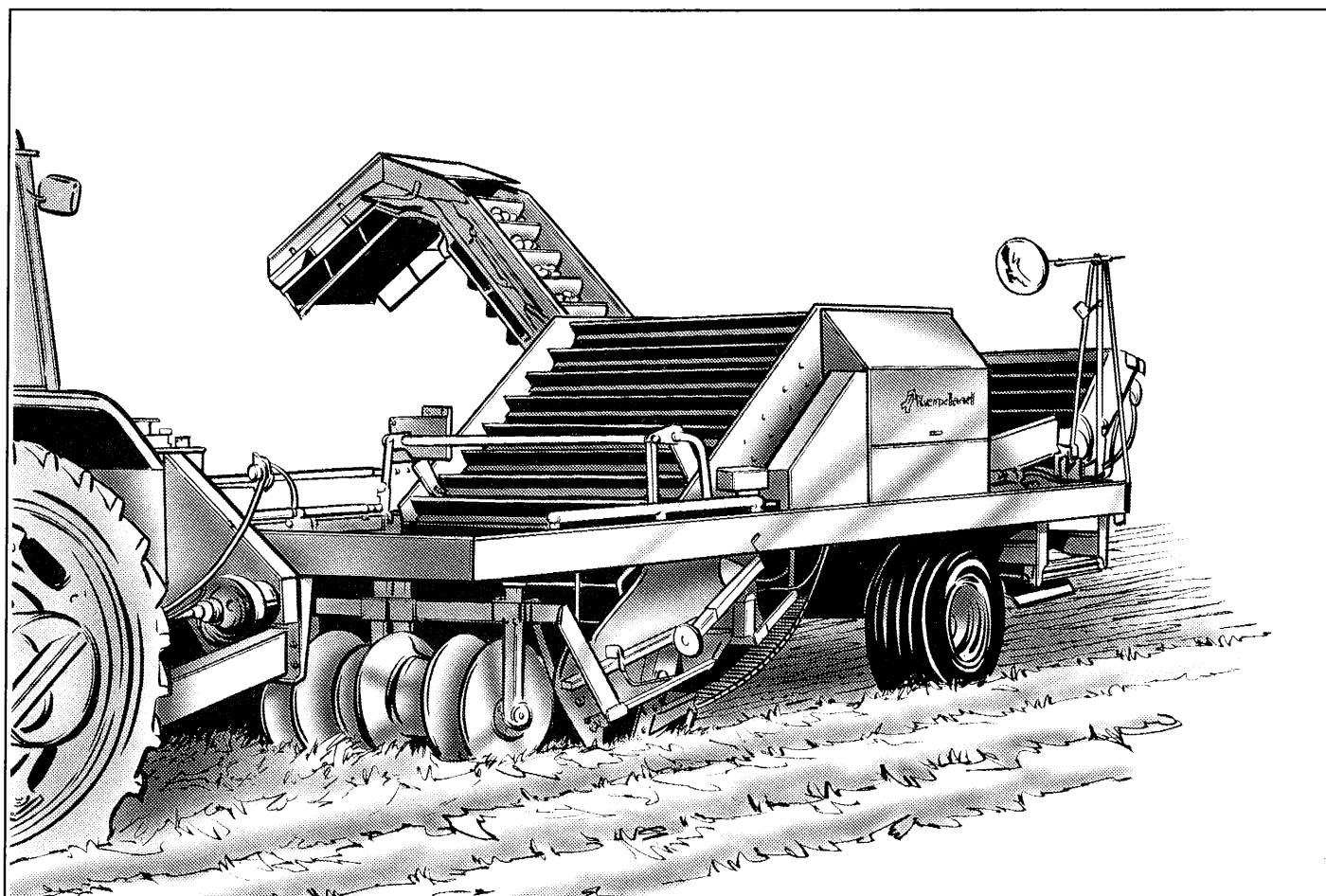


**GB**

# Operator's manual **Two row potato harvester**

Models UN2407, UN2410, UN2417,  
UN2418, UN2419, UN2420, UN2421,  
UN2422, UN2427 & UN2430



# Guarantee

Kverneland product's are guaranteed for a period of one year from the date of delivery, against defects in material and workmanship.

Component's not manufactured by Kverneland, i.e. electrics and hydraulics, p.t.o. shafts and tyres are guaranteed according to the original manufacturer's recommendation.

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

Tyres - Shares - Webs - Web rollers - Fuses - Safety clutches - PTO shafts

Hydraulic seals for pumps, motors, valves and cylinders - Oil filter

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

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 Kverneland sales company of importer 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 Kverneland sales company or importer if required.

Due to the operation of the Kverneland 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 Kverneland authorization.
- b) operators 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 Kverneland and its importer or sales company are not responsible for the function of components not shown in the spare parts catalogue covering this product.

Kverneland reserve the right to change the product with no obligation to previous supplied machines.



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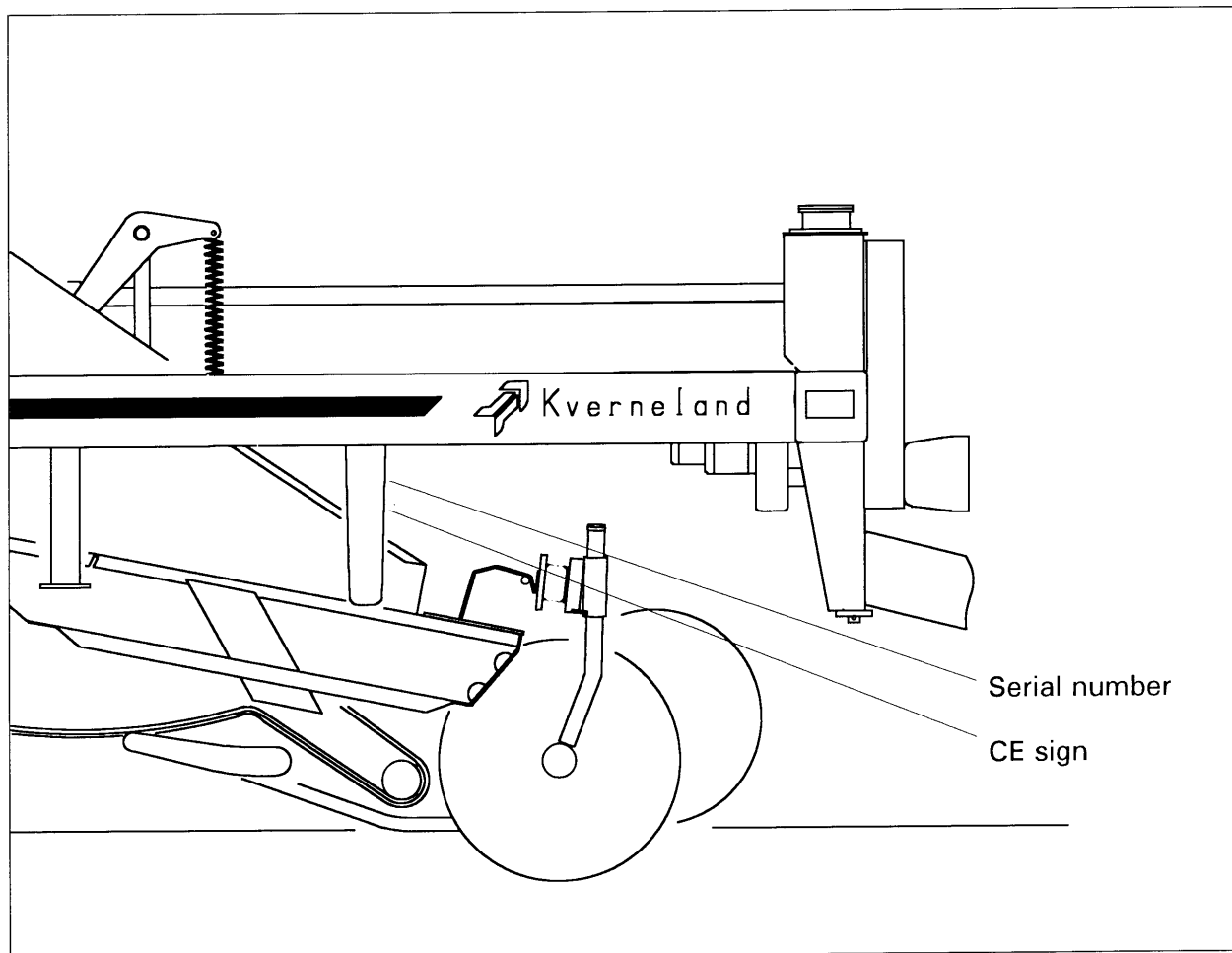
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# Machine identification

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 delivery 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 and 93/44/EEC.



Serial number	:	_____
Year of delivery	:	_____

## Introduction

We congratulate on the purchase of your new Kverneland 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 Kverneland products are designed and tested in close co-operation with farmers and contractors to ensure optimal function and reliability.

Please read this manual before using your new machine.

We wish you all the best with your Kverneland product.

Yours faithfully  
**Kverneland AS**



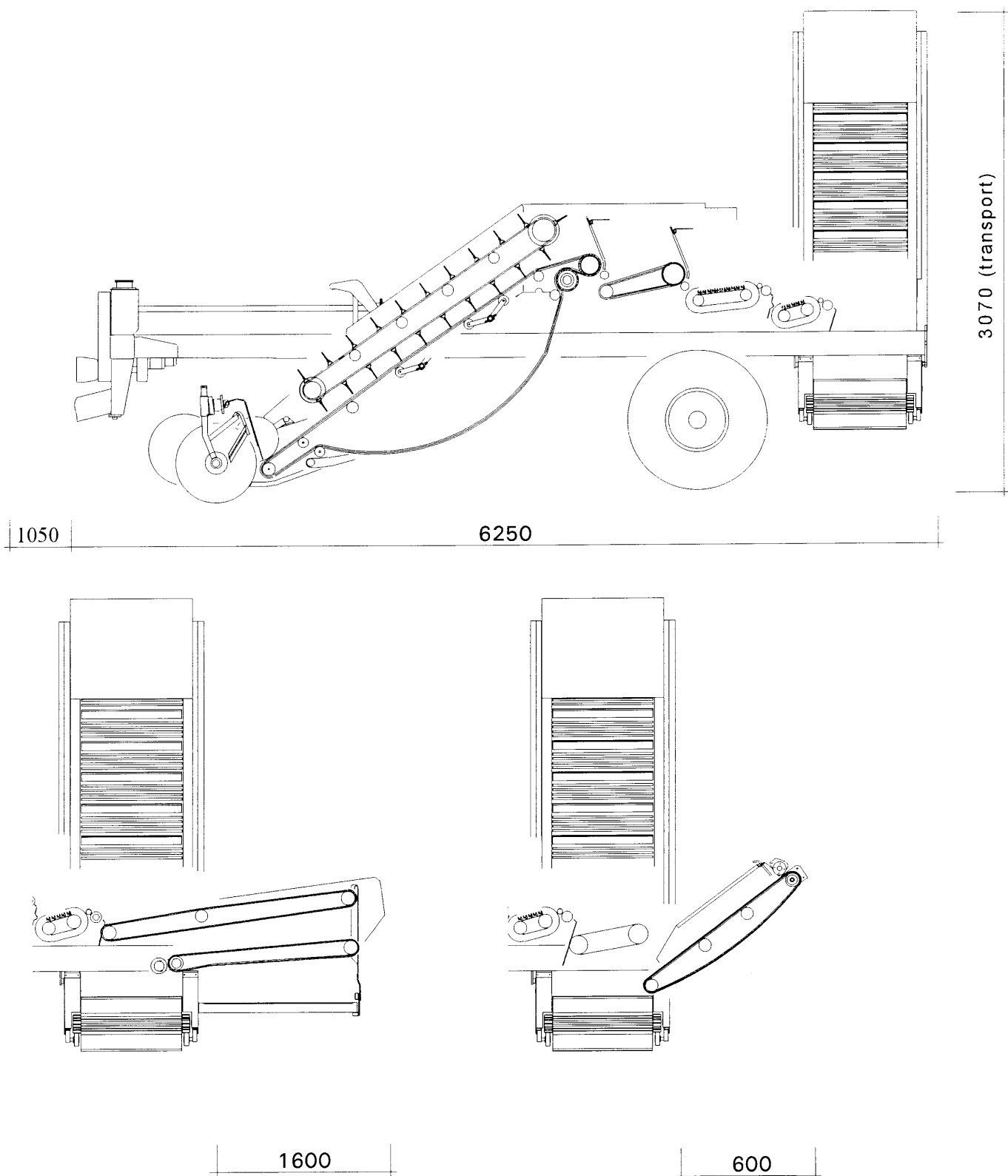
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«Where farming means business»

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# Dimensions



All measures are in mm (1" = 25.4mm)

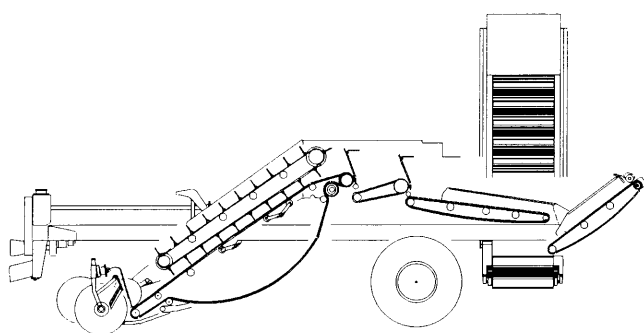
# Technical specifications

Covers machine with horizontal main frame  
and standard wheel dimension (500/50-17")

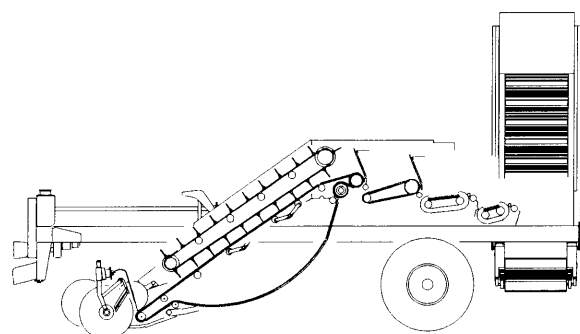
Harvester model:	UN2407	UN2410/2417/ 2419/2420/2430	UN2421/2422/2427	UN2418
<b>Tractor connections</b>	Hitch/ tractor drawbar 1 hydraulic outlet w/non resistance tank connection	Hitch/ tractor drawbar 1 hydraulic outlet w/non resistance tank connection	Hitch/ tractor drawbar 1 hydraulic outlet w/non resistance tank connection	Hitch/ tractor drawbar 1 hydraulic outlet w/non resistance tank connection
<b>Row width (infinite)</b>	75-100cm 30-40"	75-100cm 30-40"	75-100cm 30-40"	75-100cm 30-40"
<b>Shares</b>				
standard	3 blades	3 blades	3 blades	3 blades
extras	2 blades	2 blades	2 blades	2 blades
	1 blade	1 blade	1 blade	1 blade
	full width	full width	full width	full width
<b>Main web</b>				
width	1.65m	1.65m	1.65m	1.65m
web gap (standard)	28mm	28mm	28mm	28mm
web gap (option)	17, 25, 33, 38mm	17, 25, 33, 38mm	17, 25, 33, 38mm	17, 25, 33, 38mm
rod diameter	12mm	12mm	12mm	12mm
separation area	5.3m <sup>2</sup>	5.3m <sup>2</sup>	5.3m <sup>2</sup>	5.3m <sup>2</sup>
<b>Second web</b>				
width	1.65m	1.65m	1.65m	1.65m
web gap (standard)	29mm	29mm	29mm	29mm
web gap (option)	17, 25, 34, 39mm	17, 25, 34, 39mm	17, 25, 34, 39mm	17, 25, 34, 39mm
rod diameter	11mm	11mm	11mm	11mm
separation area	1.0m <sup>2</sup>	1.0m <sup>2</sup>	1.0m <sup>2</sup>	1.0m <sup>2</sup>
<b>Cleaning web</b>				
width		1.50m		1.50m
<b>Third web</b>		(2417 & 2419 only:)	(2427 only:)	
width	1.50m	1.50m	1.50m	
web gap	24mm	24mm	24mm	
<b>Haulm elevator</b>		(2417 & 2419 only:)	(2427 only:)	
width	1.50m	1.50m	1.50m	
area	2.1m <sup>2</sup>	2.1m <sup>2</sup>	2.1m <sup>2</sup>	
<b>Haulm (deviner) web</b>		(bare 2419:)		
bredde		1.50m		1.50m
arbeidslengde				
<b>Picking table</b>		(2420 & 2430 only:)	(2422 only:)	
width		1.10m	1.65m	
web gap		20mm	20mm	
<b>Discharge elevator</b>				
loading height (standard)	3.50m	3.50m	3.50m	3.50m
width (net)	0.78m	0.78m	0.78m	0.78m
<b>Axial rollers</b>		(2430 only:)		
no. of rollers		12		18
length		0.95m		0.95m
diameter spiral rollers		82mm		82mm
diameter smooth rollers		82 & 92mm		82 & 92mm
<b>Wheel dimensions</b>				
standard	500/60-22.5"	500/60-22.5"	500/60-22.5"	500/60-22.5"
option	500/60-26.5"	500/60-26.5"	500/60-26.5"	500/60-26.5"
	600/55-26.5"	600/55-26.5"	600/55-26.5"	600/55-26.5"
righthand side only	13.6/12-28"	13.6/12-28"	13.6/12-28"	13.6/12-28"

(cont.)

