THIS BOOK

The purpose of this book is to enable the Operator to familiarize himself with the combine. It is of utmost importance that the Operator becomes familiar with the structures, adjustments and maintenance of his combine. Compliance with the advice and instructions given in this manual guarantees the best results at the lowest costs.

Have this manual always in the cab, in the special pocket reserved for it, for convenient reference.

This manual provides descriptions of as well as operating and maintenance instructions for several models in the series. Every combine does not have all the described features. The actual structure as well as the number of accessories and optional equipment depend on what was agreed in the delivery contract. This is to be kept in mind when reading the manual.

Item “Technical Specifications” has a description of the features of the combine.
It does, however, not include retro-fitted accessories.

The Manufacturer reserves the right to modify the structure, adjustments or accessories of the combine as well as the service and maintenance instructions without further notification.
CONTENTS

This book 1
Safety Precautions 3
Warning Signs 7
Type Marking 9
Technical Specifications 11
Conformity to the EU Directives 13
Acceptance Inspection 14
Opening of the Guards 15
Structure and Functions of the Combine 20
Cut-away Picture of the Combine 21
Operator Controls and Instruments 24
Key to the Symbols 27
Operation and Adjustment 28
Threshing Equipment 40
Driving and Threshing Instructions 71
Approximate Settings 78
Service and Maintenance 80
Transmission 112
Hydraulics 115
Electrical Equipment 120
Lubrication 129
Summary of Periodical Maintenance Procedures 133
Storage when Not in Use 134
Recommended Tools and Accessories 136
Screw Joints 136
Discarding of the Combine 137
Conversion to Maize Harvesting 138
Conversion to Sunflower Harvesting 143
Conversion to Rice Harvesting 145
SAFETY PRECAUTIONS

Read carefully these instructions on safety and use before starting to operate the combine. Time spent in becoming familiar with the instructions now will save you money or may even spare you from injury.

Before accepting the delivery of the combine, make sure it conforms to the delivery contract.

Do not fit the combine with any accessories not approved of by the Manufacturer. The Manufacturer of the Combine is not responsible for any damage or injury caused by such accessories either to people or property.

1. TRANSPORTATION ON A VEHICLE OR BY RAIL

Make sure you know the measurements and weights of the combine and the transporter. Comply with any regulations governing the transportation.

Use increased tyre pressures (2…2.5 Bar) to improve stability.

Fix the combine securely in the transporter. For road transport lower the cutting table fully or disengage it.

2. DRIVING IN TRAFFIC

When driving on public roads, comply with the relevant statutory traffic regulations.

Remember the combine has rear-wheel steering.

The brake pedals must be latched together. Test brake functions before driving on the road. Brake smoothly as the rear wheels of the combine easily rise from the ground when applying the brakes violently.

The safety switch on the instrument panel must be depressed. (The switch is released to its top-most position by turning the knob clockwise). The threshing equipment must be disengaged, the straw dividers removed and the unloading pipe locked for road transport.

The knife shield and the front warning signs shall be fitted onto the table, if it is permitted to drive on the road with the cutting table engaged. (Fitting of the front warning signs in accordance with the enclosed illustrations, A1).

The front and rear lights and the rear-view mirrors shall be correctly aligned.

Never drive downhill with the gears in neutral.

Never carry passengers on the combine.

Never use the combine for transporting goods.

Always have the grain tank empty when driving on the road.

3. THRESHING

Get familiar with the structure of the combine by studying the manual before starting threshing.

Wear appropriate clothing. Avoid loose clothing that may get caught in moving parts. Keep the doors closed when working to prevent dust and noise entering the cabin. Use of hearing protectors is recommended. Make sure the protective guards are properly attached and in good condition.

Sound the signal to warn people around the combine before starting the engine.

Adjust the rear-view mirrors before starting to ensure good visibility of the road or the working area behind.

Never use the combine for anything but threshing.

Manual feeding of crops onto the cutting table is prohibited.
Before starting, particularly reversing, make sure that everybody nearby is aware of your intentions. Test the brakes as soon as you start, and stop immediately if the brakes or steering operate defectively.

Never adjust the seat or steering wheel while driving. Never leave the cab while the combine is moving. Never leave the engine running unattended. **Do not open the guards with the engine running.** Do not open the safety grate on the grain tank cover with the engine running.

Do not mount, or allow others to mount, on top of the grain tank or the straw walkers with the engine running. Beware of the cutting mechanism and the rotating chopper knife.

Keep in mind that with the chopper rotating, there is a 20 m no-access danger zone behind it. /Fig. A2/ Drive carefully on hillsides; the combine may overturn, particularly with the grain tank full.

The combine cab is no safety cab.

**THE RIGHT-HAND SIDE WINDOW MAY BE USED AS AN EMERGENCY EXIT WHEN THE WEDGED GASKET OF THE WINDOW IS FIRST REMOVED BY PULLING FROM THE LOOP MARKED WITH “EXIT”**.

Note the recommended safety distances when threshing under power lines. **Stop the engine before cleaning or servicing the combine.**

Stop the combine and the engine immediately if there is an alarm or any abnormal sounds or smells. Find out the reason for them, and remove the problem before carrying on with threshing.

**Support or lock the cutting table and the reel before going beneath them.**

Never clean the combine without the proper equipment.

When leaving the combine, lower the cutting table, lock the parking brake, stop the engine and remove the ignition key.

**SAFETY DISTANCES WHEN THRESHING UNDER OPEN-WIRE POWER LINES**

The minimum space between the combine and power lines with voltage must be in accordance with the enclosed illustration, in which the danger zone is darkened.

Low-voltage power lines (240/400V), fig. B3, can be distinguished from high-voltage lines (over 1 kV) by the smaller insulators and the fact that there are usually 4 low-voltage lines.

In case the height or voltage of the power line is difficult to estimate, the Electric Company shall be consulted.

**In Case of an Accident**

If there is an accident despite all precautions, keep calm and consider carefully what to do. First try to reverse the combine away from the power line. If there are other people near, ask them to check that the combine is not stuck in the line.

If the combine is just leaning against the lines, try to
disengage it by driving. Follow the advice from the people nearby. Due to their own safety, they shall stay a minimum of 20 metres from the combine touching the power line.

If the combine cannot be disentangled, and you have to leave the combine, jump down with your feet together in order not to touch the combine and the ground simultaneously. Do not make yourself a conductor through which electricity can pass; the real danger lies in touching the combine and the ground simultaneously.

et away from the combine jumping either with your feet together or with only one foot on the ground at a time. Otherwise the electric field on the ground may create a fatal electric current between your legs. You will be safe at a distance of 20 metres from the combine.

Beware of broken power lines lying on the ground. A combine touching a power line may catch fire. Leave the combine immediately if smoke starts coming from the tyres.

Make sure the combine is guarded at a safe distance. Do not try to get on the combine even if the power in the power lines may seem to have gone off. Remember that open-wire lines never have a “blown fuse”, but they are always dangerous unless made dead by an electrician. Even if the power went off, it may come back on in a while due to technical reasons. This may be repeated several times.

Contact the Electric Company and inform them about the exact site of the accident. By doing this, any risk can be eliminated and the fault repaired.

Ask the Electric Company for advice and follow it. Inform them about any contact with power lines even if there was no actual damage.

Source: Koneviesti Magazine 15/87

4. **REPAIR AND SERVICE**

Always keep the combine in good condition. Check the condition of fast moving parts daily. Pay special attention to the transmission mechanism and the rotating chopper knives. Replace defective parts before they become dangerous.

Make sure that all the guards and other safety equipment are in good condition and mounted before the combine is used.

Clean, repair and service the combine with the transmission and engine off, the ignition key off the ignition and the master switch in its on position.

Disconnect the battery minus cable before repairing the engine or the electrical instruments.

Do not use inappropriate tools to connect and disconnect the battery.

Do not make an open fire or smoke near the battery.

Handle the battery acids with care.

Do not add air in the tyres without a pressure gauge due to risk of explosion.

Do not add coolant with the engine running.

Do not remove the radiator cap from an overheated engine. Do not refuel with the engine running.

Do not smoke while fuelling.
Do not adjust the hydraulic working pressure without a pressure gauge due to possible damage to the hoses. When servicing the hydraulics, be aware of the high pressure in the system. Make sure there is no pressure in the system or in the pressure reservoir before disconnecting the connectors. Never use over-sized fuses; they involve risk of accident. Never start the combine with anything but the ignition key. When refitting a wheel, tighten the fixing screws to the correct torque. Attach accessories such as the trailer using the appropriate equipment. Tow the combine only from designated points.

5. THE LAWS AND REGULATIONS

Combine harvester is a complex device, and dangerous if misused. User manual must always be preserved with the machine at the place reserved for it and if needed, new drivers should be instructed to operate the machine. Different countries have different safety at work and traffic regulations. Get to know the existing regulations of your area. This symbol in the manual refers to a special risk involved in taking a certain measure, due to which extra caution shall be practiced.

6. FIRE SAFETY

Two factors are needed to start a fire: flammable material and ignition; oxygen is always available. Threshing generates a lot of light and highly flammable dust. Therefore it is important to clean the combine on a regular basis and the engine compartment daily. Oil and fuel leaks increase the risk of fire. Repair any defects immediately. High temperature near the exhaust pipe makes the area fire-prone. A fire may also be caused by a short circuit in the electric system, slipping of an overloaded belt, a damaged bearing or overheating of the brakes. Make sure there is at least one 6-kilo class AB fire extinguisher located in its marked place on the combine at all times. In particularly dry and dusty circumstances another similar extinguisher is to be placed near the engine compartment.
MARKING OF THE DANGER POINTS

The structures of the combine have been designed to be as safe to use and service as possible. This manual provides instructions on how to eliminate any risks there may be in the use of the combine. The danger points have been marked on the combine using danger symbols. The following diagram shows the location of the markings. Check regularly that the markings are clearly visible.

On the following page you will find the key to these symbols. The danger symbols are based on the international ISO 11 684 standard.

Location of the Danger Symbols
### DANGER SYMBOLS

<table>
<thead>
<tr>
<th>Danger</th>
<th>How to avoid it</th>
<th>No</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject to danger due to insufficient information</td>
<td>Read the manual before starting the combine</td>
<td>1</td>
<td><img src="symbol1.png" alt="Symbol 1" /></td>
</tr>
<tr>
<td>A raised part may fall down</td>
<td>Support raised parts before going under them</td>
<td>2</td>
<td><img src="symbol2.png" alt="Symbol 2" /></td>
</tr>
<tr>
<td>Gap in belt drive</td>
<td>Stop the engine and remove the ignition key before removing any guards</td>
<td>3</td>
<td><img src="symbol3.png" alt="Symbol 3" /></td>
</tr>
<tr>
<td>Getting entangled in moving parts</td>
<td>Stop the engine and remove the ignition key before removing any guards and/or reaching the danger zone</td>
<td>4</td>
<td><img src="symbol4.png" alt="Symbol 4" /></td>
</tr>
<tr>
<td>Getting entangled in rotating auger</td>
<td>Stop the engine and remove the ignition key before removing any guards</td>
<td>5</td>
<td><img src="symbol5.png" alt="Symbol 5" /></td>
</tr>
<tr>
<td>Getting entangled in rotating auger</td>
<td>Do not reach into an opening with the engine running</td>
<td>6</td>
<td><img src="symbol6.png" alt="Symbol 6" /></td>
</tr>
<tr>
<td>Falling into moving machinery</td>
<td>Stop the engine and remove the ignition key before removing any guards</td>
<td>7</td>
<td><img src="symbol7.png" alt="Symbol 7" /></td>
</tr>
<tr>
<td>Danger caused by hurtling objects</td>
<td>Keep at a safe distance from the combine</td>
<td>8</td>
<td><img src="symbol8.png" alt="Symbol 8" /></td>
</tr>
<tr>
<td>Kickback or upward motion of arm handle</td>
<td>Stop the engine and remove the ignition key before inserting the handle</td>
<td>9</td>
<td><img src="symbol9.png" alt="Symbol 9" /></td>
</tr>
</tbody>
</table>
TYPE MARKING

When ordering spare parts or service, always quote the type marking and number shown on the machine plate of the combine. When ordering parts for the cutting table, also quote the type marking and number shown on the cutting table.

When ordering engine parts, also quote the engine number.

Write down the numbers of the combine and engine on this page (and in the spare parts list).

Combine type plate

Cutting table type plate

Note!
Left side of the combine = The side of the cab with the stairs
Right side of the combine = The side with the fuel tank
## TECHNICAL SPECIFICATION SR 3000
(ISO 6689 standard has been used in measuring)

### Cutting table
<table>
<thead>
<tr>
<th>Cutting width (m)</th>
<th>3.9</th>
<th>4.2</th>
<th>4.5</th>
<th>4.8</th>
<th>5.1</th>
<th>5.7</th>
<th>6.0</th>
<th>6.3</th>
<th>6.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutting height (m)</td>
<td>-0.20…+1.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knife, Number of Strokes</td>
<td>1020 cycles/min</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Reel
| Diameter (m) | 1.05 |
| Speed range RPM | 16...51 (3045C) |
|                 | 0.....50 |

### Threshing Cylinder
| Width (m) | 1.33 |
| Diameter (m) | 0.5 |
| Number of rasp bars | 8 |
| Speed range RPM | 600...1300 MD |
|                 | 400...1150 HD (Maize) |

### Concave
| Area (m²) | 0.62 |
| Angle of wrap | 105° |
| Number of rasp bars | 12 |
| Clearance in front (mm) | 6...42 |

### Straw Walkers
| Number | 6 |
| Separating area (m²) | 5.80 (3045C) / 6.30 |

### Shaker Shoe
| Area 4.10 m² (3045C) | Chaffer 2.10 + 0.40 m² |
| Area 4.50 m² | Chaffer 2.30 + 0.40 m² |
|                 | Sieve 1.6 m² |
|                 | Sieve 1.8 m² |

### Grain Tank
| Volume (m³) | 5.20 6.50 7.60 8.10 |
| Unloading height (m) | 3.75 / 4.0 / 4.40 |

### Engine Sisu Power
<table>
<thead>
<tr>
<th>Engine Sisu Power</th>
<th>SR3045</th>
<th>SR3065</th>
<th>SR3085</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power kW / hp / num.of cyl.</td>
<td>136/185/6</td>
<td>154/210/6</td>
<td>184/250/6</td>
</tr>
<tr>
<td></td>
<td>154/210/6</td>
<td>184/250/6</td>
<td>203/276/6</td>
</tr>
</tbody>
</table>

### Traction Drive
| Hydrostatic |
Driving speed (km/h)*

<table>
<thead>
<tr>
<th>Final drives</th>
<th>CIT</th>
<th>0...6,6</th>
<th>0...5,3 (ger)</th>
<th>4WD</th>
<th>0... 5,8</th>
<th>0... 4,6 (ger)</th>
<th>4WD</th>
<th>0... 8,5</th>
<th>0... 7,0 (ger)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrostatic Traction Drive</td>
<td>II</td>
<td>0...10,7</td>
<td>0...8,8 (ger)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>0... 25</td>
<td>0...20 (ger)</td>
<td>4WD</td>
<td>0... 5,3 (ger)</td>
<td>0... 8,8 (ger)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Speeds may vary depending on the size of the tyres

Turning radius (m) 7,7 (8,0 SR3085)

Tyres / Air pressure (bar)

Front

<table>
<thead>
<tr>
<th>Tyres</th>
<th>Weight limit kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front</td>
<td>10500</td>
</tr>
<tr>
<td>650/65R38</td>
<td>157A8</td>
</tr>
<tr>
<td>650/75R32</td>
<td>172A8</td>
</tr>
<tr>
<td>800/65R32</td>
<td>172A8</td>
</tr>
<tr>
<td>900/60R32</td>
<td>176A8</td>
</tr>
<tr>
<td>1050/50R32</td>
<td>178A8</td>
</tr>
</tbody>
</table>

Rear

<table>
<thead>
<tr>
<th>Tyres</th>
<th>Weight limit kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rear</td>
<td>10500</td>
</tr>
<tr>
<td>380/70R24</td>
<td>125A8</td>
</tr>
<tr>
<td>480/65R24</td>
<td>133A8</td>
</tr>
<tr>
<td>540/65R24</td>
<td>146A8</td>
</tr>
</tbody>
</table>

Wheel track (m)

Front

<table>
<thead>
<tr>
<th>Final drives</th>
<th>Tyres</th>
<th>CIT</th>
<th>rim 18x38</th>
<th>rim 16x38</th>
<th>650/65R38</th>
<th>650/75R32</th>
<th>800/65R32</th>
<th>900/60R32</th>
<th>1050/50R32</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,78 / 2,89</td>
<td>2,68 / 2,99</td>
<td>2,85 / 2,81</td>
<td>2,93</td>
<td>3,03</td>
<td>3,22</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Rear

<table>
<thead>
<tr>
<th>Tyres</th>
<th>380/70R24</th>
<th>480/65R24</th>
<th>540/65R24</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,71</td>
<td>2,61 (2,80 4WD)</td>
<td>2,61 (2,80 4WD)</td>
<td></td>
</tr>
</tbody>
</table>

Volumes (litres) (Oil volumes mentioned in the manual lubrication table)

<p>| Fuel tank | 350 / 450 |
| Coolin system | 36 |</p>
<table>
<thead>
<tr>
<th>Weight (kg)</th>
<th>SR3045</th>
<th>SR3065</th>
<th>SR3085</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without table and chopper</td>
<td>10350</td>
<td>10500</td>
<td>11350</td>
</tr>
<tr>
<td>Cutting table (m)</td>
<td>3.9</td>
<td>4.2</td>
<td>4.5</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>1190</td>
<td>1240</td>
<td>1290</td>
</tr>
<tr>
<td>Chopper weight (kg)</td>
<td>280</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maize table 6 row (kg)</td>
<td>2000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length (m)</td>
<td>SR3045</td>
<td>SR3065</td>
<td>SR3085</td>
</tr>
<tr>
<td>On the road</td>
<td>9.5</td>
<td>9.9</td>
<td>10.4</td>
</tr>
<tr>
<td>Without cutting table</td>
<td>8.0</td>
<td>8.5</td>
<td>9</td>
</tr>
<tr>
<td>In the field</td>
<td>10.9</td>
<td>11.4</td>
<td>11.9</td>
</tr>
</tbody>
</table>

| Width (m) | SR3045 | SR3065 | SR3085 |
| Final drives | Tyres 650/65R38 rim 18x38 | 650/65R38 rim 16x38 | 650/75R32 | 800/65R32 | 900/60R32 | 1050/50R32 |
| CIT | 3.4 / 3.5 | 3.28 / 3.58 | 3.5 / 3.46 | 3.73 | 3.93 | 4.27 |
| With Table (m) | 3.9 | 4.2 | 4.5 | 4.8 | 5.1 | 5.7 | 6.0 | 6.3 | 6.9 | 4.42 | 4.73 | 5.03 | 5.34 | 5.64 | 6.25 | 6.56 | 6.86 | 7.47 |

| Height with cabin (m) | 3.95 |

| Noise level in cabin dB(A) (O. E. C. D.-1967/6) | 80 |

The weighted acceleration subjected to operator's arms does not exceed 2.5 m/s² (ISO-5349)
The weighted acceleration subjected to operator's body does not exceed 0.5 m/s² (ISO-2361)
CERTIFICATE ON CONFORMITY TO THE EU DIRECTIVES

Manufacturer
Sampo-Rosenlew Ltd
Konepajankanta 2A, P.O.Box 50
28101 Pori Finland

Collector of technical specification
Kalle Parkö
Sampo-Rosenlew Ltd
Konepajankanta 2A, P.O.Box 50
28101 Pori Finland

Declares that the machinery placed on the market:

Combine Harvester

Type: __________________________

Serial Number: __________________________

complies with the technical requirements specified in the:

2006/42/EC machinery directive
97/68/EEC engine emission directive
89/336/EEC electromagnetic compatibility

The machinery has been designed in conformity with the following international standards:

SFS-EN 632-1995 Combine harvesters and forage harvesters, Safety
EN-ISO 14121-1 Safety of machinery. Risk assessment
EN-ISO 14982-1998 EMC acceptance criteria

29.12.2009 Pori

Jari Priihti
Managing Director
Sampo Rosenlew Ltd
ACCEPTANCE INSPECTION AND GETTING STARTED

The combine leaves the factory packaged in an appropriate way to ensure undamaged delivery. Before using the combine, the following measures shall be taken:

- Read the instruction manual carefully.
- Remove any loose parts stored in the grain tank.
- Check the combine for any transport damage or lost parts. (If necessary, contact the dealer or the transport company.)
- Make sure the combine complies with the purchase contract. (If necessary, contact the dealer.)
- Attach any parts removed before shipment such as lamps, mirrors, etc.
- Put the fire extinguisher in its place.
- Check the oil and coolant levels.
- In case the combine has been stored for over a year, perform annual service according to the manual.
- Check and lower tyre pressures to comply with the manual.
- Make sure the threshing mechanism can rotate unhindered and that there are no foreign objects inside the combine before starting the engine.
- Engage the cutting table if delivered disengaged.
- Assemble, fit and adjust the straw dividers as shown in the drawings in the spare parts catalogue.
- Fit the crop lifters as instructed in the manual.
- Test-run the combine as instructed in the manual under "Storage when Not in Use".

IMPORTANT NUMBERS

Check and write down the following numbers:

The combine serial number

The cutting table serial number

The engine serial number

The cab key number

The fuel tank key number
OPENING OF THE GUARDS

The C Model
To ensure safety, the movable guards in the combine have been equipped with a locking device. They cannot be opened without the appropriate tool supplied with every combine, hanging on a hook on the back wall of the cab. (The guards can also be opened with a 13 mm socket wrench or a screwdriver.) The guards get locked automatically when closed. Some guards also have additional clamps.

Unlock the guard at the left end of the cutting table by turning the locking device counter-clockwise. To open the guard, pull the handle outwards and lift the guard slightly upwards at the same time. Fig. B1a.

Unlock the belt drive guard on the reel by turning the locking device counter-clockwise. The rubber clamps need to be opened first. The guard is kept open by means of a gas spring. Fig. B1a.

The side guards, fig. B2a, are released by placing the tool in the hole at the lower part of the guard and turning counter-clockwise. The guard opens when the lower edge is pulled outwards. The guard rests on the gas springs. The guard is locked automatically when closed.
OPENING OF THE GUARDS

The L Model
To ensure safety, the movable guards in the combine have been equipped with a locking device. They cannot be opened without the appropriate tool supplied with every combine, hanging on a hook on the back wall of the cab. (The guards can also be opened with a 13 mm socket wrench or a screwdriver.) The guards get locked automatically when closed. Some guards also have additional clamps.

Unlock the guard at the left end of the cutting table, fig. B1b by turning the locking device counter-clockwise. To open the guard, pull the handle outwards and lift the guard slightly upwards at the same time. The guard gets locked automatically when closed.

The side guards, fig. B2b, are released by placing the tool in the hole at the lower part of the guard and turning counter-clockwise. The guard opens when the lower edge is pulled outwards. The guard rests on the gas springs. The guard is locked automatically when closed.

Depending on the specification the lower guards on the combine may open. The front and rear of the guard can be opened separately. First open the top guard as instructed above. After that the front of the lower guard is opened by unlocking the front of the guard using the tool. Fig. B2c. To open the rear, release the catch at the rear of the guard. There is space for a tool kit on the left behind the front guard.
The rear guard of the chopper, fig. B3, (straw spreader) is released by opening the side locks on both sides of the combine. The guard gets locked in the upper position. When the guard is lowered, make sure the guard gets locked at the required height on both sides.

The locking on the rear door to the straw hood, fig. B3, is released by placing the tool in the hole at the lower part of the guard and turning counter-clockwise. The guard opens upwards and rests on the gas springs.
The locking on the guard on the engine air intake is opened by placing the tool in the hole on the rear corner of the guard and turning counter-clockwise, fig. B4.

The top door to the straw walker compartment is locked with a hexagonal screw.

Open the locking on the fixed grain tank cover, fig. B5, by placing the tool in the hole and turning counter-clockwise.

Depending on the specification, there may be a cover above the engine compartment that can be opened. Open the cover like this:

- Unlock the rear locks on both sides of the cover using a tool and turn the rear cover on top of the top cover. Fig. B6.
- Push the top cover forward so that the rolls go all the way into the locking notch. The cover folds up from the middle.
STRUCTURE AND FUNCTIONS OF THE COMBINE

Standard Threshing Mechanism

The cutting and feeding equipment take the crops in for threshing.

The straw dividers limit the crop to be cut and bring it within reach of the reel.
The reel, together with the crop lifters, lift up the laid-down crop up and take it from the cutting knife onto the table auger.
The table auger gathers the cut crop and feeds it onto the crop elevator, which takes the crop forward to be threshed. Stones and other heavy objects are pushed to the stone trap thus preventing damage to the threshing mechanism.

The threshing mechanism separates the grains from the straw.

The threshing cylinder beats the grain off on the concave. Most of the threshed grain and chaff go through the concave into the grain pan.
The rear beater and the concave extension take the threshed straw onto the straw walkers.

The separating and cleaning equipment sieves the grains.

The straw walkers separate the grains from the straw and eject the straw out to the field from the rear of the combine. The grains run along the bottom grooves to the grain pan.
The grain pan takes the threshed material to the shaker shoe. The chaff and any light remains are sorted topmost in the grain pan with the grain at the bottom.
The air stream from the fan lifts the light chaff in the air and transports it over the shaker shoe and out of the machine. Heavier grains and any partly threshed material fall through the chaff sieve. Any larger remains move out along the sieve. Clean grain falls onto the grain auger through the grain sieve and is transported from there by the grain elevator and filling auger to the grain tank.
The grains and occasional straw bits, which lie on the shaker shoe extension, fall to the returns course to be re-threshed.

The chopper cuts and spreads the straw.

After the straw walker, the straw is either discharged uncut onto the field or taken to the chopper, which cuts and spreads it out.
STRUCTURE AND FUNCTIONS OF THE COMBINE,

The TS Threshing Mechanism

The cutting and feeding equipment take the crops in for threshing.

The straw dividers limit the crop to be cut and bring it within reach of the reel. The reel, together with the crop lifters, lift up the laid-down crop up and take it from the cutting knife onto the table auger. The table auger gathers the cut crop and feeds it onto the crop elevator, which takes the crop forward to be threshed. Stones and other heavy objects are pushed to the stone trap thus preventing damage to the threshing mechanism.

