

# ALPHA

## Instruction book

670701-GB-97/1

### EC Declaration of Conformity

#### Manufacturer,

HARDI-EVRARD  
301, Rue du 21 Mai 1940  
F - 62990 BEURAINVILLE

#### Importer

declares that the following product

SPRAYER Model ALPHA 2000 and ALPHA 2500

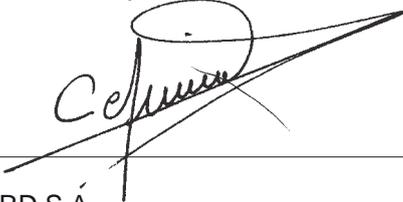
was manufactured in conformity with the provisions in the COUNCIL DIRECTIVE on mutual approximation of the laws of the Member States on the safety of machines, 89/392/CE, 91/368/CE og 93/368/CE

was manufactured in conformity with special reference to the Directive on essential safety and health requirements taking into account the following standards:

EN 292-1  
EN 292-2

Furthermore, the owner of the material must keep this manual as long as the machine is in his possession, and when passing it on to a possible new owner he must also pass on the manual.

Beaurainville, 1st January, 1997.



The director  
HARDI-EVRARD S.Á.

Illustrations, technical information and data in this book are to the best of our belief correct at the time of printing. As it is HARDI INTERNATIONAL A/S policy permanently to improve our products, we reserve the right to make changes in design, features, accessories, specifications and maintenance instructions at any time and without notice.

HARDI INTERNATIONAL A/S is without any obligation in relation to implements purchased before or after such changes.

HARDI INTERNATIONAL A/S cannot undertake any responsibility for possible omissions or inaccuracies in this publication, although everything possible has been done to make it complete and correct.

As this instruction book covers all models, features or equipment, which are available in certain countries only can be shown. Please pay attention to paragraphs dealing with precisely your model.

Published and printed by HARDI INTERNATIONAL A/S

## Contents

Foreword .....	2	(4-wheel steering only) .....	10
Use of the sprayer .....	2	Control lamp, 4-wheel steering, (if fitted) .....	10
Safety precautions .....	2	Pedal, 4-wheel steering (if fitted) .....	10
Roadworthiness .....	4	Switch for Electronic Anti-Spin System, SAPE (if fitted) .....	10
Plant protection chemicals .....	4	Use of cab heating .....	10
Identification plates .....	4	Use of air conditioning (if fitted) .....	10
Warranty .....	4	Windscreen wiper/washer .....	10
International Pictorial Symbols .....	4	Pilot lever .....	11
Controls, instruments and switches .....	5	Fuel tank .....	11
Driver's seat .....	5	Straw dividers (optional extra) .....	11
Steering column .....	5	Optional tyre mountings .....	11
Controls and switches, steering column .....	6	Track width .....	11
Revolution counter and hour meter .....	6	Number plate(s) .....	11
Start key .....	6	Driving .....	11
Hazard warning signal device .....	6	Before starting the engine .....	11
Alternator charging control lamp .....	6	Starting the engine .....	12
Engine oil pressure control lamp .....	6	To stop the engine .....	12
Head lamps, main beam .....	6	Propulsion .....	12
Directional indicator control lamp .....	6	Braking .....	12
Position lamps or dipped beam, control lamp .....	6	Electronic anti-spin, SAPE (if fitted) .....	12
Rotating warning beacon control lamp .....	6	Steering .....	13
Engine coolant thermometer .....	6	Front Wheel Steering .....	13
Fuse box .....	7	Four Wheel Steering .....	13
Multi functional control stalk .....	7	Spraying .....	13
Rotating amber warning beacon switch .....	7	Before taking the sprayer into operation .....	13
Controls and switches, dash board .....	7	Spraying circuit operating diagram .....	13
Adjustable air flow louvres .....	9	Self-cleaning filter .....	14
Console for HARDI PILOT .....	9	Use of MANIFOLD valve system .....	14
Boom function switches .....	9	Filling of rinsing tank .....	15
4-wheel steering switch .....	9	Filling of clean water tank .....	15
Engine throttle lever .....	9	Filling of main tank .....	15
Engine STOP warning lamp .....	9	Filling through tank lid .....	15
Spraying pump control lamp .....	9	Suction Filling Device .....	15
Engine pre-heating control lamp .....	9	Fast Filling Device .....	16
Battery isolator switch control lamp .....	9	Adjustment of operating unit .....	17
Windscreen wiper switch .....	9	Filling of chemicals .....	17
Working lamps switch .....	9	Filling by HARDI FILLER chemical inductor .....	18
Wind screen washer switch .....	9	Operating the boom (all models) .....	19
Auxiliary lights switch .....	9	Unfolding of the boom .....	20
Windscreen washer reservoir .....	9	Folding of the boom .....	20
Fuse box (dash board) .....	9	Use of rinsing tank and rinsing nozzles .....	20
On/off switch HARDI PILOT .....	9	Technical Residue .....	21
Cab interior lamp .....	9	Operation of the tank drain valve .....	21
Fan control 3-speed switch .....	9	Rinsing tank, draining .....	21
Fuse box .....	9	Maintenance .....	22
Air conditioning warning buzzer .....	9	Fuel and lubricants storage .....	22
Air conditioning control lamp "overpressure" .....	9	Tilting of the cab .....	22
Air conditioning control lamp "low pressure" .....	9	Maintenance during the running-in period .....	23
Parking brake lever .....	9	Regular, preventive maintenance .....	23
Air conditioning temperature control .....	10	Shock absorbers (wheel suspension) .....	32
Cab heater / defroster .....	10	General maintenance with flexible intervals .....	33
Cab air flow louvres .....	10	Electrical system maintenance .....	37
Spraying pump switch .....	10	Off-season storage .....	42
Hydrostatic transmission control lever .....	10	Preparation after off-season storage .....	43
Front wheel motors fast / slow switch .....	10	Emergency operation of the sprayer .....	43
Rear wheel motors fast / slow switch .....	10	Trouble shooting .....	44
Control lamp, realignment of front wheels (4-wheel steering only) .....	10	Operational problems, spraying equipment .....	44
Control lamp, realignment of rear wheels		Technical specifications .....	46



## Foreword

We congratulate you for choosing HARDI plant protection equipment. The reliability and efficiency of this product depend on your care. The first step is to carefully read and pay attention to this instruction book. It contains essential information for the efficient use and long life of this quality product.

As the instruction book covers all ALPHA models, please pay attention to the paragraphs dealing with precisely your model.

All instructions related to service and maintenance of the machine is described in this instruction book. If you do not feel absolutely confident carrying out these jobs please contact your HARDI dealer. He has trained service personnel, workshop facilities, spare parts, tools and instruments that are required to supply the best service.

If there are several operators of the machine please ensure that all operators have read this instruction book before using the machine. If selling the machine, please let this book follow the machine to the new owner.

## Use of the sprayer

This agricultural sprayer is designed for application of plant protection chemicals and liquid fertilizers at agricultural crops. The sprayer must be used for this purpose only. It is not allowed to use the sprayer for any other purposes.

Please observe rules regarding driver's license for driving on public roads.

If no local rules of holding a sprayer operator license, it is strongly recommended to be educated in correct plant protection and safe handling of plant protection chemicals in order to carry out spraying jobs without unnecessary risk for persons and environment.



## Safety precautions

Before using your ALPHA sprayer, note the following safety precautions and recommended safe operating practices.

### General

Watch for this symbol . It means WARNING, CAUTION, PAY ATTENTION. Your safety is involved, so be alert!

-  Read and pay attention to the instruction book before starting and operating the sprayer. It is equally important that other operators of this equipment read and understand this book.
-  If any portion of this instruction book remains unclear after reading it, contact your HARDI dealer for further explanation before using the equipment.
-  Use the handholds and steps when getting on and off the machine to prevent falls. Keep steps and platform clear of mud etc.

-  Do not permit passengers to ride on the machine. There are no safe places for others than the driver.

-  Keep children away from the sprayer.

### Driving the machine.

-  Make sure that nobody is carrying out service or maintenance jobs on the sprayer *before* starting the engine.
  -  Make sure, that parking brake is activated, and the pilot lever is in neutral before starting the engine.
  -  Ensure that the on/off valve on the spraying circuit is switched off before starting the engine.
  -  The hydrostatic transmission control lever has a safety start switch. Do not by-pass this switch. If out of order, get the switch repaired instantly.
  -  Do not start the engine or operate control levers standing outside the cab. Always sit in the driver seat when starting and operating the levers.
  -  Be careful not to accidentally operate the hydrostatic transmission control lever. This will result in unexpected movements of the machine.
  -  Do not leave the driver seat while the machine is moving.
  -  Apply the parking brake, and switch off the engine before getting off the machine.
  -  Do not let the engine run in closed buildings unless an exhaust gas aspirator is connected to the exhaust pipe. Exhaust gases in closed rooms are lethal.
  -  If the steering malfunctions, stop the machine instantly.
- ### Diesel fuel
-  Do not remove the fuel tank cap when the engine is running or hot.
  -  Do not smoke or use open fire when refuelling the machine.
  -  Avoid spilling of fuel. Do not leave the machine when refuelling. Wipe up spilled fuel instantly.
  -  Do not fill the fuel tank to the edge. Allow a little room for expansion.
  -  Tighten the fuel cap properly.
  -  Use only the genuine HARDI fuel cap. If the original cap is lost, replace instantly with a new genuine HARDI fuel tank cap. **Do not** use a non-approved cap. **Never** plug with a piece of cloth or similar.
  -  Use only pure diesel fuel of approved quality. **Do not** mix diesel fuel with petrol or alcohol. These mixtures can be explosive and will cause severe injury and damage.
  -  Keep fuel lines in order. Repair possible leaks immediately.

### Operating the spraying equipment

-  Do not eat, drink or smoke whilst spraying or working with contaminated equipment.
-  Do not enter the sprayer tank.
-  Do not drive the machine near open water reservoirs (rivers, lakes etc.). Spilled chemicals can stream into the water causing serious contamination of environment.
-  Do not fill the sprayer from open water reservoirs. Malfunctioning or faulty operated filling process can siphon chemicals back into the water. Fill from closed reservoir (e.g. mobile water trailer, overhead tank) instead.
-  Do not let the filling hose enter the tank. Keep the end of the hose at least 10 cm. above the tank filling hole to avoid risk of tank content being siphoned back, contaminating water supply lines and well.
-  Do not fill chemicals nearby the well. Any overflow can contaminate the well.
-  Do not store chemicals nearby the well. Store chemicals behind locked doors to avoid unauthorized persons and children to access the chemicals.
-  If the sprayer is filled with chemicals at the same place every time, establish a filling place with concrete surface which is able to retain possible spillage.
-  Keep the cab door closed during spraying. The cab has built-in active carbon filters, which to some extent protects against chemicals.
-  Always read the chemical label prior to use and follow instructions given on the label.
-  Wear personal protection as stated on the chemical label. As a minimum always gloves, overalls, rubber boots, and face protection shield.
-  Chemicals will penetrate gloves, rubber boots etc. after a certain period of contact. This period will vary from a few hours to several days depending on rubber material and chemical used. Be familiarized with the quality of your protection equipment, and renew them according to the instructions.
-  Wash your gloves before taking them off. Do not touch the contaminated outer side of the gloves with bare hands when taking them off.
-  Keep the cab clean inside. Take off contaminated clothes and wash hands before entering the cab. Do not touch steering wheel, controls and instruments with contaminated hands or gloves. Wear gloves when touching any part of the machine outside cab.
-  If chemicals are splashed over you, remove soaked clothing instantly and wash with soap and water instantly. Plant protection chemicals will penetrate the skin, and affect your health. Consult chemical label regarding precautions to be taken against poisoning.

-  Watch out for overhead electrical conductors when operating the boom. A boom wing hitting a high voltage conductor is lethal!
-  If you need to check anything during spraying, e.g. nozzle clogging, close the main on/off valve and drive a few metres forward before stepping out. This to avoid walking in the crop just sprayed.
-  Wash and change clothes after spraying jobs.
-  In case of poisoning, seek medical advice or call an ambulance. Bring chemical label or container for identification of chemical.

### Cleaning the machine

-  Never wash the machine where washing water can flow into lakes, rivers etc. causing contamination of the environment.
-  Wash the machine on concrete surfaces where washing water can be retained and drained into a reservoir for controlled spreading on the field or proper disposal.
-  If no washing spot with concrete surface is available, avoid accumulation of pesticide residues in the soil. Do not wash the machine on the same spot every time. Huge accumulations will result in pesticides seeping down in the ground water.
-  Wear protective clothing when washing the equipment.
-  Wash the entire machine inside and outside to remove all chemicals as much as possible.
-  Do not enter the spraying tank for washing.
-  Wash and change clothes after spraying and washing spraying equipment.

### Servicing the machine

-  Rinse and wash equipment after use and before servicing.
-  Depressurize equipment after use and before servicing.
-  The cooling system operates under pressure which is controlled by the radiator cap. It is dangerous to remove the cap while the system is hot. Always loosen the cap slowly and allow the pressure to escape before removing the cap completely.
-  Do not smoke or use open fire when refuelling the machine.
-  Do not smoke or use open fire nearby the battery or cold weather starting aids. Use battery charger or jumper cables according to instructions.
-  Escaping hydraulic fluid or diesel fuel under pressure can penetrate the skin causing serious injury. **Do not** use your hands to check for leaks. Use a piece of paper or card board to search for leaks. If fluid is accidentally injected through the skin gangrene may result. Seek medical advice immediately.

-  Do not service the air conditioning system. It contains refrigerant under pressure. Escaping refrigerant is flammable, toxic and will cause severe frostbite if in contact with skin. If the air conditioning system need service, contact your HARDI dealer.
-  Continuous long term contact with used engine oil may cause skin cancer. Avoid prolonged contact with used engine oil. Use protective hand cream and wash skin promptly with soap and water.
-  The fuel injection system operates under high pressure. Unqualified persons should not carry out service or maintenance on any part of the fuel injection system. Faulty assembly or adjustment can lead to serious injury.
-  Do not rely on a jack alone. Support the machine with axle stands or similar if changing wheels or carrying out maintenance jobs where the machine need to be lifted off the ground.
-  Make sure the cab is correctly secured again after having been tilted for service and maintenance.
-  The main chassis is made of high tensile steel. Do not weld or drill holes in this frame as the material will completely change character. All warranty will be lost if this is violated.
-  If you do not feel totally confident in certain maintenance jobs described in this manual, leave the job for your HARDI dealer.

### Roadworthiness

When driving on public roads and other areas where the highway code applies, or areas with special rules and regulations for marking and lights on implements, you should observe these and equip implements accordingly.

Please be aware of the machine's overall dimensions before driving on public roads.

### Plant protection chemicals

The safety in use of plant protection chemicals depends on the user who must observe the legislative rules and instruction given by the manufacturer of each individual plant protection product.

Certain plant protection products cannot be mixed with each other - always follow the manufacturer's recommendations and instruction on the chemical label.

Clean the sprayer thoroughly after each spray job to avoid chemicals to react with the sprayer components.

Observe local legislation regarding chemical residues and mandatory decontamination methods. If in doubt contact the authorities e.g. Department of Agriculture.

### Identification plates

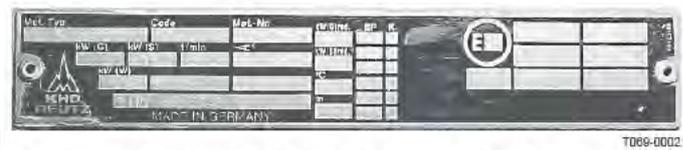
An identification plate is fitted to the sprayer's chassis at front right hand side. Pump, boom parts have ID-plates placed as shown. Please write the information given at these plates in this instruction book.

**IMPORTANT!**  
When ordering parts for the sprayer inform your dealer of these, so the correct model and version is described.

**HARDI-EVRARD S.A.**  
F 62990 BEURAINVILLE

Marque : EVRARD	Type	
N° Série	Série	
Année Fabrication	Capacité / L	
P.V. / Kg	P.T.C / Kg	
Immatriculation		
N° Nomenclature		

Type : 0 0 0 0 0 5  
N° de série : 0 8 2 0 4 4  
N° homologation : 1 9 1 1 9 6



The machine chassis No. is stamped into the frame near the ID-plate.

### Warranty

The delivery report supplied with the machine must be filled in, signed by the dealer and owner and returned to HARDI. This document puts the machine warranty into force. Please read the warranty conditions printed on the delivery report.

### International Pictorial Symbols

-  Horn
-  Battery charging condition
-  Hourmeter
-  Fast
-  Slow
-  Engine coolant temperature
-  Engine stop

- T232-0008  Electrical preheat
- T232-0009  Fuel
- T232-0010  Headlights - Main beam
- T232-0011  Headlights - Dipped beam
- T232-0012  Work lights
- T232-0013  Hazard warning lights
- T232-0014  Warning beacon
- T232-0015  Clearance/position lights
- T232-0016  Turn signals
- T232-0017  Windscreen wiper
- T232-0018  Windscreen washer
- T232-0019  Ventilating/air circulating fan

**Controls, instruments and switches**

**Driver's seat**

The driver's seat can be adjusted in several ways:

1. Longitudinal adjustment
2. Seat inclination
3. Adjustment of suspension according to weight
4. Back rest inclination
5. Arm rest adjustments



T060-0020



T060-0019



T060-0001

**Steering column**

The steering column height and angle can be adjusted.

1. Inclination lever
2. Height adjustment lever

The inclination of the steering column is adjusted



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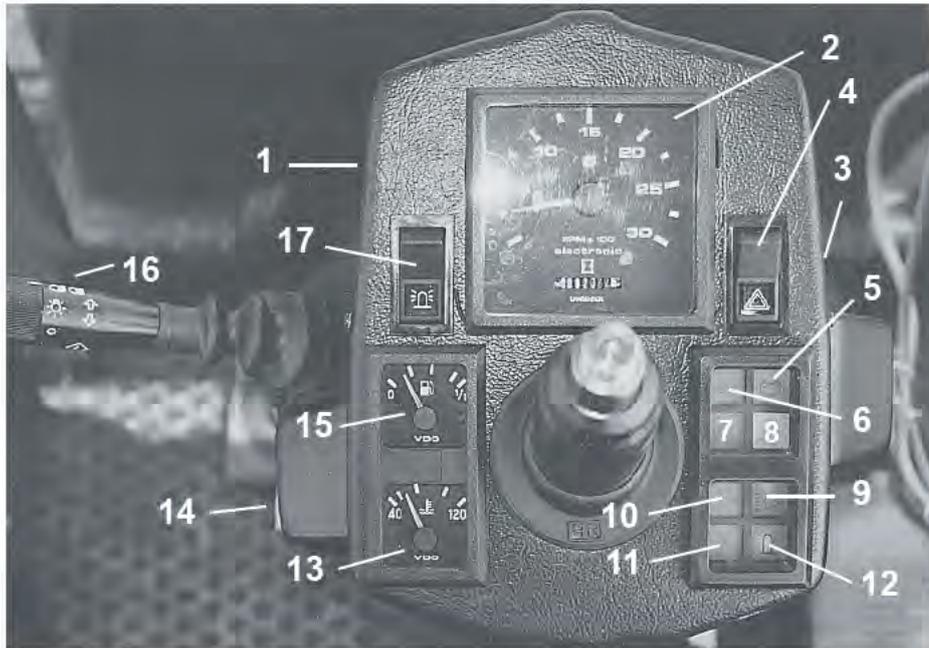
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by depressing the pedal 1.

The height of the steering wheel is adjusted by loosening the lever 2 anticlockwise.

## Controls and switches, steering column



T080-0003

1. Console
2. Revolution counter and hour meter
3. Start key
4. Hazard warning signal device
5. Alternator charging control lamp
6. Engine oil pressure control lamp
7. Not used
8. Not used
9. Head lamps, main beam
10. Directional indicator control lamp
11. Position lamps or dipped beam, control lamp
12. Rotating warning beacon control lamp
13. Engine coolant thermometer
14. Fuse box
15. Fuel level gauge
16. Multi functional control stalk
17. Rotating amber warning beacon switch

### Revolution counter and hour meter

Count engine revolutions and working hours. All service and maintenance intervals are based on hour meter readings.

### Start key

- 0 = Off
- 1 = Power at all electric circuits, warning lamps and pre-heating on.
- 2 = Engine start position

### Hazard warning signal device

Depress knob to switch on and off hazard warning signals. Note local traffic regulations regarding use of this device.

### Alternator charging control lamp

This should be off immediately after start of engine. If this lights up during working, the battery is not being charged. Get alternator and electric wiring inspected a.s.a.p.

### Engine oil pressure control lamp

This lamp must be off immediately after engine starts. If this lamp is not off or lights on when engine works, STOP ENGINE IMMEDIATELY and check engine oil level - refill if necessary. If oil level is OK it is advised not to restart engine before it has been inspected by the engine service agent.

### Head lamps, main beam

Indicates main beam is on.

### Directional indicator control lamp

(right and left side). If a bulb is defective, the frequency will increase or the control lamp will not flash.

### Position lamps or dipped beam, control lamp

Indicates the head lamps and / or position lamps are on.

### Rotating warning beacon control lamp

Indicates when the rotating beacon is switched on.

### Engine coolant thermometer

The engine coolant temperature should be 80-100 °C when the machine has reached normal operating temperature. If the temperature exceeds 110°C the engine is overheating, which can occur from the following reasons:

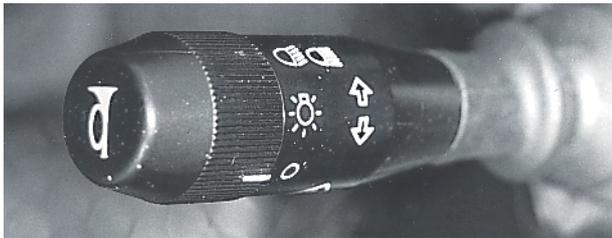
- Overload of engine - reduce driving speed
- Clogged cooler radiator fins - clean the radiator
- Coolant level low - refill with hot coolant to correct level
- Engine oil level low - refill to correct level.

If none of the above is solving the problem, call the engine service agent.

**Fuse box**

Regarding fuse diagram - see "Electrical system maintenance"

**Multi functional control stalk**



T066-0004

- The position lamps' and head lamps' dipped beam are switched on by turning the multi-functional lever and is indicated by the pilot lamp
- The main beam is activated by pressing the lever downwards and is indicated by the pilot lamp.
- To flash the main beam pull the lever upwards.
- The directional indicators are operated by pushing the lever forward (right) or backward (left) and indicated by the pilot lamp.
- The horn is activated by depressing the stalk end.

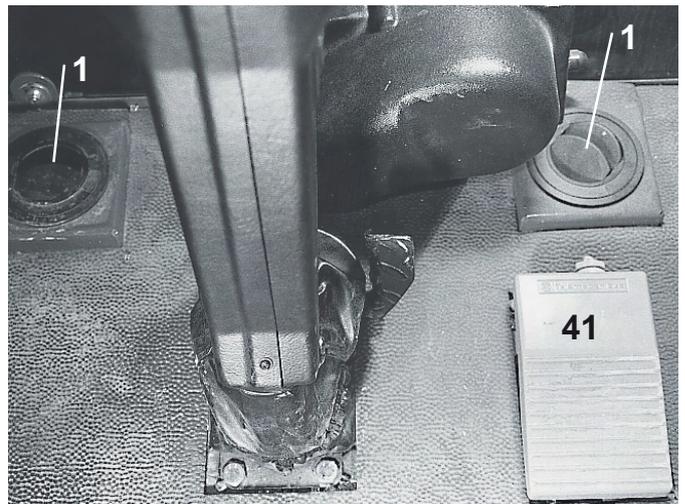
**Rotating amber warning beacon switch**

Is recommended to be used when driving on public roads. Note local regulations regarding use of rotating warning beacon.

