

NAVIGATOR '22

3000/4000/5000/6000



Original

Operator's manual

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We congratulate you for choosing a HARDI plant protection product. The reliability and efficiency of this product depends upon 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.

Sprayer Use

The HARDI sprayer is for the application of crop protection chemicals and liquid fertilizers, and it is designed only for that purpose. If the sprayer is to be used for any other purposes than the ones described in this Instruction Book, a new risk assessment and a workplace assessment must be completed for this use. This obligation lies with the owner and operator of the sprayer.



Your HARDI sprayer is a machine [A] without drive system in accordance with directive 2006/42/EC, article 2.

It must be connected to a tractor [B], which is a driving machine subject to its own directive.

Together they make one machine [C] as defined in the directive 2006/42/EC, article 2.

Connecting the sprayer to the tractor makes the operator responsible for safety and health when using that combination of machines.

Before first use of the sprayer, the owner and operator must take note of all of the following obligations:

- Workplace assessment
- Operator instructions
- Use of work equipment
- Statutory inspection
- Restricted use
- Maintenance regulations
- Health issues

For more details, please see "Before First Use of the Sprayer" on page 9 in this Instruction Book.

Instruction Book Formalities

The original Instruction Book is approved and published in English. All other languages are translations of the original Book. In the event of any conflicts, inaccuracies or deviations between the English Book and other languages, the English version shall prevail.

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2.1 Obligations and Liability

Comply with the Operator's Manual

Knowledge of the basic safety information and safety regulations is a fundamental requirement for safe handling and fault-free sprayer operation.

Lack of knowledge or non-compliance of the safety regulations can lead to injuries and fatal accidents as well as damage to the sprayer and its surroundings.

Follow the safety instructions in this operator's manual.



Before First Use of the Sprayer

The owner of the sprayer must take note of the following obligations before using the sprayer. These obligations also apply to the employer or the supervisor of the sprayer operators.

Workplace Assessment

This must be completed to start with. Check your local regulations regarding:

- The content of the workplace assessment.
- The frequency of repeating the workplace assessment.

Worker / Operator Instructions

Only let those people work with, or on the sprayer, who:

- Are aware of the basic workplace safety information and accident prevention regulations.
- Have been instructed in working with/on the tractor and sprayer and hereby achieving appropriate qualifications.
- Have read and understood this Operator's Manual.

If you still have queries after reading the Operator's Manual, or if something remains unclear after reading it, please contact the manufacturer or your HARDI dealer.

A worker is hereinafter called an operator. An operator is a person who installs, operates, configures, adjusts, maintains, cleans, repairs, transports or moves the sprayer.

Use of Work Equipment

Throughout the lifetime of the sprayer, the owner shall take every measure to ensure the safety of the sprayer and its equipment made available to operators.

The responsibility lies with the owner of the sprayer to ensure the safety of the operator in accordance with all of the relevant act (s).

2 - Safety notes

Statutory Inspection

Before first use of the sprayer, a surveyor must complete a statutory inspection of the tractor and sprayer. However, the rules often allow the tractor and the sprayer to be inspected separately before being connected. Contact your local HARDI dealer for more information on this inspection and when it has to be completed.

Restricted Use

As the use of the sprayer is likely to involve a specific risk, the owner shall ensure restricted access to its use as needed, and any modification of the restrictions is to be allowed to specialized persons only.

Restricted use also applies to the selection of tractor to be used together with the sprayer. Usable tractors must be tested for driving the sprayer, and the owner must keep a document showing which tractors may be used for driving the sprayer, as well the information about the tests. This information must be available to the operator of the sprayer.

Maintenance Regulations

Throughout its working life, the owner shall keep the sprayer compatible with the current safety regulations by means of adequate maintenance.

The owner shall ensure that the sprayer is installed and set up correctly and is operating properly by inspection/testing of the sprayer (initial, after assembly, periodic and special) by authorized persons. The results of inspection/testing shall be recorded and kept.

Health Issues

Ergonomics and occupational health aspects shall be taken fully into account by the owner.

Obligations of the Operator

Before starting work, the operator or anyone in charge of working with/on the sprayer is obliged to:

- Comply with the basic workplace safety acts and accident prevention regulations.
- Read and follow the safety instructions as described in this Operator's Manual.
- Read the section "Representation of Safety Symbols" in this Operator's Manual and to follow the safety instructions represented by the danger, warning and attention symbols, when operating the sprayer.
- Get to know the sprayer.
- Connect the sprayer securely and correctly to a tractor, which has passed the test for driving the sprayer.
- Read the sections of this Operator's Manual that are important for carrying out the work.
- Read the manufacturer's information regarding safety and use of chemical products for crop care, such as spray chemicals or liquid fertilizer.
- Keep all the danger, warning and attention labels on the sprayer in a legible state.
- Replace damaged labels on the sprayer.
- Know the importance of the use of genuine HARDI spare parts.

If the operator discovers that a function is not working properly, he must eliminate this fault immediately. If this is not the task of the operator, or if the operator does not possess the appropriate technical knowledge, then he should report this fault to his superior (a qualified operator).

Risks in Handling the Sprayer

The sprayer has been highly developed and constructed to the recognized rules of safety. However, operating the sprayer may cause risks and restrictions to:

- The health and safety of the operator or third parties.
- The sprayer.
- Other property.

Only use the sprayer:

- For the purpose for which it was intended.
- In a perfect state of repair.

Eliminate any faults immediately which could impair the safety.

Disclaimer

Our "General Terms of Sale and Delivery" are always applicable. These shall be available to the owner at the latest on conclusion of the contract.

Warranty and liability claims for damage to people or property will be excluded by HARDI, if they can be traced back to one or more of the following causes:

- Improper use of the sprayer.
- Improper installation, commissioning, operation and maintenance of the sprayer.
- Operation of the sprayer with defective safety equipment, or improperly attached or non-functioning safety equipment.
- Non-compliance with the instructions in the instruction manual regarding commissioning, operation and maintenance.
- Unauthorized design changes to the sprayer.
- Insufficient monitoring of sprayer parts which are subject to wear.
- Improperly executed repairs.
- Spare parts used are not genuine HARDI spare parts. If the operator decides to use a spare part, which is not approved by HARDI, the operator immediately assumes responsibility for any accident, damage or malfunction, which can be traced back to the use of this spare part. HARDI accepts no liability for such incidents caused by the use of non-approved spare parts, wear parts or aids.
- HARDI accepts no liability for disasters through the impact of foreign bodies, natural disasters or force majeure.

2 - Safety notes

Organisational Measures

This Operator's Manual

- Must always be kept together with the sprayer.
- Must always be easily accessible for the operator.

Personal Protective Equipment

The operator must use the necessary personal protective equipment as per the information provided by the manufacturer of the plant protection product to be used, such as:



Chemical-resistant gloves



Chemical-resistant and disposable overalls



Water-resistant footwear



Face shield



Breathing protection



Eye protection



Head protection



Skin protection products

2.2 Safety and Protection Equipment

Safety at Start up

Each time before the sprayer is started up, all the safety and protection equipment must be properly attached and fully functional. Check all safety and protection equipment regularly. Repair or replace the equipment as needed.

Faulty Safety Equipment

Faulty or disassembled safety and protection equipment can lead to dangerous situations.

2 - Safety notes

2.3 Informal Safety Measures

Additional Safety Instructions

Together with the safety information in this Operator's Manual, also comply with the general and national regulations related to:

- Accident prevention.
- Environmental protection.
- The applicable workplace safety.

Follow these regulations, especially when:

- Driving on public roads and routes. Comply with the appropriate statutory road traffic regulations. These vary from country to country, and there may be local regulations which need to be followed.
- Local law may demand that the operator is certified to use spray equipment.
- Using pesticides or liquid fertilizer. Make sure you understand the information from the supplier regarding their use.

2.4 Operator Training

Authorised Persons

Only those people who have been trained and instructed may work with/on the sprayer. The operator must clearly specify the responsibilities of the people in charge of operation and maintenance work.

People being trained may only work with/on the sprayer under the supervision of an experienced operator.

	Person especially trained for the activity ¹⁾	Trained operator ²⁾	Person with specialist training (specialized workshop) ³⁾
Loading / Transport	X	X	X
Commissioning	0	X	0
Setup and tool installation	0	0	X
Operation	0	X	0
Maintenance	X	X	X
Troubleshooting and fault elimination	X	0	X
Disposal	X	0	0

Symbols: X - permitted, 0 - not permitted.

1. Persons who can assume a specific task, and who can carry out this task for an appropriately qualified company. Examples of these persons are truck drivers, machinery dealer and scrap dealers (depending on the activity).
2. Persons who have been instructed in their assigned tasks and in the possible risks in the case of improper behaviour, who have been trained if necessary, and who have been informed about the necessary protective equipment and measures. Examples of these persons are customers, farmers and farm workers.
3. Persons with specialist technical training shall be considered as a specialist. Due to their specialist training and their knowledge of the appropriate regulations, they can evaluate the work with which they have been appointed to and detect possible dangers. Examples of these persons are sprayer importers, dealers and service engineers and service technicians.

Comment:

A qualification equivalent to specialist training can be obtained from several years of experience in the relevant field.

If maintenance and repair work on the sprayer is additionally marked "Workshop work", or a similar marking, only a specialized workshop may carry out such work. The personnel of a specialized workshop shall possess the appropriate knowledge and suitable aids (tools, lifting and support equipment) for carrying out the maintenance and repair work on the sprayer in a way that is both appropriate and safe.

2 - Safety notes

2.5 Safety Measures Under Normal Operation

Protection Equipment

Only operate the sprayer if all the safety and protection equipment is fully functional.

Check the sprayer at least once a day for visible damage and check the function of the safety and protection equipment.

2.6 Residual Energy

Possible Dangers

Note that there may be residual energy from mechanical, hydraulic, pneumatic and electric / electronic parts on the sprayer.

Use appropriate measures to inform the operators.

Prevent any accidents from happening due to residual energy.

Below are some examples on where the sprayer's residual energies may be present:

Mechanical Energy

- Springs under tension.
- Weights exposed to gravity.
- Heat from brake drums.
- Heat from wheel motors.

Hydraulic Energy

- Trapped oil under pressure in cylinders, hoses and accumulators.
- Heat from cylinders and oil tank.

Pneumatic Energy

- Air tank.
- Air activated brake system.
- Pressure dampers for fluid system.

Electric Energy

- Energy stored in capacitors.
- Tractor battery. 12v DC battery.

2 - Safety notes

2.7 Service and Maintenance Work

Statutory Inspection

A surveyor must complete a statutory inspection of the tractor and sprayer prior to connecting the two. However, the rules often allow the tractor and the sprayer to be inspected separately before being connected.

Each country should regulate the level and frequency of this inspection. Contact your local HARDI dealer for more information, before using the sprayer the first time.

Preventive Measures

Before carrying out service and maintenance work, secure all media against unintentional start-up. This goes for:

Hydraulic system

- Set the tractor's hydraulic levers in neutral position (or 'float') to relieve oil pressure.
- Turn off the tractor ignition and remove the ignition key. Disconnect the hydraulic hoses connected from the tractor to the sprayer.

Electric system

- Turn off the tractor ignition and remove the ignition key.
- Disconnect the electric cables from the tractor's battery. Turn off the isolation switch.

Fluid system

- Turn off the tractor ignition and remove the ignition key.

Compressed air

- Turn off the tractor and remove the ignition key. Drain the air tank.

Carry out prescribed service, maintenance and inspection work in due time. This will help to eliminate faults on the sprayer, including safety related functions.

Carefully fix and secure larger components to lifting gear when carrying out replacement work.

Check all the screw and bolt connections for firm seating. On completion of the maintenance work, check the function of the safety devices.

2.8 Design Changes

Operator Limitations

You may make no changes, expansions or modifications to the sprayer without an authorization from HARDI. This also applies when welding support parts.

Any expansion or modification work shall require the written approval from HARDI. Only use modification and accessory parts approved by HARDI, so that the type approval or other design approvals remain valid in accordance with national and international regulations.

Vehicles with an official type approval, or with equipment connected to a vehicle with a valid type approval, or approval for road transport according to the local road traffic regulations, must be in the state specified by the approval.

It is strictly forbidden to:

- Drill holes in the steel frame or in the running gear.
- Increase the size of existing holes in the steel frame or in the running gear.
- Weld support parts.

Risk of crushing, cutting, catching, squeezing, getting trapped, being drawn in or being struck by sprayer parts due to the failure of support parts.

Spare Parts, Wear Parts and Aids

Immediately replace any sprayer parts which are not in a perfect state.

Only use genuine HARDI spare and wear parts or those approved by HARDI, so that the type approval remains valid according to national and international regulations. The use of spare and wear parts from third parties does not guarantee that they have been constructed in a way as to meet the requirements placed on them.

HARDI accept no liability for damage caused by the use of non-approved spare parts, wear parts or aids.

2 - Safety notes

2.9 Cleaning and Disposal

Environmental Protection

Carefully handle and dispose of any materials used, in particular:

- When carrying out work on oiled or lubricated sprayer parts.
- When cleaning using solvents.

Always follow local legislation regarding disposal.

2.10 Workstation

Intended Place for Operator

There may be only one person sitting in the driver's seat of the tractor connected to the sprayer. This is the intended workstation for operating the sprayer.

Risks of Non-Compliance

During the operation or transport of the sprayer:

If another person disturbs or interferes with the operator, or if the operator is trying to operate the sprayer from other places than the tractor's driver seat, this can result in negligent or incorrect handling of the vehicle.

- Risk of the operator losing his concentration and focus on operating the vehicle correctly.
- Risk of the operator losing his ability to operate the vehicle correctly.
- Risk of fatal accidents while driving.
- Risk of damages to the tractor, sprayer and foreign objects while driving.
- Risk of inefficient spraying due to incorrect operation of the sprayer.

2 - Safety notes

2.11 If the Safety Information is Ignored

Possible Risks and Dangers

Non-compliance with the safety information:

- Can pose a danger to people, to the environment and to the sprayer.
- Danger to people through non-secured working areas.
- Danger to people through mechanical and chemical influences.
- Failure of important sprayer functions.
- Failure of prescribed methods of maintenance and repair.
- Leakage of hydraulic oil or spray fluid to the environment.
- Can lead to the loss of all warranty claims.

2.12 Safety Information For Operators

General Safety and Accident Prevention

Before use or starting up the sprayer and the tractor, always check their:

- Roadworthiness
- Operational safety

Risk of crushing, cutting, catching, squeezing, getting trapped, being drawn in or being struck by sprayer parts due to inadequate roadworthiness and operational safety.

Beside these instructions, comply with the generally applicable national safety and accident prevention regulations.

The warning symbols and other labels attached to the sprayer provide important information on safe sprayer operation. Compliance with this information is in the interests of your safety.

Keep the spray boom in folded position, whenever the sprayer is not coupled to a tractor. Unfolding the boom on an uncoupled sprayer will shift the balance point of the sprayer causing a risk of overturning.

Before driving off and starting up the sprayer, check the immediate area of the sprayer - look out especially for children and instruct them and other unauthorized persons to stay out of reach of the sprayer. Ensure that you can see clearly.

Drive in such a way that you always have full control over the tractor with the attached sprayer. In doing so, take your personal abilities into account, as well as the road, traffic, visibility, weather conditions and the driving characteristics of the tractor and of the connected sprayer.

Slow down when driving in uneven terrain or when making sharp turns, as the sprayer might be at risk of turning over.

It is forbidden to ride on the sprayer or use it as a means of transport.

It is forbidden to stay in the working area of the sprayer's drawbar, on the sprayer's platform or behind the operating area (the tractor), unless the hydraulic pressure to the sprayer has been switched off.

Only authorized persons are allowed inside or outside the tractor-sprayer cabin during operation.

Keep persons, children and animals away from the operation areas of the sprayer and from the sprayer's equipment. Be careful when manoeuvring the sprayer, especially when reversing, as there is a risk of hitting people or surroundings.

Avoid eating, drinking or smoking while spraying or working with equipment contaminated with chemicals.

The chemicals used for spraying are dangerous to your health! In case of ingestion, poisoning or damage to your skin or face, immediately seek medical advice. Remember to identify the chemicals used.

2 - Safety notes

Coupling and Uncoupling the Sprayer

Only connect and transport the sprayer with tractors suitable for the task. See the section "Technical Specifications" in this manual to make sure that the tractor matches the requirements to operate the sprayer.

When coupling sprayers to the tractor's three-point linkage, the linkages of the tractor and the sprayer must always be the same.

Connect the sprayer to the prescribed equipment in accordance with the specifications.

When coupling sprayers to the front or the rear of the tractor, the following may not be exceeded:

- The approved total tractor weight.
- The approved tractor axle loads.
- The approved load capacities of the tractor tyres.
- The approved load capacities of the tractor hitch points.

Secure the tractor and the sprayer against rolling unintentionally before coupling or uncoupling the sprayer.

It is forbidden for people to stand between the sprayer to be coupled and the tractor, while the tractor is moving towards the sprayer.

Any helpers may only act as guides standing next to the vehicles, and helpers may only move between the vehicles when both are at a standstill.

If using the tractor's three-point linkage, including lift arms (lower links), secure the operating lever of the tractor's hydraulic system, so that unintentional raising or lowering is prevented when coupling or uncoupling the sprayer.

When coupling and uncoupling sprayers, move the support equipment, such as support leg or support wheels (if available), to the appropriate position (check stability and strength of the ground).

When activating support equipment comprising a hydraulic cylinder, there is a risk of injury from crushing and cutting.

Be particularly careful when coupling the sprayer to the tractor or uncoupling it from the tractor. There are crushing and cutting points in the area of the coupling point between the tractor and the sprayer.

It is forbidden to stand between the tractor and the sprayer when raising or lowering the three-point linkage.

Coupled supply lines

- Must yield to all movements while cornering without tensioning, kinking or rubbing.
- Must not rub against other parts.

Ropes or cords releasing quick couplings must hang loosely, and they must not release themselves when lowered.

Also ensure that uncoupled sprayers are in a stable position.

Use of The Sprayer

Before starting work, ensure that you understand all the equipment and actuation elements of the sprayer and their function. There is no time for this when the sprayer is already in operation.

Only wear tight clothes. Loose clothing increases the risk of being caught by the drive shaft / PTO.

Only start-up the sprayer, when all the safety equipment has been attached and in the safety position.

Comply with the maximum load for the connected sprayer and the permissible axle and drawbar loads for the tractor. If necessary, drive only with a partially filled tank.

It is forbidden to:

- Stand in or near the working area of the sprayer.
- Climb the sprayer.
- Stand or sit on the sprayer.
- Stand in the turning and swivel range of the sprayer.

There are crushing and cutting points at externally actuated sprayer points, e.g. hydraulic cylinders.

Only actuate externally actuated sprayer parts when you are sure that no one is standing within the prescribed safety distance.

Before leaving the tractor:

- Lower the spray boom to around waist height above the ground or lower.
- Fold the spray boom into the transport position.
- Activate the tractor's parking brake, put the transmission into (P).
- Turn off the tractor's engine.
- Remove the ignition key.

Always keep the sprayer under supervision when:

- The vehicle is parked with the tractor engine running.
- The sprayer pump is running.
- The tank on the sprayer is being filled.

2 - Safety notes

Road Transport

When driving on public roads or highways with the sprayer coupled to the tractor, the following instructions must be followed. Failure to do so will create a risk of:

- Traffic accidents or fatalities!
- Damage to the tractor and sprayer.

General Instructions

Comply with the national or local road traffic regulations when using public roads and highways.

When driving in areas with special rules and regulations for markings and lights on sprayers, you should observe these and equip your sprayer accordingly.

Make sure that you have a clear field of vision when driving.

Check the immediate vicinity of the vehicle; no persons, children or animals must be near the vehicle!

No one is allowed outside the tractor cabin during road transport. It is forbidden to use the sprayer as a means of transportation of people or goods.

The tractor sprayer driver must not be disturbed by other people in the cabin during driving.

Maximum driving speed for sprayer models equipped with brakes and for models without brakes is different. Be aware that these speeds may differ due to local law. Contact local authorities for information on maximum driving speeds.

Adjust your driving speed to the prevailing conditions.

Before driving downhill, switch to a low gear.

When making turns, lower your speed.

Checking the Vehicle

Before transporting the sprayer on a road, complete the following check points for the tractor and sprayer.

- Spray boom is folded and resting in transport brackets with the intended locks engaged.
- Engage transport locks on the steering cylinders.
- Supply lines for hydraulic, electric and pneumatic systems (if installed) are correctly connected.
- Parking brake is completely disengaged. Safety line is secured (if applicable).
- Hydraulic pressure from tractor to sprayer is turned off.
- Pump drive is turned off, if the main tank is empty. If the main tank is filled with spray liquid, the need for agitation demands that the pump drive is turned on.
- Hitch bolt(s) between tractor and sprayer must be secured with a linchpin or other appropriate means.
- If the sprayer is coupled onto a lift link drawbar, the lower link should be laterally fixed.
- Traffic lights and reflectors are in good working order, clean and free from damage.
- Signs or markings on the vehicle regarding road transport are correctly placed and visible.
- Brakes are in good working order and free from visible damage.
- Tyre pressure is correct according to the load.
- No cables or other parts must be strained or caught in the tractor's wheels when cornering.
- Crop residues and dirt are removed.
- All moveable or loose equipment are securely latched or stowed away in the designated compartments.

Three-Point Linkage

If the sprayer is fixed to the tractor's three-point linkage or lower links, ensure sufficient side locking of the tractor lower links before driving off.

Before driving off, secure the operating lever of the three-point hydraulic system against the unintentional raising or lowering of the connected sprayer.

Carry out a visual check that the upper and lower link pins are firmly fixed with linchpins against unintentional release.

Braking and Steering

Braking distance is increased and steering capabilities are influenced, both when the sprayer's tank is empty and even more so with a full tank.

Ensure that the tractor has sufficient steering and braking power. If necessary, use front weights to bring the tractor into a well-balanced and stable position.

Any sprayers and front/rear weights connected to the tractor influence the driving behaviour and the steering and braking power of the tractor.

The front tractor axle must always be loaded with at least 20% of the tractor's empty weight, in order to ensure sufficient steering power.

Always fix the front or rear weights to the intended fixing points according to regulations.

Comply with the maximum load for the connected sprayer and the approved axle and drawbar loads for the tractor.

The tractor must guarantee the prescribed braking distance for the loaded vehicle combination (tractor plus connected sprayer).

Before driving off, always switch off independent wheel braking on the tractor (e.g. lock the braking pedals together).

When turning corners with the sprayer connected, take the broad load and balance weight of the sprayer into account. Slow down as needed to avoid tilting or overturning of the vehicle, especially on sloping roads.

2 - Safety notes

Hydraulic System

The sprayer is supplied with hydraulic functions operating under a high pressure.

In case of malfunction, there is a risk that the hydraulic system may act inadvertently. This can lead to:

- Fatalities or serious injuries to persons or animals in the working area of the sprayer.
- Material damage to the sprayer when colliding with trees, vehicles or other objects in the working area of the sprayer.

Ensure that the hydraulic hose lines are connected correctly.

When connecting the hydraulic hose lines, ensure that the hydraulic system is depressurized on both the sprayer and tractor sides.

The operator-controls in the tractor, used for hydraulic and electrical movements of components must stay unlocked, e.g. for folding, swivelling and pushing movements. The movement must stop automatically when you release the appropriate control. This does not apply to equipment movements that:

- Are continuous.
- Are automatically controlled.
- Require a floating position or pressed position to function.

Before working on the hydraulic system:

- Lower the spray boom to its lowest position or into the transport position.
- Turn off / depressurize the hydraulic system.
- Turn off the tractor engine.
- Engage the parking brake.
- Remove the ignition key.

Have the hydraulic hose lines checked at least once during a calendar year by an expert to ensure that they are in safe working order.

Replace the hydraulic hose lines if they are damaged or worn, which is when:

- It is leaking.
- Reinforcement material inside the hose is visible due to cracks in the outer layers.

Only use genuine HARDI hydraulic hose lines.

The hydraulic hoses should not be in use for longer than 5 calendar years, including any storage time of maximum 2 years. Even with proper storage and approved use, hoses and hose connections are subject to natural ageing, thus limiting storage time and the time of use. However, it may be possible to specify the length of use from experience values, in particular when taking the risk potential into account. In the case of hoses and hose connections made from thermoplastics, other guide values may be decisive.

Never attempt to plug leaks in hydraulic hose lines using your hand or fingers. Escaping high pressure fluid (hydraulic oil) may pass through the skin and ingress into the body. Risk of serious injury or death.

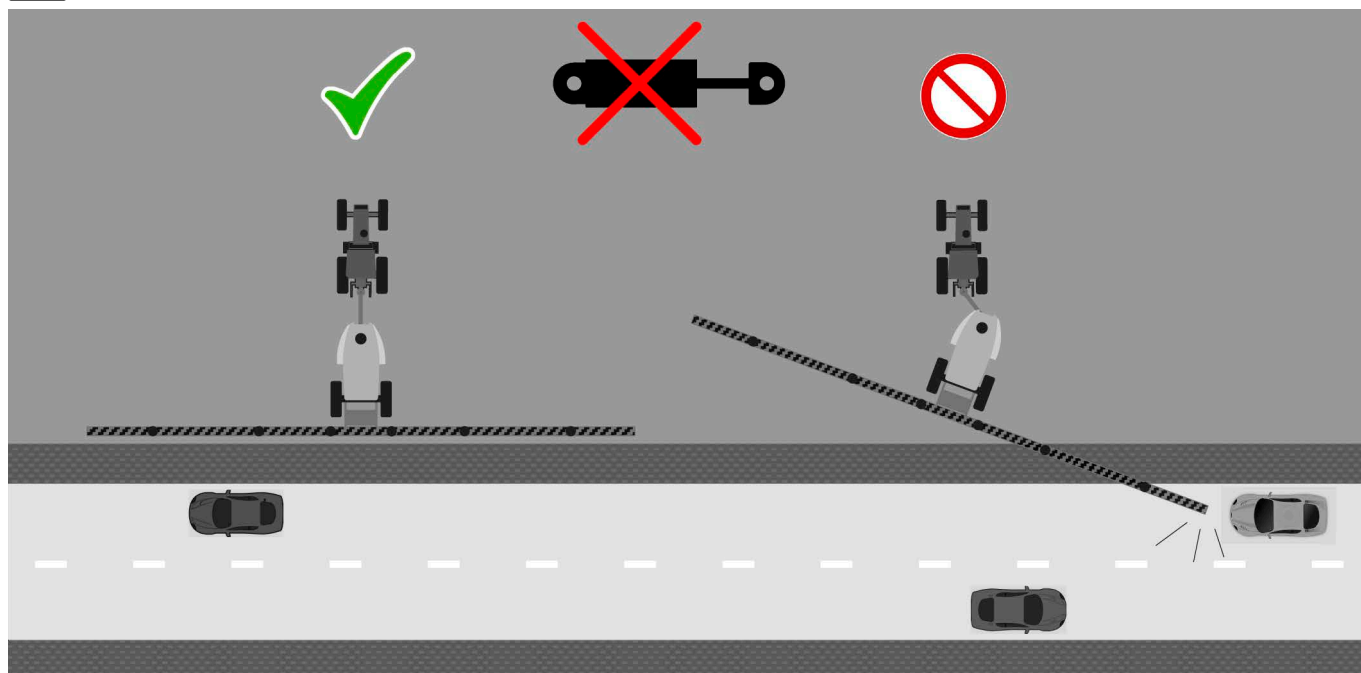
If you are injured by hydraulic oil, contact a doctor immediately.

When searching for leaks, use suitable aids to avoid the risk of serious injury or death.

Malfunction of Track Function



DANGER! Inadvertently activation of the track function involves a risk of accidents in the working area of the sprayer.



2 - Safety notes

Electrical System

When working on the electrical system and the sprayer is attached to the tractor, always disconnect the tractor's battery.

When disconnecting the battery, disconnect the negative terminal first, followed by the positive terminal.

When connecting the battery, connect the positive terminal first, followed by the negative terminal.

Always place the appropriate cover over the positive battery terminal. If there is accidental earth contact, there is a risk of explosion.

If climbing onto the sprayer during service work, be aware of the low voltage danger from electric components.

Only use the prescribed fuses. If the fuses used are too highly rated, the electrical system will be destroyed. Risk of fire.

The sprayer may be equipped with electronic components whose functions are influenced by electromagnetic interference from other units. Such interference can pose risks to people, if the following safety information is not followed:

- If retrofitting electrical units and/or components on the sprayer with a connection to the on-board power supply, the user is responsible for checking whether the installation might cause faults on the vehicle electronics or other components.

Universal Joint Shaft

A rotating shaft can catch clothes, tools or aids, if touching or getting in contact with each other. Risk of severe damage and injury as the rotating shaft is driven by a powerful torque from the tractor.

Use only the power take-off (PTO) shaft prescribed by HARDI, equipped with the proper safety devices.

Read and follow the delivered instruction manual from the manufacturer of the PTO shaft.

The protective pipe and PTO shaft guard must be undamaged, and the shield of the tractor and sprayer universal joint shaft must be attached and be in proper working condition.

Safety devices must be in good condition when you are working with the sprayer.

You may install or remove the PTO shaft only after you have done all of the following:

- Switched off the universal joint shaft drive.
- Switched off the tractor engine.
- Removed the ignition key.
- Applied the parking brake.



Always ensure that the PTO shaft is installed and secured correctly both at the tractor end and at the sprayer pump end.

When using wide-angle PTO shafts, always install the wide angle joint at the pivot point between the tractor and sprayer.

Secure the PTO shaft guard by attaching the chain(s) to prevent movement.

Observe the prescribed pipe overlaps in transport and operational positions. See the operating manual from the PTO shaft manufacturer.

When turning around corners, observe the permitted bending and displacement of the PTO shaft.

Before switching on the universal joint shaft, check that the selected universal joint shaft speed (rpm) of the tractor matches the permitted drive speed of the sprayer.

Stay below the maximum speed (rpm) suitable for the PTO shaft.

Instruct people to leave the danger area of the sprayer, before you switch on the universal joint shaft.

While work is being carried out on the universal joint shaft, there must be no one in the area of the universal joint shaft or PTO shaft, while it is rotating.

When the tractor engine is turned off, the universal joint shaft must also be switched off. This prevents an unintentional restart of the universal joint shaft immediately, when the tractor engine is turned on again.

Always switch off the universal joint shaft if it is not needed in action, or if excessive bending of the PTO shaft occurs.

You may work on the sprayer only after all moving sprayer parts have come to a complete stop.

Secure the tractor and sprayer against unintentional starting and unintentional rolling, before you perform any cleaning, service or maintenance work on universal joint shaft-driven sprayers or PTO shafts.

After disconnecting the PTO shaft, place it on the holder provided.

After removing the PTO shaft, attach the protective sleeve to the universal joint shaft stub.

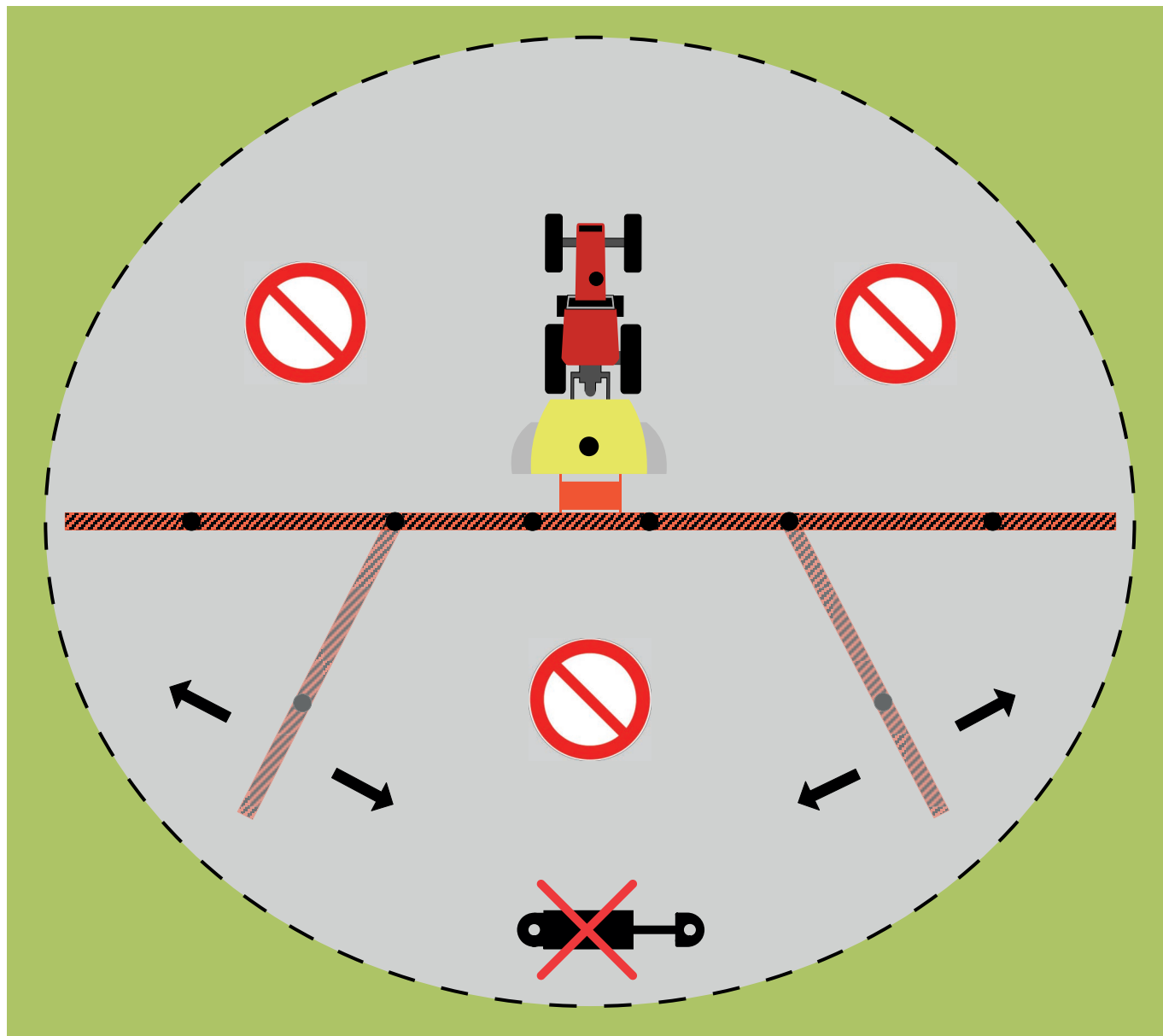
If using a travel-dependent universal joint shaft, note that the PTO speed depends on the drive speed of the vehicle, and that the direction of rotation reverses, when you drive in reverse.

2 - Safety notes

Working Area of the Sprayer

Before operating the sprayer, the operator must ensure that the area around the sprayer is free.

This working area is defined as the area within the dashed line:



The working area includes the total width of the spray boom as well as the area used for boom folding. Please note the area immediately behind the sprayer, which is also defined as working area.

The size of the working area depends on the boom type and boom width. The operator must familiarize with the boom at hand before using the sprayer.



DANGER! Before the hydraulics for the sprayer are activated, there must be no risk of persons, animals or other machines or vehicles entering the working area of the sprayer. Risk of damage and fatality!

Field Sprayer Operation

Observe the recommendations from the manufacturer of the crop protection product in respect of:

- Personal protective equipment.
- Warning information on exposure to crop protection products.
- Regulations on dosing, applications and cleaning.

When there will be exposure to the crop protection product:

- Wear the proper personal protective equipment - this may differ depending on the chemical being sprayed.
- Wash and change clothes after spraying.
- Wash tools if they have been contaminated.

Observe the information in the national plant protection law.

Keep hoses, pipes or other lines closed, when they are under pressure.

When use of the TurboFiller or VACnMIX has ended, make sure that all valves on the TurboFiller or VACnMIX are closed / deactivated.

Only use genuine HARDI hoses and hose clamps for replacement, which stand up to chemical, mechanical and thermal requirements.

The rated volume of the spray liquid tank must not be exceeded during filling. If overfilled, some sprayer functions may be disabled. However, the MainTank is a little oversized to allow for foaming.

When using tractors with a cab with ventilation fans, replace the fresh air filters with activated carbon filters.

Observe the information on the compatibility of crop protections and substances for the field sprayer.

Be aware that some crop protection products have a tendency to stick together or settle when being mixed.

Do not fill the sprayer with water from bodies of water, which are open to the public. This is for the protection of people, animals and the environment due to the risk of contamination.

Only fill the sprayer using a free flow of water from the mains water supply or from an external water tank.

Environmental Precautions

It is essential to reduce the environmental impact of plant protection chemicals to a minimum. Particularly the soil, subsoil water, streams, lakes, flora and fauna must be in focus. Contamination of subsoil water must be prevented by paying particular attention to avoidance of spot contamination of the soil in connection with filling and washing and parking of the sprayer.

If any concentrated chemicals are spilled on the soil, the contaminated soil should be removed and sent for cleaning at a capable facility. Follow local regulations regarding disposal. This must be done to avoid seepage of chemicals to the subsoil waters. Avoid spillage - use the chemical filling device for filling the sprayer with chemicals.

Do not overfill the MainTank. The rated volume inside the MainTank is stated with large printed numbers on the outside of the tank. If overfilled, the spray liquid could leak from the sprayer causing contamination of the soil.

Before filling the sprayer with plant protection chemicals, the sprayer must be calibrated to apply the precise dose rate selected. The important input sensors are the flowmeter, the pressure sensor and the speed sensor.

It is recommended to establish a proper filling and washing location with hard, impenetrable surface drained to a receptacle if the sprayer is always filled or cleaned on the same spot at the farm. If a washing/filling location is NOT available, the following precautions should be taken:

- The sprayer should only be filled with clean water at the farm.
- The plant protection chemicals must be added and mixed in the field to be sprayed.
- Select a different location each time the sprayer is refilled.

