covered with gear oil when the rotary harrow is in a horizontal position

By the factory, the spur gear troughs have been filled with:
Gear oil type: ERSOLAN 460
Manufacturer: Wintershall

Filling quantity:

<table>
<thead>
<tr>
<th>Spur gear troughs</th>
<th>per trough</th>
<th>per machine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotary cultivator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KG 403-2</td>
<td>18 l</td>
<td>36 l</td>
</tr>
<tr>
<td>KG 453-2</td>
<td>20 l</td>
<td>40 l</td>
</tr>
<tr>
<td>KG 503-2</td>
<td>21 l</td>
<td>42 l</td>
</tr>
<tr>
<td>KG 603-2</td>
<td>25 l</td>
<td>50 l</td>
</tr>
</tbody>
</table>
The oil types listed below can be added or used instead of the standard oil if gear oil must be added or exchanged and if ERSOLAN 460 gear oil is not available:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Gear oil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wintershall</td>
<td>ERSOLAN 460</td>
</tr>
<tr>
<td>Agip</td>
<td>Blasia 460</td>
</tr>
<tr>
<td>ARAL</td>
<td>Degol BG 460</td>
</tr>
<tr>
<td>Autol</td>
<td>Precis GEP 460</td>
</tr>
<tr>
<td>Avia</td>
<td>Avilub RSX 460</td>
</tr>
<tr>
<td>BP</td>
<td>Energol GR-XP 460</td>
</tr>
<tr>
<td>Castrol</td>
<td>Alpha SP 460</td>
</tr>
<tr>
<td>DEA</td>
<td>Falcon CLP 460</td>
</tr>
<tr>
<td>ESSO</td>
<td>Spartan EP 460</td>
</tr>
<tr>
<td>FINA</td>
<td>Giran 460</td>
</tr>
<tr>
<td>Fuchs</td>
<td>Renep Compound 110</td>
</tr>
<tr>
<td>Mobil</td>
<td>Mobilgear 634</td>
</tr>
<tr>
<td>Shell</td>
<td>Omala 460</td>
</tr>
</tbody>
</table>

The inspection cover (Fig. 19.4/1) is equipped with a breather tube (Fig. 19.4/2). Ventilation must always be provided to prevent damage!

Use only new gear oil after overhauling the rotary cultivator.
19.5 Grease nipples

Grease the bearings of the packer rollers every 50 hours of operation.

Clean the grease gun and the grease nipples carefully before greasing, so that no dirt will penetrate the bearings. All dirty grease must be forced out of the bearings and replaced by new grease.

Grease the following parts after every 50 hours of operation:

- the two grease nipples (Fig. 19.5/1) on the axle bearings.
- the tooth packer roller (Fig. 19.5)
- the tyre packer roller and
- the wedge ring roller.
- the 4 grease nipples (Fig. 19.6/1) on the hinges of the transport folding frame.
- the 2 grease nipples (Fig. 19.6/2) on the hinges of the hydraulic rams.
Grease the pto shafts P500 and P600 at regular intervals according to the advice of the pto shaft manufacturer.

For greasing the slide profiles, the pto shafts P 500 and P 600 are equipped with grease nipples (Fig. 19.7). Before greasing, open the shutter slides (Fig. 19.7/1) and shut them after having finished greasing.

You will find further grease nipples (Fig. 19.9) on the cross joints of the pto shafts. Before greasing move the guard cones (Fig. 19.8/1) on the pto shaft according to para. 6 and close them afterwards as prescribed.
19.6 Tines

The tines (Fig. 19.10/1) of the soil tillage implement are made of very tough hardened boron steel. The tines are subject to wear and must be replaced at the latest when they have reached a length of \( L_{\text{min}} = 150 \text{ mm} \) (see Fig. 19.10). At great working depths, the tines must be exchanged earlier to prevent damage or wear of the tool supports (Fig. 19.10/5).

\[ \text{The manufacturer is not liable for damage caused by stones if the length of the tines drops below the minimum of } 150 \text{ mm specified by the manufacturer!} \]