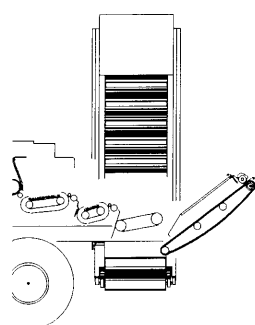




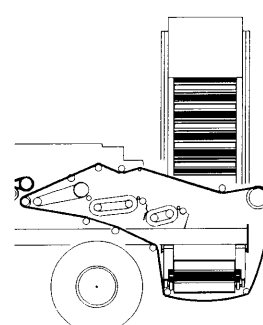
UN2407



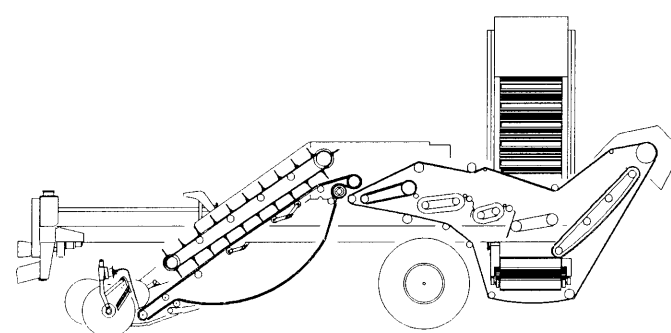
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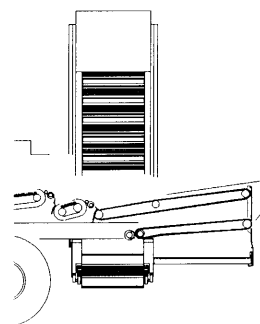
UN2417



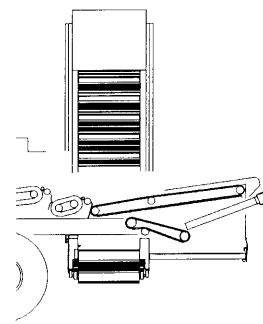
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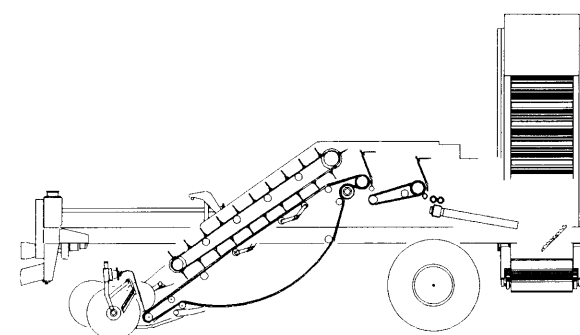
UN2419



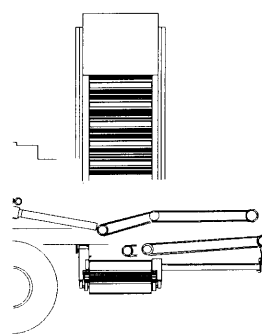
UN2420



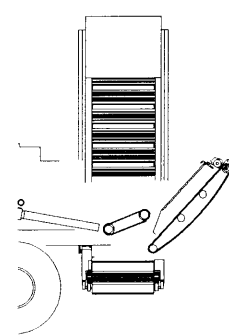
UN2430



UN2421



UN2421



UN2427

Harvester model:	UN2407	UN2410/2417/ 2419/2420/2430	UN2421/2422/2427	UN2418
Length inclusive drawbar	9.00m	2410: 8.35m 2417: 9.00m 2419: 9.45m 2420: 10.05m 2430: 10.05m	2421: 8.35m 2422: 9.80m 2427: 9.00m	8.85m
Transport width	2.91m	2.91m	2.91m	2.91m
Transport height	2.67m	2.67m	2.67m	2.67m
Total weight/Axle load	5200/4600kg	2410: 5100/4450kg 2417: 5250/4600kg 2419: 5500/4900kg 2420: 5400/4800kg 2430: 5870/5370kg	2421: 5200/4550kg 2422: 5950/5300kg 2427: 5350/4650kg	5300/4650kg
Drawbar load	600kg	600-700kg	650-700kg	650kg

## Model description

The UN2400 potato harvester from Kverneland is a two-row elevator machine. Following main models are available:

Secondary cleaning	Primary cleaning system		
	Third sieving web	Two cleaning webs	Integrated axial rollers
None		UN2410	UN2421
Haulm elevator	UN2407	UN2417	UN2427
Haulm (deviner) web		UN2418	
Haulm elevator + haulm web		UN2419	
Picking table		UN2420	UN2422
Picking table with axial rollers		UN2430	

The machine is supplied with two three-blade shares c/w diabolo and two pairs of discs. The lifting unit is self-levelling and provides an even working depth on uneven land. The machine has a hydraulically driven flight conveyor with speed adjustment. The main web has two mechanically driven agitators with hydraulic adjustment. Standard wheel size is 500/60-22.5". Hydraulically operated steering wheel shaft and machine levelling is included. The drawbar is fitted with manual lane adjustment. The picking table is hydraulically driven with speed adjustment included. The deviner web and the haulm elevator are hydraulically driven as well. The discharge elevator is hydraulically driven and controlled. The machine includes a separate hydraulic pump for the drive of the flight conveyor and picking table/deviner web/haulm elevator. Any axial rollers are driven from a separate pump. The harvester has a solenoid operated hydraulic valve system with the possibility of manual (emergency) operation. The discharge elevator has a priority flow valve with speed control. Discharge height is 3.5m maximum.

The machine may be supplied with one or more options:

- Centre haulm pull-in wheel (stop haulm building up between the centre roller discs)

- Optional shares are listed in Technical specifications page 5.

- Full width share is included with combi windrowing kit, share for bed and Non stop harvesting kit.

- Half diabolos (used on beds together with bed lifting share, Non-stop and combi windrowing kits)

- Non-stop harvesting equipment by simply using the field as temporarily store the harvester keeps working even when an empty trailer arrives late)

- Windrowing equipment (windrow and lift the potatoes with the same machine)

- Hydraulic diabolo relief unit (reduces the pressure on the depth adjustment rollers, to be used on soft soil)

- Hydraulic lane adjustment for drawbar (replaces turnbuckle, simplifies the lane adjustment, particularly on slopes)

- Optional web types are listed in Technical specification on page 5.

- Optional wheel sizes are listed in Technical specifications on page 5.

- Elevator hopper chute (reduces free dropping height, forms a flexible end to the elevator)

- Canopy over operator table

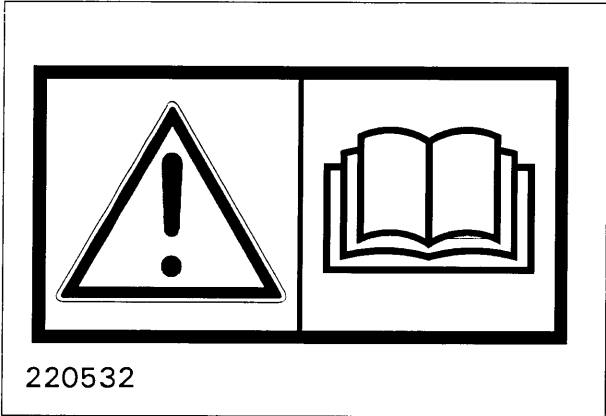


Fig. 1

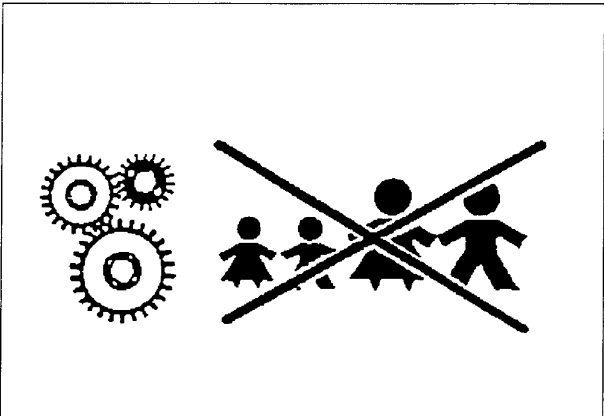


Fig. 2

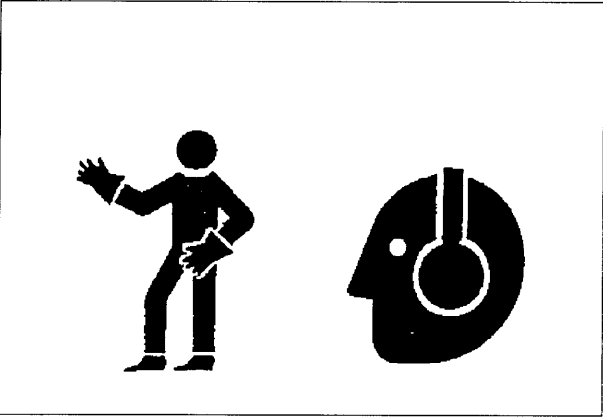


Fig. 3

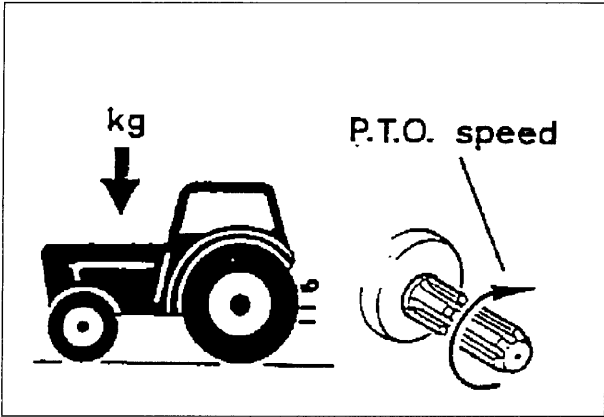


Fig. 4

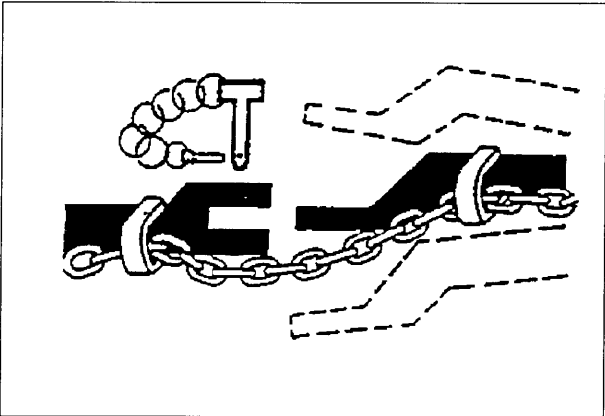


Fig. 5

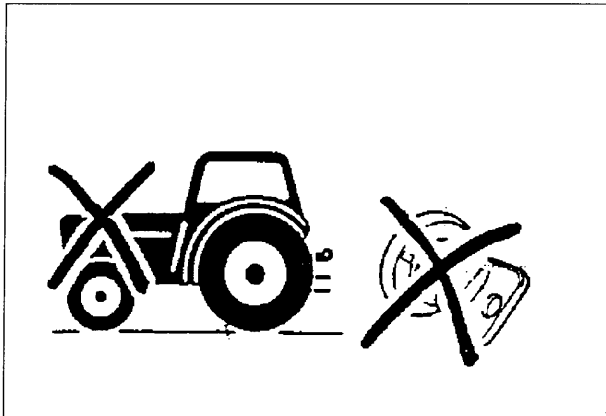


Fig. 6

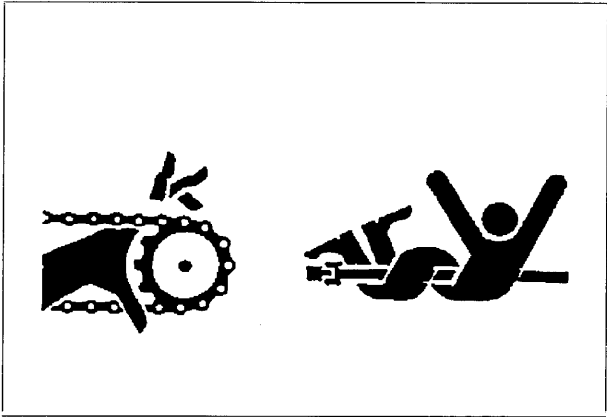


Fig. 7

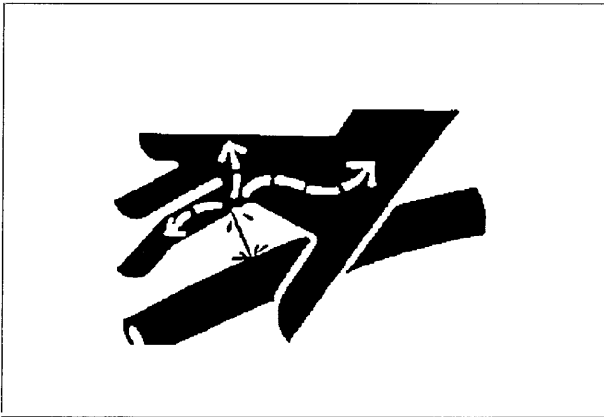


Fig. 8

# 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. 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. 2)

Bear in mind regulations regarding the lower age 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. 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. 4)

Make sure that the tractor has the correct P.T.O. gear engaged. A machine designed for an input speed of 540 r.p.m. should never be connected to a tractor with 1000 r.p.m. 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 drawbar, one of the parts (tractor's or machine's drawbar) must have a clevis. The drawbar pin must be secured with a lock pin. (Fig. 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 maintaining the machine. (Fig. 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. 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 dealing with hydraulics. Use eye protection and gloves. Escaping hydraulic oil under pressure might penetrate into the skin and cause serious infection. See a doctor if you have been exposed to injury. (Fig. 8)