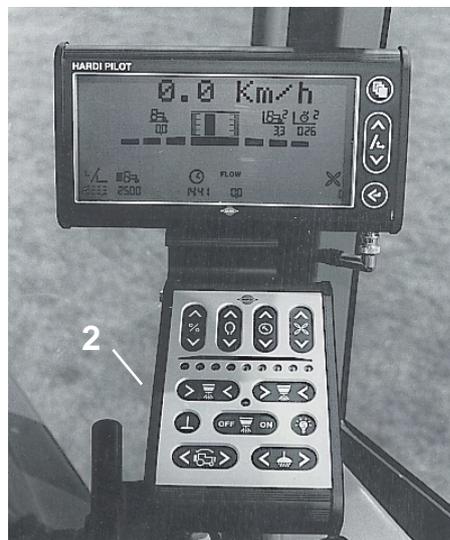
**Controls and switches, dash board**

1. Adjustable air flow louvres
2. Console for HARDI PILOT
3. Boom outer section folding, left
4. Boom inner sections folding
5. Boom outer section folding, right
6. Boom pendulum locking device
7. 4-wheel steering switch
8. Engine throttle lever
9. Not used
10. Not used
11. Engine STOP warning lamp
12. Spraying pump control lamp
13. Engine pre-heating control lamp
14. Battery isolator switch control lamp
15. Windscreen wiper switch
16. Working lamps switch
17. Wind screen washer switch
18. Auxiliary lights switch
19. Not used

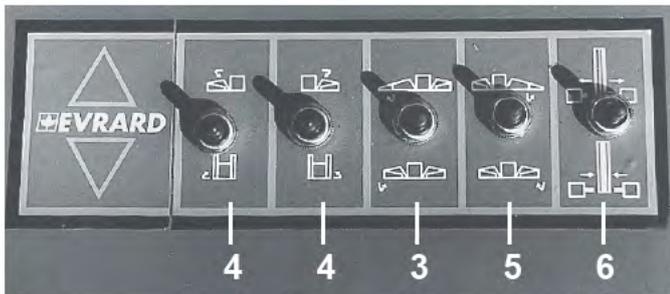
20. Screen wash reservoir
21. On/off switch for HARDI PILOT
22. Fuse box
23. Cab interior lamp
24. Fan control 3-speed switch
25. Fuse box
26. Air conditioning warning buzzer
27. Air conditioning "over pressure" control lamp
28. Air conditioning "low pressure" control lamp
29. Parking brake lever
30. Air conditioning temperature control
31. Cab heater / defroster
32. Cab air flow louvres
33. Spraying pump switch
34. Hydrostatic transmission control lever
35. Hydrostatic front wheel motors Fast / Slow switch
36. Do. Rear
37. Control lamp, realignment of front wheels (4-wheel steering)
38. Control lamp, realignment of rear wheels (4-wheel steering)
39. Control lamp, 4-wheel steering.
40. 4-Wheel steering AUTO/MANUAL switch
41. Pedal, 4-wheel steering
42. Switch for Electronic Anti-Spin System, SAPE



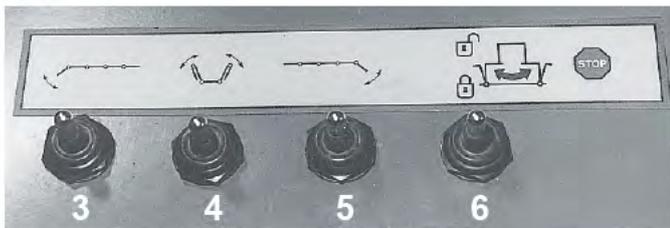
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T066-0021



T080-0028



T080-0031

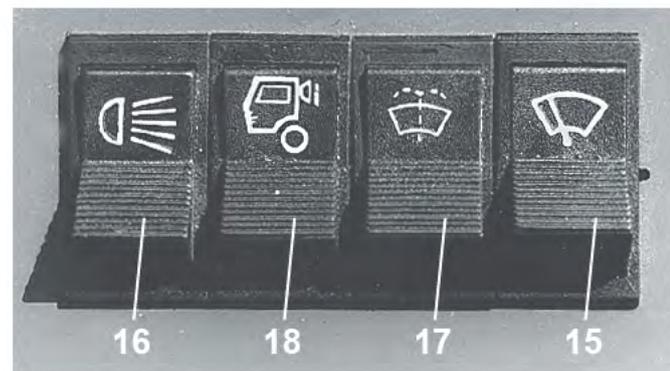


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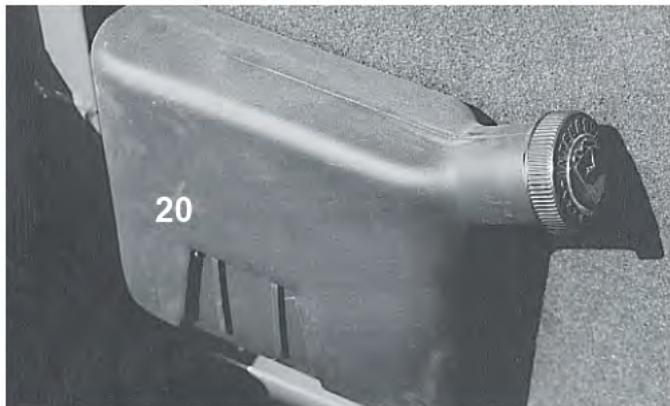
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T080-0026



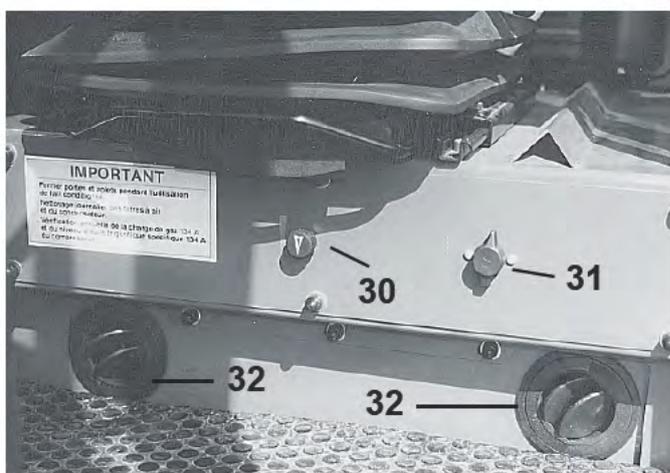
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T080-0027



T080-0032



T080-0022



T080-0029

**Adjustable air flow louvres**

Can be adjusted to obtain optimal air circulation in the cab.

**Console for HARDI PILOT**

See separate manual for operating instructions for HARDI PILOT.

**Boom function switches**

For operation, see section "operating the boom".

**4-wheel steering switch**

For operation see section "driving".

**Engine throttle lever**

To be used for maintaining the correct engine revolutions and forward speed during filling and spraying. A second throttle lever is situated on the left hand side of the machine under the platform, and can be used during filling of water and chemicals.

**Engine STOP warning lamp**

This lamp indicates a malfunction:

- Engine coolant temperature too high
- Engine oil pressure too low
- Hydraulic oil level too low

If the STOP lamp should light, stop the machine and engine instantly and sort out the cause to the failure.

**Spraying pump control lamp**

Lights when diaphragm spraying pump is engaged. A second lamp is situated at the machine left hand-side at the throttle and pump controls.

**Engine pre-heating control lamp**

The engine pre-heating device is functioning automatically. Start the engine when the pre-heating control lamp switches off.

**Battery isolator switch control lamp**

This lamp indicates that battery isolator switch is on, and 12V is present in the electrical circuit.

**Windscreen wiper switch**

The windscreen wiper has three positions:

- Off
- Normal
- Fast

**Working lamps switch**

Controls front fitted working lamps. The lamps can only be switched on when at least the position lamps are switched on. The working lamps must be switched off on public roads.

**Wind screen washer switch**

Controls the windscreen washer. Use plenty of screen wash before starting the wiper to avoid scratches in the windscreen.

**Auxiliary lights switch**

Switch to be used if extra working lamps are to be fitted.

**Windscreen washer reservoir**

To be filled with clean water or an approved screen wash. In freezing conditions use frost proof screen wash. Do not use engine antifreeze.

**Fuse box (dash board)**

For details see section "Electrical system maintenance".

**On/off switch HARDI PILOT**

For switching on and off the HARDI PILOT. This switch by-passes the start key.

**Cab interior lamp**

The cab interior light switch is situated at the frame of the lens.

**Fan control 3-speed switch**

Controls the cab fan speed.

- 0 Off
- 1 Low
- 2 Normal
- 3 Full

The air conditioning can only be operated when the fan is set at pos. 1-3.

**Fuse box**

For details see section "Electrical system maintenance"

**Air conditioning warning buzzer**

Will buzz simultaneously with control lamp for "Air conditioning overpressure" See paragraph "Air conditioning"

**Air conditioning control lamp "overpressure"**

If the refrigerant pressure in the air conditioning circuit becomes too high, this warning lamp will light. See paragraph "Air conditioning"

**Air conditioning control lamp "low pressure"**

If the refrigerant level or pressure in the air conditioning circuit is too low, this lamp will light. See paragraph "Air conditioning"

**Parking brake lever**

The parking brake is working on all four wheels.

Up = Engaged

Down = Disengaged

In case of loss of hydraulic pressure the parking brake will engage automatically.

**Air conditioning temperature control**

This switches on the air conditioning and adjusts the temperature in the cab. The air conditioning does only work when fan switch is switched on as well. See paragraph "Air conditioning"

**Cab heater / defroster**

Controls the in-cab temperature.

**Cab air flow louvres**

Adjustable in all directions.

**Spraying pump switch**

Engages and disengages the diaphragm spraying pump. A second switch is located on the left hand side of the sprayer under the platform.

**Hydrostatic transmission control lever**

To start the engine, the lever must be in neutral position. Move the lever forward to drive forward and move backwards to reverse.

**Front wheel motors fast / slow switch**

Controls the front wheel motors speed and torque mode. See section "Driving".

**Rear wheel motors fast / slow switch**

Controls the rear wheel motors speed and torque mode. See section "Driving".

**Control lamp, realignment of front wheels (4-wheel steering only)**

When the front wheels are aligned with the chassis this lamp lights.

**Control lamp, realignment of rear wheels (4-wheel steering only)**

When the rear wheels are aligned with the chassis this lamp lights.

**Control lamp, 4-wheel steering, (if fitted)**

When the 4-wheel steering is set in automatic mode this lamp lights.

**Pedal, 4-wheel steering (if fitted)**

When this pedal is depressed the 4-wheel steering is active and front and rear wheels will steer when the steering wheel is turned.

**Switch for Electronic Anti-Spin System, SAPE (if fitted)**

Indicates that SAPE is engaged.

**Use of cab heating**

The cab is heated by means of the engine coolant. The warm air is distributed via the adjustable air flow louvres placed in the floor of the cab and will ensure effective heating of the cab and defrosting of the windscreen.

- Adjust the air volume by turning the 3-speed fan control
- Open and adjust the air flow louvres
- Adjust the temperature on the heater temperature control

**Use of air conditioning (if fitted)**

The air conditioning evaporator unit is placed in the compartment under the seat and conditioned air is let into the cab via the air flow louvres.

Use of the air conditioning:

- Set the heater temperature control to minimum
- Adjust the air conditioning temperature control to the desired temperature
- Adjust the air volume by turning the fan speed control
- Adjust the air flow louvres to obtain comfortable air circulation in the cab
- Do not cool the cab air too much below outside temperature. A huge temperature difference will affect your physical well-being.

**IMPORTANT!** Always keep the cab door closed when the air conditioning is switched on.

To demist the windows rapidly, the air conditioning and heater can be operated simultaneously to lower cab air humidity.

**IMPORTANT!** To keep the air conditioning properly working, it must be operated at least once a month for minimum 10 min. Circulation of the refrigerant will lubricate all seals and prevent escape of the refrigerant.

Consult with your HARDI dealer if the problem continues, and have the system inspected by a specialist in air conditioning systems. AC refrigerant is not environmental friendly. Have leakages mended instantly.

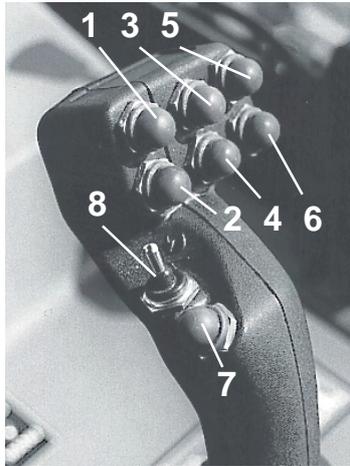
**Windscreen wiper/washer**

Depress the 2-speed wiper switch to operate the wiper. To wash the windscreen, press the button using screen wash from the reservoir

**Pilot lever**

The pilot lever controls driving forward and reverse:

- Driving forward by moving the lever forward
- Reversing by moving the lever backwards
- Neutral position is midway in the notch



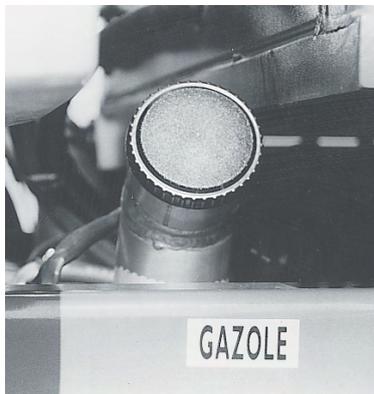
T060-0006

Following functions can be operated via switches on the pilot handle:

1. Raising of the boom
2. Lowering of the boom
3. LEFT hand side boom tilt UP
4. LEFT hand side boom tilt DOWN
5. RIGHT hand side boom tilt UP
6. RIGHT hand side boom tilt DOWN
7. EC operating unit ON / OFF
8. Slanting of the boom

**Fuel tank**

The filling cap on the fuel tank is located on the machine right hand side. Always clean the area around the fuel cap before unscrewing it for refilling.



T060-0030

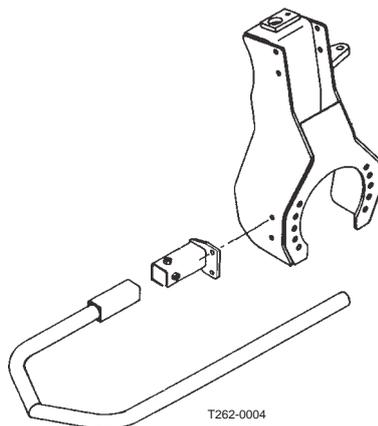
It is recommended always to refuel the machine at the end of the day to avoid condensation of water in the fuel tank overnight.

**Straw dividers (optional extra)**

The machine can be fitted with straw dividers on all four wheels in order to reduce crop damage during spraying.

The straw dividers can be fitted on the following tyre sizes:

- 11.2 R 32"
- 14.9 R 24"
- 16.9 R 24"



T262-0004

**Optional tyre mountings**

The machine should normally only be fitted with the optional rims and tyres supplied as original equipment or rims with similar specifications and load capacities.

The maximum rim off-set is **-80 to +150 mm**.



**WARNING!** Failure to keep this maximum off-set may result in broken wheel motor shafts and can lead to serious accidents and personal injury!

**Track width**

The track width is factory set at 1800, 2000 or 2250 mm measured by standard wheel mountings. Change of wheel sizes will alter the actual track width.

Alteration of the track width requires the front and rear axles to be replaced.

Tyre size	Actual track width in mm (+/-10 mm):			
	Base track width (Mounting face distance)			
	1500 (1801)	1800 (1977)	2000 (2177)	2250 (2427)
11.2 R 32"	1500	1800	2000	2250
14.9 R 24"	1500	1800	2000	2250
16.9 R 24"	1700	2000	2200	2450
540/65 R 24"	1700	2000	2200	2450

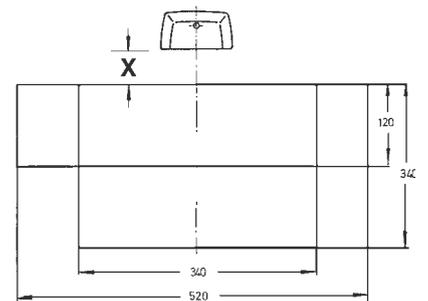
Actual track width at base track width with different tyre sizes

**Number plate(s)**

If the machine is required to be fitted with a number plate, this must be placed correctly under the lamp.

Number plate size	distance "X"
340 x 240 mm	45-65 mm
520 x 120 mm	65-100 mm

Rear number plate



T174-0002

The front number plate, if required, is fitted on the engine bonnet under the screen. Do not fit in the screen as it will reduce the cooling air flow.

**Driving**

**Before starting the engine**

Before starting the engine, always ensure that:

- All oil and fluid levels are correct
- Nobody is carrying out service or repair jobs on the machine
- All protection guards are properly fitted
- Parking brake is activated
- Pilot lever is in neutral position
- Main on/off valve at operating unit is switched off.

## Starting the engine

1. Switch on the battery isolator switch.
2. Ensure pilot lever is in neutral and parking brake is activated. A safety start switch will disable the starter motor when the pilot lever is not in neutral.
3. Set throttle at 1/4 of full speed.
4. Switch on key to pos. 1 and check warning lamps.
5. Check that the spraying pump and on/off valve at EC-operating unit is switched off.
6. When the preheating control lamp is off, turn the key to start position.
7. Set throttle to 1000 r.p.m. and let the engine warm up for 3 min. to ensure good lubrication before driving.

## To stop the engine

1. Set the pilot lever in neutral position and apply parking brake.
2. Let the engine run idle (800-1000 r.p.m.) for 5 min. to cool turbo and engine before stopping.
3. Stop engine by turning key to position 0.
4. Switch off the battery isolator switch.



**WARNING!** When parking, always ensure that the sprayer is out of reach of children or others, who can get contaminated and injured by chemical residues left at, or in the sprayer!

## Propulsion

The sprayer is equipped with hydrostatic transmission with full time 4-wheel-drive.

The speed can be varied stepless forward and reverse with the pilot lever.

The transmission has two different speed ranges which can be set independently on the front and the rear axle:

1. Low speed / high torque range. 0 - 12.5 km/h
2. High speed / low torque. 0 to 25 km/h.
3. Different setting on front and rear axles. 0-18 km/h.

**Range 1** is used for spraying in the field and when working speed and full traction power is required.

**Range 2** is used for road transport when the full speed and less traction power is required.

**Range 3** is used when driving uphill in slippery conditions where change in weight distribution will cause spinning front wheels.

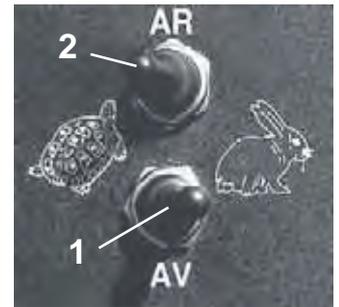
**IMPORTANT!** Range 3 should not be used for continuous driving. When conditions are back to normal, switch to range 1 again. NEVER change range when machine is moving.

To select speed range:

- Stop driving by moving the pilot lever to neutral
- Set the speed selector switches *forward* for slow speed range
- Set the switches *backwards* for fast speed range

- 1: Switch front wheels
- 2: Switch rear wheels

Slow range: 0 - 12.5 km/h  
Fast range: 0 - 25 km/h  
Medium range: 0 - 18 km/h



T060-0007

To avoid wheels spinning:

- Set the speed selector on "High" speed (Hare) on the axle with spinning wheels
- Set the speed selector on "Low" speed (Tortoise) on the axle with non-spinning wheels
- As soon as the conditions are back to normal, set both selectors to "low" again

**IMPORTANT!** The engine r.p.m. must always be **minimum 1800-2000 r.p.m.** to ensure full traction and braking power of the transmission. Driving with too low engine r.p.m. can cause braking failure and transmission damage!

## Braking

The ALPHA has no actual service brake system. The hydrostatic transmission works as propulsion and service brake system in one.

To stop the machine, the pilot lever is moved towards neutral "0".

The parking brake is placed on the side of the lateral switch board/console.

The brake is engaged when the handle is pushed upwards.



T060-0032

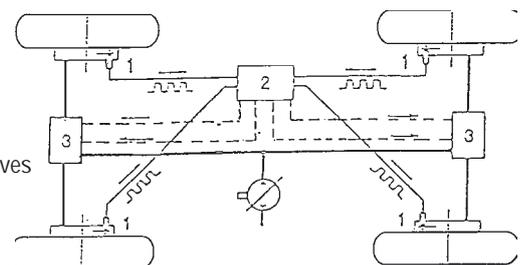
**IMPORTANT! Never activate the parking brake when the self-propelled sprayer is moving!**

## Electronic anti-spin, SAPE (if fitted)

The SAPE will prevent wheel spinning under difficult field conditions - especially uphill with uneven axle loads.

A wheel speed sensor on each wheel will report if the speed on one wheel will increase more than 15%, and the oil supply to this wheel will be reduced by an electronic controlled hydraulic valve.

1. Sensor
2. Black box
3. Hydraulic valves



T055-0006

### Steering

The steering on the ALPHA can be set in two different modes:

*Front wheel steering* - to be used on the road and during spraying

*Four wheel steering* - to be used during turning at the end of the tram lines



**WARNING!** Do not use 4-wheel-steering on public roads, and fast driving. Always disengage the 4-wheel steering before entering public roads.

In case of failure in the hydrostatic steering circuit the steering orbital permits an operation of the steering in a closed circuit.

### Front Wheel Steering

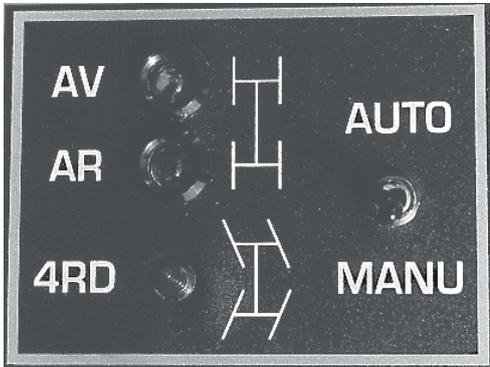
In this mode, only the front wheels can turn, the rear wheels stay in straight position.

To select Front Wheel Steering mode:

- Set the switch on 'AUTO'
- Turn the steering wheel so that the rear wheels are placed in right position; the signal **AR** is activated.

### Four Wheel Steering

In this mode, the front and rear wheels are steering opposite each other simultaneously.



To engage 4-wheel-steering mode:

- Set switch to "AUTO"
- Turn the steering wheel until both alignment lamps, **AV** and **AR**, lights
- Step on the 4-wheel-steering pedal on the floor
- Keep the pedal depressed as long as 4-wheel-steering is required

To disengage 4-wheel-steering mode:

- Step off the 4-wheel-steering pedal
- Turn the steering wheel until the lamp **AR** lights

The steering is now back to 2-wheel-steering.

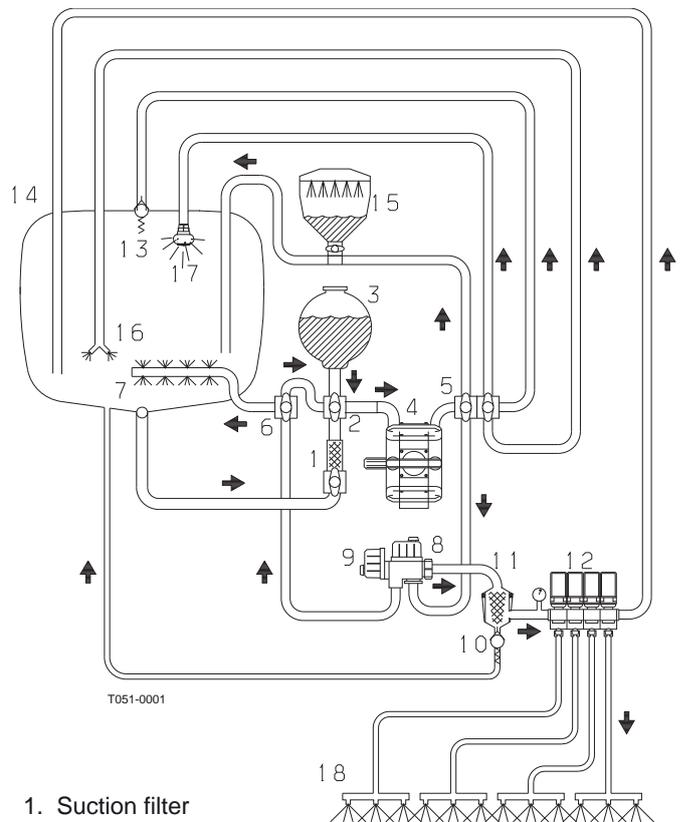
**NOTE!** If the AUTO/MAN switch is set in MAN mode, the wheel alignment must be done manually. The diodes indicate the wheels are aligned. In MAN mode an adapted crab steering can be done by using the steering wheel and pedal.

### Spraying

#### Before taking the sprayer into operation

Although the sprayer has been applied with a strong and protective surface treatment on steel parts, bolts etc. in the factories it is recommended to apply a film of anti-corrosion oil (e.g. CASTROL RUSTILLO or SHELL ENSIS FLUID) on all metal parts in order to avoid chemicals and fertilizers to discolourate the enamel. Avoid to apply oil on windows, lamps, markings and rubber parts.

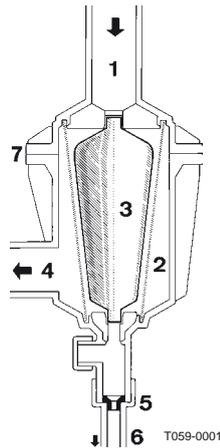
#### Spraying circuit operating diagram



1. Suction filter
2. Suction manifold
3. Rinsing tank
4. Pump
5. Pressure manifold
6. Return valve
7. Return agitation
8. Operating unit on/off
9. HARDI MATIC pressure adjustment
10. Check valve
11. Self-cleaning filter
12. Distribution valves
13. Safety valve (operating pressure is 12 bar)
14. Return hose, constant pressure device
15. HARDI FILLER chemical filling device
16. Pressure agitation
17. Tank rinsing nozzle
18. Spray boom

### Self-cleaning filter Operating Diagram

1. From pump
2. Double filter screen
3. Guide cone
4. To operating unit
5. Replaceable restrictor
6. Return to tank
7. Nut

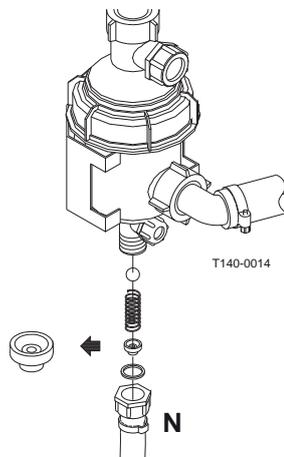


### Choice of restrictor

It is important to have a large flow through the filter. This is achieved by choosing the restrictor size in relation to the liquid consumption of the spray boom.

4 restrictors are supplied. Use the green one (largest orifice first).

The hose **N** is demounted at the self-cleaning filter, the restrictor is put in the hose and the hose is mounted again.