19.6.1 Replacing tines

\[ \text{Lift the rotary cultivator using the tractor’s hydraulic system and secure it with appropriate support elements!} \]

\[ \text{Replace tool tines only if the pto shaft and the motor are switched off and the ignition key has been removed!} \]

The tines (Fig. 19.10/1) are fastened in the pockets of the rotor (Fig. 19.10/5).
Removal of tines:
- Pull the linch pin (Fig. 19.10/2) out of the pin (Fig. 19.10/3).
- Knock the pin (Fig. 19.10/3) out of the rotor from below.
- Pull the tine (Fig. 19.10/1) out of the pockets of the tool carrier.

Installing tines

The rotary cultivator is equipped with two kinds of tines. The direction of rotation of the tines is different for each tine rotor. The tines must not be interchanged.

The rotor of the outermost left, seen in driving direction, rotates clockwise. The direction of rotation of the tool carriers is shown in Fig. 19.18. The arrows above the tool carriers indicate the direction of rotation.

Fig. 19.11 shows the tines for rotors rotating in clockwise direction.
Fig. 19.12 shows the tines for rotors rotating in counter clockwise direction.

- Insert the tines (Fig. 19.10/4) into the pockets of the tool carriers.
- Insert pins (Fig. 19.10/3) into the holes of the tool carriers and the tines
- Secure pins by using linch pins (Fig. 19.10/2).

The tines of the rotary cultivator are positioned “on grip” if the tines are attached to the rotor as described above. The tines can also be attached in a “pulling” manner to the rotary cultivator, i.e. in the opposite direction of rotation. For this, the tines for the clockwise rotating rotors are to be attached to counter clockwise rotors and vice versa.
19.6.2 Welding on new tine tips

With increasing wear, the rotary cultivator tines can be brought back to the original length using welding tips (Fig. 19.13/1). First remove the tines from the rotor. If, in extraordinary cases, the tines are to be lengthened without removing them, the ground must be attached directly to the tines during electric welding to prevent damage of the tine rotor bearings and the transmission.

Work procedure
- Hold the tip to be welded (Fig. 19.13/1) to the old tine and make a separation mark (Fig. 19.12/1).
- Separate the old tine at the mark (Fig. 19.14/1).
- Attach the tip to be welded (Fig. 19.14/2) to the tine stump, solder with root of the seam (Fig. 19.14/3) and let the tine cool.
- After the covering layer welding (Fig. 19.14/4) the tine is again ready for use.
Materials

Use

- Wire electrodes for the MAGC/MAGM-welding of non-alloyed, low-alloyed, heat resistant and fine-grained steel, e.g. Union K 52 (Thyssen).

- Bar electrodes labelled:
  - SH black 3 K
  - SH green K 70
  - SH Ni 2 K 90
  - SH Ni 2 K 100
19.7 Overload clutch with
Cam wheel clutch
Walterscheid EK 64/2R

19.7.1 Function
Should the tines come to a standstill due to the cam wheel clutch being deactivated (Fig. 19.15/1) stop and reduce the pto shaft speed of the tractor to approx. 300 R.P.M. until the cam wheel clutch engages audibly. Should the tines do not begin to rotate, disengage the pto shaft and remove the obstacle (only with stopped engine and removed ignition key). The cam wheel clutch is then immediately ready for use.

19.7.2 Fitting
Attach the pto shaft half with the overload clutch to the gearbox input shaft of the implement and secure by using a cone bolt (Fig. 19.15/5) (CC-locking). The torque of the cone bolt (Fig. 19.15/5) is 80 Nm (please refer to the hints of the pto shaft manufacturer). Regularly check the cone bolt for firm seating.

19.7.3 Setting the torque
In the factory the overload clutch has been set to a torque of 2300 Nm which should not be changed.

It is recommended to operate the implement with a pto shaft speed of 1000 R.P.M. Set the tractor pto shaft speed to 1000 R.P.M. if you operate with a tractor pto shaft speed of 540 R.P.M. and the overload clutch engages too often.