2 - Safety notes

Service Work Precautions

Before carrying out any service work, all of the following instructions must be followed in order to prevent damages to the sprayer, injuries and fatalities:

- Do not walk under any part of the sprayer, unless it is secured. The spray boom is secured when placed in the transport brackets.
- If the spray boom is folded up and resting in the transport brackets for service, check visually that the ParaLift locks are engaged (the boom is locked in place).
- If the spray boom is unfolded for service, the boom must be lowered, until it reaches its end stop. Place strong trestles under the boom for support or use a lifting crane for support.
- Never service or repair any equipment while it is operating.
- Any service work should be carried out on level ground with only authorized persons nearby.
- Depressurize the hydraulic system for the sprayer to prevent unintentional movements of the sprayer.
- Switch off the PTO.
- Switch off the tractorignition and remove the ignition key to prevent unintentional starting.
- Activate the parking brake to prevent rolling.
- Put wheel chocks in front and behind of the wheels to prevent the sprayer from rolling.
- Electric power must be disconnected from the sprayer.
- Any service work on electronic /electric parts must be carried out under dry conditions - no rain or splashes from water or other liquids.

Cleaning

When cleaning nozzles and filters, lower the spray boom to around waist height above the ground. For safety reasons, do NOT! walk or stand below the boom or ParaLift during this cleaning work!

Dispose of oils, greases and filters in the appropriate way to protect the environment.

Cleaning of tanks:

- Due to toxic vapours from spray liquids in the MainTank, climbing into this tank is very hazardous. Cleaning should only be done from the outside.
- Do NOT! enter the MainTank.
- Do NOT! inspect any of the tanks with the liquid pump running.

Rinse and wash the equipment with clean water after use and before servicing.

Service and Maintenance

Always reassemble all safety devices or shields immediately after servicing.

After a longer period of storage, the sprayer must be inspected by a qualified operator. Contact your HARDI dealer for more information.

Repair work in the MainTank must only be carried out by a specialized workshop.

Do NOT! enter the MainTank.

Access to the RinseTank must only take place with the spray boom in transport position, and after it is verified that the transport locks are engaged.

Regularly check the nuts and bolts for firm seating and re-tighten them as necessary.

If electrical welding is used on the tractor and on the attached sprayer, disconnect the cable to the tractor's alternator and battery before carrying out electrical welding work on the tractor and on the connected sprayer. Remove all inflammable or explosive materials from the area to prevent fire.

Pressure test the spray functions with clean water prior to filling with chemicals.

Do NOT! disconnect hoses, pipes, or any equipment, if the sprayer is in operation.

Stay below the maximum speed (RPM) suitable for the PTO shaft.

When replacing spare parts, use suitable tools and personal protective equipment.

Spare parts must at least meet the specified technical requirements of HARDI. This is ensured through the use of genuine HARDI spare parts.

2 - Safety notes

2.13 Operator safety

Symbols

These symbols are used thorough the manual to designate where extra attention is required by the reader. The four symbols have the following meaning:



This symbol means DANGER. Be very alert as your safety is involved! The DANGER symbol indicates a high risk for an immediate death or serious physical injury, if the instruction is not followed.



This symbol means WARNING. Be alert as your safety can be involved! The WARNING symbol indicates a medium risk for immediate death or serious injury, if the instruction is not followed.



This symbol means ATTENTION. This indicates an obligation to special behaviour or an activity required for proper sprayer handling. This instruction will help you to avoid faults on the sprayer or disturbance to the environment.



This symbol means NOTE. This instruction will help you to use all the functions of your sprayer in the best way possible for better, easier and safer operation

Label explanation

The labels are designating potential dangerous places on the machine. Anybody working with or being in close range of the sprayer must respect these labels!

The labels should always be clean and readable! Worn or damaged labels must be replaced with new ones. Contact your local dealer for new labels.



Note that not all labels shown here will apply to your sprayer.



978437 Chemical handling!
Carefully read the informations about chemical preparation before handling the machine. Observe instructions and safety rules when operating.



978436 Service!
Shut off the engine and remove ignition key before performing maintenance or repair.



97802100 Risk of death!
Do not attempt to enter tank.



978444 Risk of injury!
Do not open or remove safety shields while engine is running.



978448 Risk of injury!
Keep sufficient distance away from electrical power.



978443 Service!
Carefully read operator's manual before handling the machine. Observe instructions and safety rules when operating.



978440 Service!
Tighten to torque according to operator's manual.



978447 Risk of burn!
Stay clear of hot surfaces.



978586 Risk of injury!
Flying objects, keep safe distance from machine as long as the engine is running.



978435 Risk of injury!
Keep hands away.

2 - Safety notes



978441 Risk of squeeze!
Stay clear of raised unsecured loads.



978445 Risk of squeeze!
Never reach into the crushing danger area as long as parts are moving.



978434 Risk of squeeze!
Keep hands away, when parts is moving.



978442 Risk of falling off!
Do not ride on platform or ladder.



978446 Risk of sprayer tipping over!
Be aware when disconnecting the sprayer.



978438 Grip area!
Manual handling of boom etc.



97802200 Not for drinking!
This water must never be used for drinking water.



97802300 Not for drinking!
This water must never be used for drinking water.



97818100 Tank under pressure!
Beware when moving lid.



97827000 EasyClean filter service!
Open and clean filter monthly.



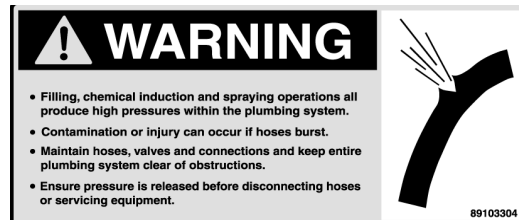
97829000 Lifting point!



978439 Lifting point!



97831500 Load index!
Max. permitted load rating is 164 at 40 km/h.



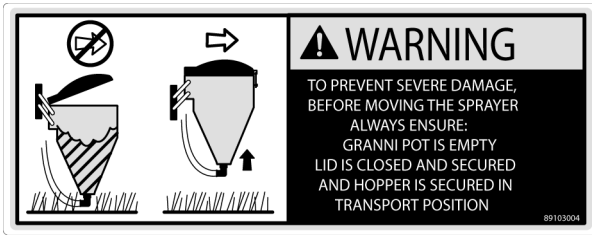
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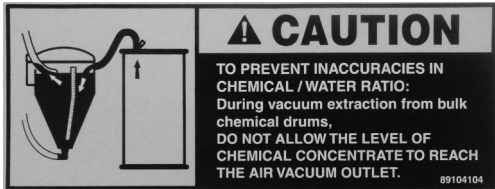
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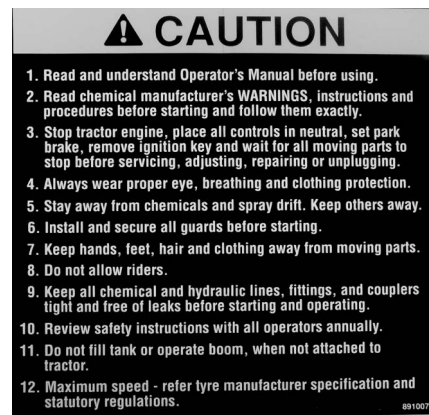
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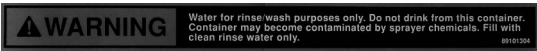
2 - Safety notes



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3.1 General Info

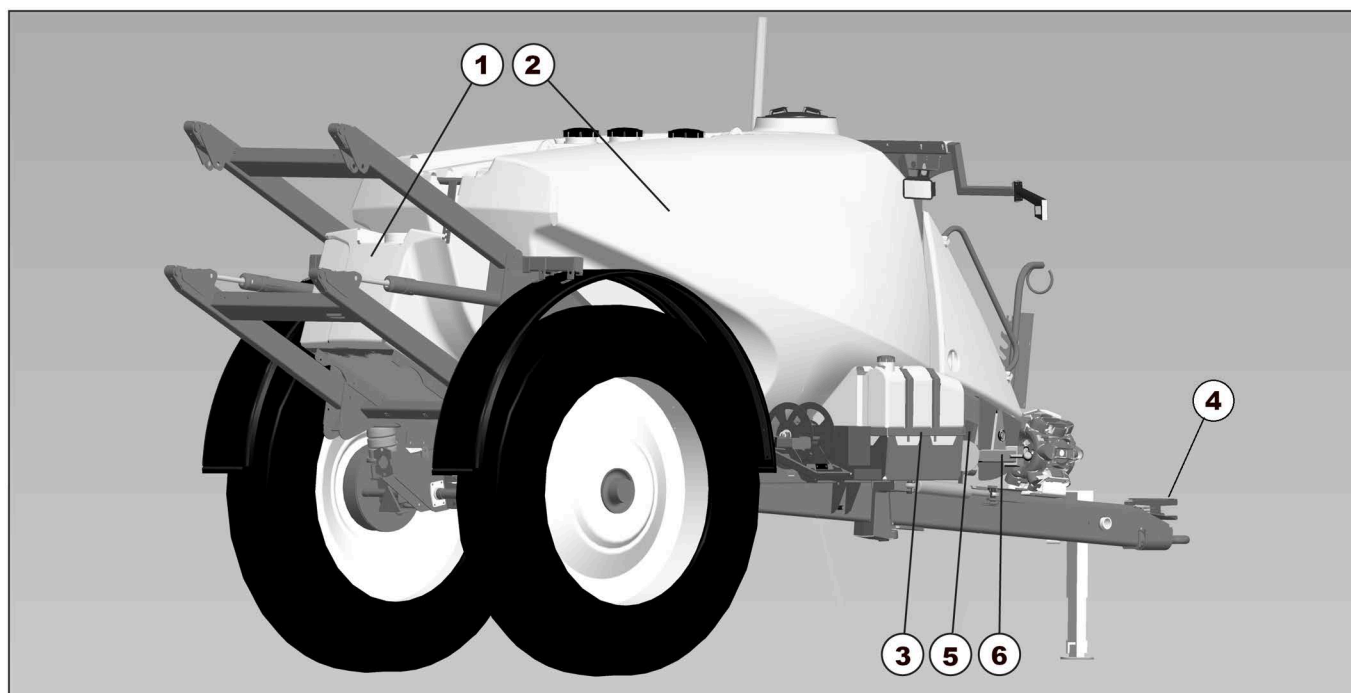
View



- | | |
|--|--|
| 1. Level Indicator for Rinsing Tank | 10. Support Leg |
| 2. Level Indicator for Main Tank | 11. Step to Platform |
| 3. Lid for Main Tank | 12. Agitation/External Cleaning Device Valve |
| 4. Clogging Indicator for EasyClean Filter | 13. Pressure Valve (SmartValve) |
| 5. Spray Pressure Gauge | 14. Suction Valve |
| 6. Lid for Clean Water Tank | 15. EasyClean Filter |
| 7. SafetyLocker | 16. Rinsing Tank Coupler |
| 8. Pump | 17. TurboFiller (VACnMIX) Valves |
| 9. Drawbar Hitch | 18. TurboFiller (VACnMIX) |

3 - Description

View



- 1. RinseTank
- 2. Main Tank
- 3. ChemLocker

- 4. Front Angle Sensor (Intelli-Steer)
- 5. CycloneFilter
- 6. Storage Position for Support Leg

Platform

Components Around the Platform

- A. Lid for MainTank
- B. MainTank Level Indicator
- C. EasyCleanFilter clogging indicator
- D. Pull cord for drain valve in MainTank
- E. Lid for CleanWaterTank
- F. Platform
- G. Rails for support
- H. Liquid pump
- I. Agitation valve
- J. Step

Accessing the Platform

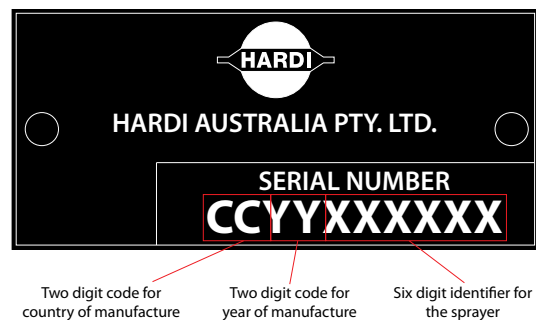
1. Swing the step out (J), until it clicks into the locked position.
2. Place your foot on the step while holding on to both rails (G).
3. Step up on the platform (F).
4. When back on the ground, push the step away (J) by pulling it up and swing it back to the locked position.



3 - Description

Identification plates

An identification plate is located at the front of the chassis on the right hand side of the sprayer. The reference number on plate will help you and your HARDI dealer to clearly identify your machine and assist in the correct supply of spare parts and service information.



Sprayer Use

The HARDI sprayer is for the application of crop protection chemicals and liquid fertilizers. The equipment must only be used for this purpose. It is not allowed to use the sprayer for any other purposes.

If no local law demands that the operator must be certified to use spray equipment, it is strongly recommended to be trained in correct plant protection and in safe handling of plant protection chemicals to prevent unnecessary risk for personnel and the environment, when carrying out your spray job.

Steel Frame

A very strong and compact steel frame / chassis with a strong chemically resistant, weatherproof electrostatic and UV resistant lacquer coat. Screws and bolts etc. are made of stainless steel, or they have been Delta/Magni-treated to resist corrosion.

Tanks

The tanks are made of impact-proof polyethylene, resistant to UV radiation and chemicals.

The main tank has a purposeful design with no sharp corners for easy cleaning.

The tank lid is placed so it can be accessed from the platform. This ensures an easy access for the filling and cleaning of the tank, etc. The sprayer may also be equipped with a TurboFiller, a RinseTank and a Hand Wash Tank. A large, easy-to-read MainTank Level Indicator is placed beside the platform, where it is visible from the tractor cabin and in the work zone of the sprayer.

Nominal main tank content is 3000, 4000, 5000 or 6000 litres.

Lifetime

The expected lifetime for the sprayer is 10 years.

To obtain this successfully, these instructions should be followed:

- All service and maintenance work must be completed in due time
- Repair any damaged parts as quickly as possible
- Replace or change spare parts as instructed
- Only use original HARDI spare parts.



ATTENTION! If using acidic liquid in a spray boom with stainless steel piping, this will shorten the lifetime significantly, as these pipes are not acid-proof. Risk of corrosion and leaks.

3 - Description

3.2 Air System

Air compressor

General Info

The air compressor is a compact V-type reciprocating compressor engineered for efficiency and durability to deliver superior performance.

The air compressor is able to deliver a continuous air supply for the operation of the Active-Air system. A crankcase breather tube is connected to the air intake to prevent blockage from dust and debris and to extend the life of the compressor.

Max Pressure: 120psi/ 8bar



Air receiver

General Info

The air receiver is used to store high-pressure air supplied from the compressor. The receiver is fitted with a drain / relief valve to protect the system from over pressure and to allow moisture to be drained from the system as required.

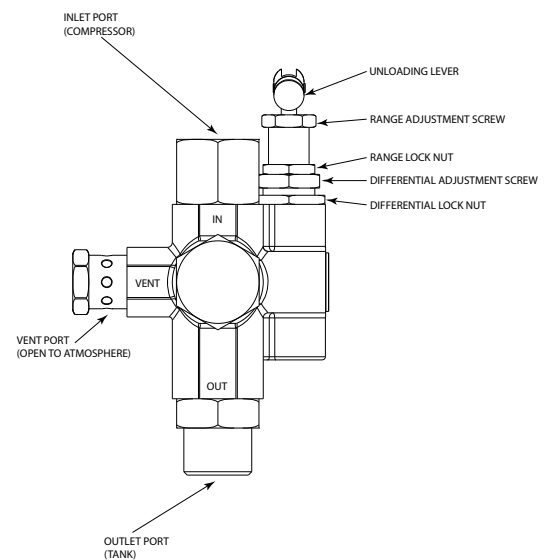
Capacity: 30Litres



Unloader valve

General Info

The function of the unloader valve is to release the remaining air from the compressor and the relative lines when the air system reaches the maximum set pressure. It is fitted to the inlet side of the air receiver located at the rear of the machine.



Air filter assembly

General Info

The air filter assembly is fitted to the top of the transport frame and consists of two parts. A pre-cleaner which is installed in the highest part of the intake system and an air-cleaner.

The pre-cleaner removes most of the contamination and dirt from the incoming air and is effective at removing larger dirt particles and water droplets. A full-view plastic bowl lets the operator easily see when a service is required.

The air-cleaner consists of an outer pleated cartridge (28109804), an inner synthetic spun-bonded cartridge (28109904) inside a polymer housing. The outer cartridge removes the remaining dust and debris from the air before it enters the air compressor.

The inner cartridge (also known as the safety filter,) provides protection for the compressor in the event of a failure of the outer cartridge.



3 - Description

3.3 Liquid System

Pump

Diaphragm pump with 6 diaphragms, model 364 or 464.

Standard speed = 540 RPM (6-spline shaft).

TWIN FORCE = 1000 RPM (21-spline shaft).

The design of the diaphragm pump is simple, with accessible diaphragms and valves, which ensures that liquid does not contact the vital parts of the pump.

Pump model 464 is shown in the picture.



Ace pump (Optional)

General Info

Ace Oasis Wet Seal Technology prevents the pumped liquid from contacting the shaft seals. The seals operate in a reservoir filled with a specially formulated barrier fluid for seal face lubrication and heat dissipation. Additionally, air pressure is introduced to prevent pump fluid from contaminating the seal reservoir. This isolation of the seals prevents abrasive wear of the seal faces and run dry seal failures.



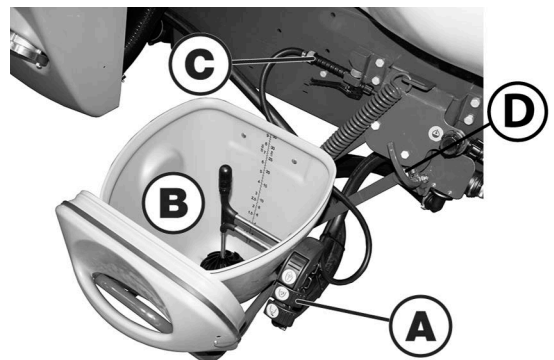
TurboFiller

The TurboFiller is where you add the chemicals to be mixed with water in the MainTank.

Capacity: approximately 35 litres.

By operating the levers (A) on the side of the TurboFiller (B), you can do the following:

- Stir up the added chemicals with water from the sprayer.
- Transfer the mix to the main tank.
- Clean your chemical container or the TurboFiller (B) inside by using the flushing nozzle.
- A spray gun (C) is also available for further cleaning.



Before Use

- Pull the handle (D) to unlock.
- Grab the handle to pull the TurboFiller (B) down, until it click into locked position.

After Use

- Pull the handle (D) to unlock.
- Pull the TurboFiller back in storing position, until it locks.



WARNING! Before releasing the lock, always keep a hand on the grip to avoid abrupt movement of the TurboFiller!

Rinsing of Chemical Containers

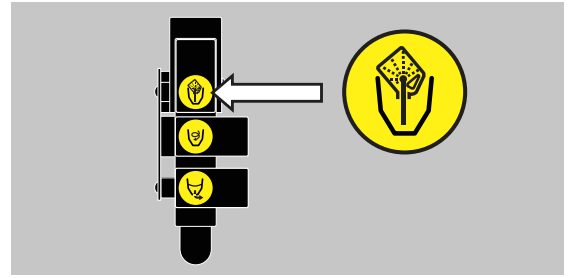
The upper lever is used for two purposes.

1. When the TurboFiller lid is open:

For rinsing empty containers. Place the container over the rotating flushing nozzle in the middle of the TurboFiller to rinse the inside of the container.

2. When the TurboFiller lid is closed:

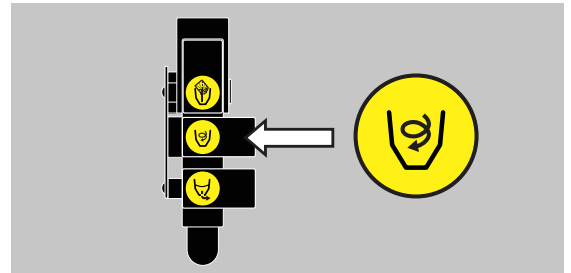
Use the lever to rinse the hopper, when the filling of chemicals is completed.



DANGER! Do not activate this lever, unless the multi-hole nozzle is covered by a container, as spray liquid may otherwise hit the operator! Risk of injuries and spillage on the ground.

TurboDeflector Valve

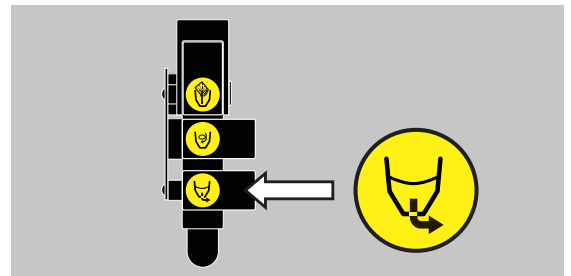
This TurboDeflector valve activates the vortex flushing of the TurboFiller. Lift the lever to lock it in open position for continuous liquid rotation in the hopper.



TurboFiller Suction Valve

The valve is used simultaneously with the TurboFiller. The valve has 2 settings: Continuously open or spring-loaded normally closed.

Open the valve by lifting the lever up, when chemicals are to be filled into the TurboFiller and transferred to the MainTank.



3 - Description

HARDI®VACnMIX (optional equipment)

The HARDI VACnMIX™ is used for the mixing of plant protection or liquid fertiliser chemicals into a solution, and transferring the solution to Main Tank.

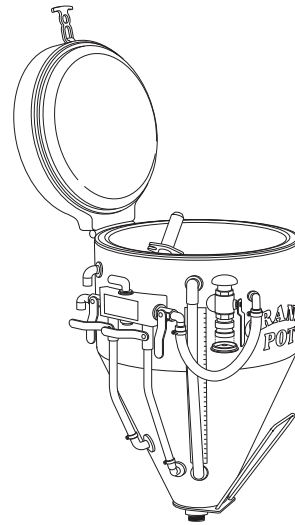
Your Vacuum VACnMIX™ uses the latest design and technology to provide fast, safe and accurate transfer of liquids, powder or granules.

The VACnMIX is a multi-purpose hopper. It is designed for use in closed system transfer and utilises the tough and reliable Hardi pump on your sprayer. The rate of transfer is controlled by the operator.

The VACnMIX is supported on a sturdy lift frame and is equipped with two vortex mixing jets, a control manifold and a rotating chemical drum rinse nozzle. The hopper flushing ring is connected to the sight tube to enable decontamination of both together. The unit has a water supply inlet port, and a vacuum suction outlet port — for transfer of either dilute or concentrated liquid chemicals to the spray tank.

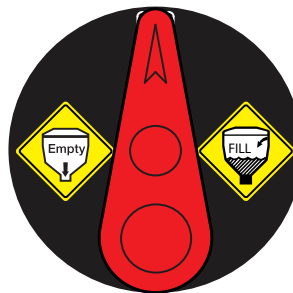
The vortex jets provide vigorous operator-controlled agitation which mixes granules into solution, or allows liquid chemical concentrate to be pre-mixed. Any granules that do not dissolve are kept in suspension in the vortex until they disperse.

Featuring a Vacuum and Transfer Valve and an in-line venturi, the unit can transfer liquid from a clean water source or Envirodrum into the hopper, and from the hopper to the main sprayer tank.



Vacuum / Transfer Valve (only if equipped with VACnMIX)

This valve is located behind the Chemical Induction Hopper and is used to control the filling / emptying of the VACnMIX hopper.



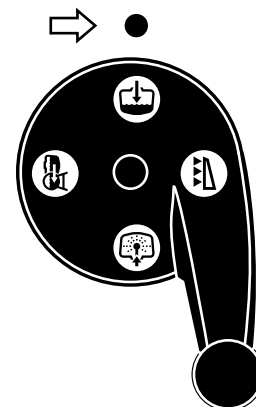
Control Manifold VACnMIX



NOTE! Please refer to “VACnMIX (Optional)” on page 120 on how to operate the VACnMIX

Fast Fill valve/Vortex Control valve

ATTENTION! The pressure Smartvalve must be set to Pressure to Main Tank to activate VACnMIX.



The Fast Fill valve (**A**) is used to fill the VACnMIX.

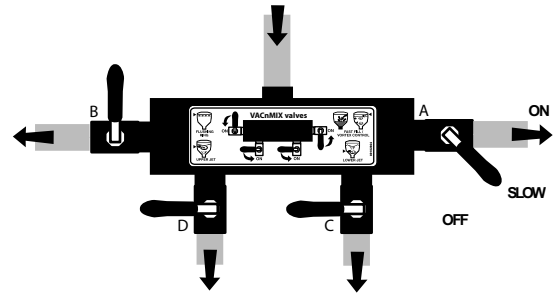


NOTE: Sight gauge is a guide only to fluid volume in hopper).

Vortex Generation

The Fast Fill/Vortex Control valve can also be used to activate a vortex flushing of the VACnMIX. To start a vortex in the hopper turn the Upper & Lower Jet valves (**C**) (**D**) to ON and turn the Fast Fill valve (**A**) to OFF.

Vortex force can be controlled by positioning the Fast Fill valve (**A**) between on/off to achieve desired rate of swirl action. Further control of the vortex action can be achieved by partially or fully closing one of the jets.



Hopper Rinsing Ring valve

The VACnMIX has a rinsing ring located under the upper lip of the hopper that uses spray liquid to flush the walls of the hopper.

The Flushing ring valve (**B**) is used to rinse the hopper after use. With the lid closed, flush the hopper using the rinse ring. Control the rinse by turning flush ring handle on VACnMIX control manifold to the ON / OFF position.



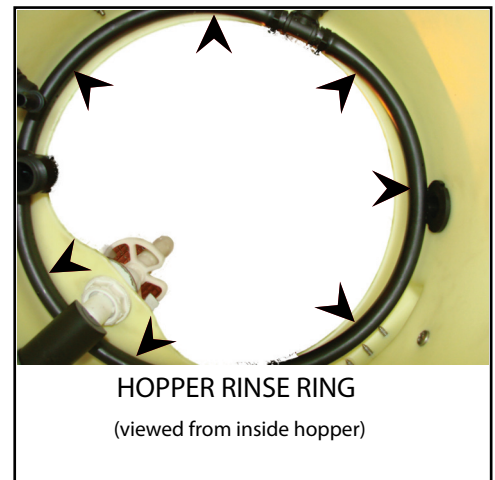
DANGER! Do not activate the rinse ring unless the hopper lid is closed to avoid spray liquid hitting the operator.



ATTENTION! Rinsing device uses spray liquid to rinse hopper. Always avoid contact with chemical solution.



ATTENTION! The hopper rinsing device uses spray liquid for rinsing the hopper. The VACnMIX must always be cleaned/decontaminated together with the rest of the sprayer with fresh water when the spray job is complete.



Chemical Container Rinsing Device

The VACnMIX comes equipped with a container rinsing nozzle which uses spray liquid from the main tank to rinse chemical containers.



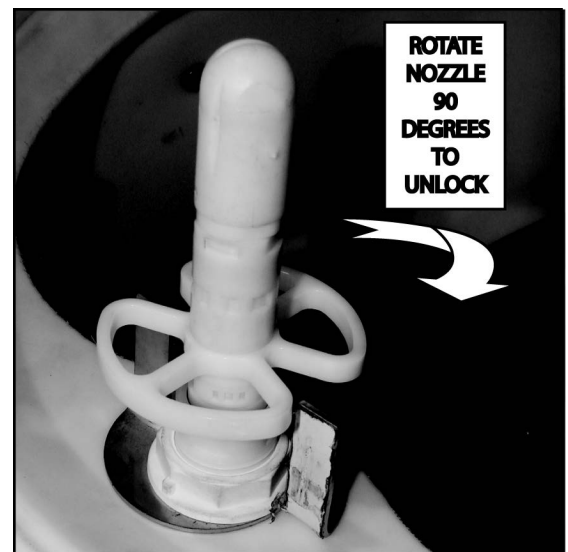
DANGER! Do not press the nozzle unless it is covered by a container to avoid spray liquid hitting the operator.



ATTENTION! Rinsing device uses spray liquid to rinse containers. Always rinse the chemical containers with clean water several times before The rinse nozzle lock is released by turning the upper section 90 degrees



Note: This lock acts as a safety measure to prevent injury to operator. Ensure lock is repositioned correctly after use.



3 - Description

DynamicFluid4 Pressure Regulation - HC5500 only

Traditional fluid regulation starts, when the nozzles are opened. With DynamicFluid4 (DF4), the regulation is a continuous process, even if the nozzles are closed. A synthetic and a stainless steel disc regulate the pressure and ensure quick reaction and zero leakages. Used parameters are sprayer speed, PTO speed and the number of activated sections. The benefit is more precise application rates from the second the sprayer begins spraying.

The DynamicFluid4 uses feed forward technology based on 5 sensors, which feed the JobCom computer with data necessary for optimal regulation. It auto-primes at start-up and starts to move the valve towards the final position, immediately after the operator makes changes. For example, when section valves are opened or closed, the regulation valve is started at the same time as the section valve motors are started. This avoids overpressure situations e.g. after running empty and refilling of the main tank.

The 5 sensors are also back-up for each other, ensuring that the system can continue regulation - even if one or more sensor signals fails. The applied sensors measure:










- Sprayer speed (km/h)
- Fluid flow (l/min)
- Fluid pressure (bar)
- Pump speed (rpm)
- Regulation valve opening angle (°)

Features for DF4

- Very fast and accurate regulation when all sensors are ok, setup in menus are correct, and pump, filters and valves are in good condition.
- Quick reacting valve, when sections are turned ON/OFF, and at speed changes.
- Optimized AutoSectionControl feature that predict boom sections to open and optimized nozzle pressure.
- Optimized for different PTO systems.
- Nozzle surveillance. No setup or tuning is required for nozzle change.
- Warning in display, if failures occur on boom plumbing, such as severe clogging of line or nozzle filters or because of large leakages on hoses and fittings.
- All functions work through with degraded performance (Limp-home modes), if:
 - Failures occur in fluid system, e.g. pump defects, clogged filters or leaking valves.
 - Failures occur on pressure sensor, flow sensor or pump sensor.
 - There is a wrong setup of sprayer data in the menus.
- Emergency mode, if angle sensor or sprayer speed sensor fails.

Screen Icons

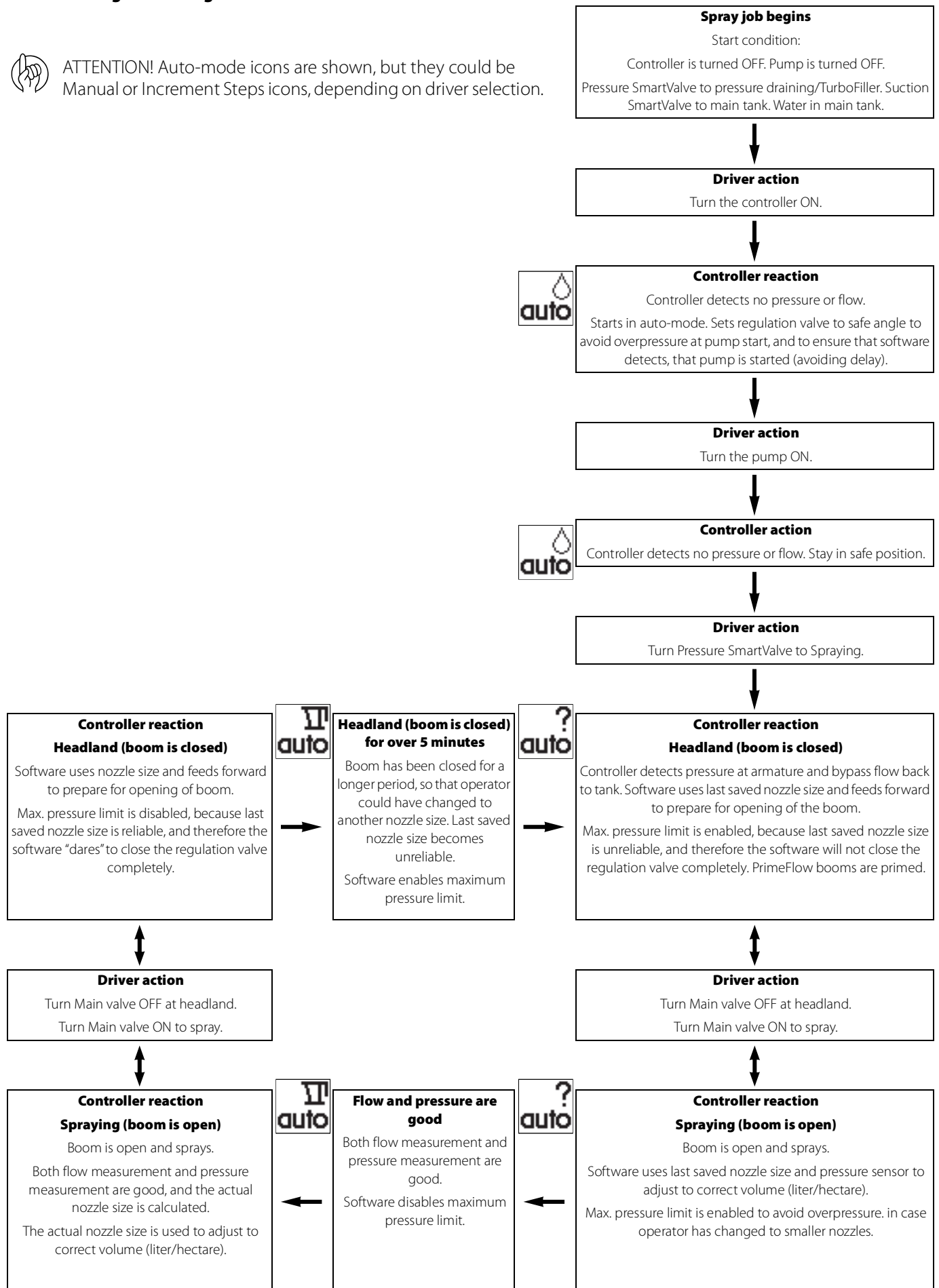
The sprayer driver selects one of three modes: Auto, Manual or Increment Steps. The sprayer computer detects one of three regulation modes: Drop, Question Mark or Calibration Jug. This makes 9 modes in total.

Auto	Manual	Increment Steps	
Automatic Volume Rate.	Manual Pressure Control.	Volume Rate is changed in steps as %-up or %-down.	Press a button on the controller box to select regulation mode.
			Calibration Jug Flow to the section valves. Nozzle size (l/min at 3 bar) has been calculated.
			Drop No flow to the section valves. The pump is not started, or the pressure SmartValve is set to another function than spraying.
			Question Mark Flow to the section valves, but pressure and flow has not yet been stable, therefore the nozzle size (l/min at 3 bar) has not yet been calculated. The system uses the last saved nozzle size.

Function Diagram for Regulation Valve



ATTENTION! Auto-mode icons are shown, but they could be Manual or Increment Steps icons, depending on driver selection.



3 - Description

Valves and Symbols

The possible functions of valves are distinguished by coloured identification on the function labels. The modular valve system facilitates the addition of optional extras on both pressure side and suction side.

A function is activated by turning the handle towards the desired function.



ATTENTION! Only the functions used should be open - always close remaining valves.



ATTENTION! If a valve is too tight to operate, or too loose (= liquid leakage, the valve needs to be serviced. Please see "3-Way Valve Adjustment" on page 171 for further information.

Pressure SmartValve (Green Symbols)

This valve is to select which function the pressurized liquid from the pump will be routed to.

The active function is indicated by the indicator.

The handle is turned so the desired symbol is just below the black mark. If the handle is turned to a position without label with a symbol (unused function), the valve is closed.



Main tank



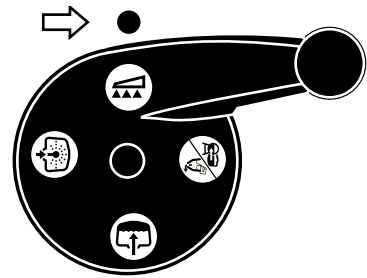
Spraying



Internal tank cleaning
(Rinsing nozzles)



TurboFiller



Suction Valve (Blue symbols)

This valve is to select suction from main tank or from rinsing tank.

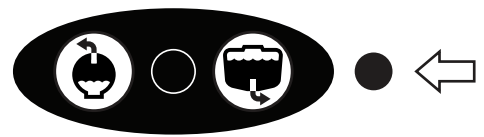
The handle is turned so the desired symbol points to the black mark. If the handle is turned to a vertical position, the valve is closed.



Main tank



Rinsing tank



Agitation Valve (Green symbols)

With the manually adjustable agitation valve it is possible to combine spraying with a high volume rate at high pressure with agitation at the same time.

This is controlled continuously by the valve: The valve is marked with an arrow on the disc which indicates the amount of liquid that passes through the valve.



Adjustable agitation



Choose your own valve setting, depending on the tank contents:

- The handle is turned to a position near the tip of the arrow:

Only a small amount of liquid is allowed to pass the valve resulting in a lesser extent of agitation. This is recommended when using chemicals with a low density to prevent foaming in the tank.

- The handle is turned to a position in the wide end of the arrow:

A large amount of liquid will pass the valve resulting in a large extent of agitation. This is recommended when using chemicals with a high density, which will tend to settle at the bottom of the tank.

External Filling Device Valve (Blue symbol) (optional)

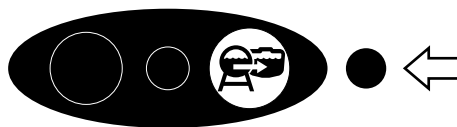
The valve is used when filling from an external tank or reservoir.
Activating the valve starts/stops the filling process



NOTE! that the suction valve must be closed for maximum filling capacity.



External filling



3 - Description

Filters

Filters on your sprayer are there to protect components and prevent nozzle clogging.

- An EasyCleanFilter (suction) is fitted in the working zone.
- A SelfCleaningFilter (pressure) is fitted on the sprayer's right side just below the yellow side cover. It has a built-in self-cleaning function.
- InLine filters (pressure) can be fitted at each boom section.
- Nozzle filters may be fitted at each nozzle.
- A coarse filter is located below the top cover for the MainTank.