The threshing mechanism separates the grains from the straw.

The cut crop first comes onto the pre-cylinder, which gently separates the most easily threshable grains and ejects them through the pre-concave to the front of the grain pan. The pre-cylinder also evens out the feed onto the main cylinder. The rest of the grains are threshed off by the main cylinder and concave. Most of the threshed grain and chaff go through the concave into the grain pan.

The rear beater and the concave extension take the threshed straw onto the straw walkers.

The separating and cleaning equipment sieves the grains.

The straw walkers separate the grains from the straw and eject the straw out to the field from the rear of the combine. The CSP ruffling drum placed above the straw walkers intensifies the separation of loose grains from the straw by opening a fluffier area into the straw flow. The grains run along the bottom grooves to the grain pan. The grain pan takes the threshed material to the shaker shoe. The chaff and any light remains are sorted topmost in the grain pan with the grain at the bottom. The air stream from the fan lifts the light chaff in the air and transports it over the shaker shoe and out of the machine. Heavier grains and any partly threshed material fall through the chaff sieve. Any larger remains move out along the sieve. Clean grain falls onto the grain auger through the grain sieve and is transported from there by the grain elevator and filling auger to the grain tank. The grains and occasional straw bits, which lie on the shaker shoe extension, fall to the returns course to be re-threshed.

The chopper cuts and spreads the straw.

After the straw walker, the straw is either discharged uncut onto the field or taken to the chopper, which cuts and spreads it out.
CUT-AWAY PICTURE OF THE COMBINE, the TS Threshing Mechanism

1. Pick-up reel
2. Cutter bar
3. Table auger
4. Crop elevator
5. Stone trap
6. Threshing cylinder
7. Concave
8. Rear beater
9. Fan
10. Grain pan
11. Grain elevator
12. Auger housing
13. Shaker shoe
14. Return auger
15. Sieves
16. Sieve extension
17. Straw walkers
18. Straw alarm
19. Straw chopper
20. Pre-cylinder
21. Pre-concave
22. Unloading auger
23. Bottom augers
24. Filling auger
25. Grain tank
26. Engine
27. CSP
OPERATOR’S CONTROLS AND INSTRUMENTS, Standard Cab

Operator’s Platform / Cab (fig. D1a)
A Table Height Indicator
B Hand Brake
C Multi-function Lever
D Steering Wheel
E Control Lights
F Brake Pedals
H Instrument Panel
I Gear Lever
J Traction Speed Control Lever
L Concave Adjustment Wheel (if manual)
N Seat
M Buddy Seat
O Quick stop of the cutting table

Instrument Panel (fig. D2a)
A Control Lights, function state
B Control Lights, alarms in the threshing mechanism
C Control Lights, engine and hydraulics
D Table Pressure Indicator
E Safety Switch
F Alarm Light
G Grain Tank Control Light
H Thermometer
I Fuel Gauge
J Electric Outlet
K Throttle Lever (depending on the engine type)
L Fuse Boxes
M Speedometer for Cylinder and Fan Rotation
N Speedometer and Hour Meter
O Ignition Signal and Engine Malfunction Light
P Ignition Lock, Starter / Stopper (dep. on engine)
R Concave Clearance Indicator
S Stop Lever (depending on the engine type)
T Ashtray

Switches (fig. D3a)
A Flasher, Head Lights, Dip Switch / Full Beam
Flasher, Horn / Tank Full Alarm Reset
B Traction Speed Lever and Multi-function Lever
C Speedometer Display Mode for Cylinder / Fan
D Safety Switch
E Rotating Flasher (optional)
F Emergency Flasher
G 4WD Switch (optional)
H Cylinder Speed Adjustment
I Fan Speed Adjustment
J Concave Clearance Adjustment (if electric)
K Front Working Lights
L Rear Working Lights
M Electric accelerator (depending on the engine type)
N Cutting Table Start/Stop
O Threshing Mech. Start/Stop
P Reel Speed Automatic Switch (optional)
R Unloading Start/Stop
S Direction of Straw Chopper Spray
U Tank Cover Lift (optional)
V Vertical Knife, left (optional)
W Vertical Knife, right (optional)
X Reversing of Cutting Table and Feeding Mech.
Y ET engine faulty code
OPERATOR’S CONTROLS AND INSTRUMENTS, De-luxe Cab

Operator’s Platform / Cab (fig. D1b)
A  Table Height Indicator
B  Multi-function Lever
C  Steering Wheel
H  Brake Pedals
F  Instrument Panel
E  Gear Lever
D  Traction Speed Control Lever
G  Seat
I  Buddy Seat
J  Concave Clearance Indicator

Instrument Panel (fig. D2b)
A  Thermometer
B  Fuel Gauge
C  Tank Cover Lift
D  Reversing of Cutting Table and Feeding Mech.
E  Concave Clearance Adjustment
F  Concave Clearance Adjustment
G  Direction of Straw Chopper Spray
H  Direction of Straw Chopper Spray
I  Working Lights
J  Working Lights
K  Safety Switch
L  Emergency Flasher
M  Rotating Flasher
N  Vertical Knife, left (optional)
O  Vertical Knife, right (optional)
P  4WD Switch (optional)
Q  Engine faulty code
R  Main switch
S  Electric Outlet
T  Ignition Lock, Starter / Stopper

Switches (fig. D3b)
A  Traction Speed Control Lever
B  Cutting Table Start/Stop
C  Threshing Mech. Start/Stop
D  Fan Speed Adjustment
E  Electric accelerator (depending on the engine type)
F  AHC/DHC
G  AHC Pre-setting height
H  AHC Automatic height
I  Armrest angle adjustment
J  Cylinder Speed Adjustment
K  Reel Speed Automatic/ Manual
L  Cover
M  Unloading Start/Stop
OPERATOR’S CONTROLS AND INSTRUMENTS, the C model (STD Cabin)

Operator’s Platform / Cab (fig. D1c)
A Table Height Indicator
B Hand Brake
C Multi-function Lever
D Steering Wheel
E Control Lights
F Brake Pedals
H Instrument Panel
I Gear Lever
J Traction Speed Control Lever
L Concave Adjustment Wheel (if manual)
N Seat
M Buddy Seat
O Quick stop of the cutting table

Instrument Panel (fig. D2c)
A Control Lights, function state
B Control Lights, alarms in the threshing mechanism
C Control Lights, engine and hydraulics
D Table Pressure Indicator
E Safety Switch
F Alarm Light
G Grain Tank Control Light
H Thermometer
I Fuel Gauge
J Electric Outlet
K Throttle Lever (depending on the engine type)
L Fuse Boxes
M Speedometer for Cylinder and Fan Rotation
N Speedometer and Hour Meter
O Ignition Signal and Engine Malfunction Light
P Ignition Lock, Starter / Stopper (dep. on engine)
R Concave Clearance Indicator
S Stop Lever (depending on the engine type)
T Ashtray

Switches (fig. D3c)
A Flasher, Head Lights, Dip Switch / Full Beam
Flasher, Horn / Tank Full Alarm Reset
B Traction Speed Lever and Table and Reel Height
C Speedometer Display Mode for Cylinder / Fan
D Safety Switch
E Rotating Flasher (optional)
F Emergency Flasher
G 4WD Switch (optional)
H Cylinder Speed Adjustment
I Fan Speed Adjustment
J Concave Clearance Adjustment (if electric)
K Front Working Lights
L Rear Working Lights
M Electric accelerator (depending on the engine type)
N Cutting Table Start/Stop
O Threshing Mechanism Start/Stop
P Reel speed automatic switch (optional)
R Unloading Start/Stop
S Reel Speed Adjustment
T Reel Fore and Aft Adjustment
U Swinging of Unloading Pipe
V Vertical Knife, left (optional)
W Vertical Knife, right (optional)
X Reversing of Cutting Table and Feeding Mech.
Y ET engine fault code
SIGNS AND SYMBOLS

Ignition Lock
Master Switch (electric)
Ignition Signal
Stop Lever
Oil Warning Light
Alternator Warning Light
Engine Revolutions, lever control
Engine Revolutions, electric control
Gear Change Diagram
Horn
Flasher
Dip Switch
Headlights
Working Lights
Windscreen Wiper
Temperature Control
Air Conditioning
Hand Brake
Cutting Table Height
Cutting Table Side Tilt
Reel Height
Threshing Mechanism Switch
Speed Control Lever
Cutting Table Switch
Grain Tank Unloading Switch
Threshing Cylinder Speed

Concave Clearance Adjustment
Reel Fore & Aft Control
Reel Speed Control
Air Volume Speed Control
Air Direction Control Lever
Reversing Switch of Cutting Table
Four-wheel Drive
Rotating Flasher
Emergency Flasher
Swinging of Unloading Pipe
Lifting of Grain Tank Cover
Grain Tank ½ Full
Grain Tank Full
Grain Elevator Alarm
Bottom Auger Alarm
Return Auger Alarm
Straw Alarm
Coolant Temperature Alarm
Straw Guide for Chopper
Straw Guide for Long Straw
Air Filters Blocked
Hydraulic Filter Blocked
Hydraulic Oil Too Hot
Emergency Exit
Engine Malfunction Light
Reel automatic / manual
OPERATION AND ADJUSTMENT

Operation Hierarchy of Electrical Controls.
The connection of the electrical controls meets the safety requirements set on the machine. In the following descriptions you can read on which conditions each operation can be started.

Engine Start-up:
The main power switch is in the “on” position
The traction lever is in its med-position and pushed into the notch on the right (If STD cabin).
The stopped is depressed (if there is a mechanical stopper)

Start-up of the Threshing Mechanism:
The engine is running
The safety clutch is pulled up
The chopper gets switched on = the pressure sensor in the chopper connection cylinder connects the drive current (if the straw plate is turned to the “to the chopper” position)
If yellow switch is left up, it must be pushed down and then lifted up again.

Chopper Start-up:
Will start when the threshing mechanism is started if the limit switches in the straw guide plate connect the drive current

Cutting Table Start-up:
The threshing mechanism is running = the pressure sensor in the connection cylinder of the threshing mechanism connects the drive current
The quick-stop pedal on the cutting table “activated” = pressed for the second time after stopping (If STD cabin)
If yellow switch is left up, it must be pushed down and then lifted up again.

Reel Start-up:
Will start when the table is started
The operation requires that the pressure sensor on the table clutch connects the drive current

Vertical Knife Start-up:
Will start when the table is started, if the knife is switched on by the control switch.
The drive current is supplied by the cutting table electric control.

Start-up of Feed Equipment Reverse:
The engine is running
Voltage in the charging generator has increased
The cutting mechanism has been disengaged

Start-up of Unloading:
The engine is running
The safety clutch is pulled up
The unloading pipe is raised to its top position = the limit switch connects the drive current (STD cabin)

Swinging of the Unloading Pipe:
The engine is running
The control light indicating low engine oil pressure (STD cabin) or charging (De-luxe cabin) has gone off
The safety clutch is pulled up

Lifting and Lowering of the Cutting Table, Lifting and Lowering of the Pick-up Reel, Adjustment of Reel Distance, Cutting Table Side Tilt:
The engine is running
The control light indicating engine oil pressure (STD cabin) or charging (De-luxe cabin) has gone off

Adjustment of Pick-up Reel Speed:
The cutting table is running (The pressure sensor in the table clutch connects the drive current)

Chaff Spreader Start-Up:
Will start when the threshing mechanism is started

Rotating Light
0, automatic and “on” position. When automatic, light rotates when grain tank is half loaded.
STEERING WHEEL Position Can Be Adjusted (Triple Adjustment Steering Column) (STD cabin)
To adjust the steering column tilt and height, depress pedal A. After the adjustment, release the pedal, which will be automatically locked. Move the column forward or backward as required. The adjust the tilt of the steering wheel, release the locking by turning lever B counter-clockwise. After the adjustment, turn lever B clockwise until it is tight enough. Fig. K1.

Double Adjustment Steering Column (K1b) (Deluxe cabin)
To adjust the steering column angle, depress pedal A and tilt the whole column forward or backward. To adjust the height of the steering wheel, loosen locking B. After the adjustment tighten locking screw B. To change the lever position, pull the whole lever outwards and turn to the right position.
OPERATOR’S SEAT Adjustments
Spring Suspended Grammer Seat (fig. K2a)
To adjust the fore and aft position, release lever A under the seat and move the seat to the required position.
Adjust the height by raising the seat manually. There are three alternative heights at 20 mm intervals. When the seat is raised above the highest position, it will drop to the lowest position.
Adjust the suspension to suit the operator’s weight by turning adjustment screw B. The screw tightens when turned clockwise.
Adjust the backrest angle by releasing lever C and turning the backrest.
Adjust the armrest angle by turning hand wheel D under the armrest (STD cab) or behind armrest (De luxe-cab). The height of the armrest can be adjusted by moving its fixing point.

Air Suspended Grammer Seat (fig. K2b)
To adjust the fore and aft position, release lever A under the seat and move the seat to the required position.
To adjust the height, raise adjustment lever B briefly after being seated. The seat will be automatically adjusted to suit the driver’s weight. From this position the seat can be moved up and down by turning the adjustment lever in the required direction.
Adjust the suspension to suit the weight of the operator by turning screw C.
To adjust the backrest angle, release lever F and turn the backrest.
To adjust the lumbar support, turn hand wheel G. Adjust the armrest angle by turning hand wheel H under the armrest (STD cab) or behind armrest (De luxe-cab). The height of the armrest can be adjusted by moving its fixing point.
BRAKES (fig. K3) While Driving and Turning
The brakes operate on the front wheels through the drive shafts. They may be used separately as steering brakes by releasing locking pin A. When driving on the road, the brake pedals must be latched together.

HAND BRAKE (fig. K5)
The hand brake operates on the intermediate shaft of the gears. Use the brake only when parking, and fully release it before starting. A flashing light on the instrument panel (STD cab.), Buzzer (De luxe cab.) and a steady symbol light warn of an unreleased parking brake. Those lights are on only when ignition is switched on.

Drive Lever (K6)
Combines speed and direction is controlled with a drive lever.
Lever handle height (STD cab.) and position can be adjusted to suit the driver.
To adjust the height, loosen screws A and move the lever up or down. When adjusting the height, ensure that the electric cables slide inside the pipe and through the bottom joint. If necessary, open the protective case at the bottom end of the lever.
To adjust the lever position, slacken nut B and turn the lever in the ball-and-socket joint.
Tighten the screws and the nut after adjustment to ensure the lever will not move while driving.
TRANSMISSION

Hydrostatic Transmission has Three Speed Ranges (fig. K7)

Engine power is transmitted to the hydraulic pump by means of gearing. Transmission from the pump onto the hydraulic motor of the gearing takes place by means of liquid. Pump output is adjusted steplessly on a drive lever between position 0 and the maximum +/-.

There are three gear speed ranges, which are selected using lever A, fig. K7. Ranges 1 and 2 are for threshing and range 3 for driving on the road. Never use range 3 on the field. Gears should be changed on level ground with drive lever B, fig. K7, in its mid position.

Transmission is hydraulically eased. The front of knob A has a switch, which is pressed to open the gear lock hydraulically. The engine must be running to provide pressure in hydraulics!

The speed and direction of the combine are controlled using lever B, fig. K7. With the lever in its mid position the combine is stationary if the gear is on and the engine running.

The combine will move forward when the drive lever is pushed forward from its mid position. The further the lever is pushed the higher the speed.

To reverse the combine, pull the lever backward from the mid position.

A combine equipped with hydrostatic transmission must never be parked using only the gear, but the parking brake must always be engaged. A hydraulic engine cannot keep the combine stationary for any length of time.

Shift the gear into neutral to enable towing, if the engine cannot be started for some reason. (In case of eased gearboxes the gear lock prevents the shifting of gear into neutral.)

3. Optional FOUR-WHEEL DRIVE (fig. K8)

The combine is equipped with assistant four-wheel drive. There is hydraulic parallel connection between the rear and the front wheels. When using speed range 2, the front and the rear wheels drive in relation to the axle weight. Due to the parallel connection the peripheral speeds of the wheels adapt to different driving conditions even within speed range 1. Rear-wheel drive is switched on electrically using switch on the instrument panel, fig. K8 (see operator’s controls and instruments page 24-26) The coupling can be done with the combine moving.

Four-wheel drive may be used in speed ranges 1 and 2 only.

When towing the combine, four-wheel drive must be off and the engine running to allow the wheel motors to be disengaged.

Switch four-wheel drive off when driving down a steep hill. The combine may rush forward unless the rear wheels grip the ground.
Starting the ENGINE with the Ignition Key (fig. K9)
The combine is equipped with a safety ignition system, which prevents the combine from moving when the engine is being started. It allows the start-up to take place only with the traction speed control lever in neutral pressed into the slot on the right. (only STD cab.)

It is advisable, however, always to start the engine with the gear in neutral.

Engines Equipped with a Mechanical Regulator, Fig. K9

Have throttle A in idling position 1, fig. K9, and stopper B pressed down (models equipped with it). Turn the ignition key to the right. The ignition is switched on and the alternator and oil pressure warning lights come on. When turning the ignition key farther to the right, to position HS, the engine starts.

In case the engine does not start, turn the ignition key to position O before restarting. With the throttle in position 2 (far front), the engine runs at full revolutions.

Cold Weather Starting in Freezing Temperatures

Turn the ignition key to ignition position H for some 20 seconds. (Ignition signal C, fig. K9a, is on when the device is working.) Now start in position HS. If the engine has not started within 10 seconds, ignite again for some 15 seconds.

Electrically Controlled Engines, Fig. K9a

Electrically controlled engines have no throttle lever but a throttle control switch with three positions. On idle the switch rear is depressed. Fig. K9a.

The power is switched on by turning the ignition key to the right. The alternator and oil pressure warning lights will come on.

To start turn the key to position HS. Do not start until the lights have come on. It takes some time to activate the control unit.

Cold weather starting at below +5°C

The engines are equipped with a pre-heating resistance controlled by the engine control unit. In cold weather it functions automatically. When pre-heating switches itself on, control light C, fig. K9a, comes on. Start the engine as soon as the control light goes off. After the engine has started, the heater switches itself on again for some time.

Fault Codes on Electrically Controlled Engines

Engine malfunction light E or F, fig. K9a, functions as a fault code indicator for the engine control unit. For more information, see the engine manual. To activate code inquiry, press button next to ignition lock with a pin as soon as the power has been switched on (std cab.). In De luxe cabin press switch F fig. K9a.

The ignition lock allows only one start-up function. Turn the key to the “STOP” position before restarting.

Combines with hydrostatic transmission must not be started in temperatures below –15°C as the oil is too stiff and the machinery may get damaged.
Stopping of the ENGINE (fig. K9) / Listening to the Radio

Before stopping the engine, move the throttle into the idling position and disengage the threshing mechanism. On models with a manual stopper, the stopper is pulled up to the STOP position. Models not equipped with an electric stopper are stopped by turning the ignition key to the STOP position. In order to listen to the radio with the engine not running, turn the ignition key left from the STOP position while pressing the key down.
STAIRS Can Be Turned Under (fig. K10)

The stairs to the cab can be turned away from their normal position between the front wheel and the cutting table, as follows:

Turn handle A to upright position. Twist and lift the handle to release the locking. Turn the stairs against the stop and lock them.

De Luxe Cab (fig. K10a)

The stairs can be turned forward to the front of the wheel to reduce combine width. They can be turned standing on the ground by lifting locking lever A. The turn can also be done standing on the cab landing by lifting knob B to release the locking.

The stairs shall always be turned forward when the combine is driven on the road without the cutting table.

MASTER SWITCH (fig. K11) Controls Electricity for the Whole Combine

There is a master switch to control the electrical equipment of the combine. It is located on the left-hand side, on the rear guard. The switch is in the +cable going to the start-up. The current is connected in position 2. To disconnect the current, turn the switch to position 1, in which position the key may be removed.

Electrical Master Switch

Depending on the specification the switch may also be electrically controlled (Optional). The switch is located between the battery and the frame. The operating switch is in the cab (see pages 24-26). The switch disconnects current to all other electrical devices except to its own control circuit.
CAB (fig. K12) Fresh-air Fan Provides Good Ventilation

The 4-speed fan is started using switch A. To change the airflow direction, turn nozzles 1 at the front top of the cab. Air coming into the fan is taken through detachable coarse mesh and fine filters.

To keep up the fan capacity and to secure the purity of the air, the filters have to be cleaned daily and replaced often enough to prevent harmful impurities and fungi from clogging the filters. In dusty conditions it is necessary to clean the coarse mesh filter several times a day.

By opening nozzles 2, cab indoor air can be circulated through the fan, which reduces the need for outdoor air and thus reduces the risk of blocked filters.

The windscreen wiper is controlled by switch B. Cover D can be removed and a radio set installed in the space.

HEATER Provides Additional Heat from the Engine

The air in the cab is heated by a heating element in which the engine coolant circulates. Turn switch E to the right to increase the amount of coolant circulating in the element. This will increase the temperature in the cab. Open nozzles 2, fig. K12, to re-circulate the heated cab air. This will further increase the temperature in the cab.

AIR CONDITIONER Cools the Air in the Cab

The cab can be equipped with an air conditioner system. Turn switch C to the right to switch on and regulate the cooler. Open nozzles 2 to re-circulate the cooled cab air, which will further cool down the cab.

Note! A difference of over 8°C between indoor and outdoor temperatures is harmful to your health.

Keep the cab door closed when the air-conditioning is on.
TOWING (figs. K14 and K15) Allowed from Towing Points Only
The combine may be towed from designated points only. When towing forward, the towline is hooked to the link on the front axle, fig. K14. When towing backward, wind the towline round the rear carrier, fig. K15. The towline must not be wound round the rear axle.
With the combine on tow, the operator must be in the cab and the engine running to enable steering. The brakes must be latched together and the gears in neutral. Four-wheel drive must be off.

Unless the engine can be started, the combine must be towed with great care; without power steering engaged, the combine is slow and heavy to handle.

When towing on the road, statutory traffic regulations must be followed.

Correct LIFTING of the Combine (figs. K14 and K15)
The combine may be lifted using the designated points only. It shall be lifted on level, sturdy ground. The grain tank shall be empty. The lifting capacity of the jack shall be a minimum of 10 tons. If an ordinary jack is used to raise the combine, a sufficiently high and firm, one-piece platform with an area of a minimum of 300 x 300 mm is to be placed underneath the jack.

Before the lift, the combine must be immobilized by placing wedges in front of and behind the wheels on the ground.

Use a sturdy trestle to secure the combine in its raised position.

If several wheels are to be removed at the same time, the ground surface of the trestles is to be a minimum of 600 x 600 mm.
TABLE TRAILER (figs. K16, K17 and K18) for Road Transport of Wide Cutting Tables

The need for a table trailer depends on farm conditions. The trailer may be necessary for a 3.9 m and 4.2 m cutting table if transportation is necessary on busy, narrow roads. Cutting tables 4.5 m and wider should always be transported on a trailer in order not to inconvenience traffic and risk the safety of road users.

The trailer has no traction unit, but shall be towed attached to the combine. No other cargo except for a cutting table must be transported on the trailer, nor must any other attachment except for the trailer be hooked to the combine towing hook. In case the trailer is attached to another traction unit, a tractor, for example, the attachment shall be made in accordance with the instructions, and the statutory traffic regulations shall be followed.

Placing the Table on the Trailer

Disengage the table from the combine as instructed in paragraph “Removing the Table”. Connect hoses for reel drive and reel horizontal movement to each other. Protect the other connectors with rubber cups.

Place the trailer on level ground and align its frame with the ground by adjusting the cam wheel. Pull locking pins A into their open position, fig. K16.

Remove the straw dividers from the table and place them on the brackets on the trailer. Depending on the type of dividers, the brackets are either at the front or the back of the axle. Lock the dividers with ring cotter and/or locking pivot B, fig. K16. When needed, adjust the guides of the adjustable divider in a narrower position so that the table bottom does not touch the divider.
Drive the table above the trailer from the left-hand side so that the knife is level with the trailer marking sticks and brackets A at the rear of the table, fig K17, are between carriers B. Lower the table slowly. Make sure the table is positioned correctly: Reverse slowly so that the rear end of the table is against both the carrier limiters. Lower the crop elevator further so that it becomes disengaged from the cutting table and back up the combine with caution. Raise the crop elevator as soon as possible. Push the rear locking pins into their locking position. The trailer is equipped with a winch, which can be used to pull the trailer to the combine hook after the combine has been reversed near the trailer. Hook the trailer to the combine and plug in the electric cable. Place the winch on the axle (fig17b), hook the table with the winch and tighten.

**Attaching of the Cutting Table to the Combine**

is done in reverse order. In case the trailer must be left on the road temporarily, place appropriate warning signs. Connect hydraulic hoses and the PTO shaft, Fig. K18. Tighten hydraulic hose fittings all the way to the bottom. If there is pressure in the hoses, a spanner may be needed. However, the fittings do not need to be tightened to any certain torque.

**Trailer on Tow**

Extreme caution shall be exercised when towing the trailer. The total length of the vehicle is approx. 16 m, so turning the vehicle requires space. Do not turn the rear wheels to their extreme position as the trailer arm may touch the rear wheel and the vehicle will get stuck. However, if this is the case, back up the combine and use the steering brake at the same time. Reverse very carefully. Watch the trailer movements in the mirror.
THRESHING EQUIPMENT

SAFETY SWITCH

There is a safety switch on the instrument panel (See pages 24-26) It must be in its top-most position before any mechanisms can be switched on. (It will rise when the knob is turned clockwise.)

When the safety switch is pressed, all engaged mechanisms (threshing, chopper, cutting table and unloading) stop.

The safety switch also stops the reversing of the feeding equipment.

The unloading pipe cannot be turned with the safety switch pressed. The switch must always be depressed when driving on the road!

WARNING LIGHTS and CONTROL LIGHTS (fig. L1) warn (STD Cabin)

There are control lights on the steering column to indicate the mode of combine functions. They are divided into three groups depending on their functions:

A
- Charging not working
- Engine oil pressure too low
- Engine overheated
- Air filter blocked
- Hydraulic liquid overheated
- Blockage in hydraulic filter

B
- Blockage in the grain elevator
- in the bottom return auger
- in the vertical return auger
- in the chaff hood
- Unload. pipe between its extreme pos.