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

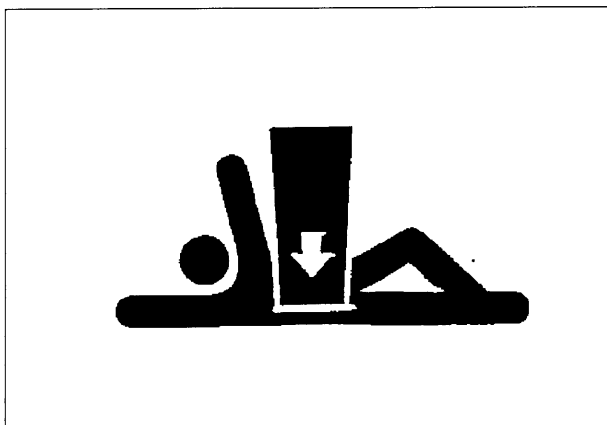


Fig. 9

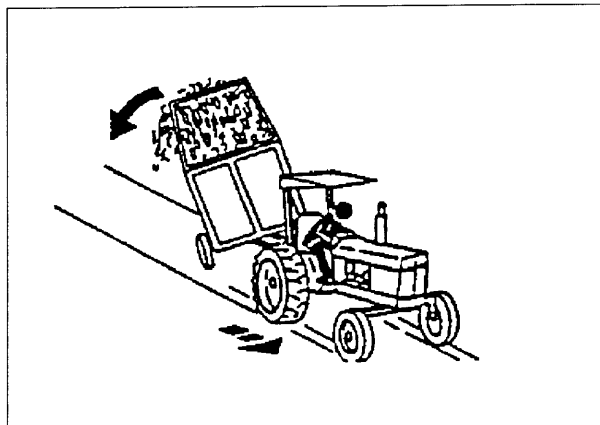


Fig. 10

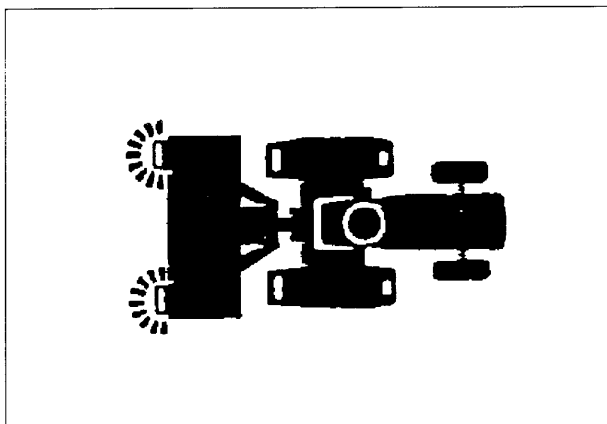


Fig. 11

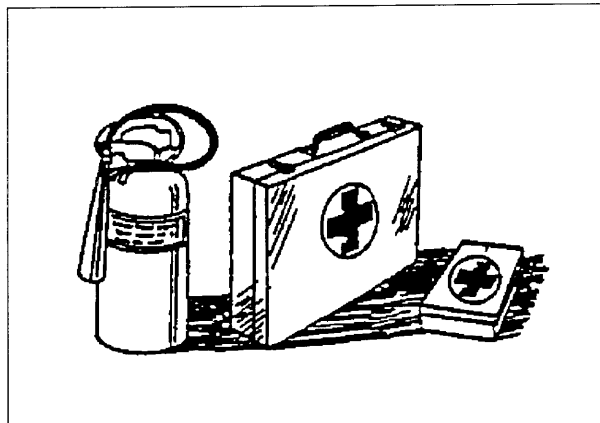


Fig. 12

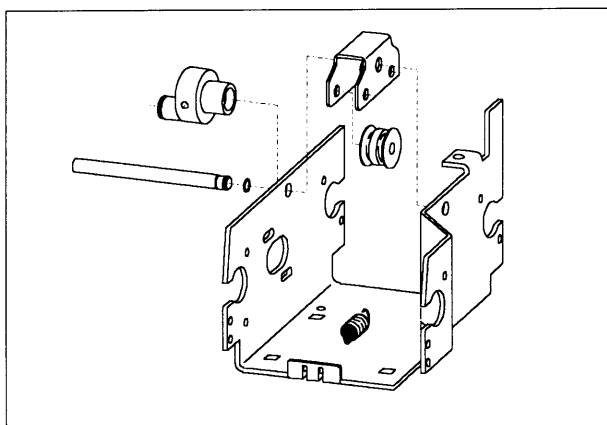


Fig. 13

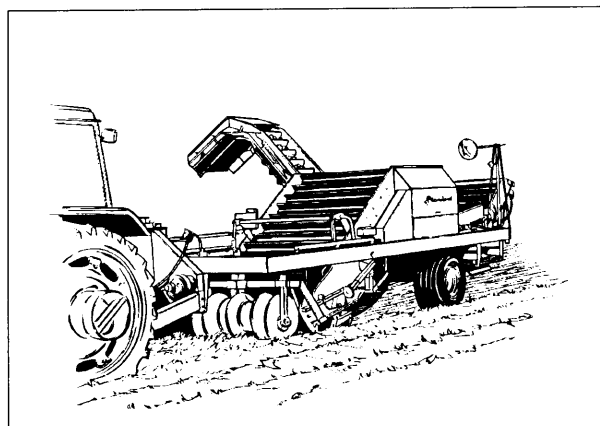


Fig. 14

**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 have parking chocks they should be used at the wheels. Never allow children to play or stay near agricultural machinery. (Fig. 9)

**Drive safely**

Beware of your responsibility, - carelessness or negligence may cause serious injury or even death. (Fig. 10)

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 machine does 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. 11)

**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. 12)

**Spare parts**

For safety reasons use only original spare parts. The use of spurious spare parts will cause the Kverneland product guarantee to be invalid. (Fig. 13)

**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. 14)

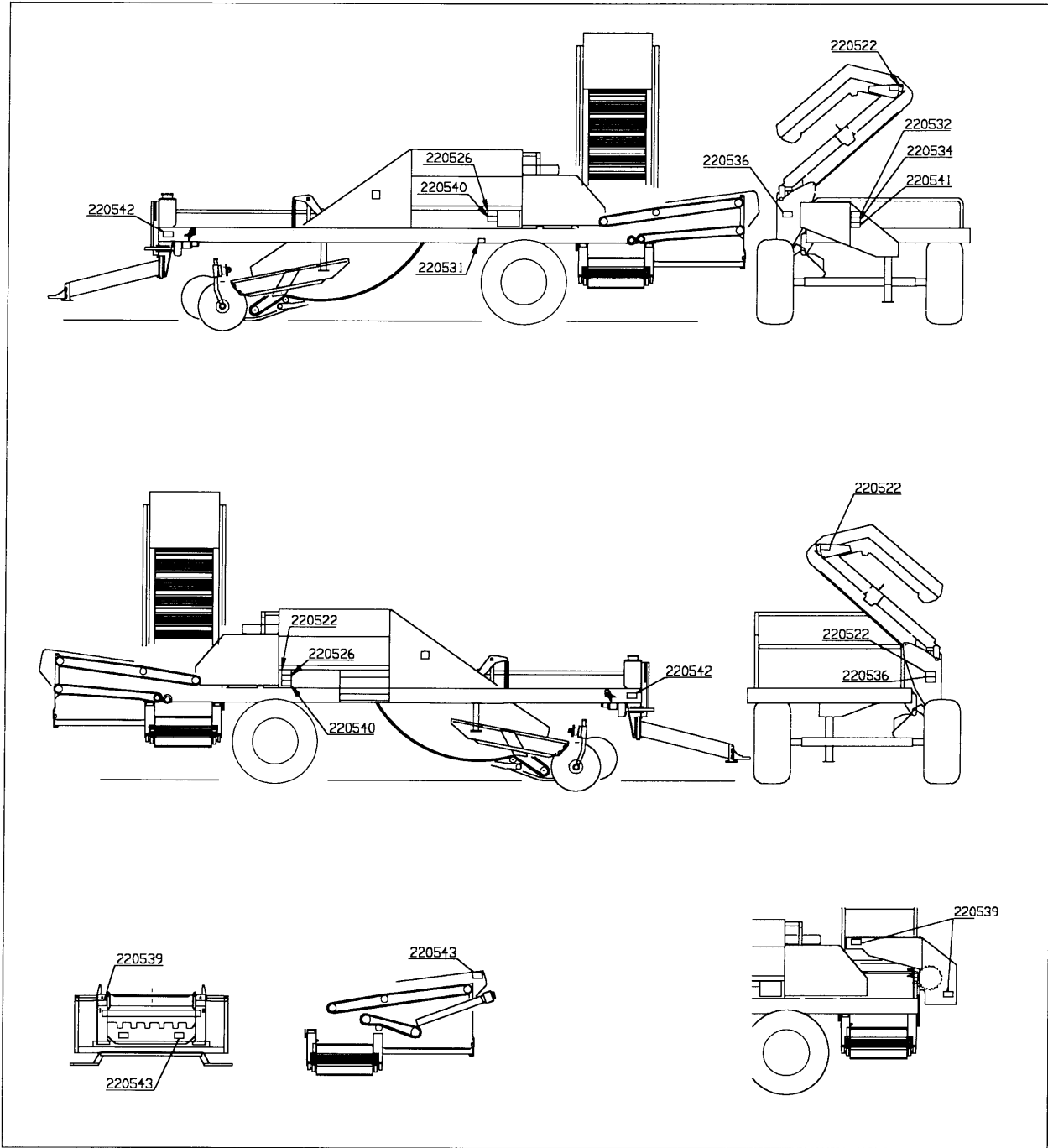


Fig. 15

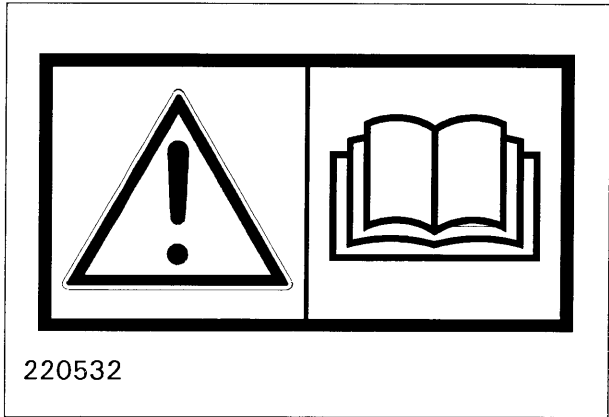


Fig. 16

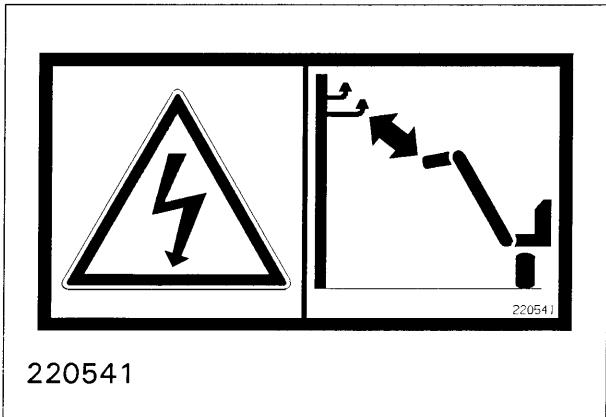



Fig. 17

# Supplementary safety instructions for UN2400 potato harvesters

This machine is designed for the purpose of harvesting potatoes and similar tubers. It has been designed to be operated unmanned if not equipped with a specially built picking table with platforms for the operator(s).

The machine is equipped with  warning signs. If any of the decals are damaged, they must be replaced. Ordering numbers are shown on the illustrations in this paragraph. Fig. 15

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

**Warning 220541 (fig. 17).** 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.

**Warning sign 220536 (Fig. 18).** Squeeze risk. Keep distance from moving parts.

**Warning sign 220522 (Fig. 19).** Squeeze risk. Keep distance from elevator. It can move without notice.

**Warning sign 220542 (Fig. 20).** Be careful when machine is lowered! Keep feet away from shares and wheels.

**Warning sign 220526 (Fig. 21).** Fingers could be cut off if caught by the roller chain.

**Warning sign 220531 (Fig. 22).** Lock the track markers prior to transport or parking with raised markers.

**Warning sign 220543 (Fig. 23).** Squeeze risk. Keep distance from rotating axial rollers.

**Warning sign 220540 (Fig. 24).** Squeeze risk. Keep distance from rotating haulm rollers.

## Lifting machine with crane


Only use approved lifting device. An approved lifting strap made specially for this machine is supplied with the machine. The weight of the machine is given in «Technical specifications» on page 5.

Be careful! Make sure that nobody stands under or near the machine when it is being lifted.

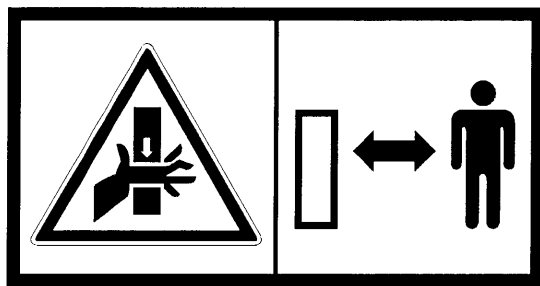
Attach lifting strap in brackets on lefthand and righthand side of main frame close to the lifting unit and at the forward side of the elevator on the righthand side of the machine. Look for the lifting hook signs. Make sure that straps are securely fastened before lifting.

Use a guide wire to keep machine in position.

## Hazard with the use of chemicals

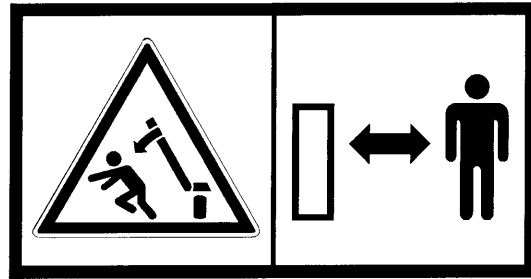
 Always follow the manufacturer's safety precautions regarding the handling of chemicals and fertilizers.





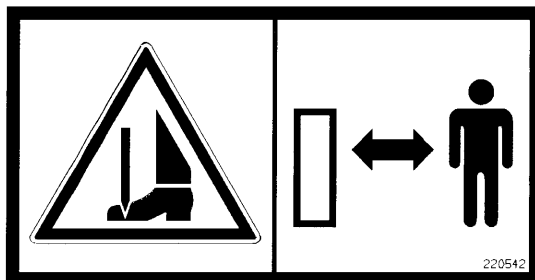
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Fig. 18



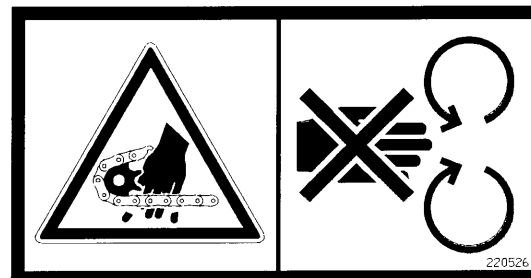
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Fig. 19



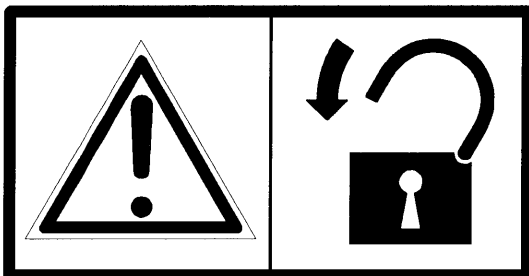
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Fig. 20



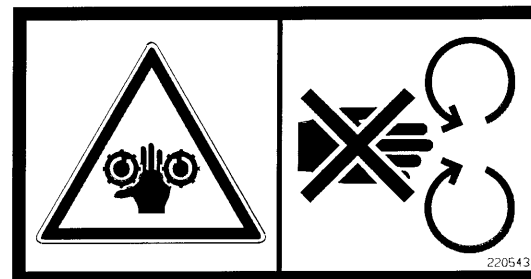
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Fig. 21



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Fig. 22



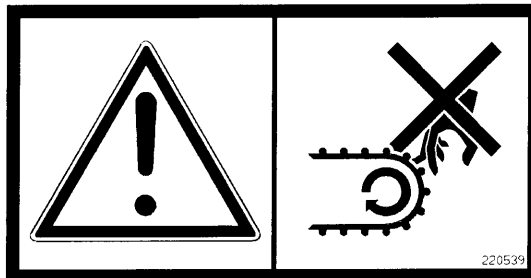
220543

Fig. 23



220540

Fig. 24a



220539

Fig. 24b

# 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 Kvernelands 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 mounted correctly and that it is not damaged. Assure that electric wirings and

hydraulic hoses have length and position that allow machine to move without causing any damage to the them.

Check the connections between tractor and machine.

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

Lubricate the machine according to paragraph «5.7. Lubrication».