ATTENTION! All the filters should be in use and their functionality must be checked regularly. Pay attention to the correct combination of filter and mesh size. For more information, see the chapter "Technical Specifications" in this book.

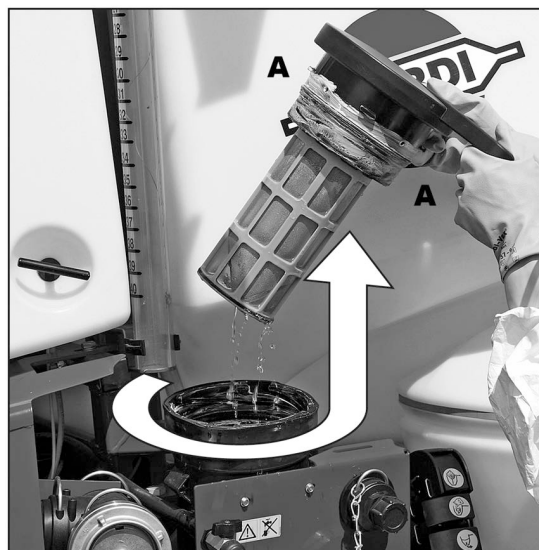


ATTENTION! Always operate your sprayer with clean filters to ensure proper functions and to protect the interior of the pump and valves.

EasyCleanFilter

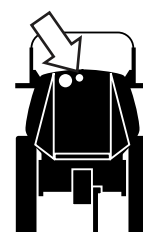
This filter collects impurities, when liquid is being sucked out of the main tank by the main pump.

To ensure proper function of the filter and its built-in valve, the filter must be opened at least once every month. A label on the lid also designates this.



Besides the spray pressure gauge a clogging indicator is installed. This works as a vacuum gauge for the filter during operation - the pointer moves from green towards red, if the filter starts clogging.

Clogging Indicator	Filter Condition
Green area	70 - 100 % capacity. No cleaning necessary.
Yellow area	55 - 70 % capacity It is possible to finish an ongoing spray job and then clean the filter afterwards.
Red area	0 - 55 % capacity Clean the filter immediately, as it is clogged too much for proper function.



SelfCleaningFilter

With the SelfCleaningFilter, any impurities in the spray liquid will be cleaned out and returned to the MainTank via the return flow.

Function diagram:

1. Filter lid
2. Piping from pump
3. Piping to boom
4. Return to tank
5. Boost valve

The boost valve (5) has three positions marked with small dots on the lever:

- A. This position is marked with 1 dot:

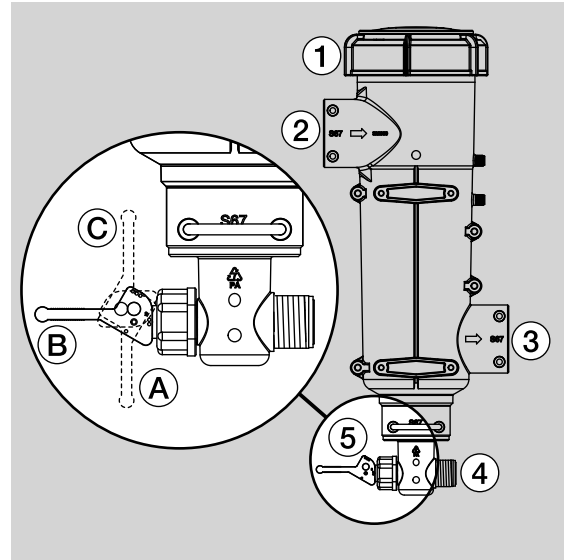
There is no return flow. This position is used when rinsing the boom, if there is spray liquid in the MainTank. Also used when high spraying volume is required.

- B. This position is marked with 2 dots:

Normal position when spraying. With return flow to prevent filter from clogging during spraying. This position is used when rinsing the boom, if the MainTank is empty.

- C. This position is marked with 3 dots:

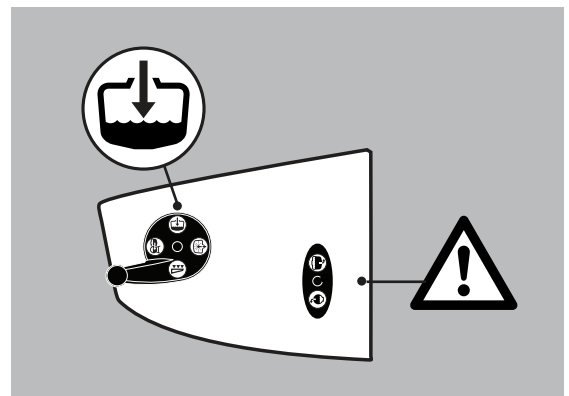
Flushing position which is used if the filter is clogged. Lift and hold the lever to use this position, which largely increases the return flow and flushes the filter. The pressure SmartValve must be set for "Spraying".



ATTENTION! Use of position (C) is no guarantee for a clean filter. Always do a visual inspection and cleaning of the filter. For more about cleaning, see the section "10 Hours Service - Self Cleaning Filter" on page 159.



DANGER! Never open the SelfCleaningFilter unless the suction valve is closed and the pressure SmartValve is set to "MainTank". Otherwise spraying liquid may hit you, when opening the filter, and this will also drain the MainTank!



3 - Description

RinseTank

One RinseTank is rear of the sprayer behind the MainTank. The tank is made of impact-proof and chemical resistant polyethylene. It is used for rinsing and flushing of the MainTank and liquid system.

Filling is done via the 1½" CamLock fitting placed in the working area. The RinseTank level indicator is placed at the platform.

Capacity: approximately 450 litres.

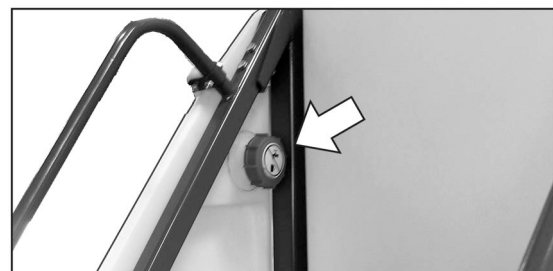


Clean water tank

A clean water tank is integrated into the right side cover. It is accessed for filling at the sprayer's right side when entering the platform. The ball valve for water draining is located on the yellow side cover beside the EasyCleanFilter on the sprayer's left side.

The water in this tank is for hand washing, for cleaning of clogged nozzles etc. Only fill this tank with clean water from the tap.

Capacity: approximately 20 litres.

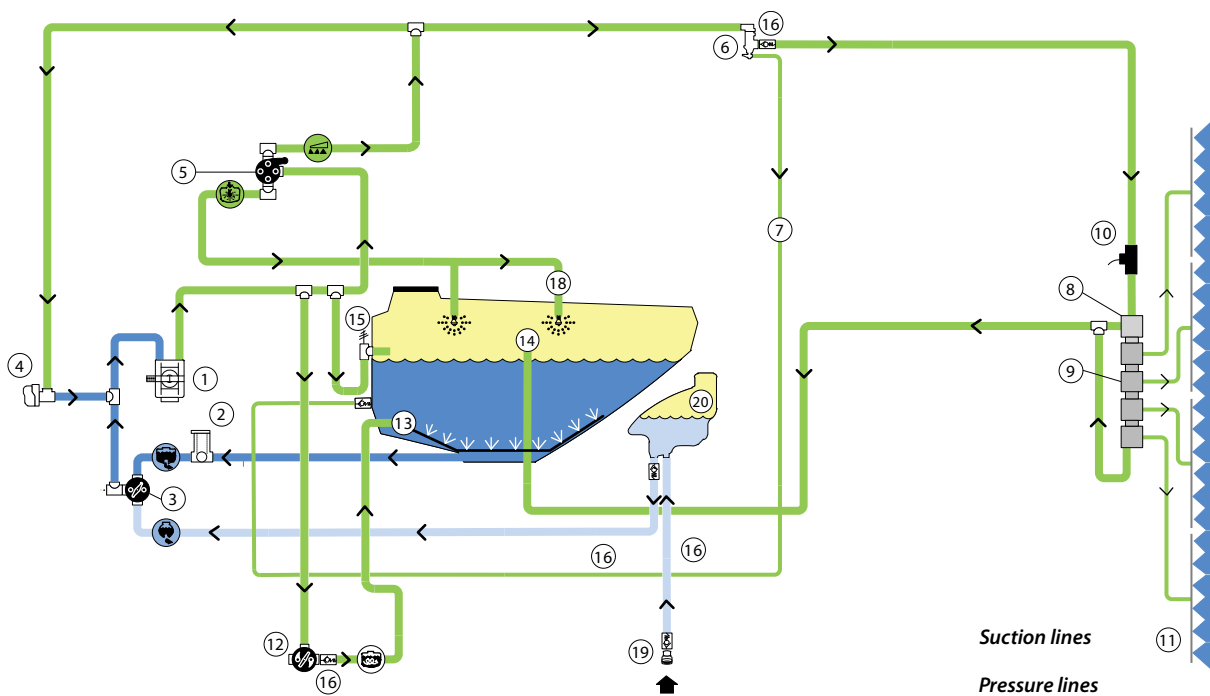


WARNING! Not for drinking!



WARNING! This water must never be used for drinking water.

Diagram - Basic Liquid System

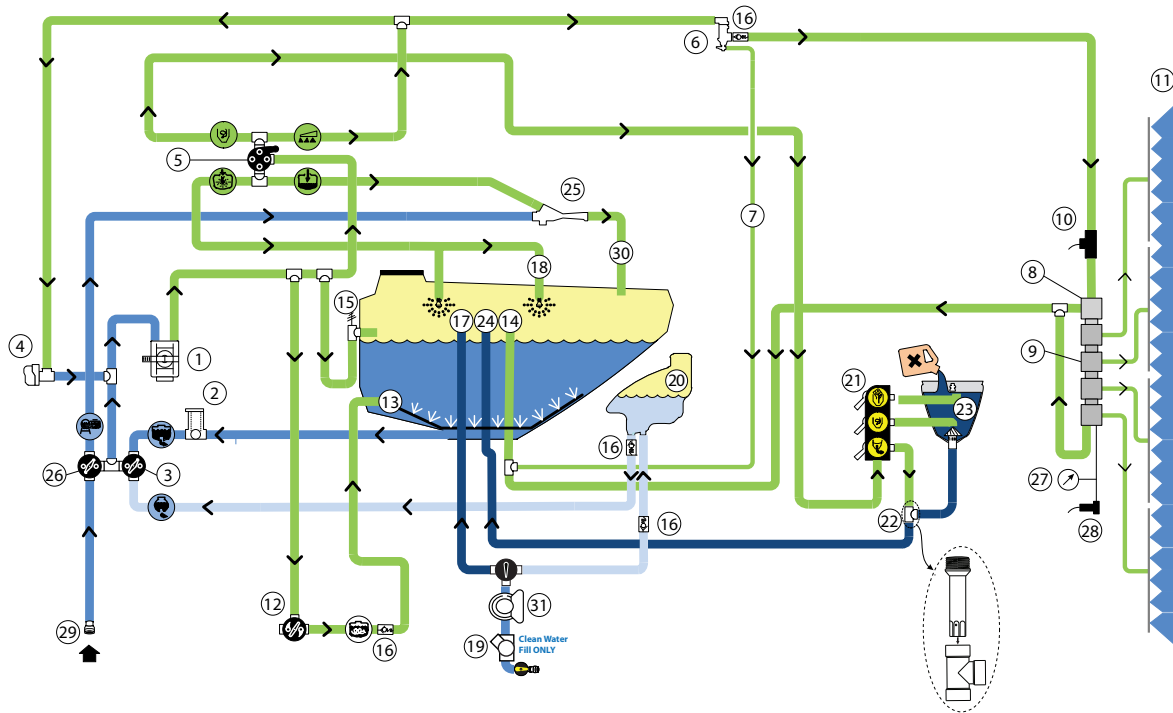


1. Main Pump
2. EasyClean Filter
3. Suction Valve for Main tank/RinseTank
4. Regulation Valve
5. Pressure SmartValve
6. SelfCleaningFilter
7. Return Line for Boost Function
8. Bypass Valve for Boom
9. Distribution Valves
10. Flow meter

11. Spray Boom
12. Agitation valve
13. Agitation Tube
14. Tank Hose for Return Lines (Riser Pipe)
15. Safety Valve
16. One-Way Valve
18. Tank rinsing Nozzles
19. Rinse Tank Coupler
20. Rinse Tank

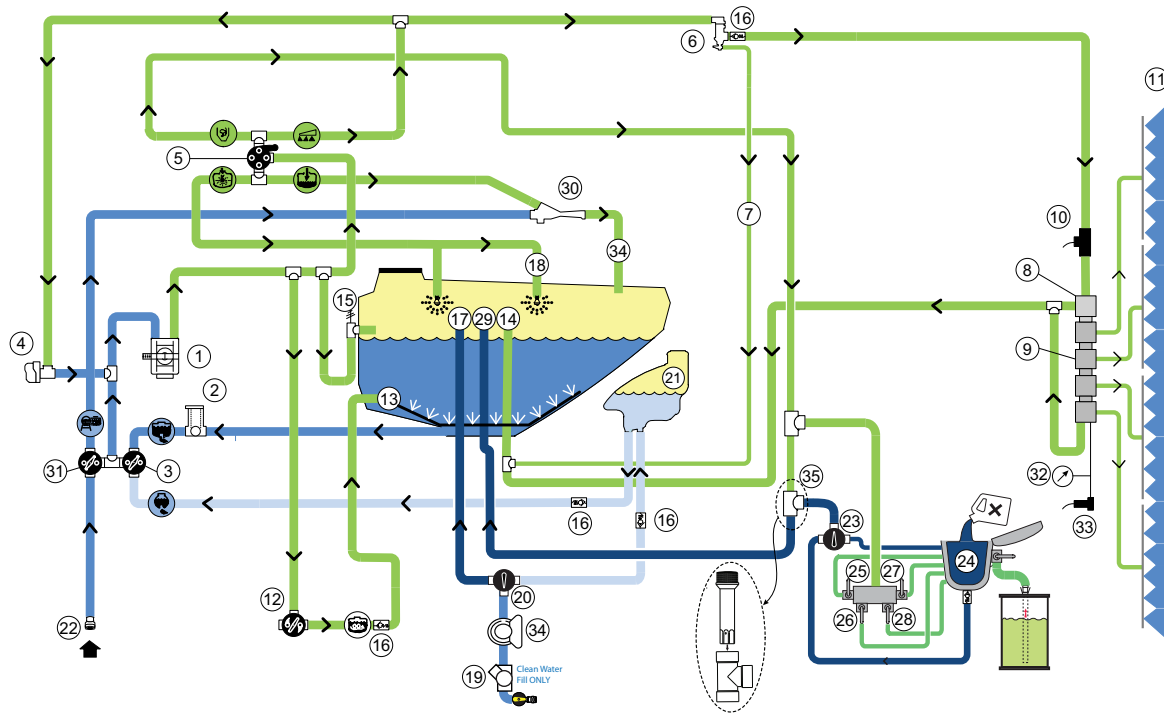
3 - Description

Diagram - Liquid System with Options and TurboFiller



- | | |
|--|-----------------------------------|
| 1. Pump | 17. Tank Hose (Riser Pipe) |
| 2. EasyClean filter | 18. Tank Rinsing Nozzles |
| 3. Suction Valve for Main Tank / RinseTank | 19. Filtered Fast Fill (optional) |
| 4. Regulation Valve | 20. Rinse Tank |
| 5. Pressure SmartValve | 21. Valve Block TurboFiller |
| 6. CycloneFilter | 22. TurboFiller Ejector |
| 7. Return Line for Boost Function | 23. TurboFiller |
| 8. Bypass Valve for Boom | 24. Tank Hose for Turbofiller |
| 9. Distribution Valves | 25. FastFiller Ejector |
| 10. Flow meter | 26. Filling Valve |
| 11. Spray Boom | 27. Pressure Gauge for Boom |
| 12. Agitation Valve | 28. Pressure Sensor |
| 13. Agitation Tube | 29. Filling Coupler |
| 14. Tank Hose for Return Lines | 30. FastFiller Hose to Tank Inlet |
| 15. Safety Valve | 31. Banjo Pump |
| 16. One-Way Valve | |

Diagram - Liquid System with Options and VACnMIX

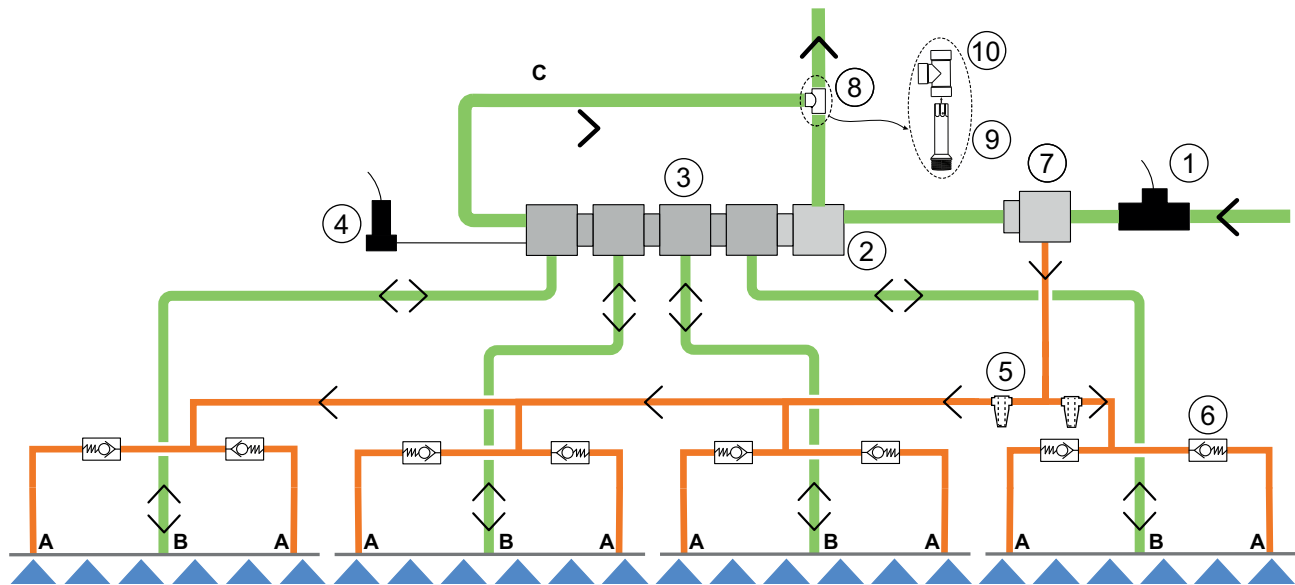


- | | |
|--|------------------------------------|
| 1. Pump | 19. Filtered Fast Fill |
| 2. EasyClean filter | 20. Directional Fill Valve |
| 3. Suction Valve for Main Tank / RinseTank | 21. Rinse tank |
| 4. Regulation Valve | 22. Filling Coupler |
| 5. Pressure SmartValve | 23. Vacuum Transfer Valve |
| 6. CycloneFilter | 24. VACnMIX |
| 7. Return Line for Boost Function | 25. Chemical container flush valve |
| 8. Bypass Valve for Boom | 26. Upper Vortex Jet valve |
| 9. Distribution Valves | 27. Fill / Vortex control valve |
| 10. Flow meter | 28. Lower Vortex valve |
| 11. Spray Boom | 29. Tank Hose VACnMIX |
| 12. Agitation Valve | 30. Fast Fill Ejector |
| 13. Agitation Tube | 31. Filling Valve |
| 14. Tank Hose for Return Lines | 32. Pressure Gauge Boom |
| 15. Safety Valve | 33. Pressure Sensor |
| 16. One-Way Valve | 34. Banjo pump |
| 17. Tank Hose (Riser Pipe) | 35. TurboFiller Ejector |
| 18. Tank Rinsing Nozzles | |

3 - Description

BoomPrime (optional)

BoomPrime is a low pressure circulation system, which primes the spray boom tubes prior to spraying, ensuring a homogeneous fluid in the boom tubes and in the MainTank. Below the illustration shows the BoomPrime system for the boom. Components are explained in the diagrams for the liquid systems.



- | | |
|----------------------|---------------------------|
| 1. Flowmeter | 6. Boom Prime Check Valve |
| 2. Bypass Valve | 7. Boom Prime Valve |
| 3. Section Valve | 8. Boom Prime Venturi |
| 4. Pressure Sensor | 9. Power Nozzle |
| 5. Boom Prime Filter | 10. T-piece |

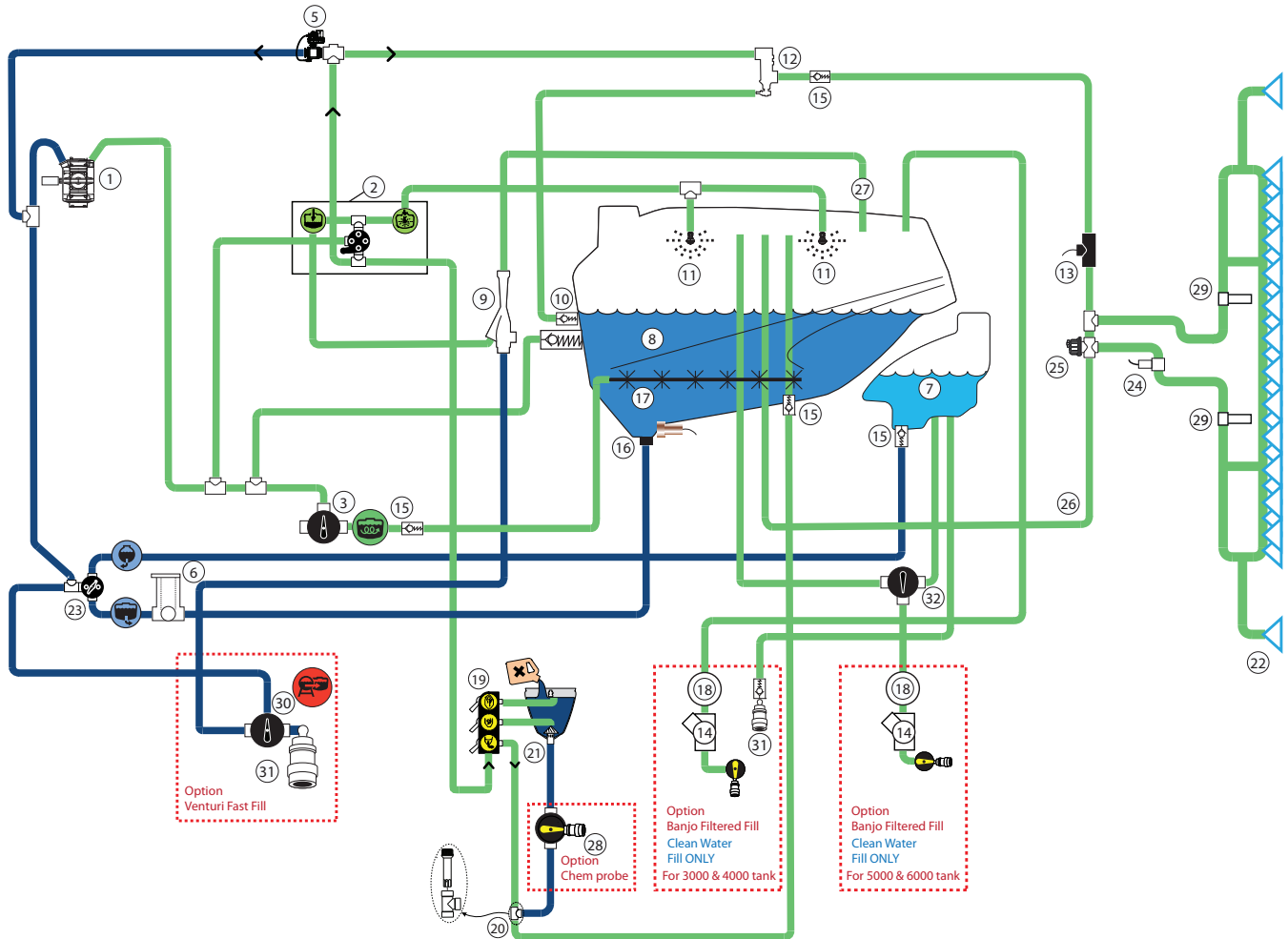
- The BoomPrime system is attached to each end of a boom section (A).
- The boom spray sections are fed into the middle of each section (B).

Liquid for BoomPrime is led through a valve (7) just after the flowmeter (1). This valve operates in opposite phase:

Operating State	Section Valves	BoomPrime Valve
Spraying	Open	Closed
Not spraying	Closed	Open

When priming, the direction of liquid flow will be reversed. The liquid is fed into the boom tubes from each end (A) and any chemical is returned back to the main tank through the return hose for the section valves (C). Low boom pressure is maintained by the use of a venturi (8). The power nozzle (9) for the venturi is supplied by liquid when the bypass valve is open.

Diagram - Liquid System with Options and TurboFiller - ActivAir



- | | |
|------------------------------|---|
| 1. Pump | 17. Agitation Tube |
| 2. Pressure SmartValve | 18. Banjo Filtered Fast Fill (optional) |
| 3. Agitation Valve | 19. Valve Block TurboFiller |
| 4. | 20. TurboFiller Ejector |
| 5. Regulation valve | 21. TurboFiller |
| 6. EasyClean filter | 22. Sprayer Boom |
| 7. Rinse tank | 23. Filling Valve |
| 8. Main tank | 24. Pressure Sensor |
| 9. Venturi | 25. Bypass valve |
| 10. Safety Valve | 26. Bypass valve return line |
| 11. Tank rinsing nozzles | 27. FastFiller Hose to Tank Inlet |
| 12. Cyclone filter | 28. Chem probe suction (optional) |
| 13. Flow meter | 29. Boom fluid isolation valves |
| 14. Filtered fill (optional) | 30. External fast filling ON/OFF valve (optional) |
| 15. One-way valve | 31. Fast fill coupler (optional) |
| 16. Main tank drain valve | 32. Directional fill valve (only for 5000& 6000 tank) |

3 - Description

3.4 Hydraulic System

Hydraulic Blocks

Hydraulic blocks fitted to the sprayer are described below.

Spray Boom

The main hydraulic block which distributes hydraulic fluid for the boom controls.

The throttle valve (A) can adjust the folding speed of the boom.
Adjusting inwards = slower boom.



ParaLift

This hydraulic block distributes hydraulic fluid for the ParaLift.

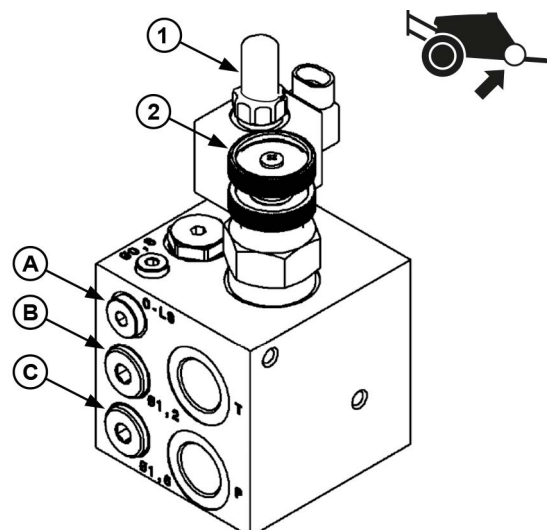


Open Centre Hydraulics

The open centre hydraulics block is required if the tractor uses open centre hydraulics and/or load sensing.

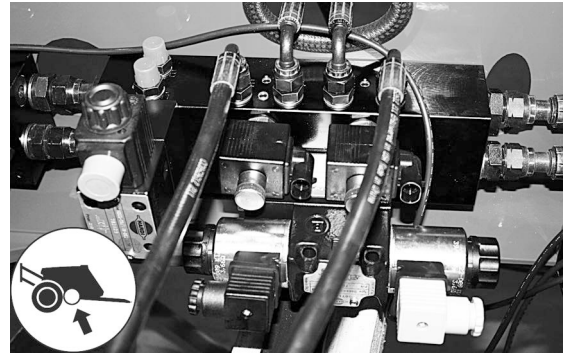
For adjustment, see "Open Centre Hydraulics" on page 84.

If in doubt what your tractor is using, see the tractor's instruction book or ask your tractor dealer.



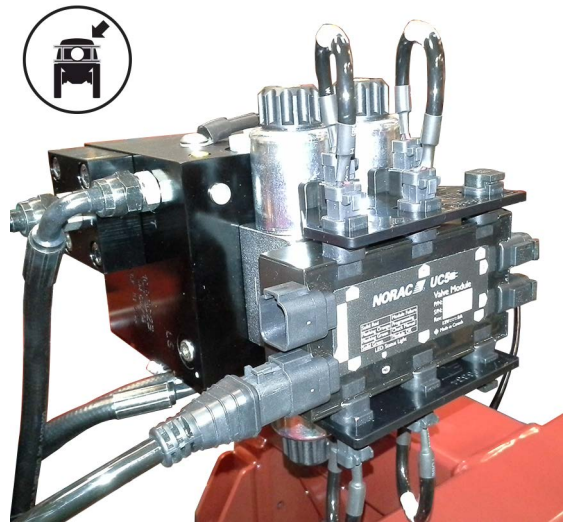
IntelliTrack Hydraulics (optional)

On sprayers with IntelliTrack steering, this hydraulic block distributes hydraulic fluid for the steering functions.



AutoHeight

On sprayers with the AutoHeight function, this hydraulic block distributes hydraulic fluid for the automatic boom height control functions.



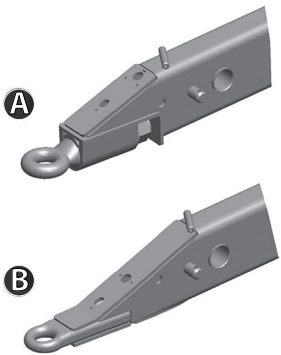
3 - Description

3.5 Equipment

Drawbars

Following drawbar couplings are available:

Drawbar	Hitch Type	Hitch Attachment
A	Pulling eye Ø50, swivel	Mounted on drawbar
B	Pulling eye Ø50, fixed	Welded to drawbar



IntelliTrack

The IntelliTrack will make the sprayer automatically follow the tractor rear wheels, when turning in the field, e.g. at headlands. The IntelliTrack can easily be operated with the hydraulic control unit. IntelliTrack has an integrated safety feature which prevents oversteering, when the driving speed is too high for the given turning radius. If a TankGauge is fitted, the tank filling level is also taken into account.

Advantages with IntelliTrack:

- Small turning radius.
- High precision when turning.

IntelliTrack requires the HC 5500 controller. More information can be found in the instruction book for the controller.

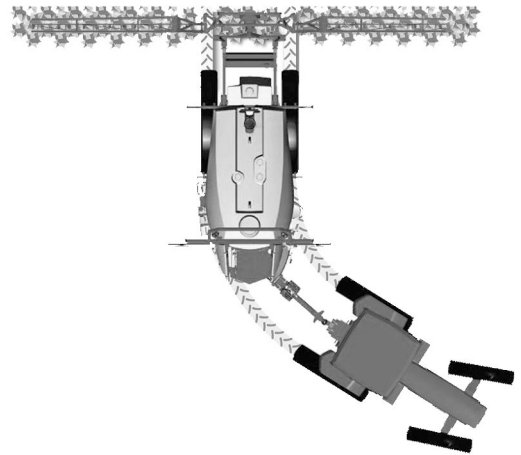


WARNING! The operator is responsible for setting the speed limit for IntelliTrack while taking into account the terrain and driving skills.

Ask your HARDI dealer if this setting is to be changed.



WARNING! During road transport the drawbar must be aligned in centre position and mechanically locked - see "Drawbars" on page 81. For more instructions, please refer to the instruction book for the controller in the tractor cabin.



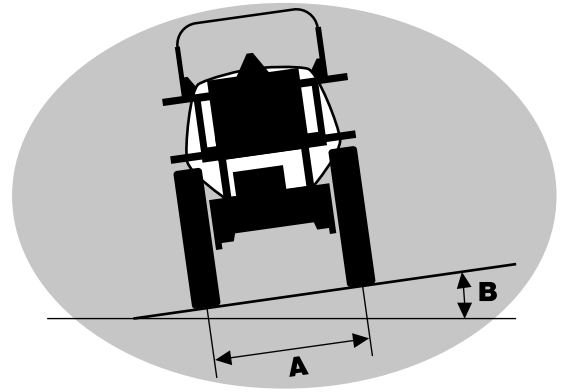
3 - Description

Driving technique for IntelliTrack

A trailer with IntelliTrack behaves differently than a normal trailer. In tracking position the vehicle centre of gravity is displaced more outward compared to the vehicle centre line of a normal trailer. Compared to a conventional trailer a steered trailer has decreased stability when turning, especially when turning on hillsides (B).

To avoid overbalancing, pay attention to these guidelines:

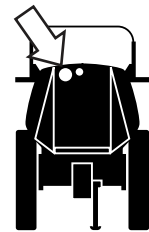
1. Avoid sudden, tight turns.
2. Slow down before entering a curve or turning, and drive with a constant, low speed during the turn.
3. Never slow down too fast, never brake heavily and never stop suddenly in a curve, or when turning on a hillside, when the sprayer is articulated.
4. Be careful when turning on uneven ground.
5. Set the track width (A) as wide as possible.
6. The proper function of the hydraulic system is essential to obtain good stability.



Nozzle Pressure Gauge

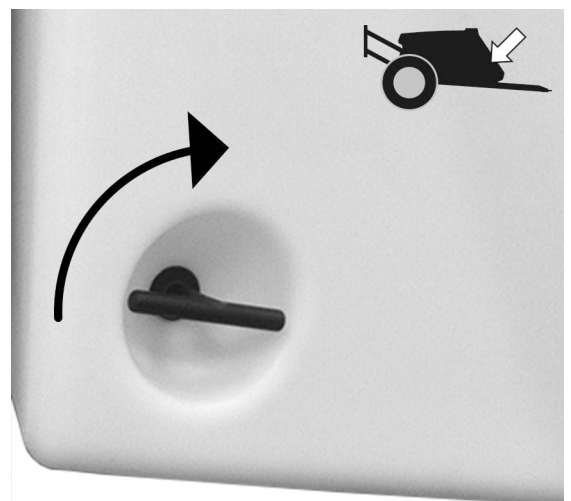
The nozzle pressure gauge is integrated in to the top of the platform. This pressure gauge measures the working pressure in the boom tubes as close to the spray nozzles as possible.

The outputs stated on the nozzle charts are always based on the pressure measured at the nozzle. When both calibrating and spraying, the pressure must be adjusted according to the readings of this pressure gauge.



Right Side Cover - HC 5500

The right side cover is opened by turning the handle in the lower left corner of the cover and lifting the cover up.

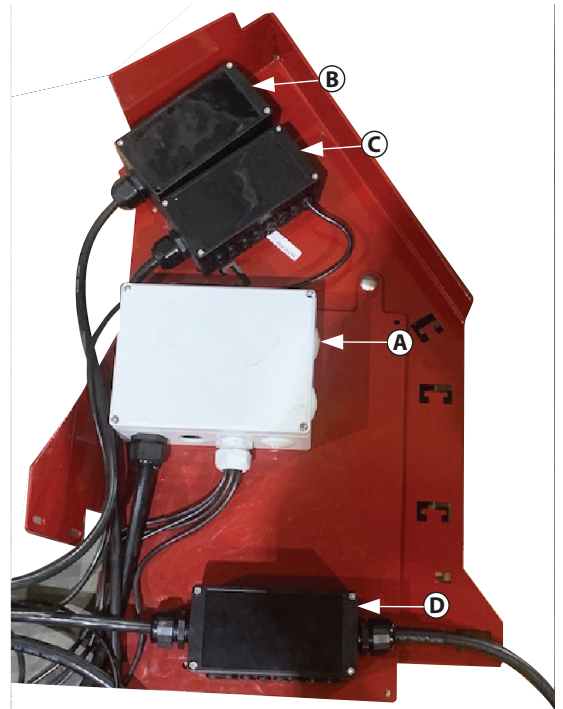


Main Components

- A. HC5500 breakout box.
- B. Junction box for under boom lights.
- C. Junction box for spray boom lights and work light.
- D. Junction box for electro hydraulic breakout.

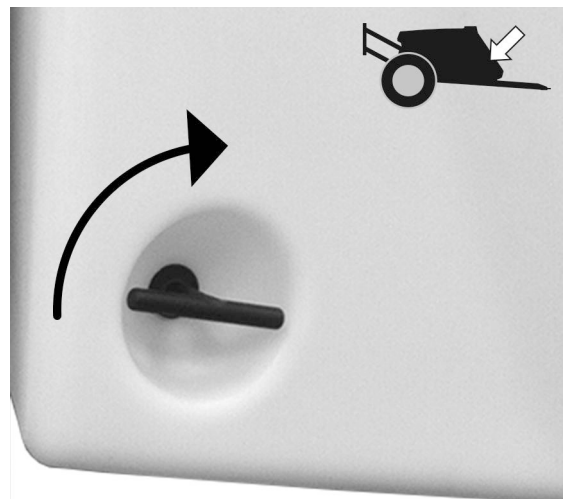


ATTENTION! Only open the right side cover, when the CleanWaterTank is empty!



Right Side Cover - HCM3

The right side cover is opened by turning the handle in the lower left corner of the cover and lifting the cover up.



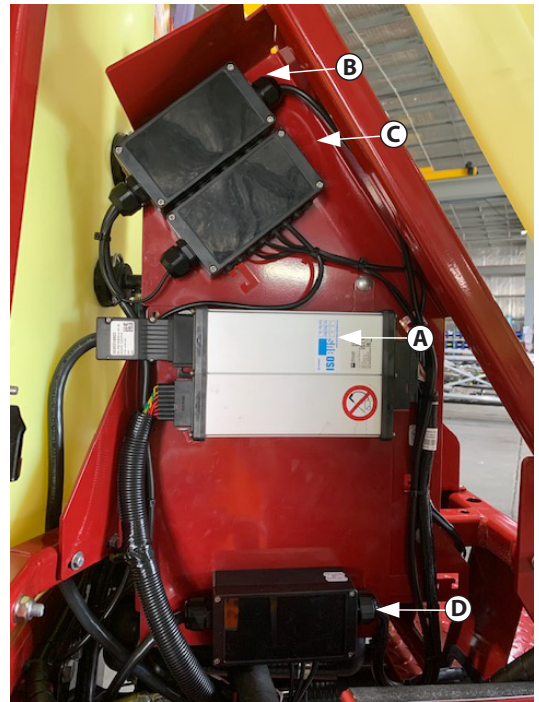
3 - Description

Main Components

- A. HCM3 Controller
- B. Junction box for under boom lights.
- C. Junction box for spray boom lights and work light.
- D. Junction box for tractor power supply.