If the required working pressure cannot be obtained, the restrictor is too large. Choose a smaller restrictor. Start with a black one, then a white and finally a red one.

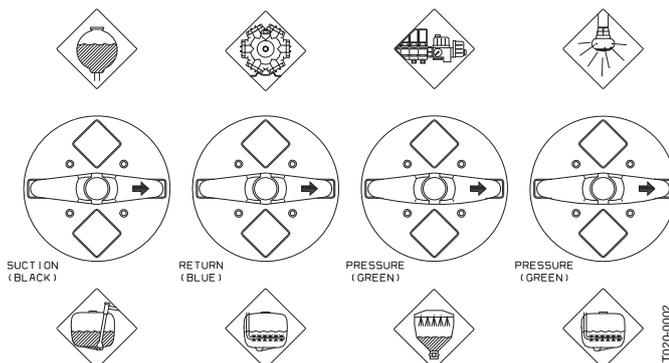
When cleaning the filter remove hose **N** and the hose at the safety valve, and check there are no residues.

Standard filter size is 80 mesh. Sizes of 50 and 100 mesh are available and can be changed by opening the filter top and replace the strainer. Check the O-rings before reassembling the filter and replace if damaged.

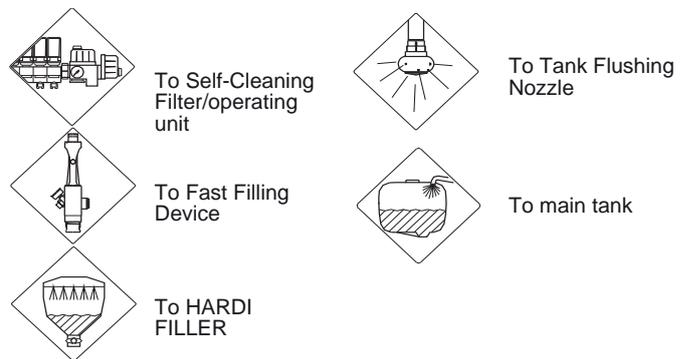
### Use of MANIFOLD valve system

The following pictograms and colours are used for the visualizing the function of the MANIFOLD valves:

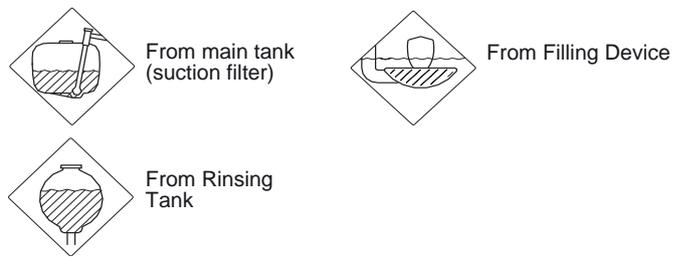
- Green disc = Pressure valve
- Black disc = Suction valve
- Blue disc = Return valve



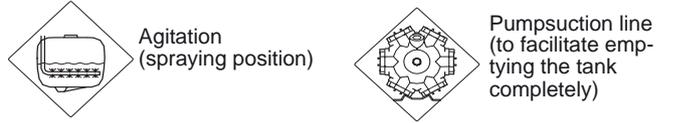
### Green disc = Pressure valve



### Black disc = Suction valve



### Blue disc = Return valve



### To operate the spraying functions:

- Turn the handle on a green pressure valve towards the function desired
- Turn the handle on a black suction valve towards the desired function
- Turn the handle on the blue return valve towards the desired direction of return flow
- Close all remaining valves by setting the handle(s) on "O"

**IMPORTANT!** The valves and functions may vary from machine to machine depending on optional equipment fitted. Only the functions to be used must be open - Always close remaining valves.

**Spraying preparations**

Before starting to spray always make necessary preparations:

- Chemical recommendations - read the label thoroughly
- Choice of nozzle type - Please see "Spray Technique"
- Working pressure - Please see "Spray Technique"
- Calibration of the nozzle output and speed. Please see "Spray Technique" and "HARDI PILOT 3880 DPE" manuals

**Filling of rinsing tank**

The rinsing tank filling tube is placed on the left hand side and has to be filled with clean water only through the filling cap. This tank is for rinsing of the spraying circuit and diluting of spray liquid residues prior to cleaning. Capacity 185 l.



T080-0010

**Filling of clean water tank**

The tank is incorporated at the left hand side front of main tank. It has to be filled with clean water from the tap only. It is used for washing of hands, cleaning of clogged nozzles etc.

Never put any chemical products in this tank and take care that it is always filled with clean water during work. Capacity: 30 l.



T080-0012

**Filling of main tank**

It is recommended to add the chemical products into the tank according to the manufacturer's instructions. During the filling process, please check continuously the liquid level in the tank in order to avoid pollution due to spillage. The chemical products can be added by suction or filled directly into the tank.

**Filling**

Water can be filled into the main tank in the following ways:

1. Filled through tank lid on top of the sprayer tank.
2. Filled by diaphragm pump through suction side fitted filling device (optional extra) by normal pump capacity.
3. Filled by diaphragm pump through pressure side fitted injector/venturi type fast filling device (optional extra) by up to 3 times normal pump capacity.
4. Combination of 2. and 3.

The tank should normally be filled <sup>2</sup>/<sub>3</sub> with water before adding the chemicals - always read instruction at chemical container!

**Filling through tank lid**

Remove tank lid and fill water through strainer to prevent rust or other particles to enter the tank.



T080-0012

An overhead tank can be used in order to obtain high filling capacity.

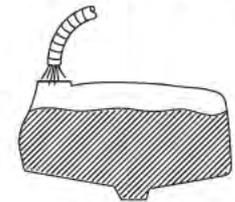
It is recommended to use as clean water as possible for spraying purposes.



**WARNING!** Never let the filling hose etc. enter the tank. Keep it outside the tank pointing towards the filling hole.



If the hose is lead to the bottom of the tank and the water pump at the water supply plant stops, chemicals can be siphoned back and contaminate water supply lines and well.

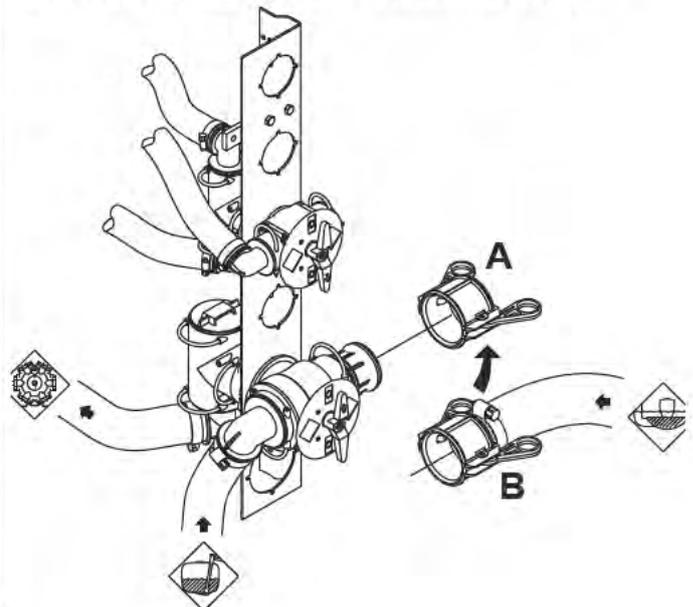


**Suction Filling Device.**

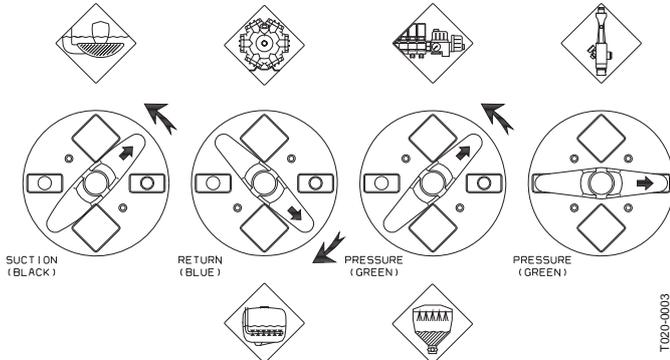


**WARNING!** Avoid contamination or personal injury. Do not open suction valve towards Suction Filling Device unless pump is running and filling hose is connected. If this valve is opened without pump running, liquid will stream out of the MANIFOLD.

The Suction Filling Device is operated as follows:



1. Remove cover **A**, and connect suction hose **B** to Suction Manifold.
2. Engage diaphragm pump and set engine revolutions at 2200 r/min. Turn handle on Suction Manifold towards Filling Device.



3. The tank is now filled with water. Keep an eye on liquid level indicator.
4. Turn handle on Suction Manifold away from Filling Device to discontinue filling process. Then disengage pump.
5. Disconnect suction tube **B** and replace cover.

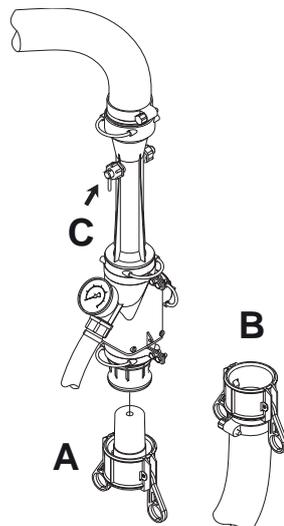
**NOTE!** Observe local legislation regarding use of Filling Device. In some areas it is prohibited to fill from open water reservoirs (lakes, rivers etc.). It is recommended only to fill from closed reservoirs (mobile water tanks etc.) to avoid contamination.

**WARNING!** If suction hose/filter is carried on the sprayer during spraying, it can be contaminated by spray drift which will be transferred to lake/river when filling!

**Fast Filling Device.**

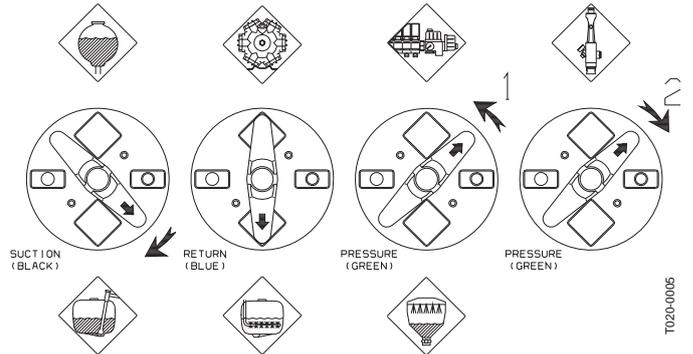
The Fast Filling Device is operated as follows:

1. Ensure spray liquid tank contains at least 50 litres of water.
2. Remove cover (A) and connect suction hose (B).



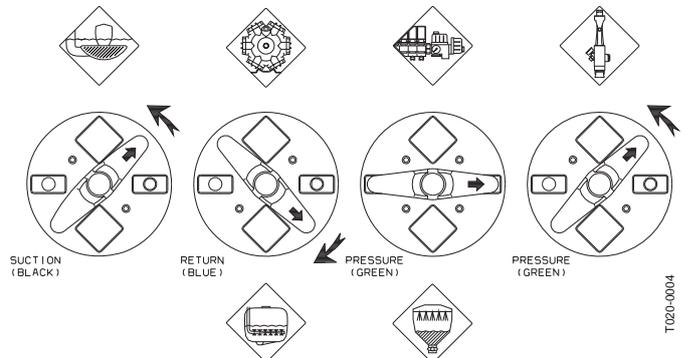
3. Turn handle on Pressure Manifold towards Fast Filler. With the engine at 2200 r/min, the pressure gauge should indicate about 10 bar.
4. If water is not seen in transfer tube, prime by turning valve (C).
5. Keep eye on liquid level indicator.
6. Turn handle on Pressure Manifold away from Fast Filler to discontinue filling process.

**NOTE:** Turn handle towards EC-operating unit **before** turning away from Fast Filler in order to avoid peak pressure blowing the safety valve!



7. Disconnect suction tube (B) and replace cover.

The Filling Device and the Fast Filling Device can be used simultaneously - this gives even bigger filling capacity.

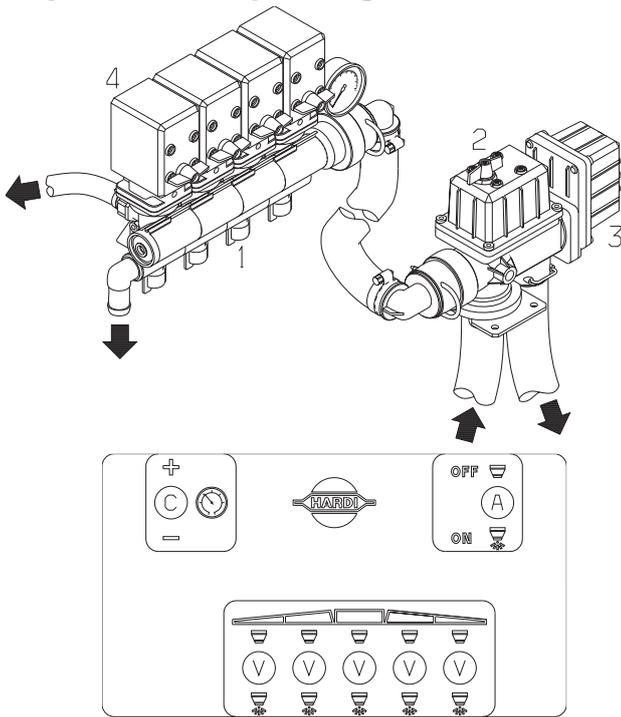


**WARNING!** Do not leave the sprayer whilst refilling the tank, and keep an eye on the level gauge in order **NOT** to overfill the tank!

**NOTE!** Observe local legislation regarding use of Filling Device. In some areas it is prohibited to fill from open water reservoirs (lakes, rivers etc.). It is recommended only to fill from closed reservoirs (mobile water tanks etc.) to avoid contamination.

**WARNING!** If suction hose/filter is carried on the sprayer during spraying, it can be contaminated by spray drift, which will be transferred to lake/river when filling!

### Adjustment of operating unit



**NOTE!** On models with HARDI PILOT the EC operating unit is controlled via the HARDI PILOT - See separate instruction book.

1. Choose the right nozzle size by turning the nozzle bodies to a suitable nozzle for the spray purpose. Make sure that all nozzles are the same type and size.
2. Open or close pressure agitation. (Remember pressure agitation takes 5% to 10% of pump output).
3. Open main on/off valve **2** by pushing switch towards green - spraying position **A**.
4. Open all distribution valves **4** by pushing switches **V** to position Green. A green indicator appears under the EC-motor when valve is in spray position.
5. Open pressure adjustment valve by activating switch **C** until green finger screw **3** stops rotating.
6. Put the machine in neutral and set the engine revolutions and thereby the number of revolutions of the pump corresponding to the intended travelling speed. Adjust the pressure adjustment valve **3** so that the pressure gauge indicates the recommended pressure.

### ADJUST THE PRESSURE EQUALIZATION SECTIONS AS FOLLOWS:

8. Note the pressure and place the first of the distribution valves **4** to position "off" (opposite "Green" position).
9. Turn the corresponding adjusting screw **1** until the pressure gauge again shows the same pressure (turn the screw clockwise for higher pressure, anticlockwise for lower pressure).
10. Place the next distribution valve to position "off", and adjust this one in the same way - one by one.

**NOTE!** HEREAFTER ADJUSTMENT OF PRESSURE EQUALIZATION WILL ONLY BE NEEDED IF YOU CHANGE TO NOZZLES WITH OTHER CAPACITIES.

### OPERATING THE CONTROL UNIT WHILE DRIVING:

11. To close the entire boom, operate switch **A**. This takes the pressure from the pump. The liquid will then return to the tank via the return system and serve as agitation. The diaphragm anti-drip valves ensure instantaneous closing of all nozzles. In order to close part of the boom, activate one of the distribution valves by the switch **V** of the section or sections to be closed. The pressure equalisation device ensures that the pressure does not rise in the sections which remain open.

### Remote pressure gauge (if fitted)

The remote pressure gauge measures the working pressure in the boom tubes as close to the nozzles as possible. This pressure reading will always be slightly lower than the reading at the operating unit pressure gauge.

The outputs stated in the nozzle charts are always based on the pressure measured at the nozzle.

Always adjust pressure when calibrating and spraying according to readings at the remote pressure gauge.

### Filling of chemicals.

Chemicals can be filled in the tank in 2 ways:

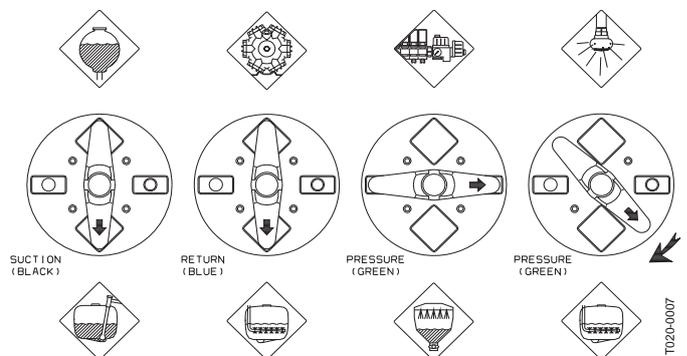
1. Through tank lid.
2. By means of HARDI FILLER chemical filling device.

### Filling through tank lid

The chemicals are filled through the tank lid - Note instructions on the chemical container!

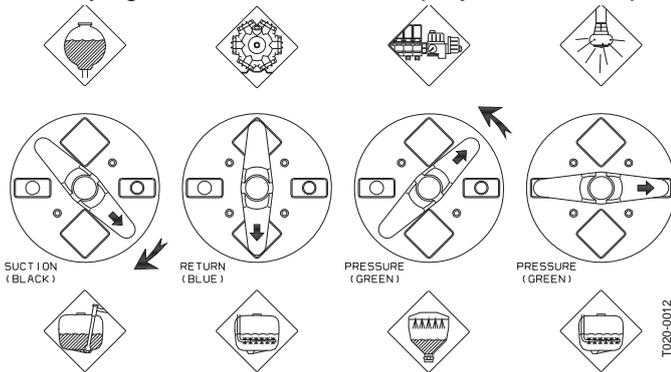
**WARNING!** Be careful not to slip or splash chemicals when carrying chemicals up to the tank lid!

1. Make sure the EC on/off valve is switched off.
2. Set the MANIFOLD valves to correct position. Black valve "Suction from main tank", green valve towards "Agitation" and Blue valve towards "Agitation".



3. Engage the pump and set engine revs. to 2200 r.p.m.
4. Add the chemicals through the main tank hole.
5. When the spray liquid is well mixed, turn handle on the Pressure Manifold towards "Spraying" position.

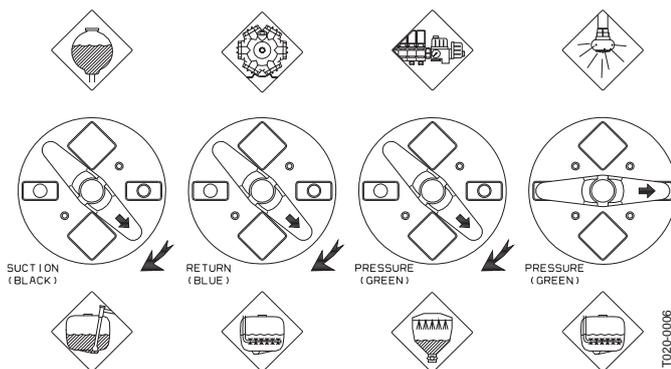
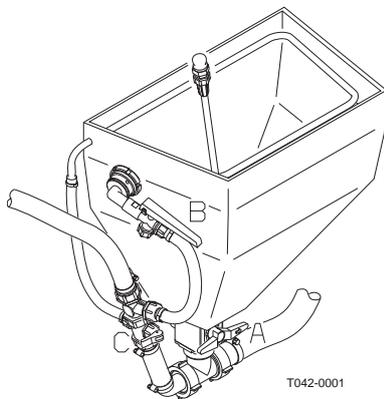
Keep P.T.O. engaged so the spray liquid is continuously agitated until it has been sprayed on the crop.



### Filling by HARDI FILLER chemical inductor

#### Liquid chemicals:

1. Fill the main tank at least 1/3 with water (unless something else is stated on the chemical container label). See section "Filling of water".
2. Turn the handle at the Suction Manifold towards "Main tank" and turn blue return valve towards "Agitation". Close remaining valves.
3. Turn the handle at the Pressure Manifold towards "HARDI FILLER". Close remaining valves. Check that bottom valve **A** at the FILLER is closed.



4. Engage the pump and set engine speed at 2200 r.p.m.
5. Open FILLER lid.
6. Measure the correct quantity of chemical and fill it into the hopper.

**NOTE!** The scale in the hopper can only be used if the sprayer is parked at level ground! It is recommended to use a measuring jug for best accuracy.

7. Open the bottom valve **A** and the chemical is transferred to the main tank.
8. If the chemical container is empty it can be rinsed by the container rinsing device (if fitted). Place the container over the multi-hole nozzle and press the lever **B**.



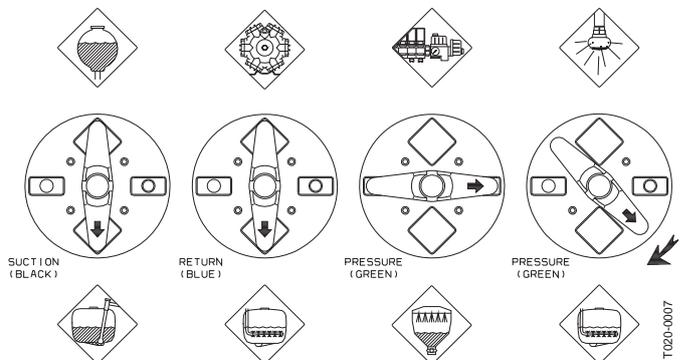
**WARNING!** Do not press lever **B** unless the multi-hole nozzle is covered by a container to avoid spray liquid hitting the operator.

**IMPORTANT!** Rinsing device uses spray liquid to rinse containers for concentrated chemicals. Always rinse the chemical containers with clean water several times until they are clean before disposal.

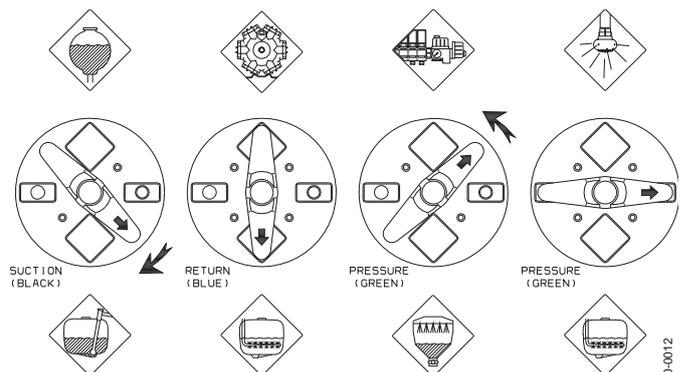
9. Engage the hopper rinsing device by opening valve **C**.
10. Close valve **C** again when the hopper is rinsed.

**IMPORTANT!** The hopper rinsing device is using spray liquid for rinsing the hopper for concentrated chemical! The FILLER must always be cleaned together with the rest of the sprayer when the spray job is done.

10. Close valve **A** and the FILLER lid again.
11. Turn handle at the Pressure Manifold towards "Intensive Agitation" and close remaining valves.



12. When the spray liquid is well mixed, turn handle on the Pressure Manifold towards "Spraying" position. Keep P.T.O. engaged so the spray liquid is continuously agitated until it has been sprayed on the crop.

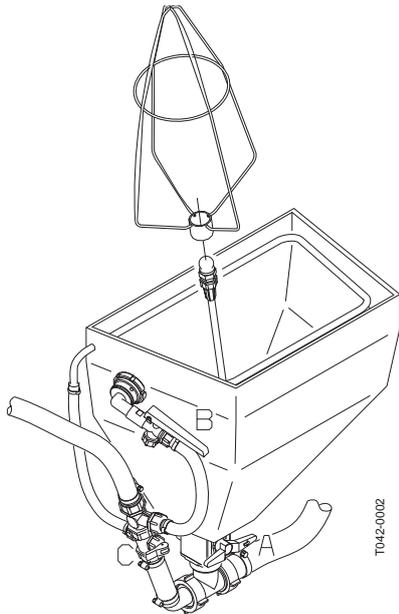


#### Powder chemicals

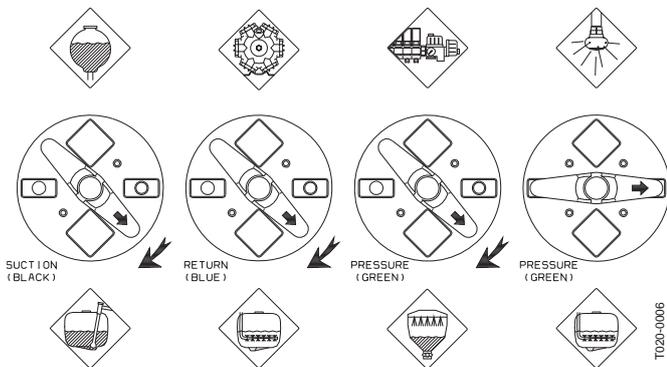
Filling of powder chemicals is done as follows:

1. Fill the main tank at least 1/2 with water (unless something else is stated on the chemical container label). See section "Filling of water".
2. Turn the handle at the Suction Manifold towards "Main tank" and turn blue return valve towards "Agitation". Close remaining valves.

