

Operator's manual
Single row potato
harvester
UN5640
inclusive options

UH124343



CE certificate of conformity

We,
TKS Mekaniske AS,
Torlandsvegen 3
N-4365 Nærbø
Norway

declare under our sole responsibility that the product:

Potato harvester UN5640

to which this declaration relates corresponds to the relevant basic safety and health requirements of the Directives 89/392/EEC, 91/368/EEC, 93/44/EEC and 89/336/EEC.

Nærbø, January 1st 2004



Henning Thunheim
Managing Director

**Enter here the identification (serial)
number of your machine:**

TKS Mekaniske AS, manufacturers of farm machinery reserve the right to change designs and/or specifications without notice. This does not include an obligation to make changes to machines previously supplied.

Guarantee

TKS products are guaranteed for a period of one year from the date of delivery, against defects in material and workmanship.

Components not manufactured by TKS, i.e. electrics and hydraulics, PTO shafts and tyres are guaranteed according to the original manufacturer's recommendation.

The components listed below have limited guarantee due to their function:

- Tyres
- Belts
- Lamps
- Fuses
- Oil filter
- Hydraulic seals of motors, valves and cylinders.

Weakening due to wear and tear is considered to be normal for these parts. The product guarantees for these components are limited to manufacturing defects, breakage, poor workmanship, transport damage etc. on new machines.

Any damage to bearings that are fitted with grease nipples is not covered under the standard product guarantee, if the damage is shown to be caused by rust or due to the ingress of liquids. Such damage is caused by insufficient lubrication or the use of low quality lubricants.

Any damage caused by the use of corrosive additives in or nearby the machine is also not covered.

If a failure is expected to be covered under the guarantee, the owner or its representative should inform the dealer when parts and/or repair work is required. Any guaranty claim should be applied for within the period of guarantee.

The dealer should fill in one guarantee claim form for each matter and forward it to the TKS representative before the 10th of the following month after the claim was raised.

The damaged parts should be marked with the number of the corresponding warranty claim and should be stored for 6 months by the dealer, available for inspection by the TKS representative if required.

Due to the operation of the TKS products being out of the manufacturer's control, the guarantee covers the product quality only. Performance or any consequential losses are not covered.

The guarantee may be invalid if:

- a) spurious spare parts are used or the product is repaired or modified without the TKS authorisation.
- b) operator's and service instructions given by the manufacturer are not complied with.
- c) The machine is used for other purposes than those designed for.

The guarantee does not cover damage caused by normal wear.

Public safety regulations require from the manufacturer of this machine that all safety aspects regarding the use of the machine is thoroughly evaluated. As a result of these obligations TKS and its representative are not responsible for the function of components not shown in the spare parts catalogue covering this product.

TKS reserve the right to change the product with no obligation to previously supplied machines.

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Introduction

We congratulate you on the purchase of your new TKS product. You have chosen a product which will give you satisfaction through a network of efficient dealers where function, finish, after sales service and spare parts are always at hand.

All TKS products are designed and tested in close cooperation with farmers and contractors to ensure optimal function and reliability.

Please read this manual before using your new machine. Note that the user manual refers to optional equipment, which is not mounted on your machine. The control panels are prepared for optional features, even if the machine not is equipped with the current function.

We wish you all the best with your TKS product.

Yours faithfully

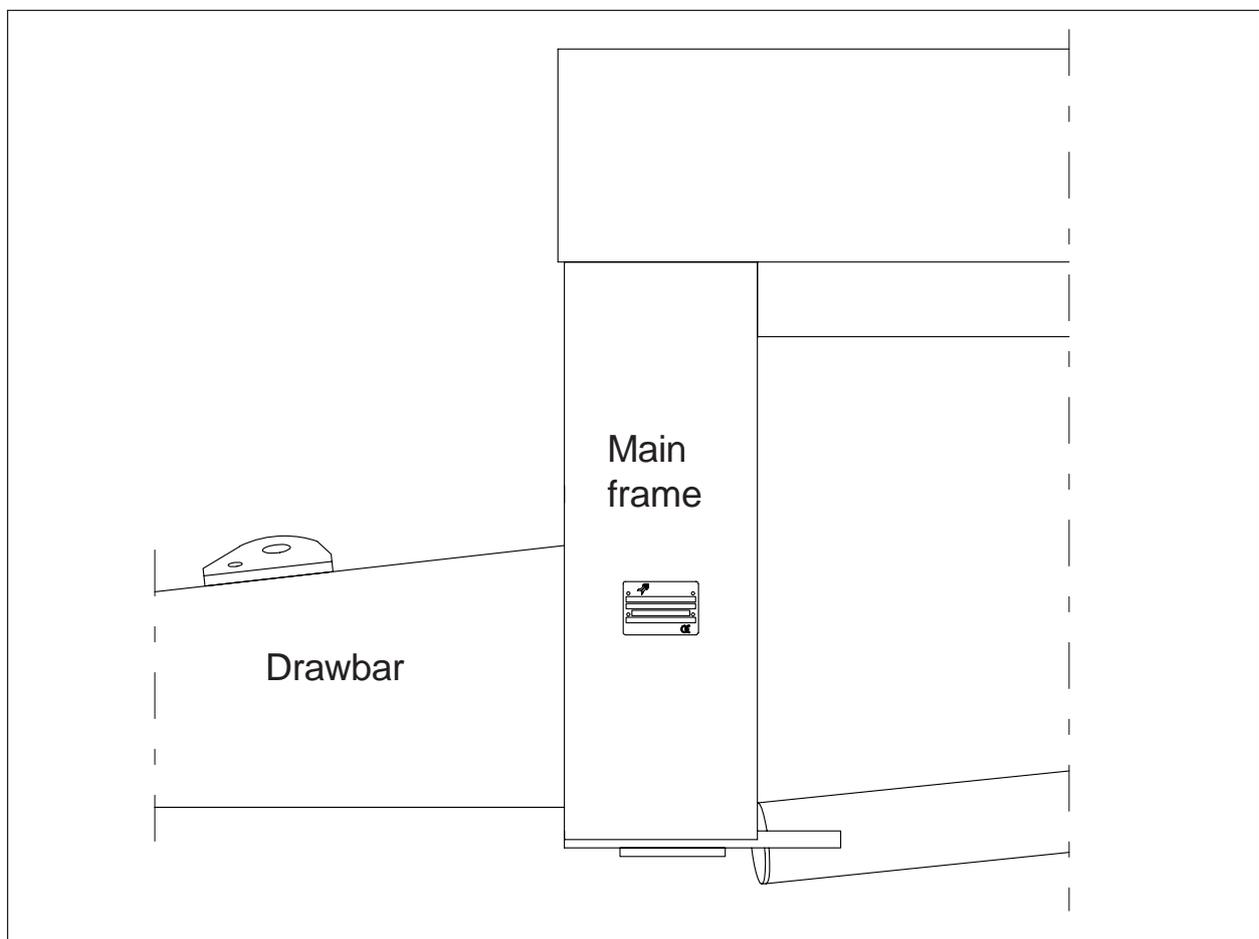
TKS Mekaniske AS

Machine identification

The machine's serial number and the manufacturer's address is found on the number plate of the machine. See illustration below.

The serial number and year of manufacture for this machine is given below. This number is important with regard to service and the correct supply of spare parts.

The machine is marked CE. This marking with appurtenant EU statement of agreement means that the machine complies with substantial health and security demands, and that it is accordance with the directives 89/392/ECC as amended by directive 91/368/ECC , 93/44/EEC and 89/336/EEC.



Serial number: _____

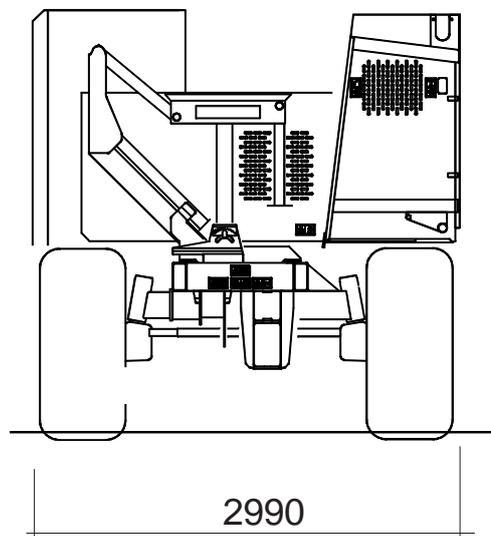
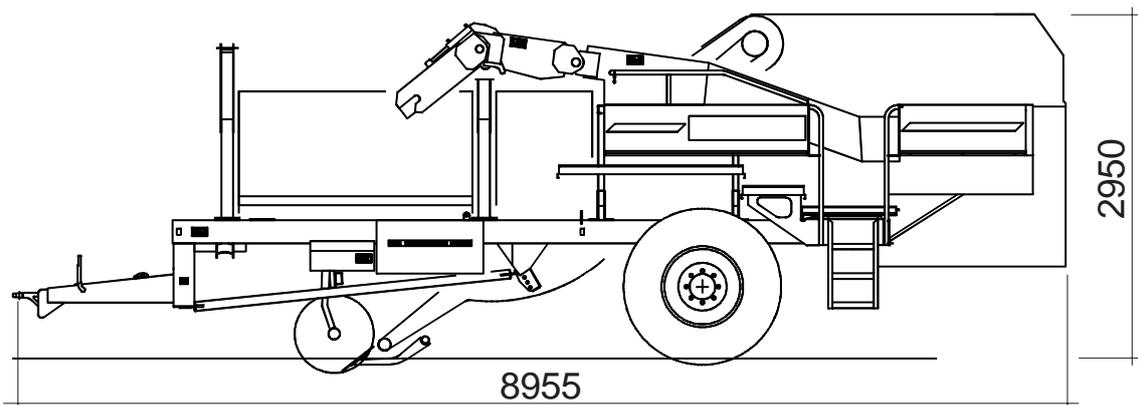
Year of manufacture: _____

Model description

UN5640 is a single-row potato harvester with bunker. The machine is designed for harvesting potatoes. The first sieving web is mechanical driven. Remaining webs, haulm diviner web, cross conveyor and picking table, is hydraulically driven. The main sieving web has adjustable agitators. The first and second cleaning webs include adjustable tilting and deflector rollers. Rotating deflectors are included in the separation system. Type of webs and deflector system is according to model version. The picking table offers space for 4 operators and has integrated trash web and trash chutes. The machine is delivered with a 4 ton main bunker. The main bunker has parallel lifting which provides large unloading height. The machine is available with alternative track widths, offers hydraulic lane adjustment and electric control systems. Observe! The standard of the machine may differ according to each market's specifications

Dimensions

Covers machine with horizontal main frame and standard wheel dimension 500/60-22.5"



Observe! The standard of the machine may differ according to each market's specifications

Technical specifications basic machine

Covers machine with horizontal main frame and standard wheel dimension 16.00/70-20"

Model:	5640
Dimensions and weight	
Length from centre drawbar yoke	8,80m
Transport width (without bunker chute)	2,99m
Transport width (with grader bunker)	2,99m
Working width (without bunker chute)	3.93m
Transport height (without bunker chute)	2.95m
Gross weight	5100kg
Drawbar weight	900kg
Axle weight	4200kg
Connection to tractor	
Mechanical	Hitch or tractor drawbar
Hydraulic	One hydraulic outlet with free return to tank or double acting outlet with 25-50 l/min at 175 bar
Electrical	12V
Control system	
Standard	Electronic prepared for auto functions
Shares	
Standard	2 blades
Optional	3 blades 1 blade
Roller discs	
Diameter	690mm
Distance	520-600mm
Haulm pull in wheel	
Diameter	385mm
1st. sieving web	
Width	750mm
Web gap (standard)	30mm
Web gap (optional)	26, 35, 40mm
Rod diameter	10mm
Sieving area	3.10m ²
Flight conveyor	
Speed adjustment	
Standard	Fixed speed ratio
Option	Infinite during harvesting
Main web agitation	
Type	One or two rotating agitators, mechanical driven
Adjustment (standard)	Mechanical
Adjustment (optional)	Infinite hydraulic
Primary cleaning web	
Type	Longitudinal hedgehog web
Width	0.89m
Web gap (standard)	22mm
Sieving area	1,5m ²
Distribution to cross conveyor	Deflector roller

Observe! The standard of the machine may differ according to each market's specifications

*=options

Model:	5640
Haulm diviner web	
Width	0,85m
Working length	1.60m
No. of strippers (standard)	2 + 3 rows of 6 strippers each
Speed adjustment*	Infinite hydraulically
Secondary cleaning web	
Type	Transversal hedgehog web
Working width	750mm
Angle adjustment	Infinite mechanical
Angle adjustment*	Infinite hydraulically
Speed adjustment	Infinite hydraulically
Deflector 1	Twin row finger web with adjustable working height
Deflector 2	Rotating deflector roller for remainings
Picking table	
Width main picking web	700mm
Width trash conveyor	300mm
Web gap	20mm
Speed adjustment	Infinite on the run
Main bunker	
Capacity	4000kg
Discharge height	approx. 1.57-3.93m (centre drive shaft)
Wheel axle	
Standard	Rigid
Optional	Hydraulic wheel steering* Auto centre system
Height adjustment	50mm
Track width (standard)	75-80cm row width
Track width (optional)	85 or 90cm row width
Wheel dimensions	
Standard	16.00/70-20"
Option	400/60-26,5" 500/60-22.5" 500/60-26,5" 600/55-26,5"

Technical specifications sundry optional equipment

Grader

Grading rate	20-50mm
Adjustment	Profiled rollers with infinite adjustment

Grader bunker

Capacity	800 kg
Discharge height	1,42m or. 1,58m (centre drive shaft)

Stone bunker

Hydraulically operated discharge hatch

Control system and automatic functions

Additional control panel for drawbar adjustment, wheel adjustment, discharge height and moving floor

Automatic depth control

Automatic lane adjustment

Automatic height adjustment picking table

Automatic filling optimization

Canopy

Canopy picking table

Canopy main bunker 4000kg

Discharge chute main bunker

Discharge chute 4000kg

Safety

Before operating, adjusting or servicing the machine it is important that the safety instructions in this manual are carefully read and understood by those directly concerned (Fig. 13-1).

Whilst all care and attention has been taken in the design and production of this machine, as with all machinery there remains a certain amount of risk to personnel whilst the machine is in use. It is strongly recommended that users and operators take all possible precautions to ensure both their own safety and that of the others that may be in the

vicinity. Read and observe the safety instructions in this manual. Safety is your responsibility!



Pay particular attention to this symbol. It means that there could be a serious hazard. It emphasises precautions which have to be complied with in order to prevent accidents.

This symbol can be found throughout this manual and on the warning signs of the machine. They are for your safety and should be observed at all time.

General safety precautions

Be careful when other people or animals are close by!

Never start the machine when people or animals are close by tractor or machine. Never stand between the tractor wheels and the machine (Fig. 13-2).

Bear in mind regulations regarding the lower age limit of operators of this kind of machines.

Use of the machine

The machine should be used only for the purpose it has been designed for.

Use personal protection devices

Do not wear loose clothing which might catch in any of the moving parts. In dusty conditions an approved mask must be used (Fig. 13-3).

Take care of excessive noise level. Some tractor/implement combinations, depending on conditions, may cause noise level beyond 85dB at the operator's ears, even in a 'Q' cab. In these conditions ear defenders must be worn. Keep cab windows and doors closed to reduce noise level.

The machine must be connected to a correctly sized tractor

The weight of the tractor must correspond to the maximum weight of the machine when operated. Follow domestic law and regulations (Fig. 13-4).

Make sure that the tractor has the correct P.T.O. gear engaged. A machine designed for an input speed of 540 rpm. should never be connected to a tractor with 1000 rpm.

output speed engaged. The normal P.T.O. speed is given on a label close to the P.T.O. input shaft.

Connecting machine to tractor

must always be carried out as described in this manual. If connection should be carried out with the drawbar, one of the parts (tractor's or machine's drawbar) must have a clevis. The drawbar pin must be secured with a locking pin (Fig. 13-5).

Observe national regulations regarding road transport. Some countries require the use of safety chain when a trailed machine is towed along public roads.

Think of safety while operating the machine

Stop the tractor engine and remove the ignition key prior to carrying out repairs, cleaning, lubrication or maintenance on the machine (Fig. 13-6).

Safety guards

Make sure all guards are in good order and fitted correctly. Do not attempt to start the machine before ensuring this (Fig. 13-7).

Pay particular attention to the plastic guards of the P.T.O. shaft. If damaged they must be replaced. The chain locks of the guards must always be fitted on a suitable place on the tractor and the machine to prevent the outer plastic guards turning.

Hydraulics

Be very careful when operating the hydraulics. Use eye protection and gloves. Escaping hydraulic oil under pressure might pene-

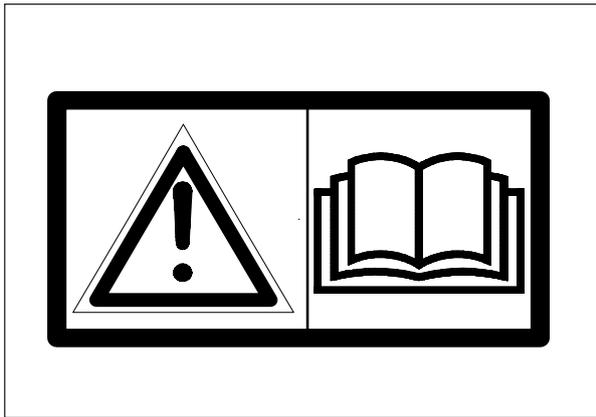


Fig. 13-1

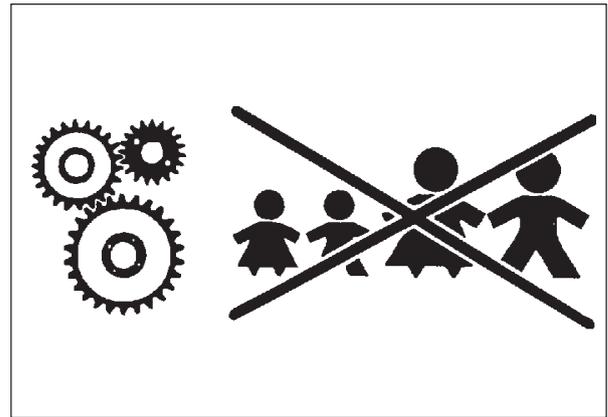


Fig. 13-2

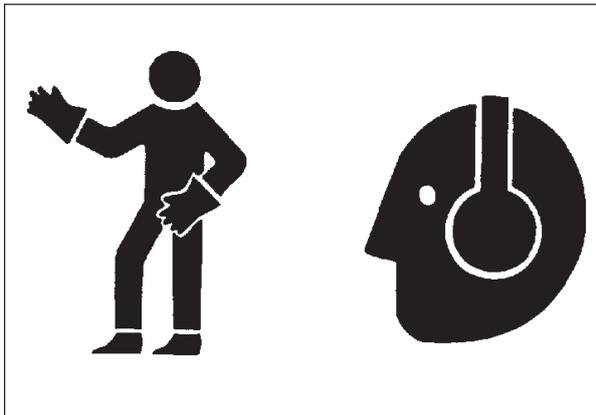


Fig. 13-3

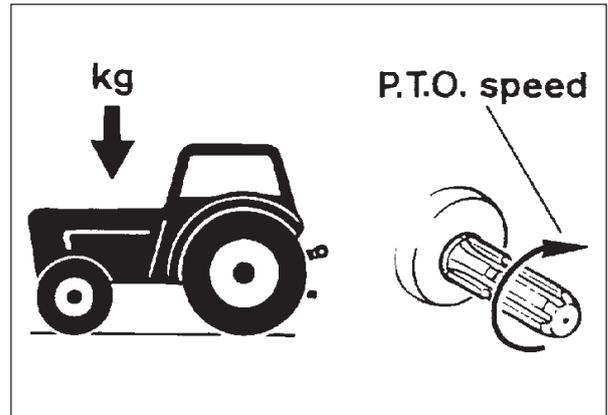


Fig. 13-4

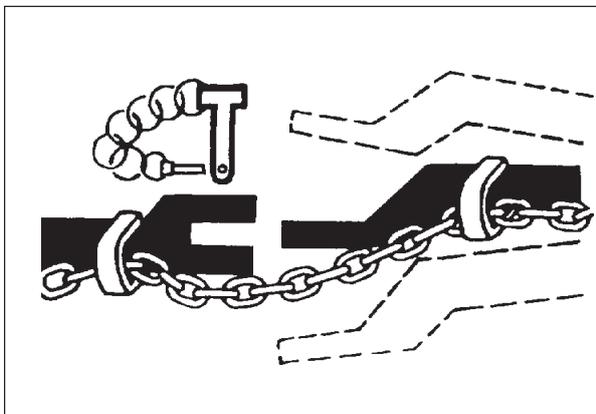


Fig. 13-5

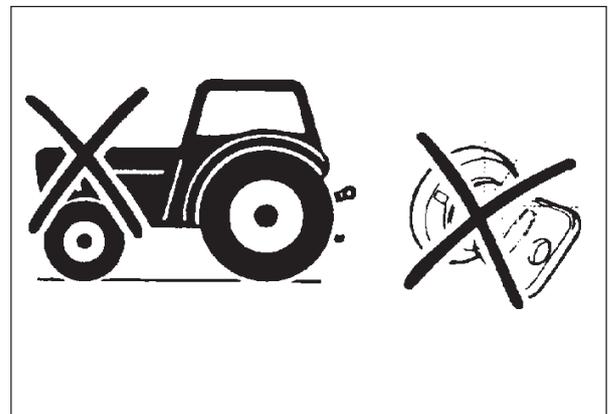


Fig. 13-6

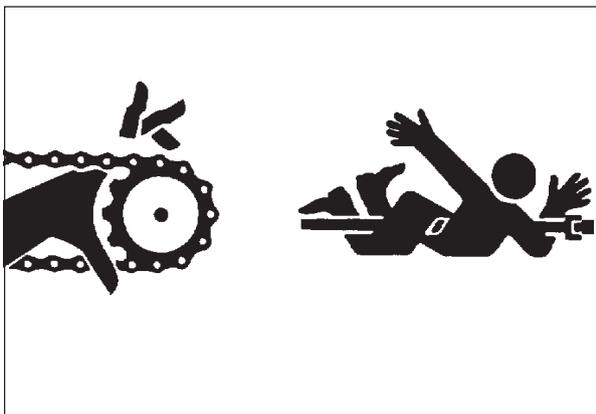


Fig. 13-7



Fig. 13-8

*=options

trate into the skin and cause serious infection. See a doctor if you have been exposed to injury (Fig. 13-8).

Take care that nobody is close to the machine when the hydraulic functions are being operated.

When uncoupling machine and when leaving tractor/machine

When uncoupling, all hydraulic functions must be in neutral position. The machine must be lowered to the ground and be safely secured. If the machine has parking chocks they should be used at the wheels. Never allow children to play or stay near agricultural machinery (Fig. 15-1).

Drive safely

Be aware of your responsibility, - carelessness or negligence may cause serious injury or even death (Fig. 15-2).

Prior to transporting the machine along public roads, check wheel bolts and couplings. Disconnect or lock the hydraulic system.

Drive carefully. Reduce speed when turning and driving on uneven ground. Take care that trailed machines do not start swinging or become unstable.

Please be aware of the danger of overturning when working on slopes and in soft ground. Reduce load.

Lights

The owner and operator is responsible of providing correct lamps and reflectors on the machine when transported on public roads. Comply with public regulations (Fig. 15-3).

Safety equipment

Always carry first aid equipment on the tractor. Also observe the regulations concerning fire extinguisher. When working with burning materials like hay and straw a fire extinguisher must be available at all times (Fig. 15-4).

Spare parts

For safety reasons use only original spare parts. The use of spurious spare parts will cause the Underhaug product guarantee to be invalid (Fig. 15-5).

Maintenance

Take care that the machine is properly maintained and kept in good safe working condition. Never change the basic technical construction of the machine (Fig. 15-6).