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

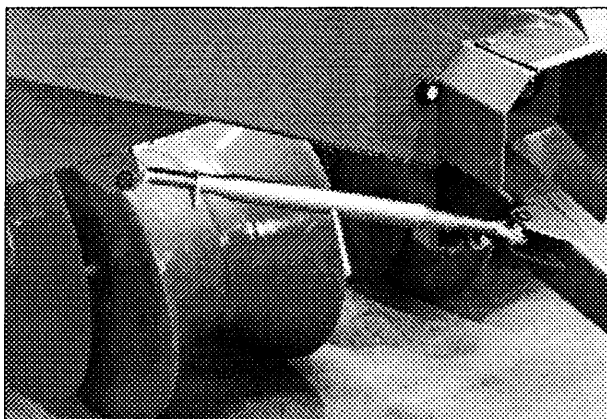


Fig. 25a

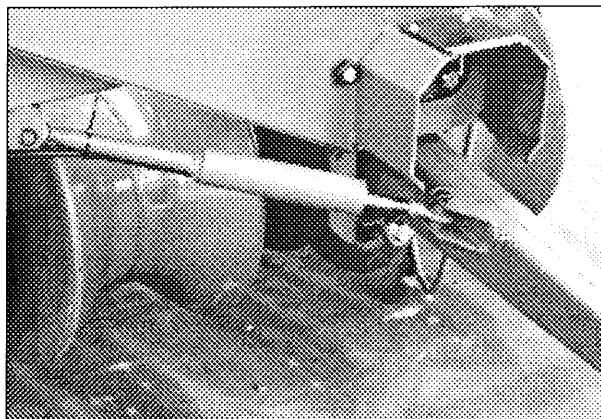


Fig. 25b

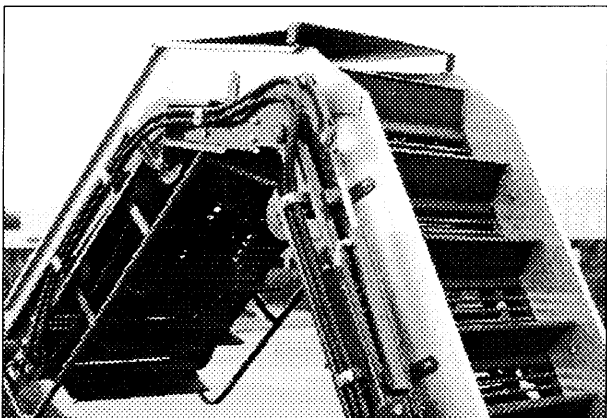


Fig. 26

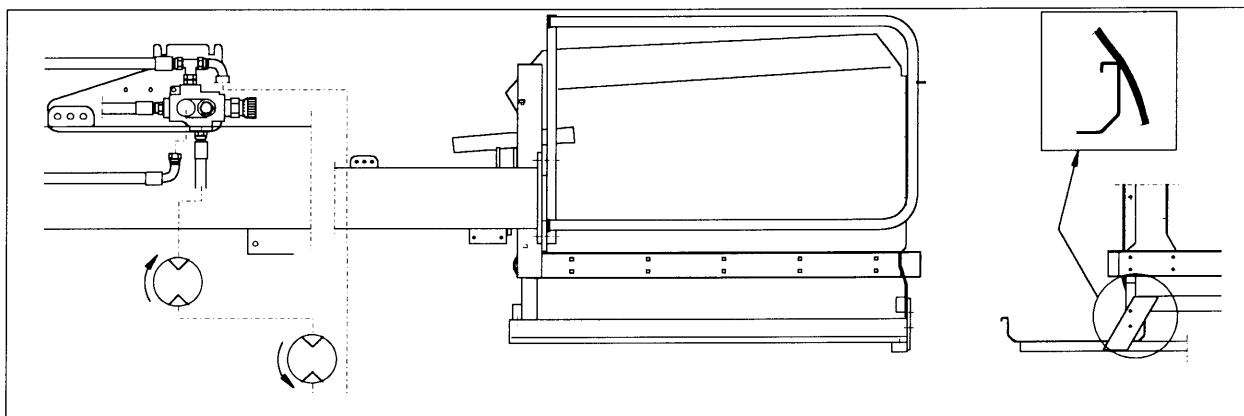


Fig. 27a

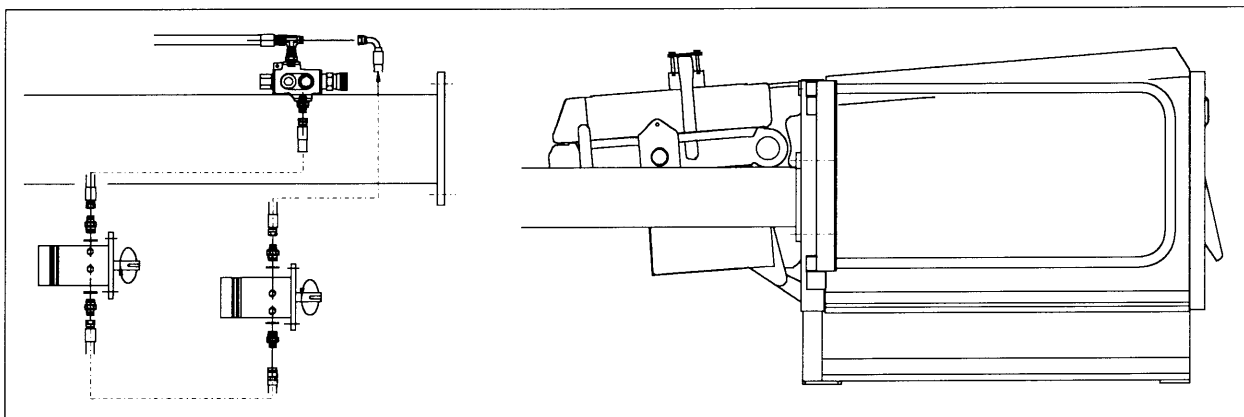


Fig. 27b

# 1. PREPARING A NEW MACHINE

## 1.1 Wheels

Fit any wheels (removed for transportation) when machine is lifted off lorry. Any wheel ribs must be fitted opposite to the tractor's wheel ribs.



**Fasten the wheel nuts properly (conic surface on nut to face the rim).**

## 1.2 Drawbar



Fit the drawbar and the turnbuckle (or drawbar cylinder) (Fig. 25a/b). Grease drawbar pin whilst still unconnected.

## 1.3 Elevator

If discharge elevator for transport reasons is folded, centre section should be raised to allow cylinders to be connected. Fit side panels on centre section and top section.

If discharge elevator for transport reasons is not fitted, it should be connected to the main frame (four points). Connect the hydraulic hoses (join hoses marked green, and join hose marked blue with hose marked red).

Fit the canvas across the end of the elevator (Fig. 26). If combi windrowing kit is fitted the canvas should cover the centre section. **Observe! If machine should**



**be transported over long distance at high speed prior to delivery to customer, the canvas should be fitted at arrival on the farm.**

## 1.4 Picking table

**Model UN2420 & UN2430 only:**

Fit the picking table if this has been dismantled due to transportation requirements (Fig. 27a). Tension the frame bolts thoroughly. Connect the hydraulic hoses of the picking table drive to the flow control valve on the machine's lefthand side (pressure hose 3/8" to port A, return hose 1/2" to port B).

**Model UN2430 only:**

Connect axial rollers' hydraulic hoses as shown on Fig. III at the back of this manual. Run the machine when machine is ready (see paragraph 1.16. Final check of machine).

**Model UN2422 only:**

Fit the picking table if this has been dismantled due to transportation requirements (Fig. 27b). Tension the frame bolts thoroughly. Connect the hydraulic hoses of the picking table drive to the flow control valve on the machine's lefthand side (pressure hose 3/8" to port A, return hose 1/2" to port B).

## 1.5 Haulm elevator

**Model UN2407, UN2417 and UN2427 only:**

Fit haulm elevator if not done at the factory. Connect it to rear end of main frame beams. Connect the hydraulic hoses of the picking table drive to the flow control valve on the machine's lefthand side (pressure hose 3/8" to port A, return hose 1/2" to port B).

**Model UN2419 only:**

Fit haulm elevator if not done at the factory. Connect it to rear end of main frame beams. Connect the hydraulic hoses of the picking table drive to the flow control valve on the machine's lefthand side (pressure hose 3/8" to port A, return hose 1/2" to port B).

Fit the haulm (deviner) web.

## 1.6 Control panel



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

Connect the control panel to the battery cable and the main cable from the machine.

Attach the control panel in a proper position on the righthand side of the tractor driver's seat. Use the bracket provided.

In the tractor cab there should be a power connection (cigarette lighter socket or 12 volt socket) with a good battery connection. Solenoid should have minimum 10.8V. The simultaneous use of two solenoid require extra capacity on battery connection.

See the symbols for choice of functions.

Note! Normal operation requires power for simultaneous operation of two solenoids.

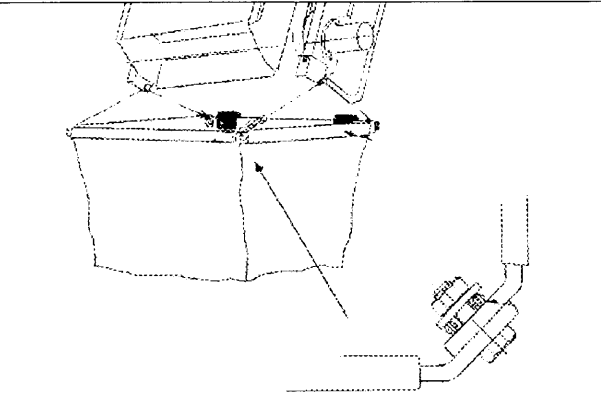


Fig. 28

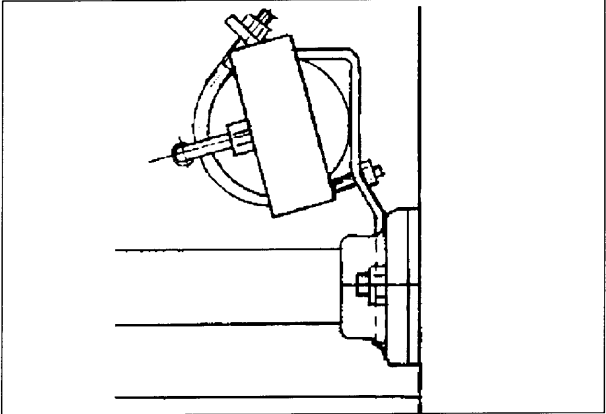


Fig. 29

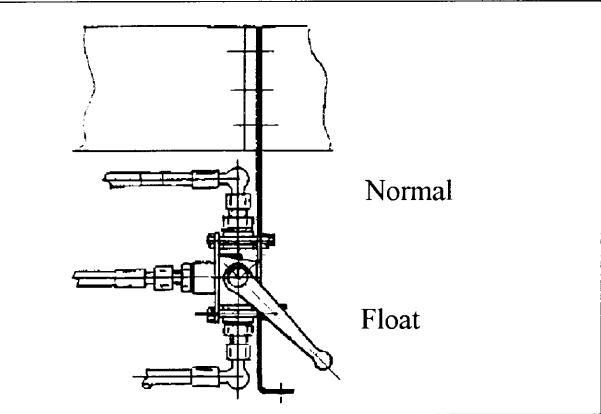


Fig. 30

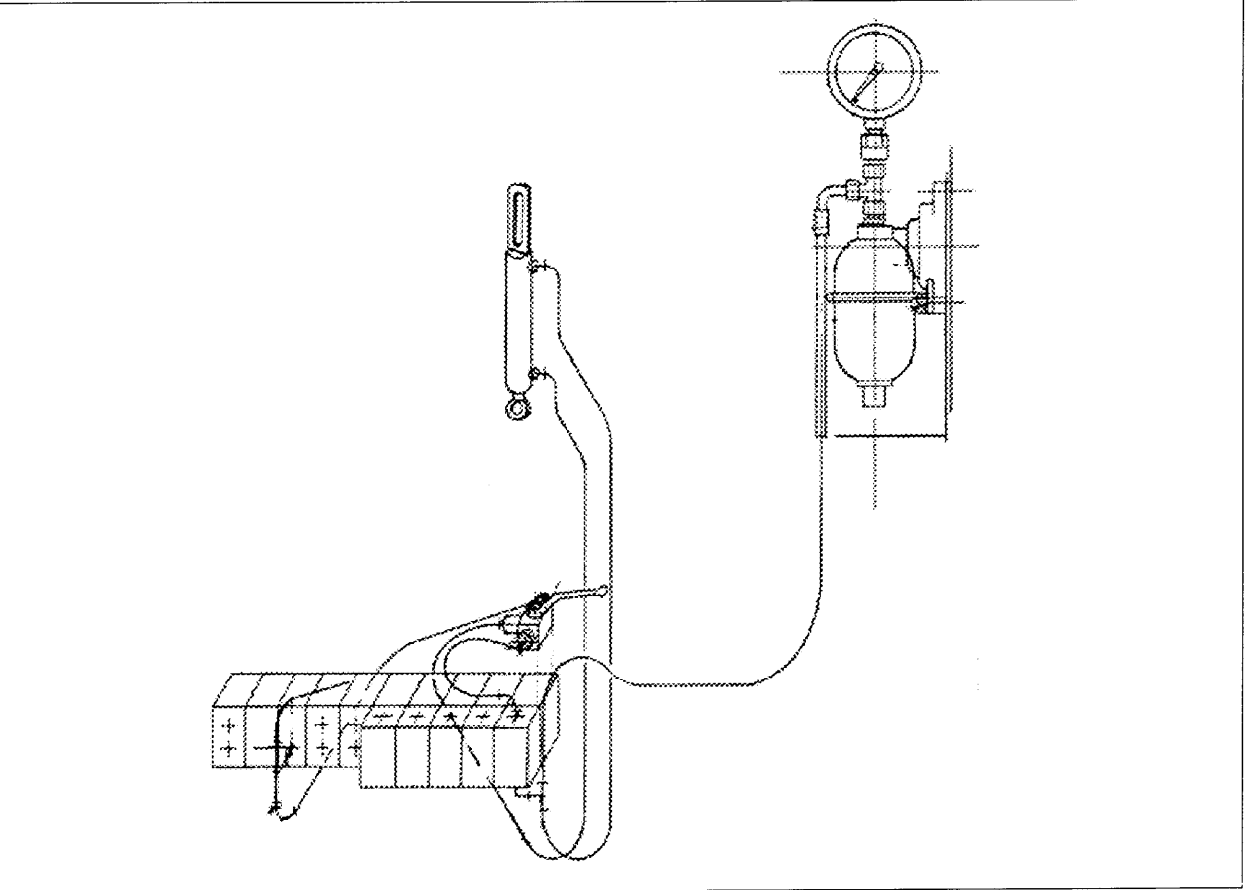


Fig. 31

## 1.7 P.T.O. shaft



Check that length of P.T.O. shaft suits the tractor. Follow the instructions given on the shaft. There is a safety clutch fitted in the main drive line of the machine. Therefore the P.T.O. shaft should not have safety clutch included.

## 1.8 Falldamper chute for elevator end

(Option)

See fig. 28. When assembled the two rubber flaps should be attached over one of the long sides of the falldamper framework. When fitting the chute on the elevator end these rubber plates should be towards the elevator and work as shock absorbers for the chute frame.

## 1.9 Canopy for picking table

See separate fitting instructions.

Before the elevator is raised, the horizontal support bar at the front of the canopy must be laid down.

## 1.10 Hydraulic diabolio relief unit

Fit accumulator at front end of long drive shaft (Fig. 29) with scale against tractor driver.

Fit hoses according to drawing on Fig. 31. Connect accumulator hose with T-junction to front spool valve's lower port. Fit hose connected to upper port to directional valves's centre port. Connect the short hose from directional valve to spool valve's upper port and the long hose to main return hose using the T-junction. Attach directional valve to spool valve end guard (fig. 30).

Set lever to «Float» position. Lower the share. When reached working level **lift till gauge shows 40-50 (bar)**.

When set to «Normal» position the share lifting cylinder is acting as if floatation unit is not fitted.

## 1.11 Miscellaneous options

See separate fitting instructions.

## 1.12 Final control

Remove lifting straps and any other safety measures fitted for transportation. Check that no machine part can block belts etc. when the machine is started.

Check wheel bolts and drawbar connections.

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 HD46 is filled at the factory. Let the pump run for some minutes at PTO speed of approx 500 revs/min.

### For model UN2421-UN2430:

When the auto reversing system is connected to the 12V power supply, the system should be tested. Control the function by pressing the button on the electronic control box. The rollers will reverse for a very short period (0.1 sec). Refer to the separate operator's instructions covering the axial rollers.

Check all mechanic and hydraulic functions.



## 2. TRACTOR REQUIREMENTS

### Engine power:

Model	Easy conditions	Heavy conditions
UN2407 - UN2419	80hk (60kW)	100hk (75kW)
UN2420	90hk (65kW)	110hk (80kW)
UN2421 - UN2430	100hk (75kW)	120hk (90kW)

### Hydraulic capacity:

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

### Connections:

Hydraulic hitch or drawbar

1 single acting hydraulic outlet with non resistance oiltank connection or 1 double acting outlet. The back pressure should not exceed 10 bar.

1 power connection 12V (battery cable included with machine) for control panel

1 power connection 12V (battery cable included with machine) for axial rollers (models UN2421-UN2430 only)

P.T.O. shaft  $1\frac{3}{8}$ " 6 splines



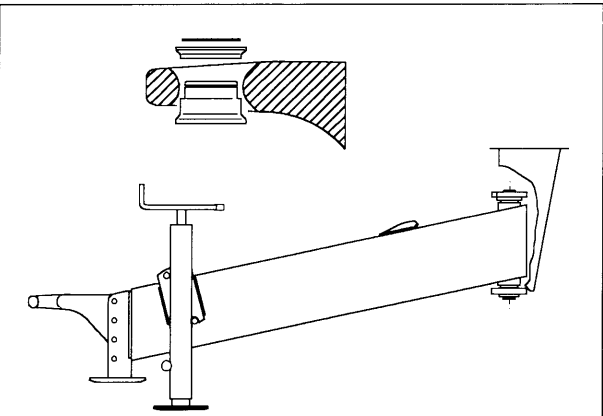


Fig. 32

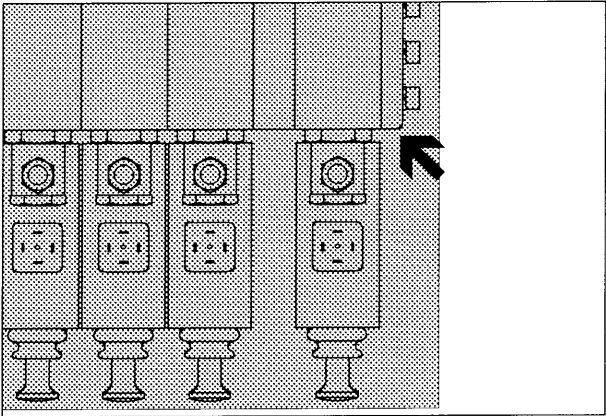


Fig. 33

## 3. CONNECTING THE MACHINE TO TRACTOR

### 3.1 Drawbar height

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

The machine is connected to the tractor drawbar (fit drawbar in ring) (Fig. 32) or to the pickup hitch.