- Turn the handle at the Pressure Manifold towards "HARDI FILLER". Close remaining valves.



T042-0002



T020-0006

- Engage the pump and increase engine speed to 2200 r.p.m.
- Open the bottom valve **A** at the FILLER. Open FILLER lid.
- Engage the hopper rinsing device by opening valve **C**.
- Measure the correct quantity of chemical and sprinkle it into the hopper as fast as the rinsing device can flush it down.
- If the chemical container is empty it can be rinsed by the container rinsing device (if fitted). Fit the bag bracket and place the powder bag over the multi-hole nozzle and press the lever **B**.

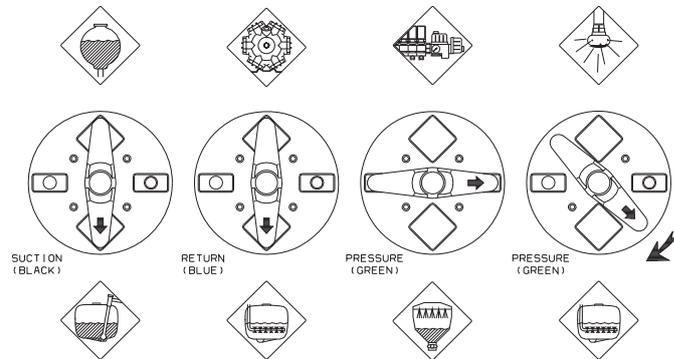
**WARNING!** Do not press lever **B** unless the multi-hole nozzle is covered by a container to avoid spray liquid hitting the operator.

**IMPORTANT!** Rinsing device uses spray liquid to rinse containers for concentrated chemicals. Always rinse the chemical containers with clean water several times until they are clean before disposal.

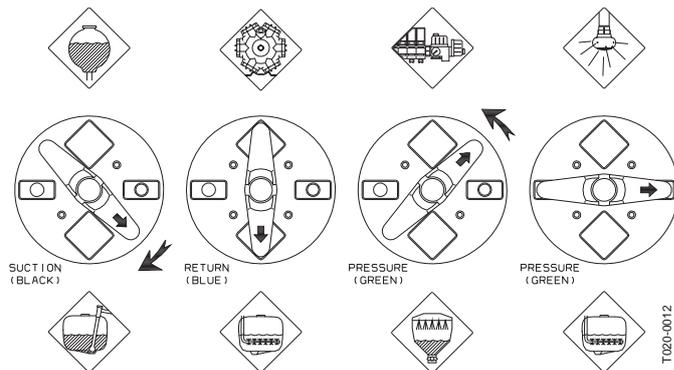
- Close valve **C** again when the hopper is rinsed.

**IMPORTANT!** The hopper rinsing device is using spray liquid to rinse the hopper for concentrated chemical. The FILLER must always be cleaned together with the rest of the sprayer when the spray job is done.

- Close valve **A** and the FILLER lid again.
- Turn handle at the Pressure Manifold towards "Intensive Agitation" and close remaining valves to mix the spray liquid.



- When the spray liquid is well mixed, turn handle on the Pressure Manifold towards "Spraying" position. Keep P.T.O. engaged so the spray liquid is continuously agitated until it has been sprayed on the crop.

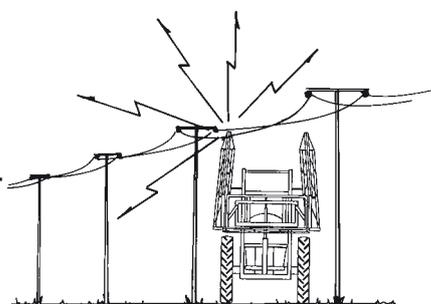


T020-0012

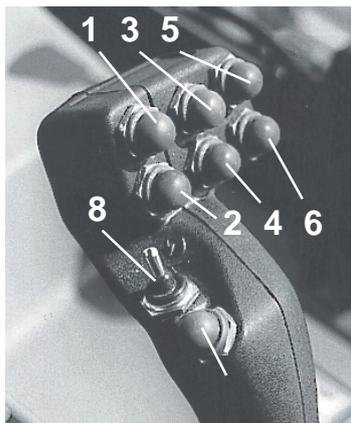
## Operating the boom (all models)

**Safety first!** Before operating the boom, be sure that no objects are found near the sprayer (poles, persons, etc.).

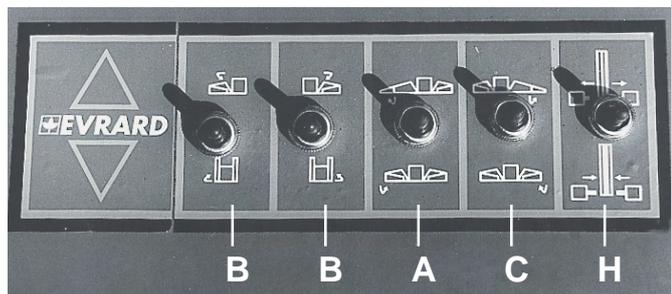
**DANGER!** When folding and unfolding the boom, be sure that no persons or objects are in the operating area of the boom and that the boom cannot touch any electrical conductors!



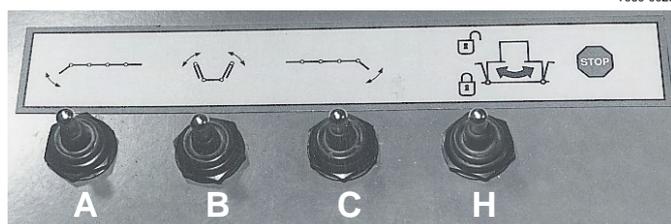
1. Raising of the boom
2. Lowering of the boom
3. LEFT hand side boom tilt UP
4. LEFT hand side boom tilt DOWN
5. RIGHT hand side boom tilt UP
6. RIGHT hand side boom tilt DOWN
7. EC operating unit ON / OFF
8. Slanting of the boom



T060-0006



T060-0028



T060-0031

- A. Unfolding/folding of the left outer section.  
 B. Unfolding/folding of the inner sections.  
 C. Unfolding/folding of the right outer section.  
 H. Pendulum locking device.

## Unfolding of the boom

To unfold the boom, please carry out the following procedure:

1. Push **boom lift** switch **1** upwards to lift the boom clear of the rear transport brackets.
2. Lift the right and left boom parts by activating the **boom tilt** function, switch **3** and **5**.
3. Push switch **B** to unfold the inner sections completely.
4. Push switch **A** and **C** to unfold outer sections completely.
5. Push switch **2** downwards to lower the boom to approx. 50 cm above crop or ground level.
6. Unlock the pendulum suspension by pushing switch **H** downwards.

**IMPORTANT!** The folding functions must only be operated when sprayer is stationary. The functions in the pilot lever can be operated during spraying. Wrong operation will damage the boom!

## Folding of the boom

When folding the boom, please carry out the following procedure:

1. Raise boom lift **1** to upper position.
2. Check that pendulum slanting control is levelled to middle position - if not correct by activating switch **8**.
3. Lock pendulum locking device by pushing switch **H** upwards.
4. Fold outer sections, **A** and **C**.
5. Lift up right and left hand side boom by activating right and left boom tilt, **3** and **5**.
6. Fold inner sections by activating switch **B**.
7. Lower boom lift, **F**, until boom rests on rear transport brackets.
8. Lower right and left boom side until they touch the front transport brackets by activating boom tilt **4** and **6**.

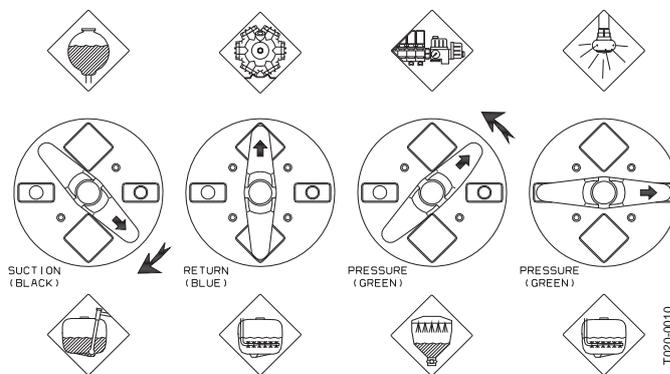
ENSURE THAT THE BOOMS ARE CLEAR FROM THE TRANSPORT BRACKETS BEFORE UNFOLDING IS PROCEEDED.

## Use of rinsing tank and rinsing nozzles

The incorporated 185 l rinsing tank can be used for two different purposes.

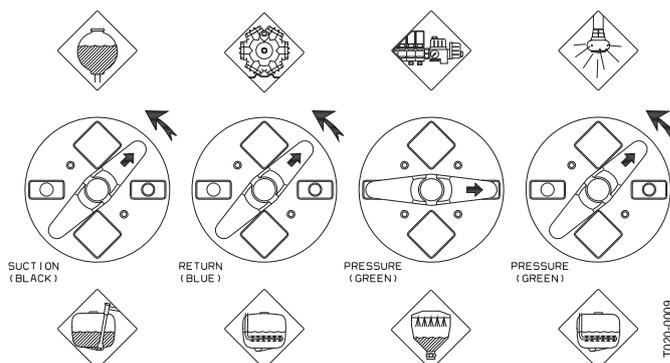
**A.** In-field diluting of remaining spray liquid residues in the spraying circuit for spraying the liquid in the field, before cleaning the sprayer:

1. Empty the sprayer as much as possible. Turn the agitation off and spray till air comes out of all nozzles.



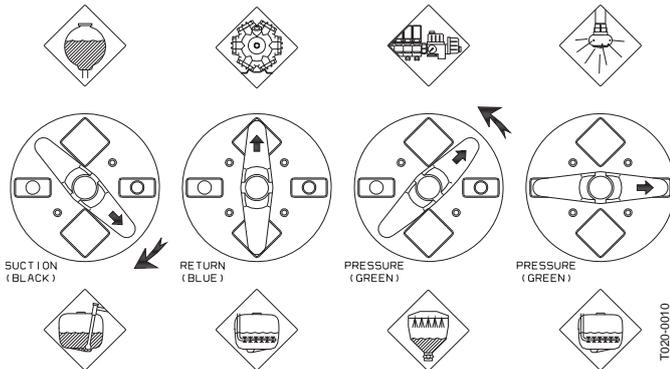
T020-0010

2. Remove the tank filter basket.
3. Turn suction valve towards rinsing tank.
4. Turn pressure valves towards rinsing nozzle.



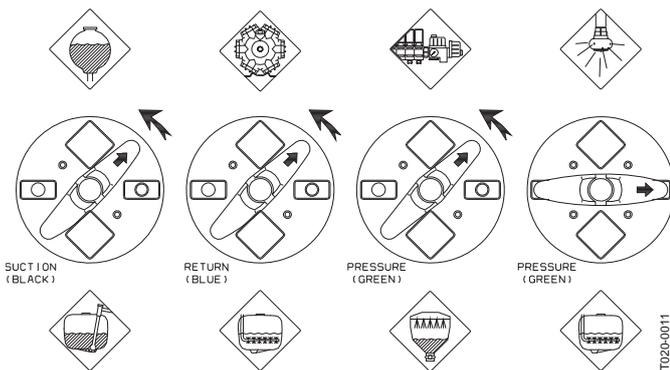
T020-0009

- Engage the pump and set the engine at approx. 1500 r.p.m.
- When rinsing water corresponding to approx. 10 times the spray liquid residue (see paragraph "Technical Residue") is used, turn back suction valve towards suction from main tank and operate all valves, so that all hoses and components are rinsed.
- Turn pressure valve back to EC operating unit and spray liquid in the field you have just sprayed.
- Repeat point 3-7 until the rinsing tank is empty.



**B.** Rinsing the pump, operating unit, spray lines, etc. in case you stop spraying before main tank is empty (e.g. beginning rain etc.).

- Turn suction valve towards rinsing tank.
- Turn blue Return valve (if fitted) towards pump suction line.
- Engage the pump and spray water from rinsing tank on the field till all nozzle tubes/nozzles are flushed with clean water.
- Disengage pump again.



**WARNING!** The rinsing nozzles cannot always guarantee a 100% cleaning of the tank. Always clean manually with a brush afterwards, especially if crops sensitive to the chemical just sprayed are going to be sprayed afterwards!

**Technical Residue**

Inevitably a quantity of spray liquid will remain in the system, which cannot be sprayed properly on the crop as the pump takes in air when the tank is about to be empty.

This Technical Residue is defined as the remaining liquid qty. in the system as the first clear pressure drop on the pressure gauge is read.

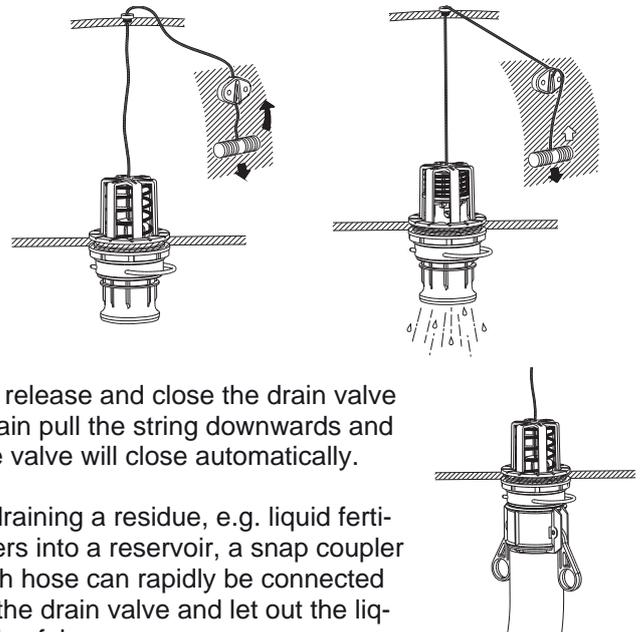
Total residue **)	Dilutable residue *)
30 - 55 litre	7-21 litre

- \*) Residue in main tank, possible to dilute with water from rinsing tank
- \*\*\*) Total residue in tank and spraying circuit on standard sprayer. Variations due to difference in ground inclination, hose length etc.

The dilutable residue must be diluted 10 times with clean water and sprayed to the crop just sprayed before cleaning the sprayer - See paragraph "Cleaning".

**Operation of the tank drain valve**

Pull the string at left hand side of the tank to open the drain valve. The valve is spring-loaded but can be kept open by pulling the string out and upwards in the V-shaped slit.



To release and close the drain valve again pull the string downwards and the valve will close automatically.

If draining a residue, e.g. liquid fertilizers into a reservoir, a snap coupler with hose can rapidly be connected to the drain valve and let out the liquid safely.

**WARNING!** Note local legislation regarding dumping of residues and rinsing water.

**Rinsing tank, draining**

To avoid algae developing in the rinsing tank always drain the rinsing tank when the sprayer is not in use for a long period. Remove the clip from the hose fitting, and pull out the hose to drain the tank.

## Maintenance

To keep the machine in good, safe and reliable working order, as well as keeping the maintenance and repair costs to a minimum it is essential to follow the preventive maintenance programme given hereafter.

### Lubrication table

Component	Capacity	Lubricant
DEUTZ engine: 4 cyl. 6 cyl.	9.5 litres 15.5 litres	TOTAL Rubia XT Castrol Powermax Shell Myrina M Mobil® Delvac®
Hydrostatic transmission Hydraulic system Hydrostatic steering	60 litres	TOTAL Equivis 46 Castrol Hyspin AWH 46 Shell Tellus T46 Mobil® DTE® 15 M
Diaphragm pump	-	Lithium based ball bearing (grease nipple) grease, NLGI No. 2-2.5: TOTAL Multis EP 2 CASTROL LMX Grease Shell HD Retinax MS Mobil® Mobilux EP 2 NC
Chassis and boom	-	Lithium based grease with grease nipples molybdenumdisulfide and graphite: Castrol Molymax Shell SAS 4000 Mobil® Mobilgrease Special
Oil lubrication points	-	TOTAL Transmission TM SAE 80W/90 Castrol EPX 80W/90 Shell Spirax 80W/90 Mobil® Mobilube® 80W/90
Engine cooling system: 4 cyl.: 6 cyl.:	11 litres 15 litres	Deutz coolant anti-freeze, 45% Castrol anti-freeze 50% Glycoshell, 50% Mobil, 50%

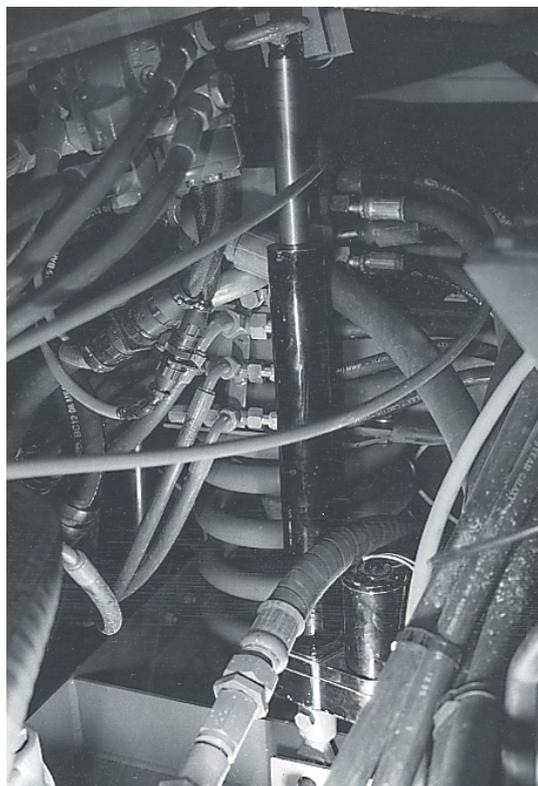


## Tilting of the cab

The cab can be tilted for easy access during maintenance jobs. An electric ram is available for this purpose.

1. Unfold the boom inner sections to improve access.
2. Fit the electric ram under the cab and secure with lynch pins.
3. Connect the plugs between control box and the ram.
4. Connect the terminal clips to battery: Red to pos. (+) and black to neg. (-).
5. Remove the two bolts in left hand-side front and back of the cab.
6. Remove the transport bracket cross sectional bar (only on OLH booms with Air conditioning).
7. The cab is now tilted.
8. The cab is lowered in reverse order.

**IMPORTANT!** Always remember to fit and tighten the two securing bolts again. Never drive with the electric ram connected, as it will disable the cab rubber suspension.



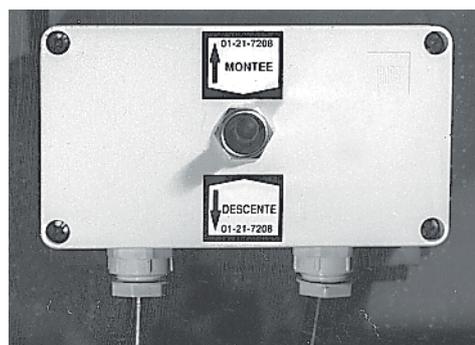
T060-0033

## Fuel and lubricants storage

Always store fuel and lubricants clean, dry and cool - preferably by constant temperature - to avoid contamination by dirt and condensed water.

When having refilled the fuel storage tank, allow sedimentation of possible dirt, condensed water and sludge - wait 24 hours before refilling the sprayer fuel tank. Drain water and sludge from storage tank once a year, if possible.

Keep oil filling jugs and hoppers clean.



T060-0034

## Maintenance during the running-in period

During the running-in period some maintenance jobs must be done with shorter intervals than usual, allowing all parts to bed in correctly. Follow instructions closely:

### After 1 hour

Tightening of wheel bolts

### After 2 hours

Tightening of wheel bolts

### After 10 hours

Tightening of wheel bolts  
Check tightness of hydraulic circuit

### After 50 hours

Check tightness of engine (\*)  
Change engine oil (\*)  
Replace engine oil filter (\*)  
Replace fuel filter (\*)  
Check belts (\*)

### After 100 hours

Check tightness of hydraulic circuit  
Change hydraulic oil  
Replace hydraulic filters

### After 150 hours

Check air conditioning circuit

### After 500 hours

Change hydraulic oil

(\*) Follow instructions given in the engine instruction book

## Regular, preventive maintenance

Service jobs and intervals:

### Every 10 hours or daily (whichever comes first)

Engine oil, check level \*)  
Fuel tank, fill up  
Engine air filter, check/clean  
Hydraulic oil, check level  
Spraying circuit filters, check/clean

### Every 50 hours or weekly (whichever comes first)

Boom, check bolt tightness  
Wheel bolts, re-tighten  
Tyre pressure, check/adjust  
Battery electrolyte level, check/refill  
Grease nipples, grease

### Every 100 hours

Cooler radiator, check/clean (\*)  
Air condition condenser, check/clean  
Battery connections, check/tighten (\*)

### Every 250 hours

Boom adjustments, check/re-adjust  
Hydraulic filters, renew  
Cab carbon filter, renew

### Every 500 hours

Engine oil, change(\*)  
Engine V-belts, check/ tighten (\*)  
Air conditioning compressor V-belts, check / tighten  
Air condition refrigerant level, check/refill  
Boom suspension damper, check nitrogen pressure and oil level (GVA-booms only)  
Engine mountings, retighten  
Coolant concentration, check/adjust

### Every 1000 hours

Fuel tank, drain for condensed water  
Fuel line suction strainer (in tank), clean  
Fuel pre-filter, clean  
Fuel filter, renew (\*)  
Hydraulic oil, change  
Engine glow plugs, check/renew (\*)  
Engine air intake, check for leakage (\*)  
Wheel suspension, check shock absorbers

### Every 1500 hours

Engine valve clearance, check/adjust (\*)

### Every 2000 hours

Coolant; drain, flush, renew (\*)

(\*) Follow the engine instruction manual

### 10 hours service (or daily)

#### Engine oil.

Check oil level is between the marks on the dip stick. Fill with fresh, clean engine oil if necessary.

Engine air filter

Please follow instructions given in the engine instruction book attached to this manual.

#### Hydraulic oil

Check the oil level to be in the upper part of the sight gauge on the hydraulic reservoir. Fill with fresh, clean oil if necessary.



T088-0001

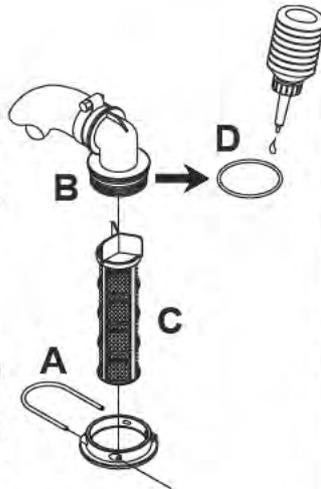
**Suction filter**

To service the suction filter:

1. Close the valve.
2. Pull the steel clip **A** out.
3. Lift the suction hose fitting **B** from housing.
4. Filter guide and filter **C** can now be removed.

To reassemble:

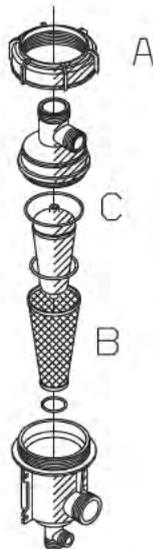
5. Press the guide onto filter end.
6. Place the filter into housing with guide facing up.
7. Ensure the O-ring **D** on the hose fitting is in good condition and lubricated.
8. Refit the suction hose **B** and steel clip **A**.



Alternative filters are available. See section on Technical specifications - Filters and nozzles.

**Self-Cleaning Filter**

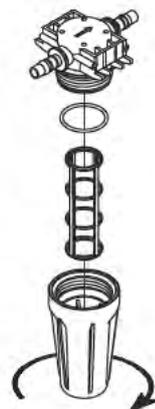
1. Unscrew nut **A** and open filter.
2. Check filter gauze **B**, clean if necessary.
3. Lubricate O-ring **C**.
4. Assemble filter again.



Alternative filters are available. See section on Technical specifications - Filters and nozzles.

**In-Line filter (if fitted)**

If the boom is equipped with In-Line Filters unscrew the filter bowl to inspect and clean the filter.



Alternative filters are available. See section on Technical specifications - Filters and nozzles.

**Nozzle filters**

Check / clean the nozzle filters. Alternative filters are available. See section on Technical specifications - Filters and nozzles.



**Spraying circuit**

Fill with clean water, operate all functions and check for leaks, use higher spray pressure than normal. Check nozzle spray patterns visually using clean water.

50 hours service (or weekly)

**Boom**

Check / retighten vital bolts on the boom.

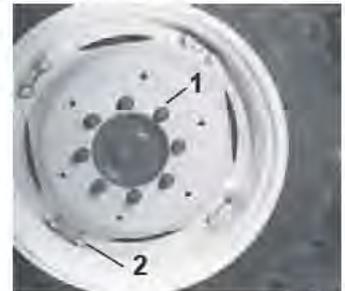
**Wheel bolts**

Tighten wheel bolts with a torque wrench.

If the bolts are replaced, grease the threads slightly.

1. Rim plate to flange: 32.0 daNm
2. Rim to rim plate,
 

Ø14	24.5 daNm
Ø16	35.0 daNm



T068-0002

**Battery**

Check the electrolyte level on the battery.