C
- Grain tank ¾ full
- Grain tank full
- Max. height exceeds 4 m
- Hand brake engaged
- Straw guide for chopper
- Straw guide for long straw
- Flasher
- Head lights

*) In case of alarm, blinking red light, blinks above the instrument panel, and a light on the signal panel indicates the source of alarm.

**) Orange light indicates a full grain tank
WARNING LIGHTS and CONTROL LIGHTS (fig. L2) warn (De luxe Cabin)

There are control lights on the right A-pillar to indicate the mode of combine functions.

- **A**: Charging not working
- **B**: Engine oil pressure too low
- **C**: pre-heating
- **D**: Engine alert light
- **E**: Engine overheated
- **F**: Air filter blocked
- **G**: Hand brake engaged
- **H**: Head lights
- **I**: Flasher
- **J**: Blockage in hydraulic filter
- **K**: Hydraulic liquid overheated
- **L**: Max. height exceeds 4 m
- **M**: Unload. pipe between its extreme pos.
- **N**: 4WD switched on
- **O**: Straw guide for chopper
- **P**: Blockage in the grain elevator
- **Q**: Blockage in the bottom return auger
- **R**: Straw guide for long straw
- **S**: Blockage in the vertical return auger
- **T**: Blockage in the chaff hood
- **U**: Grain tank full
- **V**: CSP alarm
- **W**: Cutting table heavily on ground
- **X**: Grain tank ¾ full
- **Y**: Hour Meter

**Instruments (fig. L2b) are located in right A-pillar**

- **A**: Warning and control ligths
- **B**: LH 500 harvesting computer
- **C**: Speedometer
- **D**: Speedometer for Cylinder and Fan Rotation
STRAW DIVIDERS (fig. L3) Have to be Adjusted

The straw dividers are fitted on both sides of the cutting table.
Their height is adjusted by means of slide pieces D with holes.
Depending on the specification the dividers can be of the following types:
Long torpedo dividers with fixed frames
Short torpedo dividers with fixed frames
Medium-long torpedo dividers with foldable frames
Arc-type dividers

Adjust guide plates A and B to suit the threshing conditions.
The outside guide tube is attached to the divider at the front and to the table side at the rear. The adjuster for the tube is at the rear. Always attach the tube on the side of the uncut crop.
Long dividers are used to thresh long-strawed crops such as rye and oats.
Short dividers are used to thresh short-strawed crops such as barley and wheat.
Dividers with foldable frames are suited for different crops. They do not need to be removed but can be turned to their transport position.
Arc-type dividers are suited for short-strawed crops and crops that do not need dividing but are pressed down in a narrow section, such as turnip rape and flax.

The straw divider can be replaced with an electric vertical knife. It is particularly efficient when threshing oil plants.

CROP LIFTERS (fig. L4) Spaced Correctly.

Below you can see the appropriate number of crop lifters for different table widths:

<table>
<thead>
<tr>
<th>Table Width</th>
<th>Number of Lifters</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.9 m</td>
<td>12</td>
</tr>
<tr>
<td>4.2 m</td>
<td>13</td>
</tr>
<tr>
<td>4.5 m</td>
<td>14</td>
</tr>
<tr>
<td>4.8 m</td>
<td>15</td>
</tr>
<tr>
<td>5.1 m</td>
<td>16</td>
</tr>
<tr>
<td>5.7 m</td>
<td>18</td>
</tr>
<tr>
<td>6.3 m</td>
<td>20</td>
</tr>
<tr>
<td>6.9 m</td>
<td>22</td>
</tr>
</tbody>
</table>

Attach the crop lifters with the knife finger fixing screw as shown in the figure. The numbers in the figure indicate the number of finger spaces. The crop lifters operate well if clearance to the ground is 8…10 cm, which clearance also prevents stone pick.
In some cases, for example, when threshing peas, it may be advisable to install more lifters, maybe even in every other knife finger.
REEL ADJUSTMENTS, the C model (STD-cabin)

Four Adjustable Settings (figs. L5a and L6a)
1. Reel height is controlled by switch A, fig. L5a.
2. Reel speed is controlled by switch B, fig. L5a.
   Speed can only be adjusted when the reel is rotating.
3. The fore / aft adjustment of the reel is made by switch C, fig. L5a.
   (If mechanical, the fore / aft adjustment is made by screws G at both ends of the table, fig. L6b.)
   Note! Make sure clearance L is the same on both sides. Tighten the locknut after adjustment.
4. The adjustment of the reel blade angles is made with quick adjustment lever D, fig. L6a.

When harvesting laid-down crops, the tines shall be adjusted to gather the crops efficiently.

Do not adjust the reel in its rear-most position if the tine angle is adjusted rearwards. The tines may reach the table auger and get damaged.

Place locking F on the reel, fig. L6a, in the support position if working beneath a raised reel.
REEL ADJUSTMENTS, the standard model

Four Adjustable Settings (figs. L5 and L6)

1. Reel height is controlled by switch B, fig. L5, on the traction speed control lever. The reel rises when the top button is pressed and falls when the bottom one is pressed.

2. Reel speed is controlled by switches E fig. L5, at the front of the traction speed control lever. Speed can only be adjusted when the reel is rotating.

3. The fore and aft adjustment is made by switches D, fig. L5. The clearance increases when the left-side button is pressed and vice versa. At the same time press shift switch F at the front of the lever.

4. The blade angles are adjusted by pulling at button F and turning the adjustment lever in the required direction, fig. L6. When harvesting laid-down crops, the tines shall be adjusted to gather the crops efficiently. The torque of the reel is restricted by means of a relief valve in the control valve.

Do not adjust the reel in its rear-most position if the tine angle is adjusted rearwards. The tines may reach the table auger and get damaged.

Place locking A on the reel, fig. L6, in the support position if working beneath a raised reel.
CUTTING KNIFE Must Be Kept in Good Condition!

No actual knife adjustments can be made during threshing. The knife must be in perfect condition to produce good threshing results. For more precise service and adjustment instructions, see under Maintenance. A spare knife is stored in the case at the top of the table.

TABLE AUGER (fig. L7) Height and Finger Positions Are Adjustable

Adjust the feed auger vertically to suit the amount of straw in the crop being threshed. Average clearance X is 10 – 15 mm. When threshing e.g. heavy rye or turnip rape, adjust clearance X between the auger and cutting table wider, approx. 30…40 mm. In special conditions even a 5 mm clearance can be used.

To adjust, loosen screws A at both ends of the cutting table. Now the table auger can be lifted or lowered as required using adjustment screws B. Clearance between the feed auger and the bottom must be equal at both ends of the table. After moving the feed auger, check the drive belt tension. Loosen screw D to adjust the feed finger position with lever C at the right hand end of the cutting table. A minimum clearance of 10 mm is required between the feed fingers and the table bottom. The fingers must recede into the auger sufficiently early to allow the crop to be transported forward. Otherwise tall and damp crops in particular may wrap around the auger.

Depending on the model, the table auger may be equipped with a safety switch. Adjustment instructions under “Service and Maintenance”.

The Correct Height and Tension of the CROP ELEVATOR CHAIN (fig. L8)

The elevator has a fixed top roller and a floating bottom roller to enable the elevator to fluctuate according to the flow of crop on it. Adjust the clearance between the bottom roller and the bottom of the elevator housing with screws C. Correctly adjusted, there should be a clearance of 20 mm between the lowest slats and the housing at middle of bottom roller.

The tension of the crop elevator chain is adjusted with screws D. To check the tension, open the inspection door at the top of the elevator housing. The tension is correct when the deflection midway between the top and bottom rollers is approx. 80 mm. If the chain is assembled too tight, it wears out quickly and in some cases it may even break.
TABLE AUGER AND CROP ELEVATOR REVERSE DRIVE (fig. L9) Eliminate Blockage from the Table
Blockage in crop feed may stop the table auger and crop elevator as the safety switches slide. The blockage can be cleared by turning the feed equipment backwards. To do this, disengage the drive to the table and press reverse switch (fig. L9). The table auger and elevator will rotate in reverse direction and clear the blockage.

NOTE! The reverse drive will only operate with the engine running and the safety switch in its upper position.

Engaging and Disengaging of the CUTTING TABLE
The cutting table is engaged and disengaged using switch (Fig. L9a) Press the front of the switch to engage the table and the back to disengage the table. (STD Cabin). In De luxe cabin by pulling up yellow switch. The actual engagement is done by means of a hydraulic drum clutch.

Quick stop (STD cabin)
To quick stop the cutting table there is a left-foot pedal on the cab floor. The table will stop when the pedal is pressed. To restart press the pedal again. Start-up always using the hand switch.

Caution! The cutting and feeding mechanism disengaged using the switch can start running when, for instance feeding disorders are eliminated from the table. Therefore, always stop the engine before any work is carried out on the table.

Supporting of the CUTTING TABLE (fig. L10)
Before doing repairs and maintenance beneath the table, raise it to its full height and lock the support over the ram by means of lever A, fig. L10, on the right-hand side of the table auger. Do not use the cutting table support while driving on the road.
Height of the CUTTING TABLE (figs. L11a, L12a and L13a), the C model (STD cabin)

Table height is adjusted using switch A, fig. L11a. The table lowering speed can be adjusted steplessly by turning the knob on the control valve. The valve is located beneath the cab. To increase speed turn clockwise and to reduce speed turn counter-clockwise.

Cutting height is shown on the scale, fig. L13a. The cutting table is eased using a gas accumulator. The pressure of the hydraulic cylinders is shown on gauge A, fig. L12a. With the needle in the green field of the gauge the table fully rests on the gas accumulator. When lowering the table onto the ground, the easing effect of the gas accumulator decreases and the needle goes to the red field. The farther red the needle goes the more heavily the table lies against the ground, in which case soil or stones easily get onto the table and damage it.

When threshing laid-down crops, adjust the table height so that the needle is in the green field or on the border between green and red where the easing effect of the gas accumulator is still sufficient.

Both the lengthwise and transverse positions of the table in relation to the ground can be adjusted. See the settings for adjustments under Maintenance.
Height of the CUTTING TABLE (figs. L11, L12 and L13), the standard model

Table height is controlled using switches A, fig. L11. Cutting height is shown on the scale, fig. L12.

**STD Cabin**

The cutting table is eased using a gas accumulator, and the easing pressure is shown on gauge (see pages 24-26). With the needle in the green field of the gauge the table fully rests on the gas accumulator. When lowering the table onto the ground, the easing effect of the gas accumulator decreases and the needle goes to the red field. The farther red the needle goes the more heavily the table lies against the ground, in which case soil or stones easily get onto the table and damage it.

When threshing laid-down crops, adjust the table height so that the needle is in the green field or on the border between green and red where the easing effect of the gas accumulator is still sufficient.

**Deluxe cabin**

The cutting table is eased using a gas accumulator, and the warning light is lit when pressure off the table lifting is too low and table switched on. When warning light is lit, the table lies heavily against the ground, in which case soil or stones easily get onto the table and damage it.

Adjustment of the pressure switch is done as follows:

Pressure switch is located in the output line of the table valve (fig. L13). Warning light must be observed when adjusting pressure switch, table switched on. Alternatively conductivity of the switch can be measured with multimeter when engine not running. Warning light is lit when switch is conductive.

1. Lift table ca.10 cm off ground
2. Turn adjusting screw clockwise until warning light is lit (if not already litted)
3. Turn adjusting screw counter-clockwise until warning light goes off. Continue turning still yet 1/8 round after warning light goes off.

More you turn switch open after warning light goes off, the more heavily table is allowed to lie against the ground before warning light is lit.

**Note.** Warning light may blink also when lowering table.

**Side Tilt of the CUTTING TABLE**

The transverse position of the cutting table to the ground can be adjusted hydraulically using switches D on the traction speed control lever, fig. L11. Simultaneously press the mode shift switch F at the bottom front of the lever. (The same knobs adjust the reel clearance.) Side tilt may be needed on a sloping field when the combine tends to tilt downhill.
STONE BLOCK Behind the Knife

An optional stone block can be fitted on the cutting table behind the knife. It has proved extremely useful on fields with a lot of small stones. They are stopped by the stone block and can be removed from there. Always stop the combine and the engine and fit the supports for the table and the pick-up reel before carrying out any work on the cutting table.

STONE TRAP (fig. L14) Must Be Emptied Regularly

The stone trap prevents stones from getting onto the concave. It is located between the crop elevator and concave. The hinged bottom can be opened and locked using lever A.

The stone trap must be emptied daily; the contents of it must be of soft nature. When harvesting short stubble on stony fields, empty the stone trap more often.

Engage THRESHING MECHANISM (fig. L15) at Engine Idling Speed Only

Engage and disengage the threshing mechanism using switch (fig. L15). Press the outer end of the switch to start the mechanism and the inner end to stop it (STD cabin) In De luxe cabin by pulling up yellow switch. The function is electro-hydraulic. The levers in the belt coupling are turned hydraulically. The chopper starts first if the chaff guide plate is for the chopper. The threshing mechanism is switched on after the chopper.

NOTE! ENGAGE AND DISENGAGE THE THRESHING MECHANISM AT ENGINE IDLING SPEED ONLY.
DO NOT INCREASE THE ENGINE SPEED BEFORE THE WHOLE THRESHING MECHANISM HAS BEEN SWITCHED ON!

Stepless Control of THRESHING CYLINDER Speed (fig. L16)

The speed of the threshing cylinder is controlled using switch (fig. L16). The rotation speed may be changed with the threshing mechanism running only. The cylinder speed is displayed in gauge on the instrument panel (STD Cabin) or A- pillar (De luxe cabin) with mode in its cylinder position. Settings for various crops are given in the adjustment table on the cab window.
STANDARD THRESHING CYLINDER

Adjusting of the CONCAVE Clearance (figs. L17 and L18)
The clearance between the threshing cylinder and concave can be adjusted steplessly either using regulating wheel A1 on the right of the operator’s seat or switch A2 on the instrument panel. Turn the wheel counter-clockwise for wider clearance and clockwise for smaller clearance.
The needle on scale B (STD Cabin) gives clearance C, i.e. the clearance in mm between the first concave beater and cylinder beater. In De luxe cabin clearance is displayed in gauge on panel in the right hand side (see page 25.)
The adjusting mechanism has been designed to maintain the ratio between the front and rear clearances. The normal ratio is 2:1; front clearance C is double rear clearance D, fig. L18. The concave clearance should be checked at the beginning of each harvest season.
See the settings for various crops in the adjustment table on the cab window.

Adjusting of the ADJUSTMENT RATIO (fig. L19a)
The adjustment ratio between the concave and the cylinder can be changed so that instead of the normal 2:1 ratio, ratios 1.5:1 or 1:1 are used. When changing the ratio, move the ratio lever on both sides of the machine to position A, B or C.
A = 2:1
B = 1.5:1
C = 1:1
Adjustment A is best suited for damp and adjustment C for extremely dry conditions when it is important to prevent the straw from breaking on the threshing cylinder.
THE TS THRESHING CYLINDER

Adjusting of the CONCAVE Clearance (figs. L17 and L18)
The clearance between the threshing cylinder and concave can be adjusted steplessly either using regulating wheel A1 on the right of the operator’s seat or switch A2 on the instrument panel. Turn the wheel counter-clockwise for wider clearance and clockwise for smaller clearance.
The needle on scale B (STD Cabin) gives clearance C, i.e. the clearance in mm between the first concave beater and cylinder beater. In De luxe cabin clearance is displayed in gauge on panel in the right hand side (see page 25.)
The adjusting mechanism has been designed to maintain the ratio between the front and rear clearances. The normal ratio is 2:1; front clearance C is double rear clearance D, fig. L18. The concave clearance should be checked at the beginning of each harvest season.
See the settings for various crops in the adjustment table on the cab window.

Adjusting of PRE-CONCAVE
STD Cabin (Fig. L17c)
Clearance between the pre-concave and pre-cylinder is adjusted steplessly with switch C, fig. L17c, on the right hand side of the combine. Press the lower part of the switch for wider clearance E, fig. L18b, and the upper part for smaller clearance. The width of threshing clearance can be seen on indicator B, fig. L17c.

De luxe cabin
Clearance between the pre-concave and pre-cylinder is adjusted steplessly with the left-hand sided switch A2, fig. L17b, on the instrument panel.
Adjusting of the ADJUSTMENT RATIO (fig. L19b)

The adjustment ratio between the concave and the cylinder can be changed so that ratios 1.5:1 or 1:1 are used. When changing the ratio, move the ratio lever on both sides of the cylinder housing to position A, B or C.

A = 2:1  
B = 1.5:1  
C = 1:1

Adjustment A is best suited for damp and adjustment C for extremely dry conditions when it is important to prevent the straw from breaking on the threshing cylinder.
CONCAVE FILLER PLATES (fig. L20) Remove the Barbs
The threshing effect of the concave can be improved by fitting filler plates A under the first concave beaters. Pass the filler plates through the holes at both ends of the concave where the springs keep them fixed. The same filler plates fit the main concave and the pre-concave on the TS model.

REVERSING THE CYLINDER (fig. L21)
In order to remove a blockage from the threshing cylinder, a tool (under the right-hand side guard) is supplied by means of which the cylinder may be turned manually. Open the plastic cover on the mudguard to reveal the shaft end. The cover can be opened with a screwdriver. The engine and the threshing mechanism coupling must be off. The concave should be in its bottom position. If necessary, the blockage may also be cleared through the service openings.
STRAW WALKERS (fig. L24) Keep the Bottoms Clean

The bottom cassettes of the straw walkers can be removed for cleaning by releasing clamps A and pulling the cassettes out from the rear door to the chaff hood. The switch on the chaff hood top lights an alarm lamp on the instrument panel if an excessive accumulation of straw causes a blockage. Immediately disengage the threshing mechanism, clear the blockage and find out the cause for the trouble before going on working.

Note! Always check the operation of the warning device before starting harvest.

CSP Straw Ruffler

Depending on the specification, there may be a belt-driven ruffling drum above the straw walkers to fluff up the mass of straw to improve grain separation. The ruffler finger angle can be adjusted by changing the position of the adjustment lever on the right side of the combine. The normal position is in the middle of the adjustment range.

When the lever is moved backwards (to the left), the fingers will retract earlier in the direction of rotation and vice versa. This should be done when threshing turnip rape of flax.

A speed monitor monitors the ruffler rotation. Its operation is connected to the straw alarm. Thus an activated straw alarm may indicate either a blockage caused by straw accumulation or a speed drop in the CSP drum.

Check the drive belt tension regularly.
GRAIN PAN (figs. L25 and L26) Clean the Segments

The grain pan can be removed in three segments for cleaning. A removal tool is supplied under the right side guard, fig. L25. Pass the flat end of the tool into the hole at the mid-plate of the segment. Press with the side of the tool to unlock the segment and pull backwards out of the machine, fig. L26. Before the removal of the segments the top sieves shall be removed.

When harvesting in damp conditions, check daily that the segment surfaces are clean, and remove any sticking dirt. A dirty surface will reduce the transporting ability and cause uneven burden on sieves and increase threshing losses. Moreover, the dirt will cause extra weight, burden the grain pan and may even lead to damage.
SHAKER SHOE (fig. L27a) Mechanical Adjustment

The shaker shoe has been divided in two lateral sections. Both the top and the bottom sieves are of the adjustable lamella type. The adjustment is made using the adjustment screws at the rear of the shaker shoe. The threshing mechanism and the engine shall be stopped before any adjustments are made. Open the back door to the shaker shoe to adjust the lower sieve. The sieve openings may be read on the scale on the connecting rod of the adjustment levers. When adjustments are made, adjust always at a smaller value first and after that at the required value. Settings for various crops are given in the adjustment table. At regular intervals, check that the reading on the scale and the sieve opening are consistent.

SHAKER SHOE Electric Remote Control Adjustment (fig. L27b)

The shaker shoe has been divided in two lateral sections. Both the top and the bottom sieves are of the adjustable lamella type. The adjustment is made using the switches on the instrument panel. The sieve openings may be read on the screens next to the adjustment switches. The upper display and switches are for the chaffer sieve and lower one for the grain sieve. When adjustments are made, adjust always at a smaller value first and after that at the required value. Adjustments can be made while threshing. Make sure the sieves are clean. Settings for various crops are given in the adjustment table. At regular intervals, check that the reading on the gauge and the sieve opening are consistent.

Adjustment of the CHAFFER SIEVE EXTENSION

Each chaffer sieve has a separately adjustable extension. It is adjusted using the adjustment screw at the rear of the extension. The threshing mechanism and the engine shall be switched off before any adjustments are made.
Removal and Refitting of CHAFFER SIEVES (fig. L30)

The sieves must be removed for cleaning. The rears of the sieves are fixed to the shaker shoe frame with hexagonal screws A. Before the sieves are removed, remove chain B in the adjustment device and connecting rod C between the sieves. Refitting is done in the opposite order. Do not make any changes in the adjustment devices. After refitting make sure that the adjustment scale and the actual adjustment value are consistent. Instructions under “Service and Maintenance”.

Removal and Refitting of SEED SIEVES (figs. L31 and L32)

To reach seed sieves for adjusting or cleaning the rear door of the shaker shoe is needed to open. Pull backward the locking rod A, fig 32 to get the door opened. The rears of the sieves are fixed to the shaker shoe frame with hexagonal screws A. Before the sieves are removed, remove cable B in the adjustment device and connecting rod C between the sieves. Refitting is done in the opposite order. Do not make any changes in the adjustment devices. After refitting make sure that the adjustment scale and the actual adjustment value are consistent. Instructions under “Service and Maintenance”.

The standard seed sieve is adjustable. For special purposes there are also fixed sieves available. Hole size 3 – 16mm.
CLEANING FAN (figs. L33, L34 and L35) Provides Sufficient Air Flow

The airflow is adjusted steplessly by changing the variator speed. Speed regulating switch(fig L33) is located on the instrument panel. The speed indicator shows the number of revolutions when shift switch is in the “Fan” position.
NOTE! Adjustments can only be made with the threshing machinery engaged.

With smaller seeds requiring a weaker airflow, open door A beneath the fan by loosening screws B, fig. L34, and find the correct air flow by adjusting the variator with the door open.

Adjust the airflow direction using regulating rod C, fig. L35. With the rod in its front position the air is directed forward and up. By moving the rod backwards, the air direction turns down and rearwards. Suggested air speed and direction settings for various crops are given in the adjustment table.
AUGER HOUSING (Fig. L36) Bottoms Can Be Opened from the Side

From the shaker shoe, the clean grains fall to the front transport auger and the returns to the rear transport auger. The bottom troughs in the transport augers can be opened by lifting wire A from groove B and letting locking levers C go down, which will open the doors. To close the doors, lift the wire back to groove B and turn up the locking levers. A warning light will flash if the bottom auger of the returns is blocked. Immediately stop the machine, clear the blockage and find the cause for the trouble.

GRAIN ELEVATOR AND GRAIN AUGER (Fig. L37) Must Be Kept Clean and the Alarms in Working Order

The grain elevator and the auger attached to it are on the right-hand side of the combine. The elevator doors enable the operator to check the tension of the chains and clean the elevator. An alarm will indicate a drop in the elevator speed. Any blockage can be cleared through the elevator service doors. After having cleared a blockage, operate the threshing machinery at low speed for some time before continuing threshing. The auger next to the elevator fills the grain tank. Doors at the lower end of the auger can be opened to clean the auger. Especially when harvesting in damp conditions, the grain transport system must be cleaned often to maintain its transporting capacity.

At the lower end of the filling auger inside the housing there is a grease nipple for periodic lubrication.
A Warning Light Controls the RETURN AUGER (Fig. L38) Safety Clutch Operation

The return auger is located on the left-hand side of the combine. A warning light will flash when there is a blockage either in the bottom or the vertical auger. There are doors in the auger housing and the lower end for cleaning and clearing any blockage.

Adjustment of the Returns Spreader Auger

Depending on the specification, the returns system may be equipped with a transverse auger, which spreads the returns onto the shaker shoe.

The gap on the bottom of the auger housing can be adjusted by turning the sleeves outside the pipe. Factory setting as shown in figure L39.
GRAIN TANK WITH CLOSED UNLOADING PIPE (figs. L40a and L41a)

Fixed Cover

The grain tank is filled by the filling auger. Filling up is indicated by a two-sensor alarm. The alarm sensor height can be adjusted by moving the sensor to a different hole. This will either advance or delay the alarm. The lower one turns on the tank ¾ signal light (and the orange lamp STD cabin), and the top one turns on the tank full signal light and the alarm. The lower sensor is to be adjusted at the height at which a signal of approaching unloading is required. The top sensor is to be adjusted at the height at which threshing needs to be stopped.

On top of the tank bottom auger there is a division brush. Its right-end height and the opening of the side plates can be adjusted.

The tank cover can be lifted up to utilize the whole capacity. Threshing can also be done with the cover down. The cover is raised with switch fig. 42a, on the instrument panel. The cover will rise with the engine running when the outer end of the switch is pressed down, and it will lower when the inner end is pressed down.

The “>4m” signal light is on in the cab when the cover is up.

To facilitate cleaning of the tank, the division brush on the bottom auger can be removed. The grain tank also has doors at the right-hand end and at the bottom end of the vertical auger for cleaning and on the rear wall for servicing of the engine. Both ends of the vertical knife have grease nipples, which must be greased in the 50h service. If cleaning or service jobs require entry into the tank, the engine must be switched off and the ignition key removed from the lock to ensure the engine cannot be started.
Turning and Operating of the UNLOADING PIPE (Fig. L43a, L43b)

Closed Unloading

The unloading pipe is turned with switches C on the traction lever. The top button raises the pipe, and the bottom one lowers it. This operation requires that the safety switch be activated in its top position.

There is a rapid motion, which turns the pipe to its extreme position (in a designated time) at the push of a button. The movement will stop if either button is pressed during the movement. A new push will turn the pipe in the selected direction.

The movement can also be stopped by pressing down the SAFETY SWITCH on the instrument panel. The switch must always be depressed when driving on the road.

To release the safety switch up, turn the knob clockwise.

Note! (The alarm light blinks STD cabin / buzzer will sound De luxe cabin) and the signal light is on while the pipe starts turning. Unloading can be done in any position.

To activate unloading, press the front end of operating switch B. Unloading stops when the rear of the switch is pressed.

During unloading it is important to ensure that there is enough space beneath the pipe spout for the unloading grain. The auger and transmission may get damaged if the grain cannot unload unhindered.

