Operator's manual

PRECISON AIR SEEDER

ED 01

Before starting to operate, please carefully read and adhere to this operation manual and safety advice!
Preface

Dear customer,

Airplanters ED are yet another high class product from the comprehensive range of farm machinery offered by AMAZONEN-WERKE, H. Dreyer GmbH & Co. KG.

To make fullest use of your new machine we recommend that you carefully read and observe this instruction manual before to start any operation.

The instruction manual contains important hints to operate the implement safe, appropriate and economical. Observing these hints helps to avoid danger and to reduce repair costs and failure periods and to increase the reliability and life span of your implement.

Please ensure that all operators will read this instruction manual before starting to operate the machine.

The instruction manual must always be at hand where the machine is operated.

This instruction manual is valid for all Airplanters of the series ED 01.
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1.0 Details about the machine

1.1 Range of application
The airplanter ED is suited for planting maize, beans, peas, soy beans, sunflower, cotton, sorghum, beets, bracharia and water melons.

1.2 Manufacturer
AMAZONEN-WERKE
H. DREYER GmbH & Co. KG
Postfach 51, D-49202 Hasbergen-Gaste / Germany

1.3 Conformity declaration
The airplanter ED fulfils the requirements of the EC-guide line Machine 89/392/EWG and the corresponding additional guide lines.

1.4 Details when making enquiries and ordering
When ordering special options and spare parts, please always indicate the type and serial number of your machine.

The safety requirements will only be fulfilled if in case of repair original AMAZONE spare parts will be used. No liability will be accepted by AMAZONE for consequential losses or resulting damage if other than AMAZONE spare parts will be used!

1.5 Type plate
Type plate on the machine.

The type plate is of documentary value and may not be changed or disguised!
### Details about the machine

#### 1.6 Technical data

## Technical data – ED-implements with Classic-sowing units

<table>
<thead>
<tr>
<th>TYP ED</th>
<th>301</th>
<th>451</th>
<th>451-K</th>
<th>601</th>
<th>601-K</th>
<th>601-K tronic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tyres (standard)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Option Terra tyres</td>
<td>6.00-16</td>
<td>10.0/75-15</td>
<td>31x15.5/15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transport width [m]</td>
<td>3.00</td>
<td>4.00</td>
<td>3.00</td>
<td>2.70 *1</td>
<td>3.05</td>
<td></td>
</tr>
<tr>
<td>Length [m] with and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>without row fertiliser applicator with pressure roller ø 370 mm</td>
<td>2.10</td>
<td>1.98</td>
<td>2.19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of sowing units (standard execution)</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of sowing units (max.) (pls. refer to table “possible row spacings” ED 01”)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>without under root fertilising</td>
<td>10</td>
<td>12</td>
<td>7</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with under root fertilising</td>
<td>6</td>
<td>12</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row spacing [cm] (standard execution)</td>
<td>75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drive</td>
<td>Sprocket gear drive 36 steps (standard execution) with additional gear 54 steps</td>
<td>hydraulic motor and Job-computer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grain spacing [cm]</td>
<td>3.1 - 46.1 depending on the singling disc used</td>
<td>stepless</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Blower fan drive</td>
<td>Pto shaft with free wheel Pto shaft speed 540 RPM, 710 RPM or 1000 RPM (standard)</td>
<td>hydraulic blower fan drive (optional equipment)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Singling unit</td>
<td>Polyethylene singling discs for maize, beans, peas, soya beans, sunflower, cotton, sorghum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fertiliser hopper capacity[l] with extension 200 l</td>
<td>450</td>
<td>900</td>
<td>750</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or Big Bag-extension</td>
<td>650</td>
<td>1300</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or 800</td>
<td>1600</td>
<td>1100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filling height (fertiliser) [m] with extension 200 l</td>
<td>1.48</td>
<td>1.62</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with Big Bag-extension</td>
<td>1.63</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1.69</td>
<td>1.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Net weight without row fertiliser applicator [kg] from Pressure roller ø 370 mm</td>
<td>630</td>
<td>662</td>
<td>824</td>
<td>903</td>
<td>1254</td>
<td>1334</td>
</tr>
<tr>
<td>Net weight with row fertiliser applicator [kg] from Pressure roller ø 370 mm</td>
<td>854</td>
<td>886</td>
<td>1098</td>
<td>1177</td>
<td>1704</td>
<td>1697</td>
</tr>
</tbody>
</table>

* only in conjunction with the transport wagon
### Technical data – ED-implements with Contour-sowing units

<table>
<thead>
<tr>
<th>TYPE ED</th>
<th>301</th>
<th>451</th>
<th>451-K</th>
<th>601</th>
<th>601-K</th>
<th>601-K tronic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tyres (standard equipment)</td>
<td>6.00-16</td>
<td>10.0/75-15</td>
<td>31x15.5/15</td>
<td>31x15.5/15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special option Terra tyres</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transport width [m]</td>
<td>3.00</td>
<td>4.00</td>
<td>3.05</td>
<td>2.70 *¹</td>
<td>3.05</td>
<td></td>
</tr>
<tr>
<td>Length [m] with and without fertiliser applicator</td>
<td>2.30</td>
<td>2.18</td>
<td>2.39</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with rubber-V-roller (standard execution)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of sowing units (standard execution)</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Number of sowing units (max.) (see table &quot;Possible row spacings ED 01&quot;)</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>without under root fertilising</td>
<td>6</td>
<td>9</td>
<td>7</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with under root fertilising</td>
<td>6</td>
<td>12</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Row spacing [cm] (standard execution)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drive</td>
<td>Chain wheel drive</td>
<td>36 steps (standard) with additional gearbox 54 steps</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hydr. motor and Job computer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grain spacing [cm]</td>
<td>3.1 - 46.1 depending on the singling disc used</td>
<td>stepless</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blower fan drive</td>
<td>Pto shaft with free wheel</td>
<td>Pto shaft speed 540 RPM, 710 RPM or 1000 RPM (standard)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Hydraulic blower fan drive (special option)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Singling unit</td>
<td>Plastic singling discs for maize, beans, peas, soy beans, sunflower, sorghum, beet, bracharia, water melons</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fertiliser tank capacity [l]</td>
<td>450</td>
<td>900</td>
<td>750</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with extension 200 l</td>
<td>650</td>
<td>1300</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>or Big Bag-extension</td>
<td>800</td>
<td>1600</td>
<td>1100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filling height (fertiliser) [m]</td>
<td>1.48</td>
<td>1.62</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with extension 200 l</td>
<td>1.63</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with Big Bag-extension</td>
<td>1.69</td>
<td>1.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Empty weight w.o. fertiliser applicator [kg] from Rubber-V-pressure roller 360 x 50</td>
<td>766</td>
<td>798</td>
<td>1028</td>
<td>1107</td>
<td>1526</td>
<td>1606</td>
</tr>
<tr>
<td>Empty weight with fertiliser applicator [kg] from Gummi-V-Druckrolle 360 x 50</td>
<td>990</td>
<td>1022</td>
<td>1302</td>
<td>1381</td>
<td>2112</td>
<td>2105</td>
</tr>
</tbody>
</table>

*¹ only in conjunction with the transport vehicle
12 Details about the machine

1.6.1 Details about noise level

The tractor operator seat related emission value is 76 dB (A), measured when operating with shut tractor cab at the ear of the tractor operator with the implement OPTAC SLM 5.

1.7 Hydraulic connections for folding machines

<table>
<thead>
<tr>
<th>Type</th>
<th>Equipment</th>
<th>Marker arm</th>
<th>Track-marker</th>
<th>Filling auger</th>
<th>Valves required on tractor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>r.h.</td>
<td>l.h.</td>
<td>r.h.</td>
<td>l.h.</td>
</tr>
<tr>
<td>ED 451-K Serie</td>
<td>w.o. track marker-actuation</td>
<td>w.o. FA</td>
<td>/</td>
<td>/</td>
<td>1 DA</td>
</tr>
<tr>
<td></td>
<td>with marker change over for track marker</td>
<td>w.o. FA</td>
<td>1 DA</td>
<td>/</td>
<td>1 DA / 1 SA</td>
</tr>
<tr>
<td></td>
<td>with vertical marker arm folding</td>
<td>w.o. FA</td>
<td>1 DA</td>
<td>1 SA</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>with FA</td>
<td>/</td>
<td>1 DA</td>
<td>2 DA / 1 SA</td>
</tr>
<tr>
<td>ED 451-K with control unit 918469</td>
<td>with vertical marker arm folding</td>
<td>w.o. FA</td>
<td>coupled (manual pre-selection)</td>
<td>1 DA</td>
<td>/</td>
</tr>
<tr>
<td>ED 451-K with individual marker arm folding 918452</td>
<td>with vertical marker arm folding</td>
<td>w.o. FA</td>
<td>1 DA</td>
<td>1 DA</td>
<td>1 SA</td>
</tr>
<tr>
<td>ED 451-K with individual marker arm folding 918452 and control unit 918468</td>
<td>with vertical marker arm folding</td>
<td>w.o. FA</td>
<td>individual (manual pre-selection) 1 DA</td>
<td>1 SA</td>
<td>/</td>
</tr>
<tr>
<td>ED 451-K with profi folding 921717</td>
<td>marker folding</td>
<td>w.o. FA</td>
<td>w. electr.-hydr. valve block (indiv.function control)</td>
<td>/</td>
<td>1 SA / 1 T</td>
</tr>
<tr>
<td>ED 451-K with profi folding S 921719</td>
<td>marker folding</td>
<td>w.o. FA</td>
<td>w. electr.-hydr. valve block (all functions controlled individually)</td>
<td>/</td>
<td>1 SA / 1 T</td>
</tr>
<tr>
<td>ED 601-K standard execution</td>
<td>marker folding</td>
<td>w.o. FA</td>
<td>/</td>
<td>1 DA / 1 SA</td>
<td></td>
</tr>
<tr>
<td>ED 601-K with control unit 918469</td>
<td>with vertical marker folding</td>
<td>w.o. FA</td>
<td>/</td>
<td>1 DA / 1 SA</td>
<td></td>
</tr>
<tr>
<td>ED 601-K with individual marker arm folding 917830</td>
<td>with vertical marker folding</td>
<td>w.o. FA</td>
<td>individual (manual pre-selection) 1 DA</td>
<td>1 SA</td>
<td>/</td>
</tr>
<tr>
<td>ED 601-K with individual marker arm folding 917830 and control unit 918469</td>
<td>with vertical marker folding</td>
<td>w.o. FA</td>
<td>individual (manual pre-selection) 1 DA</td>
<td>1 SA</td>
<td>/</td>
</tr>
<tr>
<td>ED 601-K with Profi folding 921716</td>
<td>marker folding</td>
<td>w.o. FA</td>
<td>w. electr.-hydr. valve block (indiv. function control)</td>
<td>1 DA</td>
<td>1 SA / 1 T</td>
</tr>
<tr>
<td>ED 601-K with Profi folding S 921718</td>
<td>marker folding</td>
<td>w.o. FA</td>
<td>w. electr.-hydr. valve block (individual function control)</td>
<td>1 SA</td>
<td>1 T</td>
</tr>
</tbody>
</table>

DA = double acting hydraulic valve / SA = single acting hydraulic valve / T = free return flow to the tank
FA = Fertiliser filling auger / Profi-control, only for tractors with Load-Sensing Systems or separate oil circuit

Required oil quantity

- Profi control

The hydraulic system of the tractor must supply a minimum volume flow rate of 20 l/min.

- Profi-control S

The hydraulic system of the tractor must supply a volume flow rate of 45 l/min. if it is intended to operate with a maximum spreading worm auger capacity.

In case of problems regarding the lifting time of the machine when turning at the headlands, operate with reduced spreading worm auger capacity. For this, reduce the volume flow rate from 45 l/min. to e.g. 30 l/min or convert the auger capacity every time.
1.8 Declined use of the machine

Airplanters AMAZONE ED 301, ED 451, ED 451-K, ED 601 und ED 601-K have exclusively been constructed for the usual operation in agriculture. Airplanters are suited for planting maize, beans, peas, soy beans, sunflower, cotton, sorghum, beets, bracharia and water melons.

Any other use 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.

Airplanters AMAZONE ED 301, ED 451, ED 451-K, ED 601 und ED 601-K may only be operated, maintained and repaired by such persons who have been made acquainted with it and who have been advised about the dangers.

All applicable accident preventive advise as well as any further generally accepted safety-, working-, medical- and road-traffic rules and any safety advice on the machine’s labels should be adhered to.

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

AMAZONE machines have been manufactured with great care, however, even in case of designed use, certain deviations from the seed rate of even a total failure cannot totally be excluded. These deviations may be caused e.g. by:

- Varying composition of the seed (e.g. grain size distribution, specific density, grain shape, dressing, sealing).
- Drifting.
- Blocking or bridging (e.g. by foreign particles, bag residue, etc.).
- Undulated terrain.
- Wear of wearing parts (e.g. singling discs . . .).
- Damage by external influence.
- Incorrect drive RPM and travelling speed.
- Incorrect setting of the machine (incorrect mounting).

Therefore, check before any use and also during operation your machine for the proper function and sufficient seed rate accuracy.

Claims regarding damage not having occured on the AMAZONE airplanter itself would be rejected. This also applies to damage due to sowing errors. Modifications made to the AMAZONE airplanter by the owner/user may result in consecutive damage and the manufacturer does not accept liability for such damage.
2.0 Safety

In this instruction manual you will find many hints which must be adhered to when fitting and operating your machine and when carrying out maintenance work. Please ensure that this instruction manual has been read by the operator before he starts to operate the machine.

Strictly adhere to all safety advice given in this instruction manual.

2.1 Dangers when not adhering to the safety advice

Not adhering to the safety advice
- may result in endangering persons, also the environment and the machine itself.
- may result in the loss of any claim for damage.

Not paying attention to the safety advice may cause the following risks:
- Danger for persons by not secured operational areas.
- Failure of important functions of the machine.
- Failure of prescribed measures for maintenance and repair.
- Danger for persons by mechanical or chemical affects.
- Danger to persons or to the environment by leaking hydraulic oil.

2.2 Operator qualification

The machine described in this instruction manual may only be operated, maintained and repaired by persons, who are acquainted with it and have been informed of the relevant dangers.

2.3 Symbols in this instruction manuals

2.3.1 General danger symbol

The safety advice in this operation manual which may lead to a danger of persons when not being observed, are identified with the general danger symbol (DIN 4844 W9).

2.3.2 Attention symbol

The safety advice in this operation manual which may cause dangers for the machine and its function when not being adhered to, are identified with the attention symbol.

2.3.3 Hint symbol

Hints regarding machine's specific functions, which have to be adhered to for a faultless function of the machine are identified with the hint symbol.

2.4 Waning pictographs and hint symbols on the machine

- The warning pictographs indicate dangerous points on the machine. Observing these pictographs means safety to all persons using this machine. The warning pictographs are always used together with the operational safety symbols.
- The hint symbols mark machine's specific points which have to be observed to ensure correct function of the machine.
- Strictly adhere to all warning pictographs and hint symbols!
- Please make these explanations also available for other users!
- Please always keep all warning pictographs and hint signs clean and in readable condition! Please ask for replacement of damaged or missing warning signs from your dealer and attach them in the relevant place (Picture-No. = Order-No.).
- The machine's fixing points for the warning pictographs and hint signs are illustrated in Fig. 2.1, 2.2 and Fig. 2.3. Please refer to the following pages for relevant explanations.
**Fig. 2.1**

**Explanation:**
Never reach into the zone. There is danger of bruising as long as parts are still moving!

**Fig. 2.2**

**Explanation:**
Before approaching the danger area, secure the lifting ram by locking it!

**Fig. 2.3**

**Explanation:**
Sitting or standing on the implement's ladder or platform during operation or during road transport is prohibited!
Picture No.: **MD 083**
**Explanation:**
Never reach into the seed box, fertiliser box of worm auger. Danger of injury from rotating agitator shaft or filling worm auger!

Picture No.: **MD 089**
**Explanation:**
Do not stand underneath a lifted implement (unsecured load)!

Picture No.: **MD 084**
**Explanation:**
Never stay within the operational area of the implement!

Picture No.: **MD 093**
**Explanation:**
Danger from rotating implement parts (e.g. pto shaft)!
Never reach into rotating shafts!

Picture No.: **MD 086**
**Explanation:**
Before coupling off the tractor pull out the storing supports!

Picture No.: **MD 094**
**Explanation:**
Ensure sufficient distance to electric high voltage lines.
Explanation:
Before starting operation read and observe instruction manual and safety advice!
2.5 Safety conscious operation

Besides the safety advice in this operation manual the national, and generally valid operation safety and accident preventive descriptions of the authorized trade association are binding, especially UVV 3.1, UVV 3.2 and UVV 3.4.

The safety advice indicated on the machine stickers must be observed.

When travelling on public roads observe the traffic regulations in force in your country.

2.6 Safety advice for the operator

2.6.1 General safety and accident preventive advice

Basic principle:

Always check traffic and operational safety before putting the machine into any operation!

1. In conjunction with the recommendations in the operator's manual, observe any general safety and accident prevention laws in force!
2. The hazard and warning signs provide important information to ensure safe operation. They are intended for your safety!
3. Follow traffic regulations when using public roads!
4. Before starting work familiarize yourself with all the operating elements and their uses. It will be too late to do this whilst you are operating the machine!
5. The operator should wear close-fitting clothes. Avoid wearing loose-fitting clothes!
6. To avoid the risk of fire, keep the machine clean!
7. Before starting up and handling the machine check the immediate vicinity for clearance (children)! Make sure you have a clear view!
8. Carrying passengers whilst driving or operating the machine is not permitted!
9. Connect the units correctly and secure them only to the proper mounting devices!
10. Exercise special care when coupling and uncoupling units to or from the tractor!
11. Ensure that the landing gear is in the correct position when mounting and dismounting (stability)!
12. Always attach weights correctly to the mounting points provided!
13. Observe the permissible axle loads, total weights and transport dimensions!
14. Check and install any transport equipment such as lighting, warning devices and any safety devices!
15. Release cables for quick hitches should hang freely and must not work loose from their housings!
16. Do not leave the driving position at any time whilst driving!
17. Driving, steering and braking abilities are influenced by mounted or suspended equipment and ballast weights. Exercise care when steering and braking!
18. When lifting a three-point device the front axle of the tractor is differently balanced according to the size. Observe the required front axle load (20% of empty weight of tractor)!
19. When driving around corners take into account the clear radius and/or the rotating mass of the machine!
20. Operate the units only after all the safety devices have been mounted in position!
21. Standing in the operating area is prohibited!
22. Do not stand near rotating and swivelling parts of the machine!
23. Hydraulic folding frames must only be activated after making sure no-one is standing near the machine!
24. Squeeze and shear points are found on externally activated components (eg, hydraulics)!
25. Before leaving the tractor leave the unit on the ground, turn off the engine and remove the ignition key!
26. Standing between the tractor and the unit is not permissible without ensuring that the parking brake and/or tyre blocks have been applied to prevent the vehicle from rolling forward!
27. Lock the track indicators in the transport position!
28. Observe permissible filling quantities!
29. Do not place any foreign elements in the storage hoppers!
30. Watch out for hazard points from rotating machine parts during truing test!
31. Use the loading platform for filling operations only. Passengers are not permitted to travel on the platform during operation!
2.6.2 Mounted units

1. Before the mounting and dismounting of units to the three-point linkage, position operating device to exclude any possibility of accidental lifting or lowering!

2. For the three-point linkage the mounting sections must be correctly aligned between tractor and unit!

3. There is a danger from squeeze and shear points near the three-point linkage!

4. Do not step between the tractor and the unit when the three-point linkage is activated externally!

5. Ensure that the tractor three-point linkage is adequately secured to the side when the unit is in the transport position!

6. When the unit is raised for transport on public roads, the operating lever must be locked to prevent any accidental lowering!

7. Suspend/mount the units as specified. Check the trailer brake system and observe the manufacturer’s instructions!

2.6.3 Power take-off shaft operation

1. Only a cardan shaft prescribed by the manufacturer and fitted with the proper safety devices must be used!

2. A protective tube and hopper for the cardan shaft and protection for the power take-off shaft must be provided and maintained in proper condition!

3. Apply coverings specified for transport and work positions of cardan shaft (follow operator's manual of cardan shaft manufacturer!)

4. Mount and dismount the cardan shaft only when the power take-off shaft and the engine are switched off and the ignition key has been removed!

5. Always ensure that the cardan shaft has been correctly assembled and secured!

6. Prevent the cardan shaft rotating by suspending chains!

7. Before switching on the power take-off shaft, make sure that the power take-off shaft speed of the tractor matches the permissible power take-off speed of the unit!

8. When using the path-dependent power take-off shaft make sure that its speed is dependent on the running speed and that the sense of direction is reversed when the vehicle is reversed!

9. Before switching on the power take-off shaft make sure that no-one is standing near the hazardous area of the unit!

10. Never switch on the power take-off shaft when the engine is switched off!

11. When operating the power take-off shaft make sure no-one is standing near the rotating power take-off shaft or cardan shaft!

12. Always turn off the power take-off shaft for wide angles where it is not required!

13. Attention! There is a danger from the subsequent rotating force of the power take-off shaft after switching off!

Do not step too near the unit at this time! Start work only when it has come to a standstill!

14. Clean, lubricate and adjust the power take-off driven unit and the cardan shaft only after the power take-off shaft and the engine have been switched off and the ignition key removed!

15. Attach the uncoupled cardan shaft to the bracket provided!

16. After removing the cardan shaft place protective cover on power take-off shaft end!

17. Rectify any damage immediately before operating the unit!
2.6.4 Hydraulic system

1. The hydraulic system is under high pressure!

2. When connecting hydraulic cylinders and motors make sure hydraulic hoses are connected as prescribed!

3. When connecting the hydraulic hoses to the tractor hydraulic system ensure that the hydraulics and the tractor is at zero pressure!

4. When carrying out hydraulic operations between the tractor and the unit coupling sleeves and connectors should be identified to prevent any operating errors.

If connections are mixed up reversed operations, eg, lifting instead of lowering, may cause accidents!

5. Before operating the implement for the first time and then at least once a year the hydraulic hoses must be checked for their operational safe condition by a skilled person. In case of damage and aging replace the hydraulic hoses. The exchange hoses must correspond to the requirements of the implement manufacturer!

6. Use suitable tools when searching for leaks to prevent injury!

7. Under high pressure any fluids (such as hydraulic oil) may penetrate the skin and cause serious injury! In the event of injury call for a doctor immediately! There is a danger of infection!

8. Before starting work on the hydraulic system, lower the units, turn the system to zero pressure and switch off the engine!