Extraordinary operating conditions (e.g. many stones in the soil) may require to change the torque on the overload clutch even at 1000 R.P.M. tractor pto shaft speed.

If the safety device engages too often or not at all, the torque of the overload clutch can be adjusted (higher or reduced). For this pull the overload clutch off the gearbox input shaft. Remove seal ring (Fig. 19.15/2), securing ring (Fig. 19.15/3), coupling hub (Fig. 19.15/6) and spring assembly (Fig. 19.15/9). Measure the spring wire diameter “D” (Fig. 19/15) and take from the table (Fig. 19/16) the figure which corresponds to a change of the spring assembly length of 1 mm.

Remove the expansion pins (Fig. 19.15/11) and
- reduce the torque by equal increase
- increase the torque by equal decrease of the setting measure “L” on both sides of the spring assembly (Fig. 19.15/9).

1. The shortest permissible spring assembly length (see table Fig. 19.16) must not be undercut in order to exclude clutch blockages!
2. Always set the same spacings ( = see Fig. 19.15)!

After any adjustment the expansion pins (Fig. 19.15/11) have to be reinserted in the pass holes of the hex. Nuts.

The assembly is done in the vice versa order.
Fig. 19.15

**Clutch type K 64/2** (Clutch outer diameter 170 mm)

<table>
<thead>
<tr>
<th>Spring wire diameter „D“</th>
<th>A change of the spring assembly length „L“ of 1mm equals</th>
<th>Shortest permissible spring assembly length „L“</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5 mm</td>
<td>85 Nm</td>
<td>116 mm</td>
</tr>
<tr>
<td>7.0 mm</td>
<td>100 Nm</td>
<td>119 mm</td>
</tr>
<tr>
<td>7.5 mm</td>
<td>140 Nm</td>
<td>119 mm</td>
</tr>
</tbody>
</table>

Fig. 19.16
19.8 Removing and installing the rotor shafts

Before any repair work on one or several tool carrier shafts (Fig. 19.17/1) dismantle the rotary cultivator as follows:
- Remove pto shaft, packer rollers, side guide plates.
- dismantle the defective implement half of the rotary cultivator, divided in its centre, from the transport folding frame.
- Support the machine half by stable jacks.
- Drain gear oil off the spur gear trough and collect in a suited container.
- Remove the tines.
- Remove the gearbox and spur gear trough cover.

The gearbox can be lifted using a crane. To fasten the crane hook, screw an eyescrew into the transmission trough.

The threading of the rotor shaft (Fig. 19.17/1) and the threads of the spur gear fastening nuts (Fig. 19.17/3) must be free of dirt before removal to prevent damage.

Dirt or bits of transmission and covering seals must not enter the spur gear trough!!

Dirt or bits of transmission and covering seals must not enter the spur gear trough!!
19.8.1 Installation plan for the rotor shafts

**Before removal, pay attention:**
Before one or more rotor shafts are removed (Fig. 19.17/1) they must be turned so that the rotor shafts are in the basic position.

**Basic position:**
The basic position of the rotor shafts is shown in Fig. 19.1. The view into the open spur gear housing towards the spur gears is shown. The arrow on the centre line shows the driving direction.

In the basic position for all machines, the left most rotor shaft is in the “0°-position. The tines stand in “0°-position perpendicular to the driving direction.

**Before installation pay attention:**
Installing individual rotor shafts: Install individually removed rotor shafts into the spur gear housing according to Fig. 19.18. Before installing these rotor shafts, the remaining rotor shafts in the spur gear trough must first be brought into the basic position (see above). Then install the removed rotor shafts according to Fig. 19.18.

**Installing all rotor shafts:** If all the rotor shafts were removed from the spur gear trough for repairs, installation begins according to Fig. 19.18 with the first rotor shaft on the outermost left-hand side. After installation, this first rotor shaft is to be brought into the basic position. In the basic position for all machines, the leftmost rotor shaft is in the “0°-position. In the “0°-position”, the tines stand perpendicular to the driving direction.