The “>4m” signal light is on in the cab when the pipe is up.
GRAIN TANK WITH AN OPEN UNLOADING PIPE

(Figs. L40b and L41b) Fixed Cover

The grain tank is filled by the grain auger, and an alarm sounds when it is full. The height of the alarm sensor can be adjusted by moving the sensor from one hole to another. This will either advance or delay the alarm. There are two filling-up sensors. The lower one turns on the tank ¾ signal light (and the orange lamp STD Cabin), and the top one turns on the tank full signal light and the alarm. The lower sensor is to be adjusted at the height at which a signal of approaching unloading is required. The top sensor is to be adjusted at the height at which threshing needs to be stopped.

There is a door on the front wall of the grain tank through which a grain sample can be taken from the grain that will start flowing in as soon as threshing is started.

The cover and the side guards of the tank are equipped with similar kind of locking, which is to be kept locked during threshing.

The bottom augers may be removed for cleaning by undoing locking catch A, fig. L41b. The grain tank has cleaning doors at the right-hand end and an engine service door on the rear wall.

When cleaning or servicing inside the grain tank, the engine must be off and the ignition key removed to make sure the combine cannot be started.

GRAIN TANK (Figs. L40b, 41b and L42b) with a Rising Cover

The grain tank is filled by the grain auger, and an alarm sounds when it is full. The height of the alarm sensor can be adjusted by moving the sensor from one hole to another. This will either advance or postpone the alarm. There are two filling-up sensors. The lower one turns on the tank ¾ signal light (and the orange lamp STD Cabin), and the top one turns on the tank full signal light and the alarm. The lower sensor is to be adjusted at the height at which a signal of approaching unloading is required. The top sensor is to be adjusted at the height at which threshing needs to be stopped.

There is a door on the front wall of the grain tank through which a grain sample can be taken from the grain that will start flowing in as soon as threshing is started.

The tank cover can be raised to utilize the whole volume of the tank. Threshing can also be done with the cover down. The cover is raised using switch (Fig. L42b) on the instrument panel. The cover will rise with the engine running when the outer end of the switch is depressed and it will lower when the inner end is depressed.

The “>4m control light” is on in the cab when the cover is raised.

The bottom augers may be removed for cleaning by undoing locking catch A, fig. L41b. The grain tank also has cleaning doors at the right-hand end and an engine service door on the rear wall.

When it is necessary to work in the tank during cleaning or servicing, the engine must be switched off and the ignition key removed from the lock to make sure nobody can turn on the engine.
Grain tank auger cover (fig. L42c)
Grain tank with open unloading pipe is equipped with an extra hole B in the middle auger. In dry conditions threshing efficiency can be increased by removing cover from hole B. Fasten removed cover to place A in grain tank. (In dry conditions augers and inner surface of the pipe stays clean and glossy.
The C Model (STD cabin)

Turning and Operating of the UNLOADING PIPE (Figs. L43c and L44c)

Switches B are used to turn the unloading pipe. To raise the pipe press the front of the button, and to lower press the rear. The safety switch must be activated in its top position.

Note! The alarm light will blink and the control light come on when the unloading pipe is turned. Unloading cannot be started until the pipe is all the way up and the control light has gone off.

Unloading is switched on by depressing the front of operating switch B. Unloading will stop when the rear end of the switch is pressed.

While unloading, it must be monitored that there is always enough space for the unloading grain beneath the top end of the pipe. The auger and the transmission may get damaged unless the grain can unload unhampered.

The “over 4m light” is on in the cab with the unloading pipe in its top position.

When cleaning the grain tank, the bottom auger with its bearings can be pulled out of the tank, fig. L44c.
The Standard Model

Turning and Operating of the UNLOADING PIPE (Figs. L43 and L44)

Switches C on the traction lever are used to swing the unloading pipe into the unloading position. The pipe rises by pressing the higher button and lowers by pressing the lower button. The safety switch must be activated in its top position before swinging of the unloading pipe. Depending on the specification there may be a quick operation to turn the pipe. In this case pressing one button will turn the pipe to its extreme position. The movement will stop if either button is pressed during turning. Another press will turn the pipe in the required direction. The movement can also be stopped by depressing SAFETY SWITCH on the instrument panel. The switch shall always be depressed when driving on the road.

To release the safety switch to its top-most position, turn the knob clockwise.

Note! (The alarm light will blink STD cabin / buzzer will sound De luxe cabin) and the control light come on when the unloading pipe is turned. Unloading cannot be started until the pipe is all the way up and the control light has gone off.

Unloading is switched on by depressing the front of operating switch B. Unloading will stop when the rear end of the switch is pressed.

While unloading, it must be monitored that there is always enough space for the unloading grain beneath the top end of the pipe. The auger and the transmission may get damaged unless the grain can unload unhampered.

The “over 4m light” is on in the cab with the unloading pipe in its top position.

When cleaning the grain tank, the bottom auger with its bearings can be pulled out of the tank, fig. L44.
Danger Zone behind the STRAW CHOPPER (Figs. L45, L46 and L47)

Beware of the rotating straw chopper knife!
Never make adjustments or clean the chopper while the engine is running!
Never stand in the no-access danger zone behind the rotating chopper!

The straw chopper is powered directly by the engine by means of a separate belt drive. It also has its own clutch. The chopper will always switch on as the threshing mechanism is started if the straw guide plate is in its “to the chopper” position. The control lever is on the rear right. The straw is guided to the chopper with the plate in position B. In position A unchopped straw is guided onto the field. Fig. L45. A control light in the cab will indicate the guide plate position when the safety switch in the threshing mechanism is activated.

The degree of chopping can be varied by turning counter knife beam A, fig. L46. To do this, slacken screws B on both sides of the chopper, and turn the counter knife beam into the required position.

With the counter knives at right angles to the rotor centre, the straw is chopped short and chopping absorbs more power. With the counter knives down from the rotor centre, the chaff is cut longer and the power demand decreases. In their lowest position, the chopping action is minimal, but for turnip rape and flax still sufficient and recommended. When extremely short chaff is required, turn stop plate C on the bottom of the chamber up by undoing clasps D.

The chaff distribution pattern is varied by changing the vane position in the spray hood after slackening screws E in the holes on both sides of the chopper, fig. 47. A lever is used to adjust the front of the vanes. The rear of the vanes can be adjusted by slackening the sectional screws.

NOTE! Avoid adjusting the spray hood in such positions that the chaff is spread onto uncut crop, as this can block the knife, overload the sieves and result in poor grain in the tank.

When servicing the knife, the spray hood may be raised to rest on a support. It shall, however, always be lowered as soon as the service job has been completed.
ELECTRICAL ADJUSTMENT OF THE CHOPPER

The combine can be equipped with a remote-controlled electrical chop guide. The controls are located on the instrument panel. Fig. L48. The left-hand switch controls the left-hand guide vane and the right-hand switch the right-hand vane. The vanes spread out when the front of the switch is pressed and become narrower when the rear of the switch is pressed.

CHAFF SPREADER Spreads the Chaff Evenly on the Field (Fig. L49)

The specification of the combine may include a chaff spreader. It is powered by the same hydraulic circuit as the pick-up reel. The spreader will switch on whenever the threshing mechanism is running. The spreader is fastened behind the shaker shoe with joints. It is turned to the front in its working position. The rear position is needed while servicing the sieves. If necessary, the spreader may be removed from the combine. In this case thick hydraulic hoses A are to be connected to each other using fast couplings as the whole oil flow for the reel drive pump flows through here.

The spreader shall be removed in case if straw is taken without chopping!

On the basic model with 5.8-m² straw walkers there is a risk that the spreader hinders the straw flow if it is fitted when the straw is taken unchopped. This is particularly the case with heavy-strawed crops. In such a case the spreader should be removed.

The L model with 6.3-m² straw walkers does not have this problem.
ENGINE, Source of Power

The engine is a water-cooled, four-stroke, six-cylinder, direct-injection diesel. For a more detailed description of the engine, see the engine manual. The power is transmitted from the rear of the engine to the traction, threshing mechanism, grain tank unloading and the hydraulic pump. At the front of the engine there are belt drives for the fan and alternator and the compressor of the optional cab cooling system.

Suction Air Filters (Fig. L51)

The engine suction air is cleaned by a coarse filter and a two-part paper filter. On the instrument panel there is a control light to indicate a blockage in the filter system. See cleaning instructions under "Maintenance". The coarse filter is on the filter housing and it is being emptied continuously by means of the exhaust fume ejector.

The Fuel Tank (Fig. L52) Shall Be Filled with Pure Fuel Only

The fuel tank is on right hand side of the combine. Use pure and water-free gas oil as fuel. Before refuelling, remove all impurities from around filler A. Be sure to clean the step above the filler, too. The filler is equipped with a refuse strainer. Clean the strainer at regular intervals.

Bio-Diesel

Unesterified vegetable oil must not be used. Bio-fuel in compliance with European norm EN 14214 or US norm ASTM D6751 can be used in SisuDiesel engines (Stage 0, 1 and 2) equipped with in-line and distributor types of injection pumps. Any mix ratios with regular fuel compatible with EN590 are acceptable. A maximum of 20% mix can be used in Common Rail (Stage 3) engines. If the mix ratio exceeds 5%, recommended lubrication oil and filter change intervals must be halved.

PRE-FILTER (fig. L52a) and water separator

The fuel pre-filter and water separator are located beneath the tank. There is a stopcock at the tank end. The pre-filter is equipped with an electric fuel pump.
Daily Checks of the Engine (Fig. L54)

Lubrication System

It is of utmost importance to use correct lubricating oil, in accordance with the load placed on the engine. See Lubrication Table under “Maintenance”. Check the oil level daily before starting; it shall be between the minimum and maximum marks on dipstick A, preferably near the maximum, fig. L54. Oil is refilled through filler B. A control light on the instrument panel (and a blinking alarm light STD cabin / buzzer De luxe cabin) indicate low oil pressure. Should the oil pressure warning light come on with the engine running, stop the engine immediately and find the cause for the trouble.

COOLING SYSTEM (Fig. 55)

The engine cooling air is purified by a rotating screen. The cooling fan is located inside the rotating screen in front of the radiator.

When the combine leaves the factory, the engine cooling system has antifreeze added. Do not use ordinary water as coolant because of the risk of corrosion.

Check the radiator coolant level daily before starting. It must be 20 - 30 mm below the filler neck.

The coolant temperature gauge on the instrument panel indicates the temperature of the engine coolant. In normal working conditions the needle must be between 75 - 95°C. A control light on the instrument panel (and a flashing warning light STD cabin / buzzer De luxe cabin) indicate engine overheating. The alarm temperature is approx. 100°C.

If the temperature starts to rise, check that the outside of the radiator is not clogged. To remove any blockage, direct compressed air from the side of the fan through the radiator, or use a brush. Always be careful not to damage the lamellas.

To clean the equipment, the fan unit in front of the radiator may be turned open by first opening protective cover A and then fan unit B.
DRIVING AND THRESHING INSTRUCTIONS

Before Starting the Combine Check that:

There are no foreign bodies inside the combine.
The oil levels are correct (engine, hydraulic tank).
There is coolant in the cooling system.
There is enough fuel in the tank.
The safety switch is pressed down.
Always before starting, sound the signal to warn those nearby.

Starting the Engine:

With the throttle lever on idle and the stopper fully depressed (models equipped with it) press the traction speed control lever to the slot on the right in its mid-position.
The power is switched on by turning the ignition key to the right. The alternator and oil pressure control lights will come on. By turning the key farther to the right into position HS the starting motor will start to run the diesel engine and the engine will start. Should the control lights not go off after starting the engine, immediately stop the engine.

Stopping the Engine:

Pull the stopper to the stop position.
Models with no separate stopper are stopped by turning the ignition key to the “STOP” position.

Note! Do not stop the engine, especially if turbo-charged, immediately after threshing. Idle the engine for a few minutes to allow it to cool off and the temperature to equalize.
Do not have the ignition on for over 15 minutes on models equipped with distributor pumps unless the engine is running as the injection pump solenoid may overheat.

To listen to the radio, turn the ignition key left from the STOP position while pressing the key down. This turns on the current to the radio only, so there is no risk of the solenoid overheating.

Cold Weather Starting:

On engines equipped with a line-type pump, the cold weather starting automation gets always switched on when the engine is stopped.

Engines with distributor type of feed pumps are equipped with a pre-heating resistance controlled by the engine electronic control unit. In cold weather it functions automatically. When pre-heating switches itself on, control light C, fig. K9a, comes on. Start the engine as soon as the control light goes off. After the engine has started, the heater switches itself on again for some time.

If the engine has not started within 15 seconds, wait for a while and ignite again as above.

Combines with hydrostatic transmission must not be started in temperatures below -30° C as the oil is too stiff, and may damage the mechanism. (In case stiffer grade VG46 oil is used in the driving hydraulics, the lowest temperature to allow starting is -15° C.)
When Starting Off:

Select the required speed range with the traction speed control lever in the mid-position. Push the speed lever slowly forward or backward to drive the combine in the required direction. Select the required speed using the speed lever. Do not start off until the hydraulic oil has warmed up. The “hydraulics not ready to function” control light will stay on on the instrument panel until oil viscosity has fallen sufficiently. Stiff oil strains the shaft seals on the traction pump. Test the brakes.

Note! Speed range 3 is only meant to be used when driving on the road with the grain tank empty. Using it on the field is prohibited.

Changing of Gears:

The gears are not synchronized. Therefore change gears cautiously. Do not change gears with the combine moving. Need for changing gears is minimal in hydrostatic combines. When getting off the road and starting threshing or vice versa, changing is, however, necessary. Change gears on level ground. If the gear feels stiff, that is because the combine tends to go downhill. In this case, slam the brake and carefully try to “drive” downhill to release the gear.

Driving on the Road:

The brake pedals must be latched together. Brake smoothly as the rear wheels easily rise from the ground when applying the brakes violently. Never drive downhill with the gear in neutral. The statutory traffic regulations stipulate that when driving on the road, the grain tank must be empty, the knife guard mounted, the lights correctly aligned and only the headlights on.

Driving on the Field:

The brakes may be used independently to reduce the turning radius.

In Soft Field Conditions:

To improve the carrying capacity, the air pressure in the front tyres may be reduced by approx. 20 kPa (0.2 bar). Do not reduce the air pressure in the rear tyres. With reduced tyre pressure, only half-fill the grain tank. When returning to normal harvesting conditions or on the road, return to recommended pressures.

On Steep Slopes:

Increase the tyre pressure by approximately 30 kPa (0.3 bar) to improve the stability of the combine. Only half-fill the grain tank to eliminate the risk of overturning.
**THRESHING INSTRUCTIONS**

**Choose the Correct Time and Conditions**

Before starting the harvest, make sure that the crop to be threshed is ripe and dry enough. The germinating power of most crops is easily reduced if the threshing moisture exceeds 25%. Moist crops easily stick to the separation surfaces and conveyors, in which case the combine needs to be cleaned more often than recommended. Particularly in dry conditions with moisture below 12%, straw becomes chopped extremely easily. This will hinder the straw walker operation and burden the shaker shoe excessively.

**Good Threshing Results with Even Feed**

Always run the engine at maximum revolutions when threshing. When threshing, it is important to adjust the forward speed, the cutting height and the reel according to crop conditions to achieve as even feed as possible. Do not cut too low. Leafy matter moistens the straw leading to a poor threshing result. Empty the stone trap at least once a day. Before emptying, stop the engine, apply the parking brake and fit the cutting table support.

**Start with the Recommended Settings**

In the table at the end of this chapter you will find settings and adjustments for different crops. After adjusting your combine according to these recommended settings, test run the combine at the speed you will use in harvesting. Monitor the quality of the sample coming into the tank and the losses in the field. Note! When threshing heavy strayed crops without the chopper, it is important to make sure that all the straw comes out of the straw walkers without clogging the chaff hood.

**Reel Position in Accordance With Crop**

For normal standing crops, set the reel in its rear position at such a height that the reel tines lightly strike the crop. Reel speed slightly higher than the combine ground speed to ensure the crop is feeding head first, fig. M1.

For short-strawed crops, lower the reel so that the tines strike just above the knife. The reel speed increases the faster you drive and the shorter the straw is cut with the heads. The reel must pull in the heads toward the table auger.

For long-strawed standing crops, set the reel in its forward position, the speed lower than the combine ground speed so that the heads are pushed forward and the crop is laid butt first onto the table, fig. M2.
For laid-down crops, set the reel forward, reel speed higher than the combine ground speed and the reel angled to facilitate the gathering of the crop, the knife cutting below the heads, fig. M3.

When using crop lifters, the reel should feed the cut crop onto the feed auger with the reel tines in the normal position.

Adjust the straw dividers to reduce table losses and improve feeding

To avoid threshing losses caused by straw dividers, pay special attention to adjusting them according to the conditions and crops.

Adjust the height of the dividers with slide piece D, fig. M4, so that in laid-down crops the dividers follow the contours of the field beneath the crop.

In standing crops the head of the divider should be set 10-15 cm above the knife.

Adjust side guide plate B so that it prevents the cut crop from getting between the table end and the reel end. Long-strawed reclining or laid-down crops are lifted by upper guide plate A so that the reel can gather the crop for cutting and convey it further to the feed auger.

Outside guide tube C is used in long-strawed crops to move the uncut crop aside.

**Estimation of Threshing Losses**

2% is generally considered to be the maximum acceptable threshing loss. The losses can be calculated as follows:

With an estimated yield of 5000 kg/ha, the weight of 1000 grains 35 g. When monitoring the cutting width of the combine, max. 3 grains may be found in a palm-sized area of 1 sq.dm. This is when straw chopper is switched on and its spreading width corresponds table width.

**Sources of grain loss:**

Shedding in the field before harvesting
From the table
Unthreshed grain
From the shaker shoe
From the straw walkers

Before readjusting, make a methodical check in the above order to isolate the cause of the loss. Make one adjustment at a time and check the result with a test run.

Check the crop in front of the combine to ensure that shedding has not occurred before the machine has touched the crops.

To test for the table loss, stop the machine and reverse it one combine length; the grain loss can easily be seen in the field.
Causes of table loss:

The reel has threshed the grain onto the field due to too high or low revolutions and too wide a clearance. Local blockage in the knife causes a depressed and uncut section in the field. This may be due to a damaged knife plate or finger. Remember that uneven feed onto the cylinder causes disturbances in the whole threshing mechanism and machinery and leads to extensive grain losses.

Always aim at even feed when threshing.

Unthreshed Grain

Check that the grain gets threshed off the heads. Check the long straw on the straw walkers as the chopper also removes the unthreshed grains efficiently. Cylinder speed should be moderate and concave clearance as wide as possible to obtain unbroken grain and straw as well as minimal grain losses. It is not necessary to aim at complete threshing. Particularly when threshing seed grain, the minimal recommended speed setting for the cylinder should be used, as high cylinder speed damages germinability more easily than minimal concave clearance.

If the moisture of the crop to be threshed is low and the straw brittle, the concave fore/aft adjustment ratio can be modified by changing the setting of the “ratio adjustment plate”. The normal factory setting is 2:1. Settings 1.5:1 and 1:1 can also be used, which means a narrower front clearance can be used without unnecessarily shredding the straw.

The threshing effect and breaking of barbs can be improved by fitting filler plates under the front of the concave. 1-2 filler plates are usually enough.

Unthreshed grain loss can be caused by:

Check the straw before it is fed into the chopper. Monitor the grain coming into the tank as well as the returns. Reasons for unthreshed grain loss can be:

- Cylinder speed too low
- Cylinder-concave clearance too wide
- Uneven feed
- Crop too green in parts
- Damaged cylinder or concave.

Shaker Shoe Losses

If the sample coming from the sieves (taken on a shovel) shows grain being lost, check for the following:

- Excessive or insufficient fan speed
- Incorrect direction of cleaning fan airflow
- Blocked sieves
- Chaffer sieve not sufficiently open
- Grain sieve holes too small (overloads the return system)
- Crop too damp
- Excessive weed
- Too high cylinder speed will generate a lot of chaff onto the sieves.

Straw Walker Losses

If the sample coming from the straw walkers shows grain being lost, check for the following:

- Uneven feed
- Blocked concave and/or straw walkers
- Excessive forward speed
- Cylinder-concave clearance too small
- Too much weed
- Crop too damp
Quality of Sample in the Tank:

If there is crushed or cracked grain in the sample, the reason could be:

- Cylinder speed too high
- Cylinder-concave clearance too small
- Blocked concave
- Crop too green in parts

If the sample is not clean, the reason could be:

- Insufficient fan speed
- Incorrect direction of fans
- Chaffer sieve open too much
- Bottom sieve open too much
- Forward speed too low (insufficient load on the threshing mechanism)
- Crop sparse in places and weedy
- Cylinder-concave clearance too small
- Too many breaks in threshing (turning, etc.)

Malfunction Problems

The cylinder winds up and gets clogged:

- Crop damp or green
- Forward speed too high
- Cylinder-concave clearance too wide
- Cylinder speed too low
- Cylinder bars damaged or worn
- Rear beater damaged

The grain auger gets clogged:

- Chaffer sieve set too wide open
- Insufficient fan speed

The return auger gets clogged:

- Bottom sieve open too little
- Bottom sieve blocked
- Insufficient fan speed
- Chaffer sieve set too wide open
Cleaning Instructions When Going From One Crop To Another

Drive the combine on level open ground. Change the gear into neutral and lock the parking brake. Remove the ignition key whenever the engine is switched off to ascertain that no outsiders can start the combine. Do not implement any cleaning operations with the engine running!

Cleaning with compressed air is recommended. An appropriate brush can also be used.

- Support the reel and the cutting table in their top positions.
- Open the stone trap and empty it with a cassette key, for instance.
- Open all cleaning doors (not those to the grain tank).
- Remove and clean all sieves.
- Clean the supporting grooves of the sieves in the shaker shoe.
- Lock the back door in the shaker shoe.
- Remove and clean the bottom grooves in the straw walkers.
- Run the threshing mechanism for 2-3 min. with the cleaning fan at maximum speed.
- Lift and lower the cutting table, but do not start it. Leave the table in its bottom position.
- Stop the threshing machinery.
- Check that the grain pan is empty. If necessary, remove and clean the cassettes.
- Check the spaces between the return and grain augers and remove any remaining grain.
- Shake the chain of the feed auger to make the grains run down. Clean the auger inside and out.
- Clean the cutting table.
- Remove the bottom augers of the grain tank and the part of the unloading auger in the grain tank. Brush the bottom furrows, discharging the grains through the bottom door.
- Clean the unloading auger by turning the auger counter-clockwise with the pipe being raised half way up to make the grains run out through the bottom door.
- After cleaning, refit the parts and close the doors.
## APPROXIMATE SETTINGS

This table only gives recommendations for settings. While threshing, adjust the settings according to the harvesting conditions.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Threshing Cylinder r/min</th>
<th>Concave front (mm)</th>
<th>Concave (front) mm</th>
<th>Chaffer sieve open mm</th>
<th>Chaffer sieve extension mm</th>
<th>Seed sieve open mm</th>
<th>Fan r/min</th>
<th>Direction Notch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rye</td>
<td>950...1250</td>
<td>8...15</td>
<td>10...15</td>
<td>8...10</td>
<td>4...10</td>
<td>700...800</td>
<td>2...3</td>
<td></td>
</tr>
<tr>
<td>Barley</td>
<td>950...1300</td>
<td>6...12</td>
<td>12...16</td>
<td>10...12</td>
<td>4...12</td>
<td>750...900</td>
<td>1.5...2.5</td>
<td></td>
</tr>
<tr>
<td>Wheat</td>
<td>900...1300</td>
<td>8...12</td>
<td>10...14</td>
<td>8...10</td>
<td>3...8</td>
<td>750...950</td>
<td>1.5...2.5</td>
<td></td>
</tr>
<tr>
<td>Oats</td>
<td>800...1200</td>
<td>9...16</td>
<td>12...17</td>
<td>10...12</td>
<td>4...10</td>
<td>700...800</td>
<td>2...3</td>
<td></td>
</tr>
<tr>
<td>Rape</td>
<td>750...1000</td>
<td>20...30</td>
<td>6...10</td>
<td>0...5</td>
<td>0...3</td>
<td>650...700*</td>
<td>2...3</td>
<td></td>
</tr>
<tr>
<td>Turnip rape</td>
<td>750...1000</td>
<td>15...25</td>
<td>5...7</td>
<td>0...5</td>
<td>0...3</td>
<td>600...700*</td>
<td>2...3</td>
<td></td>
</tr>
<tr>
<td>Timothy</td>
<td>700...1000</td>
<td>9...12</td>
<td>0...3</td>
<td>0...3</td>
<td>0...3</td>
<td>500...650*</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Clover</td>
<td>1100...1300</td>
<td>5...10</td>
<td>12...17</td>
<td>10...16</td>
<td>0...5</td>
<td>600...650*</td>
<td>2...3</td>
<td></td>
</tr>
<tr>
<td>Pea</td>
<td>600...800</td>
<td>24...30</td>
<td>16...18</td>
<td>10...14</td>
<td>8...14</td>
<td>650...750</td>
<td>2...3</td>
<td></td>
</tr>
<tr>
<td>Meadow fescue</td>
<td>950...1050</td>
<td>8...12</td>
<td>8...10</td>
<td>6...8</td>
<td>3...5</td>
<td>500...650*</td>
<td>2...3</td>
<td></td>
</tr>
<tr>
<td>Sunflower</td>
<td>400...600</td>
<td>30...35</td>
<td>11...14</td>
<td>8...12</td>
<td>8...14</td>
<td>700...800</td>
<td>2...3</td>
<td></td>
</tr>
<tr>
<td>Buckwheat</td>
<td>700...1000</td>
<td>8...15</td>
<td>12...16</td>
<td>8...12</td>
<td>3...8</td>
<td>650...750</td>
<td>2...3</td>
<td></td>
</tr>
<tr>
<td>Cumin</td>
<td>700...1000</td>
<td>15...20</td>
<td>5...8</td>
<td>0...5</td>
<td>0...5</td>
<td>500...650*</td>
<td>2...3</td>
<td></td>
</tr>
<tr>
<td>Honey Flower</td>
<td>700...1000</td>
<td>10...16</td>
<td>2...5</td>
<td>0...4</td>
<td>0...4</td>
<td>550...700*</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Flax</td>
<td>1100...1300</td>
<td>2...4</td>
<td>5...8</td>
<td>0...5</td>
<td>2...5</td>
<td>600...700</td>
<td>2...3</td>
<td></td>
</tr>
<tr>
<td>Maize</td>
<td>400...900</td>
<td>20...40</td>
<td>12...16</td>
<td>12...16</td>
<td>12...16 removed**</td>
<td>900...1050</td>
<td>2...3</td>
<td></td>
</tr>
<tr>
<td>Sorghum</td>
<td>600...1000</td>
<td>6...12</td>
<td>8...12</td>
<td>4...8</td>
<td>3...7</td>
<td>750...850</td>
<td>2...3</td>
<td></td>
</tr>
<tr>
<td>Soybean</td>
<td>400...600</td>
<td>15...18</td>
<td>14...17</td>
<td>10...13</td>
<td>10...14</td>
<td>650...800</td>
<td>2...3</td>
<td></td>
</tr>
<tr>
<td>Rice</td>
<td>600...1100</td>
<td>16...28</td>
<td>10...14</td>
<td>8...10</td>
<td>8...14</td>
<td>550...800</td>
<td>3...4</td>
<td></td>
</tr>
</tbody>
</table>

*) with the bottom door open  
**) Returns course closed with blanking plates at the rear of the shaker shoe.