(ATTENTION! Only open the right side cover, when the CleanWaterTank is empty!



Tank Level Indicator

Main tank

The actual liquid level in the main tank can be observed on the main tank level indicator (A), where a plug (B) inside the tube follows the liquid level, as it is connected to a float inside the tank.

The scale is displayed in litres - multiply by 100 for the reading.

Example: The plug floats at 10 on the scale; this means 1000 litres left in the tank.



ATTENTION! The level indicator is only a guidance for the liquid level in the tank.

For the most accurate reading, park the sprayer on level ground with the sprayer chassis in a horizontal position.

The total deviation of accuracy for the level for each scale mark or readout value is:

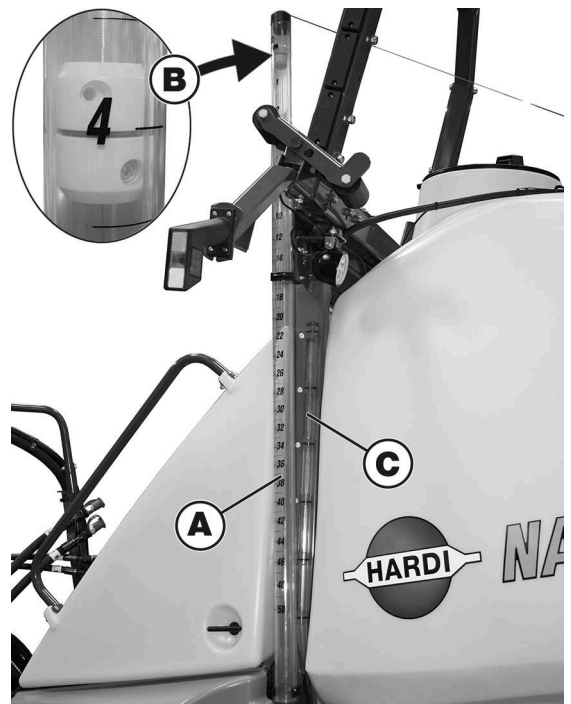
- $\pm 15\%$ for volumes up to 10% of the nominal tank volume.
- $\pm 7.5\%$ for volumes between 10 and 20% of the nominal tank volume.
- $\pm 5\%$ for volumes above 20% of the nominal tank volume.

RinseTank

The water level in the Rinsetank can be observed in the tube (C).

A red ball floating inside the tube indicates the water level.

- The ball is at the top of the tube: A full tank.
- The ball is at the bottom of the tube: An empty tank.



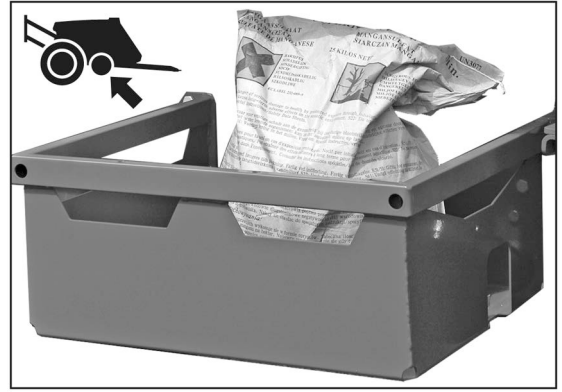
ChemLocker (optional)

A ChemLocker for storage of chemical containers or bags is mounted on the sprayer's right side.

The ChemLocker can also be used for storage of wheel chocks.



ATTENTION! Maximum load is 100 kg or 100 litres.



SafetyLocker

This locker is integrated to the front left hand of the platform. The SafetyLocker is for storage of safety gear such as non-contaminated protective gear, soap for hand washing etc.

The locker is split in two compartments for the separation of clean clothes and contaminated equipment.



WARNING! Although this locker is meant for the storing of non-contaminated items, it must never be used for the storing of food, beverages or other items meant for human consumption.



3 - Description

3.6 Optional Filling Systems

Optional Filling systems and equipment

- 1. Venturi Fast fill system (Venturi -Non Filtered fill)
- 2. Quick Filtered fill system (Filtered -External Pump)
- 3. Banjo Fast Fill (with high capacity Banjo Pump)

Venturi Fast Fill System

The “Fast Fill” option uses an on-board venturi system (powered by the HARDI 464 Diaphragm pump) to draw water directly from an external source.

A suction hose is run from an external water source and coupled to the sprayer via a trailer mounted aluminium quick coupler.



ATTENTION! The Fast Fill circuit does not include a filter or strainer! It is highly recommended you use a remote in line filter to remove any debris and impurities. For more information please contact your HARDI dealer.

Quick Filtered Fill System

The filtered “Quick fill” system allows the operator to fill the sprayer from an external water source using an auxiliary pump. The system includes a high capacity filter. The operator can also control the speed at which filling takes place by adjusting the quick fill ball valve on the sprayer.

By using the “Directional Fill” valve the “Quick Filtered Fill” system can be used to fill either “Main Tank” or “Rinse Tank”.



WARNING! If a high capacity pump is used open the tank lid before filling, be prepared to quickly turn off the pump and valve when the tank is full, otherwise there is a risk of overfilling causing structural damage to the tank.



ATTENTION! The Quick Filtered Fill system should only be filled with clean water.

Cam Lock coupling sizes:

3000, 4000, 5000 and 6000 Litre models.....2 or 3 inch

Banjo Fast Fill System

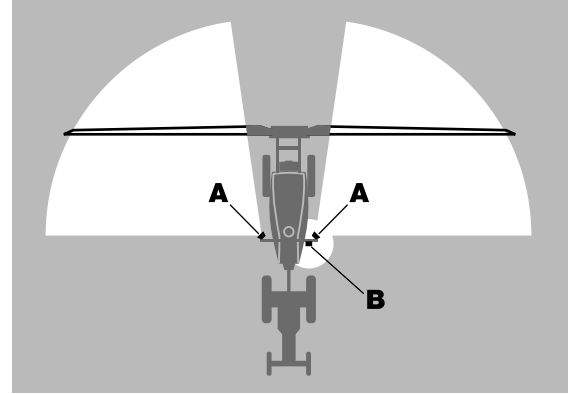
The Banjo Fast Fill system employs a high capacity centrifugal pump **(P)** driven by a hydraulic drive motor **(M)**. The motor is powered by the tractor's auxiliary hydraulic system and is protected from over speeding by a hydraulic relief valve.

The operator can also control the flow rate by means of a variable speed control valve **(V)** mounted on a panel by the filter on the LH side of the machine.

By using the “Directional Fill” valve the “Banjo Fast Fill” system can be used to fill either “Main Tank” or “Rinse Tank”.

Night Spraying Lights (optional equipment)

The 2 boom lights (**A**) are mounted to the railing of the working platform (one at each side) and are positioned to illuminate both boom wings for night spraying.

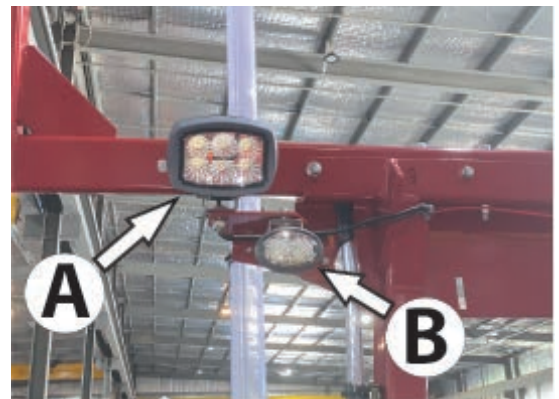


Work Light

The work area light (**B**) is also mounted to the railing of the working platform, just above the Manifold valves, and illuminates the HARDI ChemFiller, Safety locker and Manifold valves.



ATTENTION! Switch OFF the rear lights of the tractor in order to save power and to avoid reflection problems. Power supply is via the power socket.



3 - Description

ParaLift Lock Brackets

With the spray boom folded in transport position, the ParaLift is in locked position. This is to prevent accidental movements of the boom while driving on the road.

Description of the Lock Mechanism for FTZ/TR4

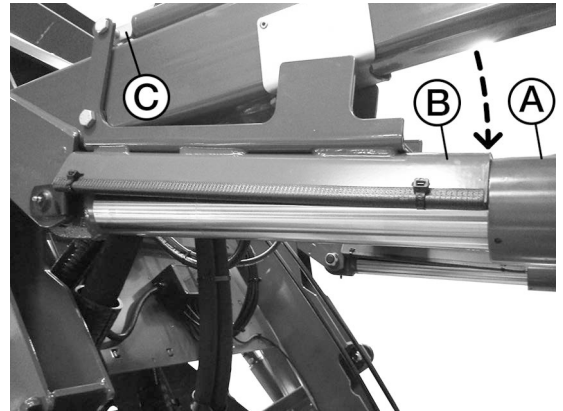
The hydraulic cylinder (A) for the ParaLift extends fully to raise the boom into transport position.

A lock bracket (B) will then automatically be lowered onto the extended piston rod by means of another hydraulic cylinder (C), when the boom is fully folded.

The lock bracket will now prevent the piston rod from retracting unintentionally during road transport, if the hydraulic pressure drops. The lock bracket helps to ensure a safe transport position of the boom.



WARNING! During road transport, it is important that the lock bracket is in the lock position. If not, it could cause a dangerous situation, if the hydraulic pressure drops. Risk of the boom falling out of the transport brackets, resulting in damage to the wheel mudguards and further damage to the sprayer. The extent of the damage depends on the sprayer size and boom size; however, this damage is depending on other components failing as well.



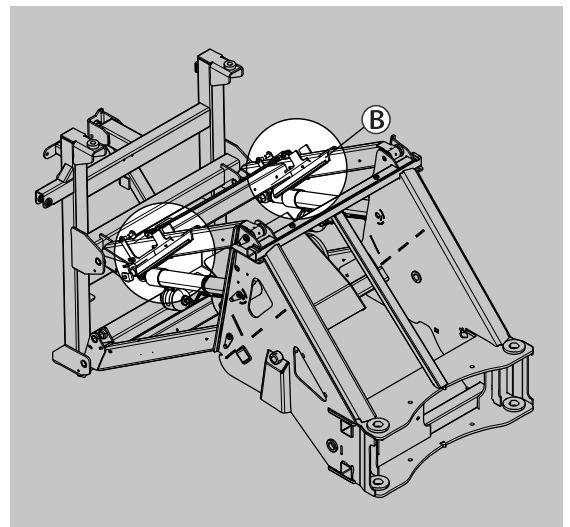
Service Situation



DANGER! In a service situation, it is very important that the lock bracket (B) is in the lock position. If the hydraulic pressure drops when standing below the ParaLift, it could cause a dangerous situation from a quickly lowered ParaLift.



DANGER! Risk of squeezing and being trapped. Risk of fatal accidents.



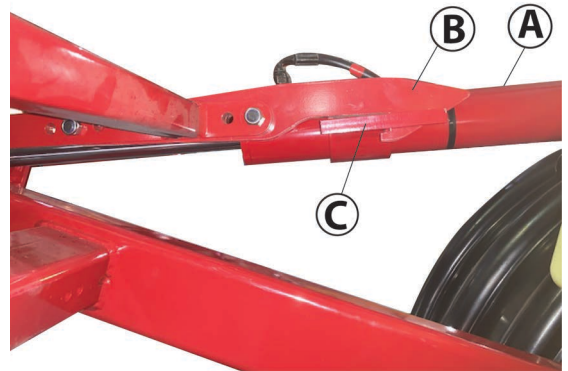
Description of the Lock Mechanism for 3000/4000

The hydraulic cylinder (A) for the ParaLift retracts to raise the boom into transport position. A lock (B) will then automatically be lowered onto the cylinder latch (C), when the boom is fully folded.

The lock will now prevent the piston rod from extending unintentionally during road transport, if the hydraulic pressure drops. The lock helps to ensure a safe transport position of the boom.



WARNING! During road transport, it is important that the lock is engaged. If not, it could cause a dangerous situation, if the hydraulic pressure drops. Risk of the boom falling out of the transport brackets, resulting in damage to the wheel mudguards and further damage to the sprayer. The extent of the damage depends on the sprayer size and boom size; however, this damage is depending on other components failing as well.



Service Situation



DANGER! In a service situation, it is very important that the lock (B) is in the lock position. If the hydraulic pressure drops when standing below the ParaLift, it could cause a dangerous situation from a quickly lowered ParaLift.



DANGER! Risk of squeezing and being trapped. Risk of fatal accidents.

4.1 General Info

Before Putting the Sprayer Into Operation

Although the sprayer has been supplied with a strong and protective surface treatment on steel parts, bolts etc., it is recommended that a film of anti-corrosion oil (e.g. CASTROL RUSTILO or SHELL ENSIS FLUID) is applied to all metal parts to avoid chemicals and fertilizers discolouring the paint or surface-treated parts.

If this treatment is applied before the sprayer is put into operation for the first time, it will always be easy to clean the sprayer and keep the paint or surface-treated parts clean for many years. This treatment should be reapplied every time the protection film has been washed off.

4 - Sprayer Setup

Support leg

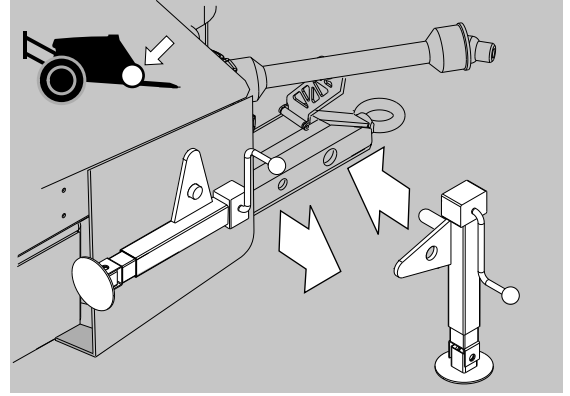
The support leg is stored in the bracket on the sprayer's right side when the sprayer is attached to the tractor.

To Use the Support Leg

1. Lift the leg off the storage bracket.
2. The support leg can then be mounted on the drawbar on both sides as preferred (for high hitch, left side only).
3. Secure with the linchpin.

To Remove the Support Leg

1. Lift the leg.
2. Remove the linchpin and pull out the support leg.
3. Secure the leg at the storage bracket with the linchpin.



Jack Up the Sprayer

When the sprayer needs wheel mounting or changing of wheels, wheel bearings or brakes, jack up the sprayer under the axle as shown on the example picture.

Notice the axle load (kg) in "Tyre Pressures" on page 206, and use a suitable jack and two axle stands for the task.



DANGER! Be sure to place sprayer at level and firm ground to prevent the sprayer from falling off the jack.



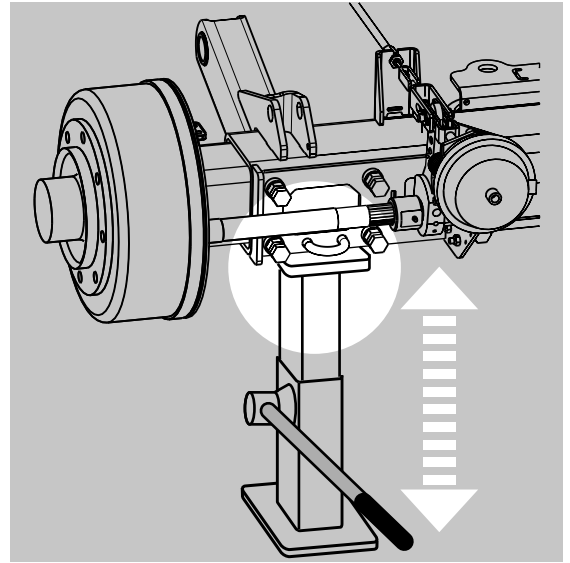
DANGER! The sprayer should be connected to the tractor. The tractor should be in park with the hand brake engaged and the key removed.



DANGER! Axle position is high. Correct jack stability is important.



DANGER! No personnel should position themselves under the sprayer when it is only supported by a jack. Ensure that axle stands are in place before personnel are allowed under the machine.

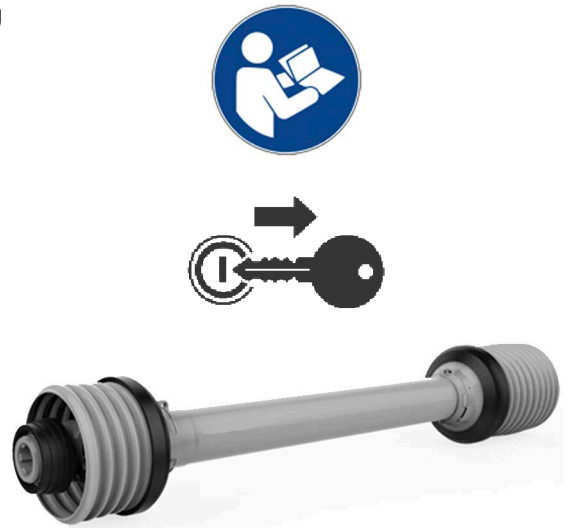


4 - Sprayer Setup

Transmission Shaft

Operator Safety

1. Always read the manufacturer's operator's manual before applying any changes to the transmission shaft!
2. Always STOP THE ENGINE and remove the ignition key, before carrying out maintenance or repairs to the transmission shaft or implement.
3. Always STOP THE ENGINE before attaching the transmission shaft to the tractor power take-off (PTO) - most tractor PTO shafts can be rotated by hand to facilitate spline alignment, when the engine is stopped.
4. When attaching the shaft, make sure that the snap lock is FULLY ENGAGED - push and pull the shaft until it locks.
5. Always keep the protection guards and chains intact and make sure that it covers all rotating parts, including CV-joints at each end of the shaft. Do NOT! use without protection guard.
6. Do NOT! touch or stand on the transmission shaft, when it is rotating - keep your safety distance at 1.5 meter. NEVER cross over a rotating PTO shaft to reach the other side of the sprayer.
7. Prevent protection guards from rotating by attaching the chains allowing sufficient slack for turns.
8. Make sure that protection guards around the tractor PTO and the implement shaft are intact.



DANGER! A ROTATING TRANSMISSION SHAFT WITHOUT PROTECTION GUARDS IS FATAL!

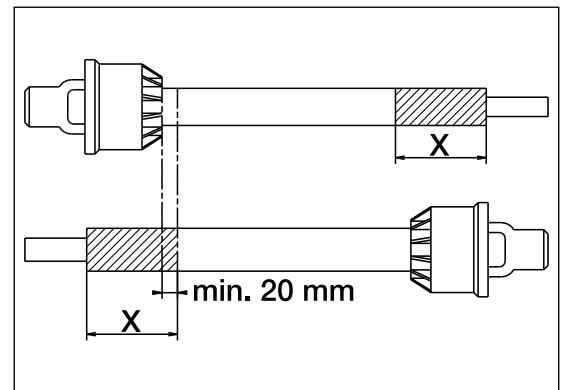
PTO Installation

First installation of the transmission shaft is done in the following way:

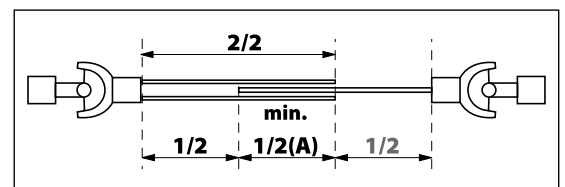
1. Attach the sprayer to the tractor and set the sprayer height in the position with the shortest distance between the tractor and the sprayer pump PTO shafts.
2. Stop the engine and remove the ignition key.
3. If the transmission shaft needs to be shortened, pull the shaft apart. Fit the two shaft parts to the tractor and the sprayer pump and measure how much the shaft needs to be shortened. Also mark the protection guards with the same length to be shortened.



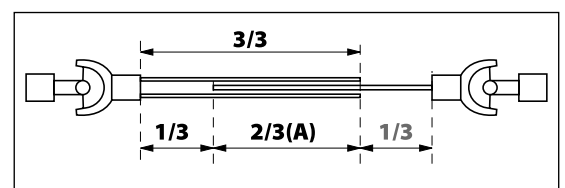
WARNING! Only shorten the shaft if it is absolutely necessary!



When cut, the shaft must always have minimum overlap (A) of $\frac{1}{2}$ of the shaft length.



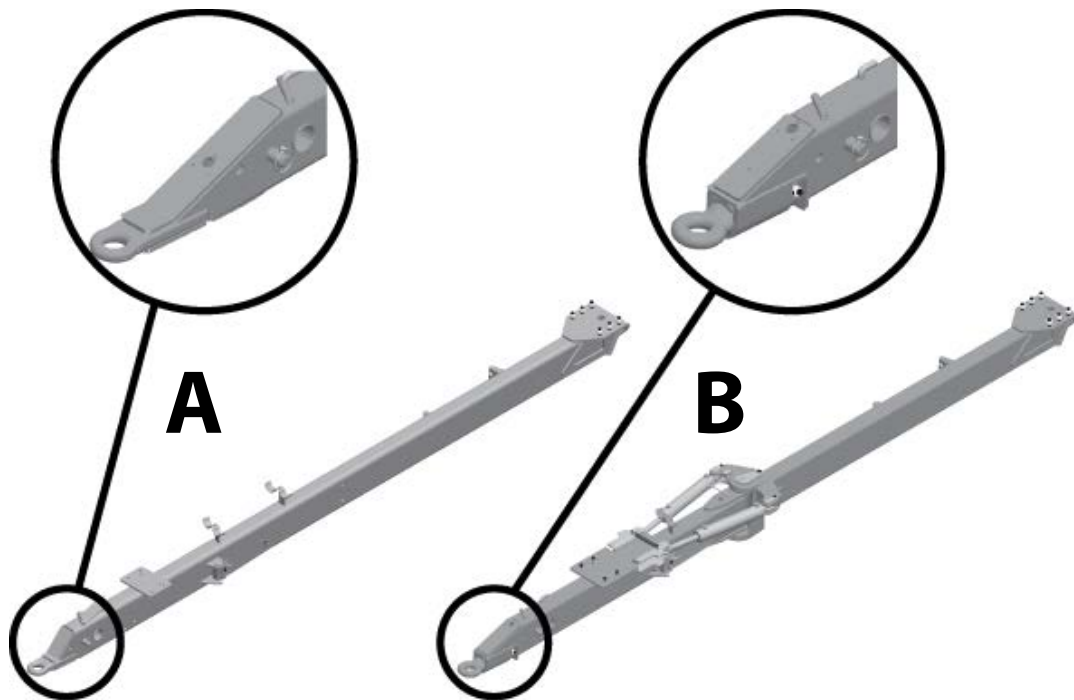
The recommended overlap (A) is $\frac{2}{3}$ of the shaft length.



4.2 Mechanical Connections

Drawbars

There is a choice between drawbar versions with different coupling parts.



The Navigator can be delivered as a fixed or a steered model.

All drawbars are fastened to the underside of the sprayer near the rear axle with 6 bolts secured by lock nuts. Furthermore the drawbar is supported by 2 bolts secured with lock nuts located in the area below the platform.

A Drawbar bushing is available which when fitted will reduce the standard 50mm hitch to 33mm.

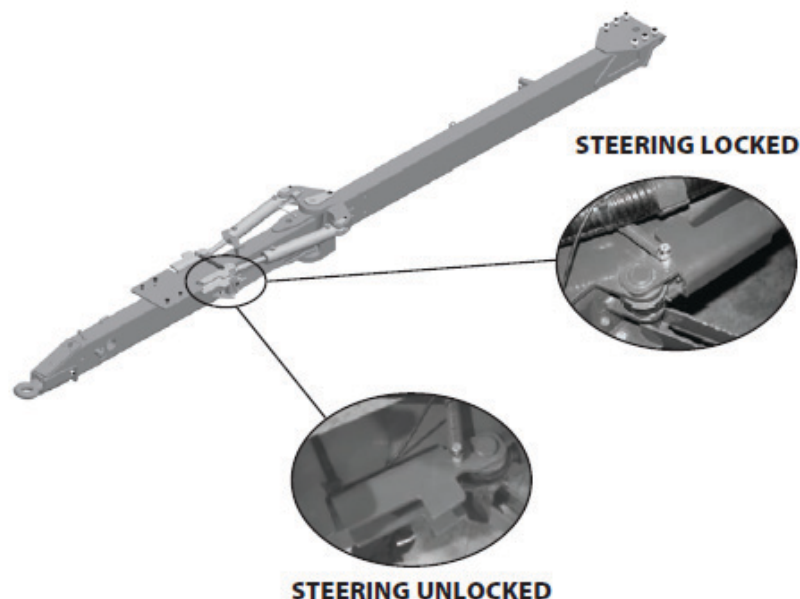
The following drawbar hitches are available;

- A. Fixed Drawbar
- B. Steering Drawbar

4 - Sprayer Setup

Tracking drawbar and transport lock (optional equipment)

The transport lock is a safeguard that will keep the drawbar in a centred position in case of hydraulic leakage during transport on public roads. The transport lock is fixed by swinging the lock plate onto the steering cylinders.



WARNING! Make sure to lock the steering when driving on public roads.



WARNING! Steering Lock is spring loaded and has the potential to pinch hands or fingers. Care should be taken when locking or unlocking the steering lock.

Hose Package Support

To prevent hoses and wiring from being damaged by the tractor wheels or the PTO shaft, all hoses, cables and wires are held by the hose package support fitted to the sprayer platform.



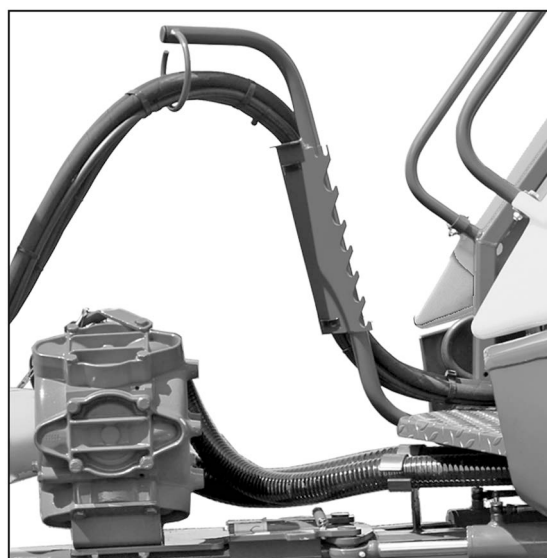
ATTENTION! A sprayer with steering requires more slack in the cables. Make sure that the hoses and cables are long enough in tight turns, when fully steered.



ATTENTION! Hydraulic hoses are provided with plastic covers. It is recommended to fit these when storing the sprayer.



ATTENTION! Electrical connections should not be left exposed. If storing the sprayer outside, it is recommended to cover the connections and then clean them before use.



Hydraulic Systems

General Info

Ensure that the snap couplers are clean before connection! Failure to do so will cause premature wear to the hydraulic system.

4 - Sprayer Setup

After having operated the boom, and the system has been filled with oil, check the tractor's hydraulic oil level, and top up if necessary.



DANGER! Test of the hydraulic system should be done very cautiously. There may be air trapped in the system which can cause violent movements of the boom.



DANGER! Hydraulic leaks: Never use your fingers to locate a leakage in any part of the hydraulic system. Due to high pressure, hydraulic oil may penetrate the skin.

Connecting the hydraulics

Make sure the hydraulic quick couplings are clean and dry taking care to connect the correct hoses to "Pressure" and "Tank" (the hoses are clearly marked for positive identification). The size and number of hydraulic hoses to connect depends on the optional equipment fitted to the sprayer. To assist in identifying the right hoses they have been tagged with colour coded "Zip-ties".

Function	Activation	Operation	Hose size	Tag colour	Hook up	
Boom Hydraulics					A	B
SPC Direct Hydraulics	Tractor Remote Control	Lift/Lower	3/8"	Green	Lift /Lower	Lift /Lower
SPC Direct Hydraulics	Tractor Remote Control	Fold	1/4"	Yellow	Fold-Unfold	Fold-Unfold
SPC Electric over Hydraulics	Switch Box Control	All	3/4"	Green	Pressure	Tank (Return)
FTZ	Switch Box Control	All	3/4"	Green	Pressure	Tank (Return)
TR4	Switch Box Control	All	3/4"	Green	Pressure	Tank (Return)
Options						
463/464 Pump Hydraulic Drive	Tractor Remote Control	Pump drive	1/2"	Red	Pressure	Tank (Return)
Banjo Filling Pump	Tractor Remote Control	Pump drive	1/2"	White	Pressure	Tank (Return)

Requirements for tractor

Y-model requirements (Only on EAGLE Boom)

- One single acting outlet for the lift function of the spray boom.
- One double acting outlet for the folding function.

Z-model requirements

- One double acting outlet for the electro hydraulic operation of the boom functions.

Optional hydraulic system requirements:

- One double-acting outlet for the Banjo filling pump



ATTENTION! The hydraulic hoses are marked with arrows to indicate the direction of oil flow.

- The system has a built-in flow regulator that maintains constant speed on hydraulic movements.
- Oil flow between 10 and 80 l/min and a min. pressure of 180 bar.
- Maximum permissible oil pressure is 210 bar.
- Return flow restriction of the connected tractor must be maximum 15 bar.



For Load Sensing systems an oil flow of approximately 3 l/min at 25 bar supplied by the sprayer hydraulics.

4 - Sprayer Setup

Open Centre Hydraulics

This hydraulic block is necessary, if the tractor uses open centre hydraulics and/or power beyond.

The valves (pos.1 and 2) are factory set for open centre hydraulics, but if closed centre hydraulics is used (also in combination with load sensing), screw in the valves (clockwise).



WARNING! Always be sure to fully open or close the selection valves for open/closed centre hydraulics.

Certain tractor models are able to use Load Sensing without connecting an external sensing line. But if optimal sensing control pressure cannot be obtained, an external sensing line needs to be connected to the tractor.

Connection to tractor

Optional restrictors inside the hydraulic block have different orifices depending on the oil flow returned to the tractor's oil pump.

A. Orifice is $\varnothing 0.8$ mm

B. Orifice is $\varnothing 1.2$ mm

C. Orifice is $\varnothing 1.6$ mm

All three connection ports are size G1/4".

Start with connecting to port A.

Check the hydraulic flow by activating a hydraulic lever in the tractor. If the reaction time for the hydraulic function is relatively short, continue your work with this restrictor installed.

If the reaction time seems too long before the hydraulic function is enabled, change to port B allow more oil flow to pass through. If the reaction time is still too long, change to port C.

Ask your HARDI dealer for correct setup and correct connection, if in doubt.



WARNING! It is essential that connectors on the sensing line are kept totally clean, so that impurities do not enter the pump. Failure to comply may cause damage to vital pump parts.



WARNING! Before operating the hydraulics, the valve should be set according to the specific tractor model. If you are unsure of the type of hydraulic system in your tractor, please contact your tractor dealer.

Combinations of settings for flow element and circuit value:

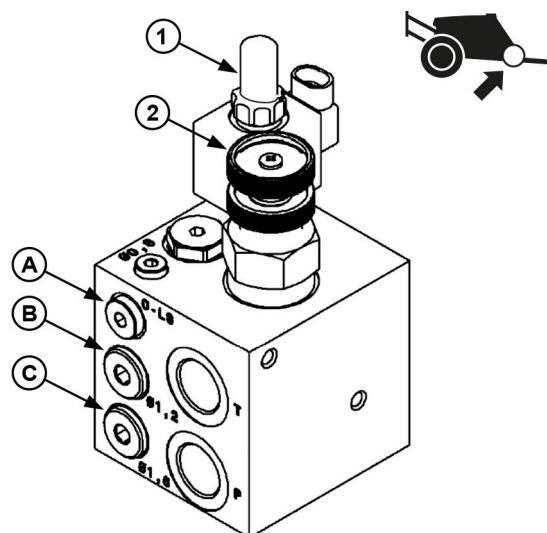
Application	Valve 1	Valve 2	LS port: A, B or C
Open centre	Out	Out	Not connected
Closed centre	In	In	Not connected
Power beyond	In	Out*	Connected

*If the tractor requires pressure relief, contact your tractor dealer for further advice.



NOTE! A spare part kit for connecting the hydraulic block to the tractor can be supplied by HARDI.

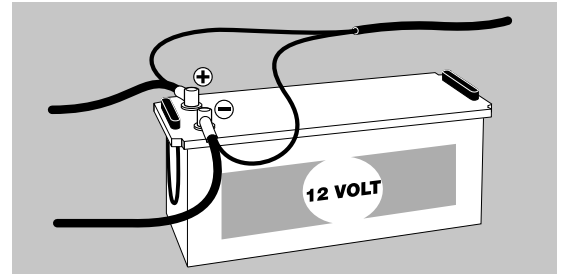
Electrical Connections

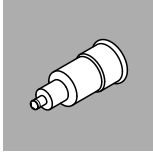
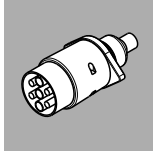



Power Supply

The power requirement is 12 V DC. Always note the polarity!

For proper function of the electric equipment for the sprayer, the tractor must have the following sizes of electric wires and fuses installed.



 <p>SprayBox Connector, 1-pin Plug</p> <p>The unit requires: Wire 2.5 mm². Fuse 10 amps.</p> <p>Hydraulic control unit requires: Wire 4.0 mm². Fuse 16 amps.</p> <p>Tractor must follow ISO 4165.</p>	 <p>Traffic Light Connector, 7-pin Plug</p> <p>The unit requires: Wire 6x 1.5 mm² + 1x 2.5 mm².</p> <p>The cable is custom made and must not be changed to another type.</p> <p>Tractor must follow AS 4177.5-2004.</p>
 <p>ISOBUS Connector, 9-pin Plug</p> <p>The unit requires: Wire 2x 10 mm² + 2x 2.5 mm² + 2x (2x 0.5 mm²)</p> <p>The cable is custom made and must not be changed to another type.</p> <p>Tractor must follow ISO 11783-2.</p> <p>Cabin connector for Grip control and SetBox: HARDI item no. 26031500</p>	

i NOTE! The delivered power connectors follow the standard of most modern tractors. If you have a tractor with another power connector, it is necessary to disassemble the connector and fit it to the actual sprayer connector. Contact your HARDI dealer.

i NOTE! The delivered connectors may vary on the sprayer, depending on its equipment and scope of supply.

4 - Sprayer Setup

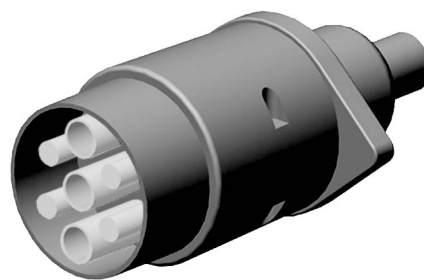
Road Safety Kit

If rear lights are installed, connect the plug for rear lights to the tractor's 7-pin socket and check the function of rear lights, stop lights, side lights and direction indicators on both sides before driving.

The wiring is in accordance with AS 4177.5-2004. See the chapter "Technical Specifications" in this Instruction Book.



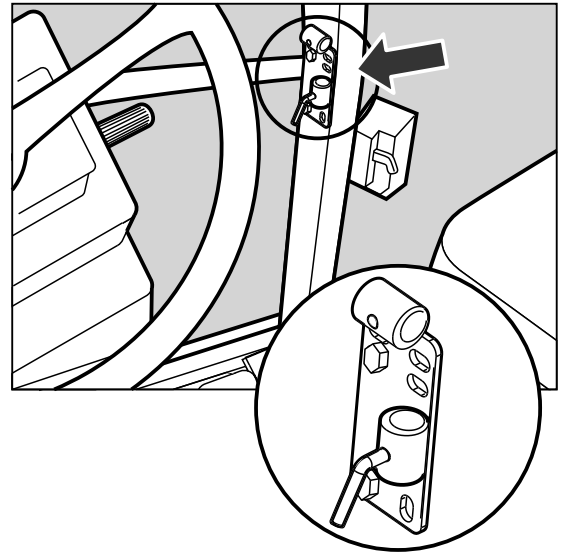
ATTENTION! Turn OFF all work lights when driving on public roads!



Installation of Control Unit Brackets (HC5500)

Find a suitable place in the tractor cabin to fit the control units.

Best recommended position is to the right of the driver seat.



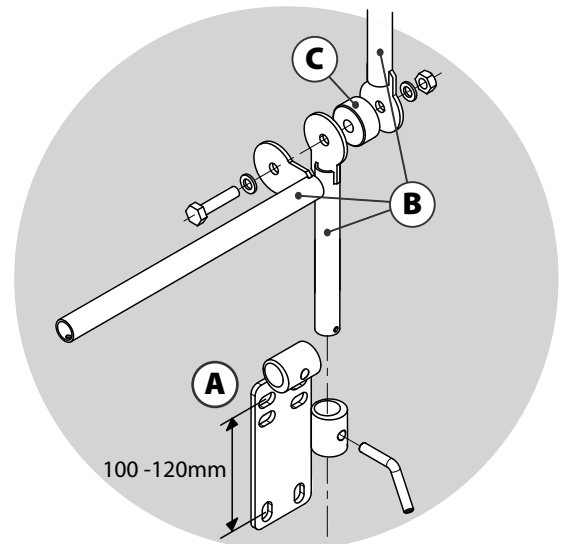
The supplied tractor pillar bracket (A) has a hole spacing of 100 and 120 mm, which fits most tractors. Threaded holes for fitting may be hidden behind the front corner cover. Check the tractor's instruction book for information regarding attachment points.

Supplied are three tubes (B) for fitting. One, two or all three may be used. They can be bent and shortened. A spacer (C) is also supplied to allow further attachment possibilities. Find the best solution for your tractor or vehicle.