### 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. This 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. Study the shaft manufacturer's instructions.

### 3.3 Electric connections

Connect the electric wires from the control panel to battery cable provided and fitted (4 pin plug).

#### **Machines with axial rollers only (UN2421 - UN2430):**

The auto reversing system of the axial rollers requires a constant 12V power supply. The battery cable provided gives a good supply. The fused wire should be connected to the +12V terminal. If the safety valve system is not powered, there is a high risk of severe damage on the roller unit.

### 3.4 Hydraulics

The harvesters hydraulic hoses are identified as follows

Flow:	Yellow dust cap
Return:	Blue dust cap, (a non return valve is fitted in the return line).

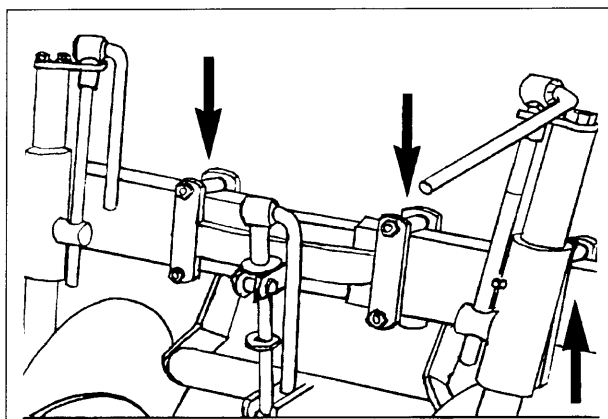
Avoid return connection which gives a high back pressure (above 5-10 bar).

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. *If the levelling cylinder moves up with no use of the controls, there is no return connection to the tractor.*

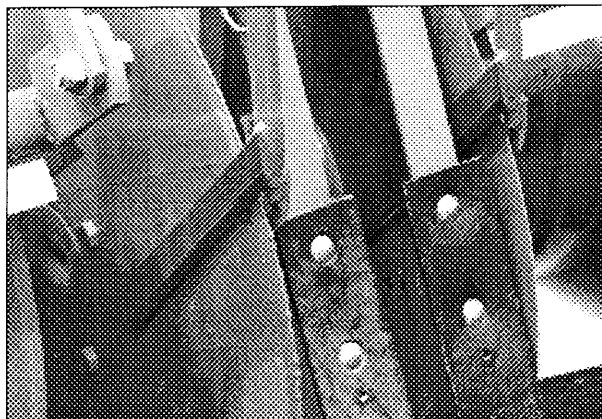


When the machine is connected to a John Deere tractor (or other tractors with closed centre hydraulics), the harvester's spool valve centre must be closed. (The pin screwed into its stop, accessible from underneath the block, Fig. 33.) When using other types of tractors this screw must be screwed fully out the head level with the central block edge.

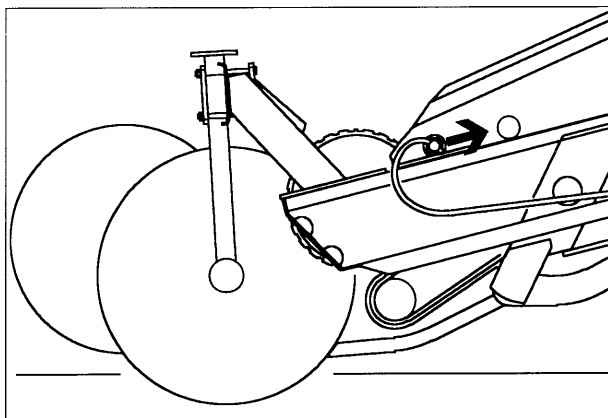
When working in dusty conditions, the top of the valve bank should be covered by some kind of filter material (rubber sponge) in order to prevent dust from intruding the valves through the caps on top of the spool guides.



*Fig. 35*



*Fig. 36*



*Fig. 37*

## 4. ROW WIDTH ADJUSTMENT

Adjust the distance between the lifting units according to the row distance in the field. Standard distance when delivered from the factory is 750 mm. Both share, roller discs and diabolo rollers must be moved altering the row distance (Fig. 35).

When there is a large distance between the inner discs wide roll-back plates must be fitted (Fig. 36).

The lifting unit discs are mounted with a distance of 560 mm. The distance can be adjusted steplessly.

With wide row distance it might be necessary to remove or to move the haulm pull in rollers to the

back position so as not to get in contact with the roller discs (Fig. 37). The first belt roller should be moved in order to support the web at the haulm pull-in roller. Note that this is a less effective position as regards pulling in haulm.

At narrow row widths and small distance between the roller discs there is a risk of loss of potatoes between the disc and the pull-in roller. This may be stopped by fitting extra roll-back plates at the outer discs (option).

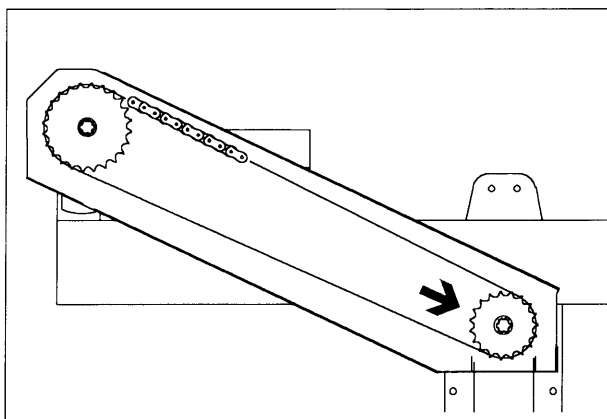


Fig. 38

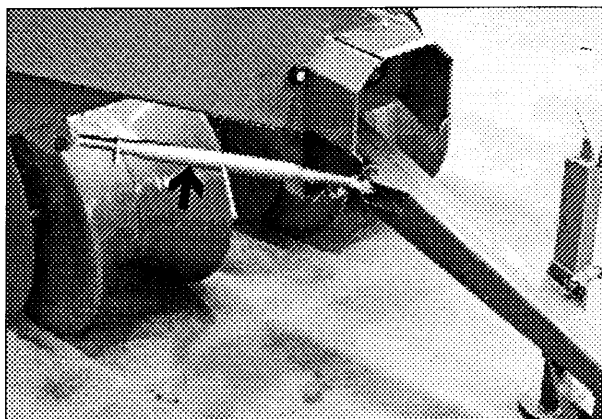


Fig. 39

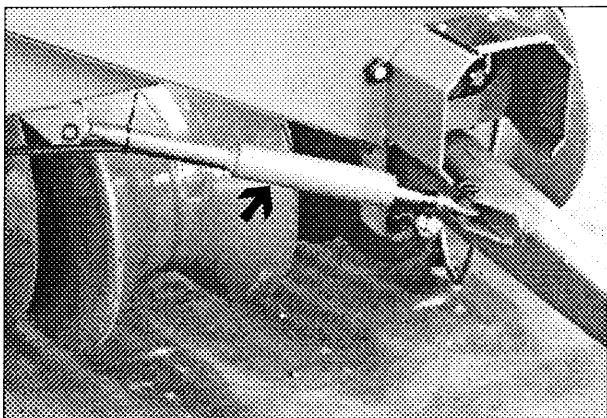


Fig. 40

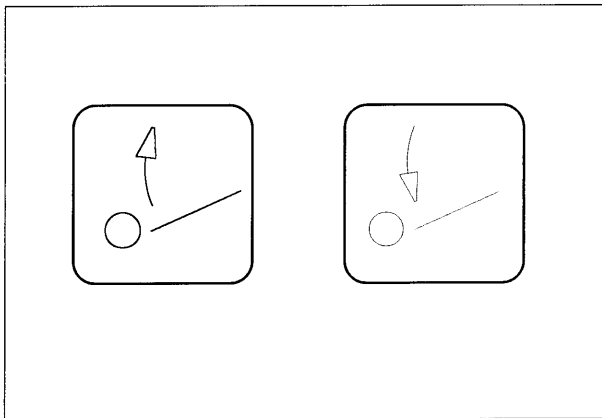


Fig. 41

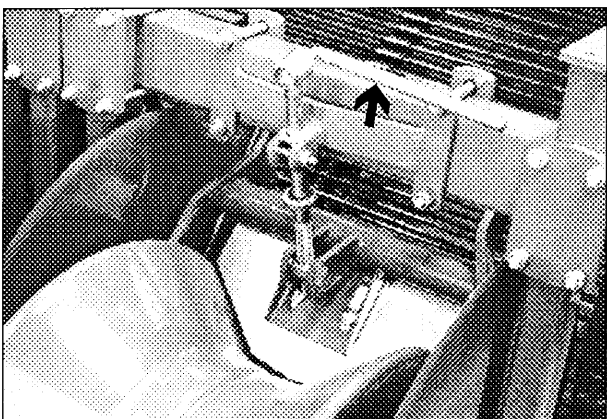


Fig. 42

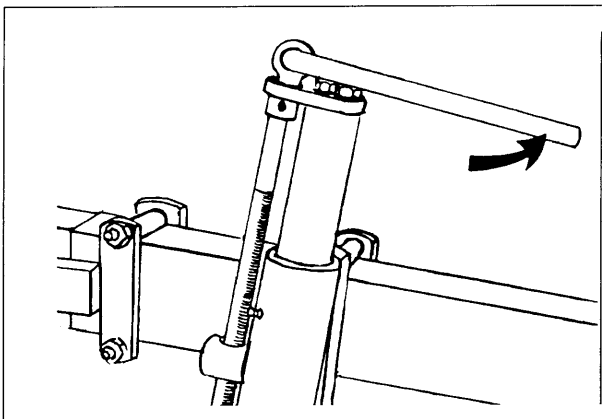


Fig. 43

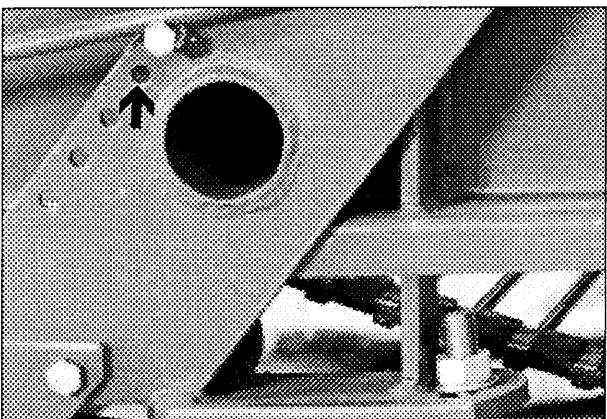


Fig. 44

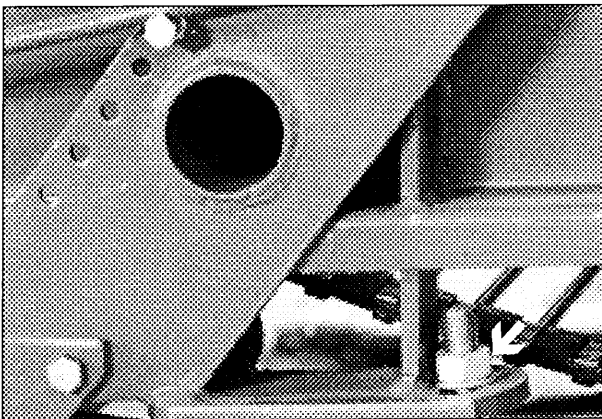


Fig. 45

# 5. OPERATING THE HARVESTER

## 5.1 P.T.O. Speed Revolutions

The recommended P.T.O. is 300-500 rev./min. An optional 16 or 14 teeth sprocket on the main drive shaft (Fig. 38) can be supplied instead of the 19 teeth standard one. This reduces the harvester's revolutions by 16 or 26 %. It may be necessary if the pump capacity of the tractor is low (increasing tractor engine speed).

Revolutions must be adjusted to progression speed. When the main digging web has the same speed as the tractor, the most gentle handling of the potatoes is achieved. The proportion between the P.T.O. and web speed is:

Sprocket size	Main web speed (km/h) at given PTO speed				
	300 rpm	350 rpm	400 rpm	450 rpm	500 rpm
19t	3.1	3.6	4.1	4.7	5.1
16t	2.6	3.0	3.5	3.9	4.4
14t	2.3	2.7	3.0	3.4	3.8

**Observe! If this is done, the maximum and minimum speed of the flightconveyor should be adjusted. See paragraph 6.11.**

## 5.2 Row adjustment

The tractor's wheel setting must be adjusted to the row distance.

Adjust lifting unit's position in the rows using the drawbars turnbuckle (Fig. 39) or the hydraulic lane adjustment (fig. 40). The diabolo rollers must run in the middle of the ridges.

When opening the field use the wheel steering to get the machine's right hand side wheel to run in the furrow. Otherwise the machine must run straight.

## 5.3 Adjusting the lifting unit

The lifting unit is raised and lowered hydraulically (Fig. 41).

Share depth is adjusted using the diabolo rollers (Fig. 42). The lifting unit is attached to the frame which means that it can twist itself and automatically adjust to an uneven surface. Depth must therefore be adjusted on both diabolo rollers. When the soil contains a lot of clod and stones accurate depth adjustments is extremely important.

**In the operating position, the share's lifting**



**cylinders will usually remain down**, for the lifting unit to flow freely on the diabolo rollers. *Exception: When using hydraulic floatation unit the cylinder is used to carry part of the weight of the lifting unit.*



The large side discs will cut the haulm etc., and should normally be adjusted to penetrate at least 5 cm (2") into the soil. Adjustment is carried out by means of the screw on either side (Fig. 43). Excessive cutting depth can cause the share to be lifted (in particularly in heavy and stony soil) and resulting in potential damage.

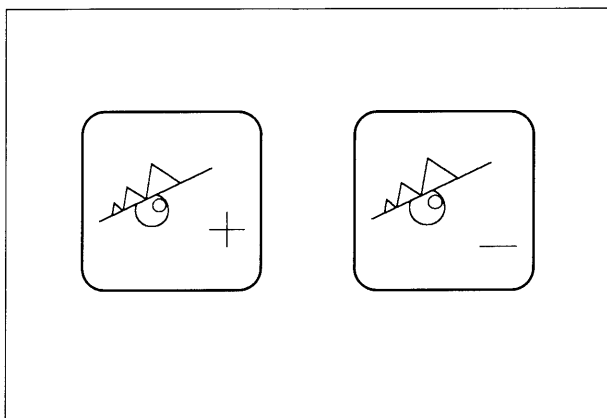
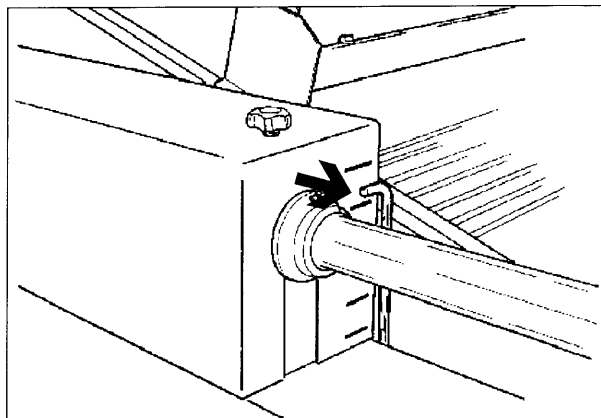
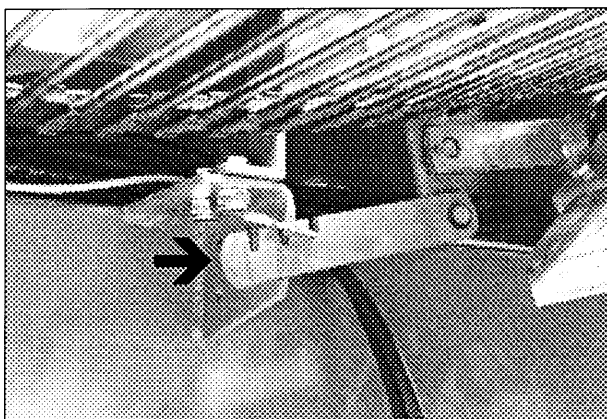
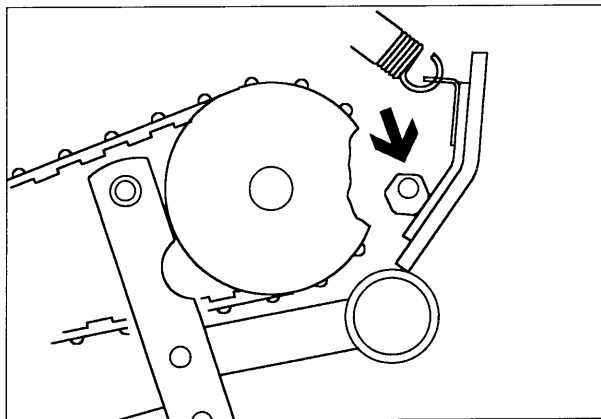
The haulm pulling rollers rotate on the belt. If they do not grip the haulm, spring tension must be increased (Fig. 44). Check that the rollers do not touch the side plate or side disks. Note that the rollers must be angled, with the minimum clearance towards the side plate of lower edge.