9. The service life of the hose assemblies should not exceed six years including a possible storage time of 2 years at most. Even during proper storage and permissible stress, hoses and hose connections are subject to natural ageing which limits their storage and service life. By way of exception, the service life may be determined according to empirical values taking into account the risk of danger. Other standard values may be applied to hoses and hose connections made of thermoplastic material.

2.6.5 General safety and accident prevention laws for servicing, repair and maintenance

1. Servicing, repair and cleaning operations together with rectification of operating defects should only be carried out when the drive and the engine have been disconnected! Remove the ignition key!

2. Check nuts and bolts regularly for tightness and re-tighten if necessary!

3. When servicing a raised unit always ensure it is secured by suitable supports!

4. When replacing work tools by means of cutting operations, use a suitable implement and gloves!

5. Remove oil, grease and filter correctly!

6. Always disconnect power before starting work on the electrical system!

7. Disconnect cable to the tractor generator and battery when carrying out electric welding work on the tractor and the mounted units!

8. When working on the tyres, make sure that the machine is stable and cannot roll away (tyre block)!

9. Repairs to the tyres may only be carried out by experts using suitable tools!

10. Tyre assembly requires expert knowledge and specific tools!

11. There is a danger of explosion if air pressure in tyres is too high!

12. Check air pressure regularly!

13. Replacement parts must comply with the manufacturer's technical requirements! Therefore original replacement parts must be used!
3.0 Description of product

The basic implement of the AMAZONE Airplanter ED is the four-row ED 301 with three-point mounting frame and a working width of 3 m (Fig. 3.1).

For an increased efficiency the Airplanters ED 451 or ED 451-K (working width 4.5 m) or ED 601 or ED 601-K (working width 6 m) are used.

On the implements up to 4.5 m working width the drive wheels (3.2/1) are located in front of the frame (3.2/2). This allows an individual row placement of the sowing units (10 rows / 3 m) on the profile frame.

Due to the profile frame design the sowing units can be moved easily, e. g. when converting the implement from maize to sugar beet.

The drive wheels can individually be adapted to the tractor track and thus run over a well re-compacted strip of soil.

On the 6- and 8-row implements the parallelogram-folding technique (Fig. 3.3) offers the advantage to fold the outer sowing unit(s) inwards while driving when operating in fields wedges. Simultaneously the sowing unit drive for this/these sowing unit(s) is switched off.

For an optimum adaptation to the prevailing terrain conditions the 8-row ED 601-K is equipped with a hydraulic track width adjustment. This way the drive wheels (3.3/1) can be extended for the sowing operation to a track width of 3 m.
3.1 Profi sowing units Classic and Contour

3.1.1 Classic-sowing units

The **Classic-sowing unit** (Fig. 3.4) is suited for sowing maize, soya beans, field beans, bush beans, peas, sunflowers, cotton, sorghum, etc. **after ploughing**.

For sowing beans and peas the basic implement can be equipped with up to 10 sowing units. These can be arranged with equal spacings on 3 m.

For the seed placement the two coulter types:
- Maize-sowing coulter and
- Bean sowing coulter

are available.

3.1.2 Contour-sowing unit

The **Contour-sowing unit** (Fig. 3.5) is suited for conventional sowing, mulch sowing, and also for direct sowing in fields with light soil. Besides the seeds which can be sown with the Classic sowing unit, the Contour sowing unit additionally sugar beet can be sown.

The Contour-sowing unit is guided by means of a longitudinal tandem. It rests in the front on a one-sided arranged pre-running pressure roller (3.5/1) and in the rear on a rubber-V-pressure roller (3.5/2) or a flexi rubber tyre.

This way the affects on the individual sowing unit by undulated field surfaces / “contours” are considerably reduced, even at high forward speeds. The very smooth running of the sowing units results in reduced deviations of the desired seed placement depth and in an optimum crop placement.

Also the one-sided placement of the front pressure roller (3.5/1) has a positive influence on the smooth running of the sowing units. The fertiliser coulter is placed opposite the pressure roller. This prevents the pressure roller from getting into contact with the soil moved by the fertiliser coulter which would result in undesirable additional movements of the sowing unit.

Depending on the position of the tensioning lever (3.5/3) the spring (3.5/4) provides an additional load on the sowing units.

The load on the rear pressure roller(3.5/2) is set with the aid of the setting lever (3.6/1) of the spring (3.6/2).
The placement depth setting spindle (3.7/1) can be fixed in differing positions between the rocker arm (3.7/2) and the quadrant plate (3.7/3). This results in the possibility of individual settings of the load distribution between pre-running and following pressure roller and thus in an adaptation to varying soil conditions.

On the Contour sowing unit, large double discs (3.8/1) made from wear resistant steel clear the furrow from organic matter. The seed placement is executed by the sowing coulter (3.8/2). The sowing coulter undercuts the furrow bottom of the clearing discs and forms the necessary wedge shaped seed furrow.

An easy conversion allows changing from the maize-mulch sowing execution to the relevant sugar beet execution (Fig. 3.9).

The conversion kit contains an additional intermediate pressure roller (3.9/1), a singling disc and a special coulter point. The quick change system of the sowing coulters allows an easy exchange of the coulter points without riveting.

Additional sowing units (Classic and Contour) as well as the interfaces (3.10/2) for the pneumatic and electronic system can easily be fitted by a clamping device (3.10/1).
3.2 Pressure rollers and furrow closers

For the equipment of the sowing units, flexi rubber tyres on ball bearings and rubber V-pressure roller in different sizes are available (Fig. 3.10). They provide setting the seed placement depth and pressing and covering (only rubber V-pressure rollers) of the seed furrow.

The flexi rubber tyres (3.11/1) in conjunction with pre-running furrow closers (3.11/2) are used for sowing maize after ploughing.

The rubber V-pressure rollers (3.12/1) operate with and without following furrow closers (3.12/2) as well on ploughed as on mulched fields. By the rubber V-pressure rollers the seed placement depth is set and the furrow is closed. They are preferably used when mulch sowing for maize and sugar beet.

The following table (Fig. 3.13) shows the use of the different pressure roller varieties depending on the type of soil.

| Range of use of the different pressure roller varieties depending on the kind of soil |
|---------------------------------|----------------|----------------|----------------|
|                                 | Sand soil       |                 | Clay soils      |
|                                 | ploughed        | mulched        | ploughed        | mulched        |
| Sowing unit execution           |                 |                 |                 |                 |
| Classic                         |                 |                 |                 |                 |
| conventional maize execution    |                 |                 |                 |                 |
| Contour                         |                 |                 |                 |                 |
| maize / mulch sowing execution  |                 |                 |                 |                 |
| Flexi rubber tyres Ø 500 mm    | XXX             | --             | --              | --             |
| with pre-running furrow closers |                 |                 |                 |                 |
| Flexi rubber tyres Ø 370 mm    | XX              | XXX            | X               | XXX            |
| with pre-running furrow closers |                 |                 |                 |                 |
| Rubber V-pressure roller Ø 360X50mm w.o. furrow closers | O | X | XXX | X | X | XXX | X | XX | XXX |
| Rubber V-pressure roller Ø 360X50mm with following furrow closers | X | XX | XX | XX | XX | XX | XXX | XX | XX |
| Rubber V-pressure roller Ø 360X33mm without furrow closers | O | O | X | O | X | X | O | X | X |
| Rubber V-pressure roller Ø 360X33mm with following furrow closers | O | X | X | X | X | X | XX | XX | XX |
| Steel-V-pressure roller Ø 360X50mm without furrow closers | O | X | XX | O | X | XX | O | X | XX |
| Steel-V-pressure roller Ø 360X50mm with following furrow closers | X | XX | XX | X | XX | XX | XX | XX | XX |

---

XXX very well suited  XX well suited  X use only limited  O not recommended

Fig. 3.11

Fig. 3.12

DB 695 04.00
3.3 **Track marker**

3.3.1 **Track marker ED 301, ED 451, ED 451-K and ED 601**

As standard, the Airplanters ED 301, ED 451, ED 451-K and ED 601 are equipped with disc markers (3.14/1).

In folded down position (Fig. 3.14) the marker discs (3.14/2) always penetrate into the soil, unless the seed drill has been equipped with a hydraulic marker change over for track markers or if it is equipped with the vertical track marker folding (both special options).

The **hydraulic marker change over** (Fig. 3.15) can only be installed on implements with a working width of 3.00 up to 4.50 m. On the ED 451 and ED 451-K it is only used for tracing a mark in the tractor wheel track, not in the tractor’s centre.

The **vertical track marker folding** (3.16/1) serves for
- bringing the track marker into a vertical position and
- switching over the track marker on the headlands.

The big width of the Airplanter, caused by the wide protrusion of the track marker arms can be reduced in a few moments by bringing the marker arms into the vertical position. This way, the operator can give way to obstacles without leaving the driver’s seat in the tractor cab.
If the track marker hits a firm obstacle, the shear bolt (3.17/1) shears off and protects the track markers from damage.

3.3.2 Track markers ED 601-K

As standard the Airplanters ED 601-K are equipped with disc track markers with vertical marker arm folding (3.18/1).
3.4 Drives

3.4.1 Suction blower fan

Instead of the standard pto shaft drive (Fig. 3.19) the suction blower fan (3.19/1) can be driven hydraulically (special option).

The blower fans of the AMAZONE Airplanter implements are located far at the rear of the lower links of the three point linkage. Thus, even if the implement is lifted, the pto shaft angling remains small.

As standard up to 12 sowing units can be fitted to the blower fan.

3.4.2 Sowing units

The singling discs of the sowing units are driven by the drive sprockets (3.20/1) by means of

- the chain drive (3.20/2),
- the 36-step mechanic setting gearbox (3.20/3).

Depending on the singling disc used, seed placement spacings of 2 to 53.8 can be set in the row.

- the pto shaft (3.20/4) and
- the secondary transmission (3.20/5). Seed placement spacings up to 92.3 cm in the row can be set with the aid of an additional gearbox which can be flanged onto the secondary transmission.

The power transmission from the sowing unit drive shaft (3.20/6) to the singling discs is provided by the central drive. The central drive consists of sprockets and a roller chain, which are well guarded inserted in the lower link (3.20/7) of the parallelogram guidance.

As standard the drive of the individual sowing units can be engaged and disengaged with the hand lever (3.20/8).

3.4.2.1 Over load securing

The integrated over load securing device for the drive of the sowing units protects the sowing units from damage. In case of overload the shear pin on the shear pin carrier (3.21/1) shears off and interrupts the drive connection from the central drive towards the singling disc. The shifting lever (3.21/2) set by the shear pin is now in a vertical position.
3.4 Singling

The seed is delivered via the feeding device (3.22/1) to the singling disc (3.23/1).

The seed singling operates according to the air suction principle. The vacuum created by the suction blower fan sucks the seed grains from the seed hopper to the nap holes of the singling discs and guides them to the scraper (3.22/2).

The scraper (3.22/2), which can be set in five positions singles the seed grains sucked onto the nap holes. Redundant grains fall back into the seed hopper.

The singled seed grains are guided through the seed housing towards the outlet opening. When the grain has arrived the deepest point the vacuum is interrupted. The grain falls off the nap of the singling disc directly into the seed furrow (Fig. 3.24) created by the sowing coulter. The height of fall “a” is 100 mm on the Classic sowing unit and 140 mm on the Contour-sowing unit.

The spring loaded ejector (3.24/3) carefully loosens the grains which might be clamped in the nap holes and frees the holes for a new supply.

Various easily exchangeable polyethylene singling discs (special option) are available for the different types of seed.
3.5 Row fertiliser applicator

The centre of gravity of the large, undivided fertiliser hopper (3.25/1) is closely behind the tractor. Easy to be stepped on loading boards or the filling worm auger (3.25/2) allow an easy and quick filling of the fertiliser hopper.

With the filling worm auger and the swivelable outlet (3.25/3) the large hopper can be filled within three to four minutes.

The big bag-extension (special option) (Fig. 3.26) with its large filling opening facilitates the filling of the row fertiliser applicator by big bags or a front shovel loader.

The fertiliser applicator is driven by the steplessly adjustable setting gearbox (Fig. 3.27/1). Fertiliser rates of 50 to 550 kg/ha can be applied.

The fertiliser metering area (3.27/2) is protected from rain. Special fertiliser metering wheels deliver the fertiliser into the outlets of the fertiliser coulters (3.27/3). On the foldable 6- and 8-row implements, the fertiliser delivery is achieved by vacuum to the outer fertiliser coulters.
With a trapezoidal suspension (3.28/2) the fertiliser coulters (3.28/1) are fixed on the profi-rail (3.28/3) at the side of the sowing units. When hitting stones the fertiliser coulter gives way upwards and to the rear.

The fertiliser placement depth can be set without any tool by resetting the pin (3.28/4). By the trapezoidal suspension of the fertiliser coulters the maintaining of the pre-set fertiliser placement depth is ensured – even in case of heavily changing soil conditions or varying forward speeds.

The highly wear resistant fertiliser coulter points (3.28/5) can be turned if one half is worn off.

The AMAZONE-fertiliser coulters open the soil until the coulter point to the full profile width. Only this way the fertiliser can be placed at the base.

By means of the fertiliser quick emptying device (special option) (Fig. 3.29) the fertiliser residue in the fertiliser hopper can easily flow into a collecting tray placed underneath.

3.7 Foldable implements ED 451-K and ED 601-K

The folding in- and out of the outer sowing units and the track marker arms as well as the drive for the fertiliser filling auger can be controlled from the tractor cab. Depending on the implement equipment either

- via the control unit(s) (standard marker arm folding)
- or
- via AMASCAN Profi (Fig. 3.30) (special option – Profi control) which controls the electro-hydraulic valve block.
3.7.1 Marker arm folding (standard equipment)

Fig. 3.31

Fig. 3.31/

1 - Marker arm folding right hand side.
2 - Marker arm folding left hand side.
3 - Track width adjustment right hand side (only ED 601-K).
4 - Track width adjustment left hand side (only ED 601-K).

5 - Vertical marker arm folding right hand side.
6 - Vertical marker arm folding left hand side.
7 - Block tap for marker arm folding.
8 - Hydraulic ram for lifting and lowering the filling auger.
9 - Block tap for hydraulic ram 8.
3.7.2 ED 601-K with control unit

For tractors with a limited number of hydraulic connections on the tractor.

Fig. 3.32

1 - Marker arm folding right hand side.
2 - Marker arm folding left hand side.
3 - Track width adjustment right hand side (only for ED 601-K).
4 - Track width adjustment left hand side (only ED 601-K).
5 - Vertical marker arm folding right hand side.
6 - Vertical marker arm folding left hand side.
7 - Control unit.
8 - Hydraulic ram for lifting and lowering the filling auger.
9 - Block tap for hydraulic ram 8.
3.7.3 ED 451-K and ED 601-K with individual marker arm folding (special option)

Fig. 3.33

Fig. 3.33/...

1 - Marker arm folding right hand side.
2 - Marker arm folding left hand side.
3 - Track width adjustment right hand side (only for ED 601-K).
4 - Track width adjustment left hand side (only ED 601-K).
5 - Vertical marker arm folding right hand side.
6 - Vertical marker arm folding left hand side.
7 - Block tap for marker arm folding.
8 - Hydraulic ram for lifting and lowering the filling auger.
9 - Block tap for hydraulic ram 8.
3.7.4 ED 451-K and ED 601-K with individual marker arm folding and control unit

For tractors with a limited number of hydraulic connections on the tractor.

Fig. 3.34

Fig. 3.34/...

1 - Marker arm folding right hand side.
2 - Marker arm folding left hand side.
3 - Track width adjustment right hand side (only for ED 601-K).
4 - Track width adjustment left hand side (only ED 601-K).
5 - Vertical marker arm folding right hand side.
6 - Vertical marker arm folding left hand side.
7 - Block tap for marker arm folding.
8 - Control unit.
9 - Hydraulic ram for lifting and lowering the filling auger.
10 - Block tap for hydraulic ram 9.
3.7.5 Profi-control with AMASCAN PROFI

All hydraulic functions are controlled by the AMASCAN PROFI (Fig. 3.35) inside the tractor cab.

The profi-control contains the following functions:

- individual folding in and out the arms for the outer sowing units,
- track marker actuation and
- filling auger control (only Profi-control S).

The Profi-control can only be operated with a tractor with the load-sensing system or with a separate oil circuit.

Required on the tractor:

- 1 single acting control valve for connecting the pressure hose.
- 1 pressure less return flow for connecting the return flow hose.

Before travelling on public roads, switch off the hydraulic drive!

Fig. 3.35/...

1 - Folding in / out – right hand boom.
2 - Folding in / out – left hand boom.
3 - Folding in / out right hand marker arm.
4 - Folding in / out left hand marker arm.
5 - Lower the filling auger and lift again; switch on and off the filling auger drive (only profi-control S).
3.7.5.1 Profi control ED 451-K and ED 601-K

- Applies only for boom- and marker arm actuation in conjunction with the vertical marker arm folding.

Fig. 3.27

1 - Boom folding right hand side.
2 - Boom folding left hand side.
3 - Track marker adjustment right hand side (only ED 601-K).
4 - Track width adjustment left hand side (only ED 601-K).
5 - Vertical marker arm folding right hand side.
6 - Vertical marker arm folding left hand side.

Fig. 3.36

7 - Valve block.
8 - System conversion bolt. The setting of the system conversion bolt depends on the tractor hydraulic system.
9 - Oil filter.
10 - Hydraulic ram for lifting and lowering the filling auger.
11 - Block valve for hydraulic ram 9.
3.7.5.2 Profi control S ED 451-K and ED 601-K

Marker arm and track marker actuation in conjunction with the marker arm folding and filling auger control.

Fig. 3.37

1 - Boom folding right hand side.
2 - Boom folding left hand side.
3 - Track marker adjustment right hand side (only ED 601-K).
4 - Track width adjustment left hand side (only ED 601-K).
5 - Vertical marker arm folding right hand side.
6 - Vertical marker arm folding left hand side.
7 - Valve block.
8 - System conversion bolt. The setting of the system conversion bolt depends on the tractor hydraulic system.
9 - Oil filter.
10 - Hydraulic ram for lifting and lowering the filling auger.
3.8 Electric and electronic monitoring devices

3.8.1 EF 2 electric function monitoring

EF 2 (Fig. 3.38) monitors the overload securing device for the drive of the sowing units. In case one of the sowing unit drives is interrupted by overload, an visible and audible alarm is given on EF 2.

3.8.2 AMASCAN and AMASCAN Profi

AMASCAN and AMASCAN Profi (Fig. 3.39) are display- and monitoring devices. In conjunction with the opto sensors they monitor the sowing unit drive and the grain supply on the singling discs. During operation the sown number of grains per hectare is displayed. In case of deviations from the given actual value a honk sounds. In addition a visible signal is shown on the display.

Additional via AMASCAN Profi the electro-hydraulic control of the filling worm auger as well as the folding in- and out of the outer sowing units and track marker arms is carried out.
4.0 Receipt of the machine, mounting and basic setting

4.1 On receipt of the machine

On receipt of the machine, please check that no damage has been caused in transit and all parts are present. Otherwise no responsibility can be accepted by us or the carrier. Check whether all parts listed up in the delivery note are present.

Before commencing work, remove all packing material, wire, etc. and check that all lubrication points are well supplied with grease (pto shaft)!

⚠️ When pushing the implement the singling discs of the sowing units and the agitator shaft inside the fertiliser hopper of the row fertiliser applicator (if fitted) will rotate, even at gearbox position “0”.

⚠️ Therefore, do not place any parts into the seed hopper or into the fertiliser hopper. Otherwise the singling discs and the agitator shaft might be damaged.

⚠️ Never reach with your hands into the seed hopper or the fertiliser hopper. Danger of injury from rotating singling discs or rotating agitator shaft!

4.2 Mounting

- Mount the AMAZONE ED onto the rear three point hydraulics of your tractor (please refer to chapter 2.6.2). For mounting fix the lower link arms of the tractor to the lower link pin (cat. II) of the ED.

- Reset top link with inserting pin (cat. II) and secure.

⚠️ Set the top link arm length in such a way that, when the implement is lowered (working position), the seed hopper covers of the sowing unit will be level with the ground when the sowing coulters are penetrating the soil. Only with this setting the sowing coulter is properly guided in the soil and a faultless, even seed placement will be achieved.

⚠️ When the implement is mounted, fold in the support stands (4.1/1) and secure!

Secure the lower link arms of the tractors three point hydraulic by stabiliser bracings or chains. In lifted position the lower link arms of the tractor must only have little play. This way, a uniform row spacing...
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towards the next bout is achieved, even in hilly terrain and the implement does not swing when turning at the headlands.

⚠️ Observe a sufficient front axle load of the tractor (at least 20 % of the tractor’s net weight). If necessary apply front ballast weights.

⚠️ When transporting the machine with filled hopper, observe the permissible rear axle load of the tractor. If necessary travel with partly filled or even empty hopper.

4.3 Pto shaft with free wheel

The counter shaft gearbox of the blower fan is driven via the universal joint shaft by the pto shaft of the tractor.

Only use the pto shaft with free wheel prescribed by the manufacturer!

4.3.1 Matching and mounting the pto shaft

Push the pto shaft halves in the prescribed sense of direction (please refer to symbol on the pto shaft) onto the pto shaft connection of your tractor and onto the pto shaft stud of the Airplanter ED.

Before doing this, clean the pto shaft stud of your implement!

When fitting for the first time match the pto shaft to your tractor according to Fig. 4.2. As this matching only applies for this particular type of tractor, the pto shaft matching must be rechecked or repeated when changing tractors.
When first mounting, fix pto shaft halves to the universal joint shaft profile of the tractor and the implement without inserting the pto shaft tubes into one another.

1. By holding the pto shaft tubes side by side, check whether an **profile overlap** of the pto shaft tubes of **at least 40 % of LO** (LO = length in inserted condition) is guaranteed as well on the lowered as on the lifted implement.

2. In inserted position the pto shaft tubes may not touch the yokes of the universal joint. A **safety margin of at least 10 mm** should be attained.

3. For matching the length of the pto shaft halves hold them side by side in the closest operating position of the machine and mark.

4. Shorten inner and outer guard tube by the same amount.

5. Shorten inner and outer profile tube in the same length as the guard tube.

6. Deburr cutting edges and carefully remove chips.

7. Apply grease to the profile tubes and insert.

8. Hook in chains into the hole of the bracing of the upper link pocket so that a sufficient swivel range of the pto shaft in all operating positions is guaranteed and the pto shaft guard is prevented from rotating during operation.

9. **Only operate with entirely guarded drive.**

⚠️ **On tractor and implement only use pto shaft with complete guard and additional guard. Replace guards immediately once they have been damaged.**

⚠️ **The maximum pto shaft angle must never exceed 25 degrees.**

Also note the fitting- and maintenance advice of the pto shaft manufacturer!