The normal concave front:rear clearance ratio is 2:1. In dry conditions when the straw is extremely brittle, it is advisable to use concave ratio 1.5:1...1:1, i.e. the clearance at the rear of the concave is bigger than in the normal setting. This will reduce straw damage and walker losses.
### APPROXIMATE SETTINGS

#### The TS Threshing Mechanism

This table only gives recommendations for settings. While threshing, adjust the settings according to the harvesting conditions.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Threshing Cylinder</th>
<th>Concave</th>
<th>Shaker Shoe</th>
<th>Fan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r/min</td>
<td>mm</td>
<td>r/min</td>
<td></td>
</tr>
<tr>
<td>Rye</td>
<td>950...1250</td>
<td>14...20</td>
<td>8...15</td>
<td>10...15</td>
</tr>
<tr>
<td>Barley</td>
<td>950...1300</td>
<td>12...20</td>
<td>6...12</td>
<td>12...16</td>
</tr>
<tr>
<td>Wheat</td>
<td>900...1300</td>
<td>14...20</td>
<td>8...12</td>
<td>10...14</td>
</tr>
<tr>
<td>Oats</td>
<td>800...1200</td>
<td>14...20</td>
<td>9...16</td>
<td>12...15</td>
</tr>
<tr>
<td>Rape</td>
<td>750...1000</td>
<td>25...30</td>
<td>20...30</td>
<td>6...10</td>
</tr>
<tr>
<td>Turnip rape</td>
<td>750...1000</td>
<td>18...25</td>
<td>15...25</td>
<td>5...7</td>
</tr>
<tr>
<td>Timothy</td>
<td>700...1000</td>
<td>12...20</td>
<td>9...12</td>
<td>0...3</td>
</tr>
<tr>
<td>Clover</td>
<td>1100...1300</td>
<td>10...13</td>
<td>5...10</td>
<td>12...17</td>
</tr>
<tr>
<td>Pea</td>
<td>600...800</td>
<td>25...35</td>
<td>24...30</td>
<td>12...16</td>
</tr>
<tr>
<td>Meadow fescue</td>
<td>950...1050</td>
<td>14...16</td>
<td>8...12</td>
<td>8...10</td>
</tr>
<tr>
<td></td>
<td>400...600</td>
<td>35...40</td>
<td>30...35</td>
<td>11...13</td>
</tr>
<tr>
<td></td>
<td>700...1000</td>
<td>14...20</td>
<td>8...15</td>
<td>12...16</td>
</tr>
<tr>
<td>Cumin</td>
<td>700...1000</td>
<td>16...22</td>
<td>15...20</td>
<td>5...8</td>
</tr>
<tr>
<td>Honey Flower</td>
<td>700...1000</td>
<td>15...22</td>
<td>10...16</td>
<td>0...4</td>
</tr>
<tr>
<td>Flax</td>
<td>1100...1300</td>
<td>8...12</td>
<td>2...4</td>
<td>5...8</td>
</tr>
<tr>
<td>Maize</td>
<td>400...900</td>
<td>25...50</td>
<td>20...40</td>
<td>12...16</td>
</tr>
<tr>
<td>Sorghum</td>
<td>600...1000</td>
<td>10...15</td>
<td>6...12</td>
<td>4...8</td>
</tr>
<tr>
<td>Soybean</td>
<td>400...600</td>
<td>20...30</td>
<td>15...20</td>
<td>10...14</td>
</tr>
<tr>
<td>Rice</td>
<td>600...1100</td>
<td>16...28</td>
<td>16...28</td>
<td>10...14</td>
</tr>
</tbody>
</table>

*) with the bottom door open

**) Returns course closed with blanking plates at the rear of the shaker shoe.

The normal concave front:rear clearance ratio is 2:1. In dry conditions when the straw is extremely brittle, it is advisable to use concave ratio 1.5:1...1:1, i.e. the clearance at the rear of the concave is bigger than in the normal setting. This will reduce straw damage and walker losses.
SERVICE AND MAINTENANCE

Safety
Installations and adjustments can only be made by a person with the required skills and qualifications and the necessary knowledge of the machine in question. Installations, adjustments and repairs must be carried out with the engine switched off and the ignition key removed.
Any moving parts shall be in balance and stopped and, when necessary, locked. Support the cutting table and the pick-up reel in their top-most positions. Make sure there is no pressure in the fluid systems before undoing mechanical or hydraulic joints. (The gas accumulator for the table, the air conditioning system, the radiator, etc.) Be very careful, when starting the engine during and after service.
To minimize the risks involved in malfunctioning make sure all the periodic service and cleaning measures are carried out on time and in compliance with the instructions.

General Instructions
• Make sure you are skilled enough to service the combine before undertaking any maintenance work. If not sure, contact a qualified service man.
• Get acquainted with the combine structure and the service instructions before undertaking any work.
• Wear appropriate protective clothing.
• Use appropriate tools and other equipment.
• Handle the combine and any work materials in compliance with the instructions in such a manner that there is no risk of injuring yourself or anybody else, or damaging the environment.

WELDING
The regular service measures required do not involve welding, but it may sometimes be necessary when doing repairs. Only qualified hot work operators are allowed to weld.
Welding causes a considerable fire risk. Clean the combine carefully before undertaking any welding work and make sure you have a fire extinguisher handy. Appropriate fire watch shall be seen to.

The electrical system of the combine houses several components with semiconductors. They get easily damaged when there are voltage peaks caused by arc welding. The main principle is to detach any structures that require welding. If any fixed combine structures need to be welded, take the following precautions:
• Switch off the master switch or disconnect one of the battery cables.
• Disconnect connector A to the LH500 display unit inside the instrument panel. Fig. LH
• Disconnect the cable between the injection pump of the electric diesel engine and pump B, and cable connector C to the control unit. Fig. ET
• Disconnect the feeder cable (left cable) to the control unit of the Common-Rail motor. First remove the protective cover off the unit (TORX TX20) attached to the motor. Turn the locking clip on the connector up and pull the connector open. Fig. CTA
The Functioning of the Combine Is Based on the Condition of the KNIFE

Check that each knife holder touches the knife section lightly. Adjust by bending the holder down, fig. P1.

Check that each knife section touches the corresponding finger. If a knife section is bent, resulting in too wide a gap between the finger and knife section, align or replace the section, figs. P5...P9.

Check the reversing points of the knife, fig. P2. At both extremities of the stroke the reversing point shall be beyond the finger centre line. If this is not the case, check the drive joint and the attachment of the knife drive device.

(In case the knife drive lever is removed for some reason, make sure the slot on the lever is aligned with the marker on the end of the groove shaft when refitting the lever.

Replacing of the KNIFE

First remove the lower guard of the knife drive.
Remove fixing screws A, fig. P3, on the connecting lever and remove the knife.

Check the knife fore/aft and up/down positions.

The fore/aft position is adjusted using screw joint A, fig. P3.
The fore/aft position is correct when the knife tang and the joint fixing piece can move freely for the whole length of the stroke without brushing the edges of the groove or the heads of the locking screws on the knife finger.
The up/down position is correct when the bottom surface of the first knife section brushes the cutting surface of the knife finger.
 Normally no adjustments are necessary.
Adjust the height by moving the drive lever in its groove connection.
Make sure the knife moves lightly when turning the drive pulley in the knife drive device by hand with the belt disengaged.
Replacing of a KNIFE SECTION

Riveted knife sections

Remove the knife section by knocking out the rivets as shown in figs. P5 and P6. Rivet up a new knife section. Use a riveting core to tighten the section to knife tang 1 and shape rivet head 2, fig. P7. Tool R 127831.

Screw-on knife sections

Screw-on knife sections can be replaced without removing the knife from the cutting table. Ensure that adjacent knife sections are aligned with each other. If necessary, remove the knife and align as shown in figures P13 and P14 or replace bent knife sections.
Align the knife sections as shown in figs. P8 and P9 when replacing one.

When replacing the KNIFE FINGERS

it is important to remember that the three pairs of knife fingers on the left differ from the other fingers.

TABLE AUGER FINGERS Must Be Straight

Straighten or replace a bent finger. To remove the finger, which is necessary in both cases, open the door in the table auger housing and turn the auger until locking screw A can be unscrewed, fig. P10.

Place the reel supports before undertaking any work!

A bent finger will wear the guiding bearing and crankshaft bearing quickly. When replacing a finger, check the bearing condition and replace the bearings, if necessary.

The feed finger has a groove at which the finger will break when it comes into contact with a hard obstacle. The broken finger will fall inside the feeder auger. Replace the finger and remove the broken part from inside the auger.
SPECIAL INSTRUCTIONS FOR THE CUTTING TABLE

THE C MODEL

The OVERLOAD CLUTCHES of the CUTTING TABLE shall be checked before starting harvest.

The function of the overload clutches protecting the cutting mechanism, the table auger and the reel shall be checked annually before starting harvest. To do this, slacken nut A, fig. P11a, which tensions the cup spring pack, so that spring pack B will slacken. After this, turn belt pulley C (and the reel) to ensure that friction plate D is not stuck. Open the clutch, if necessary, and remove any rust from the friction surfaces. After checking, tension the spring pack to its original measure E.

Table width Measurement E
3.1 m 11 mm
3.4 11
3.9 10
4.2 10
4.5 9
4.8 9
5.1 m 9

Removing of the CUTTING TABLE in the Correct Order

- Lower the reel into its lowest position.
- Stop the engine.
- Disconnect the quick release in the reel hydraulic piping and the electric connector on the right side of the crop elevator.
- Unlock the locking between the bottom corner of the crop elevator and the table rear, fig. P12a.
- Slacken the cutting table drive belt by turning lever A, fig. P13a, and remove the belt off the drive belt pulley of the sliding clutch shaft.
- Disconnect the feed cable for the table reverse from the quick release.
- Place the table support in between the knife fingers, in the approximate centre of the knife, as shown in fig. P14a.
- Lower the table onto the support ensuring that the support remains in position and that the crop elevator comes away from the rear of the table.
- When the crop elevator is entirely off the table, reverse the combine, checking that the table does not move. ...........

CUTTING TABLE Parallel to the Ground

The widthwise position of the cutting table in relation to the ground can be adjusted by altering the height of the fork brackets in the crop elevator, as follows:
- Lower the cutting table onto the ground.
- Slacken screws A and B, fig. P15a.
- Add or remove adjustment plates C as necessary.
- After adjusting, tighten the screws.
- The adjustment is made on both sides of the crop elevator.
Adjustment of the CUTTING TABLE ANGLE in soft conditions

Remove the cutting table. Remove the filler beam from the joint between the crop elevator and the lower end of the table, fig. P15b.

This adjustment may be necessary in such soft harvesting conditions in which the front tyres of the combine sink so deep into the soil that the position of the knife in relation to the ground changes. By adjusting the position of the table, the original position can be restored.
SPECIAL INSTRUCTIONS FOR THE CUTTING TABLE

THE STANDARD MODEL

The OVERLOAD CLUTCH of the TABLE AUGER shall be checked before starting harvest.

The function of the overload clutch protecting the table auger shall be checked annually before starting harvest.

To do this, slacken nut A, fig. P11, which tensions the cup spring pack, so that spring packs B will slacken. After this, turn belt pulley C to ensure that friction plate D is not stuck. Open the clutch, if necessary, and remove any rust from the friction surfaces. After checking, tension the spring packs to their original measure. If necessary, move adjustment plates F under the springs.

Removing of the TABLE in the Correct Order

The cutting table may only be removed on hard, level ground.

Lower the reel into its lowest position. Stop the engine. Disconnect the hydraulic piping between the combine and the table. Cover the hose connectors with plugs and put the hoses in their holders. If the machine is equipped with a hydraulic quick coupling unit, set the connector on the side of the combine on its holder. Remove the transmission shaft from the crop elevator and place it on the holder on the table. P12. Pull the locking pins in the connection between the crop elevator and the table outwards to their extreme positions. Use cotters to secure them open.

Place the table support in between the knife fingers, in the approximate centre of the knife, as shown in fig. P13. Lower the table onto the support ensuring that the support remains in position and that the crop elevator comes away from the rear of the table. When the crop elevator is entirely off the table, reverse the combine, checking that the table does not move.
Adjustment of the CUTTING TABLE ANGLE in soft conditions

The cutting table angle can be adjusted in relation to the ground. This may be necessary due to soil properties, for example.

To make the adjustment loosen locking nut A, fig. P14, on the centre shaft of the side tilt beam at the front of the crop elevator and add or remove adjustment plates B. After adjustment tighten nut A.

The factory setting is one 12 mm adjustment plate. There are additional plates in the tool kit. With all the plates installed, the knife reaches furthest down to cut laid down crops.
CROP ELEVATOR OVERLOAD CLUTCH
Fig. P16

Check the operation of the overload clutch protecting the crop elevator annually before the harvesting season.

Single-disc clutch, Fig. 16a

Undo nut A on the cup spring pack, fig. P16, so that spring pack B will slacken. After this rotate belt pulley C to check that friction disc D is not stuck. If necessary, take apart the whole clutch and remove any rust off the friction surfaces. Oil the pulley sliding hub and thrust bearing E.

After the service adjust the spring pack to its original measurement of A=18 mm when measured from the top of the washer.

Ensure that the belleville springs are fitted correctly: always two springs facing in the same direction on top of each other!

Checking of the CYLINDER Clearance, Fig. P17

Periodically, preferably at the beginning of each harvesting season, check the concave position in relation to the threshing cylinder, i.e. the cylinder/concave clearance. Use tool R152308.

First turn the concave adjustment indicator to position 20 and then further up to 12.

Now the clearance, i.e. the feed distance between the first concave rasp bar and a cylinder rasp bar, shall be 12 mm.

Correspondingly, the clearance between the last concave rasp bar and a cylinder rasp bar shall be 6 mm, if the ratio is in position 1:2. (If the ratio is in position 1:1.5, the clearance shall be 8 mm. If the ratio is 1:1, the clearance shall be 12 mm).

If there is deviation, adjust the clearance using nuts B at the lower end of concave adjusting arm A, fig. P17.

Check the measurements from all the four corners of the concave.
Checking of PRE-CYLINDER Clearance, Fig. P18

Check the clearance using R152308.

- First turn the pre-concave to position 20.
- Turn down to position 12 mm.
- Make sure the clearance between the pre-cylinder and the concave is 12 mm.
- If necessary, adjust the length of supporters A with nuts B, fig. P18.
- Check the clearance on both sides of the combine.
BELT TENSIONING

NOTE: Check the tension of all the belts after the first day of harvesting.

THRESHING MECHANISM DRIVE BELT

The belt and its tensioning device are located under the left side guard of the combine and in the engine compartment.

Check the drive belt tension with the threshing mechanism running.

Check the tension visually looking from behind the engine compartment. Be very careful when carrying out the check.

End of measuring plate A shall come up to the outer edge of the hexagonal part of the adjuster sleeve when the threshing mechanism is running at normal speed without any load. Fig. P20.

When necessary, the adjustment is made with the engine stopped and the ignition key removed.

To adjust the belt, loosen locking nut B and turn adjuster sleeve C in the required direction as far as needed. Check and readjust if necessary. Lock locking nut B.

THRESHING MECHANISM DRIVE BELT

The TS threshing mechanism

The TS threshing mechanism uses a four-row drive belt. The belt and its tensioning device are located under the left-hand side guard and in the engine compartment.

Check the drive belt tension with the threshing mechanism running.

Check the tension visually looking from behind the engine compartment. Be very careful when carrying out the check.

There must be a minimum of a 8 mm gap A, fig. P20a, between the edge of the limiter sleeve and the lever bracket beam.

When necessary, the adjustment is made with the engine stopped.
DRIVE BELT IN THE CUTTING AND FEEDING MECHANISM

The belt and its tensioning device are located under the left side guard of the combine. The tension is correct when spring length corresponds with length of the external gauge A. If necessary, the tension is adjusted by turning adjuster sleeve B in the required direction. Fig. P21.

CUTTING TABLE DRIVE BELT

The belt and its tensioning device are located under the left side guard of the crop elevator. The tension is correct when spring length A in the tensioning device is 72 - 74 mm. When necessary, adjust the tension by turning adjuster sleeve B in the required direction. Fig. P22.
CUTTING TABLE DRIVE BELT

THE C MODEL

Stage 2

To tension the belt, slacken locking nut A, fig. P22a, on the drawbar and turn nut B until measurement X is 72...74 mm with the belt engaged.

REEL VARIATOR BELTS
THE C MODEL

To tension the belts, slacken nut A, fig. P22b, at the end of the middle shaft and turn screw B so that the pulleys move upward tensioning both belts evenly.

THE ADJUSTMENT RANGE OF THE REEL VARIATOR
THE C MODEL

After replacing or tensioning of belts, check the variator adjustment range. To make the adjustment, first slacken locking screw B, then adjust with nuts C. Finally tighten screw B. The variator shall be adjusted so the belt does not rise above the outer rim of the pulley in its extreme positions, but stays 1-3 mm below the rim. A, Fig. P22c.
KNIFE DRIVE BELT
THE C MODEL

A spring-loaded jockey pulley tensions the belt automatically. In any case, check that pre-tension measurement X, fig. P23a, of the spring is 7...8 mm. If necessary, slacken lock nut A and turn bushing B upwards to achieve the afore-mentioned pre-tension measurement. Then lock nut A.

TABLE AUGER DRIVE BELT
THE C MODEL

To tension the table auger drive belts, first slacken middle shaft A, fig. P23b, on the jockey pulley and turn nut B on the conveyor auger. Then move the jockey pulley belt in the required direction. Belt tension is correct when the deflection midway on the lower span is 11 mm when pressing by thumb (65 N = 6.5kg).
KNIFE DRIVE BELT
THE STANDARD MODEL

The belt and its tensioning device are located under the left side guard of the cutting table. The belt-tensioning device is stiff, without any spring. The belt tension is correct when the deflection midway on the lower span is 16 mm when pressing by thumb (45 N = 4.5 kg). If necessary, the tension is adjusted by turning adjuster sleeve A in the required direction. Fig. 23.

TABLE AUGER DRIVE BELT

The belt and its tensioning device are located under the left side guard of the cutting table. The belt-tensioning device is stiff, without any spring. The belt tension is correct when the deflection midway on the lower span is 11 mm when pressing by thumb (65 N = 6.5 kg). If necessary, the tension is adjusted by turning screw B. Fig. 23.
GRAIN TANK UNLOADING BELT

The belt and its tensioning device are located under the left side guard of the combine and in the engine compartment. Check the belt tension with the unloading mechanism running. For safety reasons the threshing mechanism shall be disengaged. Check the tension visually looking from behind the engine compartment. Be very careful when carrying out the check. End of measuring plate A shall come up to the outer edge of the hexagonal part of the adjuster sleeve when the threshing mechanism is running at normal speed without any load. Fig. P24. When necessary, the adjustment is made with the engine stopped and the ignition key removed. To adjust the belt, loosen locking nut B and turn adjuster sleeve C in the required direction as far as needed. Check and readjust if necessary. Lock locking nut B.

STRAW CHOPPER CLUTCH BELT

The belt and its tensioning device are located under the left side guard of the combine and in the engine compartment. Check the belt tension with the threshing mechanism and straw chopper running. Check the tension visually looking from behind the engine compartment. Be very careful when carrying out the check. End of measuring plate A shall come up to the outer edge of the hexagonal part of the adjuster sleeve when the threshing mechanism is running at normal speed without any load. Fig. P26. When necessary, the adjustment is made with the engine stopped and the ignition key removed. To adjust the belt, loosen locking nut B and turn adjuster sleeve C in the required direction as far as needed. Check and readjust if necessary. Lock locking nut B.

Note that the jockey pulley can be fitted in two different holes in its lever. Move the pulley if necessary.

STRAW CHOPPER BELTS

The straw chopper transmission belts are located under the left side guard of the combine. The tension is correct when spring lengths corresponds with the lengths of the external gauges A. Fig. P27. If necessary, the tension is adjusted by turning adjuster sleeve C in the required direction.
DRIVE BELT in the CLEANING MECHANISM

The belt is located under the left side guard of the combine.
The belt-tensioning device is stiff, without any spring.
The belt tension is correct when the deflection midway on the upper span is 10 mm when pressing by thumb (100 N = 10 kg). Fig. P28
If necessary, the tension is adjusted by turning adjuster sleeve A in the required direction.

SHAKER SHOE DRIVE BELT

The belt and its tensioning device are located under the left side guard of the combine.
The belt-tensioning device is stiff, without any spring.
The belt tension is correct when the deflection midway on the lower span is 10 mm when pressing by thumb (100 N = 10 kg).
If necessary, the tension is adjusted by turning adjuster sleeve B in the required direction. Fig. P28.

RETURN AUGER DRIVE BELT

The belt and its tensioning device are located under the left side guard of the combine.
The belt tension is correct when spring length C corresponds with the length of the external gauge. If necessary, the tension is adjusted by turning adjuster sleeve D in the required direction. Fig. P28.

CSP DRIVE BELTS

The CSP drive belts are tensioned by adjusting the intermediate pulleys.
Both the belts become tensioned simultaneously.

Undo pulley locking screws A behind the pulleys. Adjust the tension with screw B. The tension is correct when the deflection midway when pressed by hand (20-30N = 2-3kg) is 15 mm at the front and 10 mm at the rear.
**CYLINDER VARIATOR BELT**

To tension the belt, tighten anchor bolts A and B (on the housing) and connecting bolt C (between the variator arms), fig. P29a. The connecting bolt must be turned two turns per each turn of the anchor bolts to retain the transmission ratio of the variator.

When tensioning the belt, operate the pulleys by hand to allow the belt to move evenly on the pulleys. Belt tension is checked with the variator midway within the adjustment range. The tension is correct when spring leaf pack length A is 21+2 mm.

After the adjustment, check that the variator arms do not touch the outer shell of the variator pulley in their minimum or maximum positions. There must be a clearance of at least 1 mm. Adjust the arms using screws A-C or B-C.

After adjusting the belt you must set stop nuts E, fig P29b so that belt does not rise over outer edge of the pulleys at min. or max speed setting.
**CYLINDER VARIATOR BELT**

**The TS Threshing Mechanism**

To tension the belt, tighten anchor bolts A and B (on the housing) and connecting bolt C (between the variator arms), fig. P30a. The connecting bolt must be turned two turns per each turn of the anchor bolts to retain the transmission ratio of the variator. When tensioning the belt, operate the pulleys by hand to allow the belt to move evenly on the pulleys. Belt tension is checked with the variator midway within the adjustment range. The tension is correct when spring leaf pack length A is 21+2 mm. After the adjustment, check that the variator arms do not touch the outer shell of the variator pulley in their minimum or maximum positions. There must be a clearance of at least 1 mm. Adjust the arms using screws A-C or B-C.

**PRE-CYLINDER BELT**

The belt is tensioned by a spring-loaded jockey pulley. The tension is correct, when spring length A, fig. P30b, is 76+2 mm.
FAN VARIATOR BELTS

The fan belt variator is located under the right side guard of the combine. Belt tension is correct when the deflection midway is 8 mm when pressing by thumb (35 N = 3.5 kg).
To tension the belts, slacken screw A on the middle shaft of the variator pulley and adjust using nuts B and C, fig. P31. After the adjustment, tighten the slackened nuts.
After the adjustment, check the adjustment range of the variator. If necessary, adjust limiter nuts D so that the belts on the variator pulley do not rise above the outer rims of the pulley in their extreme positions.

GRAIN ELEVATOR BELT

The belt and the tensioning device are located under the right side guard of the combine. The tension is correct when spring length corresponds with the length of the external gauge. Fig. P32. If necessary, tension the belt by turning adjuster sleeve A in the required direction.

STRAW WALKER BELT

The belt and the tensioning device are located under the right side guard of the combine. The belt-tensioning device is stiff, without any spring. The belt tension is correct when the deflection midway on the vertical span is 20 mm when pressing by thumb (75 N = 7.5 kg).
Fig. P33. If necessary, tension the belt by turning adjuster sleeve B in the required direction.
RADIATOR BELT

The belt is located in the engine compartment at the front of the engine. The tension is correct when spring length A in the tensioning device is 100 - 105 mm. Fig. P34. If necessary, the adjustment is made with nut B.

COOLING FAN BELT

The engine-cooling fan is located on the right hand side of the combine inside the cooling unit, which can be opened. The belt is tensioned with a spring. The tension is correct when spring length A is 100 - 105 mm. Fig. P35. If necessary, the adjustment is made with nut B.

COMPRESSOR BELT IN THE AIR CONDITIONER

The refrigeration compressor is located at the front of the engine. It is driven by the water pump disk. The belt tension is correct when the deflection is 10 mm when pressing by thumb (200 N). To adjust the belt, slacken adjustment screw A and sectional screws B. Fig. P36. Turn the compressor with a suitable lever and lock the slackened screws.