## 5.4 Share angle

Can be adjusted using the adjustable screws on the share holder (Fig. 45). This also adjust share height in relation to the main digging belt.



The most gentle position of the share is achieved when a straight edge laid on the share in a backwards pointing direction only just touches the belt.

*Fig. 46**Fig. 47**Fig. 48**Fig. 49*

A steep share penetrates well.

When there is a problem with the haulm attaching itself to the share frame sides, this can either be avoided or reduced by lowering the share (the entire lifting unit is raised onto the diabolo roller). In this way the frame sides will clear haulm left in the furrows.

## 5.5 Separation

### 5.5.1 Flight conveyor adjustments

The flight conveyor speed is adjusted from the control box. Normally the flight conveyor should run at the same speed as the main web thus handling the pota-



atoes very gently. 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 allow the main web to run faster.



The maximum speed of the flight conveyor should be equal to the main web speed. The minimum speed should be approx. 60% of the main web speed. Regarding resetting av speed limits, see chapter 6.11.

### 5.5.2 Belt agitation



The mains web agitation is adjusted hydraulically from the machine's control panel (Fig. 46). Agitation intensity can be read on the indicator in the middle of the left hand side of the machine (Fig. 47). Always run with the minimum agitation necessary.

## 5.6 Clod crushing

Reduce speed of flight conveyor, see paragraph 5.5.1. Set the cleaning units to achieve desired cleaning, see paragraphs 5.11 and 5.12.

## 5.7 Haulm removal

### 5.7.1 Haulm rollers

The haulm rollers in the transition between the main and the intermediate web (not included in deviner web machines) and between the intermediate and hedgehog web can be moved forwards in order to reduce the effectiveness or backwards to increase it. The haulm rollers are moved using the handle at either end (Fig. 48). In the far back position the haulm rollers will be able to grab the potatoes and damage them. The mid position should be used during normal operating conditions.



The clearance between the haulm rollers and the web can be adjusted by turning the excentric haulm roller pins at either end (Fig. 49). Normal distance is approximately 4-6 mm.



The haulm guides across the haulm rollers adjust the amount of haulm taken on to the rollers. The forward haulm roller should therefore have fewer haulm guides than the one to the rear, for the haulm to be distributed evenly between the two haulm rollers.

The distance between the haulm fingers and the web can be adjusted by bending the top plate of each finger. It should be 10 - 100mm. Observe the clearance between the end of haulm fingers and the haulm roller. Adjust by moving the haulm finger frame forwards or backwards.

### 5.7.2 Haulm elevator

The haulm elevator can be used for separating small stones, clods and remaining haulm and weed. The cleaning efficiency depends on how easy the substance is moved by the elevator belt.

Maximum cleaning is achieved when working speed and/or working angle is set allowing some potatoes to follow all the way to the top of the elevator. **Observe! In stony conditions this may cause increased damage to the tubers due to stones continually hitting the tubers.** Set working speed with control valve on the righthand side. The working angle is set from the tractor cab.

Set the spring pressure of the top roller to remove potatoes from the haulm.



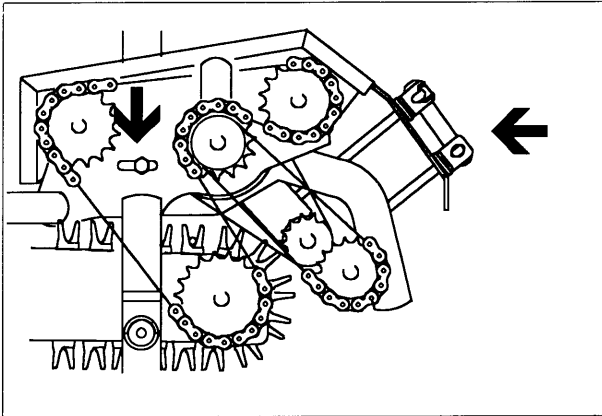


Fig. 51

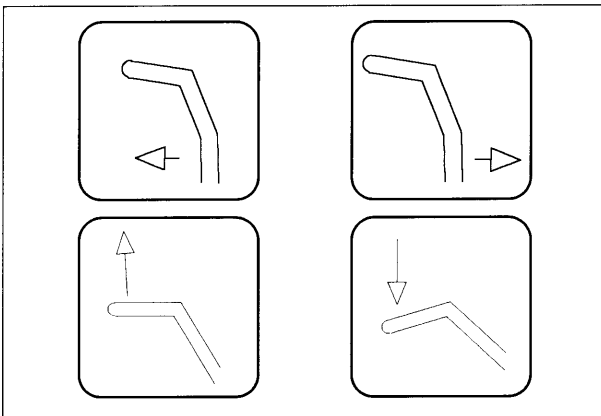


Fig. 52

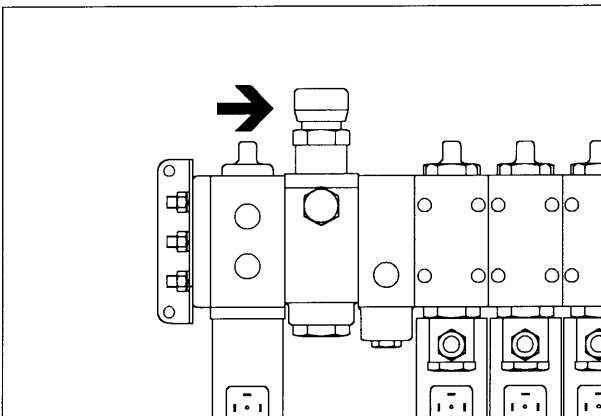


Fig. 53

### 5.7.3 Haulm (deviner) web

Adjust the speed (hydraulically from the valve on the left-hand side of the haulm elevator) to obtain the correct cleaning effect. When working in long or green haulm the deviner speed should be increased to prevent potatoes from dropping out with the haulm.

## 5.8 Cleaning systems

### 5.8.1 Cleaning web/spiral roller



The hedgehog web's cleaning effect is extremely dependent on the position of the spiral rollers and the cleaning roller.

The rollers can be moved up or down in order to change the aggressiveness of the cleaning belt. The attachment plates are loosened in the frame and turned (Fig. 51). Remember to adjust the chain tensioning.

In stonefree soil conditions with little haulm and large amounts of potatoes, the rollers should be lowered.



The distance of the spiral roller to the hedgehog belt is adjusted using the adjustment screw at either sides. The most favourable position depends on the size of the potatoes (small potatoes - small distance, large potatoes - big distance). The spiral roller should not be pushing up against the hedgehog, this gives a poor cleaning effect and considerable wear on the roller and belt.

If the cleaning roller behind the spiral roller is adjusted out, this will result in the potatoes using more time on the spiral roller. This achieves improved cleaning. The cleaning roller should not be adjusted so far down that it touches the hedgehog belt.

The rollers must be adjusted in or out using the adjustment screws on either side of the machine (Fig. 51).



Be careful to ensure that the deflectors lay parallel with the hedgehog belt. This prevents blocking due to haulm which can block under the guards.

**Observe! The settings of the cleaning web system depends very much on the machines speed. Therefor, keep steady engine speed on tractor!**

## 5.8.2 Axial cleaning rollers

Covers integrated axial rollers behind the second web and when fitted underneath the picking table. On machine with rollers in after picking table the highest capacity is achieved when large clods and stones are picked by hand. Leave the small trash for the rollers.

### a. Roller speed

The speed is controlled by operating the flow control valve at the rear side of the picking table. A high speed is recommended. Speed and angle should be set according to the working conditions.

Max speed is approx. 35% above the PTO speed.

### b. The angle of the roller unit

Adjust the angle by operating the cylinders (integrated rollers) or the handle on the rear end of the picking table. High capacity is achieved by a fairly flat unit, while a steep unit offers a more gentle handling of the crop. Speed and angle should be set according to the working conditions.

### c. Hydraulic working pressure

When running empty the hydraulic pressure should be approx. 40 bar. Working hard the pressure may reach approx. 80 bar. The auto reversing system is activated at approx. 110 bar.

### d. Auto reversing system

The auto reversing system is preset at the manufacturer and should normally not be reset by the operator. Control the function by pressing the button on the electronic control box. The rollers will reverse for a very short period (0.1 sec).

### e. Roller scrapers

The scrapers of the smooth rollers will improve the cleaning efficiency in sticky conditions.

The building up of soil on the rollers even depends on the roller speed. It is recommended to run without scrapers due to the risk of severe roller wear. Try to speed up the rollers a bit to reduce the building up of soil.

## 5.8.3 Haulm elevator

See paragraph 5.7.2.

## 5.9 Discharge elevator

The lower section of the elevator should be moved into its correct position prior to loading (out) or transport/parking. To operate the lower section, the valve at the elevator should be set to the correct position (handle at the rear end of the cover above the right-hand land wheel). When set to operate position the lower elevator section is controlled by the ELEVATOR IN/OUT control. Prior to loading, the valve is repositioned to allow the centre elevator section to be operated (IN/OUT). The elevator is then fully controlled from the tractor cab (Fig. 52) (IN/OUT & UP/DOWN & DRIVE).

**The elevator must be lowered prior to starting.**

The range is dependent on loading height, and can be adjusted mainly by using the elevator's centre cylinders. Loading height must be adjusted using the outer part of the elevator.

Elevator speed can be adjusted using the volume adjustment valve at the back of the hydraulic services (fig. 53) (put your hand into the hole at the back of the central guard and turn the wheel). Maintain the minimum speed for the elevator's pockets to fill properly. This provides gentle transportation. If the machine has the electric speed control, the adjustment is done from the tractor cab.



If the elevator has a hopper chute be aware of the danger of haulm residue etc. building up and blocking the opening.



If the harvester has an picking table canopy, the front part of this must be collapsed before the elevator is put in a transportation position.

## 5.10 Picking table

The speed of the picking table can be adjusted on the flow control valve at lefthand side of the picking table. The alarm, levelling and main web agitation can be controlled from the picking table control panel.

**Observe! When the machine is lowered on the levelling cylinder, the elevator is automatically raised in order to avoid any contact with the trailer besides (this function is not automatically operated from the tractor cab controls).**

The operator platform height can be adjusted in steps.

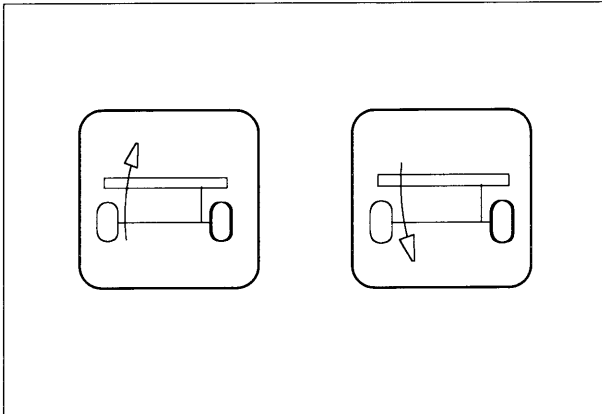


Fig. 55

On the wide picking table (1650mm) the platform and the step may easily be moved in to reduce transport width. The lefthand rail can easily be removed by loosening two bolts.

## 5.11 Alarm

The alarm is operated by pushing the button on the control panel of the picking table. Agree an alarm code with the tractor driver for the various operations; for example Start, Stop, Reduce speed, Increase speed.

The tractor driver can operate the same alarm by pushing the button on the control panel.

## 5.12 Levelling

The machine can be lowered or raised hydraulically on the right hand side (Fig. 55). This function is used on slopes in order to get an even distribution of the potatoes across the entire width of the machine. The transportation support must be folded in order to lower the machine. This function may be controlled from tractor cab and picking table. **Observe! When the machine is lowered on the levelling cylinder, the elevator is automatically raised in order to avoid any contact with the trailer besides** (this function is not automatically operated from the tractor cab controls).

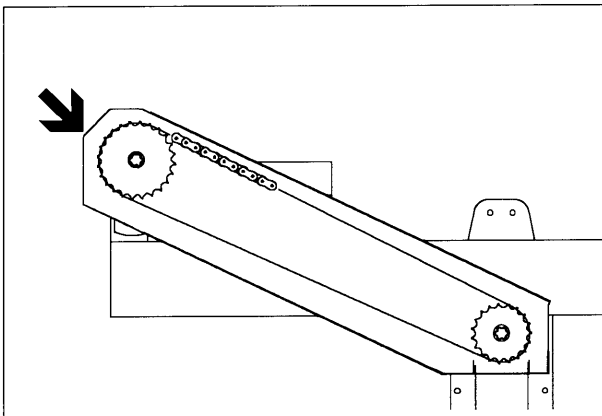


Fig. 56

## 5.13 Adjusting machine's height on wheels

The wheel axle has three positions. If a change is necessary, the wheel axle must be moved in the frame attachments, the stay/cylinder attachments to the frame and the transportation support attachment to the wheel axle.

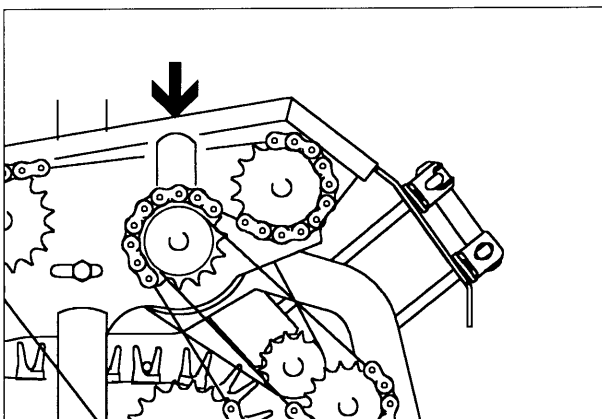


Fig. 57

## 5.14 Picking table canopy

The front part of the canopy must be lowered before the elevator is put in a transportation position.

The rear canopy side can be rolled up to improve ventilation in hot weather. In strong wind conditions the sides must be fastened correctly.

## 6 MAINTENANCE

### 6.1 Wheel pressure

Tyre dimension	Normal pressure	Maximum pressure
500/60-22.5", 8 ply .....	1,3 kp/cm <sup>2</sup> (17 psi) .....	1,8 kp/cm <sup>2</sup> (23 psi)
500/60-26.5", 8 ply .....	1,1 kp/cm <sup>2</sup> (14 psi) .....	1,6 kp/cm <sup>2</sup> (21 psi)
600/55-26.5", 8 ply .....	0,9 kp/cm <sup>2</sup> (12 psi) .....	1,4 kp/cm <sup>2</sup> (18 psi)
13.6/12-28", 10 ply .....	2,5 kp/cm <sup>2</sup> (32 psi) .....	2,5 kp/cm <sup>2</sup> (32 psi)

### 6.2 Belt tensionning

#### Main digging web

No tensioning

#### Intermediate web

Automatic spring tensioning. Springs must be tensioned as belt is slipping.

#### Hedgehog webs

Automatic spring tensioning. Springs must be tensioned as belt is slipping.

#### Third web

Forward screw tensioning

#### Haulm elevator

Automatic spring tensioning. Springs must be tensioned as belt is slipping.

#### Haulm (deviner) web

Tensioning roller on web

#### Picking web

Rear screw tensioning.

#### Return web

Rear screw tensioning.

#### Elevator

Lower bottom screw tensioning.



**Note!** Make sure that the belts are adjusted equally on both sides, for these to run straight.

### 6.3 Drive chain tensionning

#### Main drive chain

Move long drive shaft to the right for tensioning to change (Fig. 56).