⚠️ **In case you operate your airplanter in combination with a soil tillage implement and a packer roller and the airplanter is lifted with the aid of a lifting frame over the packer roller to reduce the lifting power when the total combination is raised, a lifting power limiting device should be provided on the soil tillage implement so that the angling of one universal joint of the pto shaft will not exceed 30°.**

⚠️ **To avoid damage to universal joint shaft and blower fan only engage the pto shaft slowly at low tractor engine speed!**
4.4 Drive of the blower fan with different pto shaft speeds

The blower fan (4.3/1) is driven by means of the pto shaft from the tractor’s universal joint shaft via the counter gearbox which acts as a V-belt drive (4.3/2).

V-belt pulleys (4.3/3) with different diameters “D” allow the counter gearbox input shaft (4.3/4) to be driven with different tractor universal joint shaft speeds without changing the blower fan speed.

⚠️ The guard (4.4/1) of the counter gearbox has been removed for demonstration purposes.

⚠️ Only operate the machine with properly fitted guard!

Possible pto shaft speeds and the relevant V-belt pulley diameters:

a) Drive for pto shaft with 1000 RPM (standard execution)
   V-belt pulley diameter D = 178 mm, V-belt length 1105 mm.

b) Drive for pto shaft with 710 RPM
   V-belt pulley diameter D = 250 mm, V-belt pulley diameter 1244 mm.
   In case you intend to drive the blower fan with reduced tractor engine speed,
   - Connect the pto shaft with the 1000 RPM tractor universal joint shaft and
   - fit a V-belt pulley with a diameter of D = 250 mm (special option).

c) Drive for pto shaft with 540 RPM
   V-belt pulley diameter D = 330 mm, V-belt length 1397 mm.
   In case you intend the blower fan with 540 RPM,
   - connect the pto shaft with the 540 RPM tractor universal joint shaft and
   - fit a V-belt pulley with a diameter of D = 330 mm (special option).
4.4.1 Exchange of V-belt pulleys

The Pulley (4.5/1) is fitted to the driven input shaft (4.5/3) with four bolts (4.5/2). The V- (4.5/4) connects pulley and blower fan drive shaft (4.5/5). The belt is tensioned by the sprung loaded roller (4.5/6).

The belt-tensioning depends on the length “I” of the spring (4.6/1), and the spring length “I” depends on the V-belt pulley diameter “d”. The correct V-belt pre-tensioning is achieved at a spring length of

- \( l = 240 \pm 10 \text{ mm} \) with V-belt pulley-diameter \( d = 178 \text{ mm} \).
- \( l = 260 \pm 5 \text{ mm} \) with V-belt pulley-diameter \( d = 255 \text{ mm} \).
- \( l = 260 \pm 5 \text{ mm} \) with V-belt pulley-diameter \( d = 330 \text{ mm} \).

Exchange V-belt pulleys as follows:

- **ED with suction fan:**
  - Remove three bolts and take off guard.
  - Release V-belt pre-tensioning and remove V-belt.
  - Slacken bolts and exchange the V-belt pulley.

- **ED with pressure- and suction fan:**
  - Slacken the 4 bolts in the bracing plate (4.7/1) of the pressure air fan and remove the bracing plate.
  - Slacken the bolt connections and remove the 3-sectioned guard (4.7/2).
  - Release the V-belt pre-tensioning and remove V-belt.
  - Slacken bolts (4.5/2) and exchange V-belt pulley.
Receipt of the machine, mounting and basic setting

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Carry out the mounting in reverse order

- The exchange of the V-belt pulley required a V-belt of another length.
- Pre-tension the spring on the correct length “I” again. Fit guard!
- Only start to operate the implement with all guards fitted and in proper position!

4.5 Hydraulic connections

4.5.1 Hydraulic connections for rigid implements

- Connect the hydraulic plug of the hydraulic marker change over or the marker arm folding to 1 single acting control spool valve.

4.5.2 Hydraulic connections for foldable implements

<table>
<thead>
<tr>
<th>Type</th>
<th>Equipment</th>
<th>Marker arm r.h.</th>
<th>Marker arm l.h.</th>
<th>Track-marker r.h.</th>
<th>Track-marker l.h.</th>
<th>Filling auger</th>
<th>Valves required on tractor</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 451-K Serie</td>
<td>w.o. track marker-actuation</td>
<td>w.o. FA</td>
<td>1 DA</td>
<td>/</td>
<td>/</td>
<td>1 DA</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td>with FA</td>
<td>1 DA</td>
<td>/</td>
<td>/</td>
<td>1 DA</td>
<td>2 DA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>with marker change over for track marker</td>
<td>w.o. FA</td>
<td>1 DA</td>
<td>1 SA</td>
<td>/</td>
<td>1 DA / 1 SA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>with FA</td>
<td>1 DA</td>
<td>1 SA</td>
<td>1 DA</td>
<td>2 DA / 1 SA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>with vertical marker arm folding</td>
<td>w.o. FA</td>
<td>1 DA</td>
<td>1 SA</td>
<td>/</td>
<td>1 DA / 1 SA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>with FA</td>
<td>1 DA</td>
<td>1 SA</td>
<td>1 DA</td>
<td>2 DA / 1 SA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ED 451-K with control unit 918489</td>
<td>with vertical marker arm folding</td>
<td>w.o. FA</td>
<td>coupled (manual pre-selection)</td>
<td>1 DA</td>
<td>/</td>
<td>1 DA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>with FA</td>
<td>coupled (manual pre-selection)</td>
<td>1 DA</td>
<td>1 DA</td>
<td>2 DA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ED 451-K with individual marker arm folding 918452</td>
<td>with vertical marker arm folding</td>
<td>w.o. FA</td>
<td>1 DA</td>
<td>1 DA</td>
<td>1 SA</td>
<td>/</td>
<td>2 DA / 1 SA</td>
</tr>
<tr>
<td></td>
<td>with FA</td>
<td>1 DA</td>
<td>1 SA</td>
<td>1 DA</td>
<td>3 DA / 1 SA</td>
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<td></td>
</tr>
<tr>
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<td>with vertical marker arm folding</td>
<td>w.o. FA</td>
<td>individual (manual pre-selection) 1DA</td>
<td>1 SA</td>
<td>/</td>
<td>1 DA / 1 SA</td>
<td></td>
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<tr>
<td></td>
<td>with FA</td>
<td>individual (manual pre-selection) 1DA</td>
<td>1 SA</td>
<td>1 DA</td>
<td>2 DA / 1 SA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ED 451-K with profi folding 921717</td>
<td>with vertical marker folding</td>
<td>w.o. FA</td>
<td>w. electr.-hydr. valve block (indiv. function control)</td>
<td>/</td>
<td>1 SA / 1 T</td>
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<tr>
<td></td>
<td>with FA</td>
<td>w. electr.-hydr. valve block (all functions controlled individually)</td>
<td>/</td>
<td>1 SA / 1 T</td>
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<td></td>
<td></td>
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<tr>
<td>ED 601-K standard execution</td>
<td>with vertical marker folding</td>
<td>w.o. FA</td>
<td>1 DA</td>
<td>1 SA</td>
<td>/</td>
<td>1 DA / 1 SA</td>
<td></td>
</tr>
<tr>
<td></td>
<td>with FA</td>
<td>1 DA</td>
<td>1 SA</td>
<td>1 DA</td>
<td>2 DA / 1 SA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ED 601-K with control unit 918469</td>
<td>with vertical marker folding</td>
<td>w.o. FA</td>
<td>coupled (manual pre-selection)</td>
<td>1 DA</td>
<td>/</td>
<td>1 DA</td>
<td></td>
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<tr>
<td></td>
<td>with FA</td>
<td>coupled (manual pre-selection)</td>
<td>1 DA</td>
<td>1 DA</td>
<td>2 DA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ED 601-K with individual marker arm folding 917830</td>
<td>with vertical marker folding</td>
<td>w.o. FA</td>
<td>1 DA</td>
<td>1 DA</td>
<td>1 SA</td>
<td>/</td>
<td>2 DA / 1 SA</td>
</tr>
<tr>
<td></td>
<td>with FA</td>
<td>1 DA</td>
<td>1 SA</td>
<td>1 DA</td>
<td>3 DA / 1 SA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ED 601-K with individual marker arm folding 917830 and control unit 918469</td>
<td>with vertical marker folding</td>
<td>w.o. FA</td>
<td>individual (manual pre-selection) 1DA</td>
<td>1 SA</td>
<td>/</td>
<td>1 DA / 1 SA</td>
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</tr>
<tr>
<td></td>
<td>with FA</td>
<td>individual (manual pre-selection) 1DA</td>
<td>1 SA</td>
<td>1 DA</td>
<td>2 DA / 1 SA</td>
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<tr>
<td>ED 601-K with Profi folding 921716</td>
<td>with vertical marker folding</td>
<td>w.o. FA</td>
<td>w. electr.-hydr. valve block (indiv. function control)</td>
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<td>/</td>
<td>1 SA / 1 T</td>
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<tr>
<td></td>
<td>with FA</td>
<td>w. electr.-hydr. valve block (individual function control)</td>
<td>1 SA</td>
<td>/</td>
<td>1 SA / 1 T</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DA = double acting hydraulic valve / SA = single acting hydraulic valve / T = free return flow to the tank
FA = Fertiliser filling auger / Profi-control, only for tractors with Load-Sensing Systems or separate oil circuit
4.5.2.1 Foldable implements with Profi-Control

The Profi-control can only be used in combination with tractors with a load-sensing hydraulic system or with a separate oil circuit.

Required on the tractor:

- 1 single acting control unit for connection of the pressure hose (4.8/1).
- 1 pressure less return flow for connection of the return flow hose (4.8/2).

Required oil quantity

- Profi control

The hydraulic system of the tractor must provide a volume of at least 20 l/min.

- Profi control S

If it is intended to operate with the maximum worm auger capacity the hydraulic system of the tractor must provide a volume of 45 l/min.

In case of problems regarding the lifting time of the implement when turning at the headlands, operate with reduced worm auger capacity. For this reduce the volume of 45 l/min. to e.g. 30 l/min. or change the worm auger capacity each time.

For road transport switch off the hydraulic drive!

In order to avoid damage to the hydraulic components the impact pressure in the return flow must not exceed a maximum of 10 bar.

Therefore, do not connect the oil return flow to the control spool valve but on a pressure less oil return flow.

4.5.2.1.1 Setting the system-conversion bolt on the valve block

The adjustment of the system conversion bolt (4.8/3) on the valve block (4.8/4) depends on the tractor’s hydraulic system. In accordance to the hydraulic system proceed as follows:

- Unscrew the system converting bolt until the lock (set by the factory) on tractors with
  - an open-center-hydraulic system (constant flow system, chain wheel pump hydraulic).
  - a load-sensing-hydraulic system (pressure- and flow controlled setting pump) – set the oil delivery with the aid of the control unit to approx. 45 l/min.

- Screw in the system converting bolt until the lock (contrary to the factory setting) on tractors with
  - a closed-centre-hydraulic system (constant pressure system, pressure controlled setting pump).
  - a load-sensing-hydraulic system (pressure- and flow controlled setting pump) with direct load sensing pump connection (4.8/5) (control circuit).
4.6 Uncoupling the implement

⚠️ When coupling of uncoupling park the implement on level ground.

⚠️ Couple or uncouple the implement only when it is empty.

⚠️ Before coupling the implement pull out the support stands (4.9/1) and secure with a spring loaded pin (4.9/2).

If available, shut the block tap for the filling auger (4.10/1) and for the marker arm folding (4.10/2) before uncoupling the implement.

⚠️ Insert the hydraulic plug into the provided plug retainer.
5.0 Track markers

⚠️ Before travelling on public roads lock the markers in transport position.

⚠️ Danger of injury in folding area of the marker arms between markers and implement frame. Never reach into the squeezing area as long as parts are still moving!

⚠️ It is prohibited to stay beneath a lifted, not secured track marker arm!

5.1 Track marker ED 301, ED 451, ED 451-K and ED 601

As standard the Airplanters ED 301, ED 451, ED 451 K and ED 601 are equipped with disc markers (5.1/1).

If your seed drill is not equipped with a marker change over, a shuttle valve or a electric-hydraulic control unit (Profi-folding) (special option) the marker discs (5.1/2) will always penetrate into the soil when being folded downwards (Fig. 5.1).

If the marker arm hits an obstacle during operation the shear bolt (5.2/1) will shear off and protects the marker arms from damage.

⚠️ When replacing the shear bolts only use bolts with the stability 8.8.

Fig. 5.1

5.2 Track markers ED 601-K

As standard the Airplanters of the type ED 601-K are equipped with disc markers in vertical position (5.3/1).

Fig. 5.2

Fig. 5.3
50 Track markers

5.2.1 Setting the marker discs

Set the marker discs in such a way that

- **on light soils** they follow about parallel with the direction of operation and.

- **on heavy soils** move them to provide more angle "on grip", so that they work more aggressive and create a clearly visible mark.

Slacken the fixing bolt (5.1/3) and set the position of the track marker discs by turning the disc.

Ensure that the marker discs do not work too deeply in the soil. If the track markers work too deeply danger of damage in a rough, stony seed bed.

First carry out the longitudinal setting of the track marker (see chapter 5.2.2).

With the aid of chains (5.1/4 or 5.1/1) restrict the working depth on 60 up to 80 mm.

5.2.1.1 Track marker ED 301, ED 451, ED 451-K and ED 601

- Place the implement on level soil, bring into working position and fold down the track marker.

- Hook the chain (5.1/4 or 5.4/1) into the marker arm tube that the chain still slightly sags when the marker discs rest on the footprint of the drive wheels.

- Secure the chain on the marker arm tube by using a spring clip

  Varying chain lengths are achieved by resetting the chains in varying chain links.

5.2.1.2 Track marker ED 601-K

- Deposit the implement on level soil, bring implement into working position and fold down the marker arm.

- Set the turnbuckle (5.5/1) on the marker arm in such a way that the marker discs will just reach the soil.

- Shorten the turnbuckle by approx. one turn so that the marker arm is further lowered (approx. 60 to 80 mm).

- Secure the turnbuckles by using a counter nut (5.5/2).
5.2.2 Setting the markers to the correct length

For setting the marker arm length fold down both marker arms.

Depending on the tractor’s wheel marks, the working width, the row spacing and the number of rows of your Airplanter different marker trace measurements result, i.e. the distances from the soil contact surface of the marker disc towards the implements’ centre or towards the outer sowing unit.

5.2.2.1 Track marker ED 301

- Slacken clamping bolts (5.6/1).
- Pull out marker arm tube (5.6/2) in the required length.
- For setting the length
  - slacken the clamping nut (5.6/3),
  - pull out the marker disc (5.6/4) and turn if necessary.
- Retighten all clamping bolts after setting.

5.2.2.2 Track marker ED 451, ED 451-K, ED 601 and ED 601-K

- Pull out the sprung loaded trip (5.7/1) and the telescopic marker arm tube (5.7/2) until the trip (5.7/1) catches for the first time (setting on the tractor track).
- For setting on the tractor’s centre pull again the trip (5.7/1) and pull out the marker arm tube (5.7/2) further until the trip (5.7/1) catches again.
- For length setting fine tuning
  - slacken the clamping bolt (5.7/3),
  - pull out track marker disc (5.7/4) and turn if necessary.
- Retighten clamping bolt (5.7/3).

In case the track markers have been set to trace a mark in the tractor’s centre slide the telescopic marker arms into each other completely before travelling with the ED 601-K on public roads as otherwise the permissible transport width of 3 m would be exceeded.
5.2.3 Determining the correct track marker arm length

5.2.3.1 How to determine the track marker arm length for tracing a track in the tractor’s centre (Fig. 5.8)

The track marker spacing $A$, measured from the implement centre to contact point of the marker disc on the soil corresponds to the working width.

$$ A = R \times n $$

**Example:**

Row spacing $R$: 75 cm

Number of sowing units $n$: 4

Track marker spacing $A = 75 \text{ cm} \times 4 = 300 \text{ cm}$

![Fig. 5.8](image-url)
5.2.3.2 How to determine the track marker arm length for tracing a mark in the tractor’s wheel track

a) Measured from the implements centre (Fig. 5.9)

With symmetric arrangement of the coulters the correct track marker spacings from the implements centre can be determined according to the following formula:

\[ A = R \times n - \frac{S}{2} \]

\[ \text{Track marker dimension } A = \text{Working width } B - \frac{\text{Tractor track } S}{2} \]

\[ \text{Working width } B = n \times \text{row spacing } R \]

Example:

Row spacing \( R \): 75 cm
Number of sowing units \( n \): 4
Tractor wheel mark \( S \): 150 cm

\[ \text{Track marker dimension } A = 4 \times 75 \text{ cm} - \frac{150 \text{ cm}}{2} = 225 \text{ cm} \]

b) Measured from the outer sowing coulter (Fig. 5.10)

With a symmetrical arrangement of the coulters the correct track marker spacing can be determined according to the following formula:

\[ A = \frac{R (n+1) - S}{2} \]

Example:

Row spacing \( R \): 75 cm
Number of sowing units \( n \): 4
Tractor track \( S \): 150 cm

\[ \text{Track marker dimension } A = \frac{75 \text{ cm} (4+1) - 150 \text{ cm}}{2} \approx 112.5 \text{ cm} \]
6.0 En route to the field – Transport on public roads

Please observe the following hints. They help to prevent accidents in public road traffic.

⚠ The vehicles driving, steering- and braking behaviour are affected by mounted or towed implements and ballast weights. It must be ensured that the vehicle steers and brakes correctly.

⚠ When lifting a three-point mounted implement the front axle of the tractor is differently relieved of load, depending on the tractor type and size. Observe the necessary front axle load (20 % of the tractor’s net weight)! If necessary fit front weights to the tractor.

⚠ The tractor used must have sufficient capacity for the additional rear axle load which is already very high when the implement is empty. Therefore the transport on public roads is only permissible with an empty implement.

→ For implements with a transport width of more than 3.0 m apply for an authorisation if necessary.

When travelling on public roads the execution of tractor and implement have to correspond to the national road transport and traffic rules.

- The transport width of 3 m must not be exceeded.
- Traffic light and identification:

Required traffic light kit,

License plate (Fig. 6.1):

- Complete rear traffic lights with reflectors and if necessary license plate, during the night additional front limiting lights.

Required identification:

- At the front and at the rear warning plates on the right and left hand side according to DIN 11 030 or parking plates.

As option available: complete, firmly mounted equipment with parking plates, front limiting lights, rear lights, rear reflectors and license plate carrier.

Tractor and implement should correspond to the national road transport and traffic rules. The vehicle owner and operator are responsible for adhering to the legal traffic rules.

- Check the traffic light kit for proper function.
6.1 Conversions on the implement before road transport

ED 301, 451 and 601

- Fold upwards the individual sowing units into transport position (chapter 8.1) and secure them against unintended lowering.
- Bring the marker arms into transport position according to Fig. 6.2 and secure by using a clip pin.

⚠️ Danger of squeezing and shearing between marker arm and implement. Never reach into the danger area as long as parts are still moving!

⚠️ Never stay underneath an upwards folded, not secured track marker arm!

ED 451-K

- Fold upwards the individual sowing units into the transport position (chapter 8.1) and secure.
- Bring the track marker arms into transport position according to Fig. 6.2 and secure by using a clip pin.
- On machines with vertical marker folding shut the block tap.
- Swivel upwards the outer sowing units into transport position with the aid of the hydraulic ram (6.3/1) and lock them in this position by using pins (6.3/2). When **locked** the pin (6.3/2) is in the position as shown in Fig. 6.3.

⚠️ Before folding up and down the outer sowing units advise people to leave the danger area within the vicinity of the sowing units (danger of squeezing!).

⚠️ For folding up and down the outer sowing units keep the lever on the control unit of the tractor in the position “lifting” or “lowering” until the sowing units are entirely folded in or out. When releasing the lever the folding procedure will be immediately stopped.

- For **unlocking** swivel the pin (6.4/1) into the position shown in Fig. 6.4.
Conversions on the implement before road transport

ED 601-K

- Fold upwards the individual sowing units into the transport position (Kap. 8.1) and secure.

⚠️ In order not to exceed the transport width of 3.05 m (if necessary apply for a special licence at your local traffic authorities) entirely slide in the telescopic marker arms, provided the marker arms have been set for tracing a mark in the tractor’s centre.

- Fold upwards the marker arm entirely.
- On machines with vertical marker folding shut block tap (6.5/1).

- Swivel upwards the outer sowing units into transport position with the aid of the hydraulic ram (6.6/1) and lock in this position by using the trip (6.6/2). When locked, the trip should have the position as shown in Figure 6.6.

- Shut the block tap (6.7/1) of the hydraulic track width adjustment according to Fig. 6.7.
6.1.1 Pressure rollers with following furrow closers

⚠️ Before travelling on public roads swivel upwards the following furrow closers into transport position.

- Unhook the spring (6.8/1).
- Remove clip pin (6.8/2).
- Pull out the pin (6.8/3).
- Swivel the furrow closers (6.8/4) upwards and secure in this transport position by inserting the pin (6.8/3) into the hole (6.8/5).
- Secure the pin (6.8/3) by using a clip pin.

6.1.2 Implements with filling auger

- Shut block tap (6.9/1) and thus lock the hydraulic ram (6.9/2) against unintended lowering of the filling auger.
7.0 Putting to operation and setting up the Airplanter

7.1 Putting implement to operation

⚠️ Danger of injury in folding area of the marker arms between markers and implement frame. Never reach into the squeezing area as long as parts are still moving!

⚠️ It is prohibited to stay beneath a lifted, not secured track marker arm!

7.1.1 Rigid machines ED 301, ED 451 and ED 601

- Lower track marker arms (Fig. 7.1).
- Check track markers for proper working depth (please refer to chapter 5.2.1).

7.1.2 Foldable machines ED 451-K and 601-K

⚠️ When actuating the outer sowing units advise people to leave the operational area (danger of squeezing!)

⚠️ When the lever of the control unit is released the folding procedure of the sowing units is stopped immediately.

👉 The outer sowing units are automatically locked in the folded down position.

- On the ED 601-K open the two block taps (7.2/1) of the transport securing device for the hydraulic track width adjustment.

⚠️ On implements of the type ED 601-K the track width may only be adjusted with the machine in lifted position.
- Unlock the transport locking (7.3/1) of the outer sowing units of ED 451-K or (7.4/1) ED 601-K.

7.1.2.1 ED 451-K Serie and ED 601-K Range

- Unlock the track markers from transport position and fold down (only ED 451-K).
- Open block tap for track marker folding-in. Change the marking sides of the track markers by actuating the control unit on the tractor.
- Folding down or in the outer sowing units.
  - Hold the lever on the control unit of the tractor in position „lifting“ or „lowering“ until the sowing units have entirely been folded in or down.
- Check the working width of the track markers (for this, please refer to para. 5.2.1).