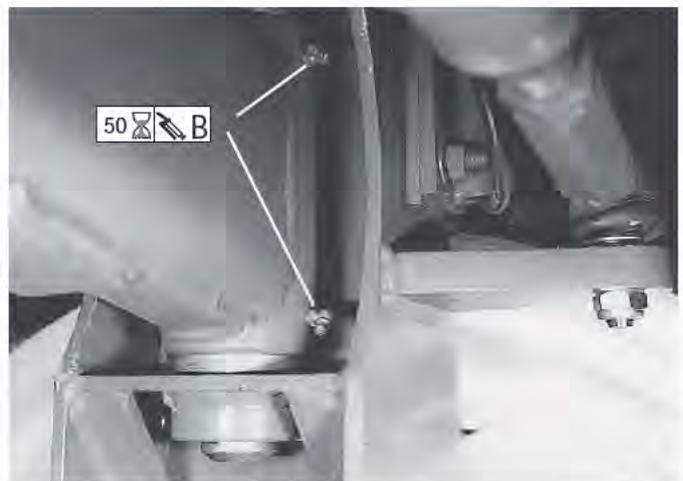
1. Remove the battery cover and retaining buckle.
2. Pull the battery sideways out of the tray.
3. Clean the area around the cell caps.
4. Remove the cell caps and check the electrolyte level to be 10 mm above the cells. If low, fill demineralized water to correct level.



**WARNING!** Do not smoke or use open fire when working with batteries. Highly explosive hydrogen gases can be generated from batteries and cause serious injuries from fire or acid. Use rubber gloves and goggles.

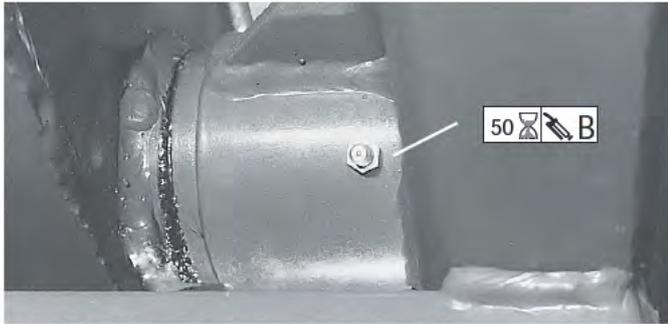
**Lubrication**

Lubricate all grease nipples in wheel suspension, paralift and boom. Regarding lubricant see section "Lubricants".



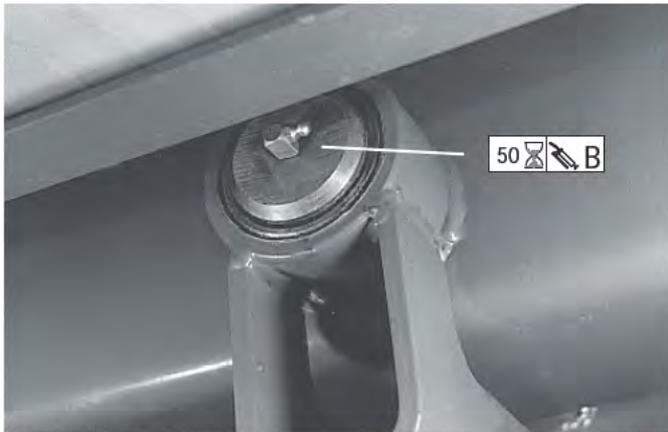
Front/rear axle spindles

T062-0001



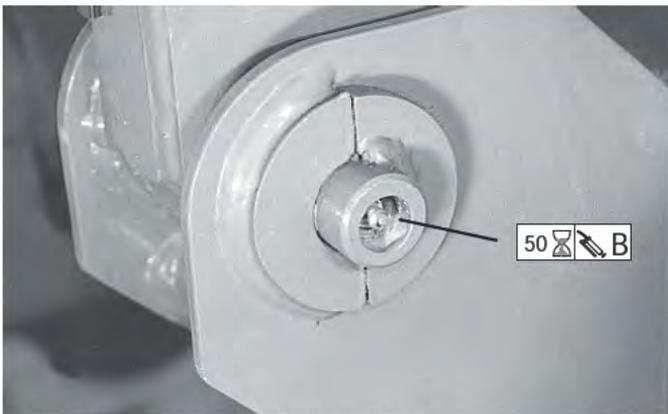
Front axle centre pin

T082-0005



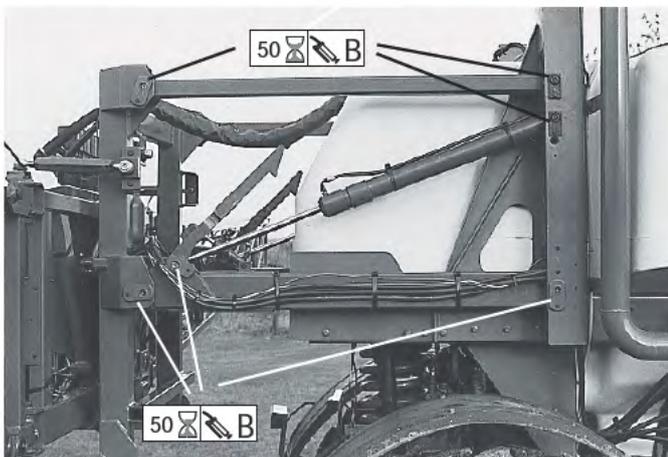
Front axle centre pin

T082-0002



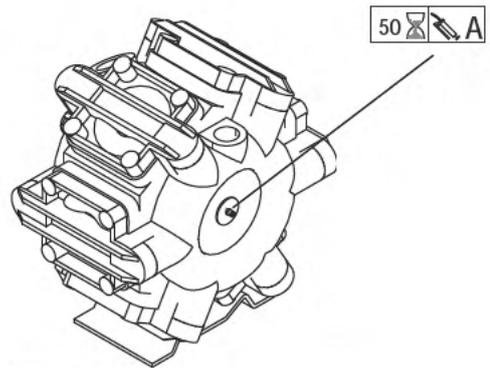
Front/rear axle suspension bearings

T082-0003

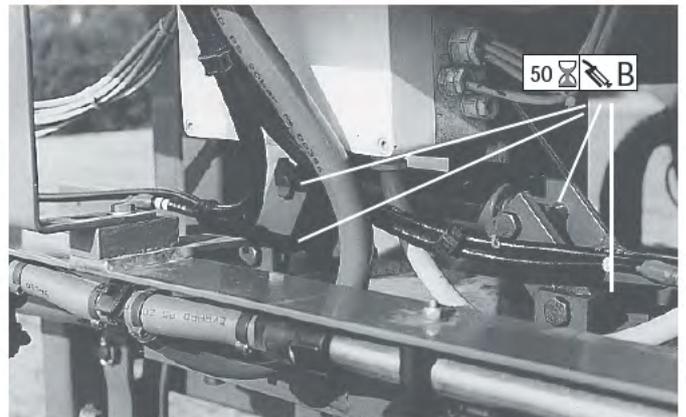


Parallelogram lift

T082-0006

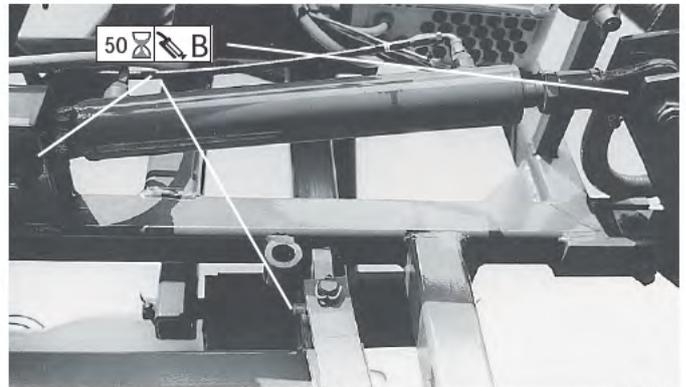


Diaphragm pump



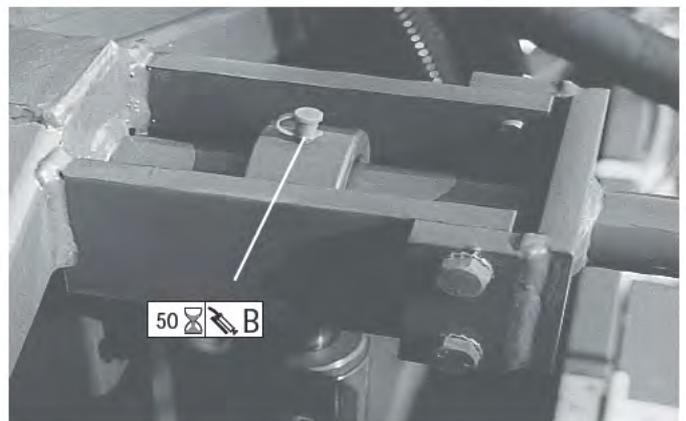
1. Boom center section (GVA)

T082-0019



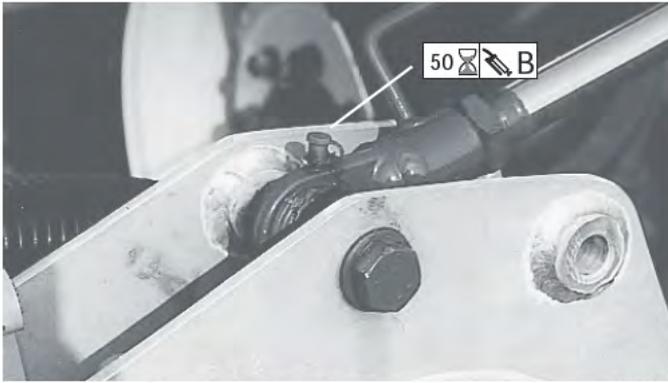
2. Boom center section (GVA)

T082-0018



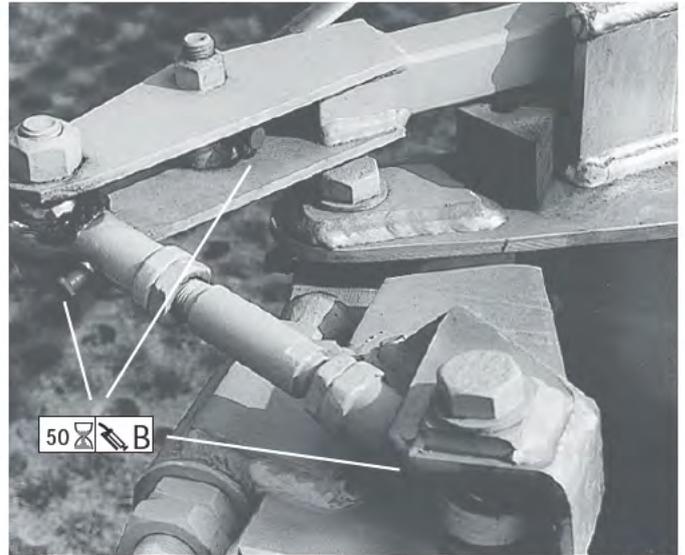
3. Boom center section (GVA)

T082-0017



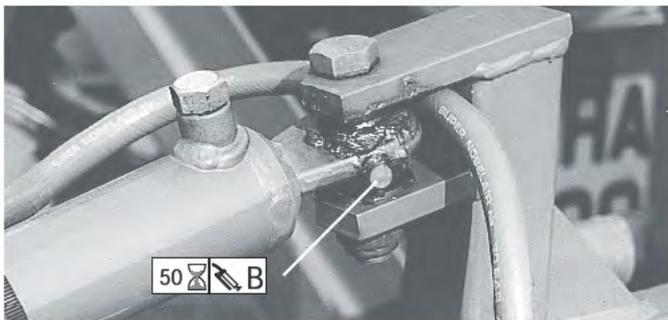
4. Boom center section (GVA)

T062-0015



1. Boom outer section folding (GVA)

T062-0013



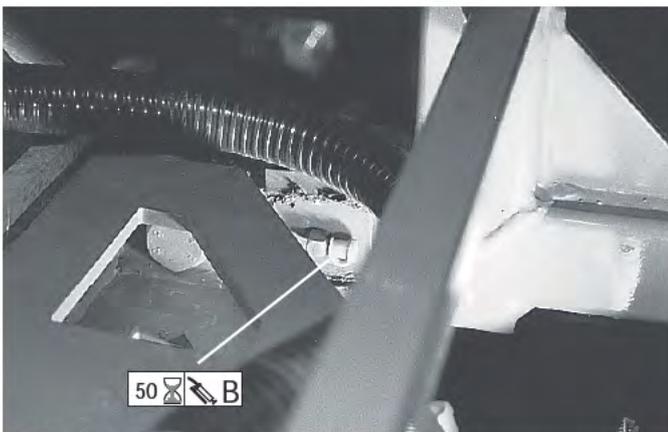
5. Boom center section (GVA)

T062-0016



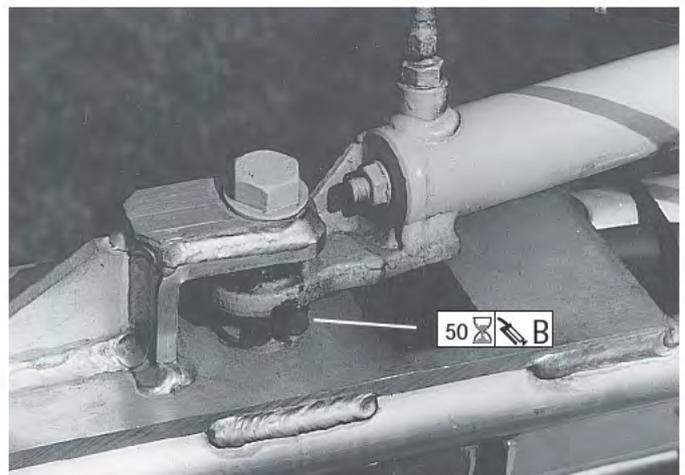
2. Boom outer section folding (GVA)

T062-0011



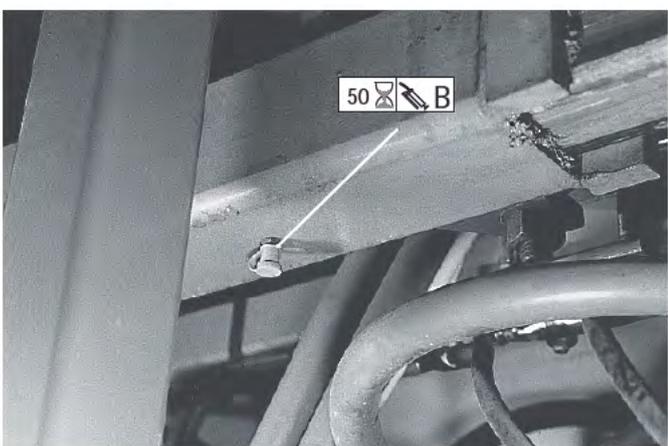
6. Boom center section (GVA)

T062-0020



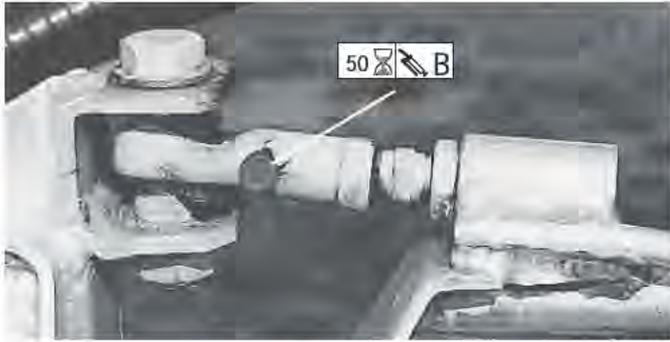
3. Boom outer section folding (GVA)

T062-0014



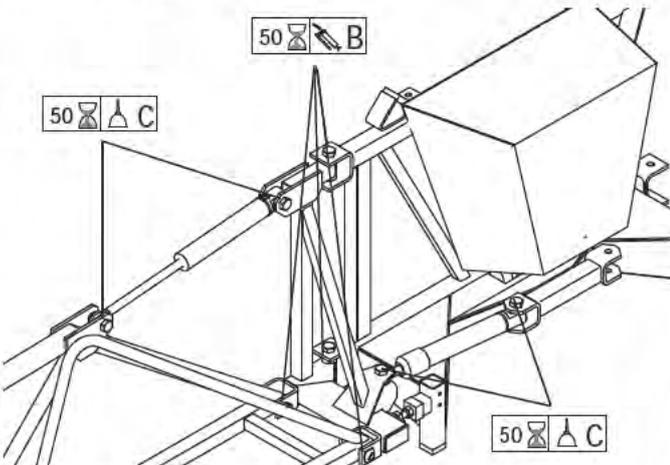
7. Boom center section (GVA)

T062-0021

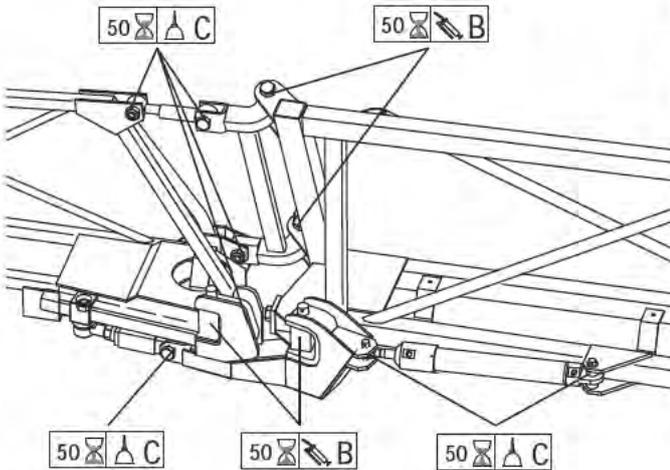


Boom break-away section (GVA)

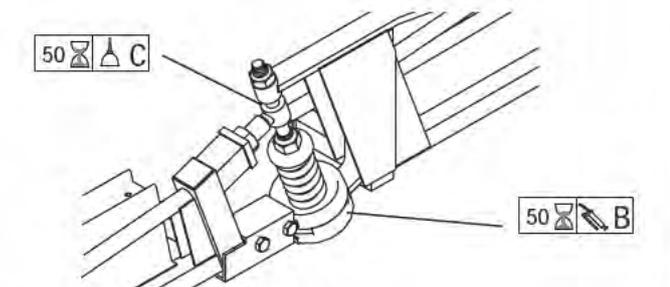
T082-0012



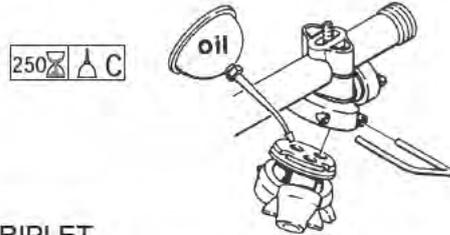
OLH boom centre section



OLH boom outer section (GVA)



OLH boom break-away section



TRIPLET

**Tyre pressure**

Check the tyre pressure which should be in accordance with the below table:

	2000 l	2500 l
KLEBER 11.2R32****	4.0 bar	4.0 bar
KLEBER 14.9R24*	1.6 bar	2.4 bar
KLEBER 16.9R24**	1.6 bar	2.4 bar
MICHELIN 540/54R24	1.3 bar	1.3 bar
GOOD YEAR 480x25.00-20 super TERRA GRIP	1.4 bar	1.4 bar

**100 hours service**

**Cooler radiators**

Please follow instructions given in the engine instruction book attached to this manual.

**Air conditioning condenser**

Check / Clean the air condition condenser for dust. Use compressed air or rinse with water. Be careful not to damage the fins when cleaning.

**Battery terminals**

Clean the battery terminals. Check the connectors to be tightened on terminals and on the starter motor. Apply acid free grease to the terminals.

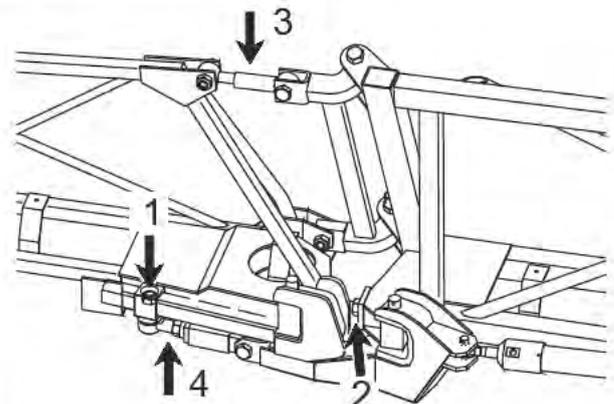
**250 hours service**

**Adjustment of outer section folding (OLH)**

Fold the outer sections completely and remove bolt 1 of the ball joint rod.

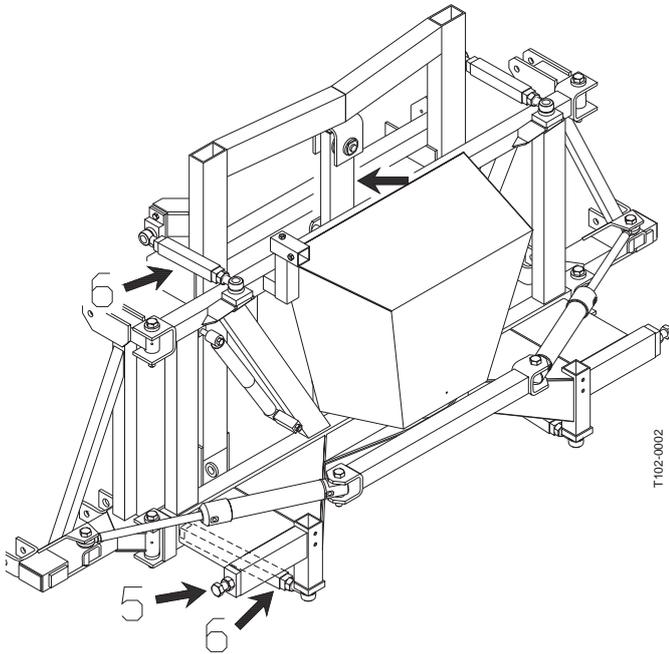
Adjust inner/outer section alignment at adjustment screws 2 and 3.

Adjust length of ball joint rod 4, until bolt 1 fits - assemble the locking device again.



**Adjustment of inner section folding (OLH)**

Boom must be unfolded to working position. Adjust inner section/centre section alignment at adjustment screw 5.



**Adjustment of pendulum suspension (OLH)**

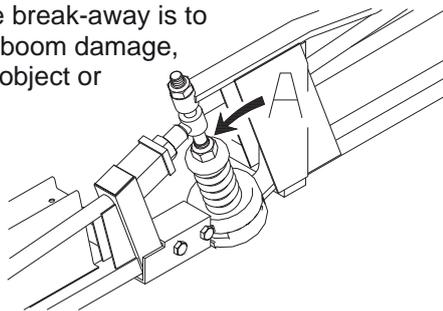
Boom must be unfolded to working position. The boom must be adjusted so the pendulum rod is vertical. Ensure that the stabilizer rods 6, 2 by 2 are of same length.

**WARNING!** Do not detach all stabilizer rods at the same time. The boom can fall out of the suspension and cause severe personal injury.

**Break-away (OLH)**

The function of the break-away is to prevent or reduce boom damage, should it strike an object or the ground.

Adjust on screw **A** until the break-away will release by a force of 80 N at the extremity. The clutch must be well greased before adjustment is taking place.



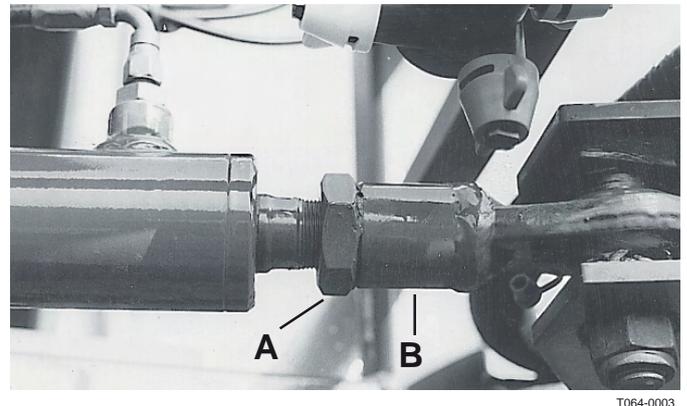
**IMPORTANT:** Check all counter nuts are tight after adjustment.

**Transport bracket (OLH)**

The left hand-side transport bracket position can be adjusted by removing the bolts. Be aware of legislation regarding overall width during road transport.