#### Drive chain intermediate web

Spring tensioning.

#### Drive chain third web

Spring tensioning.

#### Drive chain haulm roller(s)

Spring tensioning.

#### Drive chain hedgehog webs

Spring tensioning.

#### Drive chains cleaning belt rollers

Tensioning levers (Fig. 57)

### 6.4 Lubrication

See Fig. 59 & 60 on page 37 and 38.

Follow the manufacturer's instructions for lubricating P.T.O. shaft/universal joint/safety clutches/wheel bearings.

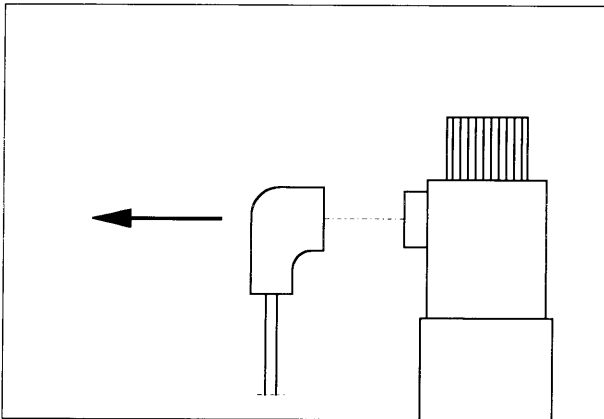


Fig. 58

## 6.5 Oil filters



The pressure oil filter for the system operated by the tractor should be changed annually. It is positioned at the rear side of the front beam right-hand side. **The filter housing is fitted with an indicator. When indicator is red change filter immediately.** Use a 25micron filter element.

The separate hydraulic system on the harvester has a return filter fitted on top of the oil tank in the frame front beam. Should be changed annually. Use a 25micron filter element.

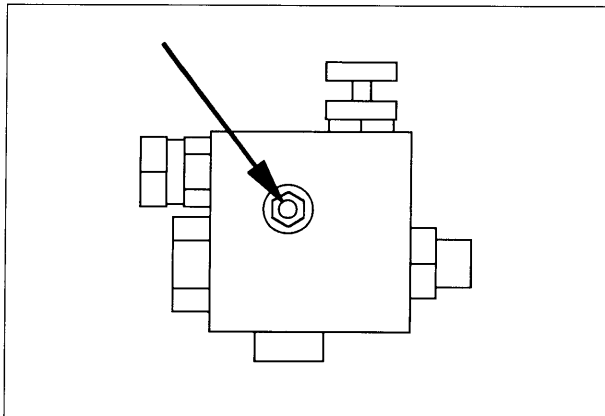


Fig. 59

### Filter typer

### Ordering no.

#### Pressure filter element:

MP	300873
Parker	306685

#### Return filter (tank):

FBO CR180/1	306577
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## 6.6 Oil change

### Hydraulic oil:

Change oil after 200 hours and thereafter every 500 hours using oil type HD46. Quantity UN2200 approx. 90 litres.

### Pump gear oil:

Change oil every 200 hours. Oil type gear oil SAE80/90. Quantity 0.45 litres.

### Roller gear oil:

Change oil after 100 hours and thereafter every year. Use oil type EP1500. Quantity 3.5 litres (12 rollers)/ 5.3 litres (18 rollers). Drainage plug underneath the gear box. Fill through plugged opening on righthand side.

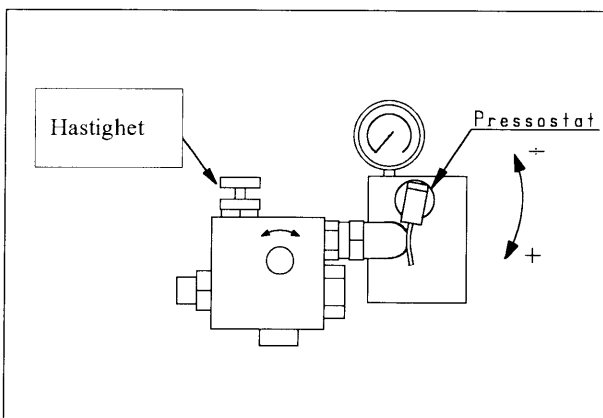


Fig. 60

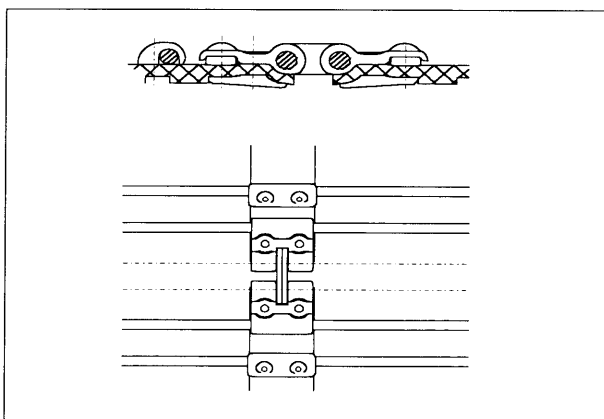


Fig. 61

## 6.7 Hydraulic valve bank



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. Clean the filter every season.

## 6.8 Axial rollers

### 6.8.1 Change of rollers

The auger roller should be fitted at the lefthand side of the cooperating smooth roller. The rollers are connected to the drive shafts using centrally positioned splines. When worn (appears normally on the rear end of the rollers) they can be reversed.

### 6.8.2 Resetting of the auto reversing system

- a. Stop machine and block the rollers with the plug on the end of the gear box. Turn the gear wheel with a screw driver, to let the plug get between two teeth.
- b. Disconnect the power cable on magnetic valve (fig. 58).
- c. Loosen locknut for the relief valve screw (fig. 59), and unscrew *one* turn.
- d. Start the tractor and let the harvester run at idle speed.
- e. Adjust relief valve screw (fig. 59) until pressure gauge shows 110 bar.
- f. If red lights are on, screw pressure relief valve (fig. 60) in until lights turn off. Then screw pressure relief valve out again until the lights flash. Now the pressure relief valve is set to reverse rollers at 110 bar.
- g. Now adjust relief valve screw (Fig. 59) further in, until pressure gauge shows 130 bar. Lock relief valve screw with lock nut. This operation is required to set the relief valve at a higher pressure than the pressure controller (130bar against 110bar).
- h. Stop harvester. Set lock plug in end of gear box in normal position.
- i. The electronic box has two time-delay relays. The first relay controls the reversing time when the rollers are blocked. The setting should be 0.1 sec. (0.3 on scale). The second relay should be adjusted on longer time to prevent further short pressure fluctuations

produce another reverse by activating the first relay. This will allow the rollers to stabilize and run normally. The setting is 0.5 sec (1.5 on scale).

## 6.9 Cleaning

By removing soil from side guards etc. regularly this will prevent unnecessary blocking of and damage to potatoes. Take care to remove soil and haulm which build up inside the belts.

When cleaning the machine after each season care must be taken when using the high pressure hose as this can damage the bearings.

Smooth surfaces should be protected against rust. This is particularly important for shares and large side discs. Remove any building up of soil and trash regularly in order to avoid severe wear of the rollers. By removing the nylock nut attaching the galvanized bar in the centre of the rear end of the picking table, the rear guard can be tilted backwards.



Stop the tractor and remove the ignition key while this type of maintenance is performed.

Smooth surfaces should be protected against rust. This is particularly important for shares and the large side discs.

## 6.10 Main web drive



When the main web start slipping any possible reason for this should be eliminated, if possible. The reason for web slippage is an obvious overload on web and drive system. This may come from soil being built up on the share arms, roll of soil and trash being built up in the web at the share, scrapers catching the web (especially the joiners), much soil on the web (heavy soil or web with small gaps) or greasy soil causing reduced friction on drive rollers.

If reason(s) for slippage is reduced to a minimum and web slippage still occurs, there are three possibilities of improvement by modification of drive system:

- a. Fit special rubber drive discs with teeth pitch suiting the web pitch.
- b. Fit positive web drive using steel sprockets on lower drive roller (pitch to suit the web pitch)

## 6.10.1 Special rubber drive discs with teeth

Fit on upper drive roller only. Replaces the original universal rubber drive disc. Change of rubber disc pitch is recommended when web pitch is changed. Thus maximum friction is obtained.

Available special rubber drive discs:

Web pitch	No. of teeth	Ordering no.
36mm	26	4 x 303510
40mm	30	4 x 303520
45mm	35	4 x 303530

## 6.10.2 Positive web drive using steel sprockets

Included with the machine (from 1995 onwards) are the parts needed for fitting the positive drive using sprockets on lower drive roller. The parts are not factory fitted. The web sprockets should have same pitch as the main web provided.

### a. Drive modification

Main web drive has normally universal friction drive fitted (rubber drive discs at all rubber belts on upper and lower drive roller). In extremely heavy conditions the steel sprockets fitted on the drive roller stop web slippage.



When the *web type 4* (cast centre clips and double ljoining links, see fig. 61) is fitted, the web steel sprockets should be fitted on the lower drive roller. Remove the outer rubber drive discs and the retaining plates. Use the proper sprocket kit according to the web pitch:

Web pitch	Rod gap	No. of teeth	Sprocket kit no.
28mm	17mm	24	2 x 303551
36mm	25mm	18	2 x 303552
40mm	29mm	16	2 x 303553
45mm	34mm	14	2 x 303554
50mm	39mm	13	2 x 303555



The lower drive roller should have the 36 teeth ratchet chain sprocket with overrun hub fitted. This replaces the fixed 31 teeth on the lefthand end of the roller. Extend the drive chain.

**Observe! When fitting friction drive once more the fixed 31 teeth sprocket should be refitted.**

When fitting the web sprockets the scrapers for ends of the lower roller should be changed. The scrapers

are included with the new machine.

### Web requirement when using positive web drive

When the web sprockets are fitted on the lower drive roller, the Kverneland web type 4 (cast centre clips and double joining links, see fig. 61) should be used. This web type offers uniform web pitch even at the joiners.



Other web types with single joiners offers deviant rod gap at the joiner when web runs over the lower drive roller. Such web types need to have joiners with following pitch:

Web pitch	Joiner pitch
28mm	28mm
36mm	36mm
40mm	36mm
45mm	40mm or 42mm
50mm	45mm

## 6.11. Setting the minimum and maximum speed of the flight conveyor

Set the flightconveyor speed at minimum by turning the knob of the control panel. Recommended minimum speed is approx. 60% of the speed of the main web. (When the main web runs 10 laps at same time as flight conveyor does 8 laps, the speed ratio is 60%.)

There is a need of resetting of speed ratio if the main drive at the front of the machine is changed. This is due to changed speed ratio between the mechanical driven components and the hydraulic pump.

The minimum speed is set on potentiometer inside the driver's control panel. Remove the lefthand end cover or the auto control module from the panel. On the left side of the upper print circuit board (seen towards the end of the panel) there are two potentiometers. Adjust the *right hand* potentiometer (P1) till correct speed ratio is achieved.

The maximum speed of the flight conveyor should be equal to the speed of the main web. Adjust the speed on the *lefthand* potentiometer (P2).