7.1.2.2 ED 451-K and ED 601-K with control unit

- Unlock the track marker from the transport position and fold down (only ED 451-K).
- Swivel the control lever (7.5/1) to position „A“ and fold down or in the outer sowing units.
  - Hold the lever on the control unit of the tractor in position „lifting“ or „lowering“ until the sowing units have entirely been folded in or down.
- Swivel the control lever (7.5/1) to position „B“. Change the marking sides of the track markers by actuating the control unit on the tractor.
- Check the working width of the track markers (for this, please refer to para. 5.2.1).
7.1.2.3  ED 451-K and ED 601-K with individual boom folding

- Unlock the track markers from the transport position and fold out (only ED 451-K).

- Open block ball tap for track marker folding. Change the marking sides of the track markers by actuating the control unit on the tractor.

- Individually fold out - or in the outer sowing units.
  - Hold the levers on the control unit of the tractor in position „Lifting“ or „Lowering“ until the sowing units have been entirely folded in or out.
  - Check the working depth of the track markers (please refer to para. 5.2.1).

7.1.2.4  ED 451-K and ED 601-K with individual boom folding and control unit

- Unlock the track markers from transport position and fold down (only ED 451-K).

- Open block ball tap for track marker folding. Change the marking sides of the track markers by actuating the control unit on the tractor.

- Swivel the control lever (7.6/1) into position „A“ and fold down or in the left hand outer sowing units.
  - Hold the lever on the control unit of the tractor in position „lifting“ or „lowering“ until the left hand sowing units have entirely been folded in or down.

- Swivel control lever (7.6/1) into position „B“ and fold out or in the outer right hand side sowing units.
  - Hold the lever on the control unit of the tractor in position „lifting“ or „lowering“ until the right hand sowing units have entirely been folded in or down.

- Check the working width of the track markers (please refer to para. 5.2.1).

7.1.2.5  ED 451-K and ED 601-K with profi-control

- Unlock track markers from the transport position and fold (only ED 451-K).

- Fold out and in the sowing units and track markers via AMASCAN.
7.1.1 Lower sowing units and engage their drive

- Unlock the transport locking (7.7/1) by releasing the spiral spring.
- Lift the sowing unit until the pin (7.7/2) automatically slides out of the gap (7.7/3).
- Slowly lower the sowing unit.
- Engaging the drive. For this
  - take the hand lever (7.7/4) out of the lower gap (7.7/5) and push downwards until the pin (7.7/6) engages in the upper gap (as illustrated).

7.1.2 Fold down following furrow closers into working position

- Remove spring cotter pin.
- Pull out pin (7.8/1).
- Fold downward the furrow closer (7.8/2) and secure in working position by inserting the pin (7.8/1) into the hole.

⚠️ Lead the pin through the eye of the spring.
- Secure pin (7.8/1) with spring cotter pin.
7.2 Setting the row spacings

The spacings between the sowing units can be steplessly set for row spacings larger than 27 cm (Classic sowing units with 32 litre seed hopper) or larger than 45 cm (Contour sowing units) as follows:

- Slacken the thread bolts of the dust caps (7.7/1) on the sowing units (7.7/2) and the secondary drive (7.7/3).
- Slacken the relevant setting ring (7.7/4) on the two outer sowing units (for ED 301 and ED 451 only).
- If necessary pull out the hexagon shaft (7.7/5).
- Slacken the nuts (7.7/6) of the fixing clamps (7.7/7).
- Move the sowing units on the clamping rail (7.7/8) as desired.
- After the relevant fixing clamps have been slackened the secondary drive (7.8/1), the support stands (7.8/2) or wheel mark eradicators (7.8/3) can also be moved.
- Tighten nuts on the fixing clamps.
- Fit hexagon shaft if it had been pulled out.
- Move the setting rings (7.7/4) towards the outer sowing units and secure by using threaded bolts (for ED 301 and ED 451 only).
- Swivel the threaded bolts of the dust caps towards sowing units and secondary drive and secure by using threaded bolts.

Rentcheck bolts for firm seat after two working hours.
### Possible row spacings

#### 7.2.1 Classic sowing units

Table 7.1: “Possible row spacings ED01 Classic sowing units”

<table>
<thead>
<tr>
<th>Number of rows x Row-spacing [cm]</th>
<th>Number of sowing units with seed hopper 32 l</th>
<th>Number of sowing units with seed hopper 45 l</th>
<th>row fertilising possible</th>
<th>working-width [m]</th>
<th>transport-width [m]</th>
</tr>
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<tbody>
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<td><strong>ED 301</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4 x 75 4</td>
<td>4</td>
<td>Yes</td>
<td>3.0</td>
<td>3.0</td>
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</tr>
<tr>
<td>4 x 80 4</td>
<td>4</td>
<td>Yes</td>
<td>3.2</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>4 x 70 4</td>
<td>4</td>
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<td>2.8</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>5 x 60 5</td>
<td>5</td>
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<td>3.0</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
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<td>6</td>
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<td>3.0</td>
<td>3.0</td>
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</tr>
<tr>
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<td>2.7</td>
<td>3.0</td>
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</tr>
<tr>
<td>7 x 45 7</td>
<td>7</td>
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<td>3.15</td>
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</tr>
<tr>
<td>8 x 40 8</td>
<td>—</td>
<td>No</td>
<td>3.2</td>
<td>3.0</td>
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</tr>
<tr>
<td>10 x 30 10</td>
<td>—</td>
<td>No</td>
<td>3.0</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td><strong>ED 451</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 x 75 6</td>
<td>6</td>
<td>Yes</td>
<td>4.5</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>6 x 70 6</td>
<td>6</td>
<td>Yes</td>
<td>4.2</td>
<td>4.0</td>
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<td>4.25</td>
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</tr>
<tr>
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<td>7</td>
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<td>4.2</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>8 x 50 8</td>
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<td>4.0</td>
<td>4.0</td>
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</tr>
<tr>
<td>9 x 45 9</td>
<td>9</td>
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<td>4.05</td>
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<tr>
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<td>4.0</td>
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<td>4.5</td>
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<td>4.8</td>
<td>3.2</td>
<td></td>
</tr>
<tr>
<td>7 x 60 7</td>
<td>—</td>
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<td>4.2</td>
<td>3.2</td>
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<tr>
<td><strong>ED 601</strong></td>
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<td></td>
</tr>
<tr>
<td>8 x 75 8</td>
<td>8</td>
<td>Yes</td>
<td>6.0</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>8 x 80 8</td>
<td>8</td>
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<td>6.4</td>
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<tr>
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<td>5.6</td>
<td>6.0</td>
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<tr>
<td>10 x 60 10</td>
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<td>6.0</td>
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</tr>
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<td>12</td>
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<td>6.0</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>12 x 45 12</td>
<td>12</td>
<td>No</td>
<td>5.4</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td><strong>ED 601-K</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 x 75 8</td>
<td>8</td>
<td>Yes</td>
<td>6.0</td>
<td>3.05</td>
<td></td>
</tr>
<tr>
<td>8 x 80 8</td>
<td>8</td>
<td>Yes</td>
<td>6.4</td>
<td>3.12</td>
<td></td>
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<tr>
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<td>9</td>
<td>No</td>
<td>5.4</td>
<td>3.05</td>
<td></td>
</tr>
<tr>
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<td>6.0</td>
<td>3.15</td>
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</tr>
<tr>
<td>12 x 45 12</td>
<td>12</td>
<td>Yes *</td>
<td>5.4</td>
<td>3.15</td>
<td></td>
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<tr>
<td>12 x 50 12</td>
<td>12</td>
<td>No</td>
<td>6.0</td>
<td>3.05</td>
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<tr>
<td>12 x 45 12</td>
<td>12</td>
<td>No</td>
<td>5.4</td>
<td>3.05</td>
<td></td>
</tr>
</tbody>
</table>

* only in conjunction with front tank
### 7.2.1.2 Contour sowing units

Table 7.2: “Possible row spacings ED01 Contour sowing units”

<table>
<thead>
<tr>
<th>Possible row distances ED-01 with Contour sowing units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of rows x Row-spacing [cm]</td>
</tr>
<tr>
<td>-------------------------------------</td>
</tr>
<tr>
<td><strong>ED 301</strong></td>
</tr>
<tr>
<td>4 x 75</td>
</tr>
<tr>
<td>4 x 80</td>
</tr>
<tr>
<td>4 x 70</td>
</tr>
<tr>
<td>5 x 60</td>
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<td>6 x 50</td>
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<tr>
<td>6 x 45</td>
</tr>
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<td>7 x 45</td>
</tr>
<tr>
<td><strong>ED 451</strong></td>
</tr>
<tr>
<td>6 x 75</td>
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<tr>
<td>6 x 70</td>
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<tr>
<td>6 x 80</td>
</tr>
<tr>
<td>7 x 60</td>
</tr>
<tr>
<td>8 x 50</td>
</tr>
<tr>
<td>9 x 45</td>
</tr>
<tr>
<td><strong>ED 451-K</strong></td>
</tr>
<tr>
<td>6 x 75</td>
</tr>
<tr>
<td>6 x 80</td>
</tr>
<tr>
<td>7 x 60</td>
</tr>
<tr>
<td><strong>ED 601</strong></td>
</tr>
<tr>
<td>8 x 75</td>
</tr>
<tr>
<td>8 x 80</td>
</tr>
<tr>
<td>8 x 70</td>
</tr>
<tr>
<td>10 x 60</td>
</tr>
<tr>
<td>12 x 50</td>
</tr>
<tr>
<td>12 x 45</td>
</tr>
<tr>
<td><strong>ED 601-K</strong></td>
</tr>
<tr>
<td>8 x 75</td>
</tr>
<tr>
<td>8 x 80</td>
</tr>
<tr>
<td>9 x 60</td>
</tr>
<tr>
<td>12 x 50</td>
</tr>
<tr>
<td>12 x 45</td>
</tr>
<tr>
<td>12 x 50</td>
</tr>
<tr>
<td>12 x 45</td>
</tr>
</tbody>
</table>

* only in conjunction with front tank
7.2.1.3 Graphic illustration of possible row spacings of the Classic and Contour sowing units

**possible row spacings ED 301**

<table>
<thead>
<tr>
<th>4 x 75 cm (Serie)</th>
<th>4 x 80 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>working width (transport width) 3 m</td>
<td>working width 3.2 m, transport width 3 m</td>
</tr>
<tr>
<td>frame width 2.96 m</td>
<td>frame width 2.96 m</td>
</tr>
<tr>
<td>track width 1.5 m</td>
<td>track width 1.6 m</td>
</tr>
<tr>
<td>75 cm</td>
<td>80 cm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4 x 70 cm</th>
<th>5 x 60 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>rame width 2.96 m</td>
<td>working width (transport width) 3 m</td>
</tr>
<tr>
<td>working width 2.8 m, transport width 3 m</td>
<td>frame width 2.96 m</td>
</tr>
<tr>
<td>track width 1.4 m</td>
<td>track width 1.8 m</td>
</tr>
<tr>
<td>70 cm</td>
<td>60 cm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6 x 50 cm</th>
<th>6 x 45 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>rame width 2.96 m</td>
<td>working width 2.7 m, transport width 3 m</td>
</tr>
<tr>
<td>working width (transport width) 3 m</td>
<td>track width 1.8 m</td>
</tr>
<tr>
<td>track width 2 m</td>
<td>track width 1.8 m</td>
</tr>
<tr>
<td>50 cm</td>
<td>45 cm</td>
</tr>
</tbody>
</table>
### possible row spacings ED 301

<table>
<thead>
<tr>
<th>Spacing</th>
<th>Track Width</th>
<th>Working Width</th>
<th>Frame Width</th>
<th>Track Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 x 45 cm</td>
<td>1.35 m</td>
<td>3.15 m (transport width 3 m)</td>
<td>2.96 m</td>
<td>1.35 (2.25) m</td>
</tr>
<tr>
<td>8 x 40 cm</td>
<td>1.6 m</td>
<td>3.2 m (transport width 3 m)</td>
<td>2.96 m</td>
<td>1.6 m</td>
</tr>
<tr>
<td>10 x 30 cm</td>
<td>1.8 m</td>
<td>3 m (transport width 3 m)</td>
<td>2.96 m</td>
<td>1.8 m</td>
</tr>
</tbody>
</table>

Not with underfoot fertilising  
Classical / Contour  
Classic
possible row spacings ED 451

6 x 75 cm (Serie)

- Working width: 4.5 m
- Frame width (transport width): 4 m
- Track width: 1.5 m
- 75 cm

6 x 80 cm

- Working width: 4.8 m (transport width: 4.25 m)
- Frame width: 4 m
- Track width: 1.8 m
- 80 cm

Classic / Contour

6 x 70 cm

- Working width: 4.2 m
- Frame width (transport width): 4 m
- Track width: 1.4 m
- 70 cm

Classic / Contour

Tyres: 10.0/75-15
**possible row spacings ED 451**

**7 x 60 cm**
- Working width: 4.2 m
- Frame width (transport width): 4 m
- Track width: 1.8 m
- Not with underfoot fertilising

**8 x 50 cm**
- Frame width (transport / working width): 4 m
- Track width: 2 m
- Not with underfoot fertilising

**9 x 45 cm**
- Working width: 4.05 m
- Frame width (transport width): 4 m
- Track width: 1.35 (2.25) m
- Not with underfoot fertilising

**10 x 40 cm**
- Frame width (transport / working width): 4 m
- Track width: 1.6 m
- Not with underfoot fertilising

**Tyres:** 10.0/75-15

---

**Classic / Contour**
## possible row spacings ED 451-K

**Tyres:** 10.0/75-15  
**or** 31X15.5/15

<table>
<thead>
<tr>
<th>6 x 75 cm (Serie)</th>
<th>6 x 80 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Working width:</strong> 4.5 m (transport width 3 m)</td>
<td><strong>Working width:</strong> 4.8 m (transport width 3.2 m)</td>
</tr>
<tr>
<td><strong>Frame width:</strong> 3.96 m</td>
<td><strong>Frame width:</strong> 4.2 m</td>
</tr>
<tr>
<td><strong>Track width:</strong> 1.5 m</td>
<td><strong>Track width:</strong> 1.6 m</td>
</tr>
<tr>
<td>75 cm</td>
<td>80 cm</td>
</tr>
</tbody>
</table>

### Classic / Contour

- **6 x 70 cm**
  - **Working width:** 4.2 m (transport width 3.2 m)
  - **Frame width:** 3.96 m
  - **Track width:** 1.8 m
  - 60 cm

- **6 x 70 cm** (not with underfoot fertilising)
  - **Working width:** 4.2 m (transport width 3.2 m)
  - **Frame width:** 3.96 m
  - **Track width:** 1.8 m
  - 60 cm
### possible row spacings ED 601

**Tyres: 31X15.5/15**

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 x 75 cm (Serie)</td>
<td>Working width (transport width) 6 m, Frame width 5.96 m, Track width 4.5 m, 75 cm</td>
</tr>
<tr>
<td>8 x 80 cm</td>
<td>Working width 6.4 m (transport width 6 m), Frame width 5.96 m, Track width 4.8 m, 80 cm</td>
</tr>
<tr>
<td>8 x 70 cm</td>
<td>Frame width 5.96 m, Working width 5.6 m (transport width 6 m), Track width 4.2 m, 70 cm</td>
</tr>
<tr>
<td>10 x 60 cm</td>
<td>Working width (transport width) 6 m, Frame width 5.96 m, Track width 4.8 m, 60 cm</td>
</tr>
<tr>
<td>12 x 50 cm</td>
<td>Working width (transport width) 6 m, Frame width 5.96 m, Track width 5 m, 50 cm</td>
</tr>
<tr>
<td>12 x 45 cm</td>
<td>Frame width 5.96 m, Working width 5.4 m (transport width 6 m), Track width 4.5 m, 45 cm</td>
</tr>
</tbody>
</table>

Classic / Contour
possible row spacings ED 601-K

8 x 75 cm (Serie)

working width 6 m (transport width 3.05 m)
frame width 5.71 m
track width 3 m
2,809 m
2,74 m

75 cm

6 cm

8 x 80 cm

working width 6,4 m (transport width 3.05 m)
frame width 5.71 m
track width 3,2 m
2,809 m
2,74 m

6 cm

80 cm

8 x 70 cm

working width 6,0 m (transport width 3.05 m)
frame width 5.71 m
track width 2,7 m
2,809 m
2,74 m

50 cm

Classic / Contour

9 x 60 cm

frame width 5.71 m
working width 5,4 m (transport width 3.05 m)
track width 3 m
2,809 m
2,74 m

80 cm

not with underfoot fertilising

12 x 45 cm

frame width 5.71 m
working width 5,4 m (transport width 3.05 m)
2,809 m
2,74 m

track width 2,7 m

45 cm

underfoot fertilising only in conjunction with front tank

Classic / Contour

12 x 50 cm

working width 6 m (transport width 3.05 m)
frame width 5.71 m
track width 3 m
2,809 m
2,74 m

50 cm

underfoot fertilising only in conjunction with front tank

Classic / Contour

Tyres: 31X15.5/15
7.3 Hydraulic track width adjustment on the ED 601-K

The hydraulic track width adjustment (7.11/1) of the ED 601-K allows the setting of different support wheel track widths.

Depending on the row spacing and tyre type the track width of the support wheels can be individually set so that the support wheels always run in between the rows.

The track width is changed by driving in and out the hydraulic ram (7.11/1).

Depending on the row spacing and tyre type different fitting positions (Pos.) (7.11/a-d) on the frame (7.11/1) result for the hydraulic ram (7.11/1). These fitting positions can be seen in table 7.2.

Table 7.2: “Fitting positions hydraulic ram”

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Row spacing</th>
<th>Tyres</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>80 cm</td>
<td>Terra-Tyres 31x15,5/15</td>
</tr>
<tr>
<td>b</td>
<td>77,5 cm</td>
<td>Terra-Tyres 31x15,5/15</td>
</tr>
<tr>
<td>c</td>
<td>75 cm</td>
<td>Terra-Tyres 31x15,5/15</td>
</tr>
<tr>
<td>d</td>
<td>45/50 cm</td>
<td>Terra-Tyres 31x15,5/15</td>
</tr>
</tbody>
</table>

To secure the set track width, shut the block tap (7.10/1).

In the position as illustrated the block tap is open.

Fig. 7.11

Fig. 7.12
### 7.4 Sowing different types of seed

For singling the various types of seed different, easily exchangeable singling discs (special option) are available. The singling discs differ by the number and diameter of their holes.

The type of seed and the thousand grain weight determine the choice of the required singling disc as well as the necessary scraper- and reduction flap position.

<table>
<thead>
<tr>
<th>Type of seed</th>
<th>Thousand grain weight</th>
<th>Singling disc</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Scraper</td>
</tr>
<tr>
<td><strong>Maize</strong></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>smaller than 220 g (11 kg / 50000 k)</td>
<td>green 30/5</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>220 to 250 g (11 to 12,5 kg / 50000 K)</td>
<td>green 30/5</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>250 to 280 g (12,5 to 14 kg / 50000 K)</td>
<td>green 30/5</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>280 to 320 g (14 to 16,0 kg / 50000 K)</td>
<td>green 30/5 or natural 30/5,8</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>larger than 320 g</td>
<td>natural 30/5,8</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Beans</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>smaller than 400 g</td>
<td>dark grey 45/5</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>larger than 400 g</td>
<td>red 45/6</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td><strong>Haricot beans</strong></td>
<td></td>
<td>black 45/2,5</td>
<td></td>
</tr>
<tr>
<td><strong>Sunflower</strong></td>
<td></td>
<td>brown 30/2,5 pink 15/2,5 (for grain spacings &gt; 22 cm)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Sojabohnen</strong></td>
<td>orange 45/4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><strong>Cotton</strong></td>
<td>light blue 45/3,2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>light green 60/3,2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Peas</strong></td>
<td>dark grey 45/5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><strong>Sorghum</strong></td>
<td>bordeaux red 60/2,2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Sugar beet, prilled</strong></td>
<td>blue 30/2,2 turquoise 15/2,2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Water melons, not prilled sugar beet</strong></td>
<td>yellow 30/1,8</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Brachiara</strong></td>
<td>fawn coloured 60/1,4</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Rape</strong></td>
<td>white 90/1,2</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

* by the factory set to position 2t
** exchange standard ejector for the supplied one
The given values in the table are only mean values which may change due to the individual grain shape.

Example:
Seed: Maize type Felix
      Thousand grain weight: 210 g

Taken from table:
Singling disc: green with 30 holes
Scraper position: “1”
Reduction flap position: “2”
set by the factory
7.4.1 Changing the singling discs

7.4.1.1 Classic sowing unit

- Lift the sowing unit (please refer to chapter 8.1) or raise the complete Airplanter.

⚠️ When lifting the complete implement secure against unintended lowering!

- Slacken the rear bolt (7.13/1) of the coulter bracket and swivel the (7.13/2) downwards.
- Slacken the upper screw joint (7.13/3) and swivel the translucent PU-flap (7.13/4) to the side.
- Slacken the front screw joint (7.13/5) and unbolt the rear screw joint (7.13/6).
- Remove the suction cover (7.14/1) together with the singling disc (7.14/2) in side way direction.
- Exchange the singling disc.

On singling discs with very small holes (e. g. singling disc for sorghum bordeaux red 60/2.2) exchange the ejector (7.14/3) for the supplied, yellow ejector with its smaller ejector ball.

- The naps (7.14/4) must face towards the housing (7.14/5) and not towards the suction cover (7.14/1).
- Mount the singling disc together with the suction cover and bolt on the cover.

- Check the scraper (7.15/1) for proper movement. To do this, repeatedly slightly swivel the scraper (7.15/1) with the aid of the lever (7.15/2) where the spring is hooked in, and guide the scraper out of its position.

⚠️ The spring must pull the scraper back into its earlier position.

- Depending on the type of seed readjust the scrapers if necessary (please refer to chapter 7.4.2).
- Swivel the coulter upwards and affix.
7.4.1.2 Contour Sowing unit

- Lift the sowing unit (please refer to chapter 8.1) or the entire Airplanter.

⚠️ When lifting the entire implement, secure against unintended lowering!

- Slacken the rear bolt (7.16/1) of the coulter brackets and swivel the coulter (7.16/2) downwards.
- Slacken the plastic nut (7.16/3) and remove sideways the suction cover (7.17/1) with the singling disc (7.17/2).
- Exchange the singling disc.

On singling discs with very small (e.g. singling disc for sorghum, bordeau red 60/2,2) exchange the ejector (7.17/3) by the supplied yellow ejector with a smaller ejection ball.