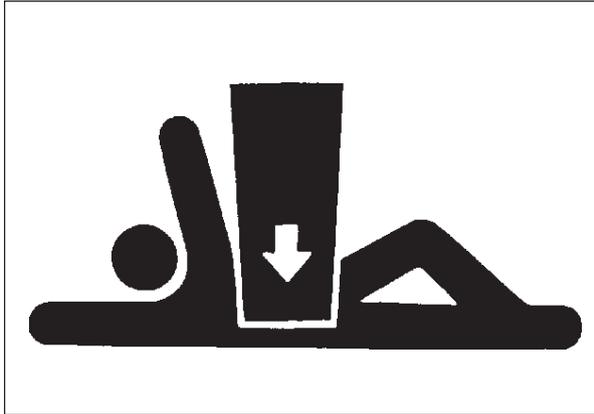


Fig. 15-1

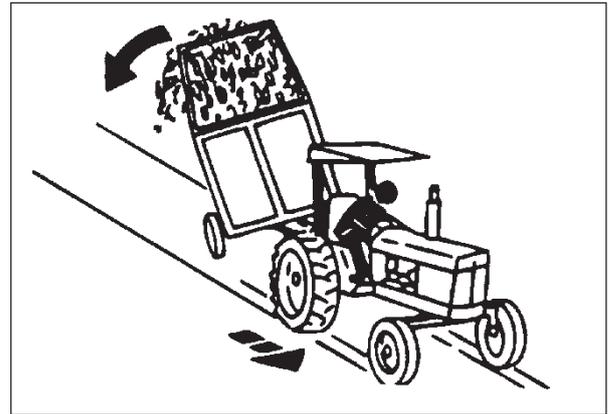


Fig. 15-2

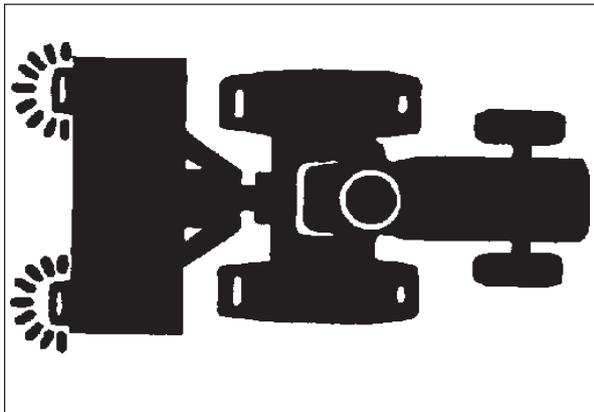


Fig. 15-3

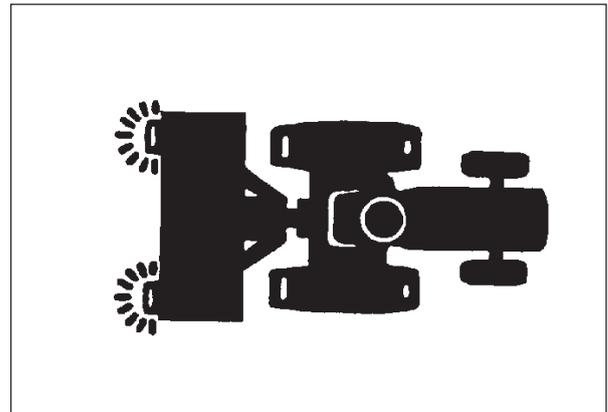


Fig. 15-4

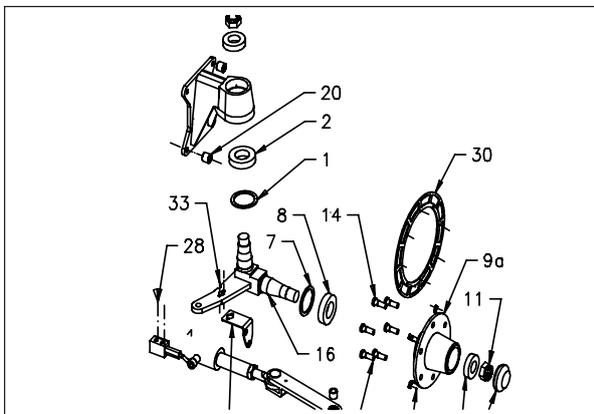


Fig. 15-5



Fig. 15-6

*=options

Supplementary safety instructions for the UN5640 harvester

The machine is equipped with warning signs. If any of the stickers are damaged, they must be replaced. Ordering numbers are shown on the illustrations in this paragraph.

Fig. 18-1 shows where the signs are placed on the machine.

Warning sign 220532 (Fig. 16-1). Be careful! Read and understand the instructions in this manual before the machine is put into service and before attempting adjustment/maintenance.

Warning sign 220548 (Fig. 16-2). Stop the tractor and remove the ignition key before any maintenance and service.

Warning sign 220546 (Fig. 16-3). Disconnect the control panel and hydraulics during transport to avoid activating hydraulic functions.

Warnings sign 220534 (Fig. 17-1). Disconnect all electronics before welding commences.

Warning sign 220531 (Fig. 17-2). Use transport locks during transport. Do not activate hydraulic cylinders while the lock is fitted. This might damage the machine.

Warning sign 220531 (Fig 17-3). Keep distance when the bunker is lifted.

Warning sign 220535 (Fig. 17-4). Danger of trapping. Use safety leg when working under lifted bunker.

Warning sign 220539 (Fig. 17-5). Danger of trapping. Keep away from cleaning webs .

Warning sign 220536 (Fig. 17-6). Danger of trapping. Keep away from moving parts.

Warning sign 220536 (Fig. 17-7). Be careful when machine is lowered! Keep feet away from shares and wheels.

Warning sign 220541 (Fig. 17-8). Be careful when passing close to overhead powerlines. The height of the machine may exceed 5 meters when the elevator is fully raised to vertical position.

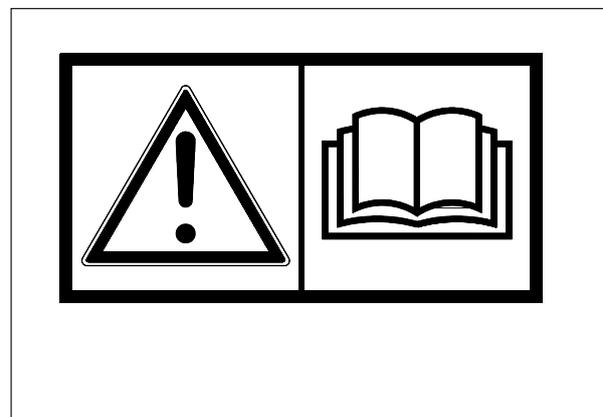


Fig. 16-1

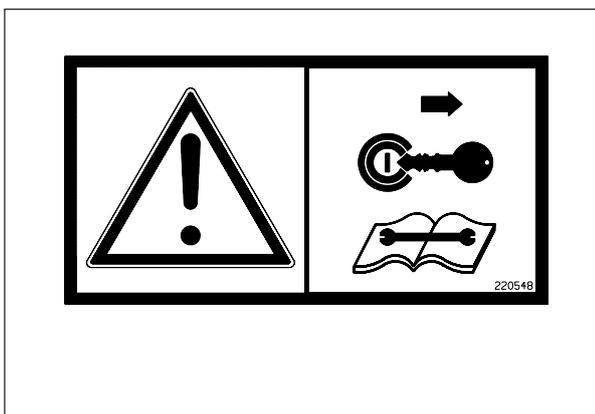


Fig. 16-2

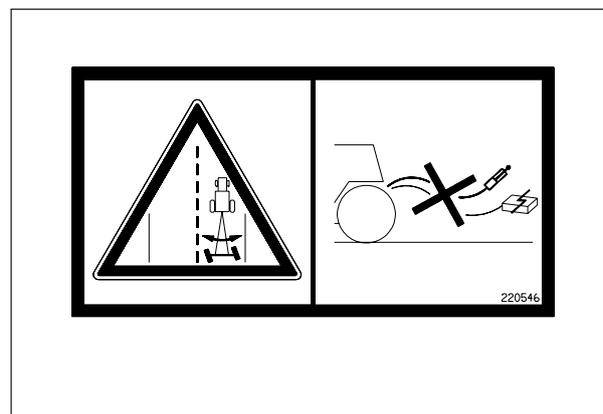


Fig. 16-3

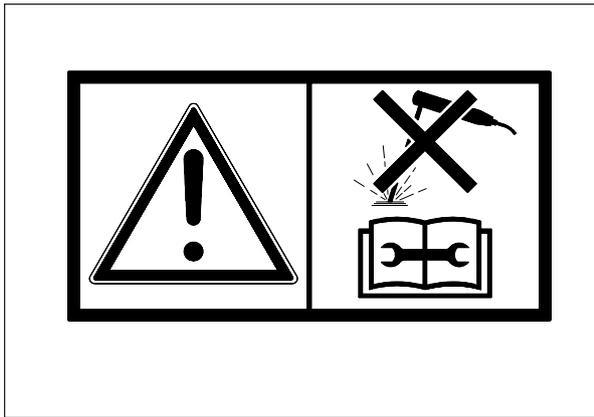


Fig. 17-1

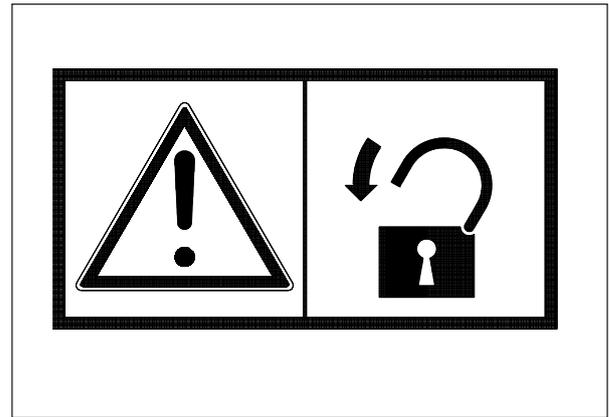


Fig. 17-2

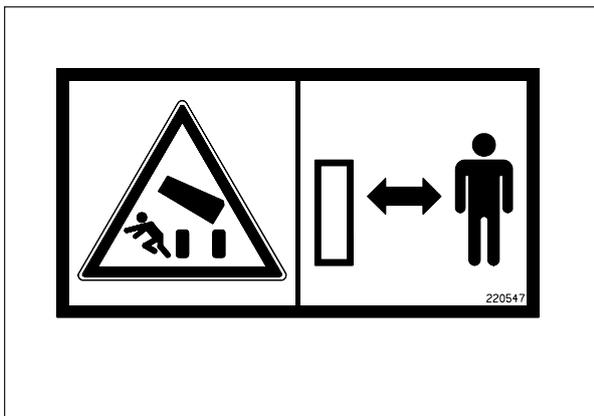


Fig. 17-3

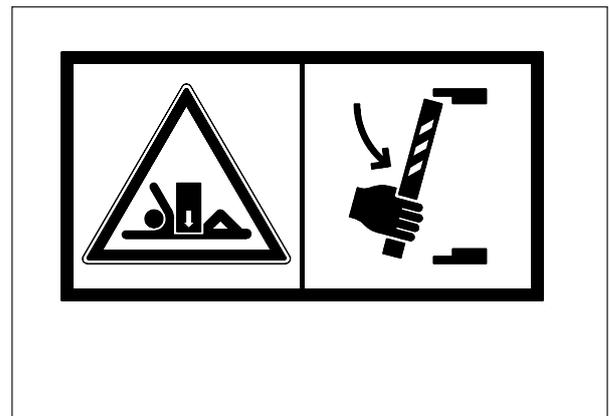


Fig. 17-4

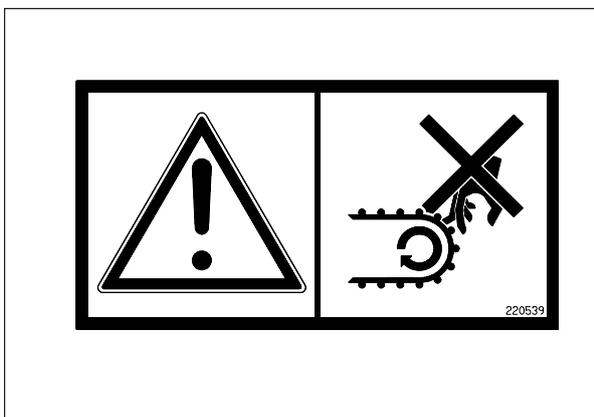


Fig. 17-5

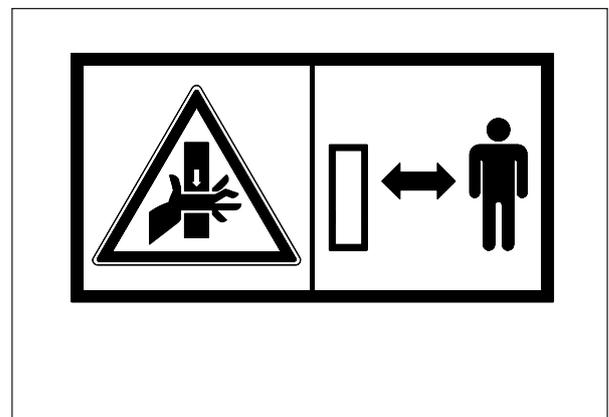


Fig. 17-6

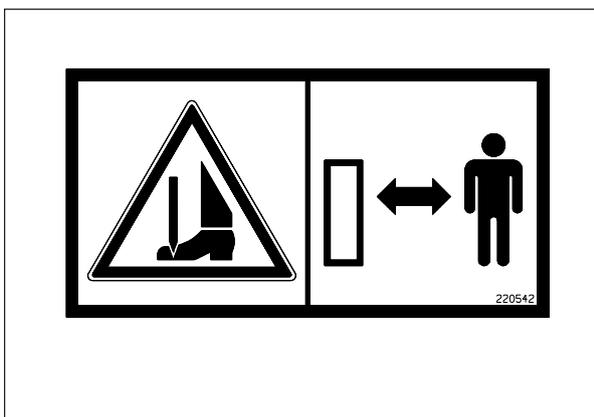


Fig. 17-7

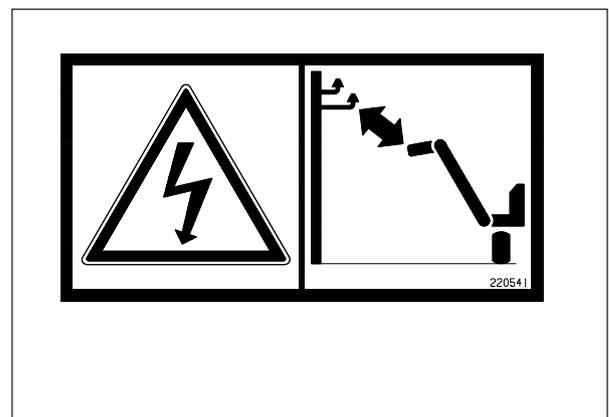


Fig. 17-8

*=options

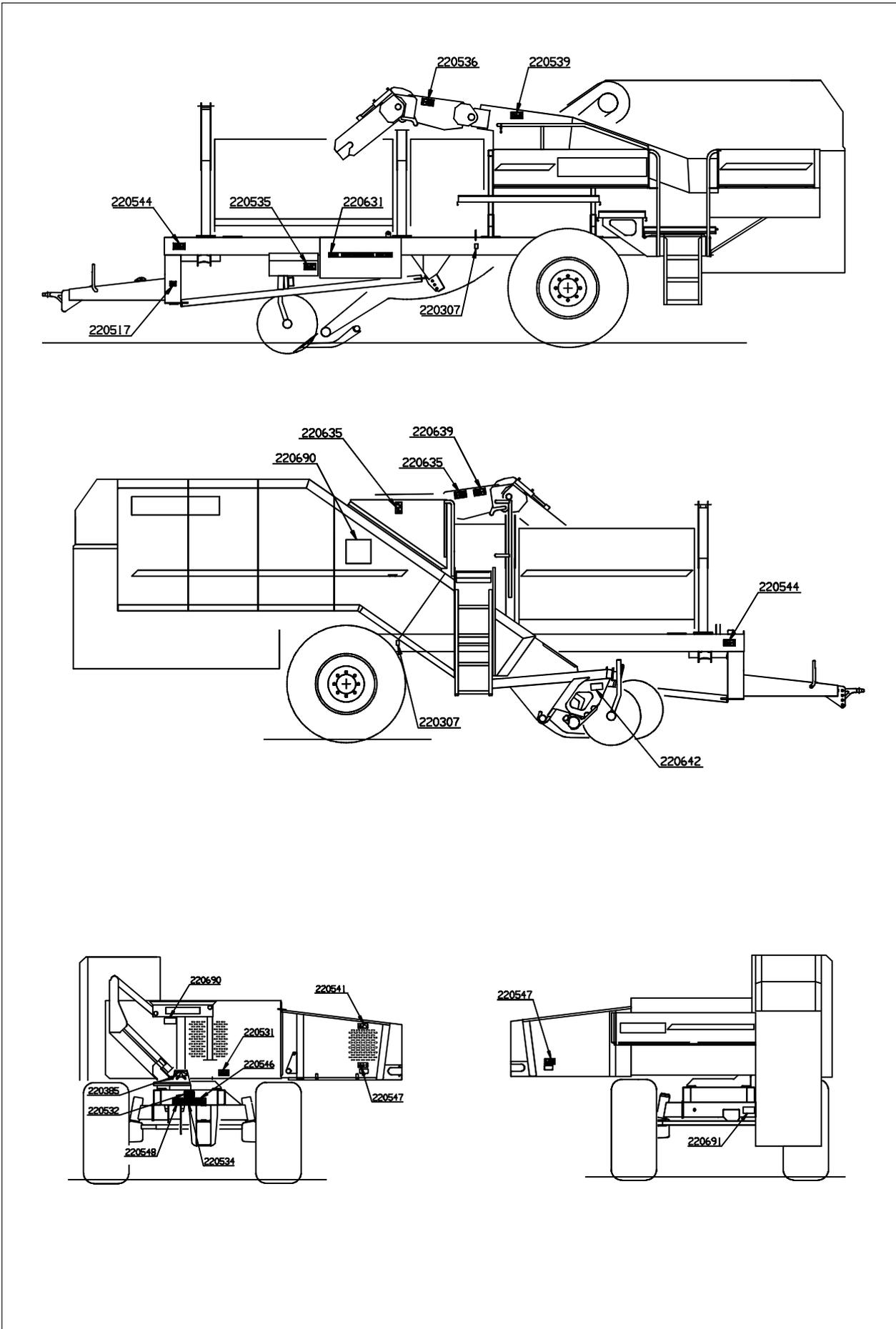


Fig. 18-1

Danger for overturning

Drive with especially care and caution in following situations to avoid danger for overturning:

- Driving in side slopes
- Driving with narrow track width
- Driving with maximum load and drawbar out of centre position
- Driving with load off centre of harvester.
- Driving on soft soil
- Unloading the bunker

When driving on field with loaded bunker, always use maximum track width and place the drawbar in its left position.



When lifting the bunker, the centre of gravity also rise, which makes the machine more unstable. This requires maximum caution when unloading the bunker. The basement must be smooth and hard. The bunker must only be lifted when the machine stand still.

Hazard with use of chemicals

Always follow the manufacturer's safety precautions regarding the handling of chemicals and fertilizers.

New machine - be careful!

Read the operator's manual. Great care must be taken when starting a brand new machine for the first time. Incorrect assembly, faulty operations etc. may cause expensive repairs and loss of profit. The Underhaug product guarantee does not cover damage occurring when the instructions given in this book are not followed.



Pay particular attention to this symbol, - it emphasises operations where great care must be taken in order to avoid incorrect assembly, faulty operations etc.

Make following checks when starting a new machine:

Check that the machine is not damaged. Assure that electric cables and hydraulic hoses have length and position that allow machine to move without causing them any damages.

Check the connections between tractor and machine.

Check that drive chains are in position on sprockets and properly tensioned.

Lubricate the machine according to lubrication charts - section 8.

Check wheel and drawbar bolts, the connections between main frame and picking table between elevator and main frame.

1. Preparing a new machine

1.1 Unloading / lifting

Only use approved lifting device. The weight of the machine is given in section «Technical Specifications». Observe! Weight may vary due to optional equipment included. (Fig. 21-1)

Use the lifting beam included with the machine.

When lifting with slings: Attach approved lifting slings to the four points indicated on the machine's main frame.



Make sure that slings are securely fastened before lifting. Use a guide wire to keep machine in position.

Be careful! Do not stay underneath a lifted machine.

1.2 Wheels

Fit any wheels (removed for transportation) when machine is lifted off the lorry. Make sure that the wheel axle is fitted in the correct height position (Fig. 21-2).

The wheel rims should be fitted opposite to the tractor's wheel rims.



Fasten the wheel nuts properly (conic surface on nut to face the rim). Torque 220Nm.

1.3 Drawbar



Fit the drawbar and the drawbar cylinder (Fig. 21-3). Grease drawbar pin whilst still unconnected (Fig. 21-4).

1.4 Packaging and equipment

Remove all equipment and packaging stored on the machine.

1.5 Transport locks

Remove any lifting slings and other security equipment measures fitted for transportation. Mount the inside platform if removed.

1.6 PTO shaft

Mount the PTO shaft. Follow the guidelines on the shaft.

See also chapter 3.2 regarding adoption of length. There is a safety clutch fitted in the main drive line of the machine. Therefore the PTO shaft should not have safety clutch included.

1.7 Haulm guide canvas

Fit the PVC haulm guide canvas on right hand side of the machine according to separate fitting instructions (Fig. 21-5 and Fig. 21-6).

1.8 Control panels

Prepare the power cable for mounting to the tractor's power supply outlet, and the cables for the control panels.

Mount the machine's control panel to the control unit support above the picking table.

The system requires 12V power supply. The solenoids should work properly even if there is 10% drop in voltage.

1.9 Sensors and switches

Check that all sensors are properly fastened after transport.

1. Sensor for wheel steering (analogue)
2. Sensor for auto dept. control* (micro switch)
3. Switches auto lane adjustment (inductive)
4. Sensor for automatic height picking table* (ultrasound)
5. Sensor for filling optimization* (micro-switch)

Inductive sensors «feels» steel.

Microswitches record on/off positions.

Check clearance sensor/steel prior to use. This should be between 2-6mm.