When Replacing the BELTS, Return the Bows and Belt Supports to their Original Positions

Particularly when changing the clutch belts in the threshing machinery, grain tank unloading and the chopper, check that the belt support and the bows round the pulleys supporting the belt are refitted correctly. Mark the positions before removing the parts to ensure re-assembly in the same positions. A new belt must be tensioned after a few operating hours. Always check the condition of the pulleys, too. The sides of the pulley shall be straight, smooth and rust-free. If necessary, clean with fine sandpaper. Replace worn pulleys as a pulley worn rough cannot convey the necessary power, but the belt gets damaged quickly. Always use original belts. They have been tested by the Manufacturer to meet the quality requirements.
GRAIN TANK CHAINS; CLOSED
UNLOADING PIPE

The tank unloading augers are rotated by two chain drives. One drive is on the right and the other on the left side of the combine. Both the chains have an adjustable tensioning device. Check the chain tension regularly and tension, when necessary, by slackening screw A in the tensioning device and turning slide piece B.
GRAIN TANK CHAIN; OPEN UNLOADING PIPE

To tension the chain, loosen screw A and nut B, fig. P42, and turn eccentric plate C in the direction indicated by the arrow. Tighten nut B and lock screw A in their original positions. There must not be slackness in the chain, but it must rotate lightly without any jerks.

REEL CHAIN

To tension the chain, loosen screws A and B, fig. P43, and turn adjustment screw C, fig. P43. There must not be slackness in the chain, but it must rotate lightly without any jerks.

GRAIN ELEVATOR CHAIN

Check the tension of the chain through the cleaning door at the bottom of the elevator. Check the tension with a tooth on the bottom sprocket pointing downwards. The tension is correct when the chain can be moved sideways by hand on the lowest sprocket, but there is no radial play.

Before any adjustment, slacken the elevator drive belt by slackening locking nut A, fig. P44, and turning adjusting nut B.

Keep tensioning the chain until when turning the drive pulley with the chain slack, some tension can be felt as the chain goes “beyond a tooth”. Slacken enough not to feel any jerking.

Tighten nut A after the adjustment. Finally adjust the elevator drive belt to the correct tension, fig. P44.
GRAIN ELEVATOR OVERLOAD CLUTCH

The overload clutch is of friction plate type and located on the rear beater shaft by the drive pulley. Always open the clutch before the harvesting season and remove any rust from the friction surfaces. The clutch spring is correctly tensioned when spring pack X is 22 mm thick, fig. P45.

There are two types of clutches:
Type 1 has a friction disc on one side of the belt pulley. Clutch spring tension is correct when thickness X of the spring pack is 22 mm, fig. P45

Type 2 has a friction disc on both sides of the belt pulley. Clutch spring tension is correct when thickness X of the spring pack is 23 mm

Both types have ten belleville springs. They are always fitted with two belleville springs facing in the same direction on top of each other!

RETURN ELEVATOR AUGER OVERLOAD CLUTCH

The overload clutch is of friction plate type and located at the top of the return auger by the drive belt pulley in the bevel gear. Always open the clutch before the harvesting season and remove any rust from the friction surfaces. The clutch spring is correctly tensioned when spring pack C is 12 mm thick, fig. P46.

RETURN BOTTOM AUGER OVERLOAD CLUTCH

The overload clutch in the return auger and the return bottom auger is located at the right hand end of the bottom auger by the drive belt pulley. It is of gear clutch type. The clutch is tight enough when the inner rim of flange A comes up to the rim of the protecting sleeve. Fig. P47. The spring shall never be tensioned shorter than 46 mm as the clutch cannot operate then.
Changing of CHOPPER KNIVES

If the rotor knives (or knife) are worn, they can be inverted. Broken or damaged knives must be replaced. To maintain the rotor balance, it is important always to change the two opposite knives as well.

To remove a knife, unscrew locknut A, fig. P50. Now remove the fixing screw from the joint, which will disassemble the joint.

Counter knives are fastened with a locking rod, which is pulled out before changing the knives.

Removing a GIB KEY with a Tool

To keep a gib key in good condition for re-use, use tool set R116007 to remove it, fig. P51.

Removing and Refitting of a Bearing Locked with an ECCENTRIC RING

A Removing:

1. Slacken the grub screw in the locking ring and open the eccentric ring by hitting the ring in the opposite direction of shaft rotation with a mandrel.
2. Unscrew the flange locking screws, remove the outer flange and pull the bearing off the shaft.

B Refitting:

1. Fit the inner bearing flange.
2. Fit the bearing, locking ring and outer bearing flange. Fit the fastening screws of the flanges and tighten by hand.
3. Check the shaft position and tighten the flange screws.
4. Lock the locking ring in the direction of shaft rotation by hitting it with a mandrel.
5. Lock the grub screw on the locking ring.
The correct direction of the SPRING COTTER NOTCH

Note the position of the cotter notch in regard to the load direction, fig. P53. Some joints have two cotters within each other in which case the notches face each other.

BRAKES

The driving brakes are of hydraulic disc brake type. They do not need any adjusting. Monitor the friction plates for wear and replace when necessary. The brake fluid tank is in the cab left of the seat. Check the fluid level on a regular basis. The fluid shall be changed every two years.

HAND BRAKE Adjustment

The brakes shall be adjusted on a regular basis due to wear of the brake bands. The free travel of the hand lever on the toothed arc must not exceed 5-6 teeth. The adjustment can be made either at the upper or lower end of the brake wire. The easiest way is to adjust the brake lever at the lower end of the wire. Locking nut A is slackened, fig. P54, pin B of the fork is removed and the fork is turned to shorten the wire as required. After the adjustment, lock the slackened joints.
CAB Ventilation, Heating and Air Conditioning

Regular daily cleaning of the suction air filter is the most important maintenance measure. The filter is of two-stage type. At the front there is a course mesh filter in a frame. Behind it there is a fine filter, a replaceable paper element. Depending on the type of cab, the filter is located either at the back of the ceiling or on the left side of the cab. Fig. P65.

To remove the side filter, unscrew screw A and slacken screw B. To remove the back filter, turn the holder plate.

The best way to clean the filters is with compressed air. The course mesh filter may be washed in washing-up liquid, if necessary. The paper filter must be replaced minimum once a year.

The condenser in the air conditioning equipment on the back wall of the engine compartment must be cleaned daily, if necessary, by blowing air into the cell from the engine side. Any debris may be removed from the sieve chamber by opening the chamber cover and bottom. Take care not to damage the heating cell.

The evaporator and the heating cell as well as the air channels and the fan shall be cleaned minimum once a year, and in dusty conditions more often. This can be best done using compressed air and/or a vacuum cleaner through the cab top door.

Checking of the Quantity of Liquid in the COOLING SYSTEM

The check shall be conducted at the beginning of every harvesting season. There may be some leaks, particularly if the cooling system is unused for a long time. Slight leakage is normal.

The check is made by running the cooling system at full capacity. Using a small mirror, look through the small inspection window on top of the drying cartridge, fig. P56, to make sure there are no gas bubbles, but liquid behind the window. The incidence of gas bubbles is allowed only for a short period after the compressor switches on. The dryer is located in the engine compartment in the coolant hose between the condenser and the cab.

Be very careful as the check is made with the engine running. If a refill is needed, it shall be done by an authorised service outlet.
ENGINE

(Complete service and maintenance instructions for the engine are provided in a separate engine manual)

Oil Change Always after the Harvesting Season

The oil is changed every 500 h and always during the winter service. The old oil is drained from the warm engine by removing plug A off the drainpipe, fig. P60, on the right side of the combine. Used oil is problem waste, which shall be disposed of in an appropriate manner.

Fig. P61
A Oil Measuring Dipstick
B Oil Filler
C Coolant Filler

Types and quantities of oil to be used are given in the oil table and the engine manual.

Replacement of the Oil Filter

The oil filter is replaced every time the oil is changed. The filter is replaced through the service door on the back wall of the grain tank. Remove the ignition key before the operation to ascertain no outsiders can start the engine. Used filters are problem waste, which shall be disposed of in an appropriate manner.

Check the instructions for filter change in the engine manual.

The 74CTA engine also has an additional centrifugal type of filter at the rear of the engine. It has a replaceable rotor unit.

Fuel Filters

The fuel pre-filter is located beneath the fuel tank. There is also a water separator. The main filters are near the engine.

Drain any condensed water into a dish weekly. Replace the filters as instructed in the service table or more often in case of clogged filters. Fault code “LOW FUEL PRESSURE” refers to a clogged pre-filter or air leak in the pipes. Used filters are problem waste, which shall be disposed of in an appropriate manner. See instructions for filter replacement in the engine manual.
Air Filter

The engine suction air is purified by a pre-filter and a double-element, dry paper filter. Perfect functioning of the filter is an essential prerequisite for long engine life. The filter housing is located in the engine compartment.

On the instrument panel there is a blockage indicator for the air filter. The cover of the filter housing is attached with locking brackets and the filter cartridges are under the cover, fig. P62.

Both the filters shall always be replaced at the beginning of the harvesting season. The outer filter cartridge shall be replaced when the blockage indicator shows the filter needs servicing or at least once a year. The outer cartridge may also be cleaned. The outer cartridge can be cleaned a maximum of five times.

Open the catches on the filter back cover and twist the cartridge out of the housing. Be careful not to damage the paper. Do not remove the inner cartridge unless it needs replacing. The filter protects the suction channel against impurities during service.

Blow dry compressed air (not exceeding 5 bar) inside the filter, fig. P63. Take care not to damage the filter cartridge nor allow dust inside the cartridge.

After cleaning, the condition of the filter is checked. Direct a strong light to the inside of the filter. In case the outer filter cartridge is broken, it shall be replaced. The inner filter shall also be replaced as it has become dirty.

Otherwise the inner cartridge is replaced after five services or at least every other year.

Clean the inside of the filter housing carefully before removing the inner cartridge. When refitting the filters, ensure that the gaskets are intact, mating surfaces clean and that the filter fits properly.

When servicing the filter, check the condition and attachment of the air hoses and the purity of the hose in the exhaust fume ejector.

Note! Do not run the engine without filters.
Removing and Refitting of the ENGINE COOLING AIR INTAKE SCREEN

The cooling air intake screen, fig. P65, may have to be removed for cleaning or other maintenance purposes. It shall be done in the following manner:

Open the side guard in front of the suction screen.
Unlock locking bolts A on the suction screen.
Turn the screen open.

When refitting, keep the following in mind:
Make sure the gear clutch on the fan drive shaft is aligned with its counterpart.

If the rotating screen must be removed when the belt is replaced, for example, take the following measures:
Undo the gas spring on the side guard and open the guard all the way.
Remove the top cover off the debris vacuum.
Unlock fastening B on the rotating screen and pull the screen off its shaft.

You need a ladder to carry out the job.
**COOLING SYSTEM**

**Draining of the System**

The coolant shall be changed minimum every other year in order to maintain its anti-corrosion properties. The cooling system is drained by opening the drain taps in the lower part of the radiator and on the left side of the engine at the rear as well as the radiator cap, figs. P66 and P67. In order to drain the heater cell as well, turn the temperature controller to maximum heating. Used coolant is problem waste and shall be disposed of in an appropriate manner. Due to this, the drain taps are equipped with a connector to which a pipe may be fastened to collect the coolant.

**Filling of the Cooling System**

The cooling system is filled with coolant with 40-50% of ethylene glycol added. Never use plain water as coolant. Before filling the system, the engine must have cooled off entirely. When refilling the cooling system, remember that the coolant expands considerably when getting warm, so the system must not be filled all the way up, but the upper tank shall be left 20-30 mm below the rim. See instructions in the engine manual. After filling, run the engine with the heater in its maximum position for approx. 5 min. to bleed the air from the heater. Check the liquid level after this.

**With the Engine Overheating, Idle the Engine before Stopping**

If the engine is overheated, and the coolant begins to boil, reduce the engine speed immediately to idling, and let the engine idle until the temperature decreases. Never open the filler plug on a hot radiator. Pressurized hot fluid will spurt out and cause serious injuries.
TRACTION TRANSMISSION

The CIT GEARBOX (fig. R1b)

Check in check plug C that the oil level is level with the rim. 
Change the oil every 600 h or once a year. 
Drain the oil by unplugging oil drain A. New oil is poured into filler B. The oil level shall be at the height of check plug C on the right side of the gearbox. 
Used oil is problem waste, which shall be disposed of in an appropriate manner. 
Use an oil type in accordance with the oil table. 
Check and clean, if necessary, the breather on the cover.

FINAL DRIVES (fig. R2)

Check in opening B that the oil level is level with the rim. 
Change the oil every 1200 h or at least every other year. Drain the oil by unplugging oil drain A. New oil is poured in through a funnel into filler B at level with the rim. 
Used oil is problem waste, which shall be disposed of in an appropriate manner. 
Use an oil type in accordance with the oil table. 
Check and clean, if necessary, breather C in the upper section of the final drive.
ENGINE SPLIT GEAR (fig. R4)

Oil quantity is checked through opening C. Oil level shall come up to the rim.
Oil is changed every 600 h or once a year. Oil is drained through drain plug A, on the left-hand side.
(The front-most hose) After the oil has been drained, open and clean solenoid plug D at the bottom of the gear. When opening the plug, a small quantity of oil comes out. With a funnel new oil is poured into opening B up to the rim of monitor opening C.
Used oil is problem waste and shall be handled in an appropriate way.
Use types of oil in accordance with the oil table. Check and clean breather B on the filler when necessary.

THE RETURN AUGER GEAR BOX (Fig. R5)

Open plug A on top of the gear box to check the oil level, which shall be at approx. 35 mm from the top level of the case so that the shaft end visible in the opening is nearly fully covered in oil. Oil is changed every 600 h or once a year. The oil may be sucked through the filler opening using a pump, or the wobble box is removed off its frame and shaft connection.

KNIFE DRIVE WOBBLE BOX (fig. R6)

Oil quantity is checked through opening C. Oil level shall come up to the rim. Oil level can be checked through the opening in the drive pulley.
Oil is changed every 600 h or once a year. Oil is drained through drain plug A. Rotate the pulley to a suitable position.
With a funnel new oil is poured into opening B up to the rim of monitor opening C.
Used oil is problem waste and shall be handled in an appropriate way.
GEARING IN CLOSED UNLOADING

Bottom Gear (fig. R7)
The unloading system of the closed grain tank houses two gear assemblies. One is at the bottom end of the vertical knife and is oil lubricated. Oil change once a year or every 600h. Open drain plug A to drain the oil. Add new oil in filler B level with the rim. There is approx. 1.5 litres of oil.

Top Gear (fig. R8)
The top gear is located inside the unloading top bend. It is grease lubricated. The grease does not need to be changed in regular service. The gearing has grease nipple A, through which more grease can be added, if there is any reason to believe some has leaked out from the gearing.
HYDRAULICS

THE C MODEL

General Description

The combine has three separate hydraulic circuits: traction hydraulics, the combined lifting and steering hydraulics and the low-pressure connection hydraulics. All the circuits use the same oil tank and filter. There are two pumps in the system. They are located at the rear of the engine in the distribution gear and form an entity. Hydrostatic steering and working hydraulics use a joint pump. Hydrostatic steering gets its oil by means of a priority valve. The valve always supplies the amount of oil needed in steering and the rest can be used in other working hydraulics. Traction hydraulics works in a closed circuit. The engine return oil returns straight into the pump. Connection hydraulics uses the feed oil in traction hydraulics. Depending on the specification, the combine may have 4WD. 4WD gets the oil from the main transmission by means of a connection valve on the rear axle. With the drive switched off the rear wheels rotate freely and there is no oil circulating in the final drives. There is also an oil cooler in the system located in the traction hydraulics return line before the filter. The cooler functions are controlled by means of a thermostat valve. The control valves in working hydraulics are electrically controlled and located at the front beneath the cab. There are two valves: the valve further front houses the control valves of table height and free circulation; the one further back houses the control valves of the reel lift and the turning of the unloading pipe. Movement speeds are regulated by restrictors at the control valve gates except for the table lowering speed, which can be adjusted by the operator.

The control valve for connection hydraulics is also located on the left-hand side, below the oil tank.

Pump output in working hydraulics is 27 l/min. Working pressure is restricted to 180 Bar.

Pump output in traction hydraulics is 217 l/min. Maximum working pressure is 420 Bar. Feed pressure in traction hydraulics is approx. 25 Bar.
HYDRAULICS

THE STANDARD MODEL

General Description

The combine has four separate hydraulic circuits: traction hydraulics, the combined lifting and steering hydraulics, the combined drive hydraulics for the reel and the chaff spreader and the low-pressure connection hydraulics. All the circuits use the same oil tank and filter.
There are three pumps in the system. They are located at the rear of the engine, in the distribution gear and form an entity.
Hydrostatic steering and working hydraulics use a joint pump. Hydrostatic steering gets its oil by means of a priority valve. The valve always supplies the amount of oil needed in steering and the rest can be used in other working hydraulics.
There is a separate pump for reel rotation, which also drives the optional chaff spreader. The spreader gets switched on when the threshing mechanism is started.
Traction hydraulics works in a closed circuit. The engine return oil returns straight into the pump. Connection hydraulics uses the feed oil in traction hydraulics.
Depending on the specification, the combine may have 4WD. 4WD gets the oil from the main transmission by means of a connection valve on the rear axle. With the drive switched off the rear wheels rotate freely and there is no oil circulating in the final drives.
There is also an oil cooler in the system located in the traction hydraulics return line before the filter. The cooler functions are controlled by means of a thermostat valve.
The control valves in working hydraulics are electrically controlled and located at the front beneath the cab. There are two valves: the valve further front houses the control valves of table height and free circulation; the one further back houses the control valves of the reel lift and for/aft, the cutting table side tilt and the turning of the unloading pipe. Movement speeds are regulated by restrictors at the control valve gates except for the table lowering speed, which can be adjusted by the operator.
The valve for reel rotation is located under the left-side guard below the oil tank. It contains the connection valve, the torque regulator valve and the speed regulator valve.
The connection and torque regulator valve for the optional chaff spreader is located next to the reel valve. The control valve for connection hydraulics is also located on the left-hand side, below the oil tank.
Pump output in working hydraulics is 27 l/min. Working pressure is restricted to 180 Bar.
Pump output in reel drive hydraulics is 27 l/min. Maximum working pressure for the reel has a factory setting of 75 Bar. The chaff spreader is connected to the series before the reel regulator valve. Its pressure setting is 125 Bar, which means that there is a minimum of 50 Bar pressure difference for the spreader.
Pump output in traction hydraulics is 217 l/min. Maximum working pressure is 420 Bar. Feed pressure in traction hydraulics is approx. 25 Bar.
Adjustment of Table Lowering Speed

The table lowering speed can be adjusted steplessly by regulating knob A, fig. R9, on the valve. The speed increases, as the adjustment knob is turned clockwise when looking from below, and decreases when turned counter-clockwise.

Daily Service

The oil tank is in the engine compartment. Periodic service measures include checking of the oil level and changing of the oil and filters. To check the oil level, there is transparent measuring hose A, fig. R10, on the oil tank. The oil level must be visible in the hose, near the maximum, with the cutting table and the reel lowered. New pure oil is added through filler B, when necessary. Before unplugging the filler, clean the whole area carefully to prevent any impurities from getting into the tank. Keep the area around the oil tank always clean.

Daily service measures also include checking and, if necessary, cleaning of the oil cooler. The cooler is positioned at the front of the engine radiator. At the base of the oil filter there is a sensor that indicates flow loss through the filter. If the control light on the instrument panel comes on with the engine running at full speed and the oil in its operating temperature, the filter cartridge is blocked and shall be replaced.

Change of Oil and Filter

The oil and filters are changed every 600 h or at least once a year before the beginning of the harvesting season to remove any condensed water from the system after the winter. The oil is drained by opening drain A, on left hand side of the combine, fig. R11. After draining of the oil, replace filter cartridge C, fig R10. Clean the area round the filter carefully before removing the filter. Check and, if necessary, change the filter cover gasket before refitting. Use original filters only to ensure perfect functioning of transmission. Fill the filter housing with pure oil before closing the cover.

Used oil and filter are problem waste, which shall be disposed of in an appropriate manner.

Use an oil type in accordance with the oil table. Make sure the oil is free from any impurities. Always use a clean funnel.

After oil change let the engine idle for some 15 minutes during which time no hydraulics must be used. During this time the oil circulates through the filters several times and the impurities in the oil are filtered off. Monitor the oil level and check for leaks in the filter. Air is bled from the system by turning the steering wheel several times from one extreme to the other with the engine running. Monitor the oil level in the measuring hose and add oil if necessary.

Also the breather, which functions as a filler, shall be changed every 1200 h or every two years.

Check the condition of the hydraulic hoses periodically. Replace damaged hoses immediately with new original ones.
4 WD on Models Equipped with it

4WD uses the pump and oil in traction hydraulics. The only service feature required is the greasing of the gasket housing on the shaft of the rear wheel hub motor. The nipple is on the outer rim of the hub motor. Greasing is done in the autumn after the harvesting season. Apply only one or two squeezes of grease. Too much grease may damage the gasket.

Chaff Spreader

The optional chaff spreader is located behind the shaker shoe. The spreader has three different quick settings. The two front-most ones are working settings. The rear-most setting is used when the shaker shoe is serviced or when the chaff is not spread. If necessary the spreader is easy to remove. If removed, the hoses in the working circuit are to be connected and the oil line is to be plugged. Otherwise the oil does not get to the reel control valve. There are no features that would require periodic service measures.
ELECTRICAL SYSTEM

The engine is equipped with an alternator. The master switch or the battery cables must not be disconnected with the engine running.

FUSES, (STD cabin) Fig. S1

The fuses are in boxes F1, F2 and F3. Depending on the type of cab, they are located either at the rear of the instrument panel or above it. To gain access to the fuses, remove the box cover from inside the cab.

The engine compartment has three 50 A main fuses on cables going to the instrument panel.

The function and ampere size of each fuse is given in the table below.

<table>
<thead>
<tr>
<th>1</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F1</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Flasher left</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>F2</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Rear light left</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parking light left</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Switch ctrl light instr panel</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>F3</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Rear light right</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parking light right</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Switch ctrl light switch</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>F4</td>
<td>15A</td>
</tr>
<tr>
<td></td>
<td>Emergency flasher</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>F5</td>
<td>15A</td>
</tr>
<tr>
<td></td>
<td>Rotating flasher</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>F6</td>
<td>25A</td>
</tr>
<tr>
<td></td>
<td>4WD control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AC condenser</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>F7</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Electric outlet, radio</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>F8</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Headlight left dipped</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>F9</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Headlight right dipped</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>F10</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Headlight left full</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>F11</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Headlight right full</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>F12</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Flasher right</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>F13</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Radio</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>F14</td>
<td>20A</td>
</tr>
<tr>
<td></td>
<td>Light switch</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>F15</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Electric main switch</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>F1</td>
<td>15A</td>
</tr>
<tr>
<td></td>
<td>Working light unloading. shaker shoe</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>F2</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Working light straw hood</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>F3</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Working light cab</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>F4</td>
<td>15A</td>
</tr>
<tr>
<td></td>
<td>Flasher supply and alarm light</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>F5</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Hydraulics safety relay</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>F6</td>
<td>25A</td>
</tr>
<tr>
<td></td>
<td>Cab ventilation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Switch for AC compressor</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>F7</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Gauges</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>F8</td>
<td>10A</td>
</tr>
<tr>
<td></td>
<td>Horn, reversing alarm</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>F9</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Brake lights</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>F10</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Grain tank light</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>F11</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Control of the electric master switch relay</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>F12</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Electric outlet, front (if specified)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>F1</td>
<td>25A</td>
</tr>
<tr>
<td></td>
<td>Concave adjustment</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>F2</td>
<td>20A</td>
</tr>
<tr>
<td></td>
<td>Traction lever supplies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Raising of grain tank cover</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>F3</td>
<td>7.5A</td>
</tr>
<tr>
<td></td>
<td>Hydraulics low pressure control</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>F4</td>
<td>15A</td>
</tr>
<tr>
<td></td>
<td>Working lights on mirror arms</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>F5</td>
<td>15A</td>
</tr>
<tr>
<td></td>
<td>Hydraulic valves</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>F6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>F7</td>
<td>10A</td>
</tr>
<tr>
<td></td>
<td>Spring suspended seat</td>
<td></td>
</tr>
<tr>
<td></td>
<td>compressor</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Easing of the gear</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>F8</td>
<td>25A</td>
</tr>
<tr>
<td></td>
<td>Funnel direction plates</td>
<td></td>
</tr>
<tr>
<td></td>
<td>control</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>F9</td>
<td>3A</td>
</tr>
<tr>
<td></td>
<td>LH-500 Backup camera</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>F10</td>
<td>10A</td>
</tr>
<tr>
<td></td>
<td>Sieve adjustment device</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>F11</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>F12</td>
<td>25A</td>
</tr>
<tr>
<td></td>
<td>Hydraulics low pressure</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>F13</td>
<td>5A</td>
</tr>
<tr>
<td></td>
<td>Control of relay K27 (+15)</td>
<td></td>
</tr>
</tbody>
</table>
Relays on the Instrument Panel (STD cabin)

The control relays for different functions are located inside the instrument panel. The functions and locations of the relays are illustrated on the instruction sticker stuck on the inside of the service door to the instrument panel. The sticker also displays the location of cable connections in the group connector.