-The naps (7.17/5) must face towards the housing (7.17/6), not towards the suction cover (7.17/1).

- Mount the singling disc together with the suction cover and bolt on the cover.

- Check the scrapers for movability (7.18/1). For this remove the scraper (7.18/1) from its position by a repeated swivelling of the lever arm (7.18/2) – where the spring has been hooked in.

👉 The spring must pull the scraper back into its earlier position.

- Depending on the seed to be sown, readjust the scraper if necessary (please refer to chapter 7.4.2).
- Swivel the coulter upwards and lock.
7.4.2 Setting the scraper position

The scrapers (7.19/1) are designed as a three staggered toothed plastic part which can be set to 5 positions towards the nap holes of the singling disc.

The position to be set in the main depends on the thousand grain weight of the seed to be sown and can be taken from the table “review singling discs and scraper position” (chapter 7.4).

- For setting the indicated scraper position hook the setting lever (7.19/2) into the setting bolt (7.19/3).

   In Fig. 7.19 the scraper position “5” is illustrated.

   If the distance between scraper and nap holes of the singling disc is too big, double coverings may occur. If the scraper covers the nap holes of the singling disc too much, gaps may be the result.

   Regarding the seed singling check the scraper position set for double coverage and/or gaps in the field.

      - Either by a person following the implement, who observes the function of the singling units by the sight windows (7.19/4), or
      
      - a distance is uncovered in the field in order to check the grain spacing.

   If double coverage or gaps are noticed, readjust the scraper position as necessary.

   If the seed can be seen through the sight window (7.19/4), more seed is delivered to the seed housing than discharged (please refer to chapter 7.4.3).
7.4.3 Setting the reduction flap position

The position of the reduction flap (7.20/1) determined the cross section of the seed inlet opening (7.20/2) from the seed hopper to the seed housing. By the factory the reduction flap has been set to position “2”. This way all common seeds like maize, sunflower, soya beans, cotton, peas, sorghum, bracharia and water melons may be delivered from the seed hopper to the singling units (please observe chapter 7.4).

Reduction flap position “1” for beans and “3” for beet.

The reduction flap positions 1 – 5 can be set. The embossings (7.20/3) indicated the individual reduction flap positions.

If the seed is nevertheless visible in the sight (7.20/4), the seed housing is filled in a not permissible way. This results in an overflow of the seed housing and thus in an inaccurate seed application. This may occur:

• at seeds with an especially good flow property (very smooth and even surface),
• when operating the ED in combination with a reciprocating power harrow.

In this case, reduce the seed delivery to the seed housing with the aid of the reduction flap (7.20/1) as follows:

- Remove suction cover and singling disc (please refer to chapter 7.4.1).
- Slacken the bolts (7.20/5).
- Reduce the seed delivery with the aid of the reduction flap.
- Tighten the bolts for locking the reduction flap.
- Install the singling disc and the suction cover according to chapter 7.4.1.

If in spite of the very large seed inlet opening the seed does not flow properly, readjust the reduction flap (7.20/1) upwards until only the contour of the aluminium housing limits the seed flow.
7.4.4 Exchange the ejectors

- Slacken the nuts (7.21/1) of the bolts (7.21/2).

  For holding up, the bolts (7.21/2) feature a hexagon socket.

- Remove the scraper (7.21/3) with bolts and springs (7.21/4).

- Exchange the scrapers and re-install properly.
7.5  Setting the grain spacings

The grain spacings in the sowing row can be set in relation to the number of holes in the singling discs with the aid of:

- the chosen chain wheel pair of the setting gearbox (7.22/1) and
- the chosen entrance “X” or “Y” or “Z” (special option reduction gear “Z”) in which the pto shaft (7.22/2) has been pushed on the secondary transmission (7.22/3).

With the aid of the gearbox setting table (7.22/4) grain spacings in a 36-step fine tuning from 4.1 up to 26.9 cm (entrance “X” or “Y”) can be set. The entrance “Z” allows the setting of grain spacings up to 46.1. The setting is carried out according to the gearbox setting table for the reduction gear “Z”.

The grain spacing depends on:

- the number of the desired plants or grains per m² (grains per ha/10 000).
- the desired row spacing.
- the number of holes in the singling disc.
Procedure:
- At first, calculate the **grain spacing “a” in [cm]** according to the given value “grains (plants) per m²” for the desired **row spacing “R”** as follows:

\[
\text{Grain-spacing } a \text{ [cm]} = \frac{1}{\text{grains per m}^2 \times \text{row spacing } R \text{ [m]}} \times 100
\]

- Choose from the gearbox setting table (7.22/4) – under consideration of the number of holes in the singling discs – a grain spacing nearest to the calculated grain spacing.
- For this grain spacing read off the necessary chain wheel pair for the setting (7.22/1) as well as the entrance “X” or “Y” on the secondary transmission (7.22/3) to which the pto shaft (7.22/2) must be applied.
- Adjust the required chain wheel pair in the setting gearbox.
- Push the pto shaft on to the required entrance on the secondary transmission.

**Example:**
Desired: **95,000 grains per hectare**
Row spacing R: **0,75 m**
Singling disc: **30 holes.**

95,000 grains per hectare = 9,5 grains per m² [K pro m²]

Calculated grain spacing a: **14,04 cm**

As the calculated spacing cannot be found in table (7.23) take the nearest spacing from the table.

From table: **13,9 cm**

For the grain spacing 13,9 cm the following results from the gearbox setting table (Fig. 7.23) :
secondary transmission: **Y**
required chain wheel pair: **A - 3**
Set the desired grain spacing as follows:

- Open the gearbox lid and secure against unintended closing (7.23/1).
- Take the calibration crank (7.23/2) out of the retainer (7.23/3) (ED 301, 451 and 601) or (7.24/1) (ED 601 and 601-K) and insert into the square tube (7.23/4).
Release the chain tensioning unit:
- Turn the calibration crank (7.25/1) in counter clockwise direction until the connecting shaft (7.25/2) of the chain tensioning unit catches on the right and left hand side into the gaps (7.25/3).

⚠️ Hold the calibration crank firmly. Until the connecting shaft catches, the full spring load burdens the entire chain tensioning unit.
- Unlock the chain tensioning unit – by swivelling the trip (7.25/4) with your free hand into position (7.26/1).
- Swivel the calibration crank (7.26/2) into the illustrated final position and thus release the chain tensioning unit. Fig. 7.26 illustrates the released chain tensioning unit.

Set the necessary chain wheel pairing inside the setting gear:
- Take the hook (7.27/1) for shifting the chain (7.27/2) from its retainer on the gearbox.
- Swivel the leverage (7.27/3) of the drive shaft (7.27/4) and locate the chain (7.27/2) with the aid of the hook (7.27/1) on the relevant chain wheel (A, B, C).
- To achieve the necessary chain wheel pairing locate the chain \((7.28/1)\) onto the relevant chain wheel \((7.28/2\) up to \(7.28/7)\) of the drive shaft \((7.28/8)\). While doing this, align the shifting shaft \((7.28/9)\) in such a way that the chain wheels of the driving- and power take off pto shaft are in accurate alignment and the chain is guided by the individual guides of the guide roller \((7.28/10)\) without toeing.

- Swivel the nose of the leverage \((7.26/11)\) and the relevant key \((7.28/12)\) of the axial securing \((7.28/13)\).

- After use reinsert the hook \((7.27/1)\) into the retainer on the gearbox.

**Burdening the chain tensioning unit:**

- Swivel the calibration crank back into position according to Fig. 7.29.

- Lock the chain tensioning unit by swivelling and letting the trip \((7.29/1)\) catch underneath the connecting shaft \((7.29/2)\).

- Slightly turn the calibration crank in counter clockwise direction, take with your free hand the trip \((7.30/1)\) and lever the connecting shaft \((7.30/2)\) of the chain tensioning unit out of the \((7.30/3)\).

- Let off the calibration crank.

⚠️ **Hold the calibration crank firmly. After leverage of the connecting shaft the full spring load burdens the entire chain tensioning unit.**

- Take the calibration crank off the square tube and insert into the provided retainer.

- Close gearbox lid.
- Push the pto shaft (7.31/1) to the necessary entrance “X” or “Y” or “Z” (7.32/Z) (special option) onto the secondary transmission.

⚠️ Check the set seed placement spacing. For this, please refer to chapter 7.7.1.
7.5.1 Determining “grains per hectare”

The number of “grains per hectare” depends on:

- the chosen row spacing \( R \) and
- the desired grain spacings \( a \) (plant spacings) within the row.

At a given grain distance \( a \) and a row spacing \( R \) determine the number of “grains per hectare” as follows:

\[
\text{grains per hectare} = \frac{10,000}{a \ [m] \times R \ [m]}
\]

Example:

Grain spacing \( a \): 14.8 cm = 0.148 m
Row spacing \( R \): 75 cm = 0.75 m

\[
\text{grains per hectare} = \frac{10,000}{0.148 \times 0.75} = 90090 \text{ K/ha}
\]

7.5.2 Determining the “grains per hectare” following the review tables

The review tables on the following pages are a guide for the easy determination of the number of “grains per hectare” for singling discs with 15, 30, 45, 60 and 90 holes for row spacings of: 100 cm, 80 cm, 75 cm, 60 cm, 50 cm, 45 cm and 30 cm.

For grain spacings and / or row spacings not shown in the tables determine the “grains per hectare” according to the above stated formula.

In the review tables the number of “grains per hectare” depends on:

- the number of holes per singling disc.
- the chosen entrance on the secondary gearbox.
- the desired grain spacing \( a \).
- the desired row spacing \( R \).
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Review table grains / ha - singling disc 15 holes
### Table

**Grains/ha at row spacing R**

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### Review table grains / ha - singling disc 45 holes

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Putting to operation

Grains/m at row spacing R

Grains/ha at row spacing R

Grains/m
Review table grains / ha - singling disc 60 holes

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Putting to operation

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Grains at row spacings

Grains/ha at row spacings

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7.6 Filling the seed hopper (Hints for sowing operation)

- Do not use moist or sticky seed.

- It has been experienced that incrusting the seed, e.g. with "Mesorol", must be done with utmost care.

- To avoid bridging ensure that the flowing property of the seed is maintained.

- Incrust the seed early enough (1 day before the intended sowing) so that the seed is sown in dry condition.

- The flowing property of the incrusted seed can be improved by adding about 200 g talcum powder for 100 kg seed.

- Strictly observe the mixture ratio given in the instruction advice of the crop agent manufacturer.

- When filling the seed hopper ensure that no foreign particles are in it (wire, stones, pieces of wood, etc.)
7.7 Setting the placement depth

Set the placement depth in the field. Prior to this check with the implement lowered into operational position whether the seed hopper covers of the sowing units are in horizontal position when the sowing coulters penetrate the soil. Only then the sowing coulter will be properly guided in the soil and a faultless, even seed placement depth is achieved. Correct deviations by lengths changement of the upper link arms.

Classic-sowing unit

On the **Classic-sowing unit** the seed placement depth can be set steplessly from 0 to 8 cm and with the bean sowing coulter (special option) from 0 to 12 cm.

The figures (0 to 110) on the scale (7.33/1) represent the individual seed placement depths. The seed placement depth set can be read off the reading edge (7.33/2).

The seed placement depth is set via the pressure roller(s) (7.33/3) as follows:
- Slacken fixing bolt (7.33/4).
- Turn the seed placement depth setting spindle (7.33/5) and set the desired seed placement depth.
- Retighten fixing bolt (7.33/4).
- Check seed placement depth.

Contour-sowing unit

On the **Contour-sowing coulter** the seed placement depth can be set steplessly from 0 to 12 cm.

The figures (0 to 100) on the scale (7.34/1) represent the individual seed placement depth. The seed placement depth set can be read off the reading edge (7.34/2).

The seed placement depth is set via the pressure roller(s) (7.34/3) as follows:
- Swivel upwards the spring buckle (7.34/4) to prevent the seed placement depth setting spindle from unintended turning.
- Turn the seed placement depth setting spindle (7.34/5) and set the desired seed placement depth.
- Lower spring buckle (7.34/4) again whereby the seed placement depth setting spindle is secured against unintended turning.
- Check the seed placement depth.
7.7.1 Checking the placement depth and the placement spacing

Check the set placement depth of the seed as the pressure roller penetrate the soil differently, depending on the kind of soil.

For this
- deposit seed grains on some meters in the soil.
- by carefully uncovering the seed grains placed into the soil check the placement depth and the placement spacing.

The multi-placement tester (special option) (Fig. 7.35, Fig. 7.36 and Fig. 7.37) is a sensible aid for checking the placement depth and the placement spacing. With the aid of the pointer (7.36/1) the placement depth can be read off the scale (7.36/2). The placement spacing can be read off the scale (7.37/1).

- If necessary, readjust the placement depth.
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### Insufficient depth placement of grains

1. Readjust depth placement with the depth placement setting crank (please refer to para. 7.7)

If this measure is not sufficient:

2. Retrofit spring pressure adjustment - Burden sowing unit (para. 7.8.1.1)

If this measure is not sufficient:

3. Change pressure roller load distribution of “front 30 % and rear 70 %” (para. 7.8.2.3)

### Too deep placement depth

1. Readjust depth placement with the depth placement setting crank (please refer to para. 7.7)

If this measure is not sufficient:

2. Retrofit spring pressure adjustment - Discharge sowing unit (para. 7.8.1.2)

If this measure is not sufficient:

3. Discharge the sowing unit by resetting the tensioning spring (para. 7.8.1.2)
7.7.3 Changing, uneven depth placement due to a very coarse seed bed

In case of a very cloddy seed bed no even seed placement depth will be achieved. For this the use of a clod clearer is sensible.

The clod clearer (7.38/1) can be set in its height by inserting the pin (7.38/2) into the various holes (7.38/3).

Set the height of the clod clearer in such a way that only the coarse clods are cleared to the sides. An entire soil movement by the clod clearer will result in disadvantages when closing the seed furrow.

Fig. 7.38
7.8 Increasing and reducing the pressure on the sowing units (spring pressure adjustment)

The spring pressure adjustment for the sowing units provides an additional increasing or reducing of the pressure on the sowing units. This is especially recommended for mulch sowing, heavy soils or a large placement depth.

The desired placement depth of the seed is not achieved

1. The own weight of the sowing unit is not sufficient to place the seed in the desired placement depth (penetration depth of the sowing coulter into the soil) into the soil, e. g. on heavy soils.
2. The own weight of the sowing unit is too big and the sowing coulter penetrates the soil too deeply.

Measures:
- see table in chapter 7.7.2.

7.8.1 Classic sowing unit

⚠️ Firmly hold the ratchet lever (7.39/1). The entire spring load acts on the ratchet lever until it catches.

7.8.1.1 Increase pressure on the sowing unit

- Hook in the tensioning spring (7.39/2) into the upper eye (7.39/3).
- Swivel the ratchet lever (7.39/1) for applying additional pressure onto the sowing unit into Positions III or IV and lock.

⚠️ If the lever is in the positions I or II (neutral position in case of applying pressure) only the own weight of the sowing unit is applied to the sowing coulter.

7.8.1.2 Reducing pressure on the sowing unit

- Let the ratchet lever catch in the position I or II (neutral position when applying pressure). The sowing coulter is penetrating the soil only by the own weight of the sowing unit.
- If this measure is not sufficient:
  - Hook the tensioning spring (7.39/1) into the lower eye (7.39/4).
  - Swivel the ratchet lever (7.39/3) for reducing the weight into the positions I or II and lock.

⚠️ If the lever is in position III or IV (neutral position when reducing the pressure) only the own weight of the sowing unit effects the sowing coulter.
7.8.2 Contour sowing unit

7.8.2.1 Increase the pressure on the sowing unit

The pressure application on the sowing unit can be changed in three steps.

![Image](Fig. 7.40)

- Firmly hold the tensioning lever (7.40/1). Until the locking gauge catches the full spring pressure is applied to the tensioning lever.

The tensioning lever (7.40/1 or 7.41/1) of the spring pressure adjustment is in the upper most position (7.40/2).

- Approach the sowing unit from the rear.
- With your right hand press the tensioning lever (7.40/1 or 7.41/1) downwards and release it this way.
- With your left hand press downwards also the locking gauge (7.40/2 or 7.41/2).
- Now go on pressing the tensioning lever downwards and thus tension the tensioning spring (7.40/3 or 7.41/3). Lock the locking gauge in the new position (Fig. 7.40 and Fig. 7.41).

7.8.2.2 Reduce the pressure on the sowing unit

- Lock the tensioning lever (7.40/1 or 7.41/1) of the spring pressure load in an upper position.
- Approach the sowing unit from the rear.
- With your right hand press downwards the tensioning lever (7.40/1 or 7.41/1), thus releasing it.
- With your left hand lift the locking gauge (7.40/2 or 7.41/2).
- Release the tensioning spring and thus release the tensioning spring (7.40/3 or 7.41/3). Lock the locking gauge in the new position.
7.8.2.3 Changing the pressure roller load distribution

For matching the various soil conditions the load distribution between the pre-running (7.42/1) and the following pressure roller (7.42/2) can be adjusted. In the factory an even load distribution (50/50) between these pressure roller has been set.

For changing the load distribution, the depth placement setting spindle (7.42/3) can be fixed in the different holes I, II, III and IV in the rocker arm (7.42/4) and the quadrant plate (7.42/5).

The rocker arm (7.42/4) is provided with the holes I and II, the quadrant plate (7.42/5) is provided with the holes III and IV.

Possible load distributions:

a) front 50% and rear 50% - holes I and III
   Standard-setting for normal sowing conditions.

b) front 30% and rear 70% - holes II and III
   Setting for very heavy soils, especially in order to apply more pressure to the rubber V-pressure rollers.

c) front 70% and rear 30% - holes I and IV
   Setting, e.g. for pressure sensitive seeds (beet), especially for reducing the pressure applied to the following pressure roller(s).
7.9 Closing the seed furrow

7.9.1 Flexi rubber tyres in conjunction with pre-running furrow closers

The furrow closers (7.43/1 or 7.44/1) shall shallowly work in the soil and they shall cover the seed furrow with loose soil.

7.9.1.1 Classic sowing unit

The pressure intensity of the furrow closers can be set in 3 steps. For changing the pressure intensity change the tensioning point (7.43/2) of the spring (7.43/3) on the furrow closer (in the illustrated position the lowest pressure intensity has been set).

For further increasing the pressure intensity hang the spring eye (7.43/4) instead of the ring (7.43/5) into the hook (7.43/6).

7.9.1.2 Contour sowing unit

The pressure intensity of the furrow closer is set in 3 steps. For changing the pressure intensity press downwards the setting plate (3.44/1) and let catch into the desired gap (7.44/2). In the upper most gap the lowest pressure intensity is set.

7.9.2 Rubber-V-pressure rollers

Besides setting the depth placement the two rubber V-pressure rollers also provide the closing of the seed furrow created by the sowing coulter.

Depending on the soil condition

- the axial between the two rubber V-pressure rollers can be changed after having removed the clip pin (7.45/1).

Set the spacing between the rubber V-pressure roller in such a way that the rubber V-pressure rollers run closely at the side of the seed furrow cutting edge. This way, the seed furrow cutting edges are broken up and close the seed furrow.

If the seed furrow is not closed properly though the axial rubber V-pressure roller distance has been set correctly

- loosen the bolted connection (7.42/2) and change steplessly the actuation of the two rubber V-pressure roller which are arranged in an inclined position towards each other. The profiled pointer element (7.45/3) acts as a setting aid.
Way of function:
- Setting lever (7.45/4) facing downwards – pressure rollers run parallel.
- Setting lever (7.45/4) facing upwards – increased soil movement into the seed furrow.

If the earlier described setting possibilities of the rubber V pressure rollers do not result in the desired success, apply more pressure to the rubber V pressure rollers – see chapter 7.9.2.1 and / or 7.9.2.2.

7.9.2.1 Further possibilities to increase the pressure of the rubber V pressure roller on the Contour sowing unit

1. Apply more pressure to the rear pressure rollers with the aid of the spring (7.46/1)
   - Lock the setting lever (7.46/2) of the spring (7.46/1) in an upper position. Three different steps of pressure intensity can be set. The highest pressure is achieved in the upper most position (7.46/3).

   This setting is mostly used at varying operational conditions.

   If the operational conditions require a higher pressure on the rubber V-pressure rollers, the pressure roller pressure distribution should be changed to “front 30 % and rear 70 %.”
2. Change the pressure roller pressure distribution to “front 30 % and rear 70 % and this way apply more pressure to the rear pressure rollers (7.47/1).

- Fix the placement depth setting spindle (7.47/2) in different holes I and II in the rocker arm (7.47/3) and on the quadrant plate (7.47/4).

7.9.2.2 Rubber-V-pressure rollers with following furrow closers

The pressure of the following furrow closers (7.48/1) can be set in three steps with the aid of the spring (7.48/2). The highest pressure is achieved by hooking the spring into the gap (7.48/3).
7.10 Setting the vacuum

The vacuum provided by the suction blower fan depends on the power take off of the tractor pto shaft. The necessary tractor pto shaft speed now depends on the implement executions described on the right hand side of this page.

Set the tractor pto shaft speed in such a way that the pointer (7.49/1) of the pressure gauge (7.49/2) is in the centre of the green range (7.49/3) (65 up to 80 mbar) while sowing.

Exceeding the indicated highest permissible pto shaft speed will result in an increased wear of the suction blower fan. Simultaneously inaccurate double coverage – depending on the seed – may occur.

Undercutting the indicated pto shaft speed may result in gaps during the sowing procedure. However, for manoeuvring at the headlands, the pto shaft speed can be reduced to this indicated minimum pto shaft speed without resulting in a seed grain drop off the singling disc. Within this speed range the suction pressure is reduced to 35 to 40 mbar.

When using the red singling disc (special option for field beans) set the pto shaft speed in such a way that the pointer (7.49/1) is positioned nearly in the red range.

Various implement executions and the required pto shaft speeds for setting the vacuum

a) Standard implement execution for connection to the pto shaft with 1000RPM (please also refer to chapter 4.2).

   The required vacuum of 65 up to 80 mbar is achieved in the pto shaft speed range of 950 up to 1050 min⁻¹.

   Highest permissible pto shaft speed 1100 min⁻¹.

   Minimum pto shaft speed at the headlands 690 up to 722 min⁻¹.

b) Implement execution for connection to the tractor pto shaft with 710RPM (reduced tractor engine speed) (please also refer to chapter 4.2).

   The required vacuum of 65 up to 80 mbar is achieved within the pto shaft speed range of 660 up to 740 min⁻¹.

   Highest permissible pto shaft speed 800 min⁻¹.