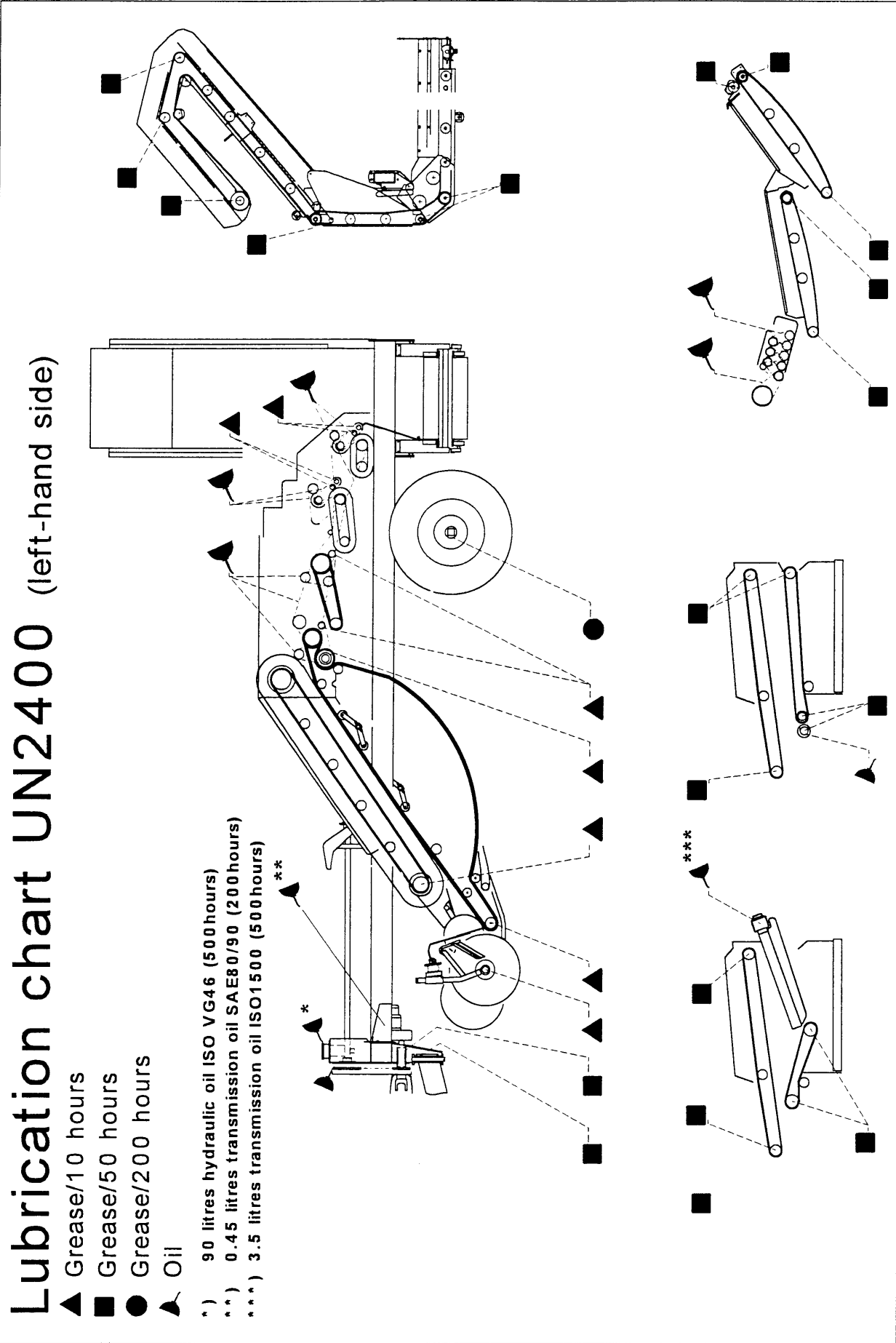


Fig. 62



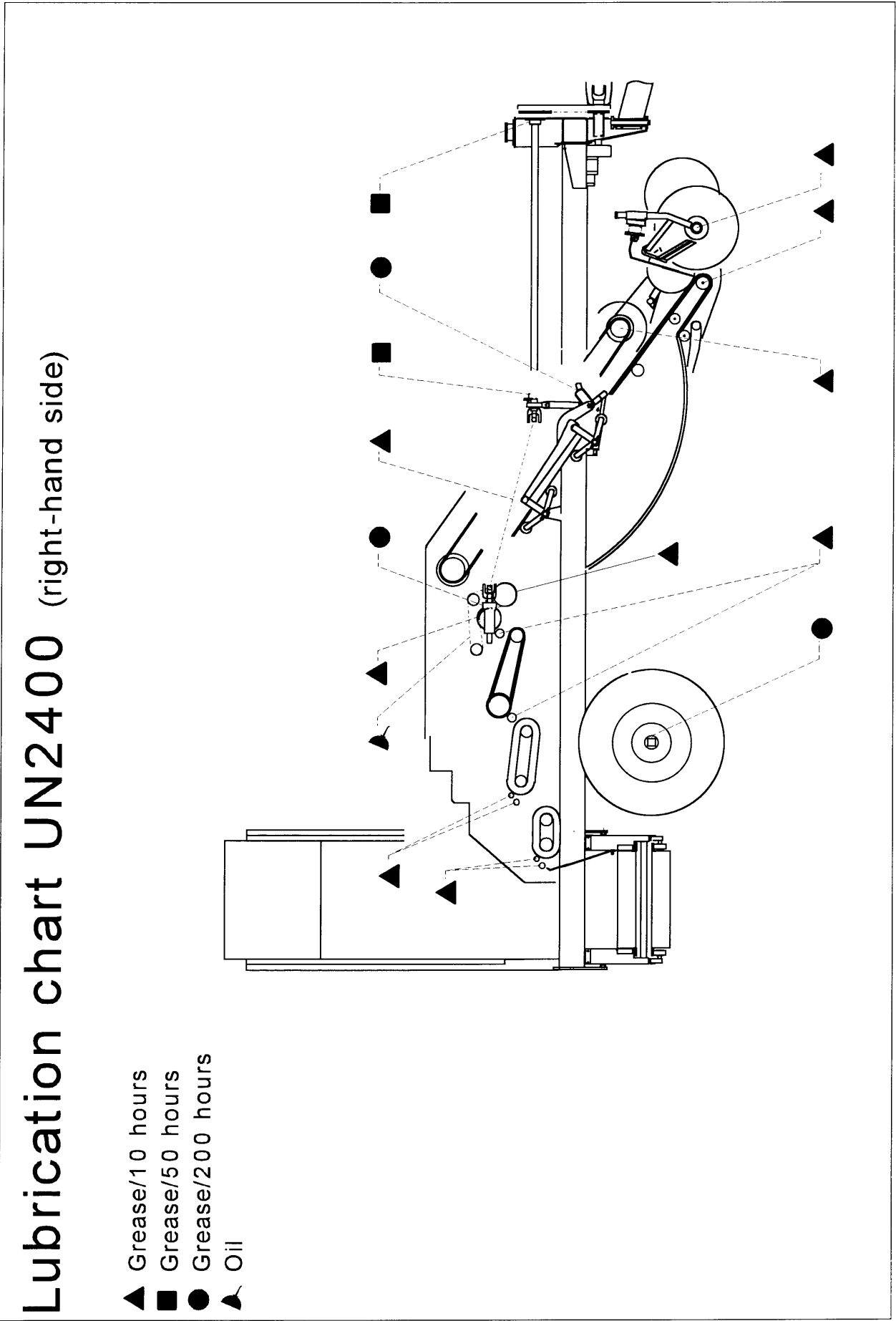


Fig. 63

## 7. TROUBLE SHOOTING

Symptom	Action
<b>HYDRAULIC, ELECTRICAL AND MECHANICAL FAULTS:</b>	
Hydraulic services failure	<p>Check that solenoids are activated.</p> <p>Change main hoses round or re-direct oil flow.</p> <p>Check that the end plate screw is in the correct position (see chapter 2.4).</p> <p>Check couplings</p>
The levelling cylinder moves up when tractor's hydraulic valve is operated	No return to tank, check coupling
Hydraulic services work only when valves are being manually operated	<p>Check the solenoid voltage minimum 10.8 V. Connect control panel with a larger wire.</p> <p>A wire has been cut, or control panel switch fails.</p> <p>Fuse failure in the control panel.</p>
Remote control only possible for one function at the time	Large drop in voltage connect control panel with a larger wire cross section.
Tractor's safety valve opens	Unscrew centre screw in the spool valve's front end plate.
Tractor's steering is jerky (John Deere)	Screw in centre screw in the spool valve's front end plate.
Harvester alarm failure	Wire breakages.
Safety couplings trip during operation	Check that conveyors and rollers are not blocked by stones etc.
The hydraulic lane adjustment works slowly	Large drawbar pivot bolt friction. Grease bolt.
<b>HAULM BLOCKING AND HAULM REMOVAL:</b>	
Haulm attaches itself to share frame	<p>Fit haulm guide skids. Increase share angle and raise the lifting unit using diabololo roller.</p> <p>Sharpen the discs.</p>
Haulm gathers around the haulm fingers	Remove haulm fingers (distribute the rest evenly across machine width).

Symptom	Action
<b>LOSS OF POTATOES:</b>	
Potatoes left in the ground	<p>Adjust share depth using diabolo roller.</p> <p>Lower lifting cylinder for the shares as far down as possible.</p>
Loss of potatoes by front discs	<p>The distance between the discs and the web or between the discs and share is too great.</p> <p>Roll-back plates between the centre discs do not function.</p>
Potatoes drop through conveyor damage.	Use web with smaller spacings or check web for
Loss of potatoes through haulm roller	<p>Tension haulm roller springs.</p> <p>Move haulm roller forwards.</p> <p>Remove haulm fingers from forward haulm roller in order to get more of the haulm to the second haulm roller.</p> <p>Increase harvester revolutions.</p> <p>Use haulm pulverizer</p> <p>Reduce forward speed.</p>
Loss of potatoes on hedgehog belt	<p>Lower spiral roller.</p> <p>Move spiral roller closer to the hedgehog belt.</p> <p>Lower deflectors.</p>
Loss of potatoes on cleaning rollers	<p>Reduce gap between rollers</p> <p>Increase working angle</p>
<b>DAMAGE TO POTATOES:</b>	
Potatoes damaged in ridge	Tyre crushing damage. Use narrower tyres, adjust wheel setting on the tractor.
Damage caused by harvester	<p>Digging web agitation too strong.</p> <p>Web spacing too wide.</p> <p>Web revolution too high.</p> <p>Forward speed too low.</p> <p>Flight conveyor speed too low.</p>

**Symptom****Action**

Damage caused by harvester (cont'd)

Share adjustment too shallow.

Front discs too narrow.

Poor climate (cold, wet).

Haulm rollers crushing the potatoes. Move rollers forward, bend haulm fingers backwards.

Spiral rollers set too high

Stony soil.

Damage caused by loading

Elevator drop too great. Lower elevator, use the chute.

Careless handling of the potatoes.

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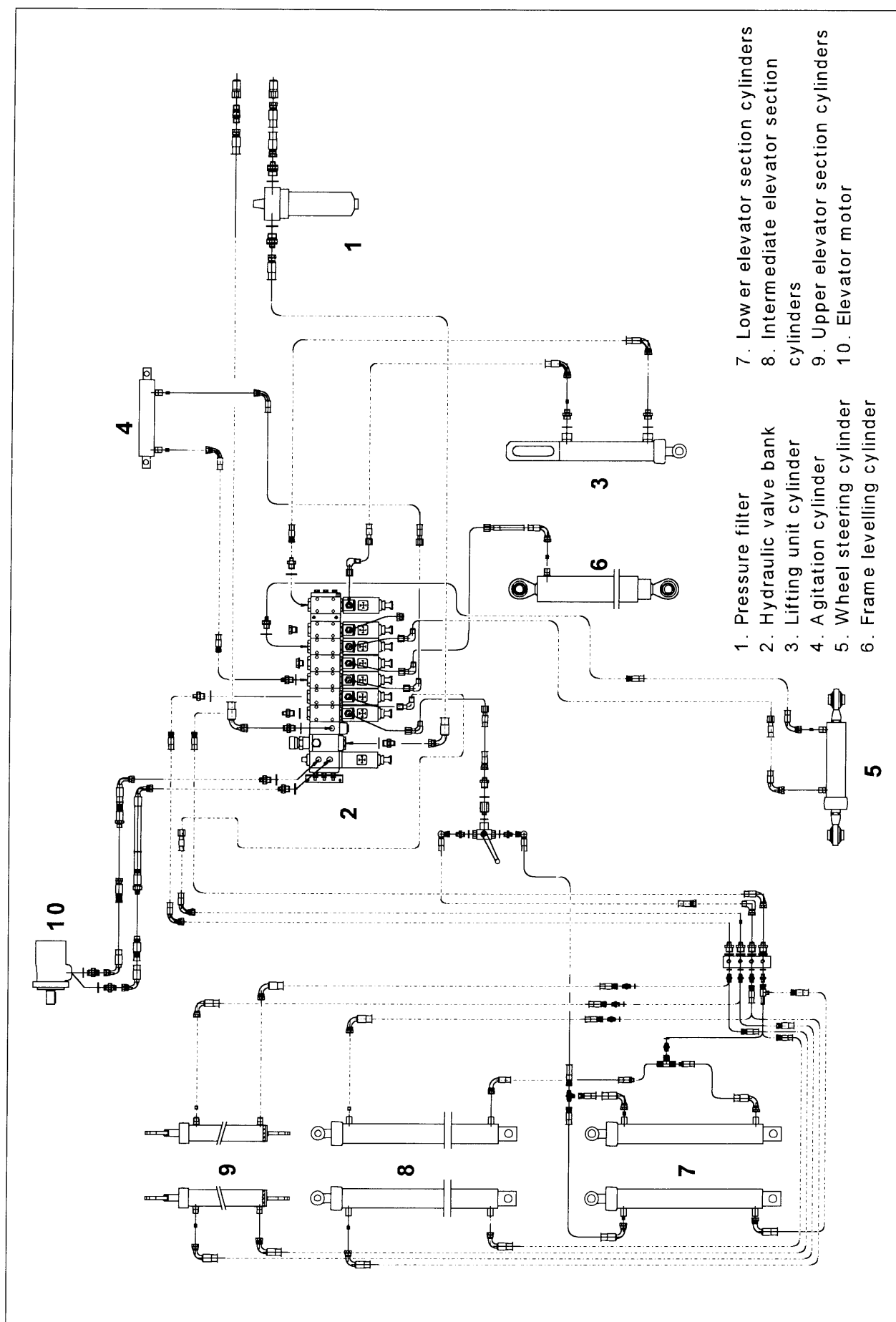


Fig. 1

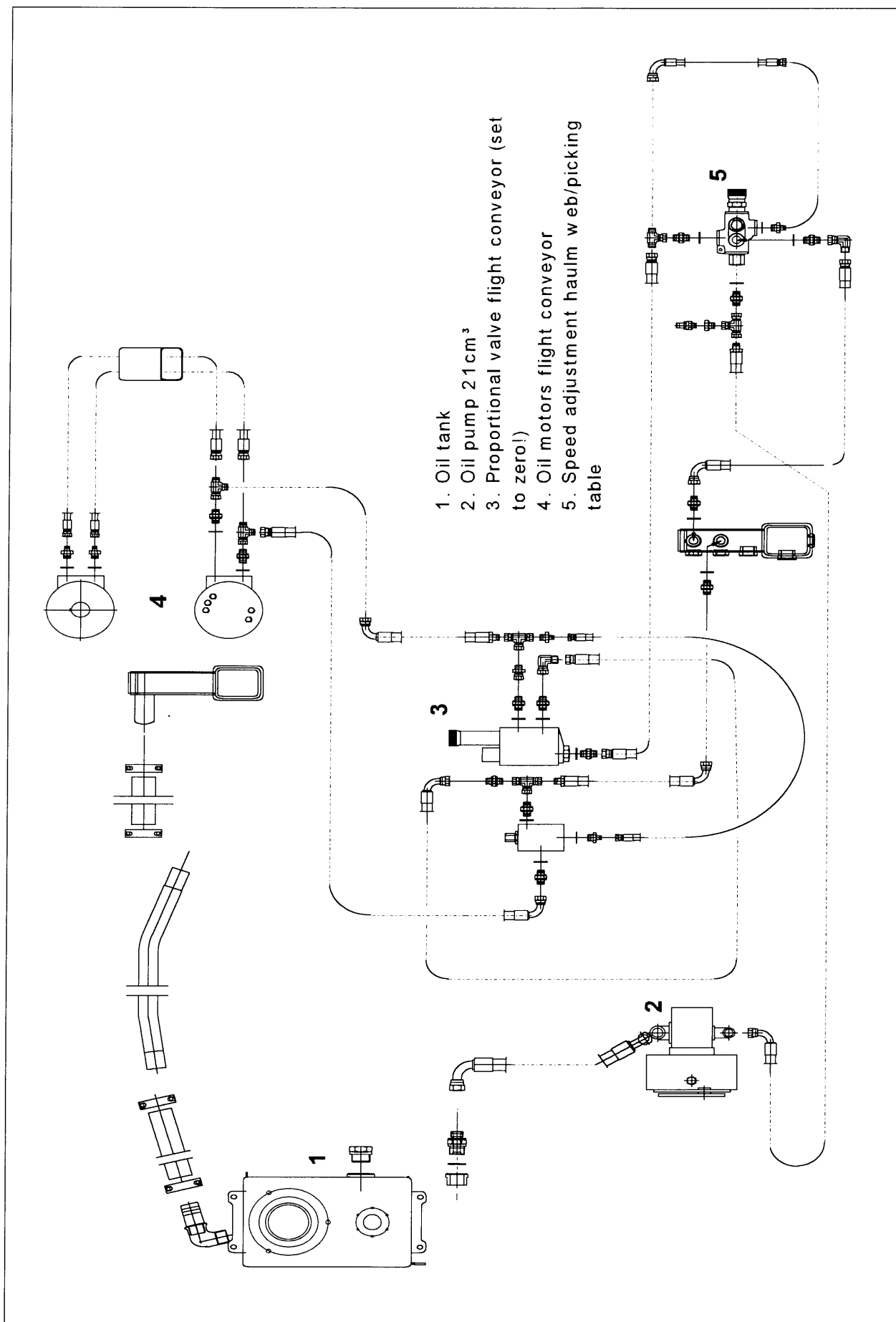


Fig. II

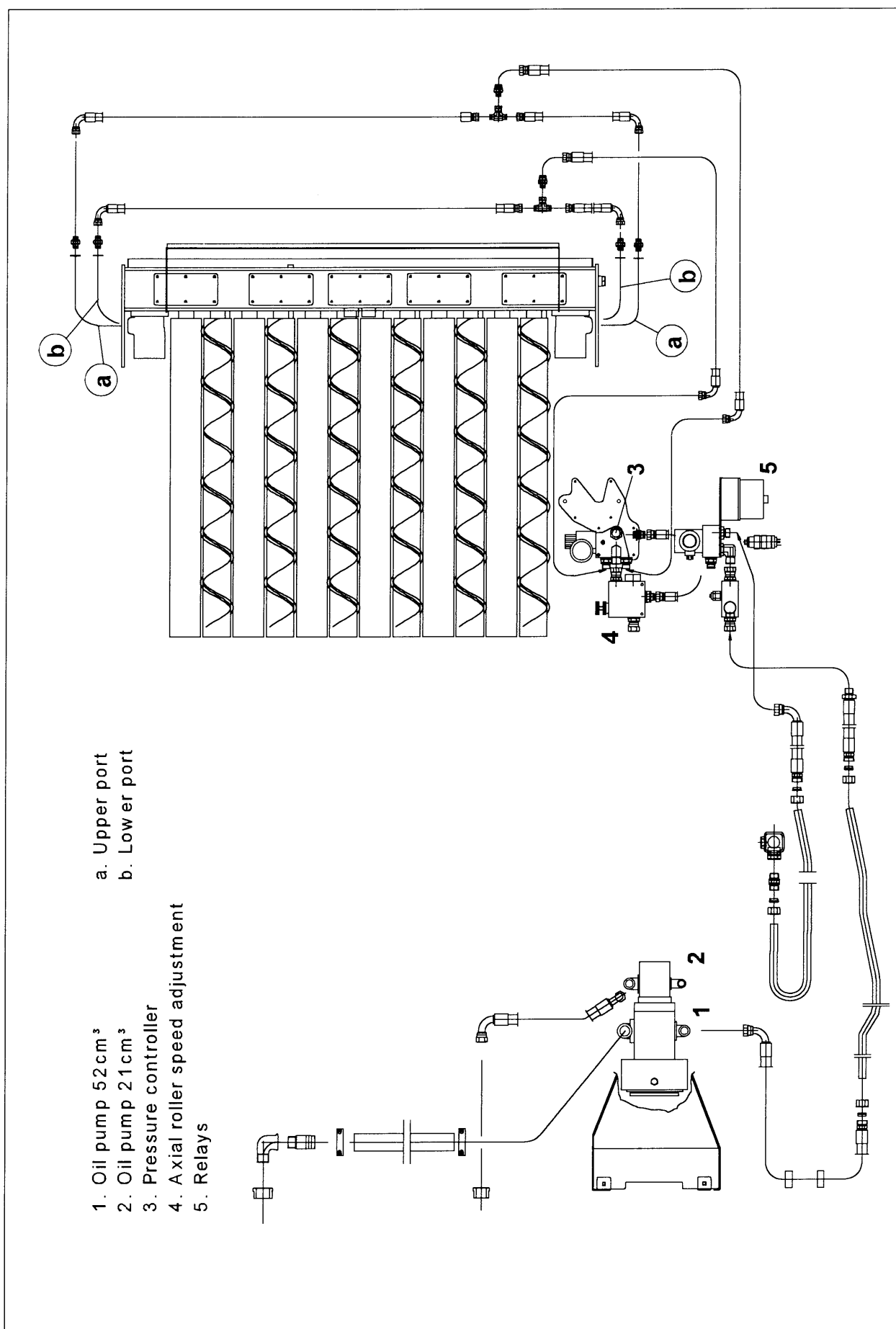


Fig. III