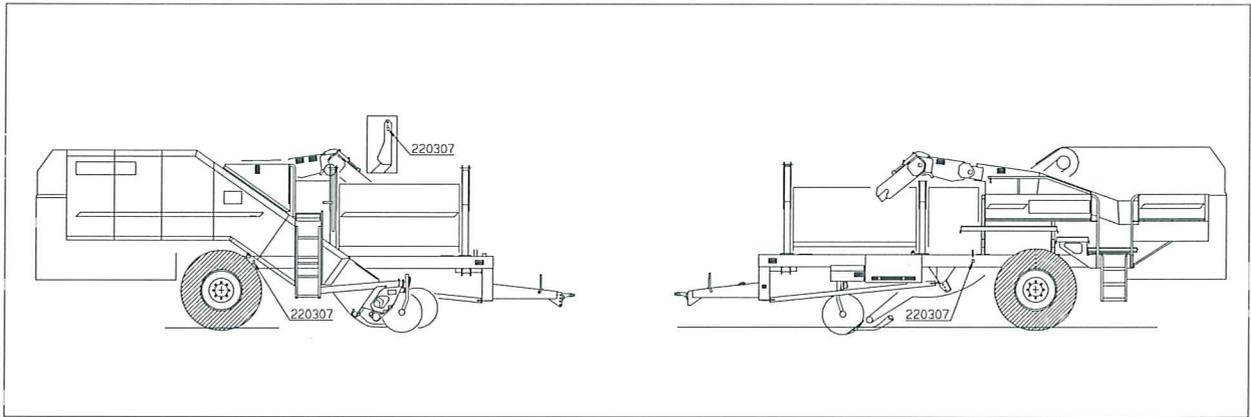


Fig. 21-1

Positioning the wheel hub

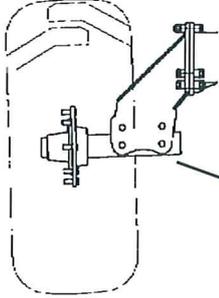
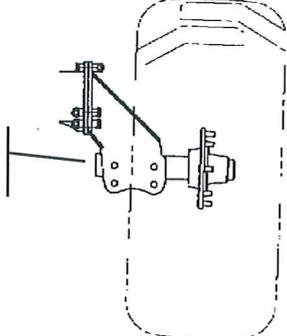
	<p>Wheel dimension</p> <p>600/55-26.5</p> <p>500/60-26.5</p> <p>400/60-26,5</p> <p>500/60-22.5</p> <p>16.00/70-20</p>	<p>Wheel diameter</p> <p>1333mm</p> <p>1273mm</p> <p>1160mm</p> <p>1150mm</p> <p>1075mm</p>	
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Fig.21-2

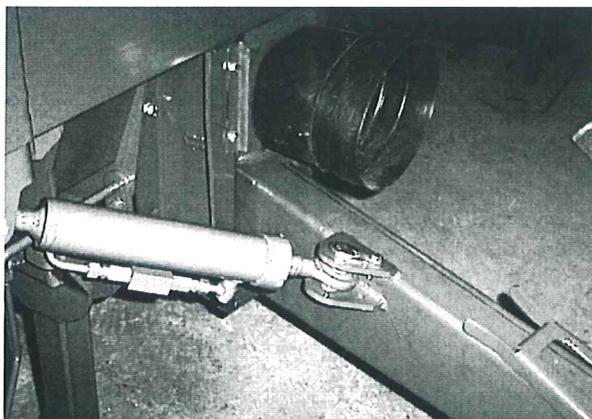


Fig. 21-3

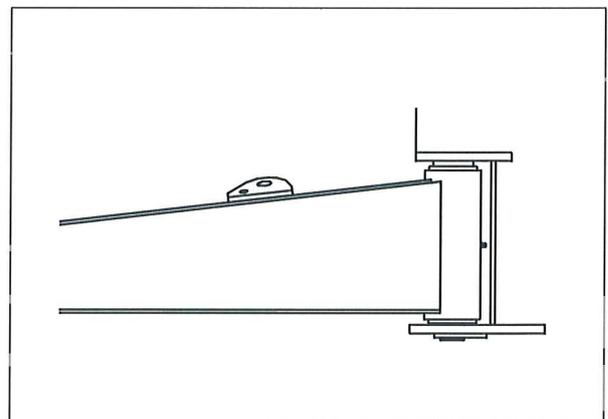


Fig. 21-4

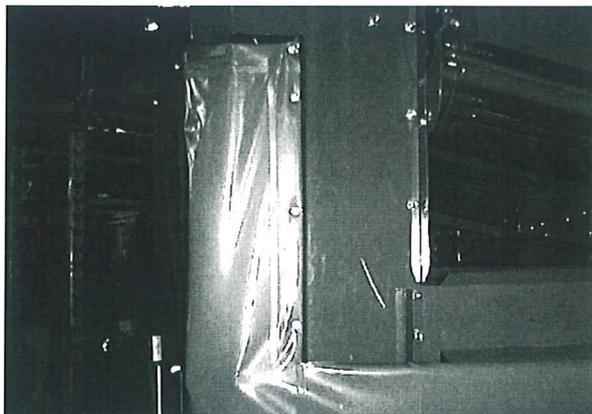


Fig. 21-5

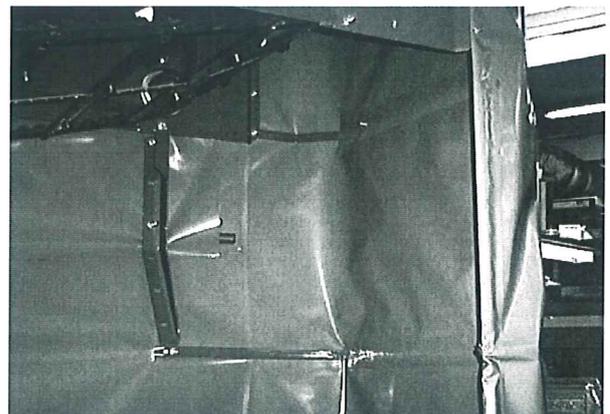


Fig. 21-6

*=options

1.10 Optional equipment

1.10.1 Moving bunker end curtain

Fit sliding frame with nylon rollers towards inner end of bunker (Fig. 23-1).

Adjust distance between roller sections achieving ball bearings roll touch bunker panel. Use the shims provided (Fig. 23-2).

1.10.2 Bunker discharge chute

Fit the side canvas onto the side frame sections. Attach them at the end of the bunker (Fig. 23-3).

Mount the brackets for the discharge chute under the bunker (Fig. 23-4).

Slide the four tubes into the slots of the canvas chute. Connect with bolts.

Note that the transport width is 10cm wider with the brackets.

See separate assembly instructions.

1.10.3 Stone hatch

The stone hatch and the cylinder are mounted to the main frame, underneath the picking table.

The hatch is operated from the tractor cab panel.

See chapter 4 and 5.

1.10.4 Grader

Contact your Underhaug dealer.

1.10.5 Grading bunker

Contact your Underhaug dealer.

1.10.6 Canopy picking table

See separate assembly instructions.

1.10.7 Canopy bunker

See separate assembly instructions.

1.11 Final control

Check that no machine parts can block belts or hydraulic functions when the machine starts.

Check wheel bolts, wheel axle connectors and drawbar connectors.

Check the oil level of the tank (level glass on the tank). Correct level at horizontal machine is upper half of level glass. Hydraulic oil type HD46 is filled at the factory. Let the pump run for some minutes at PTO speed of approx. 500 rpm.

Test all mechanical and hydraulic functions.

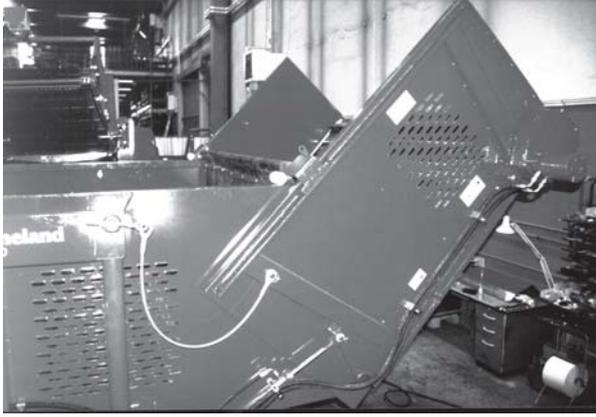


Fig. 23-1

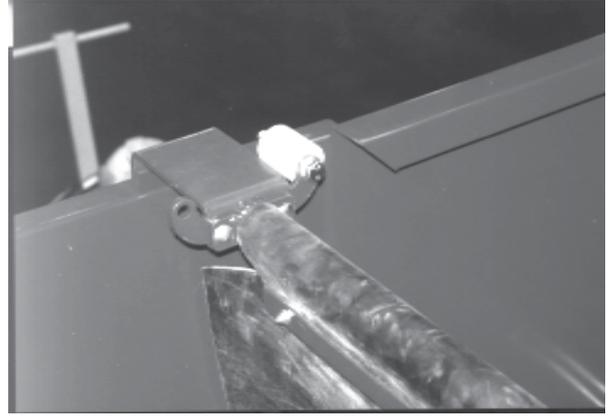


Fig. 23-2

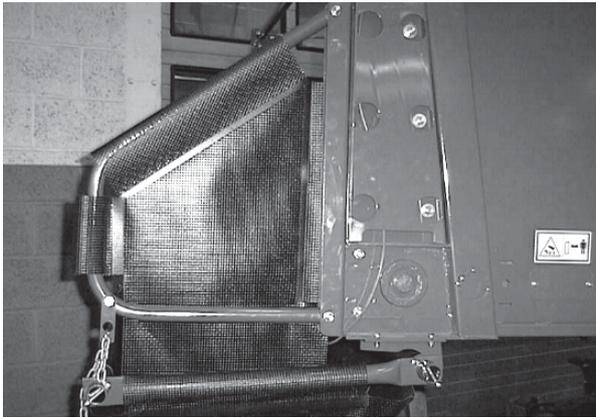


Fig. 23-3

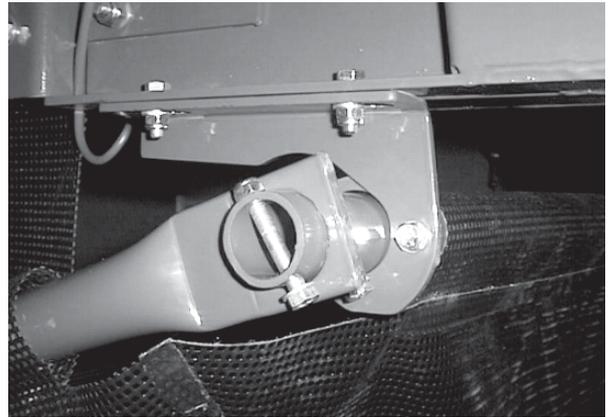


Fig. 23-4

2 Tractor requirements

2.1 Engine power

Model	Minimum engine power
5640	90 hp

2.2 Hydraulics

25-50 litres/min. at 175 bar (tractor running at required engine speed).

One single acting hydraulic outlet with free return to oil tank or one double acting outlet.

The back pressure should not exceed 10 bar.

2.3 Drawbar

Hydraulic hitch or drawbar.

Use of drawbar will transfer weight from the front to the rear of the tractor. This might reduce the tractors steering property.

2.4 Electric power supply

The electric/electronic controls require a steady 12V power supply.

Use the power supply cable included with the machine to connect battery.

The solenoids can be operated at 10.5V power (measured at the solenoid), while the electronics require min. 11V input power (measured at the «black box»).

Light connections uses standard DIN socket.

2.5 P.T.O. shaft

540 rpm

13/8" 6 splines.

3. Connection to tractor

3.1 Drawbar height

Adjust drawbar height for main frame to be parallel with the ground.

When attaching to drawbar use the pipe sleeve, lock ring on top (Fig. 27-1).

3.2 P.T.O. shaft



When starting a new machine the length of the P.T.O. shaft must be adjusted to allow it to slide freely yet have adequate overlap (Fig. 27-2). Both ends must be cut equal when shortening the shaft (Fig. 27-3 and 27-4).

The overlap must also be checked when connecting to another tractor. Fasten the safety chains and check that the axle can move freely in both directions.

See the shaft manufacturer's own information which is attached to all new shafts.

3.3 Electric connections

1. Connect the power cable to the tractor's power supply. Check that the outlet voltage is 12V.
 2. Place the control panel in a proper position on the driver's right hand side (Fig. 27-5). If the machine is fitted with an extra control panel, place this on the left hand side.
 3. Mount the data cable to the control panel.
- See chapter 4 regarding electric controls and 5 regarding electronic controls.

3.4 Hydraulics

The harvester's hydraulic hoses are identified as follows (Fig. 27-6):

Flow: Short quick release coupling

Return: Long quick release coupling
(a non return valve is fitted in the return line).

Avoid return connection which gives a high back pressure (above 5-10 bar).



The flow hose can be connected to a single acting spool valve and a return hose with non-resistance oil tank connection. Missing return will damage the machine's hydraulic valves and oil motor.

When the machine is connected to a John Deere tractor (or other tractors with closed centre hydraulics), the harvester's spool valve centre must be closed. (The pin screwed into its stop, accessible from underneath the block) (Fig. 27-7). When using other types of tractors this screw must be screwed fully out with the head level with the central block edge.

When working in dusty conditions, the top of the valve bank should be covered by some kind of filter material (rubber sponge) in order to prevent dust from intruding the valves through the caps on top of the spool guides.

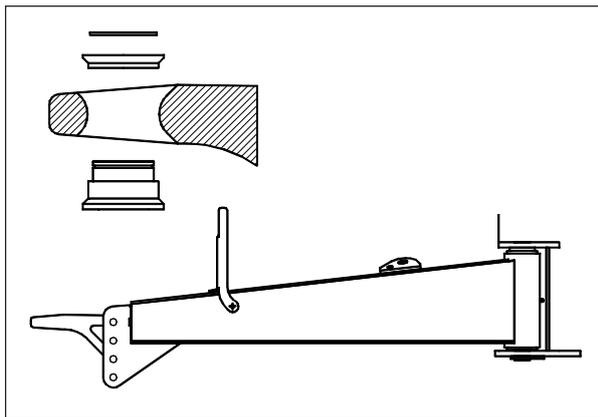


Fig. 27-1

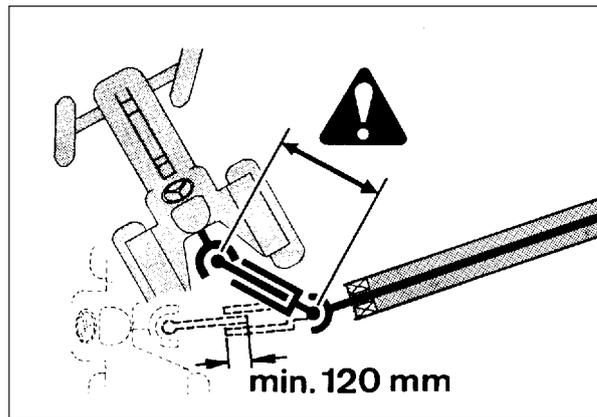


Fig. 27-2

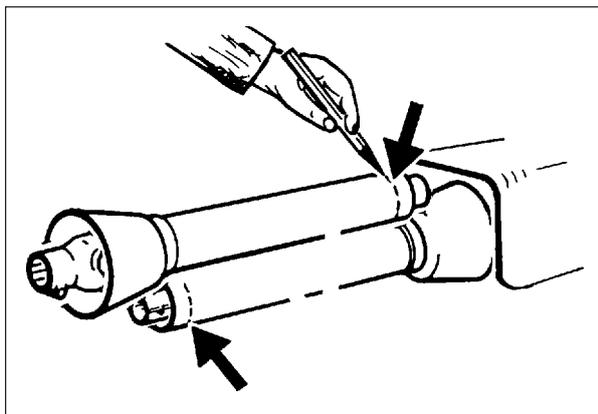


Fig. 27-3

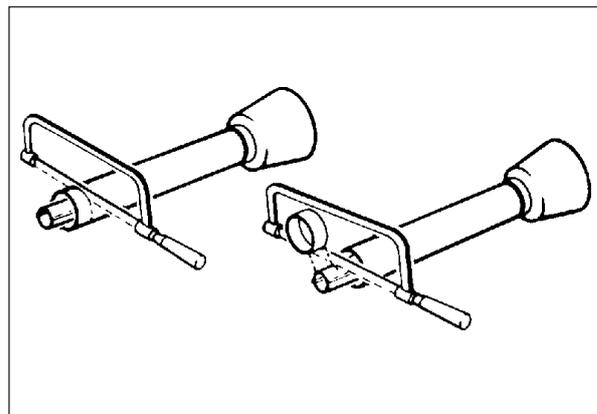


Fig. 27-4

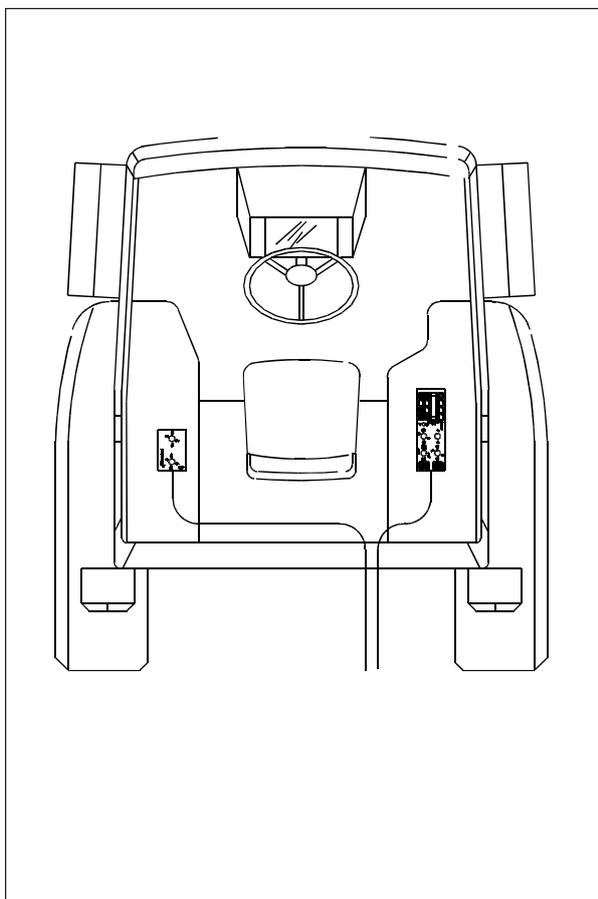


Fig. 27-5

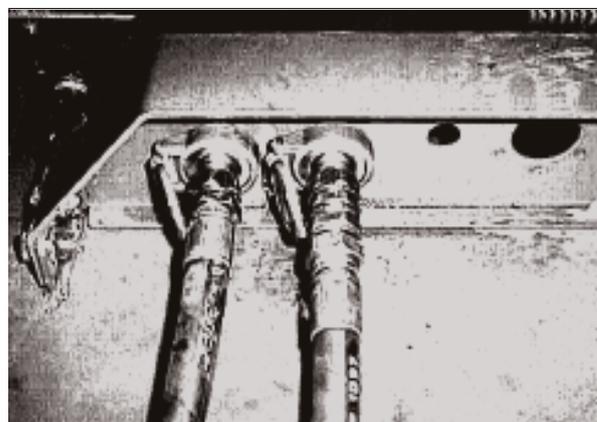


Fig. 27-6

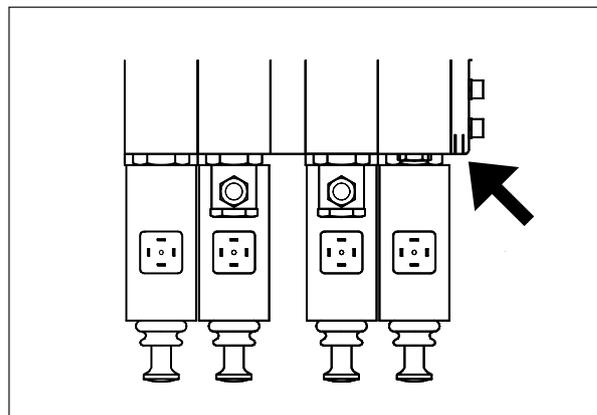


Fig. 27-7

*=options

5. Operation the electronic control system*

5.1 Function and structure

The electric control system consists of:

- Control panel tractor (Fig. 29-1)
- Control panel picking table (Fig. 31-1)
- Extra control panel for positioning and bunker operations (Fig. 31-2)
- Driver unit fitted on the machine (Fig. 29-2)

The valve block is fitted with electromagnetic spool valves, which are operated from the control panels' joysticks, toggle switches and buttons.

The computer operates continuously, reading information from inputs (sensors) and panel, comparing information and thereafter activating outputs (spool valves).

The electronic control system can be fitted with following auto functions:

- Automatic wheel centring
- Automatic lane adjustment
- Automatic height adjustment picking table
- Automatic bunker filling

5.2 Connection

Connect the electric plugs directly to the battery to ensure satisfactory power supply.

Connect the data cable from the driver module / black-box to the control panels.

5.3 Control panel tractor

(Fig. 29-1). Appearing of text in the display shows that the power supply is connected. The panel is prepared for operating extra functions, even if the machine is not equipped with this functions

G. Display:

Shows alphanumeric information (numbers and letters). Standard display mode shows the wheel position in degrees, and in addition position of other auto-levelling functions if mounted. Standard display mode can be changed using «Select» and «Save». When activating/deactivating auto functions this is displayed.

E. Toggle-switch:

The toggle-switch is used in combination with the keys. The switch are used to change working positions and operate hydraulic functions which do not have their own joystick (bunker end/stone hatch). Activate the current function, and then press the toggle-switch to activate the function.

Example on activating the bunker end:

1. Press shortly key no. 14, bunker end/stone hatch. The display indicates now «Hopper».
2. Activate the toggle switch within 6 seconds. The display returns to standard view after 6 seconds.

Diode lights F:

Indicates the wheel position. (Requires automatic wheel centre positioning fitted)

- Green: The machine turns left
- Red: Wheels in centre position
- Yellow: The machine turns right

Joystick A:

1. Main web agitator adjustment*

Joystick B:

1. Wheels turn right - left*
2. Main bunker up - down

Joystick C:

1. Shares up - down
2. Drawbar right - left

Joystick D:

1. Picking table end up - down
2. Roller floor main bunker (joystick to the left)
3. Roller floor grader bunker* (joystick to the right)

Keys 1-16:

1. Audio alarm (separate bugle on the machine)
2. Not in use
3. Not in use
4. Not in use
5. Select: Chooses standard display view (long touch) Forward in menu (short touch)
6. Angle adjustment cross conveyor
7. Not in use
8. Select: Automatic lane adjustment*
9. Save: Saves data/positions (long touch)
Backwards in menu (short touch)

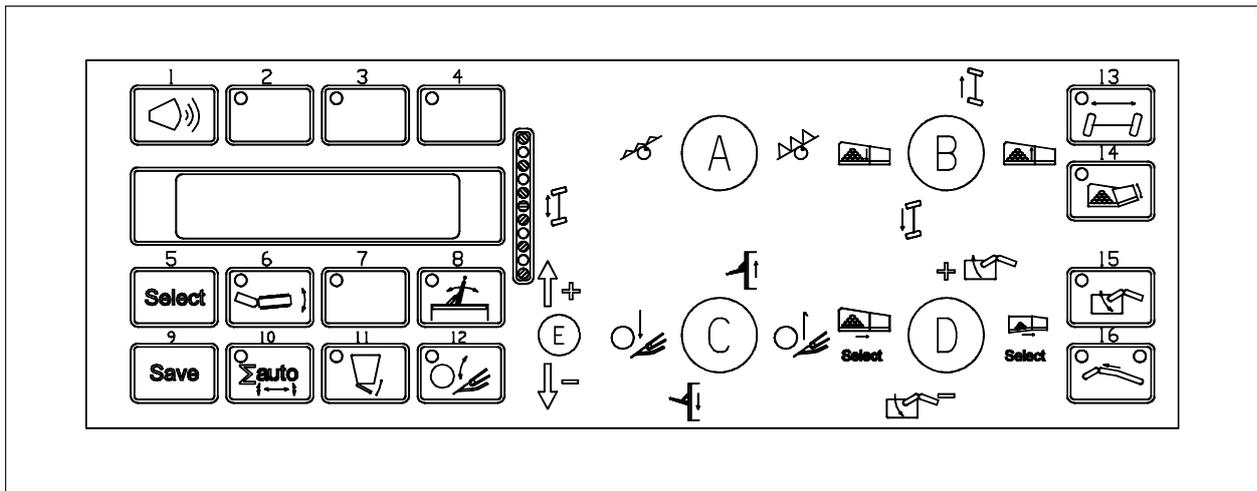


Fig. 29-1

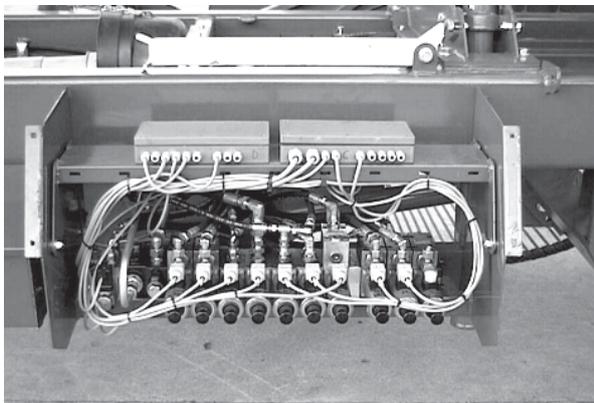


Fig. 29-2

- | | | | |
|--------------|---|--------------|---|
| 10. All auto | Activates more auto functions simultaneously | 14. Select: | Bunker end control
Operate by toggle switch |
| 11. Select: | Stone box
Adjust angle by operating the toggle switch* | 15. Select: | Automatic height adjustment
picking table end*/automatic bunker filling* |
| 12. Select: | Automatic depth control* | 16. Operate: | Picking table start - stop |
| 13. Select: | Automatic wheel centre positioning | | |

*=options

5.4 Extra control panel tractor*

(Fig. 31-1) This unit have functions for positioning of wheels, drawbar, and operating the main bunker.

Joystick 1:

1. Drawbar right - left
2. Roller floor main bunker (left)
3. Roller floor grader bunker* (right)

Joystick 2:

1. Wheel steering right - left
2. Main bunker up - down

Diodes:

- Error: System faults. See chapter. 9.3.
 Power: Indicates power supply
 Data in: Receiving data
 Data out: Transmitting data

5.5 Control panel picking table

(Fig. 31-2)

1. Picking table end up
2. Picking table end down
3. Automatic height adjustment picking table end*/automatic bunker filling*
4. Grader bunker end up* (single control only)
5. Grader bunker end down* (single control only)
6. Roller floor grader bunker* (long touch = start/short touch = stop)
7. Cross conveyor up*
8. Cross conveyor down*
9. Not in use
10. Save: Save current work position
11. Audible alarm
12. Not in use
13. Not in use

5.6 Automatic mode operation

The auto functions are activated by a long touch on the relevant key, until the red diode light up. There is also a display message telling which function that is in auto mode. The auto function is deactivated with a short touch on the relevant key, or by activating the relevant joysticks.