   Minimum pto shaft speed on the headlands 485 up to 505 min⁻¹.

c) Implement execution for connecting to the tractor pto shaft with 540RPM (please also refer to chapter 4.2).

   The required vacuum of 65 up to 80 mbar is achieved at a pto shaft speed range of 510 up to 570 min⁻¹.

   Highest permissible pto shaft speed 600 min⁻¹.

   Minimum pto shaft speed at the headlands 375 up to 390 min⁻¹.
8.0 After having finished work

8.1 Lift the sowing units
- Tension leg spring (8.1/1) as illustrated.
- Lift the sowing unit at the rear until the pin (8.1/2) catches into the key (8.1/3) by itself.

8.2 Emptying the seed hopper
Open the sprung loades flap (8.2/1) and empty the seed hoppers.
Empty the seed housings with the aid of the discharge flap (8.2/2) entleeren. For this slacken the plastic nut (8.2/3) and swivel the fixing spring (8.2/4) to the side.

After emptying shut the two emptying flaps properly.
Ensure the correct fitting of the fixing spring!

Storing the implement for a long period:
- Completely empty the seed hopper to avoid germination of seed residue.
- Open the discharge flaps of the seed housings so that no mice will be trapped in the seed housing. They might nibble on the plastic parts.

8.3 Cleaning the implement
The implement can be cleaned with a jet of water or a high pressure cleaner.

⚠️ In case you blow out the seed hopper by using compressed air, please keep in mind that dressing agent are poisonous. Do not inhale the dust.
After having finished work
9.0 Setting the row fertiliser applicator into operation

9.1 Filling the fertiliser hopper

⚠️ Couple the Airplanter to your tractor before filling the fertiliser hopper.

- Open the fertiliser hopper lid (9.1/1) and secure in opened position with the aid of the locking device (9.1/2) according to Fig. 9.1, so that it cannot shut of itself due to wind or other influences
- Fill the fertiliser hopper from the rear.
- For shutting the lid release the locking device (9.1/2) with one hand and shut the lid with the other hand.

9.2 Tilt the fertiliser sieves upwards

- Tilt the fertiliser sieves (9.1/3) upwards by using the hand grips and lock with the lateral locking angle (9.1/4).

👉 The upwards tilted fertiliser sieves can be removed to the rear if necessary.

⚠️ Never reach with your hands into the fertiliser hopper. Danger of injury from the rotating agitator shaft!

9.3 Drive of the seed metering wheels

The seed metering wheels (9.2/2) are arranged on the metering shaft (9.2/1). They are driven by the shaft (9.2/3) of the running wheels via the chain drive (9.2/4) an the setting gearbox (9.2/5) for the fertiliser rate applicator.

9.4 Setting the fertiliser application rate

The speed of the metering shaft and thus the fertiliser application rate can steplessly be set with the aid of the gearbox setting lever (9.2/6) of the setting gearbox. This setting is carried out according to the fertiliser setting chart (9.2/7 or table 9.1). To achieve the desired fertiliser application rate, carry out three different settings:

a) Setting the gearbox setting lever
b) Shutter slide position
c) Bottom flap position
Fertiliser setting chart

The values in the fertiliser setting chart are mean values. They may deviate due to grain size, grain shape and bulk density. We recommend that you carry out a calibration test in any case.

Table 9.1: Fertiliser setting chart

<table>
<thead>
<tr>
<th>Kind of fertiliser</th>
<th>Diammon-phosphat 18-46-0</th>
<th>CAN 27,5 % N</th>
<th>Urea 46 % N</th>
<th>NPK 13+13+21 BASF</th>
<th>Triple Super-phosphate</th>
<th>MAP 12-52</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schüttgewicht [kg/l]</td>
<td>0,94</td>
<td>1,02</td>
<td>0,76</td>
<td>1,18</td>
<td>0,98</td>
<td>1,02</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gearbox setting number</th>
<th>Application rate [kg/ha]</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>27</td>
</tr>
<tr>
<td>10</td>
<td>62</td>
</tr>
<tr>
<td>15</td>
<td>93</td>
</tr>
<tr>
<td>20</td>
<td>126</td>
</tr>
<tr>
<td>25</td>
<td>162</td>
</tr>
<tr>
<td>30</td>
<td>190</td>
</tr>
<tr>
<td>35</td>
<td>220</td>
</tr>
<tr>
<td>40</td>
<td>250</td>
</tr>
<tr>
<td>45</td>
<td>277</td>
</tr>
<tr>
<td>50</td>
<td>311</td>
</tr>
<tr>
<td>55</td>
<td>339</td>
</tr>
<tr>
<td>60</td>
<td>377</td>
</tr>
<tr>
<td>65</td>
<td>400</td>
</tr>
<tr>
<td>70</td>
<td>434</td>
</tr>
<tr>
<td>75</td>
<td>464</td>
</tr>
<tr>
<td>80</td>
<td>478</td>
</tr>
</tbody>
</table>

The values in the fertiliser setting chart are only valid for 8, 12 or 16 outlets and for the indicated working widths.

- 8 outlets, 16 metering units, 3,00 m working width
- 12 outlets, 24 metering units, 4,50 m working width
- 16 outlets, 32 metering units, 6,00 m working width

All shutters are 3/4 open.
Should the number of outlets and/or the working width deviate from the indicated values, convert the shown gearbox setting figure for the desired fertiliser application rate [kg/ha] according to the following formula:

**Example:**
Type of fertiliser: Diammonphosphat  
desired application rate: 250 kg/ha  
read off gearbox setting figure: 40

**Standard execution:**
Number of sowing units: 4  
Row spacing: 75 cm  
8 outlets, 16 metering units,  
Working width: 3,00 m (4 x 75 cm)

**Changed execution:**
Number of sowing units: 6  
Row spacing: 45 cm  
Number of outlets: 12  
Working width: 2,70 m (6 x 45 cm)

**Conversion of the gearbox setting figure for the changed execution:**

\[
\text{Conversion factor} = \frac{\text{number of actual outlets}}{\text{number of standard outlets}} \times \frac{\text{indicated working width [m]}}{\text{actual working width [m]}}
\]

\[
\frac{12}{8} \times \frac{3 [m]}{2,70 [m]} = 1,667
\]

\[
\frac{40}{1,667} = 24
\]

For spreading the desired spread rate of 250 kg/ha set the gearbox setting lever on to the scale figure 24.
9.4.1 Setting the gearbox setting lever

By adjusting the gearbox setting lever (9.3/1) the fertiliser rate to be spread can be set. The higher the figure on the scale (9.3/2), the bigger the fertiliser spread rate will be.

Set the gearbox as follows:
- Slacken the knob (9.3/3) by turning counter clockwise.
- Swivel the gearbox setting lever downwards (towards the biggest scale figure) and swivel it upwards from below into the desired position according to the fertiliser setting chart.
- Retighten knob.

The values in the fertiliser setting chart are only mean values. Deviations may occur due to grain size, grain shape and bulk density. In any case carry out a calibration test.

9.4.2 Setting the shutter slide

The shutter slides (9.4/1) may catch in three different positions:
- "closed"
- "3/4 open"
- "open".

All shutter slides must be in the position "3/4 open".

9.4.3 Closing and opening the bottom

For fertiliser metering the lever (9.4/2) catches on the bolt (9.4/3).

With the aid of the lever (9.4/2) the bottom flaps can be opened, e. g. for cleaning the implement.
9.5 Calibration test to check the set fertiliser application rate

During the calibration test
- the shaft (9.5/1) of the running wheels is turned clockwise with the aid of the calibration crank (9.5/2) and thus the travel in the field is simulated.
- collect the fertiliser rate (from all fertiliser coulters or just from one fertiliser coulter) and check whether the desired and the actual fertiliser application rate correspond.

The collected fertiliser quantity corresponds to that spread on an area of 1/10 or 1/40 ha.

Carry out the calibration test as follows:
- Shutter slide position is “¾ open”.
- Check whether both bottom flap levers are engaged.
- Set the gearbox setting lever according to the fertiliser setting chart (see chapter 9.4.1).

The values given in the fertiliser setting chart correspond for the working widths of 3.0 m, 4.5 m and 6.0 m.

- Insert the calibration crank into shaft (9.5/1) or on ED 601 and ED 601 K (9.6/1).
- According to the following table and depending on the working width and tyres carry out the necessary crank turns.
Table 9.2: Crank turns for calibration test

<table>
<thead>
<tr>
<th>Crank turns on the wheel</th>
<th>3,0 m</th>
<th>4,5 m</th>
<th>6,0 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working width</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tyres</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.00-16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/10 ha</td>
<td>159,0</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1/40 ha</td>
<td>39,8</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>10.0/75-15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/10 ha</td>
<td>147,0</td>
<td>98,0</td>
<td>---</td>
</tr>
<tr>
<td>1/40 ha</td>
<td>36,8</td>
<td>24,5</td>
<td>---</td>
</tr>
<tr>
<td>31x15,5x15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/10 ha</td>
<td>136,0</td>
<td>90,7</td>
<td>64,3</td>
</tr>
<tr>
<td>1/40 ha</td>
<td>34,0</td>
<td>22,7</td>
<td>16,1</td>
</tr>
</tbody>
</table>

Converting the crank turns for other working widths:

Example:

Standard execution: 3,00 m  
Actual working width: 2,70 m  
Tyres: 6.00-16  
Crank turns: 39,8 for 1/40 ha

Crank. (actual) = Crank. (Tab. 9.2) x conversion factor

\[
\text{Conversion factor} = \frac{\text{standard working width [m]}}{\text{actual working width [m]}}
\]

\[
\frac{12}{8} \times \frac{3 [\text{m}]}{2,70 [\text{m}]} = 1,667
\]

Crank. (actual) = 39,8 x 1,11 = 44,2

a) The fertiliser amount is collected in all fertiliser coulters:

- Weigh the collected fertiliser amount [kg] and multiply by the factor "10" (1/10 ha) or "40" (1/40). The resulting fertiliser application rate corresponds to the fertiliser application rate in [kg/ha].

b) The fertiliser quantity is collected on one fertiliser coulter only:

- Shut the shutter slides of the other metering housings.
- Weigh the collected fertiliser quantity [kg] and multiply by the number of fertiliser coulters and with the factor "10" (1/10 ha) or "40" (1/40). The resulting fertiliser application rate corresponds to the fertiliser application rate in [kg/ha].
9.6 Setting the fertiliser coulters

The fertiliser coulters (9.7/1) have been fitted to the profile rail (9.7/3) by means of fixing clamps (9.7/2) s. In the factory the fertiliser coulters have been fitted in a distance of 6 cm towards the sowing coulter of the sowing units. The spacings can be adjusted steplessly as on the sowing units (chapter 7.2).

The placement depth of the fertiliser can be individually set by the depth setting device (9.7/4) of the fertiliser coulters. Set the depth of the fertiliser coulters by using inserting (9.7/5).

⚠️ For setting the placement depth of the fertiliser coulters you have to work under and between the devices of the lifted implement. This means danger of squeezing for the entire body. Therefore secure the lifted implement against unintended lowering by using appropriate supports!

👉 When hitting an obstacle in the soil (9.7/6), the fertiliser coulters give way upwards to the rear and to the side.

Each two fertiliser hoses lead to the fertiliser coulters.

🚫 Ensure that the hoses are not sagging which could result in a fertiliser blockage inside the hose. If necessary shorten the hoses.

Only each one hose leads to the fertiliser coulters of the booms of the ED 451, ED 451-K and ED 601-K.
9.7 Fertiliser delivery to the outer fertiliser coulters on ED 451, ED 451-K and ED 601-K

The fertiliser delivery to the outer fertiliser coulters is achieved by compressed air. On the ED 451 and ED 451-K the metered fertiliser is delivered to the relevant injector (9.8/1) and then delivered to the outer fertiliser coulters with the aid of the compressed air jet of the compressed air blower fan (9.8/2).

In case the fertiliser is blown out of the outer fertiliser coulters, reduce the compressed air jet with the aid of the screen (9.8/3), i.e. reduce the diameter released by the screen.

On the ED 601-K the injectors have been arranged as illustrated in Fig. 9.9.
9.8 Working width reduction by lifting the outer sowing units on the ED 451-K and ED 601-K with row fertiliser applicator

- Lift the outer sowing units. This way the drive for the individual singling discs is disengaged automatically.
- Close the shutter slides (9.10/1) of the outer fertiliser coulters.

If the shutter slides of the metering wheels for the outer fertiliser coulters have not been closed, the fertiliser will drop to the ground.

9.9 After operation empty the fertiliser hopper

- For emptying the fertiliser hopper place an appropriate collecting container underneath the fertiliser coulters.
- Open all shutter slides (9.11/1), unlock the bottom flap setting lever (9.11/2) and swivel to the rear/downwards until the bottom flaps are fully open.

On ED 451, ED 451-K and ED 601-K after complete emptying the fertiliser hopper:

- Drive the blower fan for a short time and thus fully empty the hoses leading to the outer fertiliser coulters.
- Thoroughly clean fertiliser hopper and fertiliser coulters with water.

Strictly ensure that neither fertiliser residue nor a water-fertiliser-mixture will remain in the implement. Moist fertiliser getting dry will result in clods which will completely block and damage rotating components on the occasion of the next operation.
10.0 Maintenance, repair and cleaning

When carrying out maintenance-, repair- and cleaning work on your implement, please observe chapter 3.4.

Thoroughly clean the implement before storing for a longer period. Fertiliser residue will result in an increased corrosion.

10.1 Bolted connections

Check all bolted connections on the implement after the first 2 hours of operation and then every 100 hours of operation, retighten if necessary.

10.2 Pto shaft

Before starting operation and then every 8 hours of operation grease the pto shaft with a trade marked grease (Fig. 10.1). Clean and grease the pto shaft before any longer period of storing.

10.2.1 Hinges on the ED 451-K / ED 601-K

Grease the grease nipples of the parallelogram guide rod (10.2/1) (4 pcs. per parallelogram guide rod) according to the actuation frequency, however, at the latest after 50 hours of operation.

10.3 V-belt for blower fan drive

The proper re-tensioning of the V-belt (10.3/1) is of decisive importance for its life span. The switching-on behaviour of the tractor pto shaft influences mainly the lengthening of the V-belt.

The slow engagement of the tractor pto shaft increases the life span of the V-belt.

The belt-pre-tensioning depends on the spring length of the tensioning spring (10.3/2). The prescribed spring length depends on the diameter of the V-belt pulley (10.3/3) and can be read off the sticker on the guard box.

A correct V-belt tensioning reduces an early wear.
118 Maintenance, repair and cleaning

Re-tension the V-belt as follows:
- Slacken counter nute (10.4/1) straining bolt (10.4/2).
- Set the tensioning spring length according to the sticker and secure both nuts.

For the first time check the V-belt after 10 hours of operation and lateron in intervals of 50 operational hours. Re-tension if necessary.

For checking the V-belt:
- Remove the guard and check the V-belt for wear.

Properly fit the guard again.

10.4 Hydraulic track width adjustment on the ED 601-K

Clean and apply oil to the hydraulic track width adjustment before longer storing periods (after the season).
10.5 Tyre pressure

Regularly check the tyre pressure of the tyres.

By the factory the tyres are provided with the following air pressures:

- Tyres 6.00-16: 1.2 bar.
- Tyres 10.0/75-15: 1.2 bar.
- Terra tyres (special option): 1.2 bar.

10.6 Chain drive

The chain drives of the ED 301, ED 451, ED 451-K, ED 601 and ED 601-K are equipped with roller chains.

Before a longer storing period remove the roller chains. Wash them in kerosene and then dip into heated grease or oil!

Check the chain drives after the first 10 hours of operation and then in intervals of 100 operational hours. Re-tension if necessary. In case a re-tensioning will be of no use any more, shorten the chains accordingly.

The implements are equipped with the following three drive chains:

1. Drive chain (10.7/1) from the shaft of the running wheels to the gearbox input shaft of the setting gearbox.

   The chain is tensioned with the aid of a sprung loaded chain tensioner. For checking the chain tensioning, remove the guard.

   This chain and its locking link features a reinforced execution with increased breaking strength. When replacing the locking link of the complete chain, only use original AMAZONE spare parts.

Fig. 10.7
2. Reversing chain (10.8/1) from the setting gearbox.

   This chain is tensioned with the aid of a sprung loaded chain tensioning (10.8/2).

   The reversing chain and its locking link features a reinforced execution with increased breaking strength. When replacing the locking link of the complete reversing chain, only use original AMAZONE spare parts.

3. Advise for removing the guide rollers

   When re-installing earlier removed guide rollers (10.9/1) of the chain tensioning unit, ensure that the guides (10.9/2) of the guide rollers are in alignment with the chain sprockets of the output shaft (10.9/3). To achieve an accurate alignment the position of the guide rollers can be re-arranged by using equalising discs on the chain tensioning unit.

4. Drive chain (10.10/1) of the sowing units from the pto shaft on the gearbox output of the secondary gear (10.10/2) to the seed shaft (hexagon shaft).

   This chain is tensioned with the aid of a sprung loaded chain tensioners.

   This chain and its locking link features a reinforced execution with increased breaking strength. When replacing the locking link of the complete chain, only use original AMAZONE spare parts.
In addition the AMAZONE ED 301, 451 and 451-K with row fertiliser applicator are equipped with the following drive chain for the row fertiliser applicator:

5. Drive chain (10.11/1) from the shaft (10.11/2) of the driving wheels to the stepless setting gearbox for the fertiliser application rate.

This chain is equipped with a sprung loaded chain tensioner. For checking the chain tensioning, remove the chain guard. If the chain has lengthened to such an extent that the chain tensioner is of no use any more, shorten the chain as necessary.

Fig. 10.11
In addition the ED 601-K is equipped with the following drive chains:

6. Drive chain (10.12/1) from the output shaft (10.12/2) of the left hand drive wheel to the intermediate shaft (10.12/3).

7. Drive chain (10.13/1) from the intermediate shaft (10.12/3) to the setting gearbox (10.13/2) for setting the row spacings.
8. Drive chain (10.14/1) from the output shaft (10.14/2) of the right hand drive wheel to the intermediate shaft (10.15/2).

9. Drive chain (10.15/1) from the intermediate shaft (10.15/2) to the oil bath gearbox (10.15/3) for setting the fertiliser application rate.
10.7 Singling discs and suction kidney

The singling discs (10.16/1) and suction kidneys (10.16/2) of the seed housings have been manufactured from two different, high grade plastic materials.

The seed housing sealing (10.16/3) is made from plastic.

The suction kidney serves as sealing between the singling disc and the suction lid (10.16/4) and the seed housing sealing as sealing between the singling disc and the seed housing.

The PE-foam profile sealing (10.16/5) represents the coarse sealing of the seed housing and prevents the penetration of sand. This sealing must not show any worn areas. Repair kits are available for the PE foam profile-sealing.

- **Singling discs, suction kidneys, seed housing sealings and PE-foam profile sealings suffer from a natural wear.**

Depending on the individual operational conditions, grooves in the singling discs will result.

- **If these grooves have a depth of 1.5 to 2 mm, replace the singling discs, as then no proper sealing is ensured any longer.**

Also replace damaged seed housing sealings (10.16/3).

- **To guarantee a proper function of the singling discs, check the singling unit every 50 hours of operation. Please refer to chapter 7.4.1.**

10.8 Ejector

- **If the sprung loaded ejector (10.17/1) shows heavy signs of wear, so that the ejector body itself is wearing off, replace the ejector.**
10.9 Oil level inside the stepless setting gearbox for the fertiliser application

Check the oil level on the oil gauge (10.18/1) of the setting gearbox. The oil quantity is sufficient if the oil level reaches up to the mark.

An oil exchange is not necessary.

In case of a lack of oil unbolt the cover (10.18/2) and top up with hydraulic oil WTL 16,5 cSt/50°C or motor oil SAE 10 W.

The filling quantity is 1,8 l.

10.10 Exchange of coulter points on the sowing- and fertilising coulters

The depth placement accuracy directly depends on the condition of the coulters. Only sharp and V-shaped coulter points create a seed furrow which prevents the maize corns from rolling about.

The coulters (10.19/1 bzw. 11/19/2) of the sowing- and fertiliser coulters (10.19/3 bzw. 10.19/4) are exchange points made from hard alloy cast iron.

In case of worn exchange hard alloy points replace them by new ones as follows:

On the Classic-sowing coulter:
- Slacken the rivet connection.
- Replace the hard alloy cast iron point by a new one.
- Fix the hard alloy cast iron point with rivets again.

On the Contour-sowing coulter:
- Slacken the bolted connections (10.20/1).
- Replace the hard alloy cast iron point for a new one.
- Re-bolt the hard alloy cast iron point.

On the fertiliser sowing coulter:
- After slackening the rivet connections the exchange hard alloy cast iron point can be turned once, before it must be replaced by a new one.
- Fix the hard alloy cast iron point with rivets again.

Check the sowing- and fertiliser coulter for wear every 50 hours of operation. In case of wear replace the hard alloy cast metal points or turn them.

Replace or turn the exchange hard alloy cast iron points before the side plates (10.19/5 and 10.19/6) of the sowing- and fertiliser coulters will show signs of wear.
10.11 Cleaning the suction air blower fan rotor

The sucking of dressing agents may result in a residue of these dressing agents on the suction air blower fan rotor.

This residue may result in an uneven run of the blower fan rotor.

In case of an uneven blower fan run, drive the blower fan and lead a jet of water into a free suction opening of the blower fan. This way, residues on the blower fan rotor are removed.

⚠️ Water will be thrown out of the blower fan opening. Protect your eyes with safety glasses.

10.12 Table for maintenance

<table>
<thead>
<tr>
<th>Component parts</th>
<th>Maintenance intervals [h]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>first maintenance after</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Bolted connections</td>
<td>☒</td>
</tr>
<tr>
<td>Pto shaft</td>
<td>☒</td>
</tr>
<tr>
<td>Hinges ED 451-K / 601-K</td>
<td>☒</td>
</tr>
<tr>
<td>V-belt</td>
<td>☒</td>
</tr>
<tr>
<td>Hydr. track width adjustment ED 601-K</td>
<td>☒</td>
</tr>
<tr>
<td>Chain drives</td>
<td>☒</td>
</tr>
<tr>
<td>Singing discs and PE-foam profile sealings</td>
<td>☒</td>
</tr>
<tr>
<td>Suction kidneys</td>
<td>☒</td>
</tr>
<tr>
<td>Coulter points on the sowing and fertilising coulter</td>
<td>☒</td>
</tr>
<tr>
<td>Grease bearings of drive shafts</td>
<td>☒</td>
</tr>
</tbody>
</table>
11. Electric or electronic monitoring devices

11.1 EF 2 – the electric function monitoring of the over load protection on the sowing units

1. Execution 1 for max. 6 rows,
   Order No.: 915 365
2. Execution 2 for max. 12 rows,
   Order No.: 915 370

On every sowing unit the function monitoring EF 2 (Fig. 11.1) monitors the over load protection between the central drive and the drive of the singling discs.