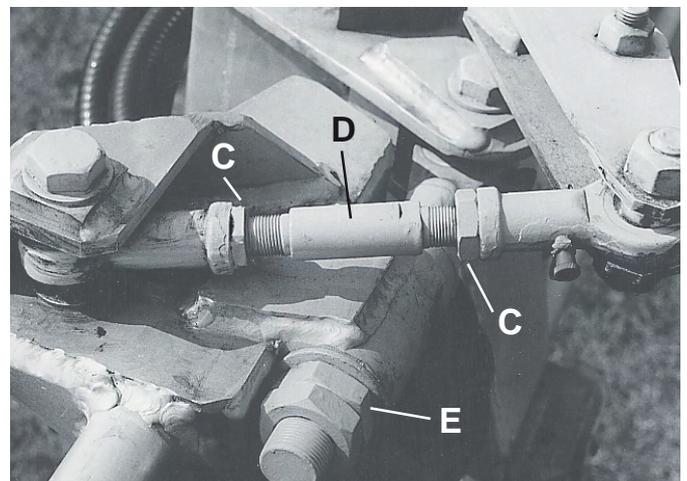
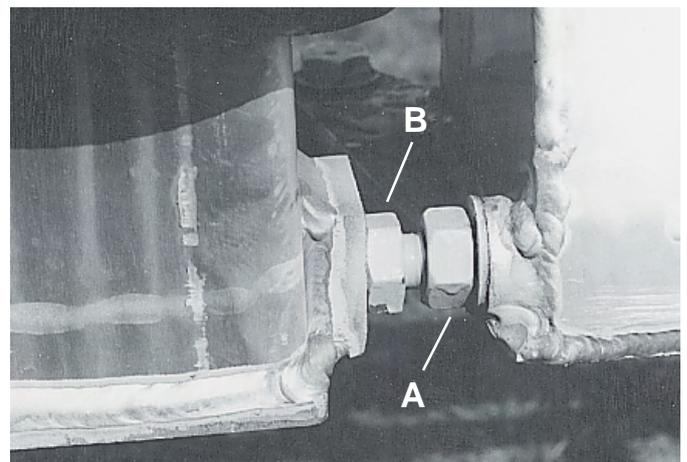
**Inner section alignment (GVA)**

1. Loosen the counter nut **A** and adjust the eye **B** until the boom is aligned with the centre section.



**Inner / outer sections alignment (GVA)**

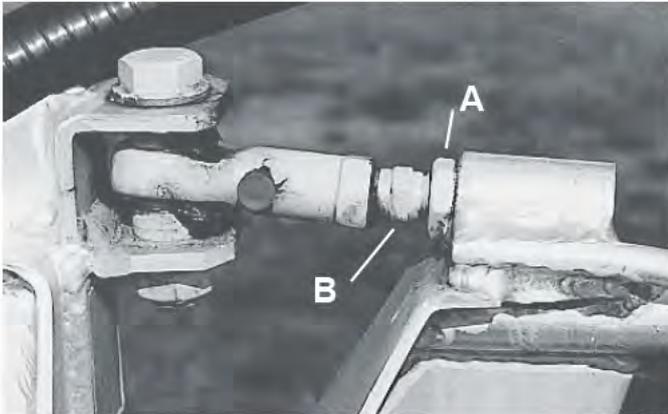
1. Loosen the counter nut **A** and screw in the stop bolt **B**.
2. Unfold the boom completely.
3. Forward/backward adjustment: loosen counter nuts **C** and turn the rigging screw **D** until the inner and outer sections are aligned.
4. Up / down adjustment: Adjust the length on nut **E**.



**Break-away section (GVA)**

Alignment:

1. Loosen the counter nuts **A** and adjust the break-away alignment on screw **B**.

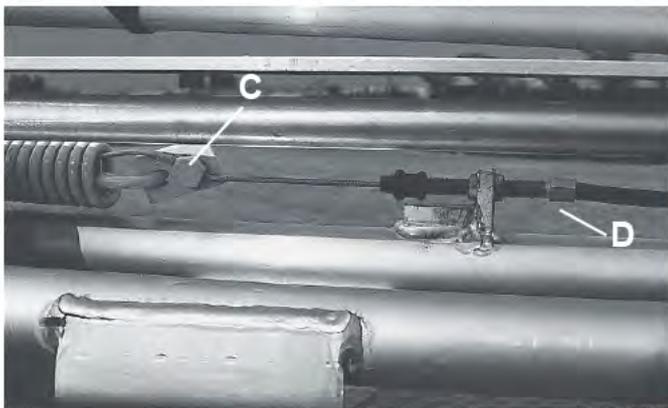


T082-0012

Release resistance:

Check the function of the break-away section and adjust if necessary.

1. Adjust the cable length on the clamp **C**.
2. To fine adjust the release force, adjust on the screw **D**.

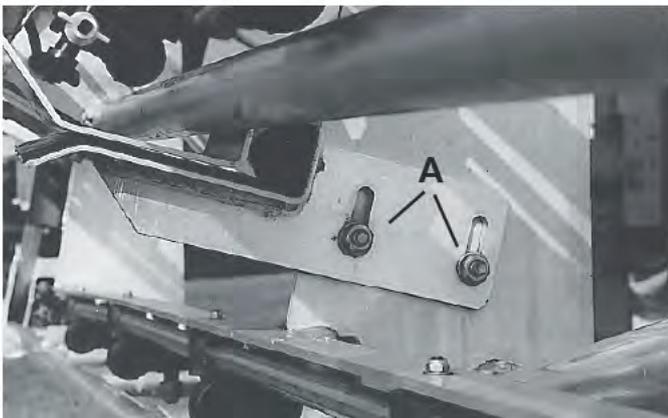


T084-0013

**Outer section transport rest (GVA)**

Fold in the outer sections completely.

1. Loosen the bolts **A**.
2. Adjust the bracket supports on the outer section. Tighten the bolts again.

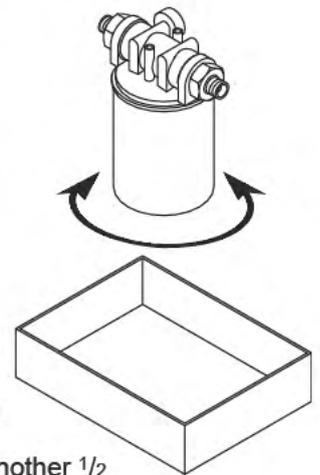


T084-0008

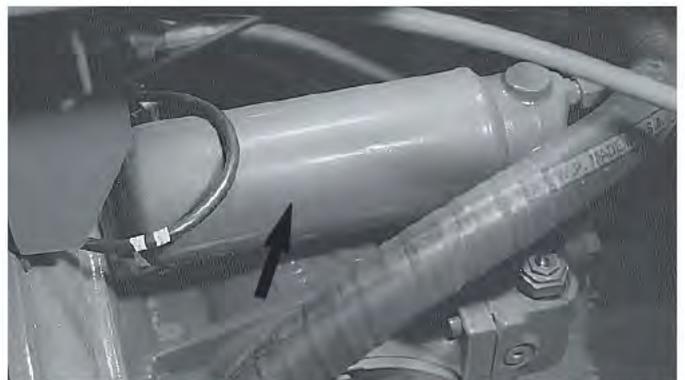
**Hydraulic filters**

Procedure for changing hydraulic filters:

1. Clean the area around the filters thoroughly.
2. Place a tray under the filter to retain waste oil and unscrew the filter cartridge CCW.
3. Apply a thin oil film to the cartridge seal. If possible fill up the filter with fresh clean hydraulic oil.
4. Screw the filter cartridge on CW until the seal is lying against the flange.
5. Tighten the filter cartridge another 1/2 to 3/4 turn by hand.
6. Check hydraulic oil level - top up with fresh, clean hydraulic oil if necessary.
7. Disposal of used hydraulic filters must take place according to local legislation.



T088-0005



T088-0006

**IMPORTANT!** Use only original filter cartridges!

Suction filters: Part No.: 786769

Boost pump filter: Part No. CA75AA8002

**Cab carbon filters**

The chemicals will cause the carbon filters losing their efficiency. The renewal interval can vary depending on which chemicals are used. If chemicals are smelled through the cab ventilation systems the cab filter must be changed instantly.

1. Remove the 4 screws in the cover located under the cab ceiling for access to the cab filter.
2. Remove the 2 retaining screws and renew the filter panel.
3. Fit the cover again.



T068-0007



T068-0033

**500 hours service**

**Engine oil and filter**

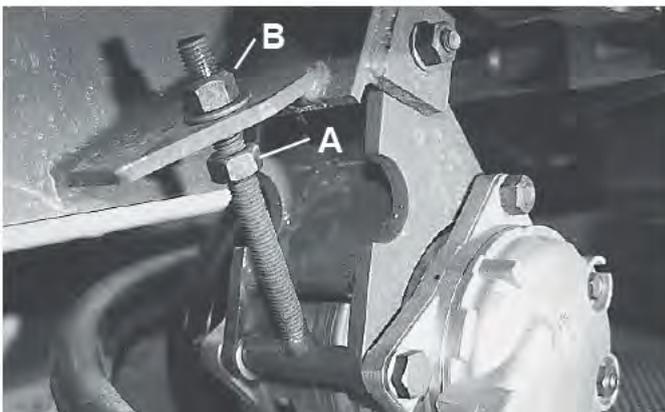
Please follow instructions given in the engine instruction book attached to this manual.

**Engine V-belts**

Please follow instructions given in the engine instruction book attached to this manual.

**Air conditioning V-belts**

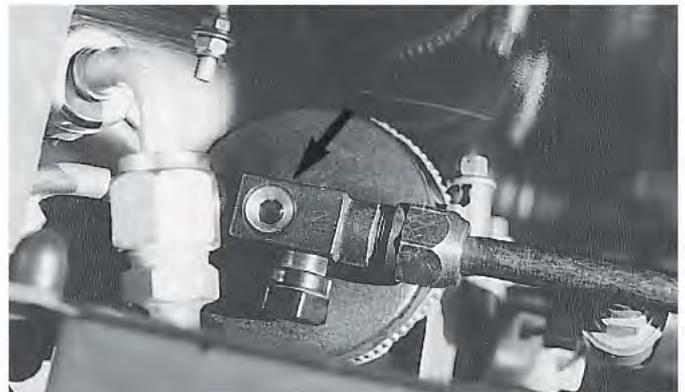
1. Loosen the counter nut **A** and adjust the belt tension on nut **B**.
2. Belt tension must be 400 N for new belts and 250 after 15 min. operation.



T064-0009

**Air conditioning refrigerant level**

1. Start the engine, switch on the air conditioning and adjust to maximum cooling.
2. Air bubbles must disappear within app. 10 sec. from the sight glass on top of the dehydrator, and cooling must be evident.
3. If the air bubbles continue, the refrigerant level is too low. Have the air conditioning unit inspected for leaks and refilled by a specialist as soon as possible.



T068-0008



**WARNING!** Do not dismantle any part of the AC circuit. The circuit contains refrigerant R134A under pressure. Escaping refrigerant will cause severe injury (frostbite) if coming in contact with skin. First aid will be as for frostbite. Warm the area with warm water (30-40°C) and cover loosely with a bandage to protect against infection. Seek medical advice immediately after.

If the eyes have been in contact with refrigerant the eyes must be flushed immediately with clean cold water for at least 5 min. Seek medical advice immediately after.

**Boom suspension damper (GVA boom only)**

Check the nitrogen pressure in the accumulators.

Boom width, m	Nitrogen damper pressure, bar	
	Suspension ram	Individual tilt rams
24	25	45
28	30	60



**WARNING!** If the nitrogen pressures are incorrect, call your HARDI dealer for adjustment. Adjustment requires special equipment to pressurize and depressurize the units.



**WARNING!** Never dismantle the nitrogen dampers. They must always be emptied for nitrogen prior to any dismantling.



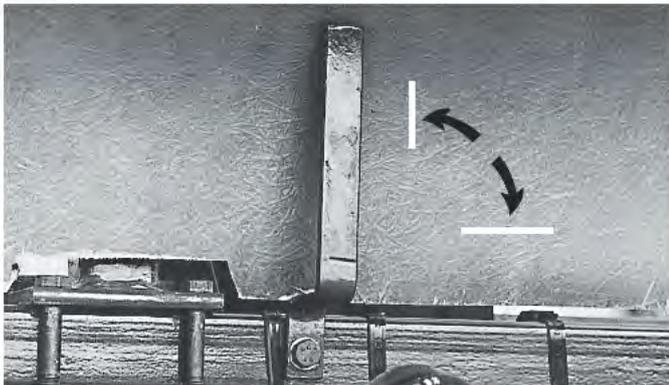
T068-0009

When the damper nitrogen pressure is correct the distance **L** must be 40-50 mm. To adjust the distance:

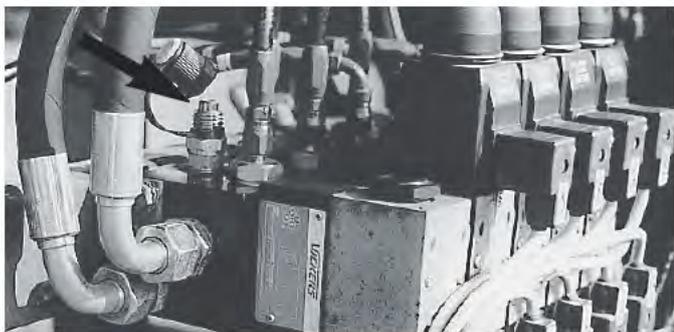
1. Open the valve cover and secure with the bracket.
2. Connect a test hose to the mini-mesh connectors on the ram and the hydraulic distribution block.
3. Activate the hydraulic function "Inner section unfold" until **L** = 40-50 mm with the boom unfolded.
4. To fine adjust loosen the minimesh coupler carefully at the distribution block to let off a small amount of oil.



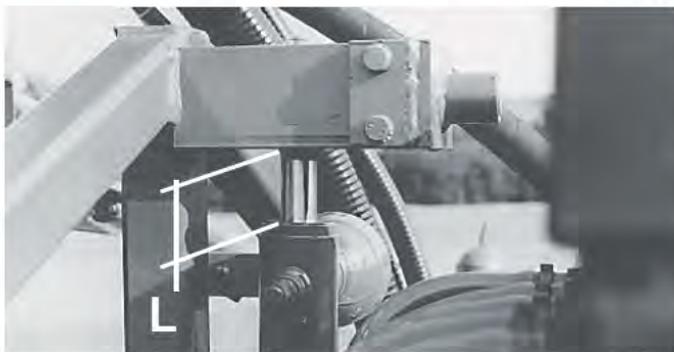
T060-0035



T060-0024



T064-0010



T064-0011

**Engine mountings**

Retighten engine mountings (if necessary) according to the instructions in the engine manual.

**Coolant concentration**

Check the coolant additive concentration according to instructions in the engine manual.

**1000 hours service (or annual)**

**Fuel tank**

The fuel tank is drained for condense and sludge. This must be done when the fuel level is as low as possible, and when the machine has been stopped for some hours to allow the condense and sludge to sediment (for example over night).

1. Clean the area around the fuel tank drain plug and place a container under the fuel tank.
2. Remove the drain plug and allow contaminated fuel, sludge and condense to drain.
3. When clean fuel is streaming out, fit the drain plug again.



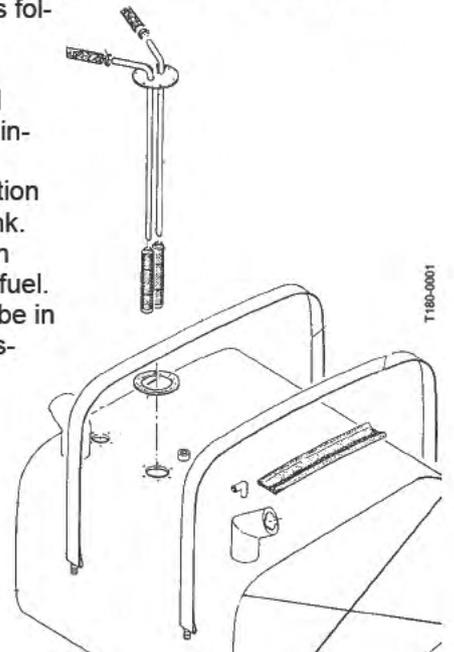
T068-0011

Disposal of waste fuel must take place according to local legislation.

**Fuel suction tube strainer**

The fuel suction strainer inside the fuel tank must be checked/cleaned as follows:

1. Unscrew the fuel suction tube retaining screws.
2. Remove the suction tube from the tank.
3. Clean the suction strainer in clean fuel.
4. Fit the suction tube in the tank again using a new gas-ket.
5. Check the fuel hose and clamp for proper attachment.

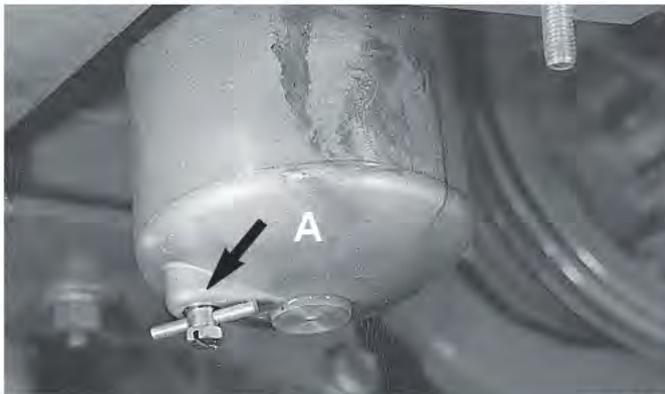


T160-0001

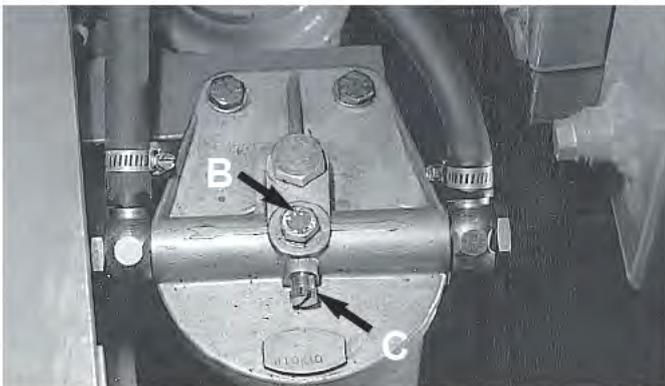
**Fuel prefilter**

The fuel filter must be dismantled and cleaned the following way:

1. Open the drain screw **A** and drain the filter bowl. Retain fuel in an appropriate container.
2. Unscrew the filter bowl retaining screw **B** and dismantle the filter assembly.
3. Clean the filter element and bowl in clean fuel.
4. Reassemble the filter unit again, and close the drain screw.
5. Open the bleed screw **C**.
6. If the fuel level is too low to flow to the prefilter, unscrew the fuel tank cap and press the fuel towards the prefilter using compressed air in the fuel tank.
7. When fuel free from air bubbles is streaming, close the bleed screw. Fit the fuel tank cap again and wipe up spilled fuel.
8. Start the engine and check the fuel lines for leaks.



T068-0013



T068-0014

**Fuel filter**

Please follow instructions given in the engine instruction book attached to this manual.

**Hydraulic oil reservoir**

The hydraulic oil must be changed when the machine is at working temperature (has been working for at least one hour) and is placed on level ground. Change the hydraulic oil as follows:

1. Clean the area around the drain plug and filling cap.
2. Place a container under the hydraulic reservoir.
3. Unscrew the drain plug and drain the hydraulic oil.
4. Wipe possible metal particles off the drain plug magnet with a clean cloth.
5. When the oil is drained, fit the drain plug again using a new copper seal (Part No. JO10AC5459).
6. Turn the key switch to pos. 1 to check function of the hydraulic oil level alarm lamp and horn.
7. Fill the reservoir to correct level with fresh, clean hydraulic oil.

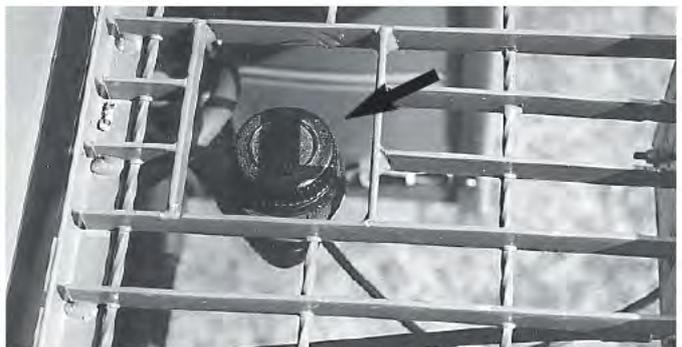
**IMPORTANT!** The hydraulic oil purity is of vital importance to the transmission components. It is recommended to fill hydraulic oil through a filter unit to guarantee the purity. Filter rating: 10 micron absolute or better.

8. Fit the cap again.
9. Start the engine. Check oil level again after 10 minutes.

Disposal of used hydraulic oil must take place according to local legislation.



T068-0015



T060-0023

**Engine glow plugs**

Check/change the engine pre-heating glow plugs.

**Air intake**

Check the hoses and clamps on the engine air intake.

**Shock absorbers (wheel suspension)**

Check the shock absorbers function. Renew if worn. Always renew absorbers in pairs.

**1500 hours service**

**Valve clearance**

Check/adjust valve clearance according to instructions in the engine manual.

**2000 hours service (or every 2 years)**

**Coolant**

Change the engine coolant fluid according to instructions in the engine manual.

**NOTE!** Set the cab heating on max. heating when draining, flushing and filling the coolant.

Always change every 2000 hours or every 2 years - whichever comes first.

**General maintenance with flexible intervals**

The intervals between following maintenance will vary depending on the conditions under which the machine is operated.

**Charge of battery**

To obtain a long life of the battery and ensure that the sprayer always is ready for use, the battery should be recharged regularly. Charge the battery every 2nd month during winter storage, and every 3rd month during season.



**WARNING!** Before, during and after the charge process, highly flammable and explosive hydrogen gases can be generated. If these gases are lighted, the battery can explode and cause severe personal injury by the explosion and battery acid! Follow instructions closely.

Safety precautions:

1. Service and maintenance jobs at batteries must always be carried out at good, ventilated areas, to prevent concentration of explosive gases.
2. Always wear rubber gloves and goggles when working with batteries.
3. Do not smoke or use open fire nearby batteries. Avoid sparks by short-cuts or when connecting/disconnecting battery terminals.
4. In case of getting battery acid in contact with eyes and skin, rinse immediately with clean water. Seek medical advice, if necessary.
5. Do not charge defective or frozen batteries.
6. Read instruction for battery charger before connecting it to the battery.

Connecting of charger:

1. Stop engine and switch off battery isolator switch.
2. Clean battery and loosen cell caps to allow gases to evaporate. (Not maintenance free batteries).
3. Check electrolyte level. Fill with demineralized water till level reaches 10 mm above cells, if levels are low.
4. Connect battery charger terminal clips to battery terminals - **Note!** Battery charger must be switched off and disconnected from power socket. Make sure that + terminal is for +, and - terminal is for -. Positive is often red and negative is often black.

5. Check that battery charger is set for 12 V DC. Connect to power socket and switch on charger.
6. Do not overcharge maintenance free batteries. Charge with few Amps and stop when battery is fully charged.

Disconnecting of charger.

1. Switch off charger at power source and disconnect plug.
2. Ventilate around the battery to make possible gases disappear, and fit cell caps.
3. Disconnect charger terminal clips from battery terminals.

**Repair of polyester tank**

Minor damages on the main tank can be repaired with polyester tissue and a special glue. Contact your HARDI dealer.

**Repair of aluminium boom**

Welding on aluminium is a specialist job and requires special welding equipment. Contact your dealer.

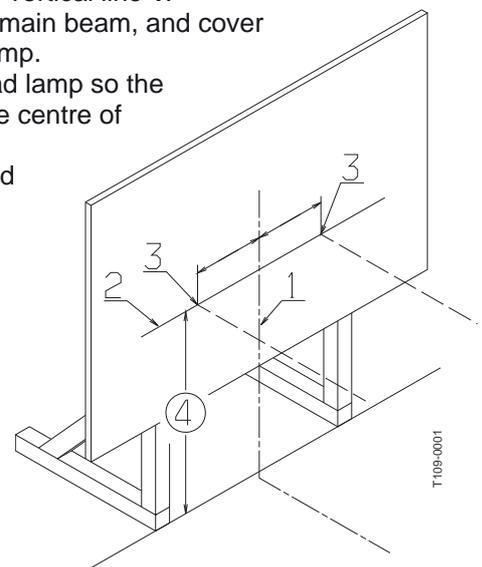
**Chassis**

The chassis is made of High Tensile Steel. Never weld on the frame. Use only bolts or rivets if fitting additional equipment. If any doubt contact your HARDI dealer.

**Adjustment of head lamps**

Adjust the head lamps the following way:

1. Position the sprayer facing a wall or screen with a distance between wall and head lamps of 2 metres.
2. Mark a point on the wall or screen by sighting down the hood centre line.
3. Draw a vertical line 1 through the point.
4. Measure the head lamp height, and draw a horizontal line 2 through the vertical line 1 at head lamp height 4.
5. Measure the distance between centre of RH and LH head lamp. Mark two points 3 on the horizontal line with head lamp distance, placed with equal distance from the vertical line 1.
6. Switch on the main beam, and cover off LH head lamp.
7. Adjust RH head lamp so the point 3 is in the centre of the beam.
8. Cover RH head lamp and repeat point 7 on LH head lamp.



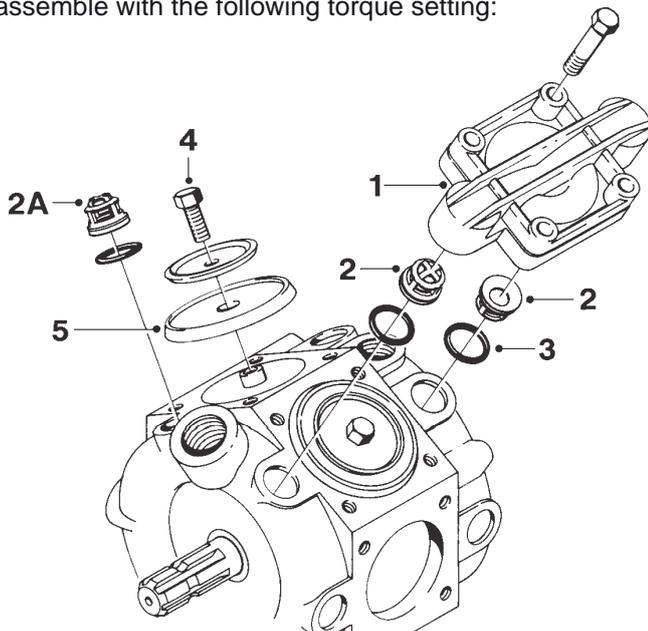
T109-0001

**Pump valves and diaphragms renewal**  
**Valves**

Remove valve cover 1. Before changing the valves 2, note their orientation so they are replaced correctly. NOTE: One special valve with white flap 2A is used. It has to be placed in the valve opening shown. It is recommended to use new gaskets 3 when changing or checking the valves.