When entering auto mode, the machine will go to the last known auto-position. This position is shown on the display.

When setting a new work position, use the joystick/toggle switch to find desired position. Then press the SAVE key with a long touch, and at last press the relevant function key with a short touch.

The system can in addition to the neutral position, store one working position. The wheel steering, however, is capable to store two offset working positions in addition to the neutral (zero) position, one to the left and one to the right.

To alternate between the different working positions, first activate the relevant auto function and then use the toggle switch <+> or <->. The toggle switch must be activated

within 6 seconds after the auto key is activated. The selected working position is shown in the display.

Example of saving and using the auto function:

Saving 5° offset wheel position:

1. Adjust the wheels to desired position (5°)
2. Press SAVE until «STORE POSITION» is shown in the display.
3. Activate the auto wheel position key with a short touch.
4. 5° offset work position is now saved.

Alternate between neutral position and offset:

1. Activate auto wheel position
2. Activate the toggle switch within 6 seconds. Use the toggle switch <+> or <-> to the desired position is displayed, 0° or 5° .

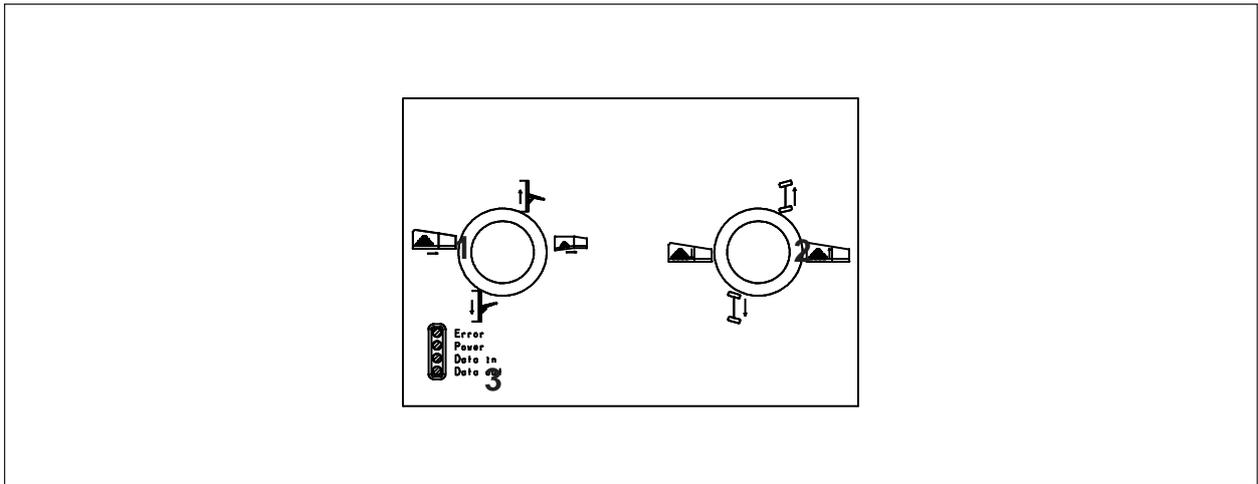


Fig. 31-1

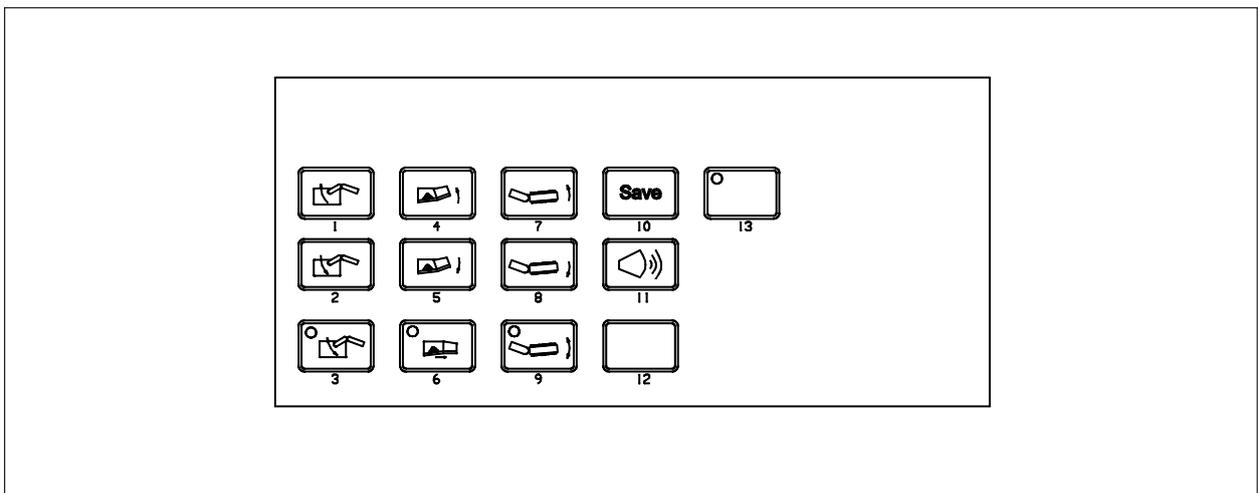


Fig. 31-2

5.7 All auto

All auto function activates or deactivates simultaneously all desired auto functions and picking table drive by on key touch (Fig. 33-1).

Any separate auto function is stored under All auto following this procedure:

1. Activate desired functions to be operated together (example: auto wheel centre positioning, auto lane adjustment and picking table drive start)
2. Press <Save> till <Store position> is displayed
3. Press <All Auto> till diode lights

The chosen functions are deactivated simultaneously by pressing <All auto>. A single functions may be deactivated by overriding till current function's joystick or key. If one or more functions are deactivated, the diode of the <All auto> key is turned off.

Changing the All auto function should be done by storing the desired functions once more, as described above.

5.8 Automatic bunker filling

The function is activated by key 15 on the control panel (Fig. 33-2). The function is deactivated by pressing the same key, or by activating relevant joysticks.

When the function is active, the end of the picking table is automatically lowered into the bunker. A sensor placed on the picking table end monitors the distance to the potatoes.

When the potatoes activates the sensor, the picking table lifts automatically. This procedure is looping until the picking table has reached its top position. When the potatoes activates the sensor at the picking table's top position, the bunker floor moves automatically until the sensor is deactivated. When the moveable bunker end curtain has reached the outer position of the bunker, a stop sensor is activated. This sensor stops the bunker floor and alerts the driver.

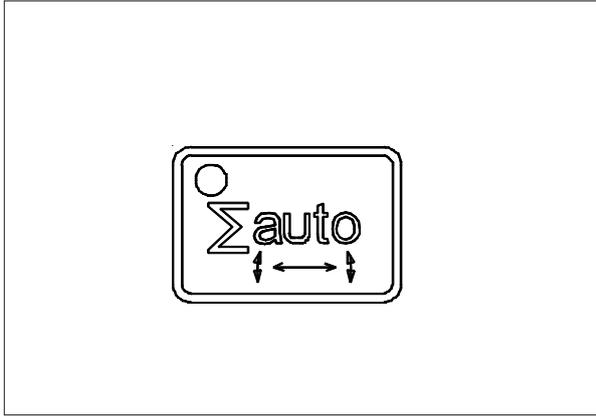


Fig. 33-1

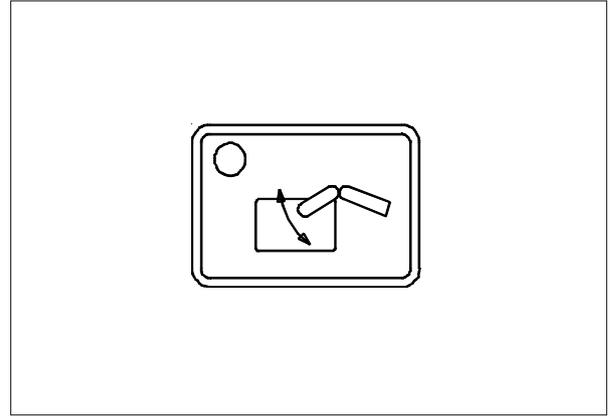


Fig. 33-2

6. Positioning and row width adjustments

6.1 Lane adjustment

The lane adjustment is hydraulically operated with a joystick at the control panel (Fig. 35-1). The diabolo rollers must run in the middle of the ridges.



The lane adjustment must only be activated when the harvester is going forwards, or the lifting unit is lifted from the ground

6.1.1 Automatic lane adjustment*

Electronic control system can be fitted with automatic lane adjustment. This option makes the diabolo running in the middle of the ridges, even if the distance between the tractor and the ridge varies. Sensors record the position of the diabolo, and if there is variance, the system corrects the position by activating the lane adjustment cylinder.

The auto mode is activated by a touch on the auto mode key 8 when lifting unit has been lowered. The auto mode is deactivated by a touch on the relevant key, or by using the lane adjustment joystick.

6.1.2 Stability

The position of the drawbar affects the stability of the machine. The stability is at its best when the drawbar is turned left.

During harvesting, and especially when turning, and unloading the bunker, the drawbar must be positioned to the left.

6.2 Wheel steering*

The wheel steering is controlled with joystick B on the panel (Fig. 35-1). The wheels' position is displayed by the indicator in front of the harvester (Fig. 35-4) or in the display of the control panel (only when automatic wheel centre positioning is fitted).

6.2.1 Automatic wheel centre positioning*

This function is activated by key 13 on the control panel (Fig. 35-1) The auto mode is deactivated by a touch on the relevant key, or by using the relevant joystick.

The position is indicated by the light diodes on the panel (Fig. 35-1).

6.2.2 Alternative work positions

The electronic control system can save two alternative work positions, one to the right and one to the left.

The offset work function can e.g. be used in hilly areas, or to store the wheel position which are used if the machine must run offset during opening of the field. Saving and using the auto function is done as follows:

Saving of 50 offset wheel position (Fig. 35-2):

1. Adjust the wheels to desired position (5°)
2. Press <SAVE> until <STORE POSITION>» is shown in the display.
3. Activate the auto wheel position key with a short touch.
4. 50 offset work position is now saved.

Alternating between neutral position and offset position (Fig. 35-3):

1. Activate auto wheel position
2. Activate the toggle switch within 6 seconds. Use the toggle switch <+> and <-> to the desired position is displayed, 0° or 5°.
The wheels will automatically move to displayed position.

6.3 Track width

The standard machine has a wheel axle suitable for row widths of 75-80cm. Extensions suitable for 85 or 90cm row widths are available (Fig. 35-5).

When splitting a field at 75cm row width and below, the machine has to run a little aslant in order to position lefthand wheel inbetween the rows. This assuming wheel steering is fitted.



The machine shall have maximum track width when operated in hilly areas and soft soil and it is equipped with 4t main bunker and grader bunker.

6.4 Roller discs

The distance between the roller discs can be adjusted infinitely by moving its bracket on the beam (Fig. 35-6). See also chapter 7.3.

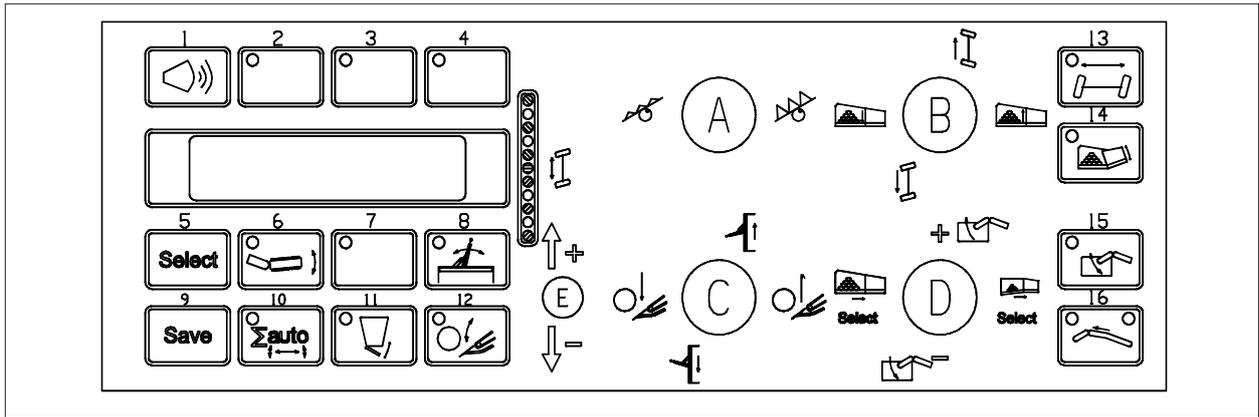


Fig. 35-1

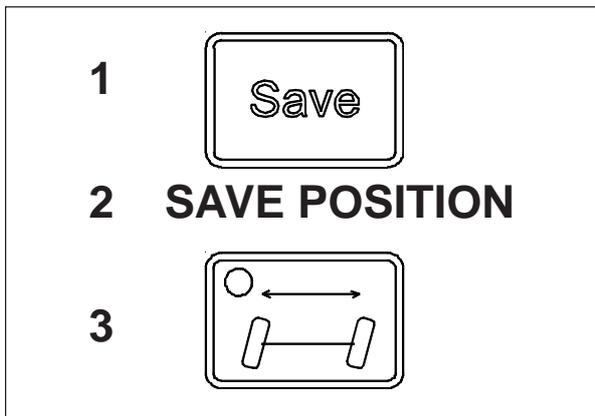


Fig. 35-2

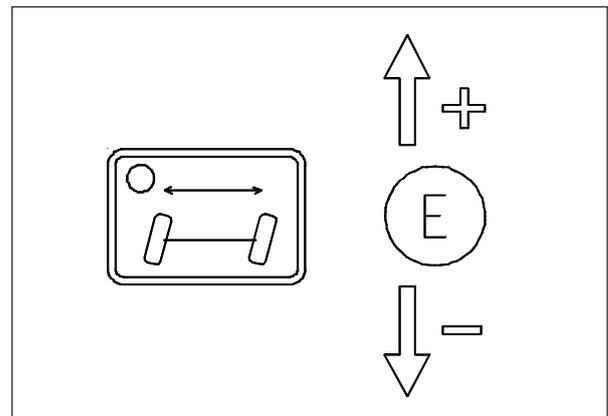


Fig. 35-3

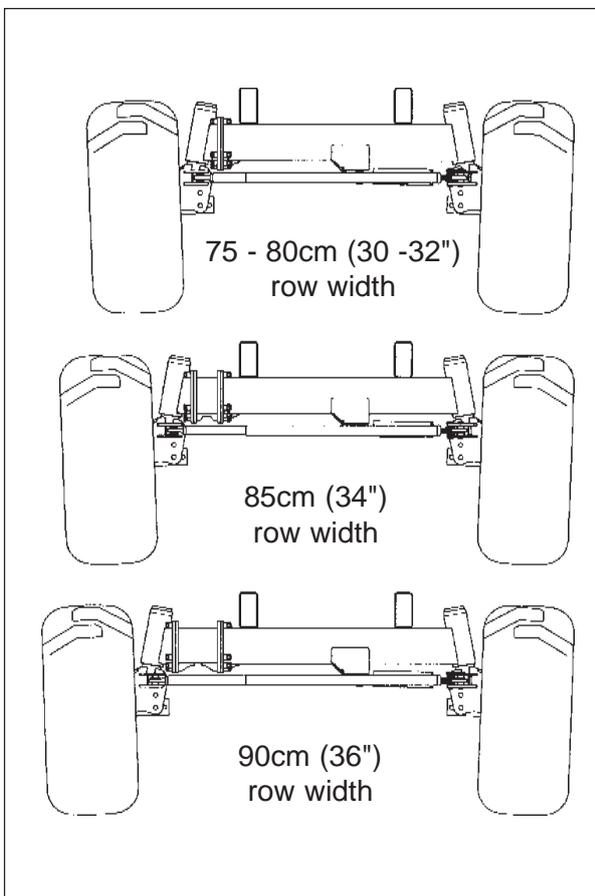


Fig. 35-5

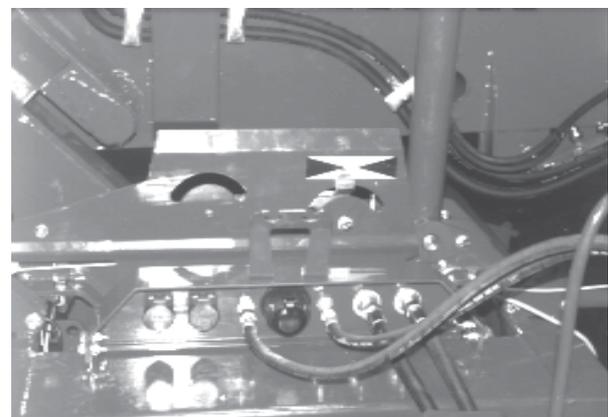


Fig. 35-4



Fig. 35-6

*=options

7. Settings and operating

Wrong settings and use of the machine, and also uncritical use of the cleaning facilities increases the risk for damaging the crop. Therefore use the cleaning facilities with care, and never more than the conditions requires. Changed soil and haulm conditions requires alternative settings of the machine to ensure a damage-free harvest with maximum capacity.



Mature crop and satisfactory soil temperature is a requirement for a damage-free harvest.

7.1 P.T.O. speed revolutions

The recommended P.T.O. speed is 300-500 rpm. Optionally the machine can be fitted with alternative speeds which reduces the revolutions with 16 and 25%. The speed reduction is done by changing sprocket B in the front (Fig. 37-2).

Speed reduction offers:

- Increased rpm on tractor if the tractor has to low engine power or to small hydraulic capacity.
- Better possibility for optimum relations between rpm and forward speed.

Revolutions must be adjusted to forward speed. When the main digging web has the same speed as the tractor, the most gentle handling of the potatoes is achieved. See chart (Fig. 37-1).

7.2 Opening of the field

Adjust the drawbar to the left to achieve sufficient distance between the ridge and the tractor.

When opening the field use the wheel steering to get the machine's left hand wheel to run in the furrow. To ease the positioning, lift the bunker a bit at the beginning. It is possible to save the wheel position to for later use. (See chapter 5).

7.3 Depth control

7.3.1 Mechanic depth control

The lifting unit is raised and lowered hydraulically by means of the control panel joystick.

Share depth is adjusted using the diabolo (Fig. 37-4). One turn of the adjustment screw corresponds to approx. 6mm share depth change.

When the soil contains a lot of clod and stones accurate depth adjustments is extremely important.



The large side discs will cut the haulm etc., and should normally be adjusted to penetrate approx. 5 cm (2") into the soil. Adjustment is carried out by means of the screw on each disc stem (Fig. 37-5). Note! Excessive cutting depth can cause the share to be lifted (particularly in heavy and stony soil) resulting in potential damage.

7.3.2 Automatic depth control*

The automatic, hydraulic depth control reduces pressure on the diabolos. The function is activated with a key on the control panel (Fig. 37-6).

A micro switch C fitted in front of the machine monitor the lifting unit (share) position. Signals from the switch are fed into the computer (Fig. 37-7).

The pressure on the diabolos is altered by changing the pre-tensioning on the plate spring D which activates the switch C. To increase pressure tighten the screw A.

The computer is programmed so that the switch try to maintain mid-position (neutral). A reaction delay in the system avoids a too «busy» depth control, that is; to avoid depth compensation for every small disturbance (small dumps, when hitting rocks etc.).

	Main web speed (km/h) at given PTO speed					
	Exchange	300 rpm	350 rpm	400 rpm	450 rpm	500 rpm
Standard machine	3,1:1	3,0	3,4	3,9	4,4	4,9
Alt. speed*						
Sprocket 25t	3,1:1	3,0	3,4	3,9	4,4	4,9
Sprocket 21t	3,7:1	2,5	2,9	3,3	3,7	4,1
Sprocket 19t	4,1:1	2,2	2,6	3,0	3,4	3,7

Fig. 37-1

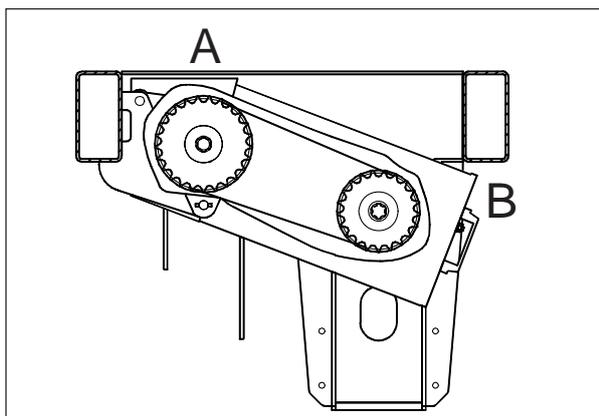


Fig. 37-2

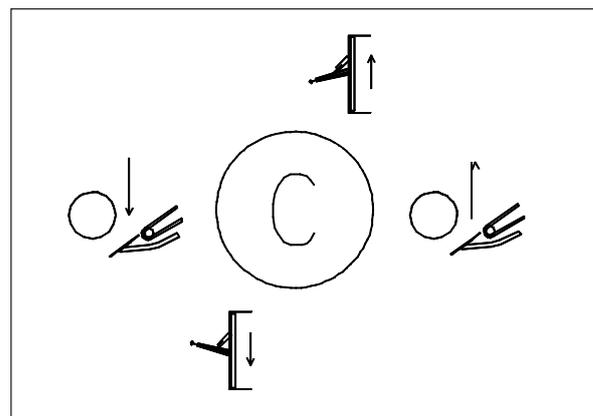


Fig. 37-3

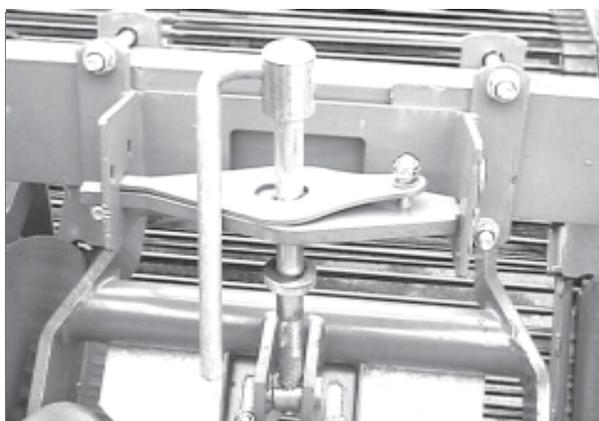


Fig. 37-4

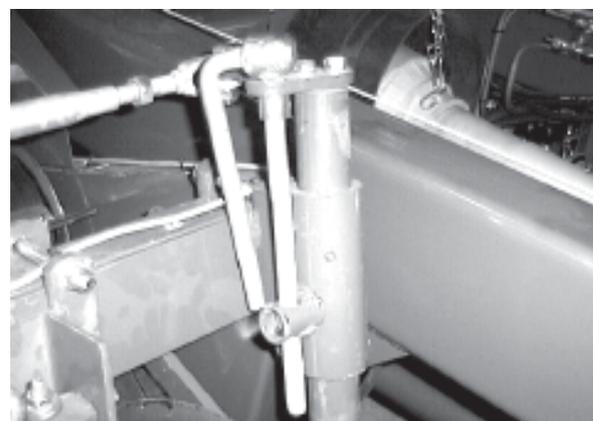


Fig. 37-5

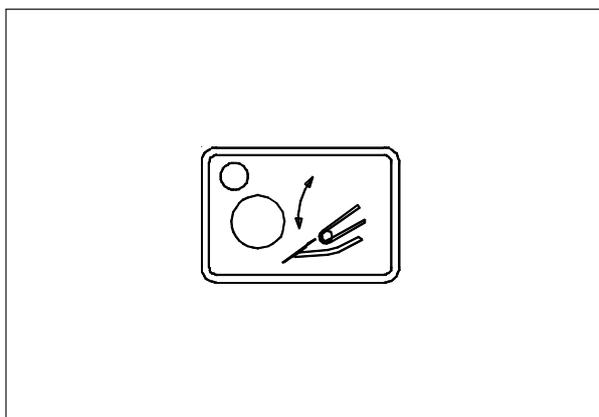


Fig. 37-6

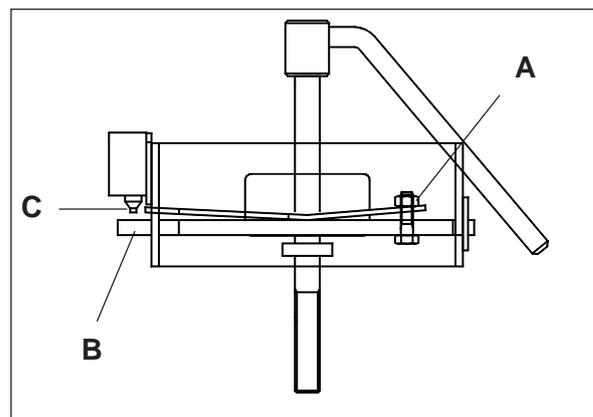


Fig. 37-7

*=options

7.3.3 Retrofitting and control of automatic depth control

When fitting automatic depth control, avoid damaging the micro switch.