<table>
<thead>
<tr>
<th>K1</th>
<th>Blinker relay</th>
<th>K23</th>
<th>Unloading starting</th>
</tr>
</thead>
<tbody>
<tr>
<td>K2</td>
<td>Warning lights relay</td>
<td>K23.2</td>
<td>Unloading stopping</td>
</tr>
<tr>
<td>K3</td>
<td>Extra work light</td>
<td>K30</td>
<td>Grain tank full</td>
</tr>
<tr>
<td>K4</td>
<td>Work light</td>
<td>K37</td>
<td>Reel speed adjustment (AHC)</td>
</tr>
<tr>
<td>K5</td>
<td>Relay, Reverse</td>
<td>K38</td>
<td>Reel speed adjustment (AHC)</td>
</tr>
<tr>
<td>K6</td>
<td>Relay, Engine start</td>
<td>K39</td>
<td>Shift relay, (header tilt left / reel forward)</td>
</tr>
<tr>
<td>K10</td>
<td>Hydraulic safety relay</td>
<td>K39.2</td>
<td>Shift relay (header tilt right / reel rearward)</td>
</tr>
<tr>
<td>K11</td>
<td>Not in use</td>
<td>K41</td>
<td>Work light on mirror arms</td>
</tr>
<tr>
<td>K12</td>
<td>Not in use</td>
<td>K51</td>
<td>Reverse safety relay</td>
</tr>
<tr>
<td>K13</td>
<td>Not in use</td>
<td>K91</td>
<td>DHC</td>
</tr>
<tr>
<td>K14</td>
<td>Relay, Radio</td>
<td>K92</td>
<td>DHC</td>
</tr>
<tr>
<td>K15</td>
<td>Not in use</td>
<td>K93</td>
<td>DHC</td>
</tr>
<tr>
<td>K16</td>
<td>Low speed relay, return bottom auger</td>
<td>K94</td>
<td>DHC</td>
</tr>
<tr>
<td>K17</td>
<td>Low speed relay, return vertical auger</td>
<td>K95</td>
<td>Grain tank indicator light ¾ full</td>
</tr>
<tr>
<td>K18</td>
<td>Low speed relay, good grain elevator</td>
<td>K104</td>
<td>Not in use</td>
</tr>
<tr>
<td>K19</td>
<td>Work hydraulic safety relay</td>
<td>K107</td>
<td>Raised headlights</td>
</tr>
<tr>
<td>K20</td>
<td>Header starting</td>
<td>K108</td>
<td>Raised headlights</td>
</tr>
<tr>
<td>K20.2</td>
<td>Header stopping</td>
<td>K109</td>
<td>Raised headlights</td>
</tr>
<tr>
<td>K21</td>
<td>Threshing unit starting</td>
<td>K110</td>
<td>Raised headlights</td>
</tr>
<tr>
<td>K21.2</td>
<td>Threshing unit stopping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K22</td>
<td>Chopper starting</td>
<td>K113</td>
<td>Control light for the electric master switch</td>
</tr>
<tr>
<td>K22.2</td>
<td>Chopper stopping</td>
<td>K116</td>
<td>Dropped rev relay, CSP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>K150</td>
<td>Multi function relay (Driving lever switches)</td>
</tr>
</tbody>
</table>
FUSES and Relays (De luxe cabin)

Fuses F1-F42 are located in circuit board (fig. S1c) under the instrument panel. Fuses F44-F51 are located in fusebox of the rear switchboard (fig. S1b) under left side guard.

Mainfuses are also located in rear switchboard under left side guard. The control relays for different functions are located under the instrument panel. The functions and locations of the relays are illustrated on the instruction sticker stuck on the inside of the service door to the instrument panel.
<table>
<thead>
<tr>
<th>Fuses (De luxe cabin)</th>
<th>Relays (De luxe cabin)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1F Main fuse</td>
<td>K1 Relay, hydraulic safety</td>
</tr>
<tr>
<td>2F Main fuse</td>
<td>K2 Relay, ignition switch (concave adjustment)</td>
</tr>
<tr>
<td>3F Main fuse</td>
<td>K3 Relay, cabin blower</td>
</tr>
<tr>
<td>4F Main fuse, start</td>
<td>K4 Relay, option</td>
</tr>
<tr>
<td>5F Main fuse, engine</td>
<td>K5 Relay, option</td>
</tr>
<tr>
<td>6F Fuse, Grid heater</td>
<td>K6 RPM guard relay, drum</td>
</tr>
<tr>
<td>7F Fuse, vertical knife</td>
<td>K7 Relay, grain tank cover</td>
</tr>
<tr>
<td>8F Fuse, vertical knife</td>
<td>K8 Relay, blinkers</td>
</tr>
<tr>
<td>Fuses circuit board</td>
<td>K9 Relay, AC compressor</td>
</tr>
<tr>
<td>F1 Sensors</td>
<td>K10 Relay, reverse</td>
</tr>
<tr>
<td>F2 4wd, A/C</td>
<td>K11 Relay, reverse</td>
</tr>
<tr>
<td>F3 Fuse, light switch</td>
<td>K12 Relay, rotating beacon</td>
</tr>
<tr>
<td>F4 Hazard blinker</td>
<td>K13 Relay, rotating beacon</td>
</tr>
<tr>
<td>F5 Air suspended seat</td>
<td>K14 Relay, treshing unit on</td>
</tr>
<tr>
<td>F6 AC, fan</td>
<td>K15 Relay, treshing machinery safety</td>
</tr>
<tr>
<td>F7 Windscreen motor</td>
<td>K16 Relay, cuttable reset</td>
</tr>
<tr>
<td>F8 Fuse, electric sieves</td>
<td>K17 Relay, treshing unit reset</td>
</tr>
<tr>
<td>F9 +12V output in cabin</td>
<td>K18 Relay, unloading off</td>
</tr>
<tr>
<td>F10 LH, engine display, rear camera</td>
<td>K19 Relay, worklight front</td>
</tr>
<tr>
<td>F11 Blinker</td>
<td>K20 Relay, grain tank cover/grain tank filling auger</td>
</tr>
<tr>
<td>F12 CTA engine +12V ignition key +15A</td>
<td>K21 Relay, cuttable on</td>
</tr>
<tr>
<td>F13 Horn, reverse alarm, indicator and backlight</td>
<td>K22 Relay, treshing unit on</td>
</tr>
<tr>
<td>F14 MAX 25A</td>
<td>K23 Relay, chopper on</td>
</tr>
<tr>
<td>F15 MAX 25A</td>
<td>K24 Relay, unloading on</td>
</tr>
<tr>
<td>F16 Treshing machinery</td>
<td>K25 Relay, worklight front</td>
</tr>
<tr>
<td>F17 Worklight, front</td>
<td>K26 Relay, grain tank cover/grain tank filling auger</td>
</tr>
<tr>
<td>F18 Worklight, front</td>
<td>K27 Relay, grain tank full (LH 500)</td>
</tr>
<tr>
<td>F19 Rotating beacon</td>
<td>K28 Relay, DHC</td>
</tr>
<tr>
<td>F20 Treshing drum and fan speed</td>
<td>K29 Relay, grain tank 1/2 (LH 500)</td>
</tr>
<tr>
<td>F21 Grain tank cover</td>
<td>K30 Relay, DHC</td>
</tr>
<tr>
<td>F22 Concave adjustment</td>
<td>K31 Relay, DHC</td>
</tr>
<tr>
<td>F23 AHC, COBO</td>
<td>K32 Relay, pick up reel ---(AHC)/Shift (K150)</td>
</tr>
<tr>
<td>F24 K5, S0, S52, S51, S55 and S59 control</td>
<td>K33 Relay, DHC</td>
</tr>
<tr>
<td>F25 K28, K30 and AHC control</td>
<td>K34 Relay, pick up reel+++(AHC)/Shift (K150)</td>
</tr>
<tr>
<td>F26 AHC</td>
<td>K35 RPM guard relay, return bottom auger</td>
</tr>
<tr>
<td>F27 K2, S37 and S38 control</td>
<td>K36 RPM guard relay, return auger</td>
</tr>
<tr>
<td>F28 Radio</td>
<td>K37 RPM guard relay, grainer elevator</td>
</tr>
<tr>
<td>F29 Radio, R position</td>
<td>K38 Classic, Reel forward</td>
</tr>
<tr>
<td>F30 Brakes</td>
<td>K39 Classic, Reel back</td>
</tr>
<tr>
<td>F31 K25, K9 and K23 control</td>
<td>K40 Classic, Reel rpm</td>
</tr>
<tr>
<td>F32 Blinker left</td>
<td>K41 Classic, Reel rpm</td>
</tr>
<tr>
<td>F33 Blinker right</td>
<td>K42 Thermostat</td>
</tr>
<tr>
<td>F34 Low beam left</td>
<td>K43 Relay, cabin blower</td>
</tr>
<tr>
<td>F35 Low beam right</td>
<td>K44 Relay, AC blower</td>
</tr>
<tr>
<td>F36 Fuse, high beam left</td>
<td>K45 Relay, cabin blower position 4</td>
</tr>
<tr>
<td>F37 Fuse, high beam right</td>
<td>K46 Relay start</td>
</tr>
<tr>
<td>F38 Parking light left, front and rear,</td>
<td>K47 Relay, working light rear</td>
</tr>
<tr>
<td>F39 Parking light left, front and rear,</td>
<td>K48 Reel reverse</td>
</tr>
<tr>
<td>F40 Glow plug</td>
<td>K49 Relay, left straw blender adjustment</td>
</tr>
<tr>
<td>F41 Start</td>
<td>K50 Relay, left straw blender adjustment</td>
</tr>
<tr>
<td>F42 Guard relays and DHC</td>
<td>K51 Relay, right straw blender adjustment</td>
</tr>
<tr>
<td>F43</td>
<td>K52 Relay, right straw blender adjustment</td>
</tr>
<tr>
<td>F44 Radio, memory</td>
<td>K53 Relay, lift pump</td>
</tr>
<tr>
<td>F45 Working light, sieves area and inside straw hood</td>
<td>K54 Relay, IGN (CTA)</td>
</tr>
<tr>
<td>F46 Working light</td>
<td></td>
</tr>
<tr>
<td>F47 +12V</td>
<td></td>
</tr>
<tr>
<td>F48 +12V</td>
<td></td>
</tr>
<tr>
<td>F49 Straw spreader adjustment</td>
<td></td>
</tr>
<tr>
<td>F50</td>
<td></td>
</tr>
<tr>
<td>F51</td>
<td></td>
</tr>
<tr>
<td>F52 Liftpump</td>
<td></td>
</tr>
<tr>
<td>F53 IGN</td>
<td></td>
</tr>
<tr>
<td>F10 LH, engine display, rear camera</td>
<td></td>
</tr>
<tr>
<td>F11 Blinker</td>
<td></td>
</tr>
<tr>
<td>F12 CTA engine +12V ignition key +15A</td>
<td></td>
</tr>
<tr>
<td>F13 Horn, reverse alarm, indicator and backlight</td>
<td></td>
</tr>
<tr>
<td>F14 MAX 25A</td>
<td></td>
</tr>
<tr>
<td>F15 MAX 25A</td>
<td></td>
</tr>
<tr>
<td>F16 Treshing machinery</td>
<td></td>
</tr>
<tr>
<td>F17 Worklight, front</td>
<td></td>
</tr>
<tr>
<td>F18 Worklight, front</td>
<td></td>
</tr>
<tr>
<td>F19 Rotating beacon</td>
<td></td>
</tr>
<tr>
<td>F20 Treshing drum and fan speed</td>
<td></td>
</tr>
<tr>
<td>F21 Grain tank cover</td>
<td></td>
</tr>
<tr>
<td>F22 Concave adjustment</td>
<td></td>
</tr>
<tr>
<td>F23 AHC, COBO</td>
<td></td>
</tr>
<tr>
<td>F24 K5, S0, S52, S51, S55 and S59 control</td>
<td></td>
</tr>
<tr>
<td>F25 K28, K30 and AHC control</td>
<td></td>
</tr>
<tr>
<td>F26 AHC,</td>
<td></td>
</tr>
<tr>
<td>F27 K2, S37 and S38 control</td>
<td></td>
</tr>
<tr>
<td>F28 Radio, R position</td>
<td></td>
</tr>
<tr>
<td>F29 Radio,</td>
<td></td>
</tr>
<tr>
<td>F30 Brakes,</td>
<td></td>
</tr>
<tr>
<td>F31 K25, K9 and K23 control</td>
<td></td>
</tr>
<tr>
<td>F32 Blinker left</td>
<td></td>
</tr>
<tr>
<td>F33 Blinker right</td>
<td></td>
</tr>
<tr>
<td>F34 Low beam left</td>
<td></td>
</tr>
<tr>
<td>F35 Low beam right</td>
<td></td>
</tr>
<tr>
<td>F36 Fuse, high beam left</td>
<td></td>
</tr>
<tr>
<td>F37 Fuse, high beam right</td>
<td></td>
</tr>
<tr>
<td>F38 Parking light left, front and rear,</td>
<td></td>
</tr>
<tr>
<td>F39 Parking light left, front and rear,</td>
<td></td>
</tr>
<tr>
<td>F40 Glow plug</td>
<td></td>
</tr>
<tr>
<td>F41 Start</td>
<td></td>
</tr>
<tr>
<td>F42 Guard relays and DHC</td>
<td></td>
</tr>
<tr>
<td>F43</td>
<td></td>
</tr>
<tr>
<td>F44 Radio, memory</td>
<td></td>
</tr>
<tr>
<td>F45 Working light, sieves area and inside straw hood</td>
<td></td>
</tr>
<tr>
<td>F46 Working lights</td>
<td></td>
</tr>
<tr>
<td>F47 +12V</td>
<td></td>
</tr>
<tr>
<td>F48 +12V</td>
<td></td>
</tr>
<tr>
<td>F49 Straw spreader adjustment</td>
<td></td>
</tr>
<tr>
<td>F50</td>
<td></td>
</tr>
<tr>
<td>F51</td>
<td></td>
</tr>
<tr>
<td>F52 Liftpump</td>
<td></td>
</tr>
<tr>
<td>F53 IGN</td>
<td></td>
</tr>
</tbody>
</table>
**CTA engines (COMMON RAIL)**

In the engine compartment on the left side of the service access (std cabin) and in the rear switchboard (De luxe cabin) there is an aluminum case with the necessary fuses and relays for the engine. The engine control unit is attached to the engine on the side of the grain tank.

### CTA engine fuse (next to the battery)

<table>
<thead>
<tr>
<th>Fuse Code</th>
<th>Description</th>
<th>Ampere</th>
</tr>
</thead>
<tbody>
<tr>
<td>6F1 Std</td>
<td>EEM current supply</td>
<td>30A</td>
</tr>
<tr>
<td>5F De Luxe</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### CTA engine fuses S3b

<table>
<thead>
<tr>
<th>Fuse Code</th>
<th>Description</th>
<th>Ampere</th>
</tr>
</thead>
<tbody>
<tr>
<td>4F3 Std</td>
<td>From the ignition lock EEM</td>
<td>5A</td>
</tr>
<tr>
<td>F53 De Luxe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4F4 Std</td>
<td>Fuel transfer pump</td>
<td>10A</td>
</tr>
<tr>
<td>F52 De Luxe</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### CTA engine relays S3b

<table>
<thead>
<tr>
<th>Relay Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>K25 Std</td>
<td>Electric fuel pump</td>
</tr>
<tr>
<td>K53 De Luxe</td>
<td></td>
</tr>
<tr>
<td>K27 Std</td>
<td>Power on/off EEM</td>
</tr>
<tr>
<td>K54 De Luxe</td>
<td></td>
</tr>
</tbody>
</table>

Do not fit an oversized fuse, as it may damage the cables and the respective electrical devices. If a fuse blows on the same location repeatedly, find the reason for it and remedy it.
**Sensors of ELECTRICAL GAUGES**

The sensors of electrical speedometers (driving speed as well as fan and cylinder speeds) are located in the gearbox and at the ends of the respective shafts. To guarantee the correct functioning of the sensor, make sure that distance $a$ between the sensor and the pulse disc (or the gear) is $1\pm 0.5$ mm. (Fig S4.) Make any necessary adjustments by turning the sensor fixing nuts. The sensor must not touch the rotating pulse disc. **Maximum tightening torque 5 Nm.**

**ELECTRONIC SPEED MONITORS**

The rotation of the elevator bottom auger, the return bottom auger and the return elevator auger is controlled by an electronic speed monitor. The control sensors are inside the instrument panel. If necessary, their alarm sensitivity can be adjusted.

The alarm shall work with the threshing mechanism running, when the throttle is adjusted at mid-speed. When engaging the threshing mechanism, the alarm is on for a 10-s starting delay, although normal speed has been reached. There are two types of relays

**Type 1 Fig. S5a (→ 06 / 2007)**

Adjustment screw P1 is located in the middle of the %-scale under a protective plug. Factory settings are, fig. S5a.

<table>
<thead>
<tr>
<th></th>
<th>Grain elevator K18 std</th>
<th>Grain elevator K37 DL</th>
<th>Return bottom auger K16 std</th>
<th>Return bottom auger K35 DL</th>
<th>Return elevator auger K17 std</th>
<th>Return elevator auger K36 DL</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>1000 r/min</td>
<td>1000 r/min</td>
<td>1000 r/min</td>
<td>1000 r/min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S2</td>
<td>OS</td>
<td>OS</td>
<td>OS</td>
<td>OS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>30%</td>
<td>25%</td>
<td>70%</td>
<td>70%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RPM</td>
<td>300</td>
<td>250</td>
<td>700</td>
<td>700</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The relay also has LED lights to indicate functioning.

- LED 1 flashes while the elevator is rotating
- LED 2 will go on when the relay alarms
- LED 3 will go on if there is something wrong with the cable

The speed sensors are located on the left side of the combine on each shaft. Sensor distance $a$ from the head of the screw on the sensor ring attached on the shaft shall be $1 - 1.5$ mm. Fig.S6. Do not tighten the adjustment nuts too tight as this would damage the sensor. Maximum torque 5Nm.
Type 2 Fig. S5b (06 / 2007—)

Alarm limit is set on knob S2. The numbers on the scale refer to a hundred revolutions per minute. Alarm delay is set on knob S1. Green led light L1 is on when the relay is supplied with electricity. Red led light L2 is on when the relay is alarming.

Factory settings for the adjustments are the following:

<table>
<thead>
<tr>
<th></th>
<th>Elevator</th>
<th>Bottom return auger</th>
<th>Vertical return auger</th>
<th>CSP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>K18 std</td>
<td>K16 std</td>
<td>K17 std</td>
<td>K116 std</td>
</tr>
<tr>
<td>S1</td>
<td>1s</td>
<td>1s</td>
<td>1s</td>
<td>2s</td>
</tr>
<tr>
<td>S2</td>
<td>3 = 300RPM</td>
<td>2.5  = 250RPM</td>
<td>7 = 700RPM</td>
<td>4 = 100 RPM</td>
</tr>
</tbody>
</table>

The LH-500 Rotation Sensors

The MAXIMUM models of the LH500 threshing monitor have rotation sensors located on several shafts. The sensors are of the Hall type, which require a magnet attached on a rotating shaft. This sensor type does not require a particularly accurate installation distance. A suitable distance ranges between 3-8 mm. Fig. S6

The LH500 Approaching Sensor

The MAXIMUM models of the LH500 threshing monitor are equipped with a Reed type detector to detect the cutting table height. The detector is located at the top right of the crop elevator. It consists of a sensor and a magnet attached on the crop elevator. The sensor distance from the magnet shall range between 3-8 mm. Fig S6

The LH500 Reel Rotation Sensor

The MAXIMUM models of the LH500 threshing monitor have a rotation sensor located on the reel shaft. It consists of an inductive sensor and a star plate attached on the shaft. The distance from the sensor head a to the edge of the star plate shall be 1-1.5 mm. Fig S4
Battery

The gas generated by the battery is very explosive. Avoid open fire and sparks in the vicinity of the battery. When servicing any electrical equipment, disconnect the negative cable of the battery.

Checking of the Charge State of the Battery

During the harvesting period the engine recharging equipment keeps the battery charged. At other times, check the state of the battery at regular intervals and recharge if necessary. An acid gauge may be used for checking. In the table below you can see the charge state of the battery compared with the acid specific weight.

<table>
<thead>
<tr>
<th>Specific weight reading</th>
<th>Charged state</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 280</td>
<td>Fully charged</td>
</tr>
<tr>
<td>1 240</td>
<td>75 % &quot;</td>
</tr>
<tr>
<td>1 200</td>
<td>50 % &quot;</td>
</tr>
<tr>
<td>1 160</td>
<td>25 % &quot;</td>
</tr>
<tr>
<td>1 120</td>
<td>No charge</td>
</tr>
</tbody>
</table>

Do not leave a flat battery unused for a long time. A low-charged battery freezes easily and exposure to frost will cause extensive damage. If a recharging device is available, recharging can also be done at home.

Before starting to recharge:
- Disconnect the battery cables.
- Check the fluid level.
- Use 5-10 % of the Ah of the battery for charging current. For example: A 140 Ah battery may be recharged using 7…14 ampere current. Recommended recharging interval is 6 -10 weeks.

Cleaning of the Battery and Other Maintenance

Clean the battery cover regularly.
Remove any oxidisation off the poles and cable lugs.
Make sure the cable lugs are properly tightened.
Coat the outer faces of the poles and lugs with Vaseline.
Check the fluid level before the harvesting season and before winter storage. Add distilled water if necessary up to the upper fluid level.

Note! Wrong connection of either the battery or the generator will damage the generator.
Before electrical welding, disconnect the battery and generator cables.
Using of an Auxiliary Battery

If an auxiliary battery is needed for starting, proceed as follows:
Check that the voltage of the auxiliary battery is 12 V.
Make sure the combine battery has not frozen; a flat battery freezes at -10°C.

Follow carefully the connecting sequence given below:
1. Connect the positive poles of the batteries (marked with red paint, a P or a + symbol) with an auxiliary starting cable.
2. Connect the end of one auxiliary starting cable to the negative pole of the auxiliary battery (marked with blue paint, an N or a - symbol) and the last free end to the negative pole of the discharged battery.

Do not lean over the batteries while making the connections.
Start the engine.
Disconnect the cables in exactly the opposite order.

Fitting of Electrical Accessories

When fitting electrical accessories to the combine, it must be noted that the capacity of the charging generator is 120 or 150A depending on the type of engine. The total consumption of a standard combine exceeds 90 A in the dark comprising:

- Headlights 12 A
- Working lights 45 A
- Gauge lights 3 A
- Fan in the cab 14 A
- Air conditioning 10 A
- Electric engine adjustment 10 A
LUBRICATION

Do not lubricate while the engine is running. Remove the ignition key and lock the parking brake before starting lubricating. The cutting table and reel supports shall be locked or lowered when lubricating.

The table below gives recommended lubricants to be used at different temperatures. The table also gives different types of air conditioning liquids, although they do not normally have to be changed.

<table>
<thead>
<tr>
<th>Recommended lubricant</th>
<th>Oil grade API</th>
<th>SAE grade</th>
<th>SAE grade</th>
<th>Filling quantity litres</th>
<th>Change intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Engine</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- With an in-line pump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- With a distributor pump</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Common Rail</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Gearbox</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Final drive</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hydraulics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Engine split gear</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Knife drive device</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Return auger angle gear</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lower gear in closed unloading</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Top gear in closed unloading</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Crop elevator angle gear</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lubrication with oil</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lubrication with grease</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Brake fluid</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Oil in the air conditioner</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Agent in the AC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Oil grade</th>
<th>SAE grade</th>
<th>SAE grade</th>
<th>Filling quantity</th>
<th>Change intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>CF/CG 4 CI-4</td>
<td>API</td>
<td>SAE 10W30</td>
<td>SAE 15W40</td>
<td>26 l</td>
<td>500 h or 1 year</td>
</tr>
<tr>
<td>GL-5</td>
<td></td>
<td>80W90</td>
<td>85W140</td>
<td>7 l</td>
<td>600 h or 1 year</td>
</tr>
<tr>
<td>GL-5</td>
<td></td>
<td>80W90</td>
<td>85W140</td>
<td>15 l</td>
<td>1200 h or 2 years</td>
</tr>
<tr>
<td>Shell Tellus T 46</td>
<td></td>
<td></td>
<td></td>
<td>25 l (change)</td>
<td>600 h or 1 year</td>
</tr>
<tr>
<td>GL-5</td>
<td></td>
<td>80W90</td>
<td>85W140</td>
<td>4 l</td>
<td>600 h or 1 year</td>
</tr>
<tr>
<td>GL-5</td>
<td></td>
<td>80W90</td>
<td>85W140</td>
<td>0.5 l</td>
<td>600 h or 1 year</td>
</tr>
<tr>
<td>GL-5</td>
<td></td>
<td>80W90</td>
<td>85W140</td>
<td>0.35 l</td>
<td>600 h or 1 year</td>
</tr>
<tr>
<td>GL-5</td>
<td></td>
<td>80W90</td>
<td>85W140</td>
<td>1.5 l</td>
<td>600 h or 1 year</td>
</tr>
<tr>
<td>Shell Alvania R3</td>
<td></td>
<td></td>
<td></td>
<td>0.135 kg</td>
<td></td>
</tr>
<tr>
<td>Lithium grease GLP 00 G</td>
<td></td>
<td></td>
<td></td>
<td>0.25 kg</td>
<td></td>
</tr>
<tr>
<td>CB/CC 10W30 15W40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lithium grease NLG 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATE Brake Fluid J 1703</td>
<td></td>
<td></td>
<td></td>
<td>2 years</td>
<td></td>
</tr>
<tr>
<td>PAG 500 SUS 500 SUS</td>
<td></td>
<td></td>
<td></td>
<td>1.8 dl initial fill</td>
<td></td>
</tr>
<tr>
<td>HFC R134a</td>
<td></td>
<td></td>
<td></td>
<td>1.2 kg</td>
<td></td>
</tr>
</tbody>
</table>
When shipped from the factory, the combine is filled with oil suitable for the temperature range of –10…+30 °C. When the oil is changed, make sure the oil used meets the prevailing temperature requirements. If the combine is used in areas where only biologically decomposable hydraulic oils shall be used, the Manufacturer is to be consulted about the choice of oil. Correct lubrication is of major importance to the perfect functioning and long working life of the combine, due to which the lubrication recommendations shall be followed carefully while simultaneously monitoring if any place demands more lubrication. All the lubricants shall be pure. Even slightest impurities may cause damage. Oil fillers and nipples shall be wiped clean. The nipples are lubricated with grease in accordance with the lubrication table. Apply machine or engine oil to places to be oiled. The safety clutches and the variator pulleys must be lubricated carefully. Excessive lubrication will cause unnecessary slipping of the clutches and damage to the belts, if lubricants come into contact with the belts or friction plates. After lubrication the variator pulleys are adjusted with the threshing mechanism running between different speed ranges, which will spread the lubricants evenly on the surfaces.
LUBRICATION DIAGRAMS, Base model

T1

T2
LUBRICATION DIAGRAMS, C model
SUMMARY OF PERIODICAL MAINTENANCE PROCEDURES
For more detailed instructions on engine adjustments and maintenance, see the engine manual.

**Daily:**

- Lubricate the points to be lubricated daily.
- Check the engine oil level.
- Check the purity of the radiator and the inlet screen.
- Check the radiator coolant level.
- Check the hydraulic oil level.
- Check the fluid and oil connections for leaks.
- Check the function of the alarm system.
- Check the condition of the cab air filter.
- Check the purity of the AC condenser.
- Check the condition and tension of belts visually.
- Check the chopper knives visually.