The next rotor shaft is installed perpendicular to the previously assembled rotor shaft, which is in “0°-position”, plus 18° in the direction of the arrow (see arrows above the rotor shafts in the figure) Turning the rotor shaft by 18° is equal to shifting the outer tooth by two tooth positions.

The previously installed rotor shaft must be turned counter to the direction of the arrow above the rotor shaft into the “0°-Position”.

The next rotor shaft is, as described above, again installed perpendicular to the previously assembled rotor shaft which is in the 0°-position”, plus 18° in the direction of the arrow and then turned counter to the direction of the arrow into the 0°-position”. This procedure continues until the last rotor shaft.

**After installing the rotor shafts, pay attention:**
When finished, check the installation using Fig. 19.18. Tighten the spur gear trough nuts on the rotor shafts according to para. 19.8.3.
Fig. 19.18
19.8.2 Removing an external bearing ring

To remove an external bearing ring (Fig. 19.17/5) the following tools are required:

1. An internal remover (Fig. 19.19/2) with counter supports (Fig. 19.19/3).
2. Two flat bars (Fig. 19.19/4).

Removing the external support ring (Fig. 19.19/1):
- insert the internal remover (Fig. 19.19/1) into the hole
- by tightening the adjusting nut (Fig. 19.19/5) the removal flanges are spread apart and the sharp projections (Fig. 19.19/arrow) press behind the rounded edge of the external support ring
- lay two flat bars (Fig. 19.19/4) on the support tube (Fig. 19.19/6)
- support the counter supports (Fig. 19.19/3) on the flat bars (Fig. 19.19/4)
- hold on to the grip and tighten the hex. nut (Fig. 19.19/7). This pulls out the external support ring (Fig. 19.19/1). When the external support ring has been somewhat loosened, tighten the adjusting nut (Fig. 19.19/5).
19.8.3 Installing the spur gear fixing nuts

Screw the spur gear fixing nuts M52 x 1.5 with collar (wrench size 80 mm) (Fig. 19.20/1) onto the rotor shafts (Fig. 19.20/2), tighten and secure:

**Torque:**
800 Nm.

**Securing:**
Hit the collar of the spur gear fixing nut (Fig. 19.20/1) into the two securing grooves (Fig. 19.20/3) of the tine rotor shaft.
19.8.4 Installation after the repairs

- Install the spur gear trough cover and the gearbox with new seals
- Fill new gear oil (see above) into the spur gear trough
- Attach the implement halves to the transport folding frame

Guide the hydraulic hoses (Fig. 19.21/1) as illustrated between the wire (Fig. 19.21/2) and the boom of the transport folding frame to prevent the hydraulic hoses from being damaged while folding the frame.

- Attach pto shafts according to para. 19.8.5.
19.8.5 Attaching the pto shafts to the three-speed shift main gear box

The pto shafts (Fig. 19.22/2) attached to the output shafts of the three-speed shift main gearbox (Fig. 19.22/1) are heavily be angled when the divided rotary cultivator is folded. Therefore the universal joints of the pto shafts (Fig. 19.22/2) may only be attached in special places where they cannot be damaged when they are angled.

Before attaching the pto shafts turn the drive shaft of the left hand angular gearbox, seen in driving direction, by using a wrench (Fig. 19.23/1) until the mark (Fig. 19.23/2) is in a vertical position towards the gearbox.
Attach the universal joints of the pto shafts (Fig. 19.24/2 and Fig. 19.24/3) to the three-speed shift main gearbox (Fig. 19.24/1) as follows:

In Fig. 19.24 the three-speed shift main gearbox is illustrated with the pto shafts in top view.

The arrow on the three-speed shift main gearbox indicates the direction of travel of the rotary cultivator:
L = left hand implement side
R = right hand implement side.

Slide the universal joint (Fig. 19.24/2) onto the left hand pto shaft in 0º-position and secure.

Turn the universal joint (Fig. 19.24/3) of the right hand pto shaft by 90º slide on and secure.