An audible and visual alarm informs the tractor operator if a sowing unit drive is interrupted.

Stop the sowing operation immediately and remedy the fault which caused the interruption of the sowing unit drive.

The electric monitoring device EF 2 consists of:

Fig. 11.3/

1 - Signal sensor with cube plug. One signal sensor is fitted to each sowing unit (2). If in case of an overload the shear pin, fitted to the shear pin bracket (Fig. 11.2/1), shears off, the fixing plate (Fig. 11.2/2) which is hold in position by the shear pin swivels upwards and thus actuates the signal sensor. This way an audible and visual alarm is released on the signal box (2).

2 - Sowing unit.

3 - Connecting cable between Opto-sensor-distributor and cube socket.

4 - Connecting unit (execution 1) – fitted to the Airplanter.

5 - Connecting unit (execution 2) – fitted to the Airplanter.

6 - Signal box (execution 1). The signal box is installed on the tractor within view of the tractor operator.

7 - Signal box (execution 2).
11.1.1 Alternative operation of the ED with 4, 5 or 6 sowing units

- Remove the cube plug and the cube socket from the connection (Fig. 11.4/1).
- Remove the air hose on the relevant sowing unit.
- Detach the sowing units from the frame of the Airplanter.

- For every detached sowing unit fit a dummy coupling (Fig. 11.5/1) (Order No.: 913 696) to the air hose of the adjacent sowing unit by using a hose clamp (Fig. 11.5/2).
- With the aid of the cube socket (Fig. 11.5/3) plug the connecting cable of the opto sensor distributor on to the cube plug (Fig. 11.5/4) and fix.

Ensure the proper fitting of the flat sealing (Fig. 11.5/5) between cube plug and cube socket (sealing against humidity).

If the plug connection has not been carried out properly an audible and visual alarm is released on the signal box (Fig. 11.4/2).
11.2 AMASCAN and AMASCAN Profi

11.2.1 Information about the computer

1. Range of application
AMASCAN and AMASCAN Profi are display- and monitoring units for Airplanters ED with 12 sowing units maximum.

2. Manufacturer
AMAZONEN-WERKE
H. DREYER GmbH & Co. KG
Postfach 51
D-49202 Hasbergen-Gaste / Germany

3. Conformity declaration
AMASCAN and AMASCAN Profi fulfils the EMV-guide line 89/336/EC.

4. Details when making enquiries and ordering
When ordering spare parts indicate the serial-number of the AMASCAN or AMASCAN Profi.

The safety requirements are only fulfilled when in the event of repair original AMAZONE spare parts are used. Using other parts may rule out the liability for resulting damage!

5. Identification
Type plate on the on-board computer.

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

6. Declined use
The AMASCAN or AMASCAN Profi is a display- and monitoring device which has been designed for the common use in agriculture.

Any use other than that stipulated above is no longer regarded as designed use. The manufacturer does not accept any responsibility for damage resulting from this. Therefore, the operator himself will carry the full risk.

Under "designed use" the operator must adhere to the manufacturer's prescribed operation, maintenance and repair conditions, and exclusively use original AMAZONE spare parts.

AMASCAN or AMASCAN Profi may only be operated, maintained and repaired by such persons who have been made acquainted with it and who have been advised about the dangers.

All applicable accident prevention advice as well as any further generally accepted safety-, working-, medical- and road traffic rules should be adhered to.

Any damage resulting from arbitrary changes on the AMASCAN or AMASCAN Profi rule out the responsibility of the manufacturer.

Before every operation and also during the operation check your device for proper function and for sufficient application accuracy of the machine.

Claims regarding damage not having occurred on the AMASCAN or AMASCAN Profi itself will be rejected. This also applies to damage due to application errors. Arbitrary modifications to the AMASCAN or AMASCAN Profi may result in damage and therefore, the manufacturer does not accept liability for such damage.

11.2.2 Safety

This instruction manual contains basic advice which must be adhered to when mounting, operating and maintaining the machine. Ensure that this instruction manual has been read by the user/operator before starting to operate the device and that it is made readily available at all times to the user.

Please strictly observe and adhere to all safety advice given in this instruction manual.

1. Dangers when not adhering to safety advice
Not adhering to the safety advice given
• may result in endangering the user or other persons, the environment and/or the machine itself.
• may result in the loss of any claim for damages.

Not paying attention to the safety advice may cause the following risks:
• Danger for persons by not secured operational range.
• Failure of important functions of the machine.
• Failures of prescribed measures for maintenance and repair.
• Danger for persons by mechanical or chemical affects.
• Dangers to persons or to the environment by leaking hydraulic oil.
2. Qualification of operator

AMASCAN or AMASCAN PROFI may only be operated, maintained and repaired by persons, who are acquainted with it and have been informed of the relevant dangers.

3. Symbols in this instruction manual

a. Attention symbol

Attention symbols which may cause dangers for the machine and its function when not being adhered to, are identified with the Attention symbol:

b. Hint symbol

Hints regarding machine’s specific particularities, which have to be adhered to for a faultless function of the machine are identified with the hint symbol:

11.2.2.1 Safety advice for retrofitting electric and electronic devices and/or components

The function of the implements’ electronic components and parts may be affected by the electric-magnetic transmittance of other devices. Such affects may endanger people when the following safety advice will not be adhered to:

When retrofitting electric and electronic devices and/or components to the implement with connection to the on-board electric circuit, the user must ensure by himself that the installation will not cause any disturbance to the tractor electronic or other components.

Special attention must be paid that the retrofitted electric and electronic parts correspond to the EMV-guide 89/336/EC in the relevant valid edition and that they bear the EC-sign.

For retrofitting mobile communication systems (e.g. radio, telephone) the following requirements must be fulfilled:

Only install devices which have officially been authorised in your country.

Firmly install the device.

The use of portable or mobile devices inside the tractor cab is only permissible with a connection to a firmly installed external antenna.

Install the transmitter spaced apart from the tractor’s electronic.

When installing the antenna ensure an appropriate installation with proper earth connection between antenna and tractor earth.

For cabling and installation as well as for the maximum permissible current supply in addition adhere to the fitting instructions of the implement manufacturer.

11.2.2.2 Safety advice for repair work

Before carrying out any repair work on the electric system or arc welding on the tractor or the mounted implement, disconnect all connections of AMASCAN or AMASCAN Profi.
11.2.3 Description of product

AMASCAN or AMASCAN Profi is a display- and monitoring- device for Airplanters ED with up to 12 sowing units maximum.

The computer has been equipped with a memory and a lithium battery. All entered and determined values are stored for about 10 years even if the on-board power supply is switched off. At the next switching on all data are available again.

AMASCAN or AMASCAN Profi consists of:

Fig. 11.6/...

1 - AMASCAN.
2 - AMASCAN PROFI.

AMASCAN or AMASCAN Profi is installed on the tractor within view of the tractor operator on a mounting bracket (3) and a console (4).

3 - Carrier.
4 - Console battery power supply cable. Connect the battery power supply cable with the tractor battery.
5 - Connecting unit AMASCAN for 6 or 12 rows with opto sensors (6), movement sensor (7) and connecting cable with implement plug (8). The connecting unit is fitted to the Airplanter.
6 - Opto sensor. Each sowing unit is provided with an opto sensor.
7 - Movement sensor (Sensor X) for travelled distance and area monitoring. This sensor simultaneously gives the reference signal for the operational situation (implement in operation "yes" (ja) / "no" (nein). The sensor fitted to the setting gearbox is transmitting impulses (Imp./100m), as soon as the gearbox input shaft is driven by the ground wheels.
8 - Implement plug with 39-pole multiple plug. Der AMASCAN is connected to the connecting unit of the ED with the aid of the implement plug.
9 - Cable-tree-system AMASCAN Profi for 12 rows in maximum incl. movement sensor (7).
10 - Opto sensor for cable-tree-system.
11 - Dummy coupling. Required for reducing the number of rows, e. g. from 8 rows sunflower to 6 rows maize.
12 - AMFÜME for row fertiliser applicator. Electronic level indicator for visual and audible alarm on the AMASCAN.
13 - AMFÜME for cable-tree system.
AMASCAN and its functions:

- Function monitoring of the individual sowing units.

After having dropped from the singling disc and passed the opto sensor (Fig. 11.6/6) (infrared light barrier), every individual seed grain creates an impulse which monitors the sowing units.

The currently counted number of grains is extrapolated to grains/ha, shown on the display and compared with the pre-determined rated value.

If the rated value falls short by more than 15% a honk sounds and the arrow above the symbol "sowing unit" flicks. Simultaneously the number of the defect unit is shown on the display with the actual value (grains/ha)/1000.

- Determination of the worked area per task in [ha].
- Determination of the worked total area, e.g. per season in [ha].
- Display of the current area efficiency in [ha/h].
- Determination of the time of operation in [h].
- Display of the travelled distance in [km].
- Display of the actual forward speed in [km/h].

Fig. 11.6
When the Airplanter is in operational position the following data are shown on the 6-digit display (Fig. 11.7/1):

- right hand – the current number [grains/ha]/1000 (Fig. 11.7/2).
- on the left hand side (Fig. 11.7/3) the display (figures 1, 2, 3 etc.) changes automatically after 5 seconds. The number of the actually monitored sowing unit is shown.
- If the computer recognises a defect on one of the sowing units or a deviation from the pre-set rated value, the arrow above the symbol "sowing unit" flicks. At the same time the number of the defect sowing unit (e. g. 3) with its current value (e. g. 50) (grains/ha)/1000 is shown on the display and an audible alarm sounds (honking).

Seen in travelling direction the sowing units are numbered from the left hand outer side to the right hand outer side. That means, seen in travelling direction, the sowing unit on the left hand outer side bears the number 1, etc..

Display in case of a defect sowing unit

- the vertical arrow (Fig. 11.7/4) and the flicking circle below (Fig. 11.7/5), as soon as the movement sensor (Sensor "X") is transmitting impulses to the AMASCAN.

The key pad (Fig. 11.7/6) is divided into the following areas:

- Red = Implement on / off.
- Green = Function keys (display of the determined data).
- Yellow = Input keys (entering the machine data).
- White = Control keys (monitoring function to switch on or off one or several units for a short time).
Table 11.1: Keypad layout

<table>
<thead>
<tr>
<th>Key</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON key</td>
<td>Input key for increasing the displayed value</td>
</tr>
<tr>
<td>OFF key</td>
<td>Input key for reducing the displayed value</td>
</tr>
<tr>
<td>ha</td>
<td>Display of the covered area [ha] after having entered the &quot;start function&quot;</td>
</tr>
<tr>
<td>Σ ha</td>
<td>Display of the covered total area</td>
</tr>
<tr>
<td>ha/h</td>
<td>Display area efficiency in [ha/h]</td>
</tr>
<tr>
<td>km</td>
<td>Display working time in [h] after having entered the &quot;start function&quot;</td>
</tr>
<tr>
<td>km/h</td>
<td>Display of the operational speed in [km/h]</td>
</tr>
<tr>
<td>Service</td>
<td>Checking the monitoring function</td>
</tr>
<tr>
<td>m</td>
<td>Working width in [m] – display and entering</td>
</tr>
<tr>
<td>Σ</td>
<td>Entering the number of sowing units</td>
</tr>
<tr>
<td>Imp/100 m</td>
<td>Imp/100 m – display and entering (directly or via the calibration procedure)</td>
</tr>
<tr>
<td>K/ha 1000 (100%)</td>
<td>Rated value grains/ha)/1000] display and entering</td>
</tr>
</tbody>
</table>
11.2.4 Putting to operation

- Plug the implement plug of the Airplanter ED, mounted to the tractor, on to AMASCAN or AMASCAN Profi.

Before starting to operate check the implement specific data by pressing the corresponding keys in the mentioned order or enter newly:

1. Switch on AMASCAN or AMASCAN Profi.
2. Check distance sensor calibration value “Imp./100m” and correct if necessary (by direct entering the calibration of the movement sensor).
3. Check the working width [m] and correct if necessary.
4. Enter the rated value for the application rate [(grains/ha)/1000].
5. Check the number of sowing units and correct if necessary.
6. Release start function and start sowing operation.

11.2.5 Operating procedure and description of the keypad

Before starting operation AMASCAN or AMASCAN Profi requires the implement specific data (values) in order to monitore the connected Airplanter ED:

After having pressed the corresponding key or and then pressing the keys or these data (values) can be dialed directly on the display.

After having dialed the desired values via the keys or always press key in order to store the dialed value.

By the first pressing on one of the keys or the display advances by one position into the desired direction.

By renewed pressure onto the key the display continues to run until the key is released.
Operating sequence

1. **AMASCAN or AMASCAN Profi on/off switching**

By pressing key ![AMASCAN on/off switch](image) AMASCAN or AMASCAN Profi is switched on and by pressing key ![AMASCAN on/off switch](image) it is switched off.

When switched on the calculator tests itself. Then automatically the function is dialed which was displayed before the calculator had been switched off.

In case of a fault in the electronic system, the device shows:

- **HALP 00**
- **HALP 88**

In this case return the computer for repair.

Whenever the supply voltage drops to below 10 volts, e.g. when starting the tractor, the computer automatically switches off. It has to be switched on again as described above.

2. **Calibrating the distance sensor**

For determining the actual forward speed AMASCAN or AMASCAN Profi requires the value "Imp./100 m", which sensor "X" releases to AMASCAN or AMASCAN Profi when driving down a calibration distance of 100 m.

There are two possibilities to enter the calibration value "Imp./100 m":

- The value "Imp./100 m" is known and dialed via the keypad.
- The value "Imp./100 m" is unknown and should be determined by driving down a calibration distance.

As the calibration value "Imp./100 m" depends on soil, we recommend that you always newly determine this value by driving down a calibration distance, in case of heavily deviating types of soil.

**a. The calibration value "Imp./100 m" is known:**

- Press key ![Imp./100 m](image) with the tractor stopped.
- Dial the known calibration value "Imp./100 m" via the keys ![Imp./100 m](image) or ![Imp./100 m](image).

Display of the dialed calibration value

- Press key ![Imp./100 m](image) to store the dialed calibration value.
- Once again press key ![Imp./100 m](image) to check the stored calibration value. Now the dialed calibration value should appear on the display.

**In case of deviations between**

- the sown application rate and the actually covered area
- the covered area determined by AMASCAN or AMASCAN Profi and the actually covered area

newly determine the calibration value by driving down a 100 m calibration distance (please refer to item b).
b. The value "Imp./100 m" is unknown:

- Accurately measure out in the field a calibration distance of 100 m. Mark the starting- and ending point of the calibration distance.

- Bring tractor to start position and Airplanter ED into operational position (if necessary, lift the sowing units to interrupt the drive of the sowing units).

- Press key keep pressed and simultaneously press key .

- Accurately drive down the calibration distance from the starting to the ending point (when starting the counter returns to "0"). The display shows the currently determined impulses.

When driving down the calibration distance, do not press any key.

Display during calibrating

- Stop after 100 m. Now the number of determined impulses is shown on the display.

- Press key to store the displayed, determined calibration value (Imp./100 m).

Display of the determined calibration value

- Once more press key to check the stored calibration value. Now, the determined calibration value (Imp./100 m) should appear on the display.

- Enter the determined calibration value into Table 11.2.

<table>
<thead>
<tr>
<th>Table 11.2: Soil related calibration value &quot;Imp./100m&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of soil</td>
</tr>
<tr>
<td>Soft soil</td>
</tr>
<tr>
<td>Medium heavy soil</td>
</tr>
<tr>
<td>Hard soil</td>
</tr>
</tbody>
</table>

- Enter the determined calibration value into Table 11.2.
3. Working width

For determining the operated area AMASCAN or AMASCAN Profi requires information about the working width. The working width should be entered as follows:

- Press key \[ m \].
- Via the keys \[ \downarrow \] or \[ \uparrow \] dial the desired working width [m] on the display, e.g. “3.00” for 3 m working width.

Display working width

![Display showing 3.00]  

- Press key \[ \text{Input} \] and thus store the dialled value.
- Once again press key \[ m \] to check the stored value. On the display then the chosen figure, e.g. "3.00" should appear.

4. Application rate

- Enter the value for the desired application rate whilst the tractor is not moving.

Example:

Desired: 95.000 grains per hectare
Row spacing R: 0,75 m
Singling disc: 30 holes.

Determined grain spacing \( a \): 14,04 cm
(please refer to chapter 7.5)

Singling disc used: 30 holes

- Take from the gearbox setting table a grain spacing nearest to the determined grain spacing whereby you have to bear in mind the holes in the singling discs.

- In the "review table grains / ha singling disc 30 holes" find the grain spacing 13,9 cm. Read off this line underneath row spacing \( R = 75 \text{ cm} \) the number of 95923 grains/ha (95923 grains/ha corresponds to 96000 grains/ha).

- Press key \[ \text{Input} \].
- Via the key \[ \downarrow \] or \[ \uparrow \] dial the desired application rate \([\text{grains/ha}]/1000\) on the display, e.g. "96" for 96000 grains/ha.

Display of the desired application rate

![Display showing 96]  

- Press key \[ \text{Input} \]. The dialed value “96” will be stored.
- Press once again \[ \text{Kha} \] to check the stored value. On the display then the figure "96" should appear.
5. Entering the number of sowing units

The entered value must not exceed the figure "12" (12 sowing units in maximum).

- Press key
- Via the keys or dial the figure for the number of sowing units on the display (e.g. "6" for 6 sowing units).

Display number of sowing units

6. Starting the sowing procedure

Before starting operation, actuate the "start function" Then the implement is ready for operation. For this

- press key, keep it pressed and simultaneously press key .

This way, the memory of the function keys , and return to "0".
11.2.6 Sowing operation

**Display “operation”**

![Display Image]

**Explanation for the display “operation”**

The vertical arrow is shown when the implement is in operational position. During travel the circle below must flick. That means that the sensor for storing the covered area and the travelled distance is transmitting impulses to AMASCAN or AMASCAN Profi.

This display (figures 1, 2, 3 etc.) automatically changes after 5 seconds. The number of the current monitored sowing unit id displayed.

During the sowing operation the display shows the actual seed rate, e. g. "96" for 96000 grains/ha.

**Switching on and off monitoring functions for the individual sowing units during the sowing procedure.**

With the aid of the white control keys ![Key Image] the monitoring function of the individual sowing units can be switched off and on during the sowing operation.

By pressing once key ![Key Image] or ![Key Image] one sowing unit is switched off. If one of these keys is pressed twice, the monitoring function for 2 sowing units is switched off.

By pressing key ![Key Image] the switching off begins on the left hand side (sowing unit 1), by pressing key ![Key Image] it begins from the right hand side.

After key ![Key Image] has been pressed, the entire monitoring is switched on again.

The entire monitoring function is automatically switched on again if AMASCAN or AMASCAN Profi realises an interruption of the operational position, e. g. if the movement sensor does not transmit impulses any more.

This can, for example, be the case when lifting the machine during turning at the headlands or in case of a stop in the field.
Description of the function keys

Via the function keys the determined data can be displayed during sowing at any time.

By pressing one of the following function keys the desired value (e.g. 9.50 for 9.5 km/h) will appear for approx. 5 seconds.

Display after the function key km/h has been pressed

On the lower edge of the display the arrow points towards the symbol of the currently pressed function key. Thereafter, the computer automatically switches back to the "operational display".

1. Part area after having actuated the "start function"

After having pressed the key the covered area in [ha] is displayed (e.g. 10.5110 for 10,5110 ha), which had been covered after having actuated the "start function".

Only the covered area is determined at which the Airplanter is in operational position.

Display after having pressed key "ha"

2. Total area, e.g. one season

After having pressed key the covered total area is displayed in [ha] (e.g. 1051.0 for 1051 ha).

Display after having pressed key "Σ ha"

3. Area efficiency

After pressing key the current area efficiency is displayed in [ha/h] (e.g. 1.800 for 1.8 ha/h).

Display after having pressed key "ha/h"
4. Hours of operation

After pressing key the operational time is displayed in [h] (e.g. 1:15:51 for 1 hour 15 min. 51 sec.), which passed after having actuated the "start function".

Display after having pressed key "clock" ("Uhr")

If the tractor engine is stopped and thus the computer currentless the time interception is interrupted. After the tractor has been started again the time interception is automatically continued.

During operation the time interception can be stopped by pressing key twice. After pressing this key again the time interception is continued.

5. Travelled distance

After pressing key the distance [km] is displayed (e.g. 4.8000 for 4.8 km), which has been travelled after having actuated the "start function".

Display after having pressed key "km"

6. Operational speed

After pressing key the actual operational speed is displayed [km/h] (e.g. 6.500 for 6.5 km/h).

Display after having pressed key "km/h"

7. Service-key for checking the function ability of the opto sensors

After pressing the key the service function is dialed.

If now the light barrier on one of the opto sensors is interrupted,
- the computer displays the sowing unit number into which this opto sensor is installed (e.g. "1" for the outer left hand sowing unit) and
- at the same time a honk signal sounds.

Display after having pressed the key "Service"

- This display is only shown for about 1 second.
- Do not push any firm particles into the sowing coulters. These might damage the opto sensor.
11.2.7 Fitting instructions

11.2.7.1 Console and AMASCAN or AMASCAN Profi

Fit console (Fig. 11.8/1) on the tractor cab within reach and sight to the right hand of the operator. It must be free of vibrations and electrically conductive.

- The distance of the AMASCAN from a radio transmitter and an antenna should at least be 1 m.
- The console should be fixed to the tractor cab within reach and sight to the right hand of the operator. It must be free of vibrations and electrically conductive.
- Make sure that the AMASCAN-housing (Fig. 11.8/2) receives via the console an electrically conductive connection to the tractor chassis. Scratch off all paint from the fitting surfaces.

- Fit the bracket (Fig. 11.8/3) fitted to the AMASCAN onto the tube of the console, bring it to the desired position and fix by the thumb bolt there.

11.2.7.2 Battery connecting lead

- Connect the battery connecting lead (Fig. 11.8/4) for the power supply directly with the tractor battery (12 V) and lay cable.
- Connect cable connector (Fig. 11.8/5) with fuse (16 A) to brown cable and connect with the plus pole of the tractor battery.
- Connect blue cable with the minus pole (earth).

When connecting to the battery, first connect plus cable to plus pole. Then connect earth cable to minus pole. When disconnecting battery, proceed in vice versa order.

- Connect minus pole of the battery (earth) with frame or chassis of the tractor which is especially important with older American, Canadian or British tractor types. On tractors with a switch in the mass cable of the battery (e.g. Zetor 8011, 8045), connect blue mass cable directly with mass (earth) (frame or chassis).