**Every 50 working hours:**

- Lubricate all the points specified in the table.
- Check the battery fluid level.
- Clean the outer element of engine air filter.
- Clean the breathers on the hydraulic containers on the outside.
- Check the gearbox oil level.
- Check the oil level in the engine split gear.
- Check the oil level in the final drives.
- Check the oil level in the knife drive device.
- Check the oil level in the return auger angle gear.
- Check the oil level in the unloading angle gear (Closed unloading).
- Check the knife condition.
- Check the concave basic setting.
- Check the condition of the threshing equipment.
- Check the condition of the power transmission equipment.
- Check the tension of belts and chains.
- Check the operations of safety clutches.
- Check and clean the cab air filter.
- Check the tension of the grain elevator chain.
- Check the tension of the crop elevator chain.
- Check the brake functions.
- Check the brake fluid level.
- Check the light functions.
- Check the tyre pressures.
- Lubricate the carrier at the bottom of the filling auger in the grain tank.

**Every 300 working hours or yearly:**

- Change the engine oil and filter 500 hours.
- Change the engine air filters.
- Lubricate the fan variator hub (Oil).
- Lubricate the pedal shafts (Oil).
- Lubricate the gear lever joints and bearings (Oil).
- Lubricate the engaging levers (Oil).
- Lubricate the throttle levers (Oil).
- Change the cab air filter.
- Check the fluid level in the battery.
- Check the hydraulic hoses visually.
- Check the engine intake air hoses and coolant hoses for leaks. Replace at least every 5 years. (Check when manufactured on the hose.)

**Every 600 working hours or yearly:**

- Change the oil in the gearbox.
- Change the fuel filters.
- Change the oil in the engine split gear.
- Change the oil in the knife drive device.
- Change the oil in the return auger angle gear.
- Change the oil in the unloading angle gear (Closed unloading).
- Lubricate the bearings on the left-hand side of the threshing cylinder and rear beater.
- Lubricate the bearings on the shaker shoe crankshaft.
- Change the hydraulic oil and filter. (Always before the harvesting season.)
- Lubricate the middle shaft of the stairs.
- Lubricate the wheel bearings.
- Grease the shaft gasket in the rear wheel hydraulic motor (on 4WD models, once a year; only a couple of pushes).
- Lubricate the hinges and lock on the cab door.
- Sensitize the friction plate type of safety clutches always before the harvesting season (feeding auger, crop elevator top shaft, return auger angle gear, grain elevator).
- Check the condition of the hydraulic hoses. Replace at least every 10 years. (Check when manufactured on the hose.)

**Every 1200 working hours or every other year:**

- Change the oil in the final drives.
- Replace the breather valve in hydraulics.

**Every other year:**

- Change the radiator fluid in the engine.
- Change the brake fluid.
STORAGE WHEN NOT IN USE

To guarantee the operating reliability of the combine, proper service and storage are of great importance. The service before winter storage can be divided into three parts, in order of performance: cleaning, checking and protection. A dry store or shed is ideal storage for the combine.

Cleaning:

Open the stone trap and all doors. Remove and wash all detachable guards, sieves, the bottom cassettes of the grain pan and straw walkers as well as the grain tank bottom augers. Dirt is efficiently removed from a dry combine by compressed air. A high-pressure washer may be used with caution. To reduce drying time use warm water and idle the threshing machinery.

Do not direct water jets at the bearings, as the packing does not hold against a strong spray of water.

In normal seasons, it is not necessary to wash the inner parts of the combine with water; the inside of the combine can be raked clean with a suitable tool. Apply suitable solvent on heavily greasy spots before washing. Start cleaning from the top. Clean the radiator cells by blowing air from the direction of the wings.

Checking:

Take a pen and paper and write down all the shortcomings and required service measures in the following order:

1. Condition of the knives.
2. Draw-in fingers and bearings.
3. Slip damages and breaks in belts and the remaining tensioning margin.
4. Condition of and basic settings for the cylinder and concave.
5. Condition of the grain pan and shaker shoe packing.
7. Wear, corrosion and dents.
8. Rotor knives and counter-knives of the chopper as well as rotor bearings.

It is important to have the recorded defects repaired before storage to ensure the efficient functioning of the combine at the beginning of the following harvesting season.

Protection:

Use pure engine oil or special protective oil in a sprayer.

Places to be protected:

1. Knife (protective oil)
2. Draw-in fingers (protective oil)
3. Worn paint (paint)
4. Electrical connections (special protective spray)
5. Chains (oil); rotate the mechanism by hand to ensure even lubrication.
6. Transmission chains (unloading and the reel) shall be disengaged, cleaned with a solvent and lubricated with molybdenic oil.
7. Lubrication of the rotor knife joints of the chopper.

After protection all the cleaning doors, the grain pan and straw walker bottoms and sieves are left open to produce a draught inside the combine. This will prevent rodents from nesting in the inner parts of the combine. Also leave the service door to the instrument panel open!

Pre-storage Service of Cab Ventilation:

Filters are cleaned. Air channels on the cab top and the ventilator unit with its cells are also cleaned. This may be done with a vacuum cleaner.
Pre-storage Service of the Air Conditioner:

Use compressed air to clean the cooler condenser and evaporator cells. In case the combine engine is run during storage, the cooler should also be switched on for a few minutes. To operate the cooling system in cold weather, have the heater on at full capacity and the ventilator fan stopped for approx. 15 min. during which time the air conditioning sensor will warm up and enable the switching on of the compressor. After this the ventilator fan is run at its lowest speed and the cooling at full capacity.

Pre-storage Service of the Engine:

Clean the engine on the outside.
Change the fuel filter.
Change the engine oil.
Change the engine oil filter.
Drain and clean the fuel tank.
Check the anti-freezing quality of the coolant. It must be a minimum of -25oC.
Run the engine min. 10 minutes.
Seal the exhaust pipe, inlet opening of the air filter and the breather with e.g. masking tape or plastic film.

Other Pre-storage Measures:

Change the oil in the gearbox. Clean the magnet in the bottom plug and the breather filter.
Clean the air filter.
Disconnect the battery, the negative pole first, clean the top of the battery with warm water and store it in a dry cool place.
Clean the cable lugs and apply grease to them.
It is not necessary to remove or loosen the V belts for storage.
Check the tyre air pressure.
Lubricate all points to be lubricated and run the threshing machinery after that.
Lower the cutting table and the pick-up reel to allow the cylinder pistons to go in.

After-storage Attention

Remove the engine opening covers.
Fit new air filters (engine and cab).
Fasten the fully charged battery, the positive pole first.
Check the coolant level.
Change the hydraulic oil and filters.
Check the oil levels in the engine and the gearbox.
Check the belt and chain tensions.
Make sure the rotor knives of the chopper turn.
Turn the coolant pump by the fan to loosen a possibly stuck sealing.
Open slightly the bottom plug of the fuel tank and drain any condensed water from the tank bottom.
Run the engine on the starter a few revolutions with the stopper in the stop position or with the running solenoid cable disconnected to allow oil pressure into the bearings prior to the actual starting.
Check that there are no foreign objects inside the combine.
Start the engine and let it run on fast idle for about 3 minutes.
Watch the oil pressure and alternator control lights.
Check for any coolant, oil or fuel leaks.
Carefully engage the threshing mechanism.
Gradually raise the RPM to the normal level, simultaneously monitoring the function of the threshing mechanism.
Stop the threshing mechanism and the engine and close all doors.
Set the threshing settings for the first threshing.
RECOMMENDED TOOLS AND ACCESSORIES

Recommended Tools

For do-it-yourself maintenance it is necessary to replenish the tools supplied with the combine with the special tools mentioned under Maintenance as well as with the fork, ring and socket wrench kits, observing the wrench gap table below and the wrench gaps of 16, 18 and 27 mm for the hose and pipe couplings.

Recommended Accessories

For the Knife Device
- Knife sections: 25 pcs
- Knife plate screws: 50 "
- Fingers: 2 "
- Knife holders: 2 "

For the Table Auger:
- Fingers: 8 pcs
- Finger bearings: 4 "
- Bearing holders: 2 "

For the Reel:
- Plastic tines: 5 pcs

General Parts

- Hexagonal screws M6-M12, the most common lengths of 16-40 mm, strength class minimum 8.8.
- Hexagonal nuts M6-M12, strength class 8.
- A few locknuts.
- Washers and spring washers, 6.5-13 mm.
- Plate screws 4.8, lengths 9.5-19 mm.
- Split cotters 3x20 and 5x30 mm.
- Wire cotters 2.5x50 mm.
- Spring cotters, 3-8 mm, lengths 20-50 mm.
- Circlip cotters 10 mm.
- Grease nipples 6 mm and 1/8", straight and angled.
- Additional loops for chains.
- Fuses 7.5, 15, 20, 25 and 50 A.

SCREW JOINTS

It is important to tighten the screw joints into the correct tightening torque. Wrench gaps and torque for the screws:

<table>
<thead>
<tr>
<th>Screw size</th>
<th>Wrench gap mm</th>
<th>Torque for screws of 8.8 strength class</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 6</td>
<td>10</td>
<td>11 Nm</td>
</tr>
<tr>
<td>M 8</td>
<td>13</td>
<td>25</td>
</tr>
<tr>
<td>M 10</td>
<td>17</td>
<td>47</td>
</tr>
<tr>
<td>M 12</td>
<td>19</td>
<td>78</td>
</tr>
<tr>
<td>M 14</td>
<td>22</td>
<td>120</td>
</tr>
<tr>
<td>M 16</td>
<td>24</td>
<td>180</td>
</tr>
<tr>
<td>M 20</td>
<td>30</td>
<td>335</td>
</tr>
</tbody>
</table>

Note! Torque for fixing screws in the wheels:

- Front wheels: M 22 700 Nm
- Rear wheels: M 18 400 Nm
- Rear wheels 4WD: M 22 500 Nm
DISCARDING OF THE COMBINE

Even the best of products will come to the end of its useful lifetime and it is time to discard it. It is important to make sure the discarded combine will not be harmful to the environment. Below you will find a list of things to consider before discarding the combine:

Do not let the discarded combine spoil the scenery. Store it indoors.
Lower all the hydraulically raised parts of the combine. (Cutting table, reel, unloading pipe)
Remove the battery and take it to an appropriate problem waste collection centre.
Drain all the fuel into a spare tank.
Drain all the oil from the engine, gearbox, final drives, engine split gear, knife drive device and hydraulic systems into an appropriate collection dish. Drain the oil from all the pipes, cylinders and hydraulic components.
Drain the coolant into a collection dish.
If the combine is equipped with air conditioning, let an authorised service outlet drain the cold gas and oil.

If the combine is to be scrapped, follow the below given procedure:

Disassemble the combine starting from the top.
In case flame cutting or other spark generating measures are used, pay careful attention to fire precautions.
There may be highly flammable dust and grease in the combine structure.
Beware of any moving machine parts.
Most of the combine material is steel.
There is copper in the radiator and electric conductors, start-up motor and alternator.
There is rubber in the tyres, belts and hoses.
There is plastic in the crop elevator tines, cab interior, lamps and lights. Pay attention to the recyclability of the components.
There is glass in the cab, mirrors, lamps and lights.
There is no asbestos in the combine structure.
There are minor quantities of heavy metals, such as lead in the slide bearings.
Take all the recyclable parts to a recycling centre.
CONVERSION TO MAIZE HARVESTING

When the combine is used to thresh maize, it can be fitted with a 4- or 6-row maize header. Some other modifications are also required to make the combine suitable for threshing of maize.

The instructions are based on a combine equipped with the following components:
- Four table lifting cylinders
- A cylinder drive variator in the speed range of 400...1150 r/min
- A HD concave with 14 mm wire spacing

Fitting of the Maize Header

- Remove the cereal-cutting table from the crop elevator and replace it with the maize header.
- There may be a drive shaft on both sides of the table, particularly if the table is equipped with a stubble chopper. If this is the case, remove the shield plate from the end of the transmission shaft cover on the right-hand side of the crop elevator and connect the right-hand side shaft.
- Connect the hose quick couplings in the pick-up reel rotation, fig V2, to allow free oil circulation.
- If the combine is equipped with a quick coupling unit for the table hoses, disconnect the electric connector from ON/OFF cartridge A of the pick-up reel control valve, fig. V3. It is located on the left-hand side of the combine, below the oil tank. Make sure not to lose the fixing screw or seal.

Do not use the cereal-cutting table to thresh maize.
Modification of the Threshing Cylinder

- Make sure the HD concave has been fitted. (Wires 8mm and spacing 14mm.)
- Fit the stone trap blanking plate A, fig. V4. The plate is fixed with the same bolts as the lower sealing of the crop elevator. Installation is done through the opened stone trap. The plate rear lies on top of the front of the concave.
- Fit rubber shield plate B, fig. V4. This is necessary, particularly if there is a stubble chopper on the maize header. Fixing with the same bolts as the before mentioned shield plate and sealing plate.

- Fit filler plates A, fig. V5, between the cylinder rasp bars. The tightening torque of the screws is 100...110 Nm. To facilitate the job, open the front door to the cylinder chamber and the top door to the crop elevator.

Note! The narrower edge of the filler plate (marked with a hole) shall be against the cylinder rasp bar!
Note! Never use higher than 900 RPM cylinder speed with the filler plates fitted.
Note! The stone trap blanking plate and cylinder filler plates shall be removed when threshing cereal.

Other Modifications of the Threshing Mechanism:

- Remove the splashguard from behind the rear beater and fit heavy splashguard A, fig. V6.
• Fit the return auger blanking plates A, fig. V7, to the rear of the shaker shoe. This is needed especially when harvesting in damp conditions. If necessary, drill 9 mm holes for the screws in the back access door to the shaker shoe as marked. Keep the return auger running even with the blanking plate fitted.

• Fit guide plate A, fig. V8, to the straw hood. The plate prevents the cobs from getting to the rising side of the rotor blades and decreases the risk of the cobs being thrown upwards. The guide plate is required if the chopper is used.

Note! Never use the above mentioned plate with any other plants but maize. Fluffy straw may get arched on the plate.

**Rear Weights**

**Std threshing unit**
The need for rear weights depends on the combine type and what kinds of accessories and cutting table are used. The main principle is that 20% of the total weight rests on the rear axle. Use of extra weights is not recommended with cereal header.

Approximately 760 kg of additional weight is required on a combine with standard threshing mechanism (with the weight of the maize header 2130 kg). The weights of the following accessories can be subtracted from this weight.

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>straw chopper</td>
<td>280</td>
</tr>
<tr>
<td>straw guide (no chopper)</td>
<td>150</td>
</tr>
<tr>
<td>chaff spreader</td>
<td>70</td>
</tr>
<tr>
<td>6.3m² straw walkers</td>
<td>100</td>
</tr>
<tr>
<td>4 WD</td>
<td>100</td>
</tr>
</tbody>
</table>

Fit rear weight frame A, fig. V9, to the rear beam. Place a maximum of twelve additional 36-kg weights on the frame. **The maximum weight to be gained is 450kg.**

It is possible to install max three weights (27 kg each) onto the straw guide (when no straw chopper). They will cause 40 kg weight to rear axle each.

Additionally, the rear tyres can be filled with either water or saline solution (Calcium chloride) to gain an additional 190kg.

**TS-model**
The TS model equipped with a pre-cylinder does not require additional weights.
Modifications of the Chopper (if used with maize):

- Turn the chopper counter knife unit to its bottom position. Fit guard plate A, fig. V10, on top of the counter knives.

- Remove the two rear-most chopper belts off the cock wheel and cock wheel A, fig. V11. Remove the belt pulley from the shaft trestle and fit it the other way. (With the bigger pulley outwards) Refit the pulley unit so that the shaft is in the fore-most position. Fit the belts and tension to their original tension. This will decrease the chopper speed to 2000 RPM.

Special Instructions to Be Followed when Threshing Maize

1. **Crop Elevator**
   
   Adjust the bottom shaft of the crop elevator near its top position.

2. **Adjustment of the Concave**

   - 20…40 mm from the front in compliance with the instructions given under Approximate Settings
   - The suitable concave clearance depends on the moisture and size of the corncobs. Adjust the clearance and cylinder speed so, that you will get all the grains removed from the cobs without damaging the grains. The core of the cob should also be undamaged; it must not split on the cylinder. When these conditions are met, threshing is at its most efficient. If the core splits, there are unthreshed grains on it.
   - The concave adjustment ratio shall be in position 1.5:1 or 1:1. See instructions in section “Threshing Equipment, fig. L19. If necessary, the adjustment ratio can be tuned using the support bars on the concave.
   - Check the threshing result on the straw walkers before the chopper.
3 Harvesting in Freezing Conditions

Remember to clean the grain elevator and the grain augers daily after threshing. If this is not done, they may be frozen the next morning, which will damage them.

Modification back to Cereal Harvesting:

When modifying the combine back to cereal harvesting, any special parts and components shall be replaced with the original ones intended for cereal harvesting. However, the rubber guard below the crop elevator and the rear weight frame (without the weights) may stay.

• Remember to return the concave clearance back to normal before starting cereal harvesting.
THRESHING EQUIPMENT TO BE USED WITH SUNFLOWER

No special threshing equipment is necessary when harvesting sunflower. The basic cutting table can, however, not be used with sunflower. The seeds fall off easily and the whole flower heads may fall onto the ground in front of the knife. This would mean too high table losses.

The combine may be equipped with a special cutting table meant for sunflower. This is recommendable if there are hundreds of hectares to be threshed annually.

A less expensive solution is to provide the standard cereal-cutting table with sunflower equipment. Fit extension trays in front of the knife to guide the stems onto the cutting knife and prevent seeds and flower heads from falling onto the ground. The reel tines are equipped with plates by means of which any flower heads on the trays are fed in. The straw dividers are replaced with high plate guides at the ends of the table to prevent the plants from turning to the side on top of the table end.

Fitting of Sunflower Equipment to the Cereal Table

Tray Clamps

If the sunflower equipment has not been pre-installed in the factory, fit the tray clamps to the cutting knife. The clamps go in the gaps between the knife presses. See fig. V21. Screen plate A is fitted above the knife and hook B below the knife. The first clamp goes between the 6th and 7th finger. M10x45 screws are used in the fitting.

Fitting of the Side Guides

The side guides are fitted to the same clamps as the straw dividers, fig. V22.
Fitting of the Trays

The center trays are fitted using the quick coupling next to each clamp. Adjust the tightness of the quick coupling when doing the installation, Fig V23. The outer trays are fitted at their ends to the side guide with screw D, fig. V22. The rear end is fixed with screws A, fig. V22 to the end of the table. Drill screw holes in the table. The height of the side tray rear is the same as that of the center trays.

Fitting of the Pick-up Reel Plates

Guard plates are fitted to the pick-up reel tines behind the tines, Fig. V24. Each plate is fixed with five screws A to the blade pipe (and with five bindings to the tines if needed).
SPECIAL INSTRUCTIONS TO BE FOLLOWED WHEN THRESHING RICE

**General**
Rice can only be threshed using a combine originally equipped for this purpose.
- Rice is extremely heavy to thresh, so the combine must be equipped with a heavy-duty table auger and crop conveyor mechanism.
- Use a replaceable type of rear beater equipped with wings.
- It is advisable to have a 4-WD transmission in the combine.

Before starting to thresh rice, the combine is fitted with a suitable spike tooth threshing cylinder and concave. The rear beater is fitted with spiked wings instead of plate wings. The straw walkers are equipped with additional ruffle plates.

**Modifications on the threshing cylinder**
To gain access to the threshing cylinder, disengage the crop elevator from the combine.

**Disengaging of the Crop Elevator (with the Cutting Table Fitted)**
- Disconnect the hydraulic hoses from the table on the right-hand side.
- Disconnect the electric cables on the cutting table. (Fig. Y1)
- Remove the left-hand guard. (Fig. Y2)
- Support the crop elevator from below using e.g. a lockable lifting jack as shown. (Fig. Y3)

- Disconnect hydraulic hose connection A to reduce pressure in the cutting table lifting cylinders. Remove carrier pins B in the table lifting cylinders from the crop elevator. (Fig. Y4)

- Slacken table drive belts A by turning adjusting screw B. Remove the table belts from the crop elevator. (Fig. Y5)
- Remove the carrier pins from the crop elevator. (Fig. 6)

- Reverse the combine slowly to disengage the crop elevator and the table from the combine.

Keep in mind that the crop elevator is heavy and needs to be well supported before the combine is reversed!

Removing of the Cylinder Variator

- Use a jack (10 tons) and a lockable support to lift the front axle. (Fig. Y7)

- Remove the right-side front tyre (bottom figure).

- Remove the right-side mudguard.

Ensure that the front axle is properly supported to stop the combine from overturning. A jack must not be used to support the front axle as it is only intended for lifting.

- Slacken nut A until the spring pack loosens. (Fig. Y8)
- Undo nuts A to slacken the variator belt. (Fig. Y9)

- Loosen 3 screws A and remove the locking plate and loosen nut B, (fig. 10).

- Loosen screws A connecting the variator arms and remove the arms. (Fig. Y11)
- Slacken the pulleys and the belt on the cylinder variator.
Disengaging of the Cylinder
With the crop elevator and the cylinder variator removed as above.

- Set the concave in its top-most position.
- Remove the speed indicator sensor and its bracket on the left side.
- Remove the bearing locking ring, loosen the bearing fixing screws and remove the bearing. (Fig. Y12)

- Remove the wedges off the threshing cylinder shaft.
- Lock the cylinder with wooden wedges. (Fig. Y13)

- Loosen the bearing locking screws on the right side and pull the shaft with its bearing housings out from the right side. Fig. Y14

- Put two 3-metre planks from the floor to the edge of the concave and roll the cylinder onto the ground.

Note! The threshing cylinder is heavy. This job requires two people.
Removing of the Concave

Fig. Y16

- Set the concave in its lowest position.
- Loosen lowest nuts A.
- Remove cotter B and slacken locking screws C.
- Remove the concave brackets on both sides of the combine.

- Pull the concave supporting shafts out to the right, (bottom figure).
- Pull the concave out from the front.

Fitting of the Rice Concave

Fitting is done in reverse order. Pay attention to the following points:

- Push the concave in from the front. Note! The concave extension shall be fitted with the ratio adjustment plate in position 1:1. (The plate in position C, fig. L19a.)
- Push the concave supporting shafts in.
- Fit the concave brackets.
- Fit the cotter and tighten the locking screws.

Note! Concave adjustments are made after the spike tooth cylinder has been fitted.
Replacing of the Rear Beater Wings
Fig. Y18
- Remove all the 6 wings by loosening the 48 screws.
- Fit the spiked wings (3+3) by tightening the screws. Tightening torque for the screws is 45Nm. Note! The left and the right side spiked wings shall be fitted alternately.

Removing of the Forward Baffle
Remove forward baffle A and its supporting shaft B behind the rear beater. Fig. Y19
Access to the straw walker compartment is through the top door.
**Fitting of the Spike Tooth Cylinder**

- Replace the rear beater wings (separate instructions).
- Fit the rice concave (separate instructions).
- Push the spike tooth cylinder along planks to its place.
- Lock the threshing cylinder with wooden wedges.
- Push the cylinder shaft with its bearings to its place from the right side. (Fig. Y20)
- Fit the left side bearing, but do not lock the bearing yet.
- Tighten the fixing screws in the right-hand bearing.
- Tighten the screws in the left side bearing and lock the eccentric ring.
- Center the spike tooth cylinder sideways so that the space between the spikes on the cylinder and the rear beater is equal on both sides of the spikes (bottom figure).
- Lock the cylinder shaft wedges in place.
- Fit the speed indicator sensor and its bracket, (bottom figure).
- Adjust the sensor distance from the disc (max. 1 mm)
- Refit the cylinder variator pulleys. Settings for the variator arms and belt are given in the combine service manual.

**Basic Setting of the Concave**

- Set the concave in position 17 mm in the cab.
- Set rice concave and spike tooth cylinder distance X at 17 mm next to the second and the last spike row on the concave. (Fig. Y23)  
  Height adjustment is made with screws A. (Fig. Y16)
- Adjust the concave sideways by tightening or loosening adjustment screws so that the space between the concave and the cylinder spikes is equal on both sides of the spikes. (Fig. Y22)
- Lock the adjustment screws by tightening the locking nuts.
Setting Instructions for the Cutting Table

- Clearance between the table auger and the bottom of the cutting table is 5 mm.
- Clearance between the anti-wind plates and the table auger is 2…3 mm.

Fitting of the Ruffle Plates in the Straw Walkers

Additional ruffle plates can be fitted to the straw walkers both at the rear of the stairs and to the sieve surface in the middle of the straw walker. The maximum number of ruffle plates recommended as given in the table. (Fig. Y25)

Special Instructions for Rice Threshing

A spike tooth threshing cylinder necessary when threshing rice does not separate grains as efficiently as the standard cylinder. This means that more grains go onto the straw walkers to be separated. Another difficulty is separating grains from dense green foliage. For these reasons threshing efficiency with rice is lower than with wheat.

- Aim at even feed. Threshing losses are highest at load peaks. The longer the stubble the more efficiently the combine threshes. Efficiency depends mainly on the amount of straw.
- Set the cutting table auger low enough (clearance from the bottom approx. 5 mm). Set the anti-wind plates behind the auger at a distance of 2-3 mm from the auger.
- Make sure the separating surfaces are clean. The spiked concave, straw walkers and sieves are the most important.
- Set the cylinder rotation speed low enough in order not to damage the grain husks. However, do not set the speed too low as lower rotation speed reduces threshing efficiency.
- The spiked concave has spikes in five rows. Different conditions and types of rice require different threshing. Too aggressive threshing produces too much chaff, which reduces straw walker efficiency.
- As factory setting only every other spike has been fitted to the front-most spike row. The missing spikes are supplied loose with their nuts to be fitted if required by the conditions. The number of spikes in the rear-most row can be halved or all of them can be removed if desired. Tightening torque for the spike fixing screw is 160Nm and for the locking nut 100 Nm.
- Set the fan speed high enough to ensure a clean threshing result.

Conversion back to Cereal Threshing

When going back to threshing cereal or maize, all the cylinder modifications shall be returned to their original state. Do the job in reverse order. The straw walker ruffle plates may also be used with cereal, but must be removed when threshing maize.