**Diaphragms**

Remove the diaphragm cover 4. The diaphragm 5 may then be changed. If fluids have reached the crankcase, re-grease the pump thoroughly. Check also that the drain hole at the bottom of the pump is not blocked. Re-assemble with the following torque setting:



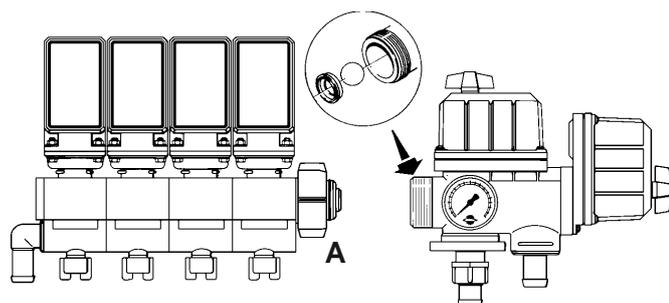
Pump Model	Diaphragm / valve cover Nm	Diaphragm bolt Nm
462	90	80

1 Nm = 0.74 lbft

**Ball seat check/renewal, EC on/off valve**

If the main ON/OFF valve does not seal properly (dripping nozzles when main ON/OFF valve is closed), the ball and seat should be checked.

Remove the 2 bolts fixing the main ON/OFF pressure valve unit to the bracket, unscrew the union nut A and pull the valve away from the distribution valves.

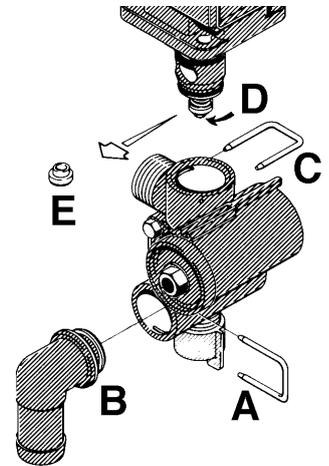


Check the ball for sharp edges and scratches and check the ball seat for cracks and wear - replace if necessary.

**Cone check/renewal, EC distribution valve**

Periodically check the distribution valves for proper sealing. Do this by running the sprayer with clean water and open ON/OFF valve and all distribution valves.

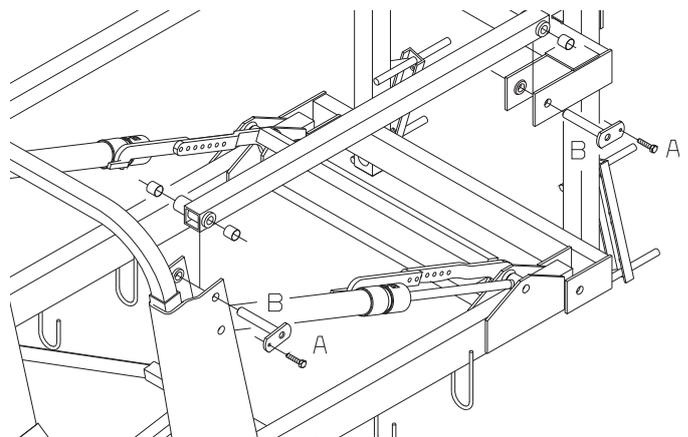
Cautiously remove the clip A and pull out the hose B for the pressure equalization device. When the housing is drained, there should be no liquid flow through the pressure equalization device. If there is any leakage, the valve cone E must be changed.



Remove the clip C and lift the EC-motor housing off the valve housing. Then unscrew the screw D and replace the valve cone E. Re-assemble in opposite sequence.

**Wear bush renewal, boom lift**

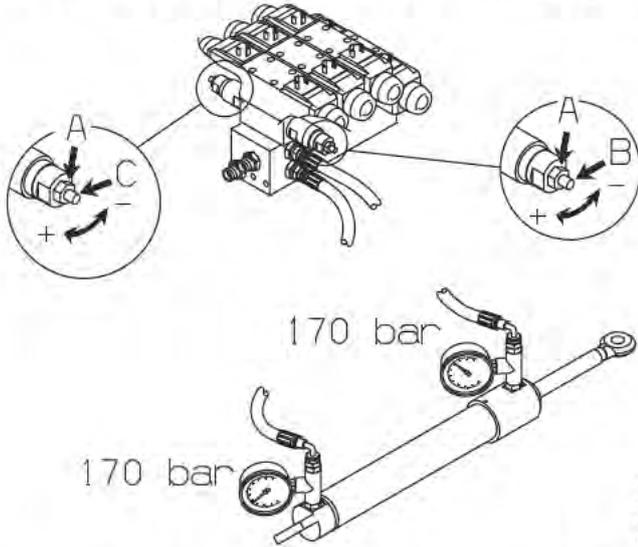
The wear bushes are inspected and renewed before they are worn through.



1. Unfold the booms to working position.
2. Lift the boom centre frame with a lifting device and support it until the load is taken off the parallelogram arms.
3. Remove the screws A, pull out the pins B at one of the upper parallelogram arms, and renew the wear bushes.
4. Refit the arm.
5. Repeat this on the other upper arm.
6. The lower arms must be disconnected simultaneously.
7. Grease all grease nipples.
8. Remove the lifting gear again.

**Pressure relief valve adjustment (OLH only)**

The pressure relief valve for the outer section folding rams must be checked/readjusted the following way.



1. Fit two 250 bar pressure gauges at the outer section folding ram.
2. Loosen the counter nuts **A** and adjust the Allen screws **B** and **C** fully out CCW.
3. When the outer section is fully unfolded, the Allen screw is turned CW until a pressure of 170 bar is reached. Retighten the counter nut.
4. Unfold fully again and check pressure again. Readjust if necessary.
5. Fold the outer sections fully in, and adjust the Allen screw **C** in CW until the folding pressure of 170 bar is reached. Retighten the counter nut.
6. Fold the outer sections fully and check the pressure again. Readjust if necessary.
7. Remove the pressure gauges again and tighten the hydraulic hose fittings. Check for leaks.

**Shock absorbers (boom)**

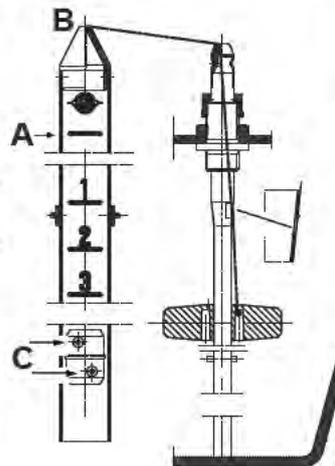
If the shock absorbers loose their efficiency or start leaking oil, they need replacement.

**Level indicator adjustment**

The level indicator reading should be checked regularly.

When the tank is empty the float should lie on the stop pin of the rod, and the O-ring on the indicator should be positioned at the top position line **A**.

If any deviation is found, pull out the plug **B**, loosen screws **C**, and adjust the length of the cord.



**Cord renewal, level indicator**

If the cord of the level indicator has to be changed, the float guide pole is removed:

1. Remove the tank drain valve (see section "Main tank drain valve") and loosen the fitting holding the pole in position.
2. Pull down the pole through the drain valve hole till it is free in the top of the tank.
3. The pole can now be taken out of the tank through the filling hole.



**WARNING!** Do not attempt to enter the tank - the float pole can be removed from outside the tank!

**Seal renewal, drain valve**

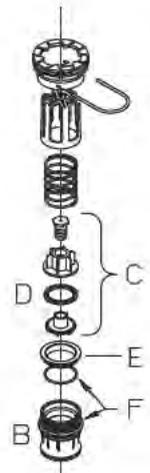
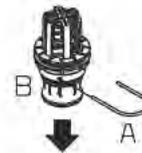
If the main tank drain valve leaks, the seal and seat can be changed the following way.

NOTE! Do not enter the inside of the tank - the parts can be changed from underneath the tank!



**WARNING!** Use eye/face protection mask when dismantling the tank drain valve!

1. Make sure the tank is empty and clean.
2. The valve must be closed and the string loose.
3. Pull out the clip **A** and pull down connecting piece **B**. The entire valve assembly can now be pulled out.
4. Check cord and valve flap assembly **C** for wear, replace seal **D** and assemble again.
5. Assemble the valve assembly again using a new valve seat **E**. Lubricate O-rings **F** before assembly.
6. Fit clip **A** again.

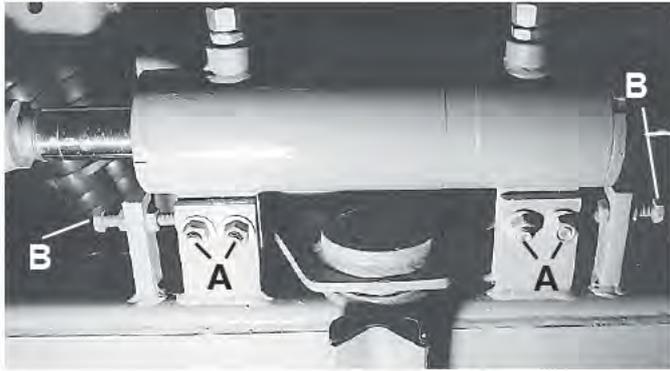


NOTE! Check function of valve with clean water before filling chemicals into the tank!

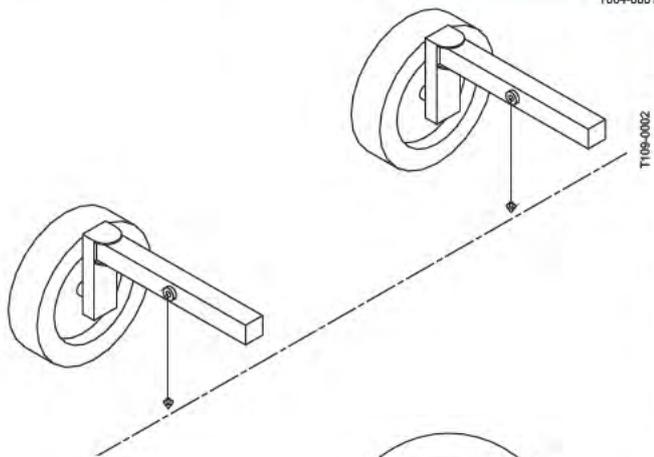
**Adjustment of steering gear**

Centre adjustment:

1. Place the machine on level surface.
2. Turn the steering wheel until the steering ram is dead centre.
3. Loosen the 4 screws **A** and adjust the screws **B** until the steering ram barrel is centred to the front axle centre pin. Tighten the screws again.
4. Mark a point vertically down on the floor under the rear axle and front axle centre using plumb bob.
5. Draw a straight line through the two points. The machine centre line has now been found and projected to the ground.
6. Measure half wheel height **A** front and back, and mark with a piece of chalk.

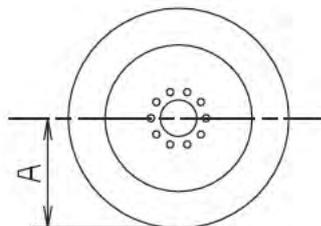


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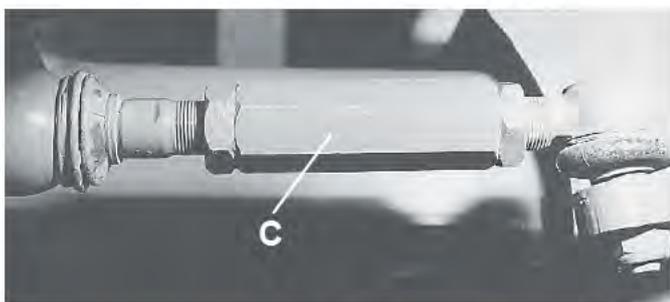


T109-0002

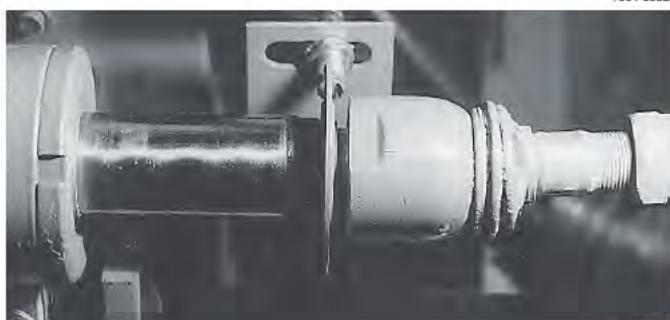
Half wheel height



7. The distance between the wheels front and rear should be equal on both axes.
8. Adjust length of connecting rods C at the steering ram if necessary to obtain correct steering .



T064-0002

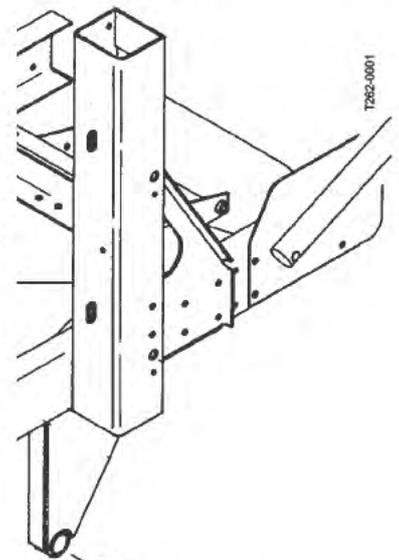


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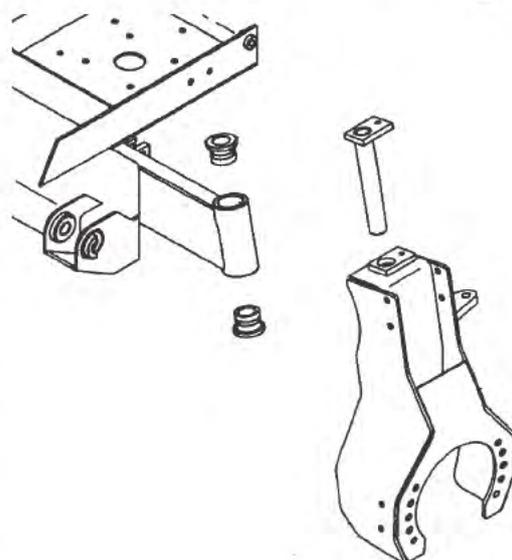
9. The half distance, front and back, between the wheels should be on the machine longitudinal centre line. Adjust equally on both the connecting rods until the wheels are aligned with the central line, and have correct toe-in.
10. Adjust the alignment sensors to be exactly over the discs and with a distance of 3 mm for front sensor and 1 mm for rear sensor.

**Wheel suspension wear bushes**

1. Remove the limitation cables from the wheel suspension.
2. Support and secure the wheel axle assembly with jacks and axle stands.
3. Remove the load on the wheel suspension with hydraulic jacks and support the chassis with axle stands.
4. Remove the suspension pins securing bolts.
5. Press out the pins.
6. Lift the chassis free of the wheel suspension and secure with the axle stands.
7. Press out the worn bushes and replace with new.
8. Lower the chassis back in position with the suspension. Ensure the spring to seat correctly again.
9. Fit the pins and securing screws.
10. Grease the pins.
11. Lower the chassis completely and check the suspension for correct assembly.
12. Fit the limitation cables again.



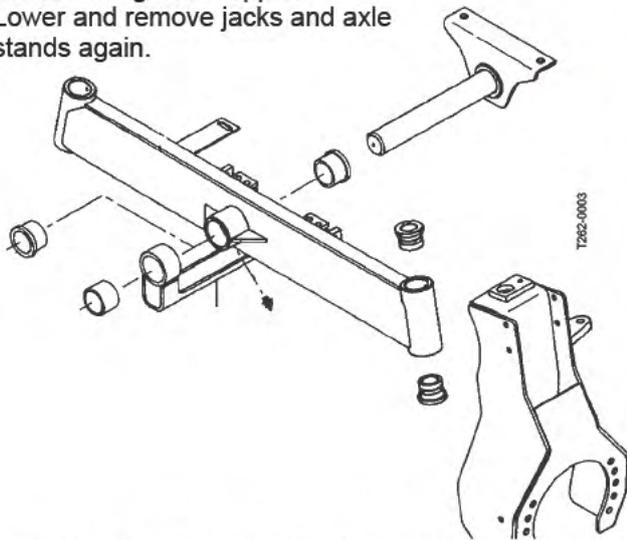
T262-0001



T262-0002

**Steering axle wear bushes**

- A. Lift and support the chassis and front axle independently.
- B. Remove the securing screws and push out the pins.
- C. Renew worn bushes.
- D. Assemble in reverse order.
- E. Grease the grease nipples.
- F. Lower and remove jacks and axle stands again.



**Electrical system maintenance**

**Speed sensor, HARDI PILOT**

It is important that the distance between the speed sensor is correct:

- Adjust the sensor to be 2.5 mm ± 0.5 mm.
- Turn the wheel one turn in order to ensure, that the distance is within the tolerances on the full circumference.

**Head lamp bulb**

Head lamp bulb renewal:

1. Remove the wire socket from the bulb terminals
  2. Remove the rubber boot from the bulb
  3. Twist the bulb retaining ring CCW and remove it
  4. Remove the bulb
  5. Fit new bulb and assemble in reverse order
- Bulb type: H4 12V 60/55W

**IMPORTANT!** Do not touch the bulb glass. Hold on the base only.



**Rear lamp and direction indicator bulb**

Unscrew the two screws and remove the lens

1. Press and twist the bulb
2. Remove the bulb

Bulb types: Rear lamp: R5W (12V/5W)  
 Direction indicator: P21W (12V/21W)



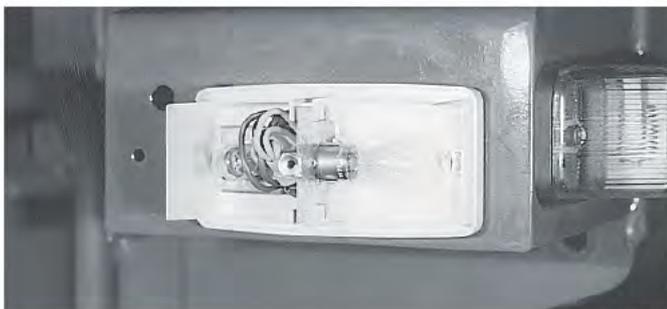
**Front position lamp and direction indicator bulb**

1. Unscrew the screw and remove the lens
2. Remove and renew the bulb

Bulb types : Position lamp: R5W (12V/5W)  
 : Direction indicator: P21W (12V/21W)



T068-0018



T068-0034

**Side direction indicator bulb**

1. Remove the 2 Allen screws
  2. Remove the lens
  3. Press down, twist and remove the bulb
  4. Renew the bulb and assemble in reverse order
- Bulb type: P21W (12V/21W)

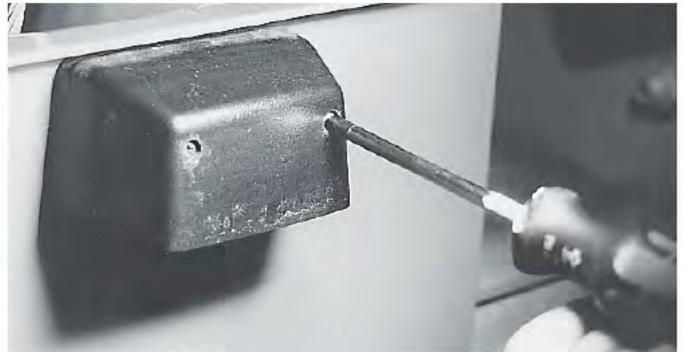
**NOTE!** Lens must be positioned correctly. Arrow indicates driving direction.



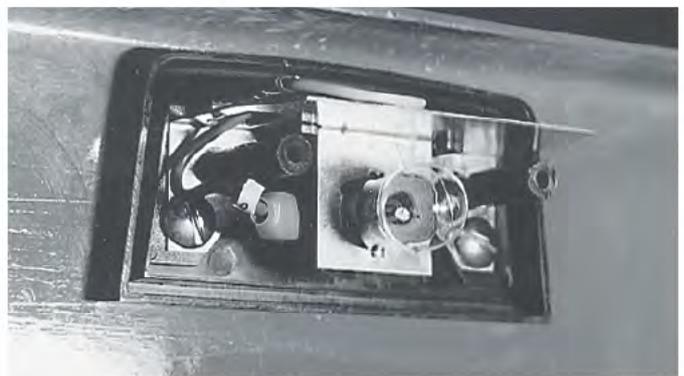
T068-0019

**Number plate lamp bulb**

1. Unscrew the two screws and remove the housing / lens
  2. Press and twist the bulb
  3. Remove the bulb
- Bulb type: R10W (12V/10 W)



T068-0020



T068-0025

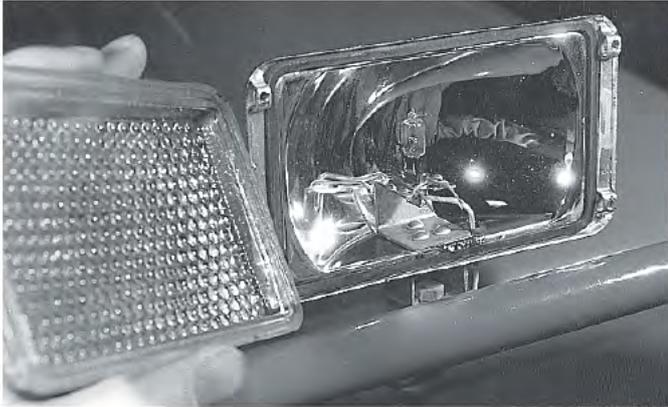
**Working lamp bulb**

1. Unscrew the 4 screws
  2. Remove the protection grid
  3. Remove carefully the lens - mind the seal
  4. Press the bulb retaining clamps and lift
  5. Disconnect the bulb wire and remove the bulb
  6. Fit new bulb and assemble in reverse order
- Bulb type: H3 12V/55W

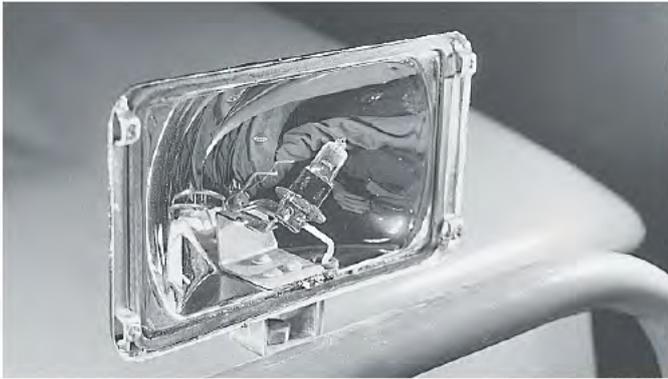
**IMPORTANT!** Do not touch the bulb glass. Hold on the base only.