The tube (B) plate is staggered so that, if correctly orientated, all boxes will line up.



ATTENTION! See the controllers instruction book for further details of fitting the controller equipment.



4 - Sprayer Setup

Speed Sensor for Sprayer (only for HC 5500)

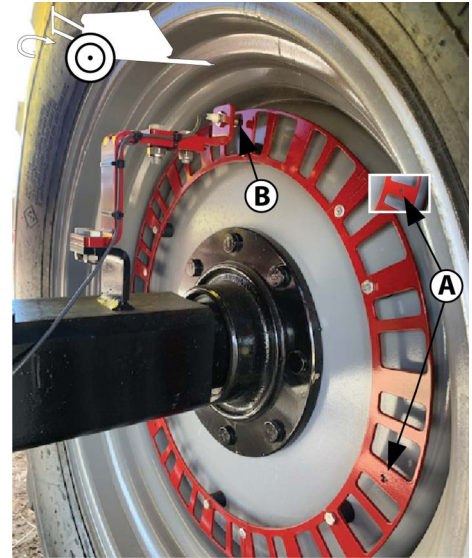
The speed sensor and speed ring are located at the inside of the sprayer's right wheel. The sensor is an inductive type that requires a metallic protrusion like the speed ring to pass by it to trigger a signal.

Adjustment

1. Assure that the speed ring is correctly fitted to the wheel, so that the arrow (A) follows the rotation of the wheel in the forward driving direction.



ATTENTION! Check that the black sensor (B) lines up in the middle of the air gaps in the speed ring when looking in vertical direction.



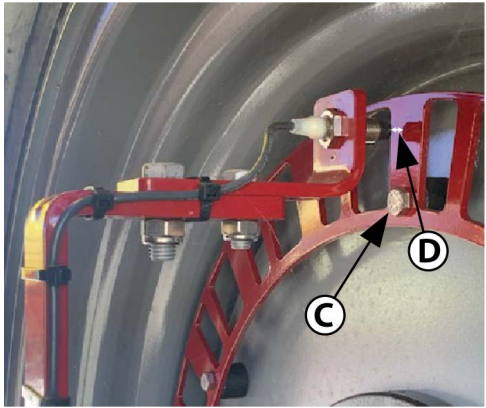
2. Adjustment of the air gap begins with the sensor directly opposite one of the bolts (C) holding the speed ring.
3. Adjust the air gap (D) between sensor and speed ring to 4 mm. Use a drill bit or similar tool.

4. After adjustment, spin up the wheel.

The air gap variation must be less than ± 0.5 mm for the sensor to function correctly.

Check this at the entire circumference of the wheel.

5. Verify the speed on the controller.



ATTENTION! Correct fitting is indicated by continuous flashing from the transducer, when the wheel rotates.

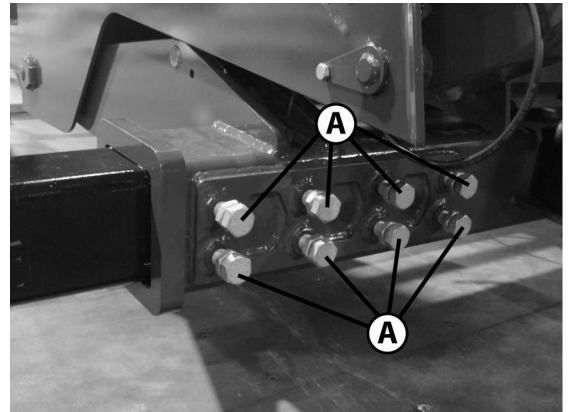
Track Width, Axles and Wheels

Altering the track width

The track width of the sprayer can be altered as follows.

Altering procedure

1. Measure the current track width (centre RH tyre to centre LH tyre). Each side must be extended or retracted half the desired alteration.
2. Attach the sprayer to tractor and engage tractor parking brake.
3. Place stop wedges in front of and behind RH wheel. Jack up LH wheel, support and secure sprayer body.
4. Loosen the conternut at the bolts (A) and the bolts (A) for LH wheel axle.
5. Extend or retract the axle.
6. Tighten the clamp bolts (A) to a torque of 640 Nm and lock the bolts with the conternuts.
7. Lower down the LH wheel.
8. Repeat the procedure on RH wheel.
9. Check if the distance from centre tyre to centre of rear frame is equal at RH and LH.
10. Retighten bolts and wheel bolts to specified torque after 8 hours of work.



WARNING! Bolts must always be locked and must always have contact. Never widen the axle beyond the securing bolt locations (A).



ATTENTION! The wider the track width, the better the stability of the sprayer. HARDI recommends to work with widest possible track width.

4 - Sprayer Setup

4.3 Liquid System

Water Sensitive Paper

Use this type of paper to help find the best spray setup and air setting.

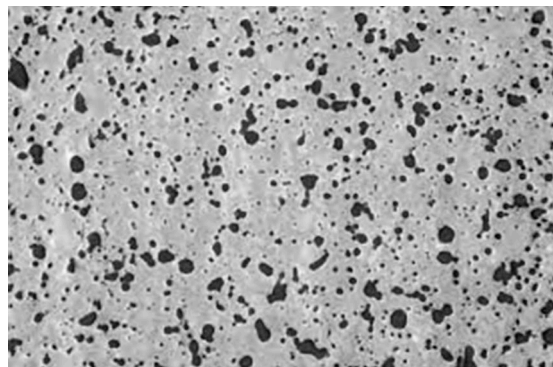
Some time spent in different types of crops with clean water in the tank and some water sensitive paper will create a valuable experience for the future work with your sprayer.

Test

The paper can be cut into smaller pieces (to simulate the target) and fixed with double sided tape at relevant places in the crop.

Now spray with pure water and check the blue spots (droplets) on the paper. This way you can test different spraying techniques.

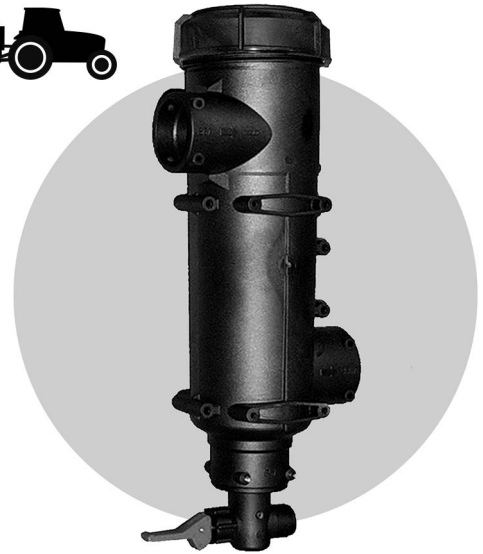
Water sensitive paper is available at your local HARDI dealer (ask for HARDI item no. 893211).



SelfCleaningFilter

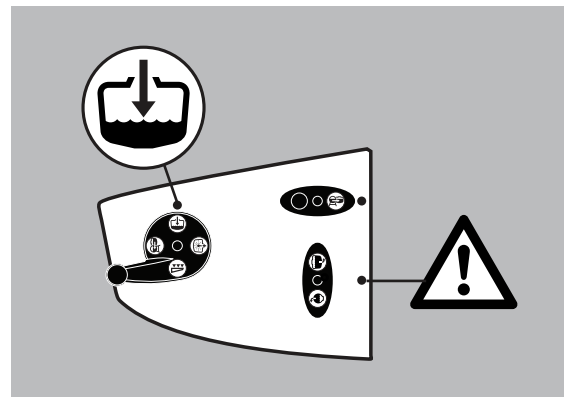
The standard filter size is 80 mesh and can be changed by opening the filter top.

Check condition of O-rings and lubricate if necessary or replace them if damaged, before reassembly.



DANGER! Never open the SelfCleaningFilter unless the suction SmartValve is closed and the pressure SmartValve is turned to "MainTank".

Otherwise spraying liquid may hit you, when opening the filter and drain from the MainTank!



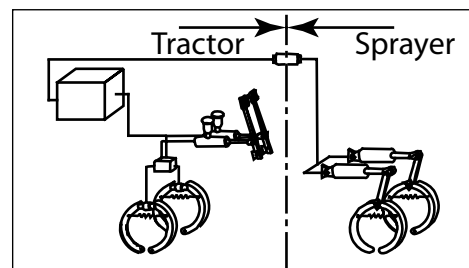
4 - Sprayer Setup

Brakes

Hydraulically Activated Brakes (optional)

This requires a special trailer brake valve connected to the tractor's hydraulics and brake system.

Connect the snap coupler to the tractor brake outlet. When the tractor brakes are applied, the trailer brakes will work proportionally to the tractor brakes, and ensure safe and effective braking.



NOTE! Ask your tractor dealer if in doubt.



WARNING! Do not connect the brakes directly to the tractor hydraulics without a brake valve. The trailer brake power cannot be controlled, and braking will therefore be hazardous.



WARNING! Maximum oil pressure is 150 bar in the brake line.

4.4 Transport

Transport Lock

Models with 3000/4000 litre tank only

The transport position can be set independently to obtain different transport heights.

To change position:

1. Lift and unfold inner sections till lock is disengaged.
2. Lower the boom completely.
3. Loosen and remove the two bolts, which keep the parts (X) and (Y) assembled.
4. Reassemble (X) and (Y) according to desired hole combination.
5. Recommended setting is when leaving 170 mm exposed from paralift cylinder ram.



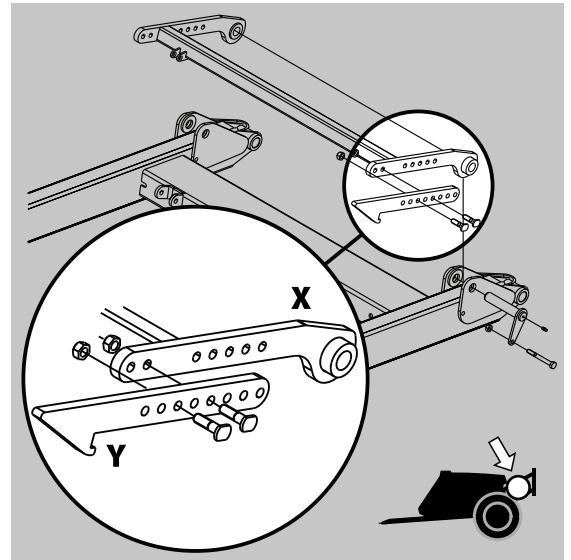
ATTENTION! Always use both bolts to assemble the lock. The setting must be identical on both sides.



ATTENTION! The rear settings must correspond to the front settings, so that the boom is resting on the front as well as rear brackets.



WARNING! The max. transport height must never exceed 4.0 m. Always measure the actual total height and choose settings not exceeding 4.0 m.



Transport lock boom FTZ, TR4

The boom is mechanically held in transport position with paralift lock mechanisms that automatically engage when the first outer is closing. The folded channel-section locks are fixed to the top paralift arm and engage directly on the top of the paralift cylinders when lowered for transport. This means the boom is not supported by hydraulic oil pressure when in transport.



WARNING! Paralift locks should be checked before and after transport to ensure positive lock engagement.



WARNING! When the sprayer is being transported along rough road and is bounced over pot holes, in extreme cases there is a risk that the lock arms can disengage.



4 - Sprayer Setup

Counter Weight

To improve stability on articulated models, extra weight can be added by means of liquid-filled tyres.

The standard tyre valve is an universal air-water valve. The tyres may be filled with liquid to max. 75% of their total volume.

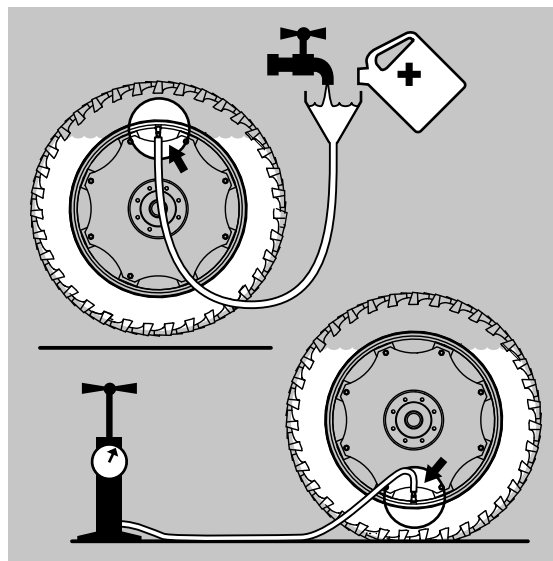


ATTENTION! Use only a suitable tyre coolant.

Filling the Tyres

1. Jack up the wheel and rotate wheel till the valve is positioned at "12 o'clock".
2. Remove the valve body and fill liquid, until it reaches the valve.
3. When surplus liquid is drained through the valve stem, fit the valve body again.
4. Adjust tyre pressure and lower the wheel.

Please refer to "Tyre Pressures" on page 206.



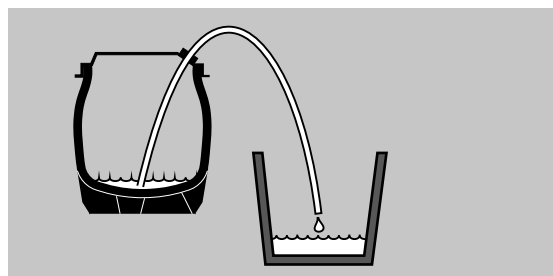
WARNING! The tyres must be liquid filled to max. 75 % of total tyre volume. Fill only the quantity. of liquid necessary to obtain sufficient stability of the sprayer.



ATTENTION! When filling the tyres, the valve should be positioned at 12 o'clock, and when adjusting the tyre pressure the valve should be positioned at 6 o'clock.

Emptying the Tyres

1. Rotate wheel until the valve is positioned at "6 o'clock".
2. Remove the valve body and lead the liquid away. Retain the liquid in an appropriate container.
3. To empty the tyre completely, the tyre is inflated and a thin drain tube is led to the bottom of the tyre. The air pressure will now empty the remaining liquid.
4. Remove the drain tube, fit the valve and inflate the tyre to specified pressure. Please refer to "Tyre Pressures" on page 206.



ATTENTION! Disposal of tyre coolant has to take place according to local legislation.

5.1 General Info (Refer to Muller manual)

Environmental Info

For environmental info, please refer to the following parts in the Spray Technique Manual (Pn: 674953):

- Nozzles.
- Spray quality.
- Choosing nozzles for arable crops.
- Spraying speed.

Sprayer Use

The HARDI sprayer is for application of crop protection chemicals and liquid fertilizers. The equipment must only be used for this purpose.

If the sprayer is to be used for purposes other than the ones described in this instruction book, a new risk assessment and a workplace assessment must be completed for this use. This obligation lies with the owner and operator - see "Before First Use of the Sprayer" on page 9.

Improper use of the sprayer results in risks to your safety, health, and even a risk of death.










If no local law demands that the operator must be certified to use spray equipment, it is strongly advised to be trained in correct plant protection and in safe handling of plant protection chemicals to prevent unnecessary risk for persons and the environment, when carrying out your spray job.

Symbols for Valves




The following symbols are shown on labels on the sprayer, where the operator can set a valve to stop or start a function.

The labels must be readable when operating the sprayer. Damaged or unreadable labels must be replaced.

The symbols are explained here.

Symbol	Symbol Description	Label Colour	HARDI Item Number
	Suction from the MainTank	Black / Blue	97821900
	Suction from the RinseTank	Black / Blue	97822000
	Filling of the MainTank from an external tank	Black / Blue	97822100
	Filling of the MainTank	Black / Green	97810300
	Spraying / Pressurized nozzles	Black / Green	97810400
	Cleaning the inside of the MainTank	Black / Green	97810500
	Agitation in the MainTank	Black / Green	97810900
	Filling of the RinseTank	Black / Green	97810800
	TurboFiller	Black / Green	97825400

5 - Operation

Symbol	Symbol Description	Label Colour	HARDI Item Number
	Cleaning of empty chemical containers	Black / Yellow	97821600
	Agitation in the TurboFiller	Black / Yellow	97821500
	Suction from the TurboFiller to the MainTank	Black / Red	97821400

Spray Boom

Safety Info

Keep the spray boom in folded position while driving outside the field. Park the sprayer and tractor on level ground before using the folding/unfolding functions.

Failure to comply will damage the boom and cause dangerous situations to people and the surroundings.



DANGER! Before unfolding the boom it is important to connect the sprayer to the tractor's hitch point to prevent overbalancing of the sprayer. Activate the tractor's handbrake.



DANGER! When folding or unfolding the boom, make sure that no persons or objects are within the operating area of the boom.

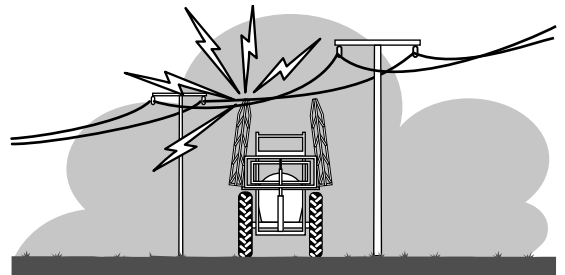


DANGER! Always follow the guidelines listed below when driving in areas with overhead power lines:

Keep from using the folding/unfolding functions in areas with overhead power lines. Unintended boom movements may cause contact with overhead power lines, causing a risk of fatal accidents.



ATTENTION! A label (HARDI item no. 978448) is fitted to the sprayer. This label must be placed in an easily visible position.



5 - Operation

Manoeuvring of the Boom (Y-version)

The boom can be manoeuvred according to instructions below.





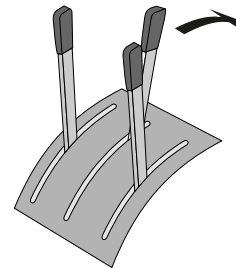
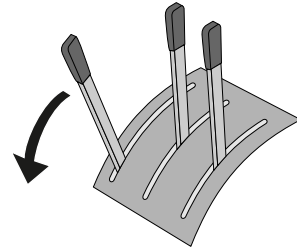
WARNING! The folding functions must only be operated, when the sprayer is stationary! Failure to do so will damage the boom.



ATTENTION! Only unfold and fold the boom on level ground.

Unfold the Boom

1. Raise the boom lift until it is clear of the transport brackets, using the single acting hydraulic outlet lever.
2. The symbol  must be shown on the display.
If not, lock the pendulum by pressing  for 1 second.

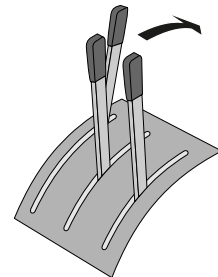


3. Unfold the boom completely using the double acting hydraulic outlet lever.

4. Lower the boom to correct working height, using the single acting hydraulic outlet lever.

5. Unlock the pendulum by pressing  for 1 second.

The symbol  is now shown on the display.

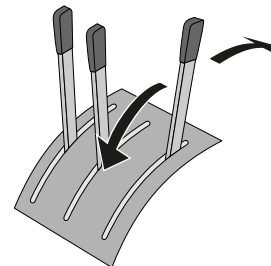


Fold the Boom

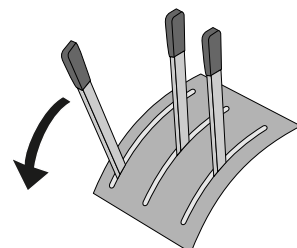
1. Slant available: If the boom is slanted, then neutralize the slant angle.

2. Lock the pendulum by pressing  for 1 second.

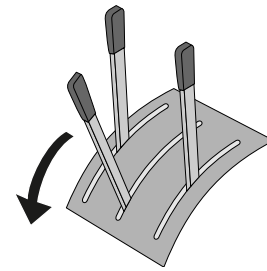
The symbol  is now shown on the display.



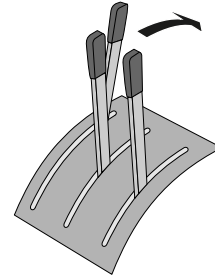
3. Raise the boom to the highest possible position, using the single acting hydraulic outlet lever.



4. Fold the boom completely using the double acting hydraulic outlet lever.



5. Lower the boom, until it rests in the ParaLift locks.



5 - Operation

Single-side Half Boom Wing (Option for 2-fold booms)

It is possible to spray with only the inner wing unfolded at one of the boom wings. This function is useful when spraying close to obstacles and in areas where a fully unfolded spray boom will not fit.



ATTENTION! The single-side half boom wing system has been designed to bypass obstacles and operate in narrow spaces, for a short duration only, and not for a continuous spray job of larger areas.

Procedure

1. Unfold the boom as explained in "Manoeuvring of the Boom (Y-version)" on page 98, and start the spray job.
2. When necessary to pass an obstacle during the spraying, stop the sprayer.
3. Lock the pendulum.
4. Fold either the left or right outer boom wing.
5. On the Grip, turn Off the spray sections placed on the outer boom wing just folded.
6. Continue spraying around the obstacle at a speed not exceeding 2 km/h.



ATTENTION! Do not unlock the pendulum, when spraying with a half unfolded spray boom.

7. When the obstacle is passed, stop the sprayer.
8. Unfold the outer wing and then unlock the pendulum.
9. Turn On the closed spray sections and continue spraying at normal spraying speed.



WARNING! Spraying with one boom wing half unfolded, must be done at a reduced speed not exceeding 2 km/h. Failure to do so may damage the boom!



WARNING! Failure to comply with the above mentioned guidelines, will damage the sprayer due to asymmetrical load and operation with the pendulum locked.

Night Spraying Light

The night spraying light is activated on the Spraybox or ISO screen. Use the A and B switches to activate the lights.

If you have a controller model HC 5500, the night spraying light may be activated using other switches depending on the equipment setup for the sprayer.

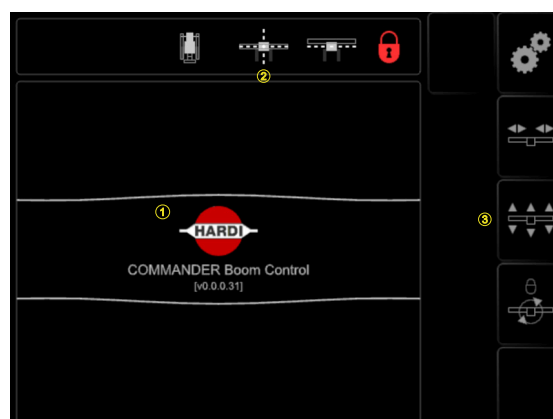
If traffic lights are fitted, the work lights will only work, when the traffic light is on.

HCH-508 Overview

Main screen

The main screen of the HCH-508 ISOBUS hydraulic control system is displayed on the right. There are 3 elements to this screen.

1. Profile description and firmware version.
2. Top row display showing basic boom conditions.
3. RH column soft keys to access further operational pages.

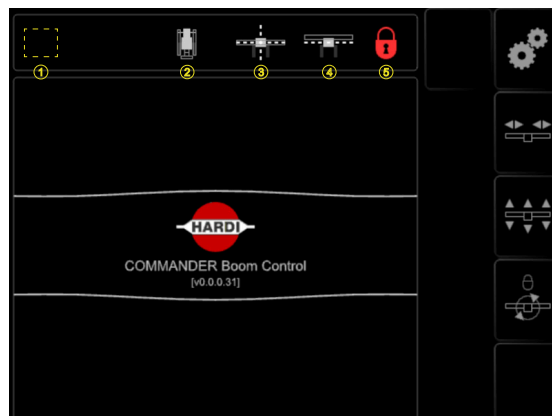


5 - Operation

Top row iconography

The top row of the HCH-508 ISOBUS hydraulic control system is always shown at the top of the VT screen. There are 5 elements that may be seen from this part of the display.

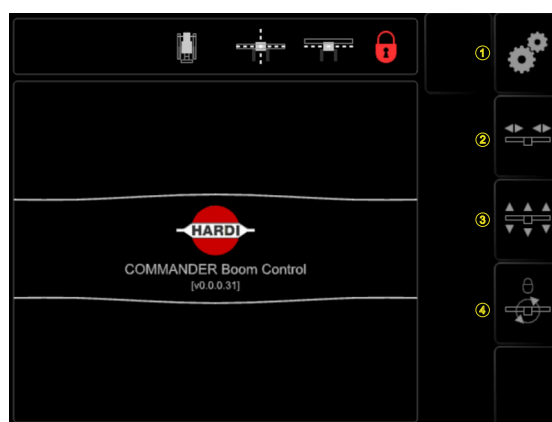
1. Active error symbol and error code (only when an error exists).
2. Inner boom fold condition.
3. Boom centre slant condition.
4. Boom height position.
5. Pendulum lock condition.



RH column soft keys

The RH soft keys allow access to different pages of the HCH-508 ISOBUS hydraulic control system. The soft keys may change depending on the page that is displayed. The following pages are available from the main screen:.

1. Settings.
2. Boom fold control.
3. Boom height control.
4. Slant and pendulum lock control.



Settings screen keys

The settings screen allows the user access to further menus for setup, diagnosis or emergency operation. The following pages are available from the settings screen:

- 1. Return to the main screen.
- 2. Control setup screen.
- 3. Sensor information screen.
- 4. EMERGENCY MODE!



Control setup screen

The control setup screen allows the user to select various options:

- 1. Return to the settings screen.
- 2. Allow grip functionality.

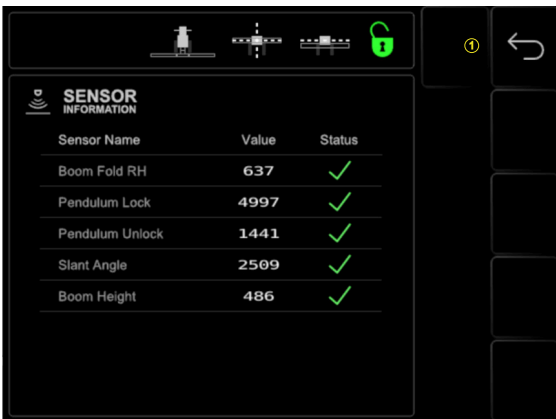
When the check-box is checked, the Hardi grip can be used to control some hydraulic functions. If the grip is unavailable or faulty, this check-box can be unchecked to prevent fault codes from being raised in relation to the Hardi grip.



Sensor information screen

The sensor information screen allows the user to view the output of sensors fitted to the machine. It also shows whether the sensor is within the normal operating range with a green tick, or out of range with a red cross. There are no actions available from this screen other than:

- 1. Return to the settings screen.



5 - Operation

Emergency mode screen

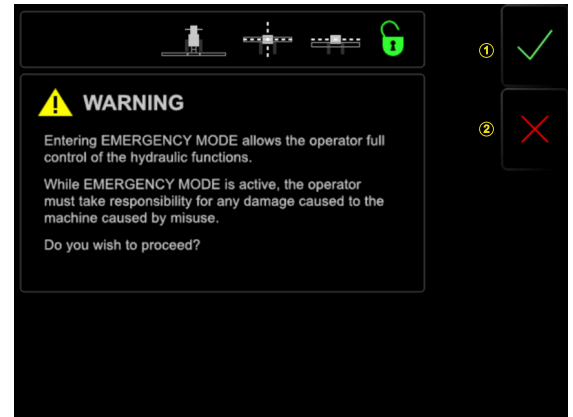
Access to the emergency mode is restricted, and the following must be acknowledged by the operator before proceeding:

“Entering EMERGENCY MODE allows the operator full control of the hydraulic functions.”

“While EMERGENCY MODE is active, the operator must take responsibility for any damage caused to the machine caused by misuse.”

“Do you wish to proceed?”

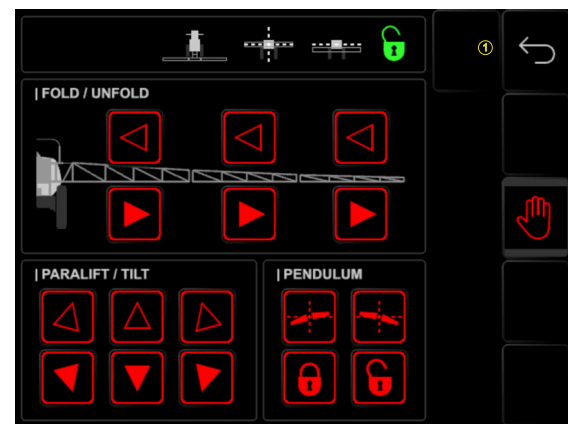
1. Pressing the tick will enter emergency mode.
2. Pressing the cross will return the user to the settings screen.



NOTE! The HCH-508 retains a permanent record of every time the emergency operations screen is accessed.

The emergency mode screen allows all hydraulic functions regardless of sensor signals or boom fold logic. The following is a list of reasons when emergency mode may be required:

1. To allow folding or unfolding of the boom when normal operations have been interrupted.
2. To allow unfolding of the boom so that critical spraying operations may be completed, or to affect repairs to damaged sensors.
3. To allow folding of the boom for safe transport of the machine.



WARNING! Serious damage to the machine may occur when operating in this mode. Only use EMERGENCY MODE when necessary.



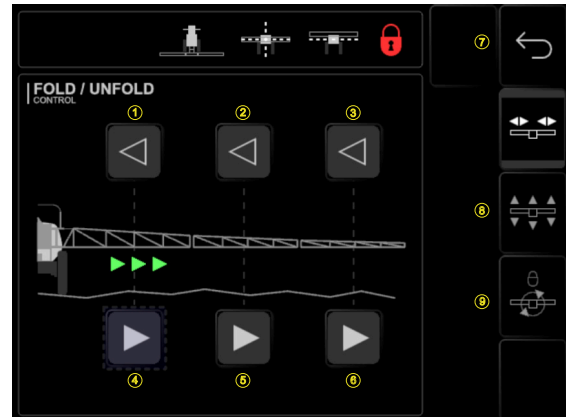
ATTENTION! Contact your local HARDI dealer as soon as practicable if repairs to the machine are required to bring it back into a normal state of readiness.

Boom fold control screen

The boom fold control screen of the HCH-508 ISOBUS hydraulic control system allows for the folding or unfolding of the boom when the machine is stationary. Access to all other boom functions are available whilst in this screen.

The available functions are:

1. Inner boom fold
2. 1st outer boom fold
3. 2nd outer boom fold
4. Inner boom unfold
5. 1st outer boom unfold
6. 2nd outer boom unfold
7. Return to the main screen
8. Boom height control
9. Slant and pendulum lock control



All boom functions have visual feedback on the relative screen as shown by '10'. This feedback is activated from the VT screen soft keys and from the Hardi grip.



ATTENTION! Only one function can be used at a time (including grip).



ATTENTION! If the vehicle speed is above 1.5km/h a warning message will popup. STOP the machine before unfolding or folding.



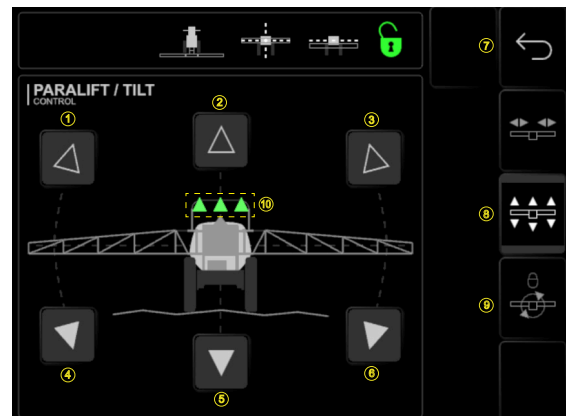
ATTENTION! The boom must be raised above a certain set point before it can be folded or unfolded. The set point is indicated by the boom height position icon on the top row.

Boom height control screen

The boom height control screen of the HCH-508 ISOBUS hydraulic control system allows for lifting and lowering of the boom and wings at anytime. Access to all other boom functions are available whilst in this screen.

The available functions are:

1. LH boom wing tilt up
2. Raise boom centre
3. RH boom wing tilt up
4. LH boom wing tilt down
5. Lower boom centre
6. RH boom wing tilt down
7. Return to the main screen
8. Boom fold control
9. Slant and pendulum lock control



All boom functions have visual feedback on the relative screen as shown by '10'. This feedback is activated from the VT screen soft keys and from the Hardi grip.



NOTE! All of these functions are available from the Hardi grip if it is installed.

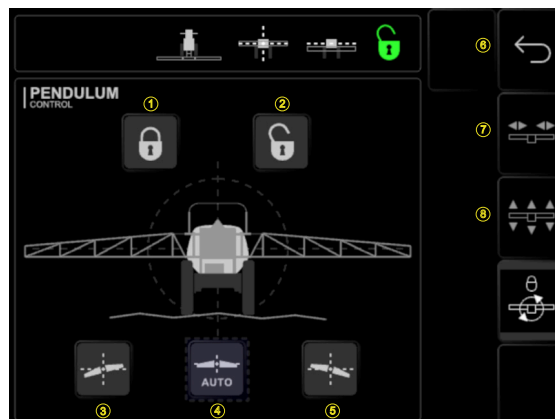
5 - Operation

Slant and pendulum lock control screen

The slant and pendulum lock control screen of the HCH-508 ISOBUS hydraulic control system allows for the folding or unfolding of the boom when the machine is stationary. Access to all other boom functions is available whilst in this screen.

The available functions are:

1. Lock the boom centre pendulum
2. Unlock the boom centre pendulum
3. Slant the boom centre clockwise
4. Auto-level the boom centre
5. Slant the boom centre clockwise
6. Return to the main screen
7. Boom fold control
8. Boom height control



WARNING! IF auto-height is installed, the boom centre pendulum must be unlocked before engaging the auto-height control. Failure to do so will result in erratic boom movement and damage to the machine.

5.2 Liquid System

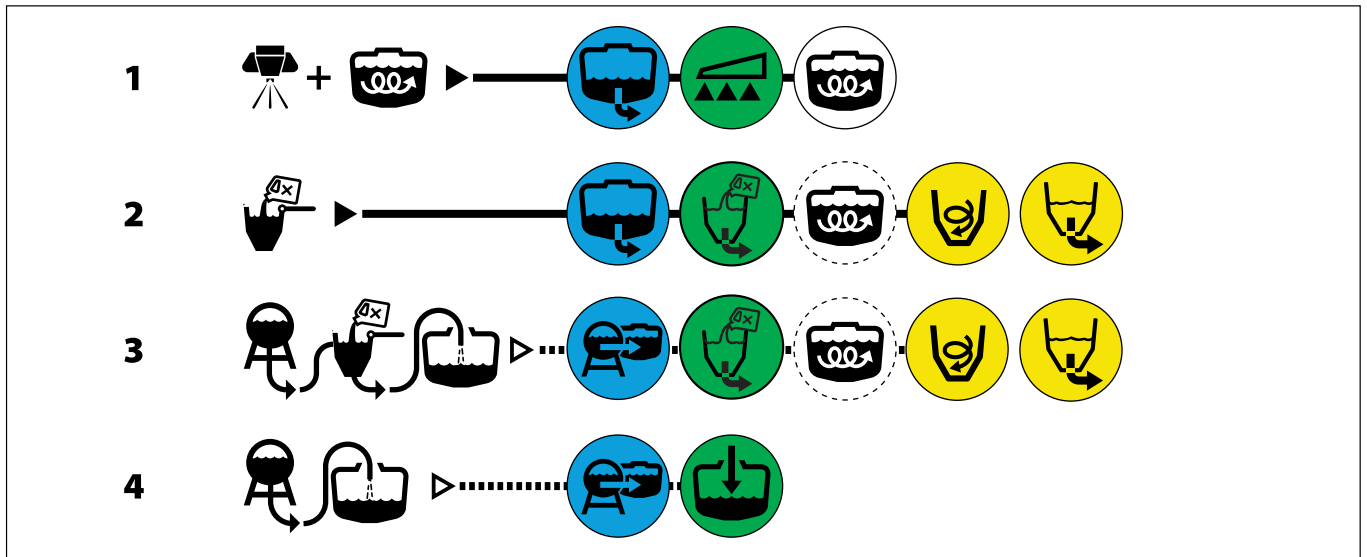
General Info

Please refer to the Spray Technique book for instructions on the use of filters, nozzles etc., and their combination in use with specific spraying applications.

5 - Operation

Quick Reference - Operation

In the following diagram, the handle positions for different options are illustrated.



NOTE! Dashed lines and valve symbols, indicates optional equipment and functions.

1. Spraying with suction from the MainTank and using agitation in the MainTank.
2. Filling chemicals using the TurboFiller with suction from the MainTank. Using agitation is optional.
3. Filling chemicals using the TurboFiller, with suction from the external filling device. Using agitation is optional.
4. Filling of the MainTank, with suction from the external filling device.

Operating the Control Units While Spraying

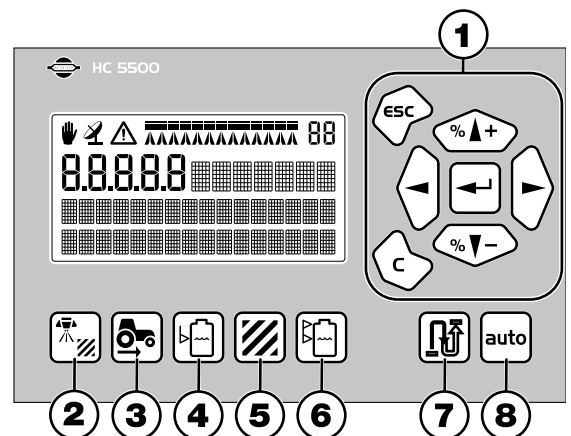


NOTE! For further explanation, please refer to the HC 5500 instruction book.

HC 5500 Controls

1. Navigation keys.
2. Volume rate.
3. Actual driving speed.
4. Actual tank contents.
5. Area covered for active register.
6. Spray volume used.
7. Remaining spray distance with actual tank contents.
8. Automatic spray pressure regulation.

The regulation valve controls the main spray pressure. This is default selection when the controller is powered ON, and it should remain here during normal spraying.



Spray III Controls

9. Power ON/OFF. Turns the HC 5500 and SprayBox power on or off.

10. Manual spray pressure regulation.

During normal spraying, this switch should not be used, as the regulation valve does this automatically.

11. Main spray ON/OFF. Turns all sections on or off.

- The switch is in up position: OFF.
- The switch is in down position: ON.