1. Loosen the screw (Fig. 37-7/A).
2. Raise the plate B at it's maximum
3. Press the micro switch down so the pin is pressed all the way in.
4. Fasten the micro switch.
5. Adjust the screw A to find desired diablo pressure.

7.4 Adjusting the haulm pull-in rollers

The haulm pull-in rollers rotate on the belt. If they do not grip the haulm, spring tension must be increased (Fig. 39-2). Check that the rollers do not touch the side plate or side disks. Note that the rollers must be angled, with minimum clearance towards the side plate of lower edge.

If gap between disc and pull-in roller is too wide, 25mm wide roller extensions are available (option).

7.5 Soil seeking

The soil seeking can be adjusted by changing the lifting units connecting point to the main frame (Fig. 39-1).

- A. Large soil seeking Heavy conditions
- B. Normal soil seeking Medium conditions
- C. Small soil seeking Light conditions

Note that all three holes must be overlapped when changing connecting point.

7.6 Share angle

The share angle can be adjusted using the screw A on the share holder (Fig. 39-2). This also adjust share height in relation to the main digging belt.

- A. Plane share Small soil seeking
- B. The share is tangent This is the most gentle to the main web position of the shares.

C. Step share Large soil seeking
When there is a problem with haulm attaching itself to the share frame sides, this can either be avoided or reduced by increasing the lifting units ground clearance:

1. Lower the share. Steeper share angle
2. Adjust the diablo for compensating the digging depth.
3. Move the digging units hinge point down in order to keep soil seeking.

7.7 Soil separation

7.7.1 Web agitation

The intensity of the agitation changes by Lifting or lowering the agitator(s) (Fig. 39-3).

Mechanical adjustment:

To be adjusted by repositioning the stay on the right-hand side of the main web (Fig. 39-4).

Hydraulic adjustment:

Operate the joystick on the control panel (Fig. 39-5). The intensity can be observed by the indicator placed in the front of the frame.

Due to danger of damaged potatoes, use as little agitation as possible.

7.7.2 Flight conveyor

The fixed speed of the flight conveyor is approx. equal to the main web speed, thus handling the potatoes most gently.

The optional infinite speed adjustment offers maximum control and capacity. Speed is controlled by the knob L on the picking table (Fig. 39-6).

Reduced speed increases sieving and clod crushing capacity.

The flight conveyor should run at least at the same speed as the forward speed of the harvester in order to prevent soil from bulldozing at the shares. If the conveyor speed is reduced to this level and there is still need of more sieving capacity, the tractor engine speed should be increased to run the main web faster.



In order to avoid crop damages the end roller unit must have a low pressure on the crop. The pressure can be adjusted by slacken or tension the spring (Fig. 39-7).

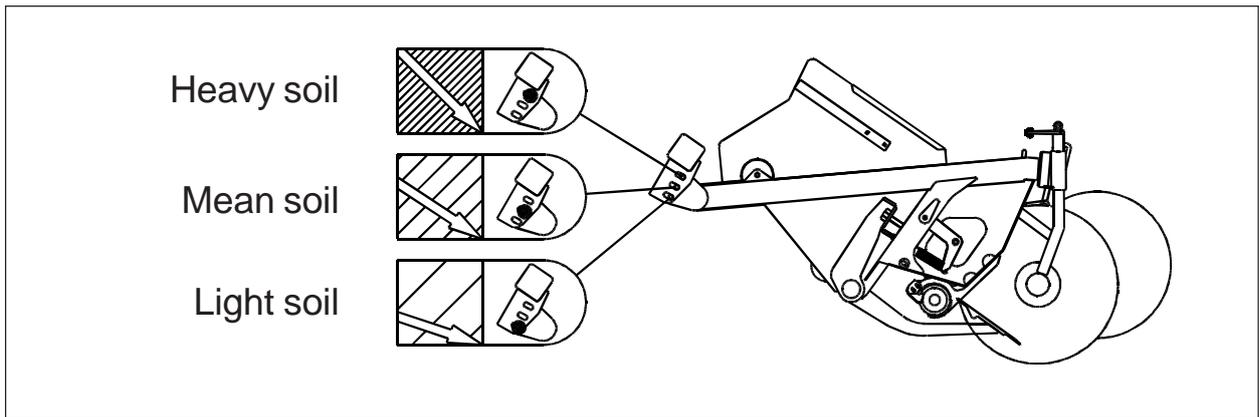


Fig. 39-1

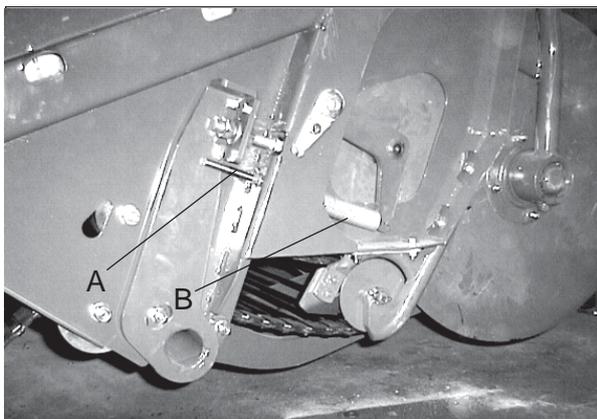


Fig. 39-2



Fig. 39-3

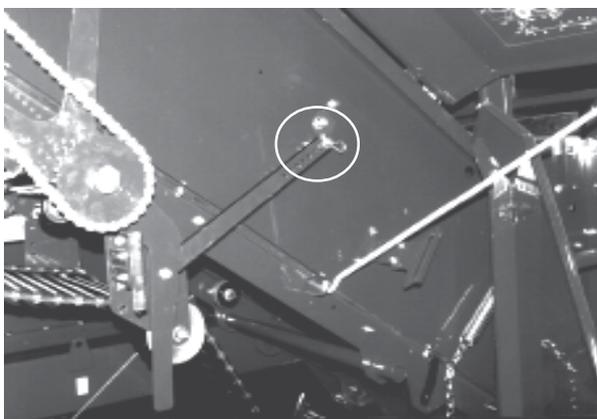


Fig. 39-4

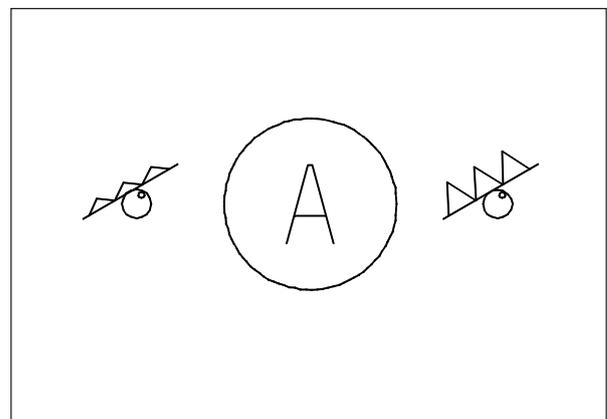


Fig. 39-5

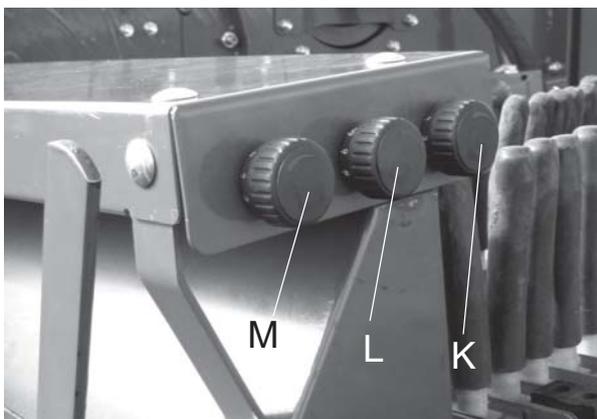


Fig. 39-6

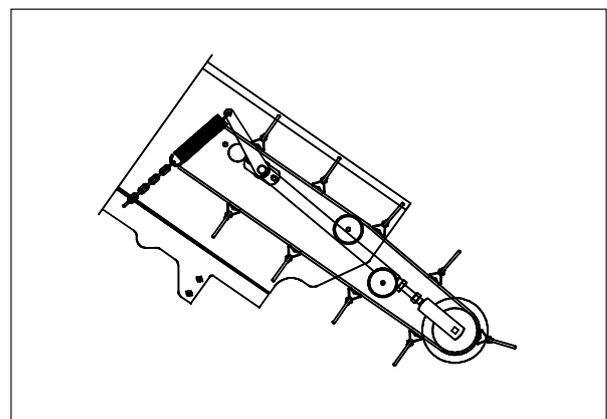


Fig. 39-7

*=options

7.8 Haulm separation

7.8.1 Flight conveyor

The flight conveyor may cause tubers to get loose from the roots if operated at a speed lower than the main web. However, if speed is reduced too much, uneven flow of haulm may cause haulm removal to get worse.

7.8.2 Haulm (diviner) web

The haulm web speed is approx. equal to the main web speed.

The optional infinite speed control offers maximum control and capacity. Speed is controlled by the knob M on the picking table (Fig. 39-6).

Large quantities of haulm	High speed
Long haulm	High speed
Small quantities of haulm	Low speed
Short haulm	Low speed

Haulm strippers

The machine is equipped with 5 adjustable rows with adjustable and spring loaded haulm strippers (Fig. 41-1/A).

The efficiency is increased by reducing the distance to the web. The distance is adjusted with levers at the left hand side of the haulm web.

Stripping bars

The stripping bars (Fig. 41-1/B) underneath the haulm diviner web pulls off potatoes still attached to the haulm. Should be removed when not required.

Haulm web screening

Straps in the web decrease the gap of the web increasing transport of short haulm. Totally 3 straps can be fitted (Fig. 41-2). The straps are assembled through slots in the web (Fig. 41-3).

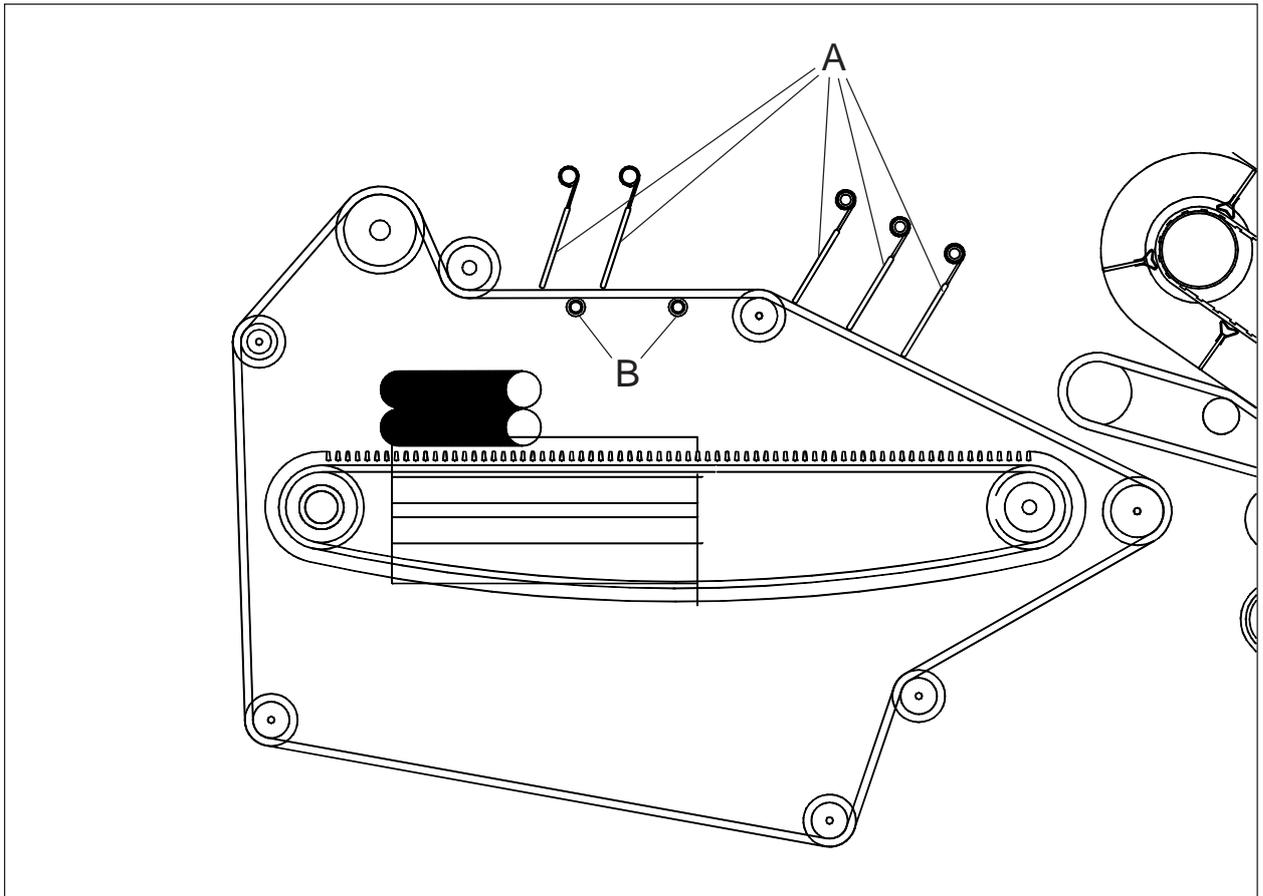


Fig. 41-1

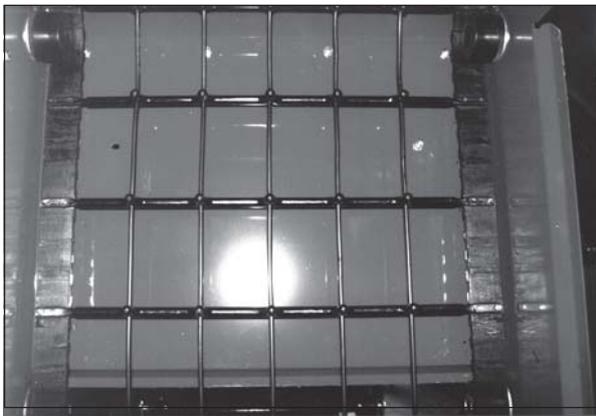


Fig. 41-2

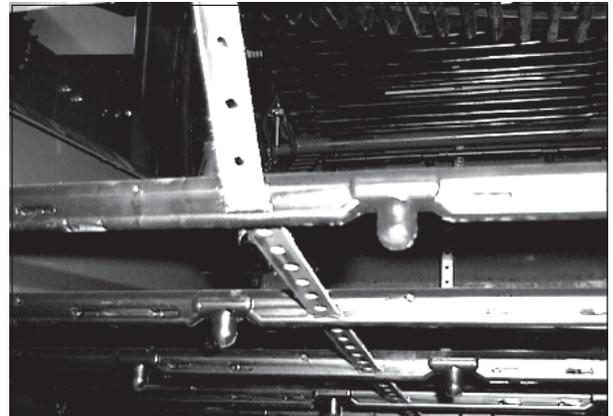


Fig. 41-3

*=options

7.9 Clod and stone separation

Separation unit includes a first hedgehog web with deflector rollers and a second hedgehog web with moving deflectors and deflector roller.

The separation depends on:

- type of soil and content of stones
- working speed
- characteristics of tubers

7.9.1 First hedgehog web

Adjust the angle of the hedgehog web and the height of the moving deflector in order to separate stones and clods effectively from the potatoes.

Adjust the tilting by means of the turnbuckle on righthand side (fig. 43-1/A).

Adjust the deflector rollers by means of the lever (Fig. 43-2/B) on lefthand side and the screw (fig. 43-1/C) on righthand side).

- Steep angle - low degree of separation, easy crop flow.
- Level angle - high degree of separation.
- Large gap between web and deflector roller gives better separation.
- Small gap (min. gap approx. 8mm) between web and deflector roller gives less separation.

Minor adjustments of tilting angle on the first cleaning web can even be done with the turnbuckle on the lefthand side (fig. 43-2/C). This will influence on the transfer of crop from first to second hedgehog web.

The speed of the first cleaning web is controlled by means of the knob K in front of the deflector unit of the second hedgehog web (fig. 43-3).

The highest speed is the basic setting. Reduced speed gives a more gentle handling of the crop. However, an even flow of crop should be maintained.

7.9.2 Moving rubber finger deflectors

Second cleaning web

Adjust the tilting of the second hedgehog web manually by means of the turnbuckle or remotely (option) by means of the control

panel of the picking table (fig. 43-4) or in the tractor cab (fig. 43-5).

Basic setting is level.

- Tilting forward - less separation, improved flow of crop.
- Tilting backwards – more separation.

The infinite speed adjustment is performed with the knob L on the deflector unit (fig. 43-3).

Basic setting is maximum speed. Reduced speed is offering a more gentle handling of the crop. However, an even flow of crop should be maintained.

Deflector roller

Adjust the height of the deflector roller by means of the cranks (fig 45-2).

The basic setting should give a maximum separation of trash. If loss of potatoes occurs, the height should be reduced.

Moving deflectors

Adjust the height of the deflectors by means of the levers (fig. 43-7) in front of the deflector unit.

Furthermore the deflector unit's connection with the hedgehog web frame can be adjusted, if required.

The first deflector should distribute crop onto the picking table in a way that makes it easy for pickers to control crop. The basic setting is 25mm gap to hedgehogs.

The second deflector should be set according to need. In bad conditions the quantity of potatoes in the trash conveyor should allow one operator to be fully occupied with picking potatoes off trash conveyor. Basic setting is 5mm gap to hedgehogs.

The speed of deflectors is adjusted by operating knob M on the separation unit (Fig. 43-3).

- | | |
|------------|--|
| Low speed | Large separation capacity |
| High speed | Large transport capacity,
decreased separation capacity |

The basic setting is medium speed.

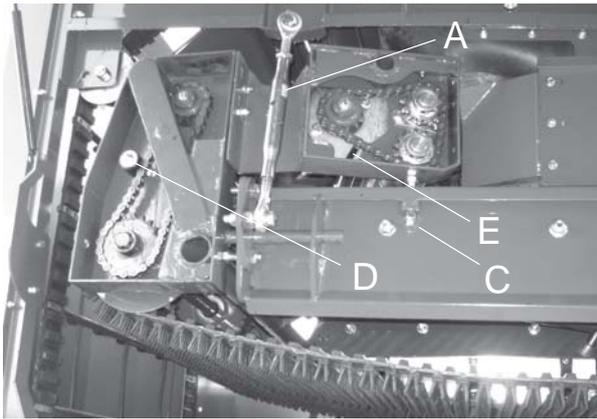


Fig. 43-1

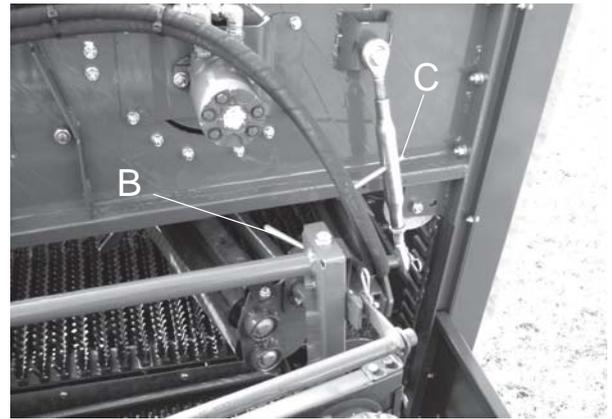


Fig. 43-2

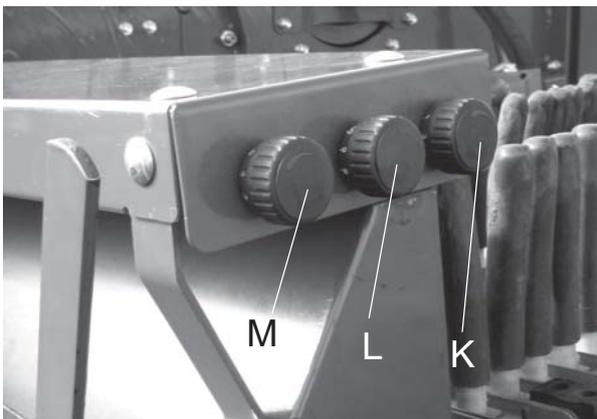


Fig. 43-3

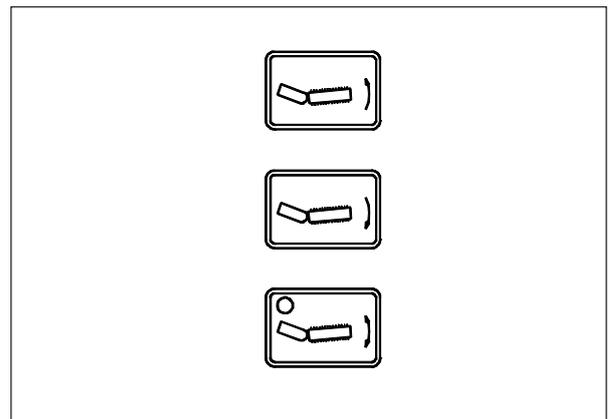


Fig. 43-4

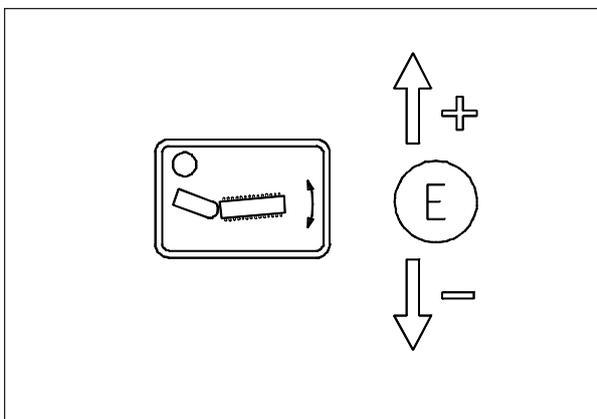


Fig. 43-5

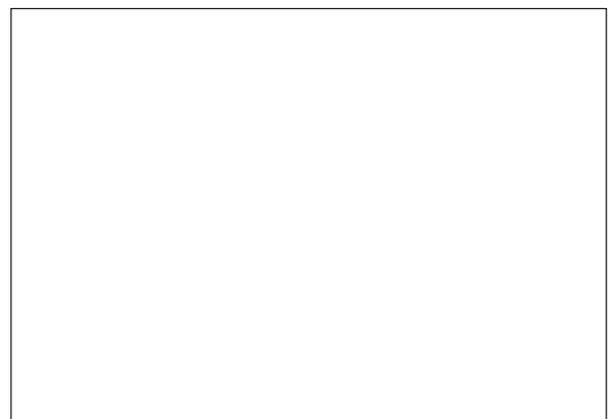


Fig. 43-6

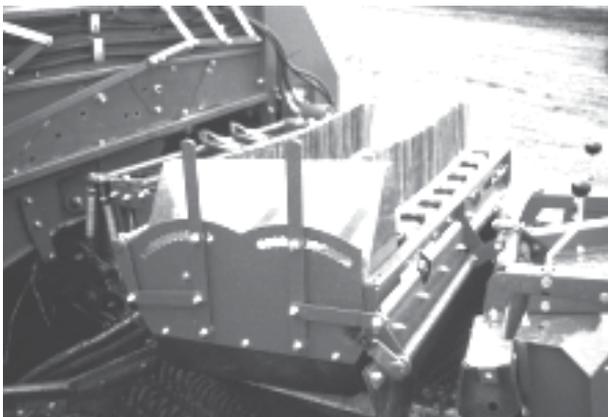


Fig. 43-7



Fig. 43-8

*=options

7.9.6 Stone box*

The stone box hatch is hydraulically operated from the tractors control panel.