T068-0035



T068-0036



T068-0021

**Rotating warning beacon bulb renewal**

1. Remove the warning beacon from the bracket
  2. Remove the amber lens by carefully prising it out of the rubber housing
  3. Prise the bulb retaining buckle downwards
  4. Pull up the bulb and disconnect the wire.
  5. Install the new bulb
  6. Assemble in reverse order
- Bulb type: H1 12V/55W

**IMPORTANT!** Do not touch the bulb glass. Hold on the bulb base only.



T068-0037



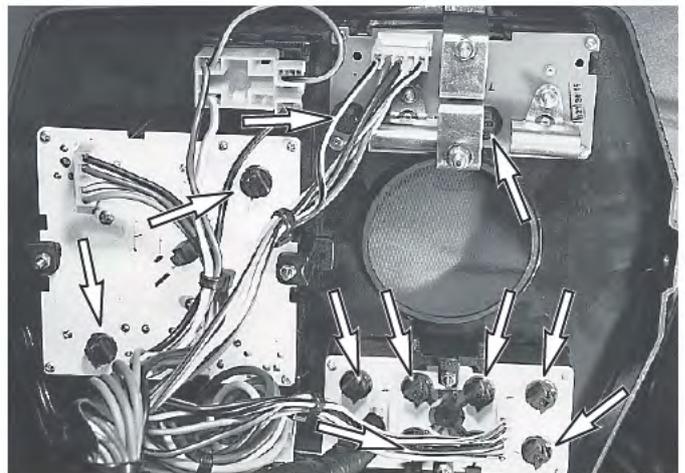
T068-0034



T068-0039

**Instrument cluster lamp bulbs**

1. Remove the 4 panel retaining screws
  2. Adjust the steering wheel to highest position
  3. Pull up the instrument panel
  4. Twist and remove the bulb and socket
  5. The switch control lamp bulb is pulled out of the switch
  6. Pull out the bulb from the socket and renew it
- Bulb type: W5/1.2 (12V/1.2W)



T068-0022

**Interior lamp bulb**

1. Press carefully on top centre of the lens and remove it
  2. Remove and renew the bulb
- Bulb type: C5W (12V/5W)



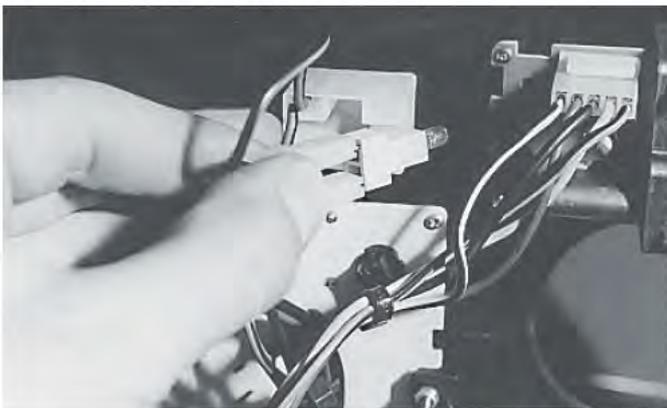
T068-0023



T068-0028

**Dashboard control lamp bulbs**

1. Open the cab service door on RH side of the cab
  2. Pull the bulb socket out of the lamp
  3. Pull the bulb out from the socket and renew it
  4. Push the bulb socket in to the lamp again.
- Bulb type: W3W (12V/3W)



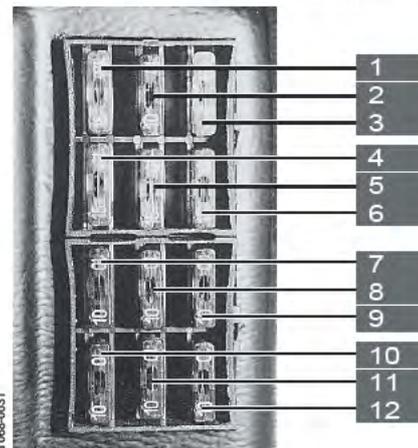
T068-0029

**Fuses**

Fuses in the electrical circuits are located several places:

**Fuse box, Steering console**

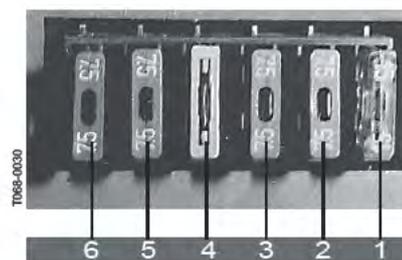
Fuse No.	Rating, Amp	Colour	Circuit
1	15	Blue	Hazard warning device
2			Not used
3	25	White	Control panel power supply Electric engine stop device
4	15	Blue	Horn
5	15	Blue	Direction indicators
6			Not used
7	10	Red	LH position lamps
8	10	Red	LH main lamp, dipped beam
9			Not used
10	10	Red	RH position lamps
11	10	Red	RH main lamp, dipped beam
12	10	Red	Head lamps, main beam



T068-0031

**Fuse box, dashboard**

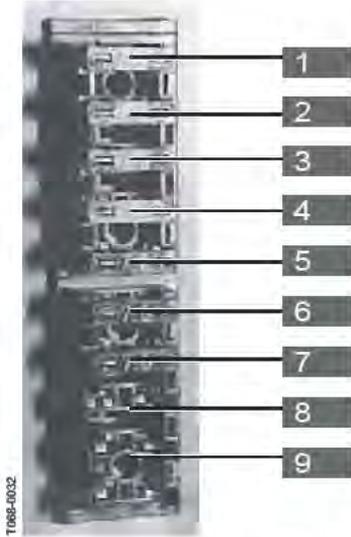
Fuse No.	Rating, Amp	Colour	Circuit
1	15	Blue	Windscreen washer Working lamps
2	7.5	Brown	Amber rotating warning beacon
3	7.5	Brown	Cab interior lamp
4	10	Red	Fan
5	7.5 Amp	Brown	Windscreen wiper
6			Not used



T068-0030

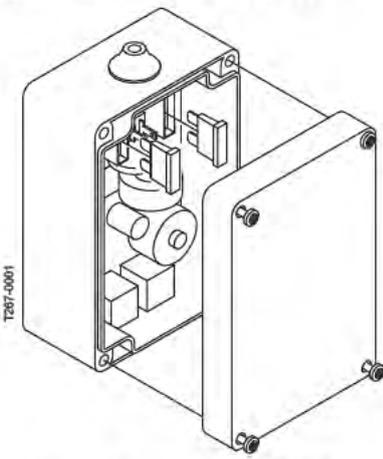
**Fuse box, dashboard**

Fuse No.	Rating, Amp	Colour	Circuit
1	7.5	Brown	Engine pre-heating device
2	7.5	Brown	Control lamps and buzzer
3	7.5	Brown	Spray pump
4	15	Blue	Boom hydraulics
5	7.5	Brown	4 wheel steering
6	7.5	Brown	Wheel motors high/low modes
7	7.5	Brown	Hydrostatic transmission control Reverse biiper
8	7.5	Brown	SAPE anti spin control
9	7.5	Brown	Aut. slanting control
10			Not used
11			Not used
12			Not used



T068-002

**Fuse, HARDI PILOT 3005 box**

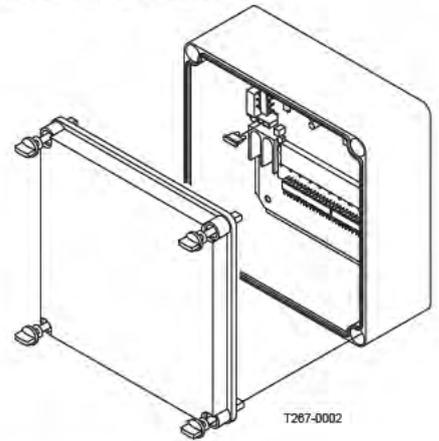


T267-0001

5 Amp, brown transparent. PILOT power supply

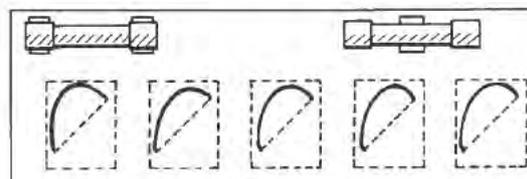
**Fuse, HARDI PILOT 3050 junction box**

25 Amp., white.  
All functions operated via HARDI PILOT.



T267-0002

**Fuse, Electric junction box, D.A.H.**



10 Amp slow blow, protects boom hydraulic functions (OLH).

**Main fuse**

80 Amp.  
All electric functions in cab.



T060-0016

### Tyre safety

Should it be necessary to replace tyres it is recommended to leave this to a specialist and follow the mentioned rules.

- Always clean and inspect the rim before mounting.
- Always check that the rim diameter corresponds exactly to the rim diameter moulded on the tyre.
- Always inspect inside of the tyre for cuts, penetrating objects or other damages. Repairable damages should be repaired before installing the tube. Tyres with unreparable damages must never be used.
- Also inspect inside of the tyre for dirt or foreign bodies and remove them before installing the tube.
- Always use tubes of recommended size and in good condition. When fitting new tyres always fit new tubes.
- Before mounting always lubricate both tyre beads and rim flange with approved lubricating agent or equivalent anti-corrosion lubricant. Never use petroleum based greases and oils as they may cause damage to the tyre. Using the appropriate lubricant the tyre will never slip on the rim.
- Always use specialized tools as recommended by the tyre supplier for mounting the tyres.
- Make sure that the tyre is centred and the beds are perfectly seated on the rim. Otherwise, there may be danger of bed wire tear.
- Inflate the tyre to 100-130 kPa then check whether both beds are seated perfectly on the rim. If any of the beds does not seat correctly, deflate the assembly, and re-centre the beds before starting inflation of the tyre. If the beds are seated correctly on the rim at 100-130 kPa, inflate the tyre to a max. of 250 kPa until they seat perfectly on the rim.
- Never exceed the max. mounting pressure moulded on the tyre!
- After mounting tyres, adjust inflation pressure to operation pressure recommended by the tyre manufacturer.
- Do not use tubes in tubeless tyres.



**WARNING!** Non observance of mounting instructions will lead to bad seating of the tyre on the rim and may make the tyre burst and thereby cause serious injury or death!

Never mount or use damaged tyres or rims!

Use of damaged, ruptured, distorted, welded or brazed rim is not allowed!

### Off-season storage

When the spraying season is over you should devote some extra time to the sprayer.

If chemical residues are left over in the sprayer for longer periods, it can reduce the life of the individual components.

To preserve the sprayer intact and protect the components, carry out the following off-season storage programme:

1. Clean the sprayer thoroughly - inside and outside - as described under "Cleaning of the sprayer". Make sure that all valves, hoses and auxiliary equipment have been cleaned with detergent and flushed with clean water afterwards, so no chemical residues are left in the sprayer.
2. Renew possible damaged seals and repair possible leaks.
3. Empty the sprayer completely and let the pump work for a few minutes. Operate all valves and handles to drain as much water off the spraying circuit as possible. Let the pump run until air is coming out of all nozzles. Remember to drain the rinsing tank also.
4. Pour approx. 100 litre anti-freeze mixture consisting of  $\frac{1}{3}$  automotive anti-freeze and  $\frac{2}{3}$  water into the tank.
5. Engage the pump and operate all valves and functions on the MANIFOLD, operating unit, FILLER etc. allowing the anti-freeze mixture to be distributed around the entire circuit. Open the operating unit main on/off valve and distribution valves so the anti-freeze is sprayed through the nozzles as well. The anti-freeze will also prevent O-rings, seals, diaphragms etc. from drying out.
6. Lubricate all lubricating points according to the lubricating scheme regardless of intervals stated.
7. Change hydraulic oil and hydraulic oil filters as described in section on "Maintenance".
8. When the sprayer is dry, remove rust from possible scratches or damages in the paint and touch up the paint.
9. Remove the glycerine-filled pressure gauges and store them frost free in vertical position. Let anti-freeze mixture fill the hose for the pressure gauge.
10. Apply a thin layer of anti-corrosion oil (e.g. SHELL ENSIS FLUID, CASTROL RUSTILLO or similar) on all metal parts. Avoid oil on rubber parts, hoses, and tyres.
11. Fold the boom in transport position and relieve pressure from all hydraulic functions.
12. Remove the control boxes and the HARDI PILOT control box + display from the cab and store them dry and clean (in-house).
13. Apply grease on all hydraulic ram piston rods which are not fully retracted in the barrel to protect against corrosion.

14. Chock up the wheels to prevent moisture damage and deformation of the tyres. Tyre blacking can be applied to the tyre walls to preserve the rubber.
15. Engine preservation is carried out as described in the engine manual.
16. To protect against dust the sprayer can be covered by a tarpaulin. Ensure ventilation to prevent condensation.

**Preparation after off-season storage**

After a storage period the sprayer should be prepared for the next season the following way:

1. Remove the cover.
2. Remove the support from the wheel axle and adjust the tyre pressure.
3. Wipe off the grease from hydraulic ram piston rods.
4. Fit the pressure gauges again. Seal with Teflon tape.
5. Prepare engine according to instructions in the engine manual.
6. Check all hydraulic and electric functions.
7. Empty the tank for remaining anti-freeze.
8. Rinse the entire liquid circuit on the sprayer with clean water.
9. Fill with clean water and check all functions.

**Emergency operation of the sprayer**

**The boom**

In case of power failure the boom can be operated manually by pressing the individual buttons on the solenoid valves.

Remove the protection box of the solenoid valves at the boom. Lock the by-pass valve. The boom can now be operated by pressing the individual buttons on the solenoid valves.

The problem may be due to a blown fuse.

**EC operating unit**

In case of power failure it is possible to operate all functions of the operating unit manually. First remove the fuse in the junction box. Now manually turn the emergency control knobs.

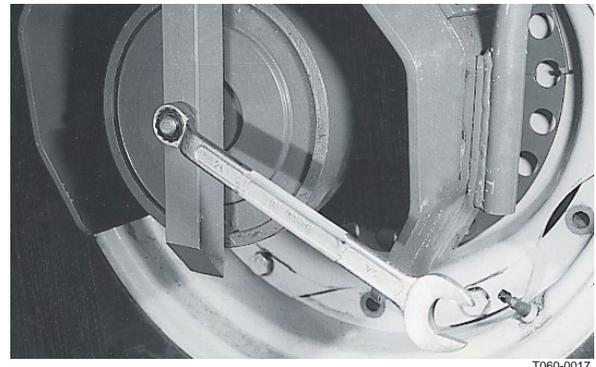
**Towing**

In emergency situations the machine can be towed a short distance. In case of a engine break-down on public road, and the machine must be pulled up on a truck.

 **IMPORTANT!** Never attempt any towing unless the parking brakes in all 4 wheel motors are relieved mechanically and the high pressure relief valves on the hydrostatic pump are relieved! Failure to do so will damage the transmission.

**Hydraulic wheel motors**

1. Remove the protection rubber dust plug
2. Fit the screw
3. Fit the yoke
4. Tighten the nut a few turns in order to relieve the spring pressure. Do this on all 4 motors.



T060-0017

**Hydrostatic pump**

1. Remove the dust plug
2. Loosen the counter nuts **A**
3. Loosen the high pressure valves **B** a few turns CCW with an Allen key

The machine can now be towed.

**IMPORTANT!** Towing must only take place in emergency situations. Max. towing distance is **15-20 m**. Max. towing speed is **5 km/h**. Exceeding these limits can damage the transmission.

When the towing is finished the transmission must be set back to normal again.

1. Loosen the nuts and remove the brake relief yokes, screws and nuts from the wheel motors
2. Fit the dust plug to the wheel motors again
3. Fit two 600 bar pressure gauges to the main pressure measure outlets
4. Activate the parking brake
5. Start the engine set at 2000 r.p.m. and push the pilot lever forward
6. Adjust the high pressure relief valve to 420 bar
7. Set the pilot lever in reverse and adjust the second relief valve to 420 bar
8. Set the pilot lever back to neutral again
9. Release the parking brake and test the transmission function



T060-0018

### Stop wedges (if fitted)

A stop wedge can be fitted at the right hand-side of the sprayer. The wedge is recommended to be used when parking the sprayer at inclining grounds.

The wedges are removed from the brackets by pulling the handle upwards and lift up the wedges.

### Warning signal triangle

A reflecting warning triangle is placed in the cab behind the driver's seat.

In case of breakdown of the machine on public roads, the triangle should be unfolded and placed 100 - 250 m behind the machine to warn, if it is parked inconveniently or dangerously to the traffic.

### Starting aid by jumper cables

Be careful when using jumper cables to start vehicle with flat battery.

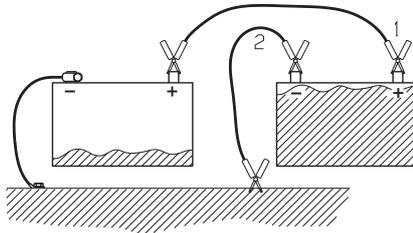
The risks are the same as described in section "Charge of battery" - see this section.



**WARNING:** Use goggles and gloves when working with batteries!

To avoid explosions it is important to connect jumper cables in the following order:

1. Connect first cable (red) to positive terminal at charged battery - then to positive terminal at discharged battery.
2. Connect second cable (black) to negative terminal at charged battery first.
3. Then connect second cable to FRAME (not negative terminal at battery!) at vehicle with discharged battery.



This to avoid sparks near the battery when connecting the last cable to terminal.

## Trouble shooting

### Operational problems, spraying equipment

In case of breakdowns, the same factors always seem to come into play:

- Minor leaks on the suction side of the pump will reduce the pump capacity or stop the suction completely.
- A clogged suction filter will hinder or prevent suction so that the pump does not operate satisfactorily.
- Clogged up pressure filters will result in increasing pressure at the pressure gauge but lower pressure at the nozzles.
- Foreign bodies stuck in the pump valves with the result that these cannot close tightly against the valve seat. This reduces pump efficiency.
- Poorly reassembled pumps, especially diaphragm covers, will allow the pump to suck air which will reduce capacity.
- Hydraulic components that are contaminated with dirt will lead to rapid wear to the hydraulic system.

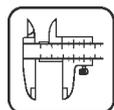
#### Therefore ALWAYS check:

1. Suction, pressure and nozzle filters are clean.
2. Hoses for leaks and cracks, paying particular attention to suction hoses.
3. Gaskets and O-rings are present and in good condition.
4. Pressure gauge is in good working order. Correct dosage depends on it.
5. Operating unit functions properly. Use clean water to check.
6. Hydraulic components are maintained clean.

<b>Fault</b>	<b>Probable cause</b>	<b>Control / remedy</b>
<b>Liquid system</b> No spray from boom when turned on.	Air leak on suction line.	Check if suction filter O-ring is sealing. Check suction tube and fittings. Check tightness of pump diaphragm and valve covers.
	Suction/pressure filters clogged.	Clean filters. Check suction pipe is not obstructed or placed too near the tank bottom.
Lack of pressure.	Incorrect assembly.	Restrictor nozzle in Self-Cleaning Filter not fitted. Safety valve spring for Self-Cleaning Filter not tight.
	Pump valves blocked or worn.	Check for obstructions and wear.
	Defect pressure gauge.	Check for dirt at inlet of gauge.
Pressure dropping.	Filters clogging.	Clean all filters. Fill with cleaner water. If using powders, make sure agitation is on.
	Nozzles worn.	Check flow rate and replace nozzles if it exceeds 10%.
	Tank is air tight.	Check vent is clear.
	Sucking air towards end of tank load.	Returns inside tank need relocation.
Pressure increasing	Pressure filters beginning to clog.	Clean all filters.
Formation of foam.	Air is being sucked into system.	Check tightness / gaskets / O-rings of all fittings on suction side.
	Excessive liquid agitation.	Reduce pump r/min. Check safety valve for Self-Cleaning Filter is tight. Ensure returns inside tank are present.
		Use foam damping additive.
Liquid leaks from bottom of pump.	Damaged diaphragm.	Replace. See Changing of valves and diaphragms.

Fault	Probable cause	Control / remedy
<b>EC Operating unit</b> Operating unit not functioning	Blown fuse(s).	Check mechanical function of microswitches. Use cleaning/lubricating agent if the switch does not operate freely.
		Check motor. 450-500 milli-Amperes max. Change motor, if over.
	Wrong polarity.	Brown - pos. (+). Blue - neg. (-).
	Valves not closing properly.	Check valve seals for obstructions.
		Check microswitch plate position. Loosen screws holding plate a 1/2 turn.
	No power.	Wrong polarity. Check that brown is pos. (+), Blue is neg. (-).
		Check print plate for dry solders or loose connections.
<b>D.A.H. Hydraulic system</b> No boom movements when activated	Insufficient oil pressure	Check oil pressure - min. 130 bar, max. 150 bar.
		Check hydraulic oil level
	Insufficient oil supply.	Check hydraulic oil level.
	Blown fuse.	Check / replace fuse in junction box.
	Bad / corroded electrical connections	Check / clean connections, etc.
	Insufficient power supply.	Voltage on activated solenoid valve must be more than 8 Volts. Use wires of at least 4 mm <sup>2</sup> for power supply.
	Defect relay / diodes in junction box.	Check relays, diodes and soldering at PCB in junction box
	Wrong polarity.	Check polarity. White pos. (+) Blue neg. (-).
Individual ram does not move	Clogged restrictor	Dismantle and clean restrictor

<b>Problem</b>	<b>Probable cause</b>	<b>Control / remedy</b>
<b>Air conditioning</b>		
The overpressure warning lamp lights	Cold ambient temperature	Turn the AC thermostat knob off and back to desired setting again
The circuit leakage warning lamp lights	Leakage of refrigerant from the circuit	Clean as described in section "maintenance"
The cooling capacity is poor	Low air flow	Clean the evaporator
	Restricted evaporator	Clean or renew the cab filters
	Restricted condenser	Increase fan speed
No function at all	Fuse blown	Change fuse
	Thermo fuse disengaged	Press in the red button on condenser left hand side
<b>Four wheel steering sensor</b>		
No signal from sensor	Distance between sensor and disc is incorrect	Adjust sensor
	Sensor defective	Renew sensor
<b>Engine</b>		
Please see engine manual		
<b>Hydrostatic transmission</b>		
Machine will drive in neutral position	Neutral position on pilot handle linkage is faulty adjusted	Adjust the linkage till neutral is correct
	Neutral position on the pump is faulty adjusted	See your HARDI dealer for pump adjustment
Machine will not drive	Parking brake is engaged	Disengage parking brake
	Feed pressure is low	Check feed pressure (brakes engaged)
The machine is moving too slowly	With SAPE engaged: Faults in the SAPE components, sensors, valves etc.	See your HARDI dealer
	With SAPE disengaged: Feed pressure low	Check feed pressure (brakes engaged)
	On hilly terrain: High pressure valves set too low	Check high pressure valves setting
	Internal leakage in pump/motors excessive	Check internal leakages on pump, motors etc.



## Technical specifications

### Specification

Engine	Engine 1	Engine 2	Engine 3
Make	DEUTZ		
Model	BF4M 1012 C	BF6M 1012	BF6M 1012 C
No. of Cyl.	4	6	6

#### Engine

HP/kW at 2500 min <sup>-1</sup>	111/82	133/94	167/118
Max. torque Nm at 1500 min <sup>-1</sup>	376	447	564
Turbo charger	Yes	Yes	Yes
Intercooler	Yes	No	Yes

#### Electrical system

Alternator	14 V, 44 Amp
Starter motor	12 V, 3.1 kW
Battery	12 V, 160 Ah

#### Transmission

Type	Hydrostatic
Pump make	Sauer series 90
Displacement	100 cm <sup>3</sup> / rotation
Feed pressure	28-30 bar
Working pressure, max.	420 bar
Loop flushing valve pressure	4 bar less than feed pressure
Motor make	Poclain
Model	MS08
Motor displacement	780/390 cm <sup>3</sup> / rotation

#### Brakes

Parking brake	Multi disc on all wheels
Service brake	Hydrostatic transmission

#### Steering

Front-wheel-steering	Standard
4-wheel-steering	Optional
Turning radius at 1800 mm track gauge, mm	5500 mm
Do. 4WS	4800 mm

#### Suspension

Type	Central Helicoid spring suspension, front and rear, with double acting shock absorbers
Front axle	Oscillating
Rear axle	Fixed

#### Cab

Air filter	Closed panoramic type Active carbon cartridge
Noise level (working conditions, 2500 engine r.p.m.) at the drivers ear	78-80 dB (A)
Heating	Engine coolant
Air conditioning	Optional extra
Air conditioning refrigerant	R134 A

## Overall dimensions

	18-24 m OLH	27-28 m OLH	24-28 m GVA	30 m GVA
Overall length	7150	7320	7200	7490
Overall width	2980-3250*)	2980-3300*)	3000	3100
Overall height	3700			
Ground clearance	1000**)			
Wheel base	3120			

All measurements in mm

\*) Adjustable transport brackets.

\*\*) 800mm on model with 1500 mm track gauge.

## Weights

### 133 HP, 2000 I, OLH

Boom width	Empty			Full		
	Front	Rear	Own weight	Front	Rear	Total weight
18	3140	1860	5000	3250	4510	7760
20	3135	1885	5020	3245	4535	7780
21	3135	1885	5020	3245	4535	7780
24	3130	1910	5040	3240	4560	7800
27	3300	1840	5140	3410	4490	7900
28	3300	1840	5140	3410	4490	7900

### 133 HP, 2500 I, OLH

Boom width	Empty			Full		
	Front	Rear	Own weight	Front	Rear	Total weight
18	3300	2240	5540	3410	4890	8320
20	3295	2265	5560	3405	4915	8320
21	3295	2265	5560	3405	4915	8320
24	3290	2290	5580	3400	4940	8340
27	3460	2220	5680	3570	4870	8440
28	3460	2220	5680	3570	4870	8440

### 133 HP, 2000 I, GVA

Boom width	Front	Empty Rear	Own weight	Front	Full Rear	Total weight
	24	3210	1470	4680	4030	3490
28	3250	1490	4740	4070	3510	7580

### 133 HP, 2500 I, GVA

Boom width	Front	Empty Rear	Own weight	Front	Full Rear	Total weight
	24	3370	1850	5220	4190	3870
28	3410	1870	5280	4230	3890	8120

All weights in kg and include driver and fuel.

Approximate values.

## Capacities

Main tank	2000 / 2500 l + 5 % oversize
Rinsing tank	185 l
Clean water tank	30 l
Fuel tank	185 l
Hydraulic reservoir	60 l
Screen wash bottle	2 l
Air conditioning circuit	1000 - 1100 gram R134 A

	BF4M 1012 C	BF6M 1012	BF6M 1012 C
Engine oil, incl. filter	10 l	15 l	15 l
Do. without filter	9.5 l	13.5 l	13.5 l
Coolant, incl. heater	11 l	14 l	14 l

### Conversion factors, SI to Imperial units

All units used in this manual are SI units. In some occasions Imperial units are used. Use following factors to convert SI units to Imperial units:

	SI unit	Imperial unit	Factor
Weight	kg	lb.	x 2.205
Surface area	ha	acres	x 2.471
Length	cm	in	x 0.394
	m	ft	x 3.281
	m	yd	x 1.094
	km	mile	x 0.621
velocity	km/h	mile/h	x 0.621
	km/h	m/s	x 0.277
Quantities/area	l/ha	gal (Imp.)/acre	x 0.089
Volume	ml	fl. oz (Imp.)	x 0.0352
	l	Imp. pt.	x 0.568
	l	gal (Imp.)	x 0.22
Pressure	bar	lb./in <sup>2</sup> (p.s.i.)	x 14.504
Temperature	°C	°F	(°C x 1.8) + 32
Power	kW	hp	x 1.341
Torque	Nm	lbft	x 0.74

### Boom hydraulic, OLH