12. Optional function (A/OFF/B). If adding extra equipment (eg: boom lights), control it from here. Middle position is OFF.

- The switch is in position A: Option A switched ON.
- The switch is in middle position: OFF.
- The switch is in position B: Option B switched ON.

13. End nozzle (Left/OFF/Right). If fitted, turn on end nozzles for each side. Middle position is OFF.

- The switch is in left position: Left boom end nozzle switched ON.
- The switch is in middle position: End nozzles are OFF.
- The switch is in right position: Right boom end nozzle switched ON.

14. Section valves for the spray boom. Turns separate spray sections On or Off.

- The switch is in up position: OFF.
- The switch is in down position: ON.

• Spraying:

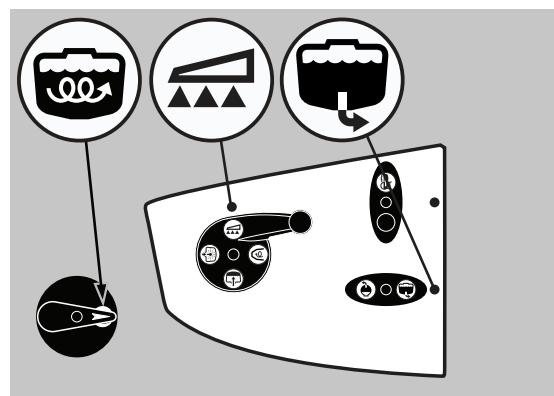
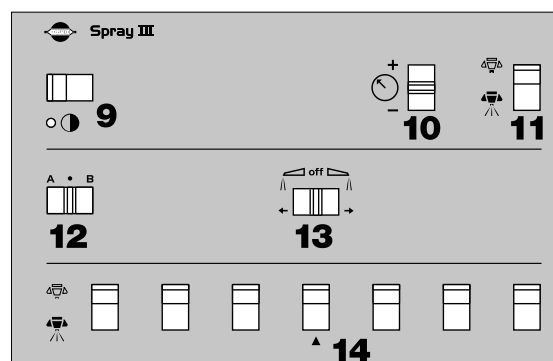
On the sprayer, turn the suction SmartValve towards "suction from main tank" and the pressure SmartValve towards "spraying". Turn the agitation valve to "agitation" if needed.

• Shut all nozzles:

Set the main spray ON/OFF (11) to OFF position. This returns the pump output to the tank through the return system. The diaphragm non-drip valves ensure instantaneous closing of all nozzles.

• Close one or more sections of the boom:

Switch the relevant distribution valve (16) to off position (upwards). The DF4 pressure equalization ensures that the pressure does not rise in the sections, which remain open.



Filling/Washing Location Requirements

When filling the sprayer with chemicals and water, it is important to avoid spot contamination by spraying chemicals in order to protect subsoil water resources.

Dedicated Filling Site

If the sprayer is always filled on the same location, a special filling/washing location should be established. This should have a hard, liquid-impenetrable surface (e.g. concrete) secured against seepage, together with edges secured against run-off to the surrounding areas. The location should be drained to an adequate receptacle (e.g. slurry tank or similar).

Any spillage or cleaning water should be retained and diluted in order to be distributed in a larger area. This is to ensure minimal environmental impact and avoid build-up of larger chemical concentrations at one spot.

If no other requirements of distances exist, the following general recommendation of distance can be used. Filling location must be no closer than:

1. 50 metres from public water supplies for drinking purposes.
2. 25 metres from non-public water supplies for drinking purposes and from treatment sumps and cesspools of drainage systems.

5 - Operation

3. 50 metres from surface water (watercourses, lakes and coastal waters) and from nature reserves.

In the Field

Alternatively the sprayer can be filled in the field, where the spraying is to take place. If so, choose a different location for each refilling.

If no other requirements of distances exist, the filling should not take place closer than:

1. 300 metres from public or non-public water supplies for drinking purposes.
2. 50 metres from surface water (watercourses, lakes and coastal waters), treatment sumps, cesspools of drainage systems, and nature reserves.



ATTENTION! Always follow local legislation.



ATTENTION! It is the responsibility of the sprayer owner/operator to comply with all relevant legislation. HARDI cannot undertake any responsibilities for incorrect operation and use.

Filling of Water

The tank should normally be filled 1/3 with water before adding chemicals. Always follow the instructions given on the chemical container!



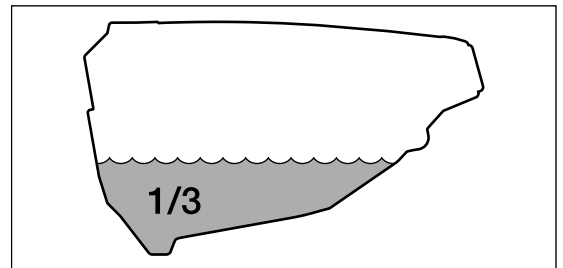
WARNING! If the sprayer is put aside with liquid in the MainTank, all manifold valves must be closed.



WARNING! Sprayer must be connected to the tractor before filling either the main or the flush tank.



WARNING! Do not disconnect the sprayer from the tractor if there is liquid in either the main or the flush tank.



Filling the MainTank Through Tank Lid

The MainTank is filled by removing the big tank lid, which is located at the top of the sprayer, which is accessible from the platform. It is recommended to use clean water for spraying purposes. Always fill water through the strainer basket to prevent foreign particles from entering the tank. An overhead tank can be used in order to obtain high filling capacity.



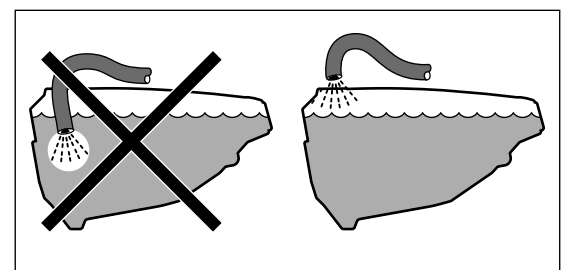
WARNING! Do not let the filling hose enter the tank. Keep it outside the tank, pointing towards the filling hole. If the hose is led into the tank, and the water pressure drops at the water supply plant, chemicals may be sucked back and contaminate the water supply lines, supply plant and supply well.



WARNING! The water supply line should be provided with a check valve as an additional safety precaution. Follow local legislation in force at any time.



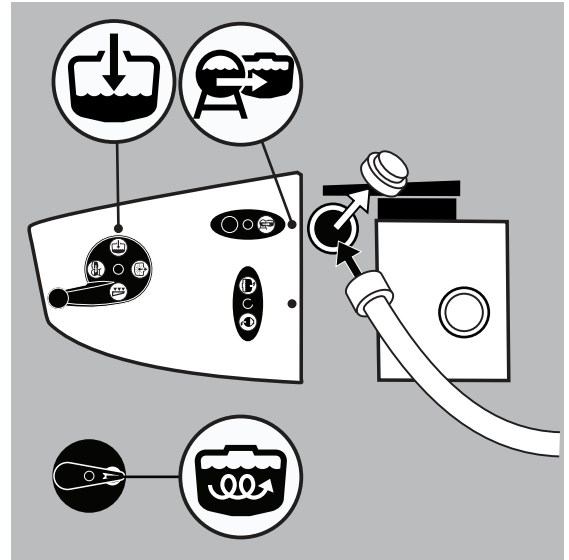
WARNING! The water supply should be provided with a water meter to avoid spillage by overfilling. Follow local legislation in force at any time.



Venturi fast fill (optional)

The venturi fast fill (if installed) is operated as follows:

1. Remove the cap and connect a suction hose to the suction manifold.
2. Turn the pressure SmartValve to MainTank.
3. Turn the suction SmartValve to "External Filling Device".
4. Activate agitation valve.
5. Open the venturi fast fill valve.
6. Engage the pump and set PTO revolutions at max. 540 RPM.
7. The tank is now filling with water. Keep an eye on the liquid level indicator.
8. Turn the handle on the suction manifold from "External Filling Device" to "Main Tank" to discontinue the filling process. Now disengage the pump.
9. Disconnect the suction hose and replace the cap.



DANGER! Prevent contamination or injury. Do not open the suction valve for the External Filling Device, unless the pump is running and the filling hose is connected. If this valve is opened without the pump running, liquid will stream out of the coupler.



WARNING! Do not leave the sprayer while filling the tank, and keep an eye on the level indicator. **DO NOT** overfill the tank.



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



ATTENTION! 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 strongly recommended only to fill from closed reservoirs (mobile water tanks etc.) to prevent contamination.

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Filtered Fast Fill System

The 'Filtered Fast Fill' allows the operator to fill the sprayer from an external water source (such as a dam or tank) using an auxiliary pump. The system includes a Cam-Lock coupling on the inlet and a high capacity in line filter.

1. Remove the cover from the Cam-Lock coupling (A) and connect a hose being fed from an auxiliary pump and external water source.
2. Run the auxiliary pump and engage the Quick-Fill ball valve (B) to fill.
3. Watch the tank level indicator closely to prevent over filling.
4. To stop filling close the Quick-Fill ball valve (B), turn off the pump, disconnect the hose and replace the Cam-lock coupling dust cover.



ATTENTION! The optional flow meter is only available on sprayers with the "Quick-Fill" system and is not offered on machines with venturi or Banjo pump fast fill systems.



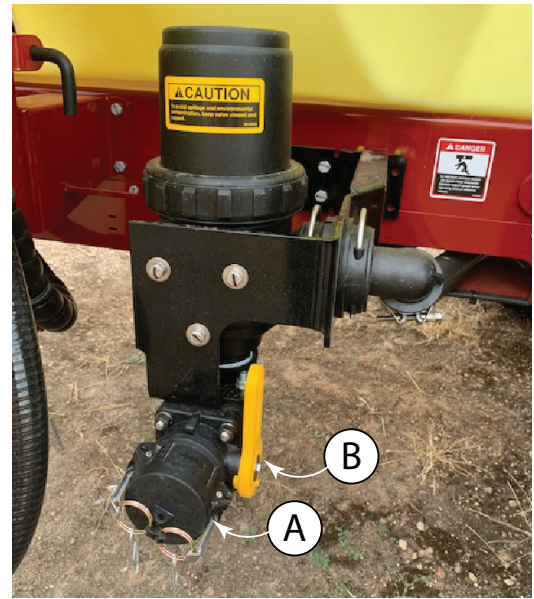
WARNING! Do not leave the sprayer while filling the tank and watch the level indicator closely to prevent over filling..



ATTENTION! Due to risk of contamination it is prohibited in some areas to fill a sprayer from open water ways such as lakes and rivers etc. Contact your local authorities for information about laws specific to your area.

Directional fill valve (optional only for 5000/6000)

The Filtered Fast Fill System can be equipped with a "Directional Fill Valve"(C). By turning the valve system can be used to fill either "Main Tank" or "Rinse Tank". The operator can control the speed at which filling takes place by adjusting the quick fill ball valve on the sprayer.

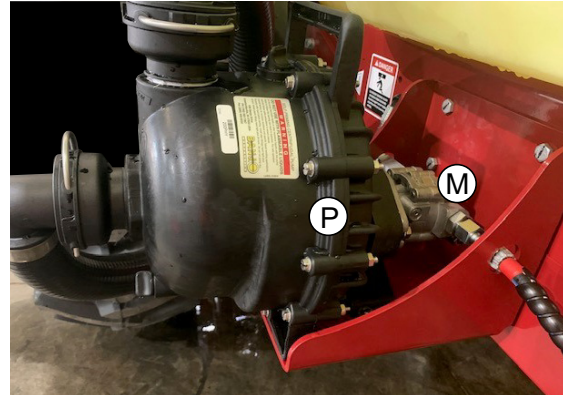


Banjo Filtered Fast Fill System

The 'Banjo Filtered Fast Fill' system employs a high capacity centrifugal pump (P) driven by a hydraulic drive motor (M). The motor is powered by the tractor's auxiliary hydraulics and is speed limited by a hydraulic burst valve. The operator can control the flow rate of the pump by use of a variable speed control valve (C) located on a panel just forward of the filter.



ATTENTION! Do not attempt to run the pump over the recommended Maximum speed.



Operation

To fill the sprayer using the 'Banjo' fast fill system:

1. Park the tractor and sprayer on a level surface, select neutral gear, apply the hand brake and engage the auxiliary hydraulics.
2. Remove the cover from the Cam-lock coupling (A) and connect a suction hose to a water source.
3. Open the ball valve (B) and gradually engage the hydraulic speed control valve (C) until the desired flow rate is achieved.
4. When filling is complete dis-engage the hydraulic speed control (C) and close the ball valve (B).
5. Remove the suction hose and replace the cam-lock cap (A).



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Filling the RinseTank

The RinseTank is filled via the 1½" cam-lock connection (A):

1. Fit the external water hose to the cam-lock connection piece.
2. Start filling with clean water.
3. Keep an eye on the level indicator in order not to overfill the tank.
4. Stop filling and refit the cap.

Volume: approximately 450 litres.



ATTENTION! Only fill the RinseTank with clean water! To avoid algae developing in the tanks, always drain the RinseTank when the sprayer is not in use.



ATTENTION! For cleaning and inspection purposes, the RinseTank is accessible via the tank lid on top of the tank.



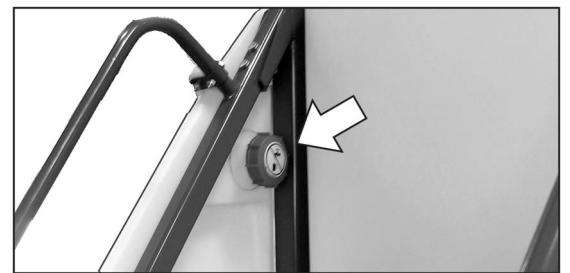
Filling the clean water tank

To fill the clean water tank:

1. Remove the tank lid.
2. Fill with clean water.
3. Refit the tank lid.

For use of water:

- Turn the lever to open the ball valve. The ball valve is located on the left side of the sprayer next to the EasyCleanFilter.



The water from this tank is for hand washing, cleaning of clogged nozzles etc.



WARNING! Although the clean water tank is only filled with clean water, this water must NOT be used for drinking.



ATTENTION! Only fill the clean water tank with clean water! To avoid algae developing in the tank, always drain the clean water tank when the sprayer is not in use.

Safety Precautions - Crop Protection Chemicals

Always be careful when working with crop protection chemicals!



WARNING! Always wear proper protective clothing before handling chemicals!

Personal Protection

Depending on the chemical type, protective gear/equipment should be worn to avoid contact with the chemicals, such as:

- Gloves
- Waterproof boots
- Headgear
- Respirator
- Safety goggles
- Chemical resistant coveralls



WARNING! Protective clothing/equipment should be used, when preparing the spray liquid, during the spray job and when cleaning the sprayer. Follow the chemical manufacturer's instructions given on the chemical label and/or local legislation.



WARNING! It is always advisable to have clean water available, especially when filling the sprayer with chemical.



WARNING! Always clean the sprayer carefully and immediately after each use.



WARNING! Only mix chemicals in the tank according to directions given by the chemical manufacturer.



WARNING! Always decontaminate the sprayer before changing to another chemical.

Filling Chemicals through Tank Lid

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



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



ATTENTION! Due to risk of spillage and spot contamination, several countries do not allow to fill chemicals directly through the tank lid. Use the TurboFiller for all filling of chemicals instead.

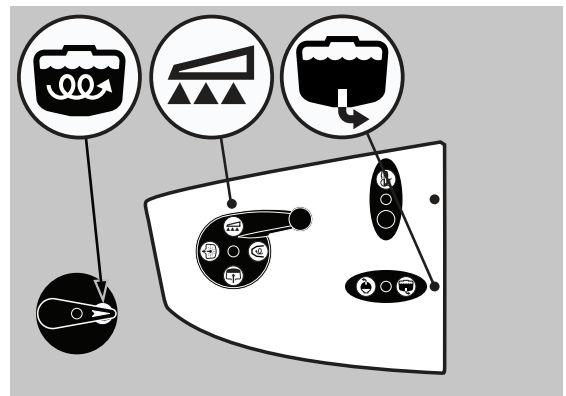
1. Make sure the spray control unit is switched off.
2. Set suction valve towards "Suction from main tank", Agitation valve towards "Agitation". Turn pressure SmartValve towards "Spraying".
3. Engage the pump and set PTO revolutions to 540 rpm.
4. Add the chemicals through the main tank hole.
5. Keep PTO engaged, so that the spray liquid is continuously agitated, until it has been sprayed on the crop.



DANGER! Before turning Pressure SmartValve past "Hopper", it is very important to ensure that the quick coupler lid is correctly and completely mounted to the filling stud in its locked position. Failure to do so causes a risk of contamination and injury from the quick coupler lid being "shot" off when pressurized! If it is not possible to mount the lid completely, lubricate the rubber seal and the grip hooks.



NOTE! Local legislation may not allow filling through the tank lid, but will require use of the chemical inductor instead.



5 - Operation

TurboFiller (Optional)

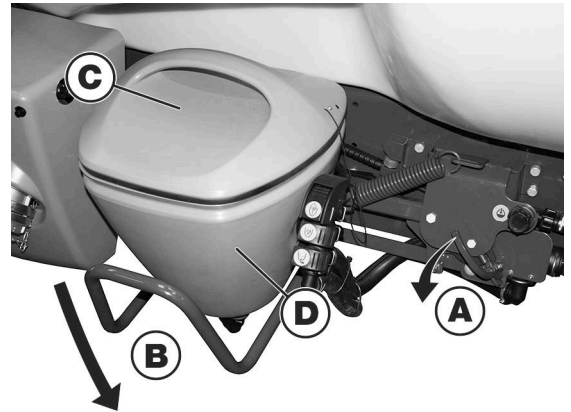
Operating the TurboFiller

The TurboFiller is where you add the chemicals to be mixed with water in the MainTank.

Capacity: approximately 35 litres.

Before Use

- Pull the locking lever (A) down to unlock the position of the TurboFiller.
- Grab the handle (B) and pull the TurboFiller downwards.
- Lower the TurboFiller to the stop and let go of the locking lever (A) to lock the position.
- Lift off the lid (C) and place it at the handle in front of the hopper (D) as shown below.
- Place the chemicals for the coming spray job nearby ready to be filled into the TurboFiller.

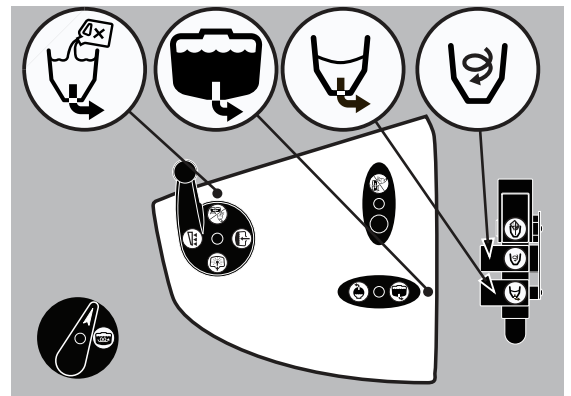


Filling liquid chemicals using the HARDI TurboFiller

1. Fill the main tank at least 1/3 with water (unless otherwise stated on the chemical container label).
2. Turn the handle of the suction valve towards "Main tank".
3. Turn the pressure SmartValve towards "Chemical hopper".
4. Partially close the agitation valve.

i NOTE! If filling from an external source, this can continue while performing the following steps.

5. Engage the pump and set PTO speed at max. 540 RPM or 1000 RPM (depending on pump model).
6. Open the TurboFiller lid. Pour the correct quantity of chemical into the hopper.



! DANGER! Always wear face shield and other appropriate personal safety equipment, when filling chemicals.

! ATTENTION! The scale in the hopper can only be used, if the sprayer is parked on level ground! It is recommended to use a measuring jug for improved accuracy.

7. Engage suction to the TurboFiller by opening the turbo filler suction valve. Chemical will be transferred to the main tank. The turbo filler suction valve must be open for at least 20 seconds after the chemical is no longer visible in the hopper, in order to empty the transfer hoses completely.

! DANGER! If the TurboFiller and the transfer hoses are not completely emptied, there is a risk of chemicals flowing back into the hopper!

8. If the chemical container is empty, it can be rinsed by the "chemical container cleaning device". Place the container over the multi-hole nozzle and open the drum cleaning valve to activate container cleaning.

! DANGER! In order to avoid spray liquid hitting the operator, do not press the lever, unless the multi-hole nozzle is covered by a container, as spray liquid may otherwise hit the operator!

! ATTENTION! The rinsing device uses spray liquid to rinse containers for concentrated chemicals. Before disposal, always rinse the chemical containers with clean water several times, until they are clean.

- Flush the TurboFiller with clean water by shifting to suction from the rinse tank or from an external tank. The TurboFiller suction valve must be open for at least 20 seconds after the rinse water is no longer visible in the hopper, in order to empty the transfer hoses completely.



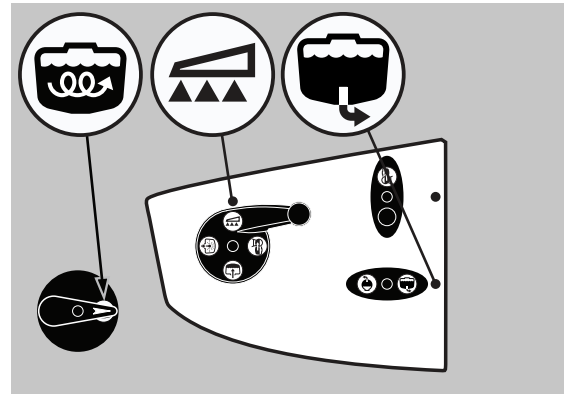
ATTENTION! If the suction valve is not moved to suction from a clean water supply, the hopper rinse will use spray liquid for rinsing the hopper! Cleaning of the TurboFiller must always be done, when the spray job is finished, together with cleaning the entire sprayer. Cleaning after the last filling, and before spraying, does not ensure a clean TurboFiller!

- Close the TurboFiller suction valve, when the hopper has been rinsed. Close the lid.
- Turn the agitation valve to increase agitation.



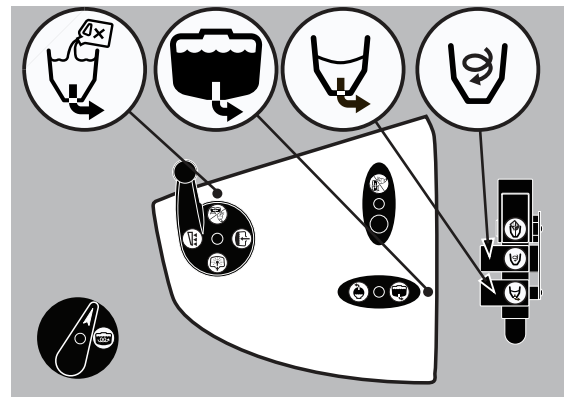
ATTENTION! If foaming is a problem, reduce the agitation.

- When the spray liquid is well agitated, turn the handle for the pressure SmartValve to the "spray" position. Continue agitation during transport and spraying of the crop.



Filling powder chemicals using the HARDI TurboFiller

- Fill the main tank at least 1/2 with water (unless otherwise stated on the chemical container label).
- Turn the handle of the suction valve towards "Main tank".
- Turn the pressure SmartValve towards "Chemical hopper".
- Turn the agitation valve towards "agitation" as required:
 - A fully open agitation valve will result in very little suction from the TurboFiller.
 - A fully closed agitation valve will result in no agitation, while the powder is being transferred into the tank, resulting in poor mixing.

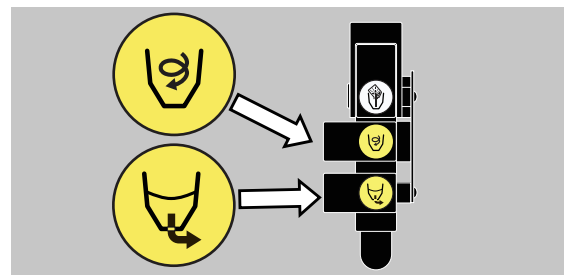


- Engage the pump and set PTO speed at max. 540 RPM or 1000 RPM (depending on pump model).
- Open the TurboFiller lid. Open the turbo filler suction valve and the TurboDeflector valve.



DANGER! Always wear face shield and other appropriate personal safety equipment, when filling chemicals.

- Pour the powder into the TurboFiller at a steady rate. The turbo filler suction valve must be open for at least 20 seconds after the chemical is no longer visible in the hopper, in order to empty the transfer hoses completely.



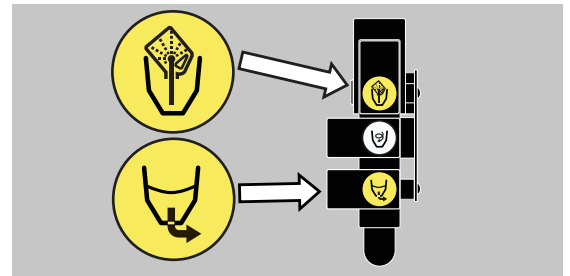
DANGER! If the TurboFiller and the transfer hoses are not completely emptied, there is a risk of chemicals flowing back into the hopper!

5 - Operation

8. If the chemical container is empty, it can be rinsed by the "chemical container cleaning device". Place the container over the multi-hole nozzle and open the drum cleaning valve to activate container cleaning.



DANGER! In order to avoid spray liquid hitting the operator, do not press the lever, unless the multi-hole nozzle is covered by a container, as spray liquid may otherwise hit the operator!



ATTENTION! The rinsing device uses spray liquid to rinse containers for concentrated chemicals. Before disposal, always rinse the chemical containers with clean water several times, until they are clean.

9. Flush the TurboFiller with clean water by shifting to suction from the rinse tank or from an external tank. The TurboFiller suction valve must be open for at least 20 seconds after the rinse water is no longer visible in the hopper, in order to empty the transfer hoses completely.



ATTENTION! If the suction valve is not moved to suction from a clean water supply, the hopper rinse will use spray liquid for rinsing the hopper! Cleaning of the TurboFiller must always be done, when the spray job is finished, together with cleaning the entire sprayer. Cleaning after the last filling, and before spraying, does not ensure a clean TurboFiller!

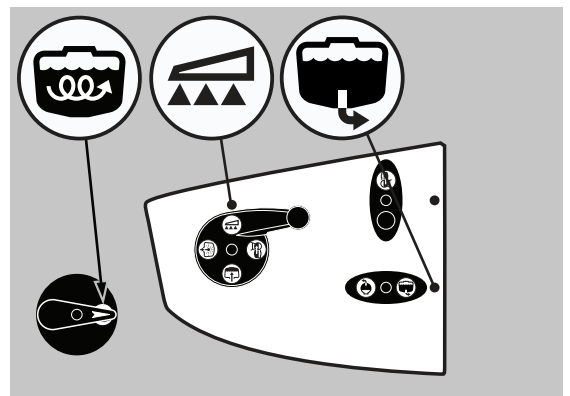
10. Close the turbo filler suction valve when the hopper has been rinsed. Close the lid.

11. Turn the agitation valve to increase agitation.



ATTENTION! If foaming is a problem, reduce the agitation.

12. When the spray liquid is well agitated, turn the handle for the pressure SmartValve to the "spray" position. Continue agitation during transport and spraying of the crop.



TurboFiller Rinsing

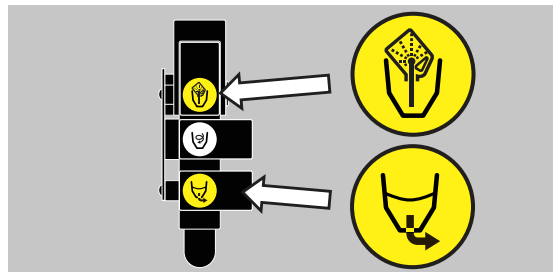


NOTE! It is important to source clean water from the RinseTank or an external tank with clean water.


Rinse the TurboFiller and chemical containers as follows:

Cleaning Empty Containers - TurboFiller Lid is Open

1. Put container over the rotating flushing nozzle in the middle of the TurboFiller, so that the nozzle is inside the container.
2. Simultaneously press the chemical container cleaning lever and the TurboFiller suction valve. This rinses the chemical container with the flushing nozzle, while the rinsing liquid is emptied out of the TurboFiller.



TurboFiller Rinsing - TurboFiller Lid is Closed

1. Close TurboFiller lid.
2. Turn the suction SmartValve towards "Rinsing tank" or "External Filling Device", if clean water is available here.
3. Open the Turbo Deflector Valve  for 1 minute to get plenty of clean water through the hoses.
4. Simultaneously press the Chemical Container Cleaning lever and the TurboFiller suction valve. This rinses the hopper with the flushing nozzle, while the rinsing liquid is emptied out of the TurboFiller.
5. Rinse the hopper for 30-40 seconds.
6. Open the lid to inspect if the TurboFiller is empty. If not, close the lid again and press the TurboFiller suction valve, until the TurboFiller is empty.
7. After the last flushing, the TurboFiller suction valve must be open for at least 20 seconds, after the rinse water is no longer visible in the hopper, in order to completely empty the transfer hoses into the main tank.



ATTENTION! The TurboFiller needs to be cleaned thoroughly after finishing spraying. This is to ensure that it is clean, before spraying other crops that may be sensitive to the chemicals just used. See the section "5.4 Cleaning" on page 138 for details.

5 - Operation

VACnMIX (Optional)

Chemical Filling by VACnMIX (optional)

The VACnMIX hopper chemical induction can be carried out in any one of the three following methods:

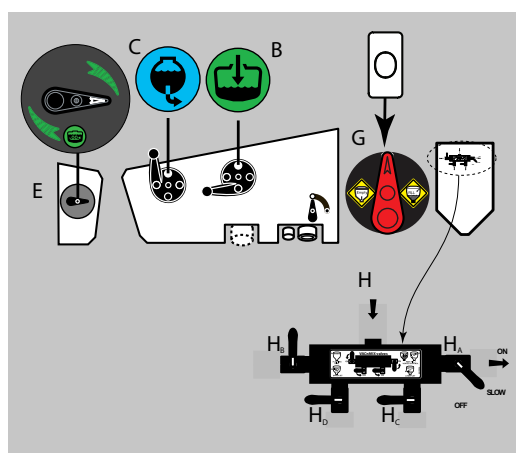
1. Induction of Dry Granules, Powders or Flowables by adding product to VACnMIX hopper.
2. Induction of Liquids by adding product to VACnMIX Hopper.
3. Using the optional Vacuum Feature to add Liquid Chemicals from Envirodrums and other containers.

Filling the VACnMIX with water



Note! The VACnMIX can be filled with water from the main tank or the rinse tank. It is recommend to use water from rinse tank. In the event of a or burst or a leak from one of the pressure hoses, only clean water will come out. Follow the instructions below to fill the VACnMIX from the rinse tank

1. Fill the rinse tank with clean water.
2. Turn the handle of the suction SmartValve towards "suction from rinse tank".
3. Set the Vacuum Transfer valve to Off position
4. To activate the Venturi and VACnMIX turn pressure SmartValve towards "Pressure to main tank".
5. Engage the pump. Set at 540 or 1000 rpm, relevant to equipped pump.
6. On the VACnMIX controls, turn Fast Fill handle on, to fill hopper. Watch the level of water. Fill to the 25 Litre level, which will be just above the upper jet. (NOTE: Sight gauge is a guide only to fluid volume in hopper).
7. When sufficient water is in the hopper turn fast fill handle off.



ATTENTION! Check operation by briefly operating all valves before introducing any chemical product. Check for leaks that may indicate loose fittings, faulty valves or damaged hoses.



WARNING! Do not use faulty equipment.

Filling with liquid or granular chemicals by VACnMIX (optional equipment)



WARNING! Only compatible and complimentary chemicals should be mixed. When combined, incompatible chemicals may cause a potentially dangerous reaction, or result in unwanted effects on the crop to be sprayed.



ALWAYS follow label instructions! Always where

1. Fill the hopper with water to the 25 litre level. (See chapter "Filling the VACnMIX with water" on page 120.)

- i** NOTE! If filling water from an external tank, this can be continued while doing the next steps.
2. Engage the pump (If not already on) and set P.T.O. speed at 540 r/min or 1000 r/min (depending on pump model).
 3. Start a swirling action in the hopper by turning ON the upper and lower jet handles and turning Off the Fast Fill handle.
 4. Adjust the Vacuum and Transfer Valve to empty the hopper as fast that is filling.
 5. Measure the correct quantity of chemical and sprinkle it into the into vortex stream (not into centre of hopper) as fast as the transfer device can flush it down.

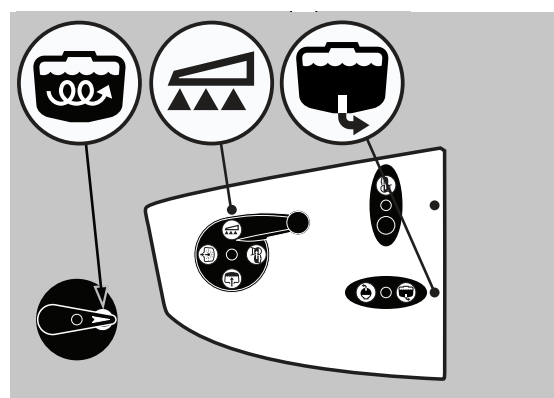
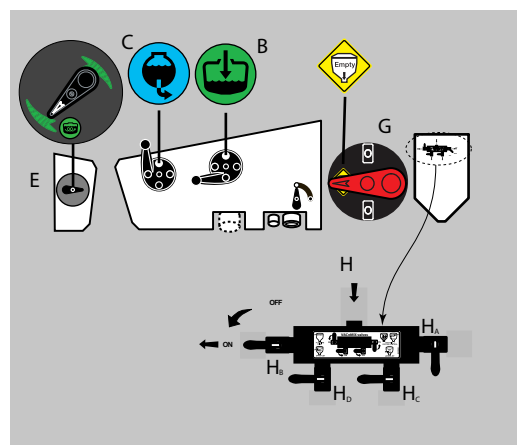
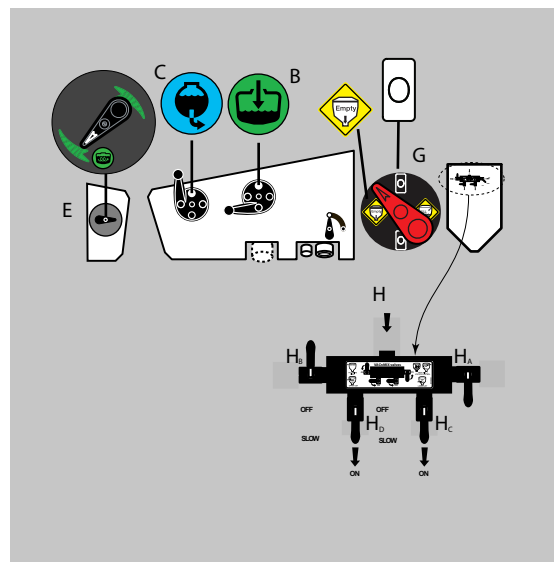
- i** NOTE! Large unmixed chemical will be held by centrifugal force to the outside wall of the hopper. Continue mixing in the hopper until chemical is fully integrated into water.

- i** NOTE! Always ensure that enough pressure is maintained to drive the vortex. A drop in level may cause air to enter the suction line, and too high a level will cause slowing of the vortex, resulting in incomplete mixing of chemicals which may affect the accuracy of application rates when spraying.

6. When all chemical has been thoroughly mixed, close vortex jet handles.
7. Close the lid and, flush the hopper using the hopper rinse ring between batches of chemical.
8. After all chemicals have been added to the sprayer tank, and the VACnMIX hopper is empty. Refill the hopper with clean water, operate all valves as in mixing procedure, empty and repeat until the system is clear of residue chemical.

- ATTENTION!** The Vacuum and Transfer Valve valve must be open for at least 20 seconds after the chemical is no longer visible in the hopper in order to completely empty the transfer hoses into the main tank
9. If closed, turn the Agitation Valve towards "Agitation". Close remaining valves.

10. When the spray liquid is well agitated, turn handle of the pressure SmartValve towards "Spraying" position. And turn the suction SmartValve to suction from Main Tank. Keep P.T.O. engaged so the spray liquid is continuously agitated until it has been sprayed on the crop.



5 - Operation

Filling chemicals by VACnMIX Chem Probe (optional equipment)

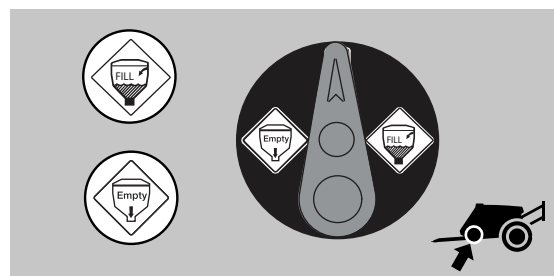


NOTE! Before adding any chemicals, fill hopper with water, to test functions see "Filling the VACnMIX with water" on page 120.

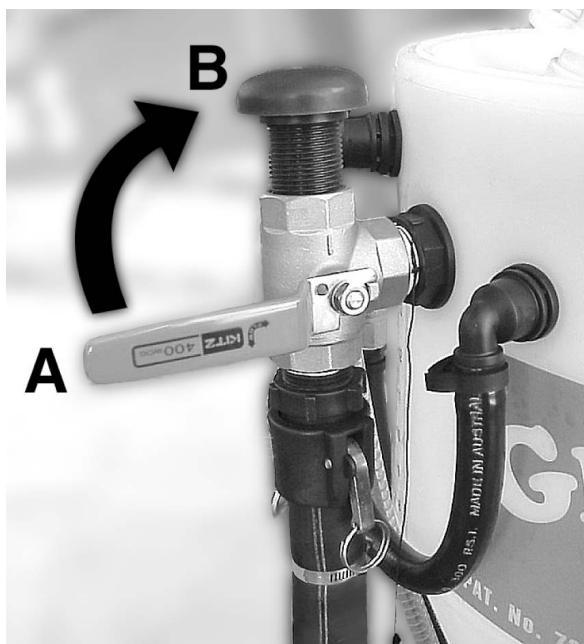
1. Connect Chem Probe suction hose to the camlock fittings on the ball valve on the hopper and the other end to the drum coupling.