1. Activate key 11, stone box (Fig. 35-1)
2. The hydraulic function is controlled by operating toggle switch B (Fig. 35-1).

7.10 Picking table

7.10.1 Access

Release righthand ladder by lifting and moving outwards (fig. 45-3/A).

Release and reposition lock plates in order to put lefthand ladder in working position (Fig. 45-3/B).

The gate on lefthand side should be closed when machine is operating.

7.10.2 Speed control

The picking table is powered by the tractor hydraulics. The speed is adjusted by the lever A at the picking table's lefthand side (Fig. 45-3). Picking table can be started and stopped from the tractor's control panel (Fig. 45-4).

The picking table is connected to the main bunker by a stay providing end conveyor to automatically lift when bunker is raised.



Before lifting the bunker, the picking table should be cleared of potatoes in order to avoid potatoes dropping off when picking table end is raised.

The picking web should be stopped while bunker is raised. The end section should not be operated while bunker is raised due to danger of collision (Fig. 45-5).

The end section of the picking table is operated by a joystick on the tractors panel or from picking table (Fig. 45-6). The end section is automatically raised when bunker lift is operated.

When bunker is empty the end section should be fully lowered. It should be raised according to the volume of potatoes in the bunker. It may cause damage to the crop if the end section is touching the potatoes.

When the end section is fully raised, it should remain in that position till bunker is

emptied. Move bunker floor gradually when potatoes get close to the web.

7.10.3 Automatic height adjustment of picking table end section*

Automatic height adjustment ensures constant distance between potatoes and picking table. The function is activated by Key 15 on the panel (Fig. 35-1).

When the outer end is in top position the automatic function is disengaged.



The end should remain in top position until bunker is emptied and lowered fully.

If the machine is equipped with automatic height adjustment only (no automatic bunker floor control) the bunker floor has to be manually operated when the potatoes is touching the picking table end. See chapter 7.12.5.

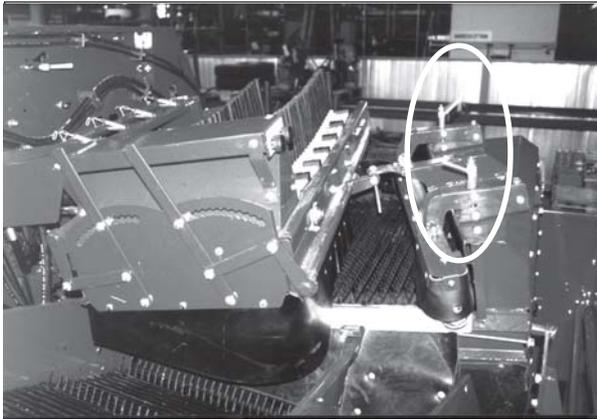


Fig. 45-1

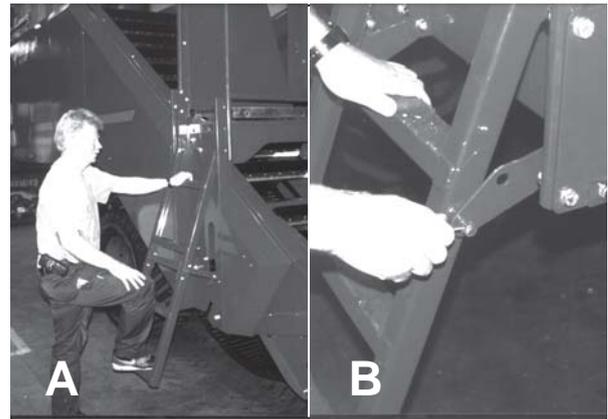


Fig. 45-2

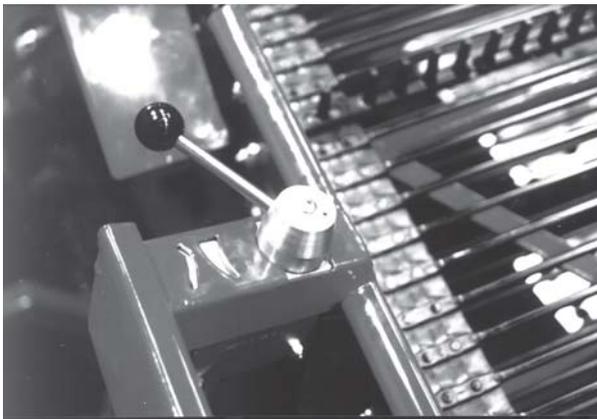


Fig. 45-3

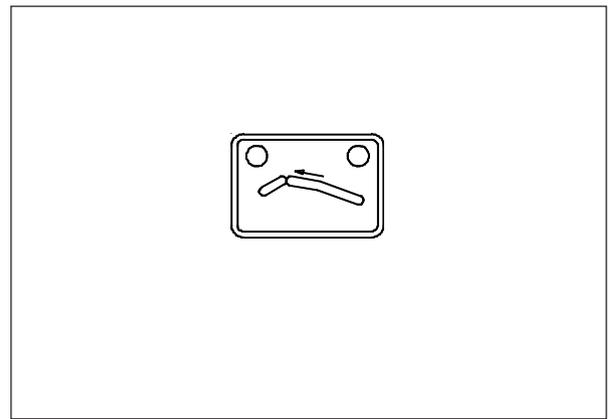


Fig. 45-4



Fig. 45-5

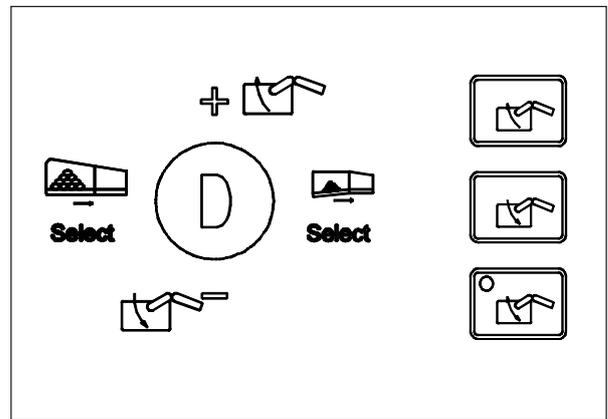


Fig. 45-6

*=options

7.10.4 Grader*

The size of the potatoes are infinitely adjusted from 20 to 50 mm with the bolts A and B (Fig. 47-1).



Ensure that shafts are parallel. Non-parallel shafts will cause excessive wear and damage on gears and bearings.

7.10.5 Extended operators' platform*

The additional platform can be mounted in front of the lefthand main platform. Not available if grader bunker is fitted.

7.10.6 Picking table canopy*

Ensure that moving parts don't tear apart the canvas. The walls can be folded in order to get more fresh air in hot weather. Secure properly in strong wind.

7.10.7 Audible alarm

The alarm is activated by pressing the knob on the picking table (Fig. 47-2). Even tractor driver can operate the alarm from his control panel.

Driver and operators should agree on communication signals.

7.11 Grader bunker*

The end section is operated hydraulically from the picking table (Fig. 47-3). It is due to safety not possible to control this from the tractor cab. The moving floor can be operated both from tractor and picking table.

The bunker end must be folded and secured during transport. The lock can be damaged if not removed prior to operating the folding cylinders.

The end section should be in lowered position when harvesting. Two discharge height positions are available by change of cylin-

ders pivot points (Fig. 47-4). Note! When folded from upper discharge position cylinders are not fully pulled in.

When bunker is filled to the top level, floor should be moved gradually.

Increase visibility by raising the main bunker prior to emptying the grader bunker. After discharging, the end section should be folded in if it causes problems when discharging main crop.

The bunker floor canvas can be damaged by sharp objects. The blue canvas strap indicates the chain connectors.

Danger! Make sure that people keeps away from bunker when folding the outer section.

7.12 The main bunker

7.12.1 Operating the bunker

The main bunker is operated from the tractor control panel.

Press key 14 and then operate toggle switch E (Fig. 47-6).

Raise and lower with bunker operating joystick B (Fig. 47-7).

Operate moving floor with joystick D (Fig. 47-8).

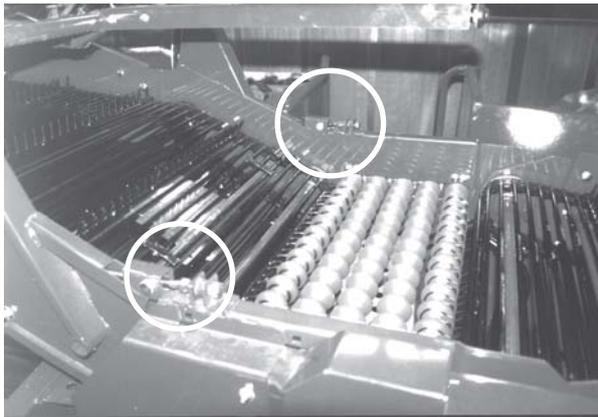


Fig. 47-1



Fig. 47-2

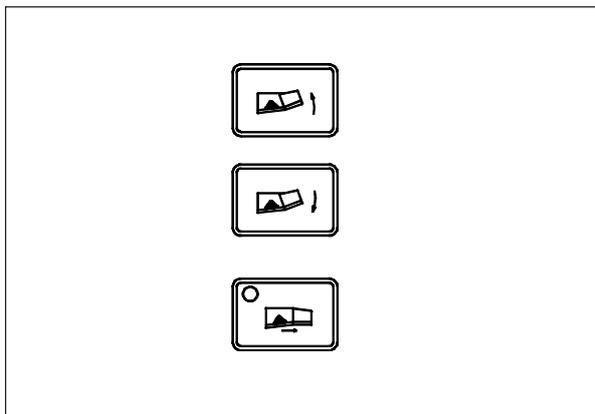


Fig. 47-3

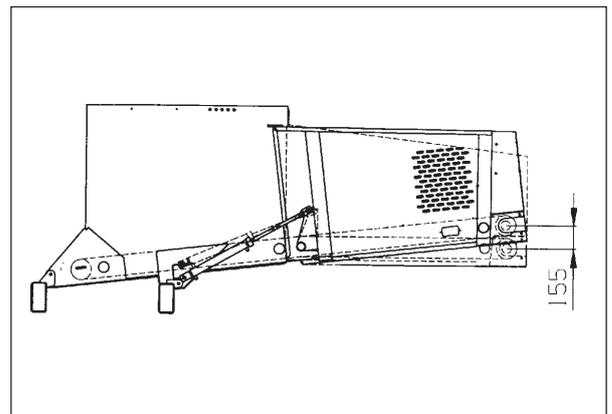


Fig. 47-4

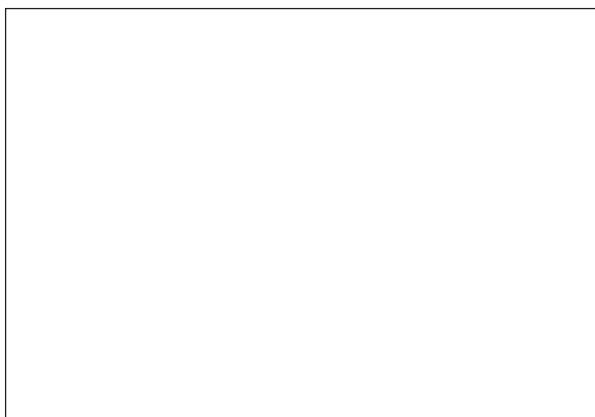


Fig. 47-5

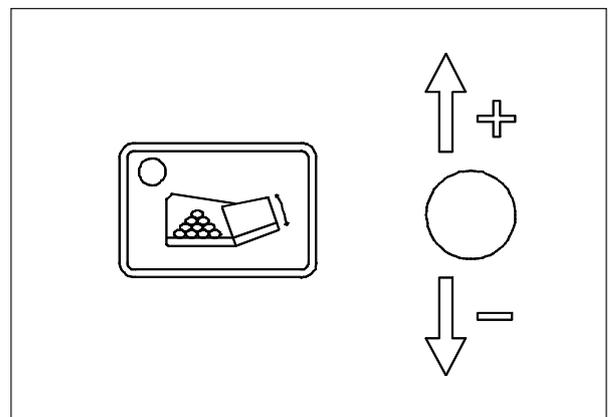


Fig. 47-6

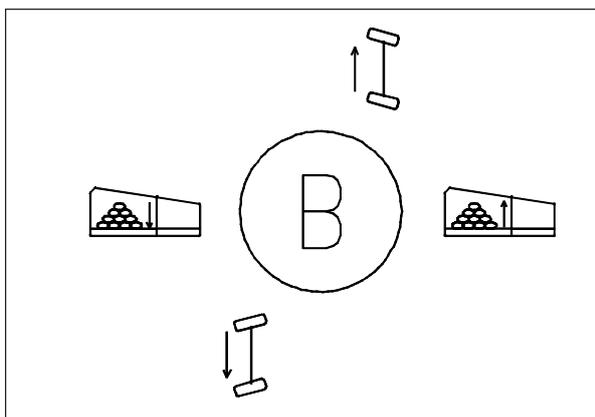


Fig. 47-7

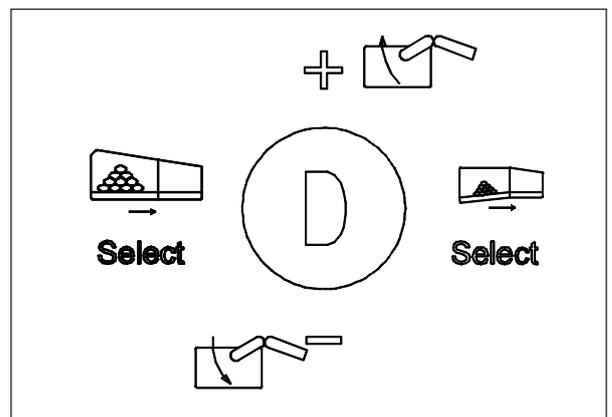


Fig. 47-8

*=options

During transport the end section shall be secured by the forward wire (Fig. 49-1).

The wire should be in upper position when end is folded out thus carrying the weight of the end section (Fig. 49-2). Assure that wire is properly tensioned.

The bunker floor canvas can be damaged by sharp objects. The blue canvas strap indicates the chain connectors.

Keep away from raised bunker. Put the safety leg into upright position ahead of any work is done underneath the bunker (Fig. 49-3). Discharge bunker ahead of any repair is done.

7.12.2 Filling the main bunker

End section should be in lower position when harvesting. When the end section of the picking table is in the top position the moving floor should be moved in short steps until the bunker is completely filled.

7.12.3 Discharging the main bunker and stability

When bunker is raised the stability is decreased due to the high positioned centre of gravity. The ground surface should level and even in order to avoid danger.



There is a risk of overturning when machine is moving with a raised bunker. Be careful when raising & lowering the bunker or when moving machine with bunker in raised position.

When unloading use following procedure:

1. Drawbar to the extreme left.
2. Drive close to unloading position.
3. Raise bunker when machine is not moving.
4. Drive carefully to unloading position and unload the potatoes.
5. Don't use jerky movements

7.12.4 Moving bunker end curtain*

The moving curtain stops potatoes from

rolling towards bunker outlet thus increasing the bunker capacity.

Raise the end section to move curtain to inner position (Fig. 46-4).

A slightly raised end section may help to maximise the hopper filling rate. Observe! Lower the end section ahead of any operation of moving floor.

7.12.5 Automatic moving floor controls*

Automatic moving floor controls requires the automatic height adjustment of the picking table end and moving bunker end curtain fitted.

The automatic moving floor controls provide automatic movement of roller floor as the potatoes get close to picking table in top position.

The function is activated by the key 15 on the control panel (Fig. 35-1).

When reaching the stop position, the curtain activates a microswitch disengaging the automatic function.

7.12.6 Discharge chute*

When discharging with the chute fitted, the chute should be lowered into the box/trailer (Fig. 49-5). The quick coupling on the chute make it easy to dismantle when chute is not required.

7.13 Bunker canopy*

Make sure that moving components (bunker etc.) do not make any damage to the canopy.

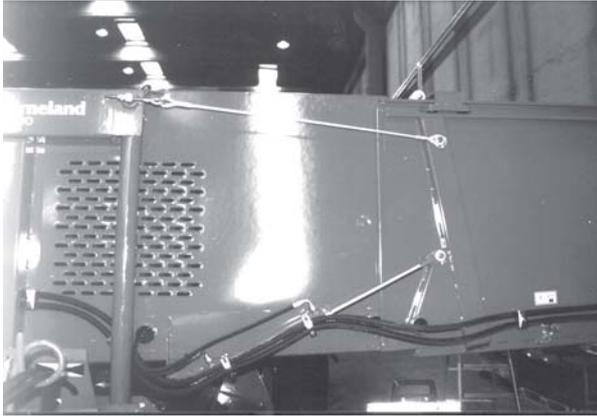


Fig. 49-1

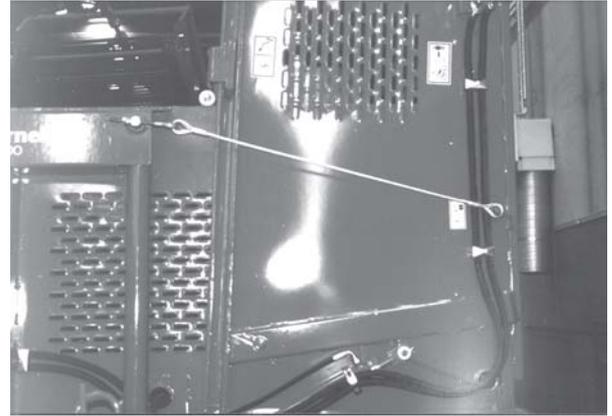


Fig. 49-2



Fig. 49-3

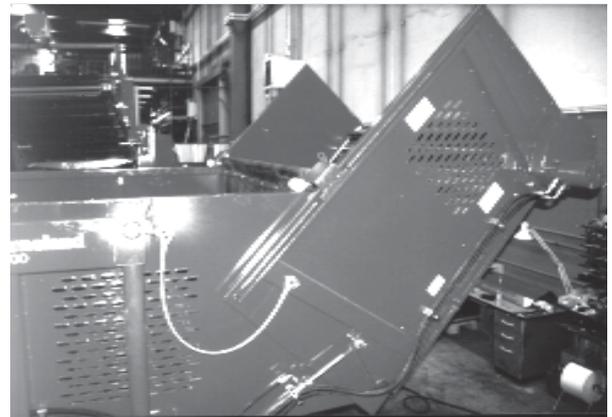


Fig. 49-4



Fig. 49-5

7.14 Auto lane adjustment

See fig. 51-1. When included the diablo and the lifting unit is automatically adjusted to run in the middle of the ridge, even if the distance between the tractor and the ridge varies.

The diablo attachment is tiltable making switch D or E (fig. 51-1) being activated when lifting unit is running off centre of ridge, causing the hydraulic system move the drawbar till lifting unit is back in centre position.

The auto lane adjustment is activated by pushing the auto lane button (fig. 51-2) (pos. 8 on fig. 35-1) when the lifting unit is lowered.

The deactivation is either done by another push on the button or by manually operating the drawbar cylinder.

7.14.1 Setting

The diablo is set level and the brackets of the switches are adjusted to obtain a distance A between the bracket and the stop of approx. 3mm on both sides.

The distance B from the switch to the stop should then be approx. 6mm.

The adjustment set the tolerances of the auto lane adjustment, small tolerance means more corrections by the drawbar and more accurate lane adjustment.

Adjust the screw C, to make sure that the screw and the bracket of the switch D obtain contact simultaneously.

Secure the screw the counter nut.

Repeat setting for screw F and bracket E. Choke valves are included in the drawbar cylinder for fine-tuning the function. The factory setting should offer a full drawbar move in about 8 sec. The valves should normally not be adjusted. However, when harvesting at a very high speed, an increased reaction speed is recommended. Correspondingly a lower reaction speed is recommended for low forward speed of the harvester, in order to avoid over corrections. Observe! The drawbar speed should be equal to both sides.

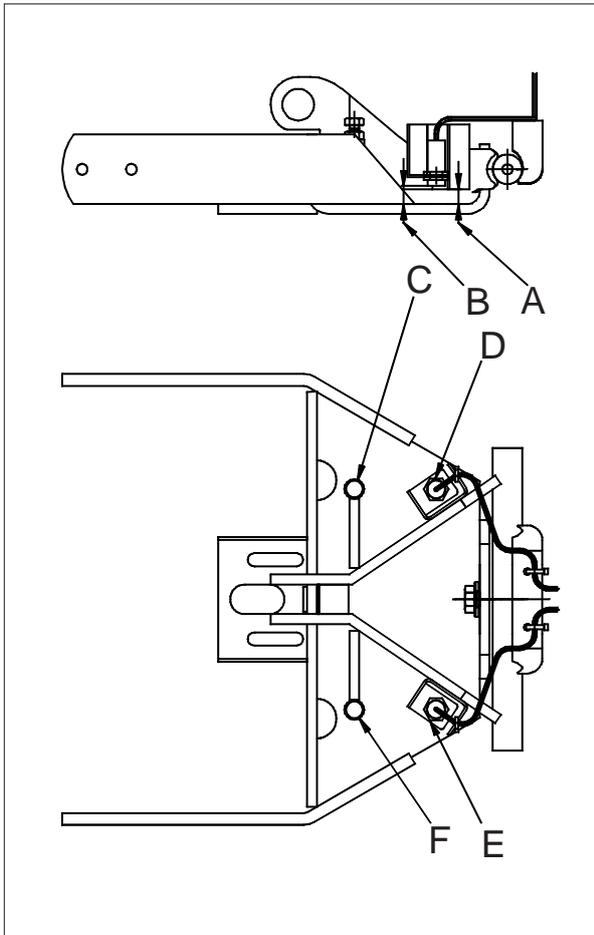


Fig. 51-1

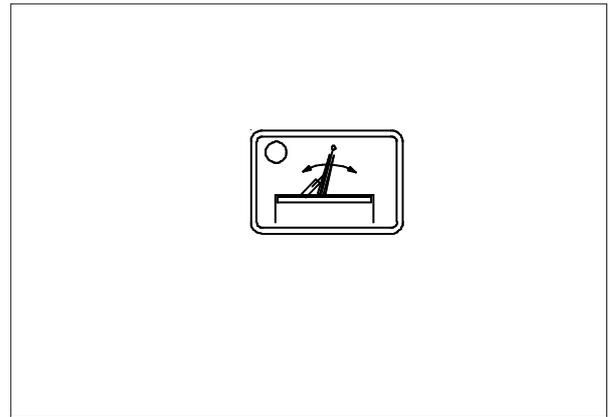


Fig. 51-2

8. Maintenance

8.1 Generally

All side panels at the machines right hand side can be opened to provide simple maintenance and inspection (Fig. 53-1).

8.2 Tyre pressure

Dimensions	4t	4t + grader bunker	
16.0/70-20 14PR	400	480	kpa
500/60-22,5 8PR	(220)	—	kpa
400/60-26,5 10PR		340	kpa
500/60-26,5 8PR	200	(220)	kpa
600/55-26,5 8PR	140	170	kpa

8.3 Welding on the machine

Disconnect all electronics before start welding. (Fig. 53-2)

8.4 Retensioning bolts

Special attention to bolts for wheels, drawbar and bunker. Check after one hour and thereafter weekly. Use torque 220Nm. Other bolts and nuts should be retensioned after 8 hour and thereafter weekly.

8.5 Chain tensioning

Alternative gear exchange* (Fig. 53-3)

Automatic

Main drive unit

Automatic

First cleaning web (fig. 53-4)

Move tensioning roller D towards the chain.

Deflector roller on first cleaning web (fig. 53-4)

Move the tension roller E towards the chain.

Picking table motor (Fig. 53-5)

Move the motor in the bracket.

Picking table conveyor end/grader* (Fig. 53-6)

Automatic

Bunker floor (Fig. 53-7)

Tighten each side at machines right hand side. Both sides tightened equally tightened.

8.6 Belt tensioning

Main sieving web

No tensioning. If web channel is not straight: Adjusted with bolt on digging unit's right hand side (Fig. 55-1).

Flight conveyor

Bolt tensioning on lower end rollers, spring loaded tensioner right-hand side (Fig. 55-2).