- Connect power supply cable (Fig. 11.8/6) of the AMASCAN with the socket (Fig. 11.8/7).
- Connect implement plug (Fig. 11.8/8) with the 20-pole connecting block of the AMASCAN. The function monitoring for the sowing units is ready to operate.
11.2.8 Maintenance

11.2.8.1 Calculator

The calculator is maintenance-free. During winter store the calculator in a frost-free room and protect it from humidity.

11.2.8.2 Sensors

If dirty, clean the opto-sensor with a soft brush.

If the dirt cannot be removed without water, clean the opto sensor with dish water. Dry with a grease-free cloth.

The cleaning applies to the inside of the opto sensor (infrared diode and photo transistors)

Before starting to operate in the season clean the sensors by using dishwater and a soft brush. Dry afterwards.

The movement sensor (sensor "X") is maintenance-free.

11.2.9 Fault remedy

For searching faults please proceed in the outlined order.

<table>
<thead>
<tr>
<th>Fault</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>The calculator cannot be switched on</td>
<td>Wrong poling on the power supply</td>
<td>Check for proper poling</td>
</tr>
<tr>
<td>Power supply interrupted</td>
<td>Check battery connecting lead fuse, binders of the battery and fuses.</td>
<td></td>
</tr>
<tr>
<td>Total failure</td>
<td>Send the calculator to your dealer</td>
<td></td>
</tr>
<tr>
<td>The calculator shows HALP 88 or HALP 00</td>
<td>Memory failure</td>
<td>Send the calculator to your dealer</td>
</tr>
<tr>
<td>Fault</td>
<td>Cause</td>
<td>Remedy</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>The forward speed is not displayed.</td>
<td>Entering &quot;Impulses/100 m&quot; is missing.</td>
<td>Enter numbers of &quot;Impulses/100 m&quot;.</td>
</tr>
<tr>
<td></td>
<td>Sensor &quot;X&quot; does not send impulses to the calculator, the ring in the display does not</td>
<td>Set the distance between Sensor &quot;X&quot; and impulse disc onto 3 to 4 mm.</td>
</tr>
<tr>
<td></td>
<td>fällig while travelling.</td>
<td>Connect cable properly in the distributor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>black = sw = Signal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>brown = br = +12 Volt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>blue = bl = - mass(earth)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sensor &quot;X&quot; is defect, replace.</td>
</tr>
<tr>
<td>The area is not displayed.</td>
<td>Working width has not been entered.</td>
<td>Enter working width.</td>
</tr>
<tr>
<td>The set application rate is not displayed.</td>
<td>Scraper position has not been set properly.</td>
<td>Re-adjust the scraper position.</td>
</tr>
<tr>
<td>(Display 0 grains/ha).</td>
<td>Opto sensor does not send any impulses to the calculator.</td>
<td>Seed box is empty.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sowing unit is defect. With the aid of the service-key determine the defective sowing unit and proceed as follows:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Opto sensors are dirty, clean them thoroughly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check whether the opto sensor or the cable of the connecting unit are defect. Remove the cube plug and apply the adjacent cube plug. If the fault has been remedied, the cable is defect. If the fault has not been remedied, the opto sensor is defect.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Connect the cables in the distributor in the appropriate manner</td>
</tr>
<tr>
<td></td>
<td></td>
<td>green = gn = Signal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>brown = br = + 12 Volt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>white = ws = 0 Volt</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sensor is defect, replace.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Calculator is defect, replace.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Distributor is defect, replace.</td>
</tr>
<tr>
<td>The display grains/ha heavily deviates.</td>
<td>The opto sensors send uneven impulses to the calculator.</td>
<td>Inaccurate seed placement – re-adjust sowing units properly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Opto sensors are dirty, clean them thoroughly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Find out the defective sowing unit. For this remove the relevant cube plug and apply the adjacent cube plug. If the fault has been remedied, the defective sowing unit has been found. If not, proceed in the same way for all sowing units.</td>
</tr>
<tr>
<td>Only 4 sowing units are monitored instead of 8.</td>
<td>&quot;Number of sowing units&quot; has not been entered correctly.</td>
<td>Enter &quot;number of sowing units&quot;.</td>
</tr>
</tbody>
</table>
12.0 Special options

All parts and devices mentioned in this chapter do not belong to the standard execution. They can be ordered together with the AMAZONE-ED or they can be subsequently ordered and retrofitted. The necessary fitting holes are provided with the base machines.

12.1 Singling discs

12.1.1 Singling discs for the sowing units Classic and Contour

- 30/5 - green – for maize - standard, Order-No.: 910 777
- 30/5,8 - natural - for maize with high TGW and high forward speeds, Order-No.: 910 790
- 45/6 - red - for field beans, Order-No.: 910 792
- 45/5 – dark grey - for beans and peas, Order-No.: 910 793
- 45/4 - orange - for soya beans, Order-No.: 910 791
- 45/2,5 - black - for small beans, Order-No.: 910 795
- 30/2,5 - brown - for sunflower, Order-No.: 910 794
- 45/3,2 – light blue - for cotton, Order-No.: 913 687
- 60/3,2 – light green - for cotton, Order-No.: 915 763
- 60/2,2 – bordeaux red - for Sorghum, Order-No.: 918 477
- 15/2,5 - pink - for sunflower (for grain spacings larger than 22 cm), Order-No.: 917232

12.1.2 Singling discs for Contour-sowing units

- 30/2,2 - blue - for prilled sugar beets, Order-No.: 918 860
- 15/2,2 - turquoise - for prilled sugar beets, Order-No.: 920 048
- 30/1,8 - yellow - for water melons and bare beets, Order-No.: 920 049
- 60/1,4 – fawn coloured - for Brachiara, Order-No.: 920 050
- 90/1,2 - white - for rape, Order-No.: 920 051

12.2 Sowing coulter for beans, Order No.: 401 800

(This sowing coulter is recommended for a seed placement deeper than 7 cm)

With the bean sowing coulter the seed can be placed with a larger depth into the seed bed. The placement depth can be set steplessly from 0 to 12 cm. For this, please refer to chapter 7.7.
12.3 Spring pressure adjustment for the sowing unit, cpl. (per coulter) Order-No. 911 546

With the aid of the spring pressure adjustment for the sowing units the pressure to the sowing units can be increased or reduced.

1. The desired placement depth of the seed is not achieved

In this case the own weight of the sowing unit is not sufficient to place the seed in the desired depth (penetration depth of the sowing coulter into the soil), e. g. on heavy soils.

Increase the sowing pressure unit as follows:
- Hook the tensioning spring (12.1/1) into the upper eye (12.1/2).
- Set the ratchet lever (12.1/3) for the additional coulter pressure to the positions III or IV and lock.

If the ratchet lever is catching in the positions I or II (neutral position when pressurised), the sowing unit is pressed into the soil just by its own weight.

2. The sowing coulter penetrates the soil too much

In this case the own weight of the sowing unit is too big. The sowing unit penetrates the soil too much.

Reduce the pressure on the sowing unit as follows:
- Hook the tensioning spring (12.1/1) into the lower eye (12.1/4).
- Set the ratchet lever (12.1/3) for reducing the weight into the positions I or II and lock.

If the ratchet lever is catching in the positions III or IV (neutral position when the pressure is reduced), the sowing coulter is again pressed into the air by its own weight.
12.4 Universal disc fertiliser coulter

In case of retrofitting the normal fertiliser coulter is replaced by a unit consisting of fertiliser coulter and clearing disc (12.2/1).

Necessary for

- one 4-row implement
  - 2 right hand and 2 left hand fertiliser coulters.
- one 6-row implement
  - 2 right hand and 2 left hand fertiliser coulters and
  - each 1 fertiliser coulter for the outer right hand and left hand side.
- one 8-row implement
  - 2 right hand and 2 left hand fertiliser coulters and
  - each 2 fertiliser coulters for the outer right hand and left hand side.

Fig. 12.2
12.5 Stone- and clod clearer

12.5.1 Stone- and clod-clearer (Fig. 12.3) for the Classic-sowing unit, Order-No.: 910 218

Sprung execution for extremely difficult conditions (not for ED 451-K with row fertiliser applicator).

12.5.2 Clod clearer (Fig. 12.4) for Classic-sowing unit, Order-No.: 916 171

When the clod clearer is retrofitted, shorten the coulter point according to Fig. 12.5.

12.5.3 Stone clearer (Fig. 12.6) for Classic-sowing unit, Order-No.: 916 216

Not for foldable implements.
12.5.4 Clod clearer (Fig. 12.7) for Contour-sowing units, Order-No.: 921 206

Fig. 12.7
12.6 Hydraulic marker change over with connecting unit for track marker order-No. 913 175

(Only for ED 301, ED 451 and ED 451-K.

On ED 451 and ED 451-K only for tracing a track in the tractor’s wheel track, not in the tractor’s centre).

Connect the hydraulic hose of the hydraulic ram (12.8/1) to a single acting control spool valve of the tractor.

Exchanging the track marker
- Before turning at the headlands set the control spool valve of the tractor on “Lifting” (“Heben”). Then both track marker arms are folded upwards when turning at the headlands.
- After having turned at the headlands set the control-spool valve into the position “lowering” “Senken”. Then the earlier not used track marker disc will automatically be lowered.

Danger of squeezing!
While actuating the marker change over staying or working in the operational range of the marker change over or the track marker arms is prohibited. Danger of injury from moving parts.

12.6.1 Setting the track marker

On the ED 451 and ED 451-K affix the wire rope (12.8/2) to the pins (12.8/3). Danger of damage if the marker discs work too deeply.

- Mount the Airplanter to the tractor and fold down the track marker arms. When the machine is standing on the ground, e. g. the left hand track marker arm is folded down.
- Affix the wire rope with the aid of a chain (12.9/1) on the marker arm tube (12.9/2) in such a way that the rope is slightly sagging as soon as the marker disc touches the contact surface of the wheel. This way, the working depth of the track marker is limited to 60 to 80 mm.
- Carrying out a track marker change
- Now affix the right hand end of the chain to the right hand track marker as described above. Please also refer to chapter “track markers”.

DB 695 04.00
- Set control spool valve of the tractor on to “Lifting”. Both marker arms are in folded upward position.

- Raise the Airplanter (like when turning on the headlands)

- Check whether both track markers have sufficient ground clearance. Otherwise re-adjust the chain length on the marker arm tube.

12.6.2 Re-adjusting the hydraulic marker change over

By the factory the marker change over has been set in such a way that it faultlessly switches. After the new implement has been operated for some time it might be necessary to slightly readjust the marker change over, in case the switching is not regular and properly any more.

Procedure:
- Pressurise the hydraulic ram (12.10/1) with pressure oil.
- Slacken the counter nut (12.10/2) U-bolt.
- With the aid of a wrench turn the piston of the hydraulic ram until the leaf spring (12.10/3) audibly catches on the marker change over and a play of 1 to 2 mm between leaf spring and tooth has been set.
- Carry out a test switching and check whether the marker change over has been set again in the right way.
- Tighten the counter nut on the U-bolt of the hydraulic ram.
12.7 Vertical marker arm folding, hydraulically

The vertical marker arm folding (12.11/1) serves at the same time

- for folding the marker arms into a vertical position and
- for switching over the track marker on the field end.

Due to the wide protrusion of the marker arms the Airplanter has a large implement width. By folding the marker arms into a vertical position the implement width can be reduced in a few moments. This way, obstacles can be negotiated in a simple way without the tractor operator leaving the tractor cab.

Connect the hydraulic hose of the switching unit for the marker arm folding to a single acting control spool valve of the tractor.

Changing the track marker

- Before turning at the headlands set the control spool valve of the tractor on “lifting” (“Heben”).
  Then both track marker arms are folded upwards when turning at the headlands.
- After having turned at the headlands set the control-spool valve into the position “lowering” “Senken”. Then the earlier not used track marker disc will automatically be lowered.

⚠️ Danger of squeezing!

While actuating the marker change over staying or working in the operational range of the marker change over or the track marker arms is prohibited. Danger of injury from moving parts.

The position of the track marker in folded upwards position in relation to the implement can be re-adjusted on the threades piece (12.12/2) of the switching unit.

When folded down the working width of the track markers can be set on the marker arm tube with the aid of a chain!

Vertical marker arm folding, hydraulically actuated:

- for ED 301, 451 and 451-K, Order-No.: 913 177
- for ED 601 (on ED 601-K standard), Order-No.: 916 139
12.8 Drive for pto shaft with 710 R.P.M., Order-No.: 425 400

Please refer to chapter 4.2 and 8.7

12.9 Drive for pto shaft with 540 R.P.M., Order-No.: 914 260

Please refer to chapter 4.2 and 8.7

12.10 Drive for pto shaft with 1000 R.P.M., Order-No.: 914 261 (standard execution)

Please refer to chapter 4.2 and 8.7

12.11 Hydraulic blower fan drive, Order-No.: 914 338

The hydraulic blower fan is only suited for tractors with a Load-Sensing-System or a separate oil circuit. Only by such tractors the implement can be lifted with the aid of the three-point hydraulic at the headlands without disengaging the blower fan drive.

Required on the tractor for the hydraulic blower fan drive:

- 1 double acting control spool valve or
- 1 single acting control spool valve and 1 pressureless return flow, favourably directly into the oil tank of the tractor.

The maximum oil quantity required by the hydraulic ram is approx. 22 l/min.

For driving the blower fan hydraulically, mount the hydraulic motor (12.12/1) auf die onto the blower fan input shaft.

The standardly supplied V-belt pulley (drive for pto shaft with 1000 R.P.M.) must be fitted onto the input shaft of the counter gearbox for the blower fan.
Set the required vacuum

The vacuum depends on the blower fan drive speed. The blower fan drive speed is set by turning the hand wheel (12.13/1) on the pressure valve.

The vacuum depends
  - on the blower fan drive speed.
     - on the kind of seed and the singling discs used.
     - on the number of the sowing units.

Procedure:
- Fill all sowing units with seed.
- Raise the implement.
- Drive the blower fan.
- Turn the drive wheel with the aid of the calibration crank until all naps of the singling discs are covered with seed grains.
- Turn the hand wheel (12.13/1) until the pointer (12.14/1) of the pressure gauge (12.14/2) has reached the green area (12.14/3).
- Secure this hand-wheel setting with the aid of the counter nut (12.14/2).

In case of changing the kind of seed and/or the singling discs or when the number of sowing unit is changed, check the vacuum and readjust, if necessary.
12.12  4 or 6 sprung track mark eradicators

Sprung track mark eradicator – set -  (4 pieces), Order-No.: 917 963
Sprung track mark eradicator – set -  (6 pieces), Order-No.: 922 233

The task of the track mark eradicator (12.15/1) is less the eradication work but mainly the closing of the tractors' wheel marks.

For ED 301 and ED 451 mount the track markers on the main frame (12.15/2) of the Airplanter in such a way that they work in the loose soil about 5 cm aside the right and left hand tractor track and close the tractor track. This way, the best levelling of the tractor track is achieved.

The eradicators can be moved on the entire length of the main frame. The securing bolt (12.15/3) prevents the eradicator from getting lost, if, e. g. the fixing bolt (12.15/4) is slackened. With this securing bolt they cannot fall through the fixing bow (12.15/5). Figures 12.16 to 12.... show different mounting varieties.

Fig. 12.16 4 sprung wheel mark eradicator – mounting variety running wheel ED 451-K

Fig. 12.17 4 sprung wheel mark eradicator – mounting variety running wheel ED 601-K
Fig. 12.18 to Fig. 12.20 6 sprung wheel mark eradicator – mounting variety tractor wheel ED 451-K
Fig. 12.21 to Fig. 12.23 6 sprung wheel mark eradicator – mounting variety tractor wheel *ED 601-K*

**Fig. 12.21**

**Fig. 12.22**

**Fig. 12.23**
12.13 **Terra-tyres 31 x 15,5/15,**  
**Order-No.: 366 800**

Profile XT II 792 mm ø, 368 mm width

The Terra-tyre is especially suited for light soils as it distributes the implement weight to a large contact surface.

**Recommended tyre pressure 1,2 bar.**

12.14 **Wheel scrapers, cpl. (set),**  
**Order-No.: 913553**

(not for ED 601-K)
12.15 Loading board for fertiliser filling, Order-No.: 913 408

At row spacings larger than 75 cm the loading board (12.24/1) can be mounted at the rear of the Airplanter to facilitate the filling of the fertiliser hopper.

⚠️ The loading board may only be used for filling the machine. Travelling on the loading board during transport is prohibited!

12.16 Fertiliser quick emptying device, cpl., Order-No.: 913 535

The quick emptying device of the fertiliser hopper consists of two outlet hoses, fixed to the left hand and righthand side in the fertiliser hopper bottom. With the aid of these hoses, it is very easy to discharge the fertiliser residues inside the fertiliser hopper into a collecting tray placed underneath.

⚠️ For ED 601 this special option is required twice.

Procedure:
- Place sufficiently large collecting trays underneath the ED.
- Remove securing pins (12.25/1) from the hose fixing plate.
- Pull the hose sideways out of the fixing plate and hold the hose end directly into the collecting tray until no fertiliser is coming out any more.
- For the complete fertiliser emptying, please refer to chapter 9.9.
- Replace the hose sideways into the fixing plate and secure with the securing pin.
12.17 Fertiliser filling auger ED

Fertiliser filling auger (Fig. 12.26)
- for ED 301, ED 451 and ED 451-K, Order-No.: 913 407.
- for ED 601, Order-No.: 916 375.
- for ED 601-K, Order-No.: 916 696.

Fertiliser filling auger with 350 l extension for a dust-free fertiliser filling (Fig. 12.27)
- for ED 301, ED 451, ED 451-K, Order-No.: 921 552
- for ED 601-K, Order-No.: 921 553

For an even fertiliser distribution the filling auger is equipped with a two-sectioned settable outlet.

The fertiliser filling auger is driven by the tractors hydraulic system with the aid of the hydraulic motor (12.26/1 or 12.27/1).

For this required on the tractor side:
- 1 double acting control spool valve or
- 1 single acting control spool valve and 1 pressure less return flow, favorably directly into the oil tank of the tractor (only in conjunction with an electric-hydraulic control unit).

With an auger speed of 400 min⁻¹, a good delivery capacity is achieved. For this an oil quantity of approx. 30 l/min. is required from the tractor.

The drive of the filling auger is connected with a hydraulic lowering device. This way a low filling height is achieved.

On tractors with only one oil circuit, it is not possible to operate the hydraulic motor and the three-point hydraulic simultaneously. For lifting the Airplanter, switch off the hydraulic motor drive.

Tractors with a constant high pressure hydraulic system (e.g. John Deere) are not necessarily suited for the operation of oil motors. Observe the recommendations of the tractor manufacturer and for further information, please contact your dealer, your importer or AMAZONE.
12.17.1 How to connect the hydraulic hoses

⚠️ The hydraulic system is under high pressure!

⚠️ When connecting hydraulic rams and engines the described connection of the hydraulic hoses has to be noted!

⚠️ When connecting the hydraulic hoses to the tractor’s hydraulics take care that the hydraulics are pressure less on the tractor as well on the implement side!

12.17.2 Operating the filling auger

- Connect the hydraulic hoses on to the tractor.
- Open the block tap on the hydraulic hose for the filling auger.
- Open the fertiliser hopper cover (12.28/1) of the row fertiliser applicator (only implements without dust-free fertiliser filling).
- Remove the hopper cover (12.28/2) from the filling chute.
- Actuate the control spool valve so that the filling auger is lowered to the filling position (filling height 60 cm).

⚠️ Danger of squeezing! When actuating the control spool valve no body is allowed to stay within the operational range of the filling auger.

- Back up, e.g. to a trailer.
- Swivel the three-way block tap (12.28/3) whereby the drive of the filling auger is switched on.
- Feed the auger via the chute.
- For an even fertiliser distribution in the hopper, adjust the setting flap (12.28/4) if necessary with the aid of the hand lever (12.28/5) (only for implements without dust-free fertiliser filling).
- Empty the filling auger completely.

⚠️ If on machines with a dust-free fertiliser filling the worm auger drive blocks during the filling procedure, the fertiliser hopper is full.

- Swivel the three-way block tap (12.28/3) and thus switch off the drive of the filling auger.
- Close the fertiliser hopper cover again.
- Cover the chute by the hopper cover.

- Actuate the control spool valve so that the filling auger will swivel upwards into the transport position.
- Close the block tap on the hydraulic hose for the filling auger. This way, the lowering device for the filling auger will get locked.

Fig. 12.28
12.17.3 Maintenance and cleaning

After having finished the operation clean the filling auger with water and apply grease to the dry implement.

Procedure:
1. Remove the lower bottom (Fig. 12.29)
   - Slacken the thumb bolts (12.29/1).
   - Turn the bottom part (12.29/2) slightly and remove.
2. Knock on the feeding tube. The fertiliser residue will fall out.
3. If necessary, the worm auger (12.29/3) can be taken out.
   - Remove the split pin (12.30/1) on the hydraulic motor.
   - Pull out the worm auger in downward direction.

Before carrying out any maintenance work, switch off the tractor and remove the ignition key.
12.18  Traffic light kit to the rear,
Order-No.: 431 400

The traffic light kit (12.31/1) can be retrofitted. It consists of a lamp combination for the right and left hand side, a socket for the power supply cable, parking warning plates according to DIN 11030, licence plates and power supply cable.

12.19  Limiting lights front,
Order-No.: 158 301

The limiting lights (12.31/2) can be retrofitted. They consist of 2 lamps on the right and left hand side, parking warning plates according to DIN 11030, and a connection plug for the traffic light kit.

12.20  Airplanter in conjunction with pto shaft driven soil tillage implements

When operating the ED 01 in combination with a rotary cultivator, a rotary harrow or a reciprocaging power harrow, please observe the following points:

1. The soil tillage implement must be provided with a rear pto shaft connection.

2. The speed of the rear pto shaft connection must coincide with one of the blower fan input speeds of the ED (540 min⁻¹, 710 min⁻¹ or 1000 min⁻¹).

3. We recommend the use of a lift frame (AMAZONE-"Liftpack"-System) (12.32/1) for reducing the lifting power requirement with which the Airplanter is lifted up above the packer roller when raising the entire combination (at the headlands).

   In addition a hydraulic height limitation for an adjustable restriction of the lifting height should be available on the AMAZONE “Liftpack” system, so that the pto shaft will not be angled too much when the Airplanter is raised.
4. For fitting the ED to the AMAZONE “Liftpack” system a specified set of “lower link pins for liftpack” is required (Order-No.: 914 476).

Insert these lower link pins (12.32/2) into the welded sleeves of the ED lower linkage (12.32/3).
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