2. With lid of VACnMIX closed, turn the Vacuum and Transfer Valve to FILL position.



3. The vacuum is controlled by the ball valve and vent. In the CLOSED (A) position, the ball valve is open to the suction line, and liquid chemical will be drawn from the drum into the hopper.
4. To stop the flow of liquid chemical from the drum, move the ball valve to OPEN (B) position - this allows air from the atmosphere to be introduced to the hopper through the vent, and closes off the suction line.
5. To transfer measured volume of chemical mixture to the sprayer tank, turn the Vacuum and Transfer valve to EMPTY.



NOTE! Chemical solution in the sprayer tank may need to be constantly agitated to keep particles in suspension. Particles which have been allowed to settle to the bottom of the tank may cause blockages in the plumbing system. You can keep the solution circulating by having sprayer tank agitators turned on.

To empty the ChemProbe hose with liquid:

1. Closed the lid of VACnMIX, turn the Vacuum and Transfer Valve to FILL position. Set the ball valve to (A) position. Disconnect the end of the hose that connects to the drum and attach it to a clean water source to clean the hose, when hose is clean turn the valve to (B) position.



ATTENTION! Flush hopper and sight tube between different chemicals with clean water.



ATTENTION! All components of the VACnMIX must be thoroughly cleaned and decontaminated, using recommended appropriate cleaning and / or neutralizing agents, before storage or using any different chemical concentrates. See "VACnMIX Rinsing" on page 123.

VACnMIX Rinsing



NOTE! It is important to use clean water when rinsing. Always set suction from rinse tank or from external source with clean water when rinsing.



NOTE! Always refer to instructions on printed labels for individual chemicals for recommended methods of de-activation and disposal of unused chemical solution.



The entire sprayer, chemical handling equipment and the boom should be cleaned together see page "5.4 Cleaning" on page 138. Please read below for an overview of cleaning

Cleaning empty containers - VACnMIX lid open

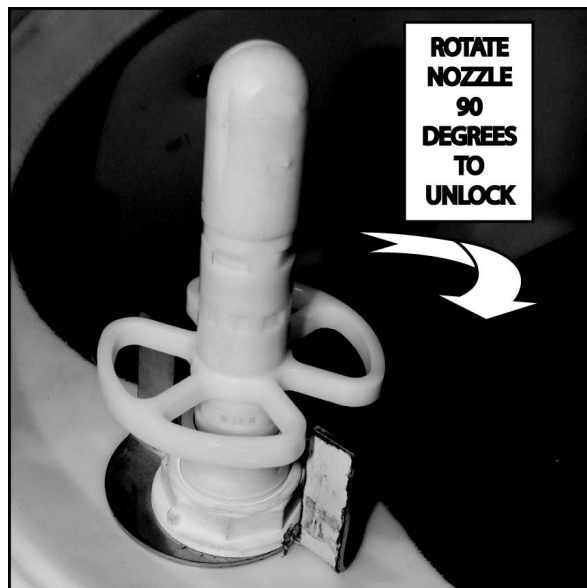


DANGER! Do not press the nozzle unless it is covered by a container to avoid spray liquid hitting the operator.

1. Rotate the nozzle 90 degree to unlock
2. Put container over the flushing nozzle so that the nozzle is inside the container and press bottom against the nozzle, this will force a powerful jet of water up into the inside of the container.



Note: This lock acts as a safety measure to prevent injury to operator. Ensure lock is repositioned correctly after use.

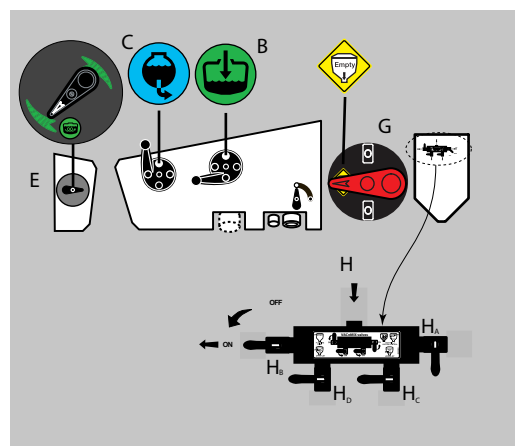


VACnMIX rinsing - VACnMIX lid is closed

1. Close VACnMIX lid.
1. Fill the hopper with clean water from the rinse tank. (See chapter "Filling the VACnMIX with water" on page 120.) Operate all valves as in mixing and transfer procedure.
2. Turn the Vacuum and Transfer Valve to EMPTY position, let valve be open for at least 20 seconds, after the rinse water is no longer visible in the hopper, in order to completely empty the transfer hoses into the main tank.
3. Repeat step 1-2 until empty until system is clear of residue.
4. After chemical induction and VACnMIX flushing is completed, continue filling the sprayer tank.



ATTENTION! The VACnMIX hopper needs to be cleaned thoroughly after spraying. This is to ensure that it is clean, before spraying other crops that may be sensitive to the chemicals just used. See section "5.4 Cleaning" on page 138 for details.



Before Returning to Refill the Sprayer

If the sprayer is to be refilled at the farm, or at a fixed filling place without a filling space with hard surface and drain to a closed reservoir, the sprayer should be rinsed before returning to refill.

Dilute the residues of the spraying circuit, and spray it on the crop. Depending on the weather conditions, it could also be necessary to clean the sprayer on the outside now while in the field, before returning to the farm.

5 - Operation



WARNING! Always follow local legislation in force at any time.

Agitation Before Resuming a Spray Job

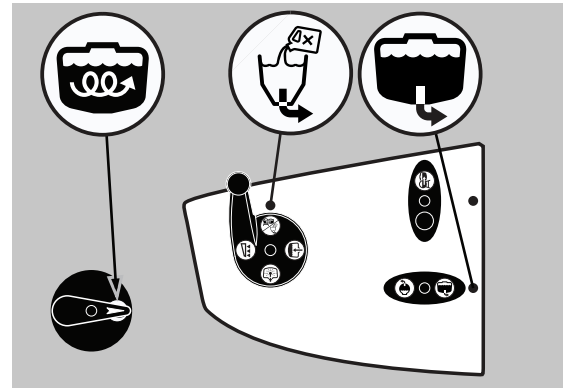
If a spray job has been interrupted for a while, severe sedimentation may occur depending on the chemicals being used. Before resuming the spray job, it might be necessary to agitate sediment material.

1. Turn the handle at the suction valve towards "Suction from main tank".
2. Turn the pressure SmartValve towards "Pressure draining/TurboFiller".
3. Turn the agitation valve towards "Agitation". Close the remaining valves.



DANGER! Before turning the pressure SmartValve to "Pressure draining/TurboFiller" it is very important to be sure that the quick coupler lid is correct and completely fitted to the filling stud into its locked position. Failure to do so may cause risk of contamination and injury from quick coupler lid being "shot" off when pressurized! If not possible to fit the lid completely, lubricate the rubber seal and the grip hooks.

4. Engage the pump and set PTO speed to max. 540 RPM or 1000 RPM (depending on pump model).
5. Agitation has started and should be continued for at least 10 minutes.
6. The spray job can now be resumed. Turn pressure SmartValve towards "Spraying" and start spraying.



Parking the Sprayer

To avoid spot contamination, the sprayer should always be parked at either the washing/filling location or under cover. This prevents rainfall from washing down chemical residue from the sprayer's surfaces.

- Parking at the washing/filling location will retain residues.
- Always park the machine out of reach of children, animals and unauthorized persons.

Operating the Control Units While Spraying (Z-version) HC5500

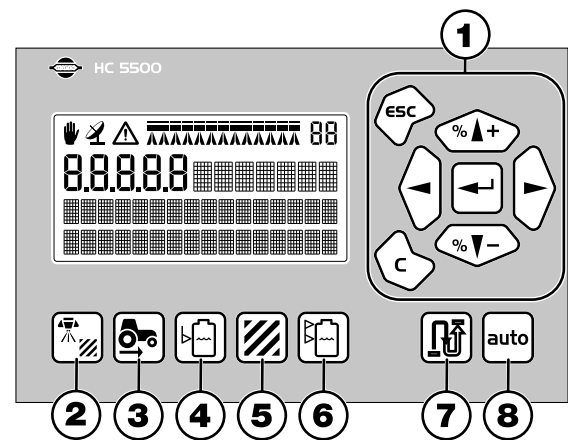


NOTE! For further explanation, please refer to the HC 5500 instruction book.

HC 5500 Controls

1. Navigation keys.
2. Volume rate.
3. Actual driving speed.
4. Actual tank contents.
5. Area covered for active register.
6. Spray volume used.
7. Remaining spray distance with actual tank contents.
8. Automatic pressure regulation.

The regulation valve controls the main spray pressure. This is default selection when the controller is powered ON, and it should remain here during normal spraying.

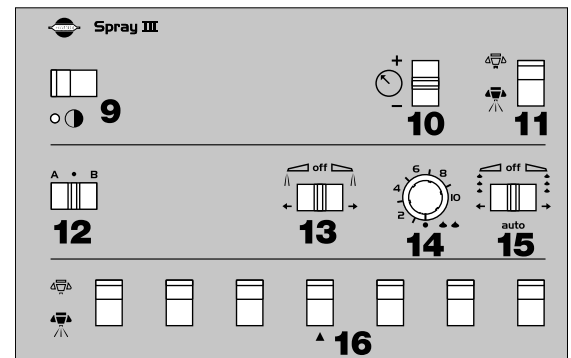


Spray III Controls

9. Power ON/OFF. Turns the HC 5500 and SprayBox power on or off.
10. Manual spray pressure regulation.

During normal spraying, this switch should not be used, as the regulation valve does this automatically.

11. Main spray ON/OFF. Turns all sections on or off.
 - The switch is in up position: OFF.
 - The switch is in down position: ON.
12. Optional function (A/OFF/B). If adding extra equipment, control it from here. Middle position is OFF.
 - The switch is in position A: Option A switched ON.
 - The switch is in middle position: OFF.
 - The switch is in position B: Option B switched ON.
13. End nozzle (Left/OFF/Right). If fitted, turn on end nozzles for each side. Middle position is OFF.
 - The switch is in left position: Left wing end nozzle switched ON.
 - The switch is in middle position: End nozzles are OFF.
 - The switch is in right position: Right wing end nozzle switched ON.
14. Foam marker blob interval. Foam marker equipment is not included from HARDI.
15. Foam marker (Left/OFF/Right). Foam marker equipment is not included from HARDI.
16. Distribution valves for the spray boom. Turns separate spray sections On or Off.
 - The switch is in up position: OFF.
 - The switch is in down position: ON.



5 - Operation

- Spraying:

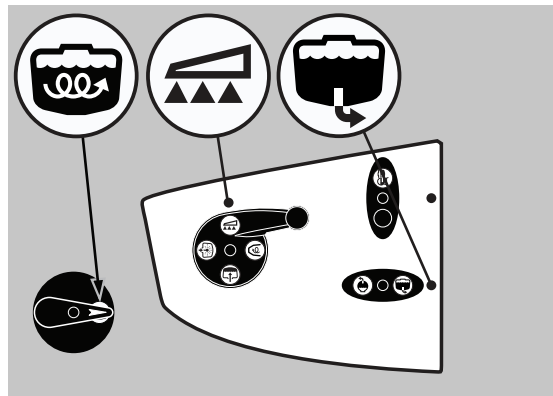
On the sprayer, turn the suction SmartValve towards “suction from main tank” and the pressure SmartValve towards “spraying”. Turn the agitation valve to “agitation” if needed.

- Shut all nozzles:

Set the main spray ON/OFF (11) to OFF position. This returns the pump output to the tank through the return system. The diaphragm non-drip valves ensure instantaneous closing of all nozzles.

- Close one or more sections of the boom:

Switch the relevant distribution valve (16) to off position (upwards). The DF4 pressure equalization ensures that the pressure does not rise in the sections, which remain open.



5.3 IntelliTrack (only for HC 6500)

General Info

The IntelliTrack is available as an option for NAVIGATOR.

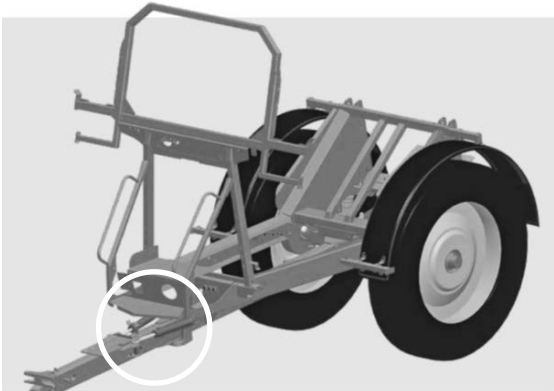
IntelliTrack is a high end steering drawbar concept which combines the advantages of an excellent designed chassis with the use of advanced electronics.

With IntelliTrack is the drawbar divided in two - a rear part fixed on the frame and a moveable front part.

Dynamic Electronic Control is an integrated safety feature which does not allow the cylinders to steer the drawbar when the driving speed is too high for the given track width.

IntelliTrack has automatic drawbar transport lock and 6 metre turning radius.

IntelliTrack can be set to a minimum radius which activates "soft stops" at the hydraulic cylinders. This is to ensure smooth operation of the machine when reaching the hydraulic cylinder end stop.



Sensors Involved

- Front angle sensor at drawbar. 70 Deg. Connected to JobCom.
- Rear angle sensor rear under machine. 120 degree Connected to track wire harness under machine.
- Boom fold sensor at boom swivel. Connected to hydraulic harness.
- Lock sensor under machine. Connected at junction box under machine.
- Speed sensor. Connected to section valve PCB.

Constants Involved

- Speed.
- Track With.
- Chassis size.
- Drawbar length.
- Tractor drawbar length.
- Safety factor.
- Minimum radius.
- Maximum speed.
- Calibration of proportional hydraulics.

Pinning/Plugs/Colours/Codes

	Potentiometer	Sensor	AMP pin	PCB
Black	GND	GND	1	-
Blue	Signal	Signal	3.	Track
Brown	+12V	+12V	2	+

5 - Operation

Fault Finding Options/Results

Check power supply and hydraulic supply. Follow instructions in the operators Instruction Book. See "IntelliTrack" on page 190

Measurements

In menu 4.7 sensor readouts can be seen.

- When machine is in straight line (centred) the potentiometers must show 2.5 Volt.
- Inductive sensors show 0.8 V to 5.0 V

Be careful when manoeuvring the sprayer, as all automatic functions are disabled when in menu 4.7.



WARNING! Do not try to operate the boom before checking that the boom is clear from the transport brackets and the IntelliTrack lock is open.

Track Setup

Enable Track

Enable track in menu E8.4.01

As default the track system is disabled. After a master reset of the controller the track system has to be enabled.

E8.4.1 Track disable/enable	
E8.4.1.1	Track disable
» E8.4.1.2	Track enable
Track is enabled	
Safety system enabled	

Chassis Setup

The correct chassis has to be selected in menu E8.4.3 for the track system to track properly.

When the chassis type is selected, the default value of menu E8.4.8 Minimum radius, is also changed.

i NOTE! If entering menu E8.4.3 to check the chassis setting, pressing "Enter" will cause the extended menu settings for that chassis reverting to default.

Safety factors and gain values then have to be set again.

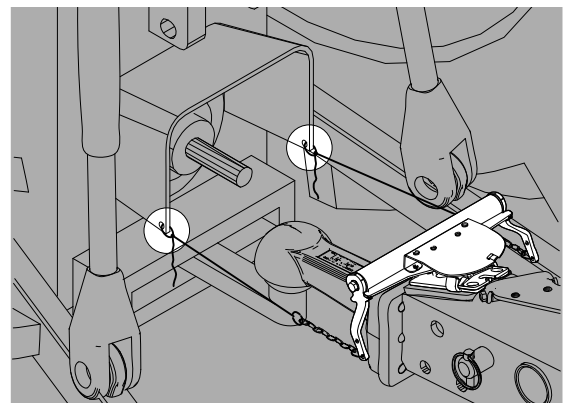
E8.4.3 Chassis	
E8.4.3.1	CM05 Small
» E8.4.3.2	CM05 Medium
E8.4.3.3	CM05 Large
E8.4.3.4	NAV07 Medium
Select for the 4400 liter chassis CM 2005 version	

Front Sensor Adjustment for IntelliTrack

1. Verify that the potentiometer is adjusted to its centre position.
2. If necessary the potentiometer is adjusted by loosening the two retaining screws and turning the potentiometer housing.
The screws are accessible through the two holes in the protective cover.
3. Ensure the lever remains seated and secure once the screws are re-tightened.

ATTENTION! The chains attached to the tractor must be parallel to each other and fairly horizontal and perpendicular to the angle sensor shaft.

If not the sensor input does not precisely reflect the actual turning angle.



5 - Operation

4. When the sprayer and drawbar is aligned, the front and rear potentiometer should be physically adjusted to read out the default voltage and degrees on the controller.

The values can be read out in:

- Menu 4.5.4.6 Track sensor test.
- For the rear sensor, also in Menu E8.4.2.1.

When the sprayer and drawbar is aligned and set, the sensor should read:

- 2.5 V +/- 0.1 V
- 0.0 degree.

4.5.4.6 Track sensor test

Front sensor	2.50	Volt
Front sensor	0.0	degree
Rear sensor	2.50	Volt
Rear sensor	0.0	degree
Boom sensor 1	0.7	Volt
Boom sensor 1	unfold	
Boom sensor 2	0.00	Volt
Lock sensor	5.00	Volt
Lock sensor	Unlockd	

Actual sensor signals

Under 0.5 volt means not connected

Voltage and Angle Read Out in Menu E.8.4.2.1

Right and Left gain value:

- Is the actual gain settings.
- The default value is 1.00.

Raw sensor and angle reading:

- Is the actual reading from the rear potentiometer.

Corr. sensor and angle reading:

- Is the actual value used by the controller when turning left or right.
- With default gain value 1.00, the Raw and Corr. values will be the same.
- When the gain is increased, the Corr. value will be higher than the Raw value.
- When the gain is decreased, the Corr. value will be lower than the Raw value.

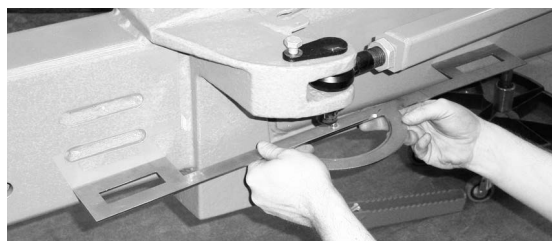
E8.4.2.1 Read out

Right gain value	1.00	
Left gain value	1.00	
Raw sensor reading	2.50	Volt
Raw angle reading	0.0	degree
Corr. sensor reading	2.50	Volt
Corr. angle reading	0.0	degree

Actual gain setting and sensor reading

IntelliTrack Drawbar Alignment

Use the protractor, ref. no. 72547300 to adjust the drawbar angle to 0 degrees or measure the length of the two cylinder pistons.



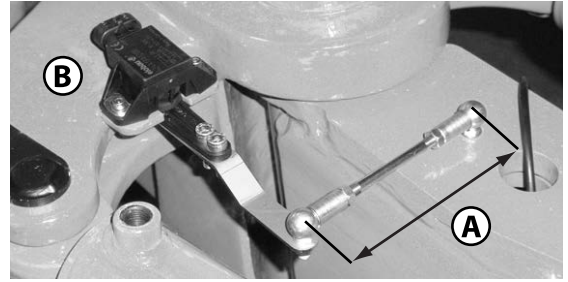
The sprayer drawbar is aligned when the two cylinder pistons have the same length +/- 2mm.



IntelliTrack Rear Sensor Adjustment

Adjust the link from the potentiometer arm to the chassis to 115mm (A).

Adjust the potentiometer by loosening the two retaining screws (B) and turn the potentiometer housing until it read out 2,5V/0 degree on the controller.



IntelliTrack Rear Sensor Calibration

Production tolerance of the sprayer influences the IntelliTrack track performance. To compensate for that tolerance, it is possible to calibrate the gain to match the actual maximum turning angle.

At the factory the maximum left and right turning angle of the drawbar is measured and a sticker with the angle is placed at the inside of the JobCom lid.

- H = right
- L = left



If the sticker with the angle is on the lid, measurements with the protractor is not necessary. The value on the sticker can be keyed in direct in menu E8.4.2.2.2 and E8.4.2.2.4.



NOTE! In case of master reset the calibration procedure must be done again.

1. Open menu E8.4.2.2.2 to calibrate the rear angle sensor.
2. Select E8.4.2.2.2 Calibrate.

E8.4.2 Rear angle sensor	
E8.4.2.1	Read out
» E8.4.2.2	Calibration
E8.4.2.3	-->
E8.4.2.4	<--
Calibration of rear angle sensor	



3. Turn the drawbar to its right extreme.
The angle can be viewed in E8.4.2.2.2.1 Raw angle reading.


5 - Operation

4. Use the protractor, (72547300), to measure the maximum right angle.



5. If the angle differ, then key in the measured angle value or the value from the JobCom lid into menu E8.4.2.2 Raw angle reading.

auto ✓ Track auto   04





E8.4.2.2 Raw angle reading


47.9

degree

Keyin physical measured angle.
Press ENTER.

6. Turn the drawbar to its left extreme.
The angle can be viewed in menu E8.4.2.3 Raw angle reading.

auto ✓ Track auto   04



E8.4.2.3 Raw angle reading

XX.X



degree


Press and hold "steer to left" button,
until end stop is reached. Press ENTER.

7. Use the protractor, (72547300), to measure the maximum left angle.



8. Key in the measured angle value or the value from the JobCom lid into menu E8.4.2.4 Raw angle reading.

auto ✓ Track auto   04



E8.4.2.4 Raw angle reading

49.9

degree

Keyin physical measured angle.
Press ENTER.

Trimming IntelliTrack Accuracy

Even with thoroughly calibrated systems, some sprayers do not obtain sufficient track precision. This can be caused by tractors that have a longer drawbar than the system was designed for. And that the angle sensors, front and rear, both have their tolerances summed in performance-negative direction.

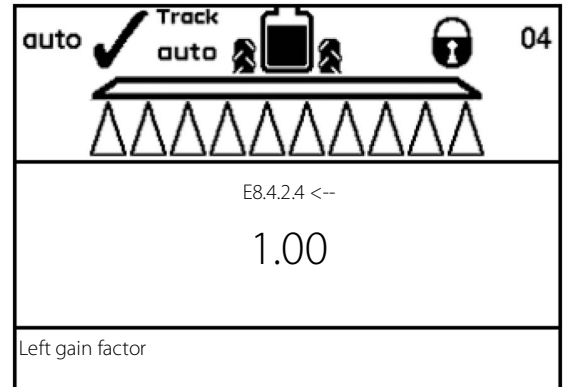
In menu E8.4.2.3 and E8.4.2.4 left and right gain factor can be set manually.



ATTENTION! Proper speed calibration and sensor adjustment are essential to both track systems.

Trimming Procedure

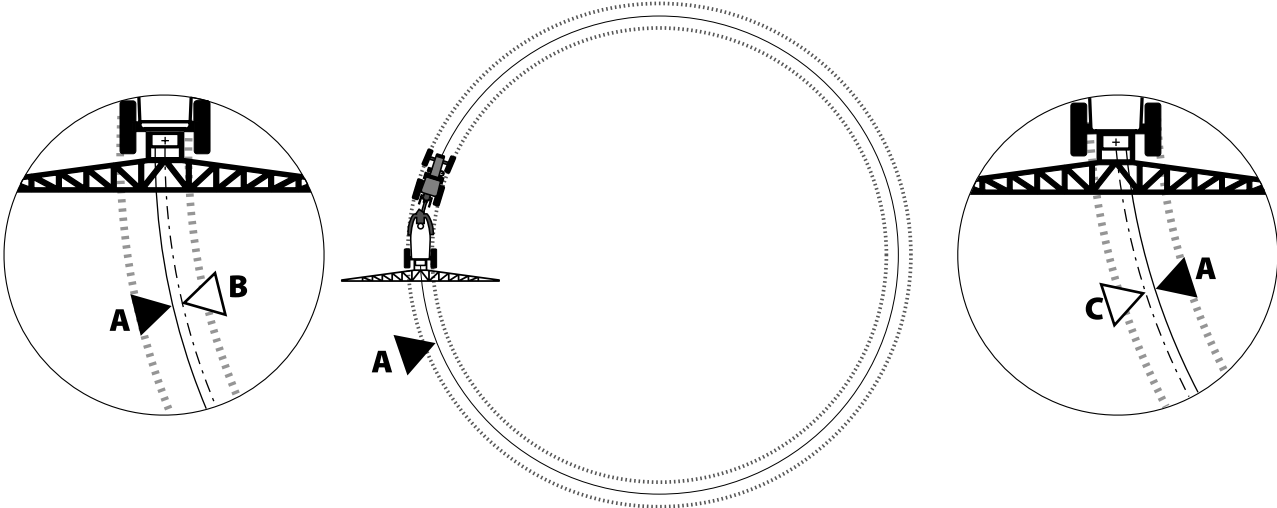
1. Make sure the track system has been properly calibrated, including the speed.
2. Set track mode button to "auto".
3. On a flat field drive in a circle about 1m bigger than minimum radius for that sprayer (A); see table.
 - Keep the steering wheel steady.
 - Speed about 5-7 Km/h.
 - Check the deviation between the sprayer and tractor.



NOTE! Turning radius:

NAVIGATOR	3000	4000
Turning radius IntelliTrack, meter	6.0	6.0

4. If the sprayer:
 - Over-compensates, sprayer runs outside tractor radius (C), increase the gain factor, 1.0 -> 1.1.
 - Under-compensates, sprayer runs inside tractor radius (B), decrease the gain factor, 1.0 -> 0.9.



5. Drive a full circle again, and check if OK. Decrease or increase the gain factors accordingly.



NOTE! Some farmers prefer a fast tramline-in / tramline-out reaction, and might be able to live with some over-compensation in the curve.



NOTE! If entering menu E8.4.3 to check the chassis setting, pressing "Enter" will cause the extended menu settings for that chassis reverting to default.

Safety factors and gain values then have to be set again.

5 - Operation




Drawbar Length


Menu E8.4.4 Sprayer drawbar length.

- Value 0-200 cm.
- Default value 100 cm (40 inches).

NAVIGATOR

Drawbar length is measured from the drawbar pin hole to the rear bolt on the pump base.

auto  Track auto   04



E8.4.4 Sprayer drawbar length

100


cm

Key in length from drawbar eye to anchor bolt on sprayer drawbar

Manual Angling Speed

Menu E8.4.5 Manual angling speed, sets the manual steering speed.




- Value -9% to 9%
- Default value 0%


 NOTE! +/- can be changed by toggling.

Unfold boom, set PTO to spraying RPM, and set the system to "Manual".

By using the L/R button the sprayer will start moving.

- If too slow increase the value.
- If too fast decrease the value.

auto  Track auto   04



E8.4.5 Manual angling speed

0

%

Use a minus value to slow hydraulic speed
positive value to increase speed

Boom Fold Sensor

Menu 8.4.6 Boom fold sensor, sets number of boom fold sensors present.

- HAZ, FTZ use P2 sensor.

In General




- Only 1 boom sensor for simultaneous folding of inner section.


Menu 8.4.6 Boom fold sensor	
E8.4.6.1	No boom sensors
E8.4.6.2	1 Boom sensor
E8.4.6.3	2 Boom sensors
On NAV07 boom sensor are optional	

Minimum Turning Radius

E8.4.8 Minimum radius permitted.

- Default value for NAVIGATOR: 6.0m
- Increase value to achieve a soft-stop and prevent bottoming out, on track cylinders.

auto  Track auto   04



E8.4.8 Minimum radius permitted

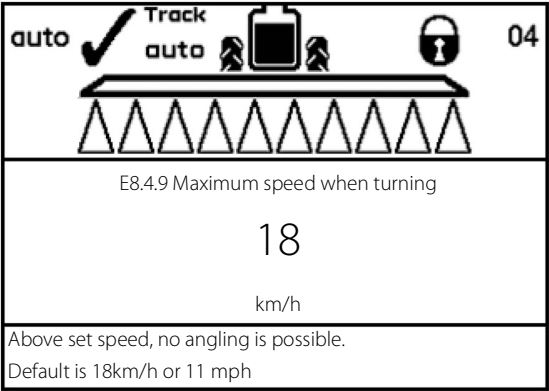
6.0

meter

Minimum permitted radius.
Will set soft stop for cylinders

Maximum Turning Speed

If maximum turning speed is exceeded, the track system aligns the sprayer and a speed alarm will be present in the display.



5 - Operation

Safety Factor

When using a track system, sprayer stability is a common concern. Many factors influence the sprayer. Different conditions where the sprayer might tip over have to be dealt with. Some are sprayer specific and others are user specific.

Sprayer Specific Factors

- Angular speed.
- Track width.
- Tank size.
- Tank level.
- Sprayer geometry.

These factors are collected and calculated to a "Safety factor" that defines a safe or unsafe driving situation for the sprayer.

User Specific Factors

- Driving behaviour.
- Tyre width
- Tyre pressure
- Field conditions.

The user specific factors are not considered in the Safety Factor calculations.

Unsafe Driving

- An alarm will be present in the display, when an unsafe driving situation is present: "Over speeding!", "Slow down!".
- A sound alarm is also present - disregarding any setting of sound level in general.

E8.4.10 Safety Factor for IntelliTrack

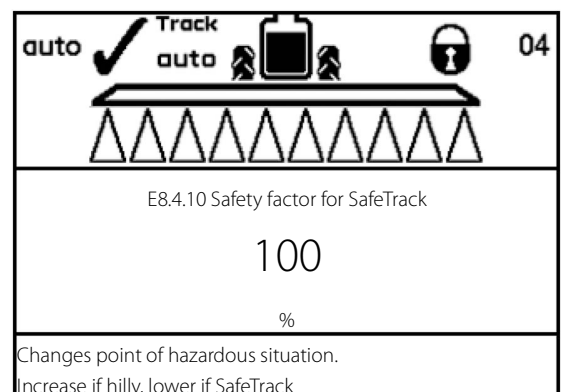
- Default value for NAVIGATOR '07 chassis Medium: 100 %
- 0 disables the build in safety system.
- Raising this value increases captiousness.
- Use steps of 10% as a guide to changes.

Safety Factor Log

Every time the user presses "Enter" in menu E8.4.10 Safety factor, a log is created with settings and date.

- 10 latest changes are logged.

The log is printed out with the error print menu E8.4.7.



Fault Finding Track Alerts

See the HC6500 instruction book Fault Finding chapter for a full table of Alarms, Warnings, etc. that will or can be shown on the terminal display.

Fault	Probable Cause	Control / Remedy
No lock release when hydraulic pressure is established, and the controller is powered up	Hydraulic pressure hoses P and T are turned around.	Turn hydraulic pressure hoses around. T= Blue, P=red
Rear angle sensor alarm	In menu 4.7 the rear angle sensor will read app. 0.00V	Check 10A fuse on DAH PCB in the JobCom
Unable to lock SafeTrack	The rear angle sensor possible need adjustment	A 16-17 mm bolt is placed in the calibrating hole on the lock. Then the rear angle sensor is adjusted to 2.50 Volt.

Additional Information

See the other book delivered from HARDI - Spray Technique - to get further information about:

- Calibration of the sprayer
- Nozzle Choice
- Nozzle Wear
- Spray Distribution
- Spray Pressure
- Water Volume Rates
- Weather Influence on Spraying
- Useful Formulae

For optional equipment - see other books delivered or contact HARDI.

5 - Operation

5.4 Cleaning

General Info

Follow the following cleaning and maintenance program, in order to derive full benefit from the sprayer for many years.



ATTENTION! Always read the individual paragraphs. Carefully read the instructions for cleaning/maintenance jobs before starting on the job. If any portion remains unclear, or if it requires facilities not available, then please leave the job to your HARDI dealer's workshop for safety reasons.



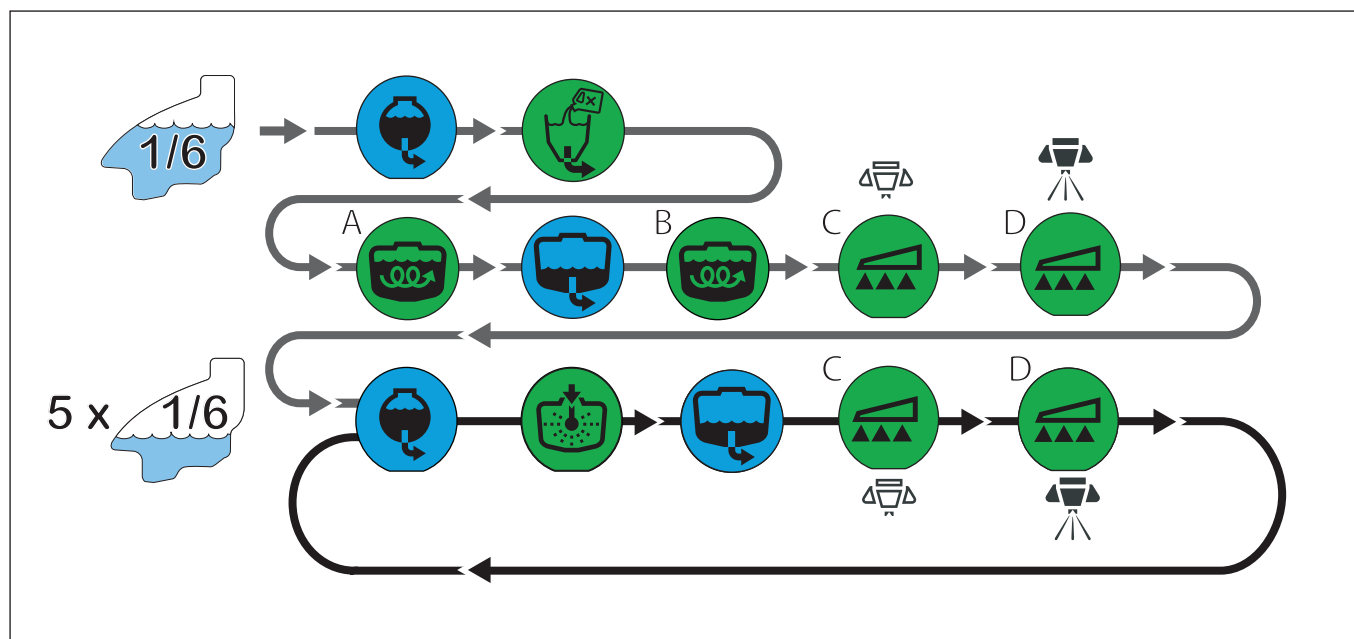
ATTENTION! A clean sprayer:

- Is a safe sprayer.
- Is ready for action.
- Reduces risk of crop damage from crop protection chemical residue.

Guidelines

- Read the complete chemical label. Take note of any particular instructions regarding recommended protective clothing, deactivating agents, etc. Read the detergent and deactivating agent labels. If cleaning procedures are given, follow them closely.
- Be familiar with local legislation regarding disposal of pesticides washings, mandatory decontamination methods, etc. If in doubt, contact the appropriate authority.
- Usually the pesticide washings sprayed out on the field just sprayed or at a suitable cultivated area. Avoid emptying the washings at the same spot every time and keep sufficient distance to the water environment. You must prevent seepage or runoff of residue into streams, watercourses, ditches, wells, springs, etc. The washings from the cleaning area must not enter sewers. Alternatively, retain the washings in an appropriate receptacle, diluted and distributed over a larger cultivated area - also see "Filling/washing location requirements" on page 125.
- Cleaning starts with the calibration, as a well-calibrated sprayer will ensure the minimal amount of remaining spray liquid.
- Good practice is to clean the sprayer immediately after use, and thereby rendering the sprayer safe and ready for the next pesticide application. This also prolongs the life of the components. Strongly advised is to perform an internal cleaning of the sprayer, when high concentrations of acids or chloride are present in the active ingredients, or if the spray liquid is corrosive. For the best result, use a cleaning agent recommended by HARDI, e.g. AllClearExtra.
- Sometimes it is necessary to leave spray liquid in the tank for short periods, e.g. overnight, or until the weather becomes suitable for spraying again. Unauthorized persons, children and animals must not have access to the sprayer under these circumstances.
- Recommended is to coat all metal parts of the sprayer before and after use with a suitable rust inhibitor, if the product applied is corrosive.
- Always park the sprayer under roof to avoid rain-washing off pesticides as well as build-up of spot contamination in the soil. If parked outside, park the sprayer on the filling/washing location in order to retain possible pesticides.

Quick Reference - Cleaning



ATTENTION! Set pump speed to 250-280 rpm.

- A. Turn agitation fully on for at least 20 seconds.
- B. Turn agitation fully off.
- C. Minimum 45 seconds with nozzles Off.
- D. Spray until air comes out of nozzles.

When the pressure drops, close the regulation valve by pressing the pressure increase button for 10 seconds.

When the boom is completely empty, press the pressure decrease button for a few seconds to avoid a pressure spike.

5 - Operation

Cleaning and Maintenance of Filters

Clean filters ensure:

- None hindering or damage during operation on sprayer components such as valves, diaphragms and operating units.
- Nozzle clogging do not occur whilst spraying.
- Long life of the pump. A blocked suction filter will result in pump cavitation. The main filter protecting sprayer components is the suction filter. Check it regularly.



NOTE! For cleaning procedure, refer to:

- "10 Hours Service - EasyCleanFilter" on page 161.
- "10 Hours Service - CycloneFilter" on page 162.
- "10 Hours Service - Nozzle Filters (If fitted)" on page 163.

Use of Rinsing Tank and Rinsing Nozzles

The integrated rinsing tank can be used for three different purposes:

- A. Full internal rinsing or cleaning. In-field diluting before cleaning.
- B. Rinsing the liquid system without diluting main tank content. Rinsing when main tank is not empty.
- C. External cleaning of the sprayer (can only be carried out on completion of "A.").