Haulm diviner web

Automatic

First cleaning web

Tensioning bolts (fig. 55-3/A), one on each side of the web

Second cleaning web

Bolts for rollers in lefthand end (Fig. 55-4)

Picking table/and trash web

Tension bolts in rear end (Fig. 55-5)

Picking table end section

Forward end

Separator deflector web

Tension bolts



Fig. 53-1

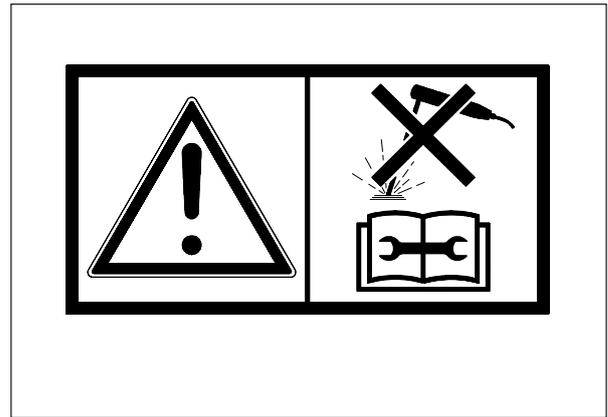


Fig. 53-2

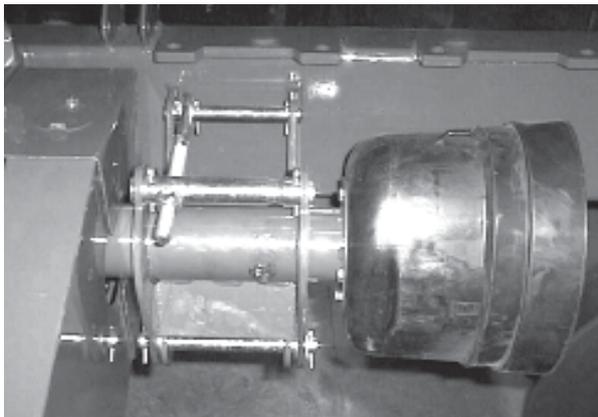


Fig. 53-3

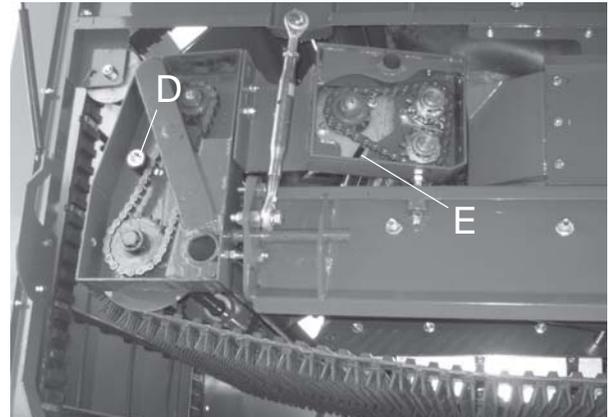


Fig. 53-4

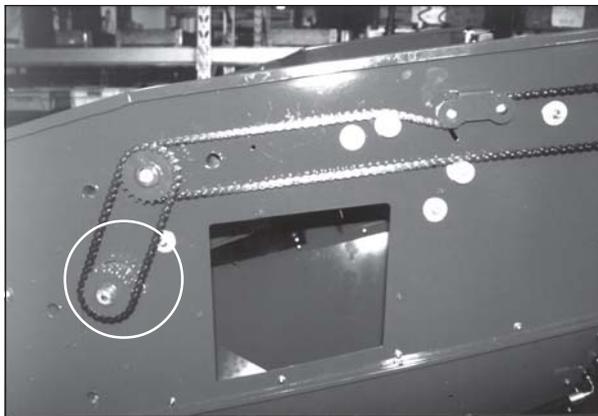


Fig. 53-5

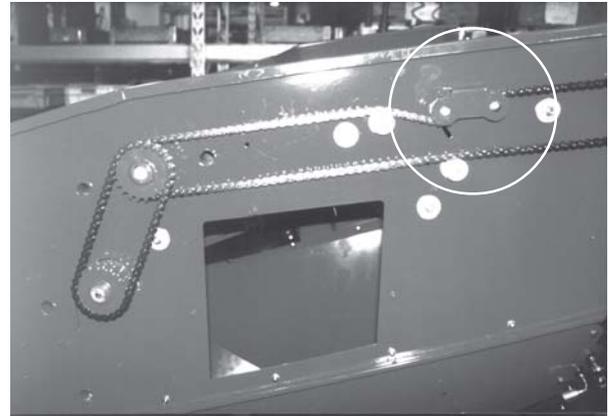


Fig. 53-6

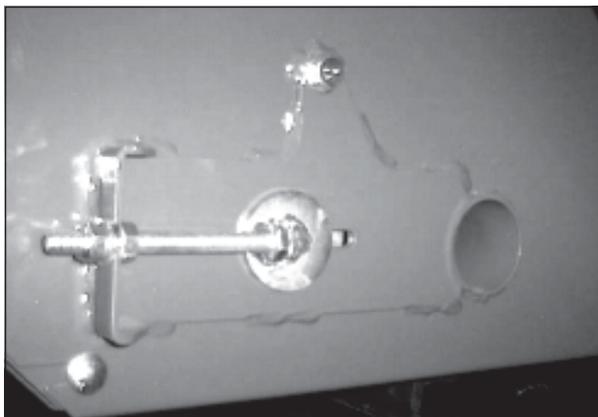


Fig. 53-7

*=options

8.7 Lubrication

Lubricate according to lubrication chart section 8.13 and 8.14.

Follow manufacturers recommendations for lubrication or PTO-shaft, universal joints and safety clutches.

8.8 Oil filters

The pressure oil filter for the system operated by the tractor should be changed annually. It is positioned at the left beam of the frame under the bunker (Fig. 55-6). The filter housing has an indicator fitted. If the indicator shows red at normal temperatures, element should be replaced immediately. Use a 25my filter element.

The integrated hydraulic system includes a return filter positioned at the left hand side of the tank (Fig. 55-7). It should be changed annually using a 25my filter element.

Filter type	Ordering number
Pressure filter element:	
Hydac	UH453411
Return filter element:	
Return filter 11/4" spin on	UH332706
Air filter for oil tank	UH332711

8.9 Change of oil

Hydraulic oil:

Change oil after 200 hours thereafter every 500 hours. Use oil type HD 46. Oil volume approx. 100 litres. Level of oil is measured on the right hand side of the tank (Fig. 55-7). Filling cap close to the filling indicator at the right-hand side of the oil tank.

Gear unit for oil pump:

Change after 200 hours. Type of oil is transmission oil SAE 80/90. Volume of oil 0,34 litre.

Angular gear boxes:

Change oil after 50 hours and thereafter every 500 hours. Type of oil is SAE 90 EP approx. 1,1 litre.

8.10 Hydraulic valve bank

When working in particularly dusty conditions the cap opposite the solenoid should be covered in order to prevent dust penetration (plastics foam). Should be cleaned annually.

8.11 Electronics

The electronics is normally free of maintenance. The driver units is positioned over the valve bank. In order to get easy access to driver units the electronics boxes can be tilted.

8.12 Cleaning and storage

Remove soil and haulm regularly, especially inside webs and in belt crossings. Soil and haulm stuck in the belts channels might block and damage the potatoes.

After the season or when the machine by other reasons should be stores for some time do the following:

1) Clean the machine properly.

Note! Be careful close to bearings and electronics components when using a high pressure cleaner. Water can penetrate the seals.

2) Check webs, sprockets and chains for damages

3) Lubricate according to lubrication chart.

4) Repaint if paint damages.

5) Store in place protected against rain and snow, sunlight and aggressives.

6) Electronic/electric equipment should be disconnected and stored indoor in a tempered room in order to prevent condensation. Don't pull the cords when disconnecting! Treat components carefully and avoid sharp objects

7) Check bolts for wear and tear.

8) Check tyres and pressure.

9) Move drawbar-, steering- and agitation-cylinders in, to keep rod inside. loaded cylinders should be let out and rod lubricated with grease to prevent corrosion.

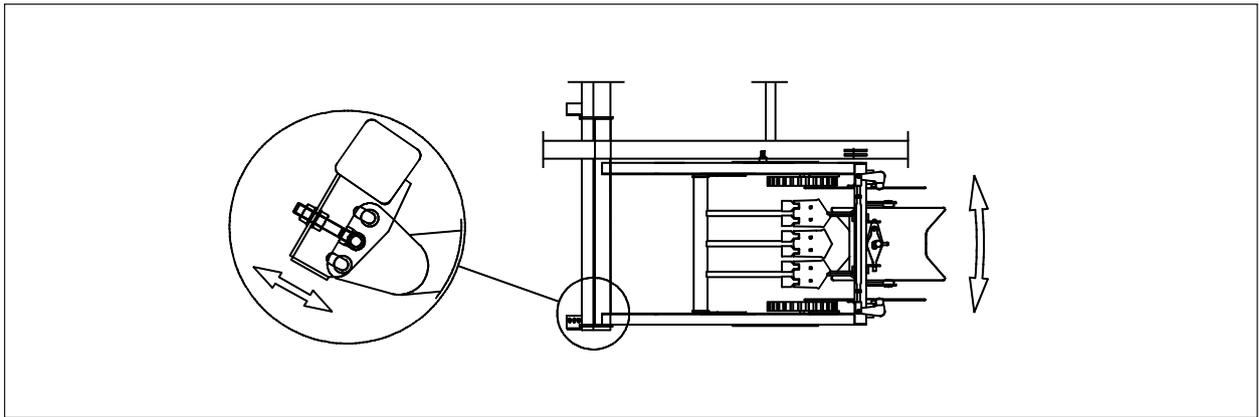


Fig. 55-1

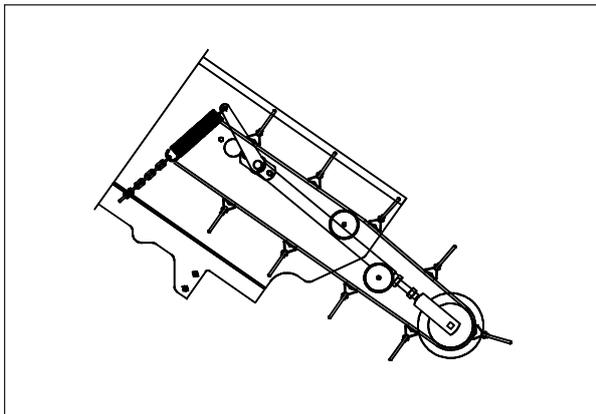


Fig. 55-2

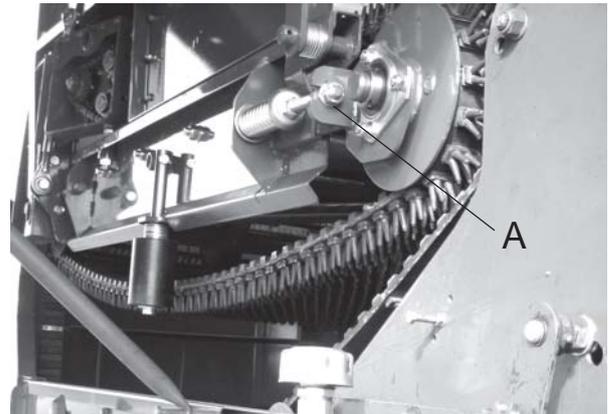


Fig. 55-3

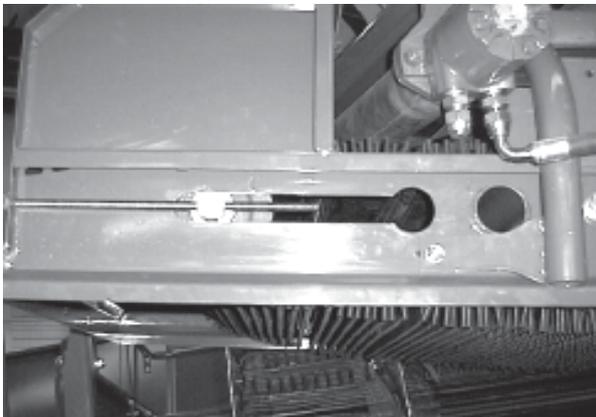


Fig. 55-4

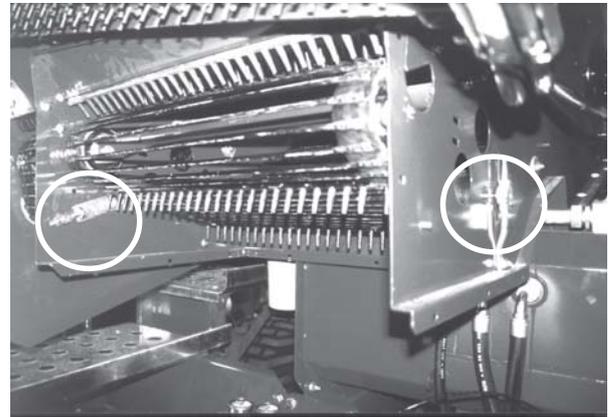


Fig. 55-5



Fig. 55-6

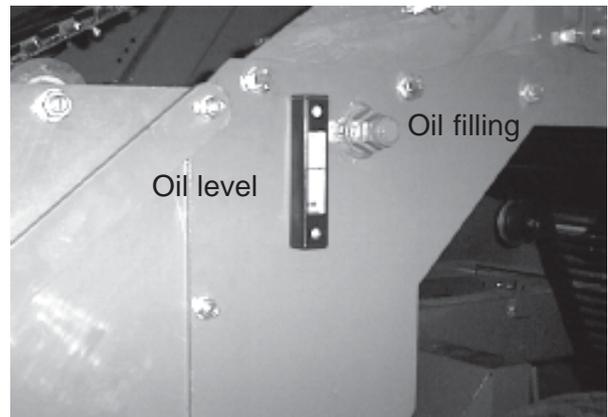
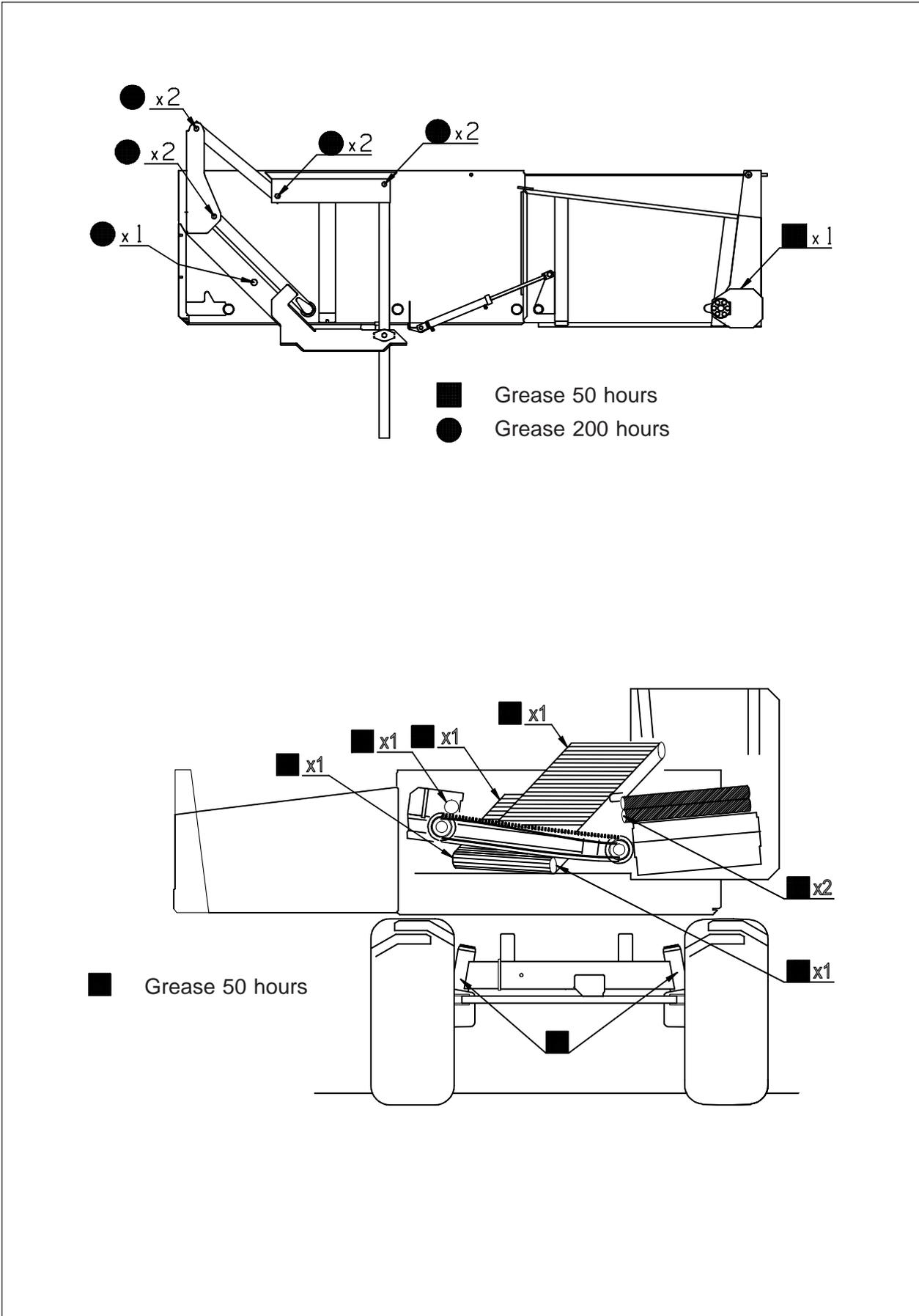


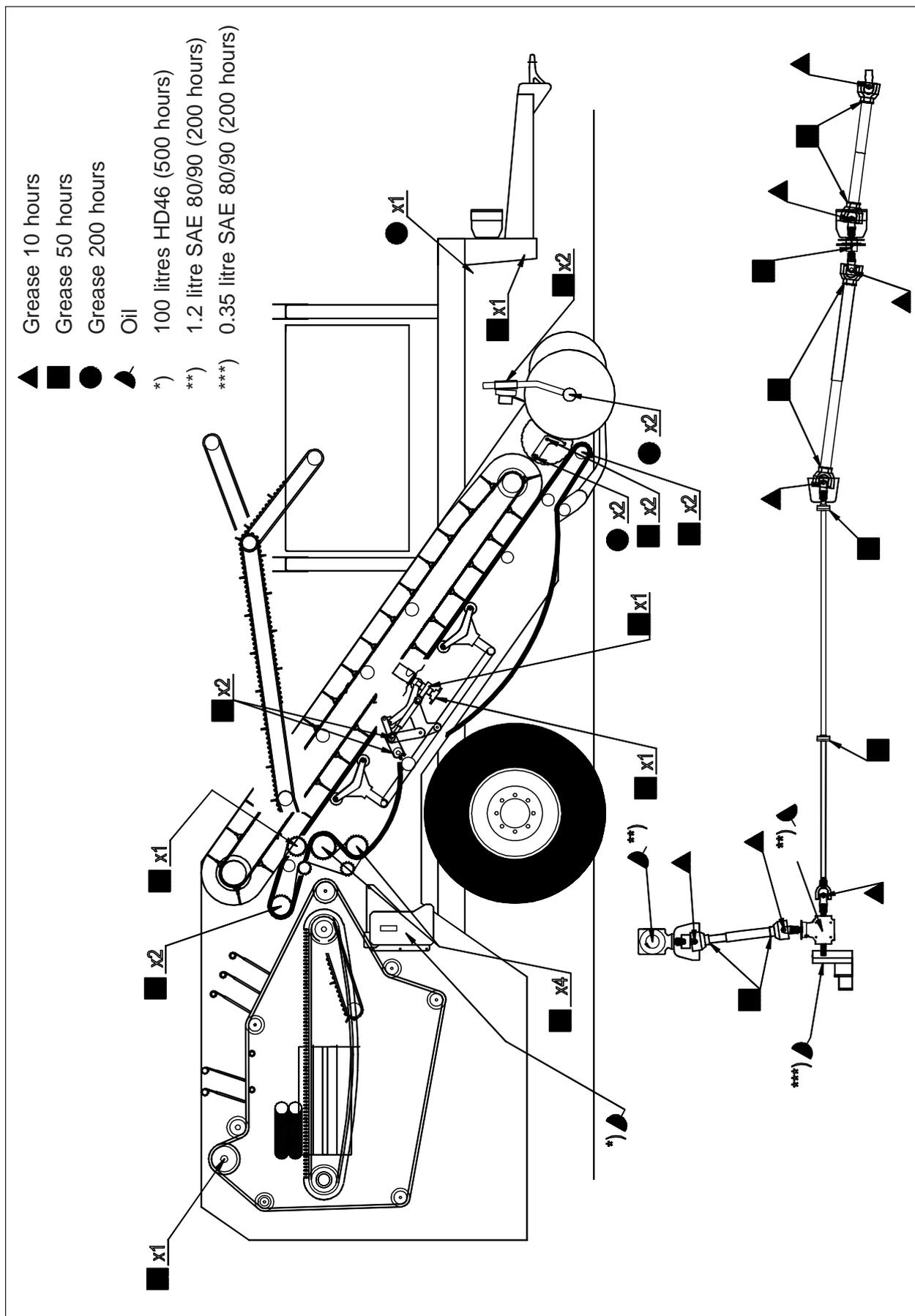
Fig. 55-7

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8.13 Lubrication UN5640 front and rear



8.14 Lubrication UN5640 righthand side



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9. Trouble shooting

9.1 Mechanics

Problem	Reason / Remedy
Safety couplings trip during operation	Check that webs and rollers are not blocked by stones etc.
Main web runs out of line	Adjust the lifting unit with the screw at its right hand (wears lifting unit side guards) side.
Main web drive rollers slipping the belt	Remove packed soil in the share unit and objects stuck in the web.
Blocking of belt drive	Remove objects/stones in the web.

9.2 Hydraulics

Problem	Reason / Remedy
Hydraulic functions don't work	Check that solenoids are activated Swap hoses or turn oil flow Check quick-couplers Check John Deere screw position (in end plate of the valve bank) (see section. 3.4)
Share raises as soon as pressure is put on Hydraulic functions only possible to activate manually	No return to tank, check quick coupler Check voltage - at least 10.8V at the solenoids Check polarity, if necessary swap + and -. Make new power supply from the battery with bigger cross-sectional area Broken wires, blown fuse or problems in the control panel
Relief valve on tractor opens	Open closed centre screw in the end plate
Steering of tractor moves jerky (John Deere)	Close closed centre screw in the end plate
Adjustment of drawbar slow	High friction in hinge bolt. Lubricate when draw bar is unloaded
Bunker moves slowly down	High return pressure, check couplings between harvester and tractor.
The alarm does not work	Swap cords in command panel connection Broken cords

9.3 Electronics

Error message	Reason / Remedy
«Initializing» don't disappear after connection	If message don't disappear after a few seconds, check transmission cable from control panel to driver units at the machine (C and D card)
«Fatal error»	Chip containing parameters or printcard defect
«Memory corrupted»	Contact your Underhaug dealer.
«No data found»	The system is not able to find values from the memory. Contact your Underhaug dealer.
«Invalid data version»	Wrong combination of program versions in operators panel and C and D card.
	Problem with saving or not saving of parameters Contact your Underhaug dealer.
«Warning !! Power fail»	Problems with power supply. Check cable.
«Warning!! CAN error» (+C, D, CD or nothing)	Communication problem between detected units, If C, D, CD displayed, check data-cable and connections If no letter indication, reset failure message with toggleswitch <->.
«Warning!! Emergency stop»	Relay prepared for emergency stop on D-card activated. Contact your Underhaug dealer.
«System mode entered»	The system is in system mode, only for service staff instead of normal. Toggleswitch to <+>. Disconnect and connect power.
«No sensors connected»	Broken cable between sensor and driver box. Check cords for connected sensors. The machine is possible to operate without sensors. Automatic functions will not work

9.4 Soil separation

Problem	Reason / Remedy
Soil disappears before leaving the main web (Soil should follow to be gentle to the potatoes)	Reduce the agitation Increase flight conveyer speed Assemble belt with smaller rod distance
Soil and clods on the picking table	Reduce speed on flight conveyer belt to increase sieving capacity Increase agitation Reduce share-depth in order to not digging hard layers
Shares does not go down or down to fast.	Adjust soil penetration by changing hinge point on the frame

9.5 Haulm separation

Problem	Reason / Remedy
Haulm sticks to frame for the share.	Increase share angle and raise lifting unit by the diabolo Sharpen the roller discs.
Excess of haulm on first cleaning web	Fit more additional straps in haulm divider web cross conveyer Reduce haulm divider web speed Change path of web to more straight
Excess of haulm by haulm guides Haulm roller does not separate haulm.	Remove haulm guides, distribute the rest. Move haulm roller out

9.6 Loss of potatoes

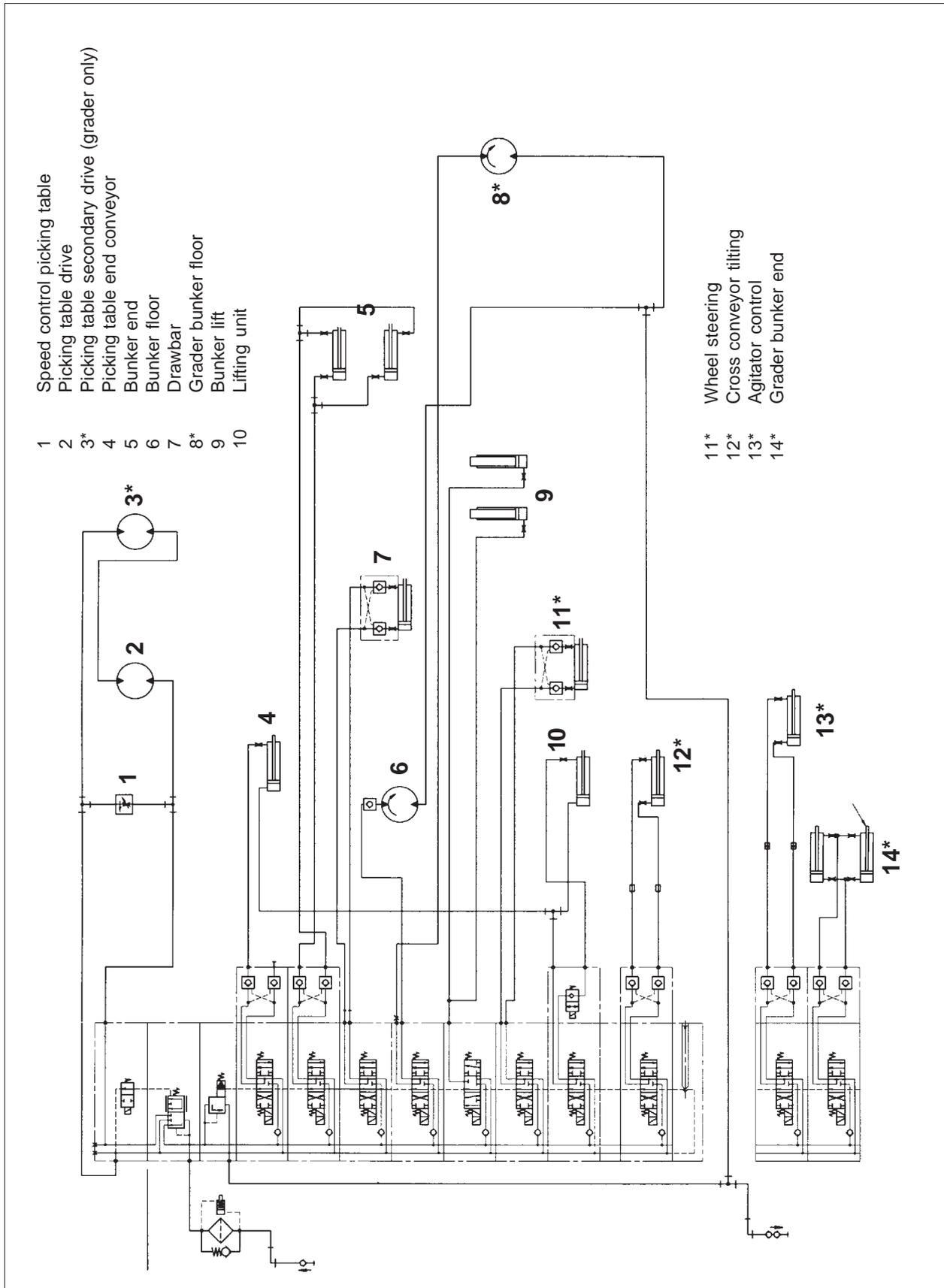
Problem	Reason / Remedy
Potatoes left in the ground	Adjust the share depth by using the diabolo
Loss of potatoes by roller discs	Too big distance between discs and shares
Potatoes falling through web	Use web with smaller spacing or check web for damages

9.7 Damage to the crop

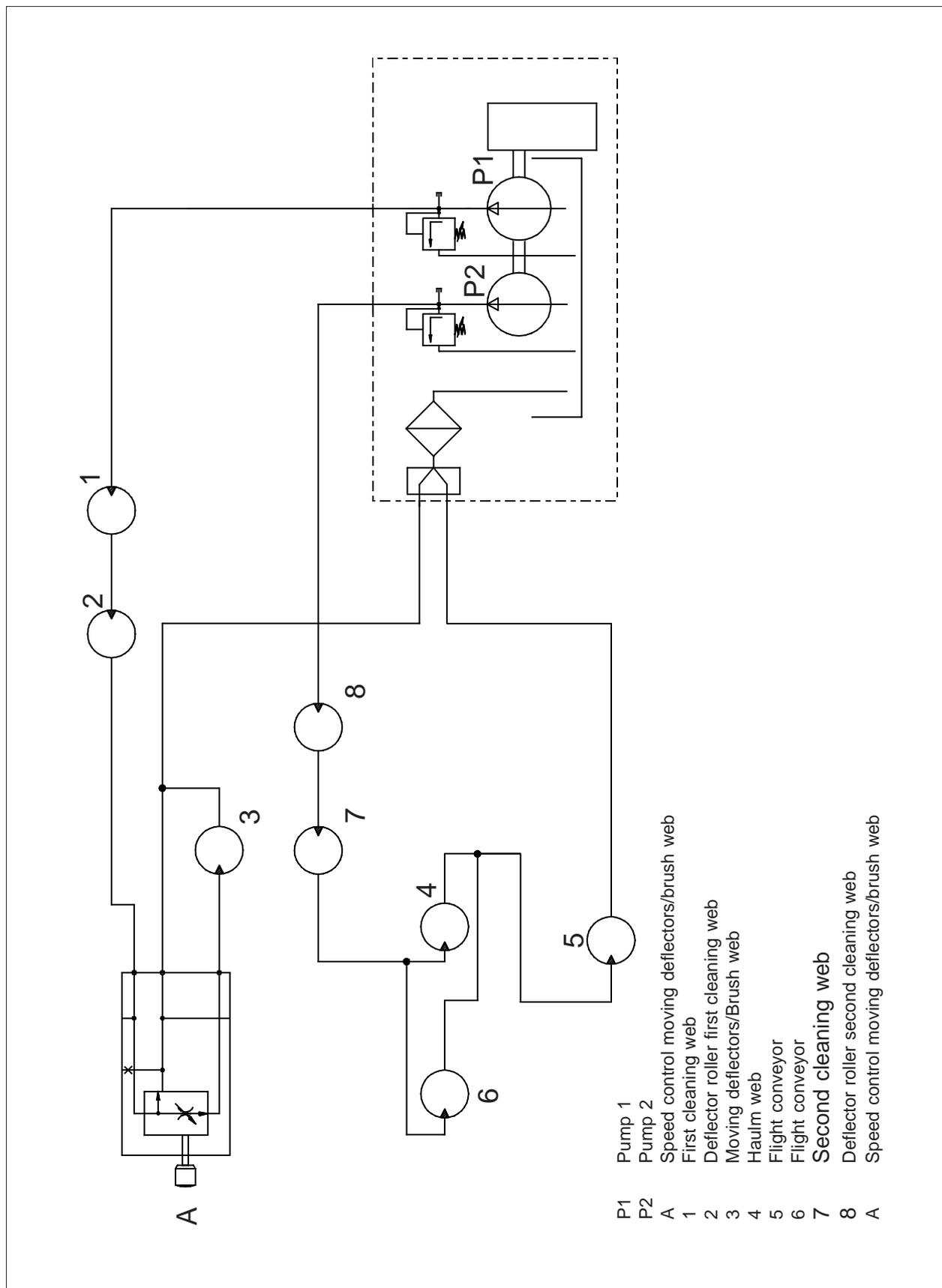
Problem	Reason / Remedy
Potatoes damaged in row	Tyre crushing damages. Use narrow tyres and adjust wheel setting on tractor
Damages caused by the harvester	<p>Too strong agitation</p> <p>Web gap to wide</p> <p>To high revolutions on the machine</p> <p>Forward speed too low</p> <p>Share adjustment to shallow</p> <p>Roller discs to far in.</p> <p>Poor climate (cold, wet)</p> <p>Stony soil</p> <p>To big drop from picking table to bunker. Lower outer part of picking table</p>
Damages caused during unload	<p>Big drop from bunker, use bunker chute and lower bunker</p> <p>Careless handling of the potatoes</p>

10. Hydraulics and diagram

10.1 Diagram tractorpowered system

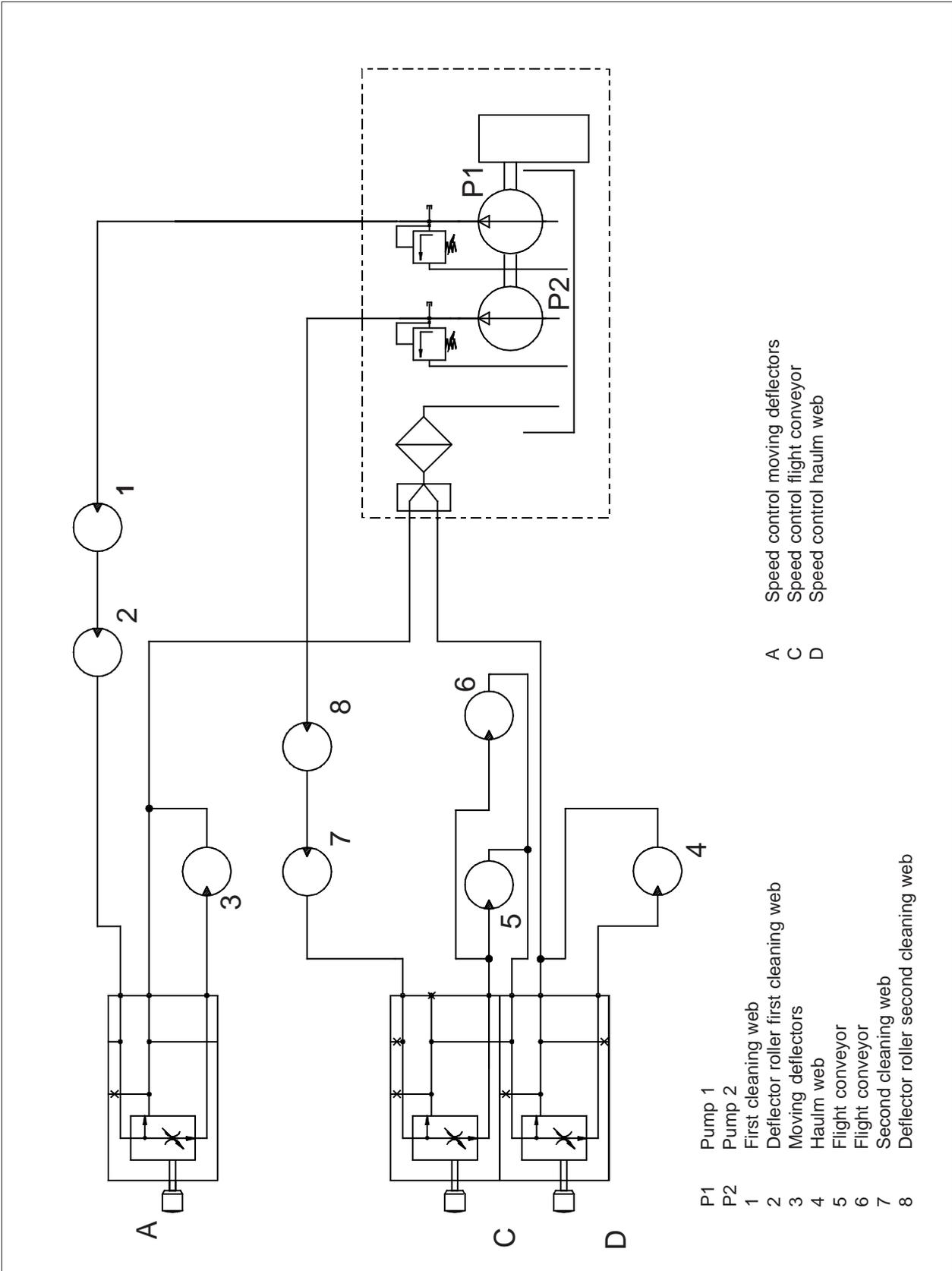


10.2 Diagram pump-powered system

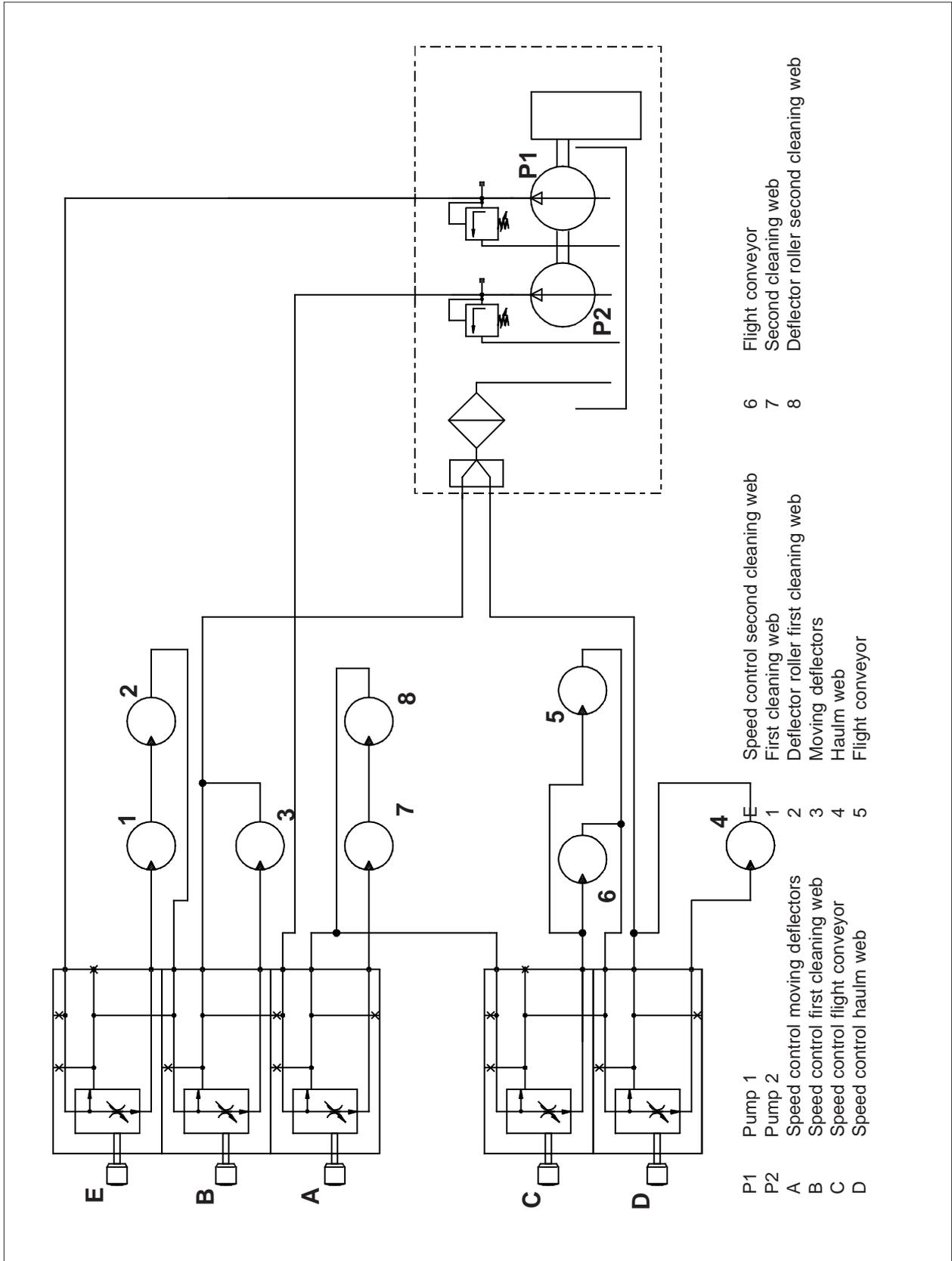


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10.4 Diagram pump-powered system with optional flight conveyor and haulm web speed control



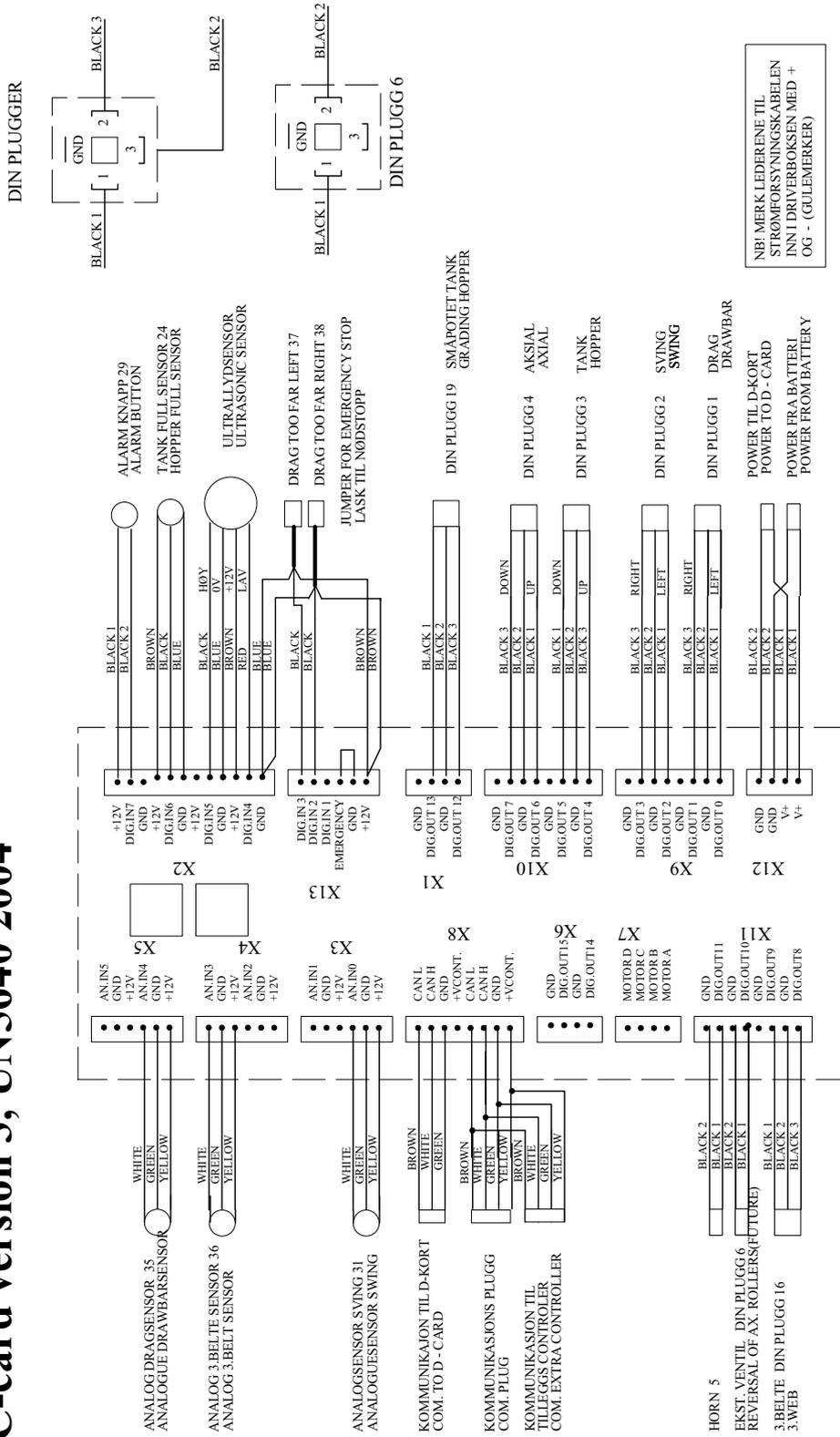
10.5 Diagram pump-powered system with optional flight conveyor, haulm web & hedgehog web speed control



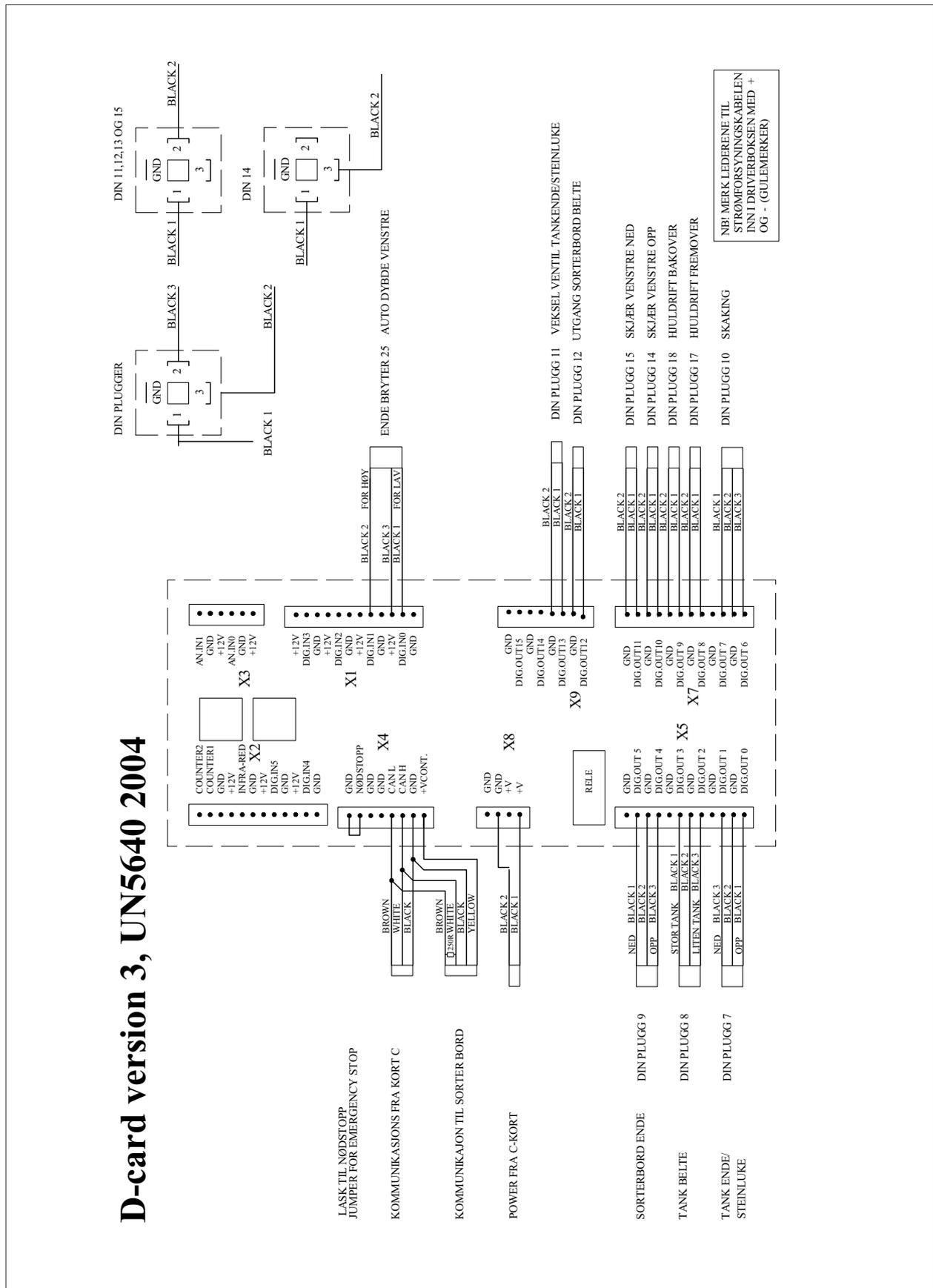
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10.7 Diagram electrical control system C-card

C-card version 3, UN5640 2004



10.8 Diagram electrical control system D-card



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