ATTENTION! The cleaning procedures stated requires the TurboFiller to be cleaned on beforehand (directly after the last chemical filling). If the TurboFiller for some reason is not already cleaned, please do this before attempting the cleaning procedures below - see "TurboFiller Rinsing" on page 119.

Note that cleaning the TurboFiller will then use water from the rinsing tank thus reducing the available quantity for cleaning procedures below.



ATTENTION! Do NOT fill any cleaning agents into the rinsing tank. If cleaning agents are to be used, they should be filled into the main tank, e. g. via the TurboFiller.

A. Full Internal Rinsing or Cleaning.

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



NOTE! This rinsing is adequate/sufficient when the sprayer is going to be used again shortly (e.g. next day) in same or similar crops (No risk by cross contamination and subsequent crop damages).



WARNING! If the next crop to be sprayed is sensitive to the latest chemical used a full cleaning should be carried out. See "Full Internal Cleaning (Soak Wash)" on page 142.



WARNING! Never clean the sprayer if there are risks of contamination of surface or underground water! Choose a different spot for cleaning every time to avoid spot contamination to build up.



DANGER! Before commencing this rinsing procedure ensure that the blind cap is securely fitted and tightened on the PressureEmpty quick-coupler! If this is not fitted and tightened properly, it may burst off during the rinsing process and lead to injuries for the operator or persons in proximity of the machine!

This rinsing procedure will rinse the liquid system and main tank as follows:

1. Empty the sprayer as much as possible. Close the agitation valve (no agitation). Allow the pump to run for at least 1 minute after the liquid has stopped coming out of the nozzles to ensure that all relevant liquid has been expelled.
2. Turn suction SmartValve towards "Rinsing tank" and pressure SmartValve towards "Main tank". Set agitation valve to "Full agitation".
3. Engage and set the pump at approximately 300 rpm.
4. Use 1/6 (approximately 75 litres) of the rinsing tank content at this valve setting.
5. Now turn the pressure SmartValve towards "Pressure Empty/TurboFiller" for minimum 3 seconds to burst and flush the safety valve. The TurboFiller is not flushed by this operation.
6. Turn the agitation valve towards "FastFiller flushing" and use another 1/6 (approximately 75 l) of the rinsing tank content for flushing the FastFiller lines.
7. Shut off all nozzles by the main ON/OFF button on the grip.
8. Turn suction SmartValve towards "Main tank" and the pressure SmartValve towards "Spraying". Engage the auxiliary pump (FlexCapacity configurations only). Set the spraying pressure at 3-5 bar. If the pressure is set outside this range the rinsing result may be insufficient.
9. Allow the rinsing water in the main tank to circulate for minimum 45 seconds with the nozzles shut to flush the return lines from boom to tank.

5 - Operation

10. Open all nozzles and spray the rinsing water from the main tank through the nozzles while driving in the field. Choose a different location each time to distribute the rinsing water over larger areas. Continue until all fluid is expelled from the boom pipes and nozzles - this may take several minutes after the spray fan has collapsed.
11. Shut off all nozzles by the main ON/OFF button.
12. Now turn the suction SmartValve towards "Rinsing tank" and the pressure SmartValve on "Tank rinsing".
Use another 1/6 (approximately 75 l) for this. The tank strainer should be removed to avoid shading the rinsing nozzle.
13. Turn the suction SmartValve towards "Main tank" and the pressure SmartValve towards "Spraying". With the nozzles shut allow the liquid to circulate for minimum 30 seconds to flush the return lines from boom to tank.
14. Open all nozzles by the main ON/OFF switch and spray the rinsing water from the main tank through the nozzles until all liquid is expelled from the boom pipes and nozzles.
15. Repeat step 11-14 another 3 times using 1/6 (approximately 75 l) of the rinsing tank content in each of the 3 sequences until the rinsing tank is empty.
16. Shut off the nozzles at the main ON/OFF button once the rinsing process is complete.

B: Rinsing When Main Tank Is Not Empty

This procedure is used to rinse the pump, operating unit, spray lines, etc. in case of stopping the spray job before the main tank is empty (e.g. at the beginning of rain etc.).

Cleaning of the liquid system:

1. Turn Suction SmartValve towards "Rinsing tank". (Keep pressure SmartValve in "Spraying"-position).



NOTE! The main ON/OFF function on the grip must be ON. Closing the main ON/OFF will transfer the rinse water back to the main tank!

2. Close agitation valve (no agitation).
3. Turn off the Cyclone Filter Boost Valve to avoid dilution of main tank content.
4. Turn on the pump and spray water from the rinsing tank into the field, until all boom pipes and nozzles are flushed with clean water.
5. Turn off the pump when rinsing is finished.



ATTENTION! It is advisable to increase the forward speed (double if possible) and reduce the spray pressure to 1.5 bar when spraying diluted spray liquid in the field just sprayed.



ATTENTION! If a cleaning procedure is given on the chemical label, follow it closely.

Full Internal Cleaning (Soak Wash)



ATTENTION! This cleaning procedure is always used when one or more of these situations occur:

- A. The next crop to be sprayed is at risk of being damaged by the chemical just used.
- B. The sprayer is not going to be used right away for the same chemical or crop.
- C. Before any repair or maintenance job is going to be carried out on the sprayer.



ATTENTION! Wash the sprayer between jobs with incompatible crops. This must be done according to the directions from the chemical manufacturer. Use a commonly used cleaning agent, or a cleaning agent and/or procedure as directed by the chemical manufacturer.

Procedure for Washing with a Cleaning Agent

1. Rinse the sprayer in the field (see the section "Use of Rinsing Tank and Rinsing Nozzles" on page 141).
2. Drive to the filling location.
3. Prepare sprayer for cleaning. Fill water in the MainTank to 10% of its capacity. Fill the RinseTank completely.
4. Add the cleaning agent to the MainTank by using the TurboFiller. Follow instructions on the label of the cleaning agent.

5. Set suction valve for "MainTank" and pressure SmartValve for "MainTank". Set agitation valve for "Full agitation".
6. Engage and set the pump speed at approximately 300 RPM.
7. Allow the liquid to circulate the system for 3 minutes.
8. Set the pressure SmartValve for "main tank" for minimum 10 seconds in order to open and flush the safety valve.
9. Open the TurboFiller transfer valve and the deflector valve. Allow the liquid to circulate for 3 minutes.
10. Close the lid and activate the container rinsing valve to clean the hopper inside.
11. Shut all three valves on the TurboFiller again.
12. Verify that all nozzles are shut on the main valve ON/OFF switch on the grip.
13. Set the pressure SmartValve for "Spraying".
14. Allow the liquid in the MainTank to circulate for minimum 3 minutes with the nozzles shut.
15. Set the pressure SmartValve for "Tank cleaning nozzles". Allow the liquid to circulate for 3 minutes.
16. Spray out water with cleaning agent and chemical residue.
Set the spray pressure at 3-5 bar.



Note! The wash water still contains active chemical. Choose an appropriate area to spray this out. Alternatively, the washings can be dumped at the filling/washing location and retained in an appropriate receptacle (e.g. slurry tank or similar). Spot contamination and accumulation must be prevented.

Continue to spray until all liquid has exited from the boom pipes and nozzles.

17. Shut all nozzles with the main ON/OFF button.
18. Rinse the sprayer again with clean water to rinse out all remains of the cleaning agent.
19. Include rinsing of the TurboFiller in step 18. Operate all 3 valves during this process.
20. Disassemble all filters (suction, pressure, in-line and nozzle filters) and clean the filter screens using clean water and detergent and a brush.



WARNING! It is the responsibility of the sprayer operator or owner, that the sprayer is cleaned sufficiently to prevent contamination of the environment, crop damages and health and safety hazards to the operator and the public. HARDI cannot be held responsible for any damages or incidents related to insufficient cleaning.



ATTENTION! The rinsing nozzles cannot always guarantee a 100% cleaning of the tank. Clean manually with a high pressure cleaner afterwards, especially if the next crop is sensitive to the chemical just sprayed!

Use of Cleaning Agents

Recommended is to use an appropriate cleaning agent suitable for cleaning agricultural sprayers.

- Recommended is cleaning agents containing a suitable lube or conditioner.
- If for some reasons not available, and instead using triple ammonia water, it is important to rinse the liquid system immediately after, and add some lubricant to the rinsing water to prevent ball valves etc. seizing up.
- Use of automotive antifreeze/radiator coolant (ethylene glycol) will protect valves and seals from drying or seizing up.

Technical Residue

An amount of spray liquid will inevitably remain in the system. As the pump takes in air when the tank is just about empty, spraying the crop properly is not possible.

This technical residue is defined as the remaining amount of liquid in the system, when the first clear pressure drop appears on the pressure gauge.

The residual dilutable volume is approx. 41 litres. See the section "Technical Specifications" for more details.

Immediately dilute the residue in the tank in a ratio of 1:10 with clean water. Afterwards spray out on the crop just sprayed with increased driving speed.

In addition, separately rinse pump, linkage and armature with water from the rinsing tank.

5 - Operation



ATTENTION! Liquid in the spray lines is undiluted residue. There should be an untreated paddock area available to spray this liquid out.

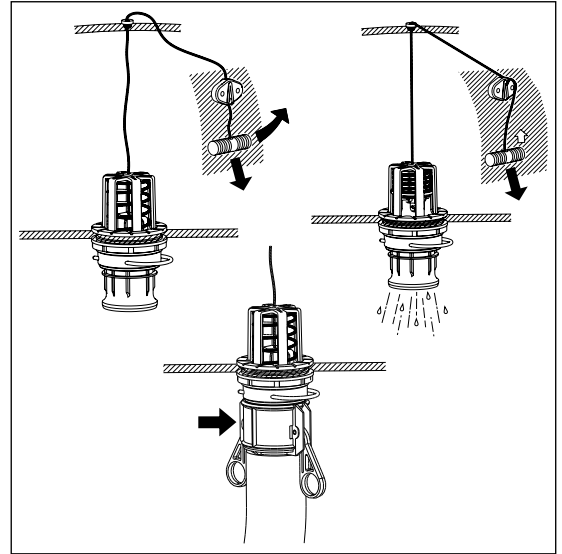
Follow national regulations when disposing of chemical residues.

Using the Drain Valve

The drain valve is operated from side of the sprayer and is located just behind the main tank lid.

1. Pull the string to open the drain valve.
2. The valve is spring-loaded, but can be kept open by pulling the string upwards in the V-shaped slit.
3. To release, pull the string downward and the valve will close automatically.

If draining residues, e.g. liquid fertilizer into a reservoir, a snap coupler with hose can rapidly be connected to the drain valve, and the liquid is safely drained.



BoomFlush - Manual Cleaning

When BoomFlush valves are fitted to the end(s) of boom piping, the cleaning procedure is as follows:

1. Follow the cleaning procedure to clean the sprayer the first two times.
2. Open all BoomFlush valves by hand.
3. Continue the cleaning procedure to clean the sprayer for the third time.
4. Close BoomFlush valves.



WARNING! To prevent contamination of the soil, the BoomFlush valves must only be opened at the last step of cleaning!

6.1 Preparation

Introduction

This section of the manual deals with maintenance. It is vitally important that you prepare the service area, the sprayer and tractor to minimise any potential risk to the operator or service technician. The following suggestions are made in the interests of safe work practices. Performing service and maintenance procedures safely requires awareness, preparation and common sense. Below is a list of safety issues which must be observed before commencing service or maintenance procedures:

Safety



DANGER: Maintenance procedures involve:

- Reading and interpreting technical information and illustrations
- Lifting the sprayer's axle off the ground
- Cleaning of filters
- Brake adjustments
- Servicing hydraulic components
- Testing and servicing of fluid systems
- Servicing PTO shaft safety shields
- Lubrication

Before you get started...

Performing service and maintenance procedures safely requires awareness, preparation and common sense. Below is a list of safety issues which must be observed before commencing service or maintenance procedures:



DANGER: Before carrying out any service procedures observe the following:

- Clean and de-contaminate the sprayer and use chemical safety protection gear (see "Chemical Safety" section 2 and "Cleaning and De-contamination" section 5)
- Ensure your work area has lifting and safety equipment of a suitable load bearing capacity
- Always wear safety eye wear, overalls, safety boots and gloves where appropriate
- Keep animals and people away from the service area at all times unless involved in the procedure
- Keep children away
- Position the tractor and sprayer on a suitable flat surface with enough room for the boom to operate
- Never perform set-up, service or maintenance procedures with the tractor running
- Turn the tractor's engine off, place in park with the hand brake on and remove the ignition key!
- Fit the support leg and retaining pins and use wheel chocks in front and behind of each wheel
- Always use safety stands when lifting the sprayer off the ground
- Always re-fit all safety equipment and shields after service procedures
- Think each job through before commencing work and assess any potential risk
- Avoid working alone or at least have some-one check on you periodically
- Carry a mobile phone on you for emergencies
- Disconnect the power and clear the area of any flammable material before using a welder or grinder
- If any procedure is unclear or requires facilities which are not available, refer the job to your HARDI dealer.

6 - Maintenance

6.2 Lubrication


General Info

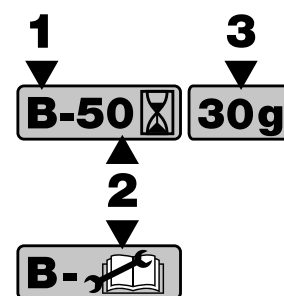
Always store lubricants clean, dry and cool - preferably at a constant temperature - to avoid contamination from dirt and condensed water. Keep oil filling jugs, hoppers and grease guns clean, and clean the lubricating points thoroughly before lubricating. Avoid skin contact with oil products for longer periods.

Always follow the quality and quantity recommendations. If no quantity recommended, feed the lubricator until new grease becomes visible.











Pictograms in Lubrication & Oiling Plans

1. Lubricant to be used (see "Suitable lubricants" below).
2. Recommended intervals. Shown in hours or with a symbol for occasional maintenance.
3. Quantity to use. Only shown if specifying a quantity.

 ATTENTION! Recommended is lubrication of the entire machine, if cleaning the sprayer with a high-pressure washer.



Recommended Lubricants

	What to Lubricate?	Lubricant Type	Factory Use	Suitable Alternatives
 A	BALL BEARINGS and PUMP	Lithium based grease Consistency NLGI grade 2 Viscosity (@40°C) > 460 cSt	SHELL Gadus S3 V460 2 Hardi pump grease cartridge (400g): Item no. 96200604	MOBIL grease XHP 462 TOTAL Multis Complex SHD 460
 B	SLIDE BEARINGS	Lithium based grease Consistency NLGI grade 1/2 Viscosity (@40°C) > 200 cSt	MOBIL XHP 222	SHELL Gadus S3 V220C 2 TOTAL Multis Complex SHD 220
 C	OIL LUBRICATION POINTS	Engine or gear oil Viscosity 20W-50 or 80W-90	OK Tractor UTTO GL 4 80W	SHELL Spirax S4 TXM CASTROL ACT EVO 4T MOBIL Mobilube HD 80W/90
 D	GLIDE SHOES IN BOOM CENTRE	Stearic or a non-greasy type of wax or engine or transmission oil		
 D	BOLTS	Anti-corrosive wax	PAVA PV 700	TECTYL 506 WD
 D	VALVES and SEALS (O-RINGS)	NSF 51, NSF 61 silicone compound	ROCOL SAPPHIRE Aqua-Sil	DOW CORNING MOLYKOTE 111 Compound
 E	HYDROSTATIC FAN TRANSMISSION	Hydraulic oil, type ISO VG 46,	CASTROL HYPIN AWS 46	
 E	AIR COMPRESSOR	Compressor oil, type ISO 100,	MOBIL RARUS 427	
 E	GEARBOX	Gear oil, type ISO VG 220 Fully synthetic	MOBIL SHC 630	
 E	HYDRAULIC DAMPING CYLINDER	Hydraulic oil type ISO HVLP Wide temperature range DIN 51524-3	CASTROL HYPIN AWS 46	

6 - Maintenance

Grease Nipple

When lubricating the sprayer, please use a grease gun that fit the dimensions of the grease nipples.

Nipple head type: DIN 71412

Nipple head size (A): 6.5 mm



ATTENTION! If grease is leaking from the nipple near its threaded part, when grease is being applied, please tighten the nipple by using a spanner or similar. If damaged or bent out of shape, replace the nipple.



ATTENTION! If applying grease into the nipple seems difficult, unscrew the nipple. Check for blocking inside the nipple, or if the spring-loaded ball is stuck. Clean or repair as needed.



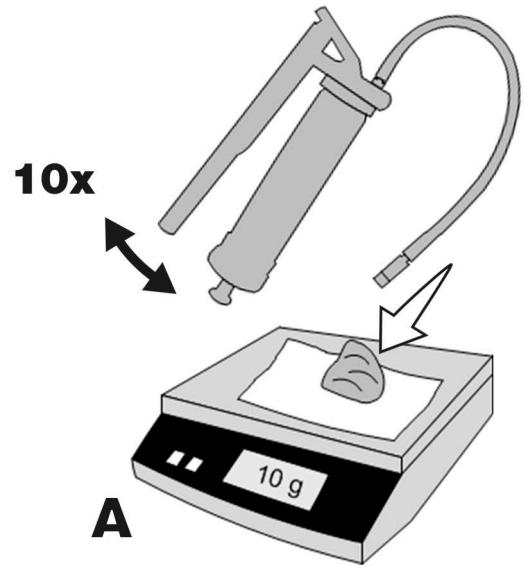
Grease Gun Calibration

Before lubricating the sprayer, you must calibrate your grease gun to ensure applying the correct quantity of grease to each lubrication point. The correct quantity of grease applied will prolong the lifetime of the sprayer.

Calibration Example

1. Insert the correct grease cartridge in your grease gun.
2. Apply grease onto a tissue or a piece of paper. Complete 10 full strokes of the grease gun.
3. Place the paper with grease on a scale (A).
4. If your grease pile weighs e.g. 10 grams, then 1 stroke equals 1 gram of grease.

When calibrated, you can count how many strokes to complete, when lubricating the different grease points on the sprayer according to the specifications.



Greasing the Pump

Grease the pump as follows:

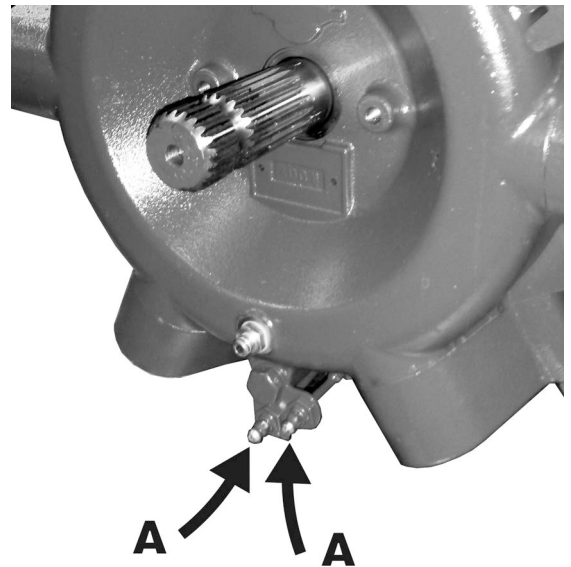
- Factory greased:
300 grams of grease into each lubrication point (A).
- Normal operation:
Greasing every 50 hours with 30 grams (approximately 50 strokes,) of grease into each lubrication point (A). Also refer to "50 Hours Service - Greasing the Pump" on page 164.
- After disassembling the pump (diaphragm renewal, etc.):
Greasing with 200 grams of grease into each lubrication point (A).



ATTENTION! In order to prevent excessive wear, it is important to use a recommended lubricant! See the section "Recommended Lubricants" in this book.



ATTENTION! When greasing the pump MUST be stopped!



Lubrication and Oiling Plan - PTO

The amount of grease to be applied is mentioned in grams (g). Test your grease gun to see how many grams it supply, for example after 10 strokes.

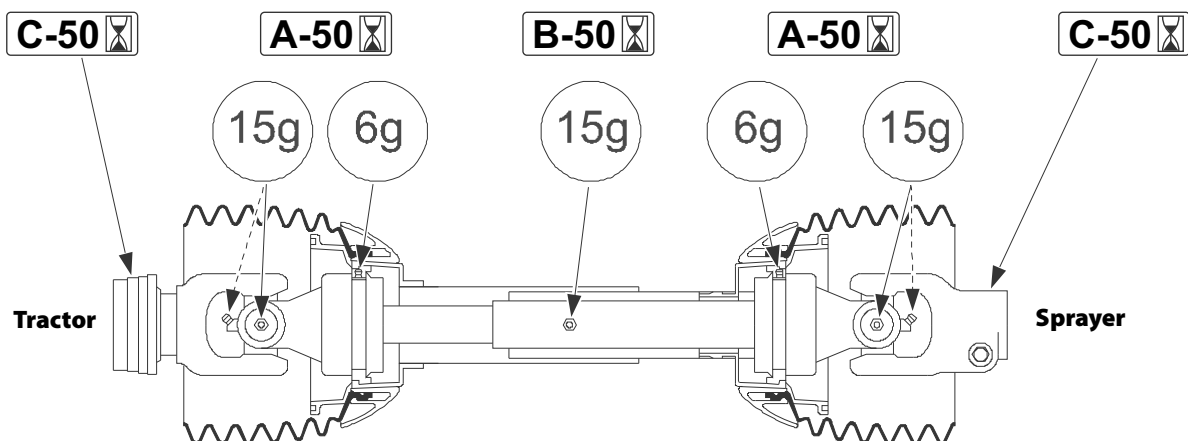


ATTENTION! It is important to apply the correct amount of grease at the intervals. Too little or too much grease will shorten the lifetime of the PTO.

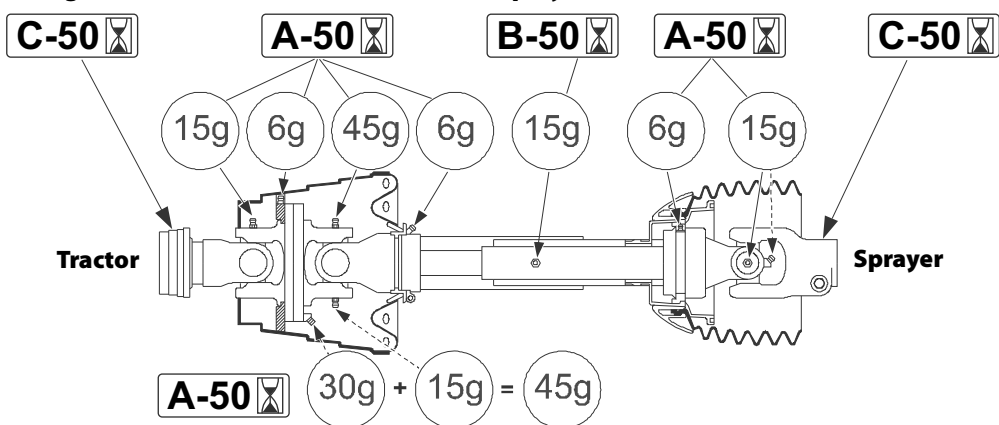
The grease points and amount of grease to apply shown in the pictures below together with the intervals.

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Standard PTO for Tractor and Sprayer

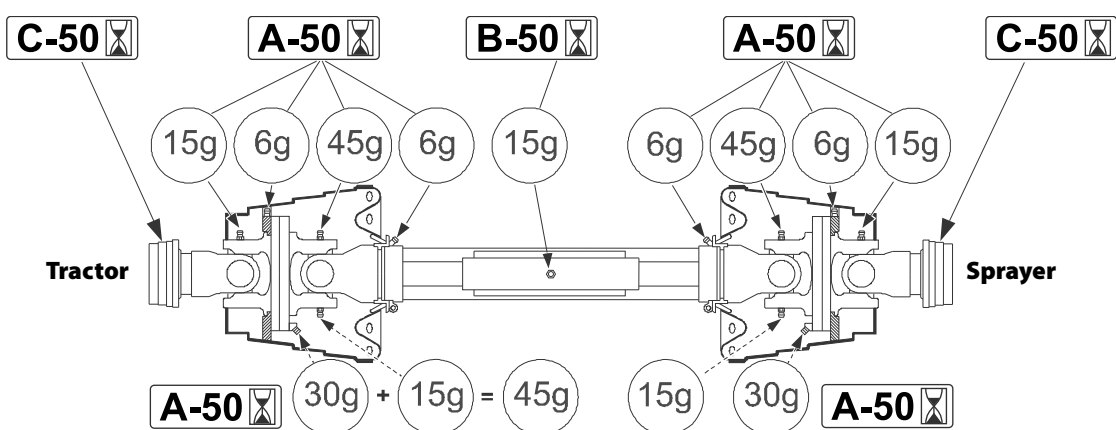


Wide Angle PTO for Tractor, Standard PTO for Sprayer



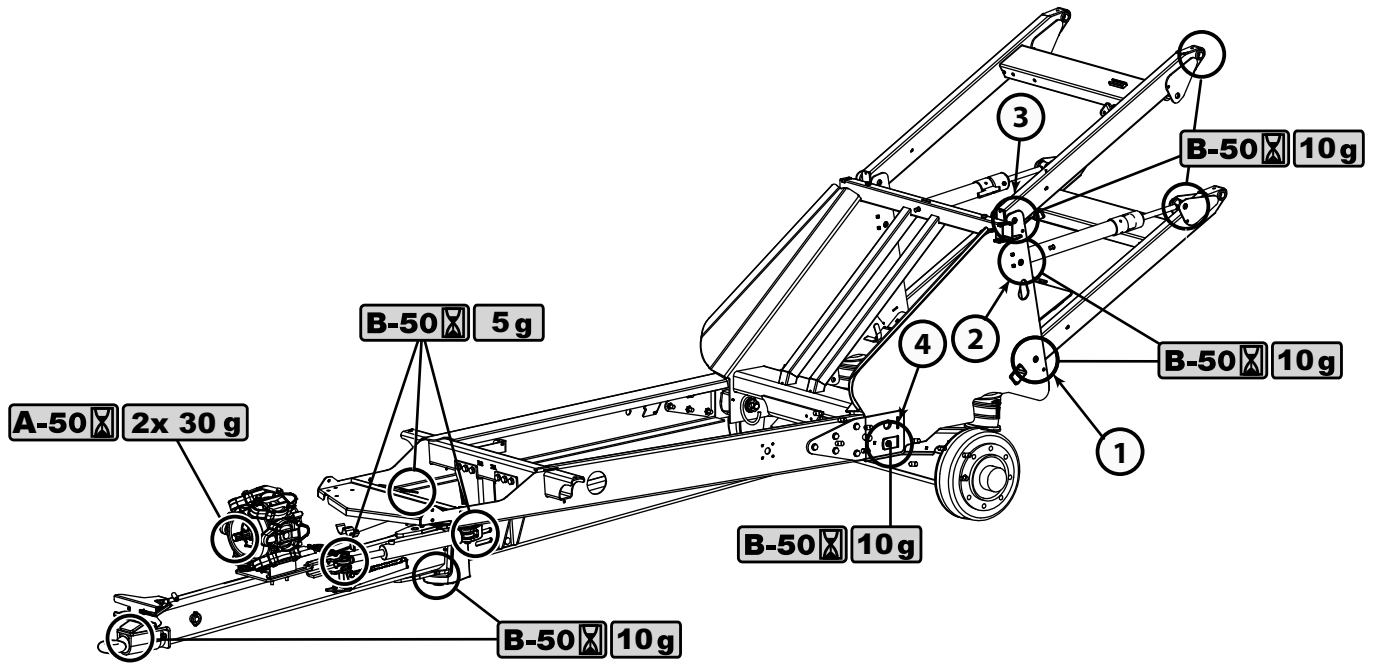
ATTENTION! If your sprayer has the TWIN air assistance included, **A-50** is changed to **A-30**.

Wide Angle PTO for both Tractor and Sprayer



ATTENTION! If your sprayer has the TWIN air assistance included, **A-50** is changed to **A-30**.

Lubrication Plan - Trailer/ParaLift



NOTE! Position 4 is for suspended sprayers only.

ParaLift

There are 4 grease points in each side.



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Central Lubrication

The grease nipples are located at the rear of the chassis on both sides.

Depending on the sprayer setup, there can be 3 or 4 grease nipples to be lubricated in each side.

Refit the dust caps after lubrication to prevent the ingress of dust and dirt into the system.



6.3 Service and Maintenance Intervals

General Info

National or regional laws may require periodic inspection of the sprayers in use. See the following section for more details.

The user may carry out the subsequent periodic service and maintenance work. Contact your HARDI dealer if in doubt. If this work completed correctly, the sprayer will run efficiently and it will prolong its lifetime.

When mentioning a number of hours in this chapter, this means hours of spraying, unless otherwise explained. Read the operation hours in the controller in the tractor (see the instruction book for the controller).

6 - Maintenance

Tightening Bolts and Nuts

When tightening bolts and nuts as a part of periodic service or due to replacement of spare parts, it is important to apply the correct torque. This will prevent accidents and prolong the lifetime of the parts included in the bolted joints.

If not stated otherwise in this book, tighten bolts and nuts using the following torques.

Material: Surface Treated Steel		
Bolt Size (metric)	Recommended Torque (Nm)	Maximum Torque (Nm)*
M4	2.4	3
M5	5	6
M6	8	10
M8	20	25
M10	39	50
M12	70	85
M14	112	140
M16	180	215
M18	240	305
M20	350	435
M22	490	590
M24	600	750
M27	976	1100
M30	1300	1495

Material: Stainless Steel		
Bolt Size (metric)	Recommended Torque (Nm)	Maximum Torque (Nm)*
M4	1.7	2.1
M5	3.5	4.2
M6	5.6	7.0
M8	14	17.5
M10	27	35
M12	49	60
M14	78	98
M16	126	151
M18	168	214
M20	245	305
M22	343	413
M24	420	525
M27	683	770
M30	910	1047

*Exceeding this value results in a great risk of deforming the bolt.



WARNING! Applying too little torque will result in these risks:

- Bolted joints will rattle and thus fail under fatigue.
- Bolts worn out quickly and thus will not fulfil their design purpose.
- Bolted joints will come loose.
- Accidents caused by assembled parts coming apart due to bolts or nuts failing or falling off.



WARNING! Exceeding the maximum torque will result in these risks:

- Damaging or stripping the threads and deforming the bolt.
- Bolt heads will be broken.
- Bolted joints will come loose.
- Accidents caused by assembled parts coming apart due to bolts breaking.

Tightening Hydraulic Hoses

When tightening hydraulic hoses as a part of periodic service or due to replacement of spare parts, it is important to apply the correct torque. This will prevent accidents and prolong the lifetime of the parts connected with the hoses.

If not stated otherwise in this book, please tighten hydraulic hoses using the following torques:

Hose Size	Thread Size	Spanner Size	Recommended Torque
1/4"	9/16"	19 mm	28 Nm
3/8"	11/16"	22 mm	44 Nm
1/2"	13/16"	24 mm	62 Nm
3/4"	1.3/16"	36 mm	130 Nm
1"	1.7/16"	41 mm	170 Nm



DANGER! A hydraulic hose or joint leaking or coming apart with the oil under pressure can cause severe injuries to persons standing nearby! The oil can be very hot, around 80 °C, and the oil streaming out can penetrate human skin. Risk of burns on the skin, internal injuries and facial injuries and even death.



WARNING! Applying too little torque will result in these risks:

- Hydraulic joints will leak due to the high oil pressure.
- Hydraulic joints will rattle and thus fail under fatigue.
- Hydraulic joints worn out quickly and thus will not fulfil their design purpose.
- Accidents caused by sudden loss of oil pressure due to hydraulic parts coming apart.



WARNING! Applying too much torque will result in these risks:

- Damaging or stripping the threads and deforming the hydraulic joints.
- Fittings will be broken.
- Hydraulic joints will leaks.
- Accidents caused by assembled parts coming apart due to bolts breaking.



WARNING! Often a hydraulic joint turned when assembling to make it fit between other components on the sprayer. Remember to finish off by applying the correct torque.

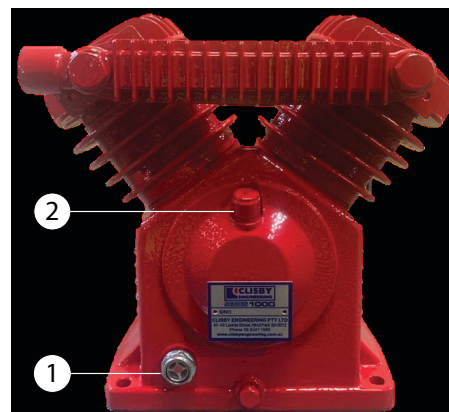


NOTE! The sealing system for hoses and fittings is ORFS type (O-Ring Face Seal). This ensures a high level of sealing and good vibration resistance. The fittings use the O-ring compression mechanism to seal.

6 - Maintenance

10 Hours Service - Air compressor

1. Regular attention should be given to the maintenance of the air cleaner depending on the operating conditions.
2. The outer air cleaner cartridge is to be removed and cleaned using low pressure air.
3. Check and maintain the oil level at centre of sight glass (1), add oil through the fill cap (2) as necessary.
4. The area surrounding the compressor should be kept clear of chaff and debris.
5. The air intakes should be clean and free from obstructions.



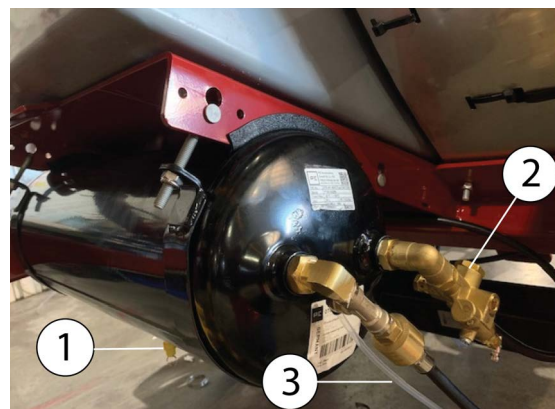
NOTE! Check for unusual noise or vibration.



WARNING! Do not remove the inner air cleaner cartridge or damage to the air compressor may occur.

10 Hours Service - Air receiver

1. Drain water from the receiver through the relief / drain valve (1).



10 Hours Service - Pre cleaner

1. When dirt reaches the level of the arrow, remove top nut and plastic body, then empty.



10 Hours Service - Ace Pump

Daily inspection

1. Decontaminate and flush the pump after each use to prevent corrosion.
2. If a danger of freezing exists, drain all water from the pump casing by removing the lowest volute pipe plug. This will prevent casting breakage due to frozen liquid inside the pump.



NOTE! Do not drain the barrier fluid from the seal reservoir.

10 Hours Service - Ace pump

Check and adjust seal reservoir pressure

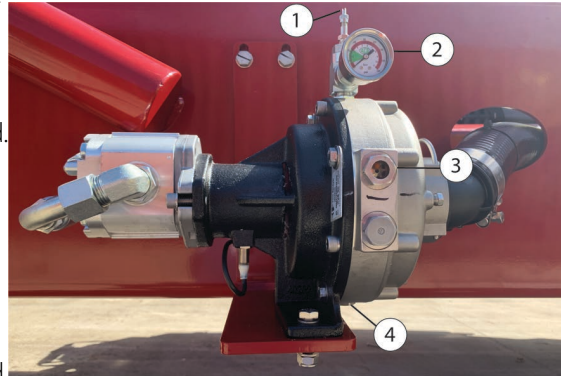
The reservoir pressure gauge (2) gives a direct pressure reading. Pressure should remain within the green zone during operation. The recommended cold reservoir pressure is 25 to 30 psi.



NOTE! Pressure will increase during operation as the fluid is heated.

Steps to pressurize the seal reservoir:

1. Verify that fill and drain plugs are installed and tight.
2. Remove air valve cap (1).
3. Add air until gauge reads 25 to 30 psi. An air supply or tank regulated to 30 psi (2 bar) is best.



WARNING! Do not over pressurize. Relieve excess air pressure if necessary.

4. Replace air valve cap.



NOTE! If air must be added regularly, spray soapy water around plugs, seams and fittings of seal plate to check for leakage. Reseal as needed. If no external leak is found, installation of a seal kit should be scheduled for next machine downtime.

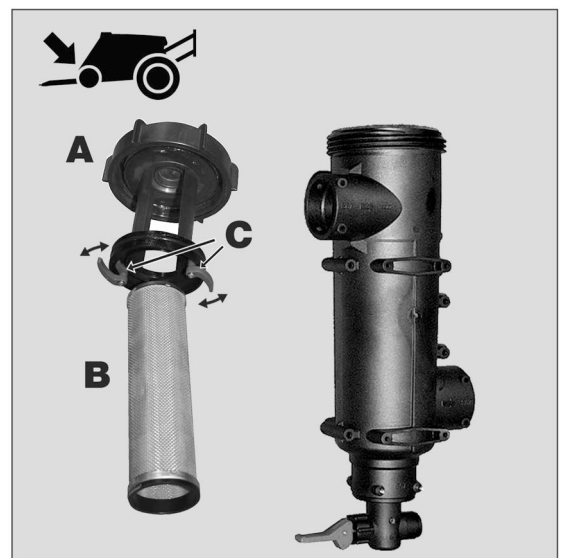
10 Hours Service - Self Cleaning Filter

Servicing the Filter

1. Turn the pressure SmartValve towards the unused function or to "tank cleaning nozzles".
2. Unscrew the filter lid (A).
3. Lift lid and filter (B) out of the housing.
4. Turn the two locks (C) outwards to unlock the filter from the lid.
5. Separate the filter from the integrated filter guide in the lid.
6. Clean the filter.

To Reassemble

1. Grease the two O-rings on the lid/filter guide. Due to small space at the lid, use a paintbrush to apply the grease.
2. Fit the filter onto the recess (do not grease the recess) in the lid/filter guide.
3. Turn the two locks (C) inwards to lock the filter into position.
4. Place the filter/filter lid into the housing and screw the lid, until it hits the stop.



WARNING! Always wear protective clothing and gloves, before servicing the filter!

6 - Maintenance



DANGER! The pressure SmartValve must always be turned to the unused function or to “tank cleaning nozzles”, before opening the Self Cleaning Filter!

In addition, turn the boost valve (D) to the closed position.

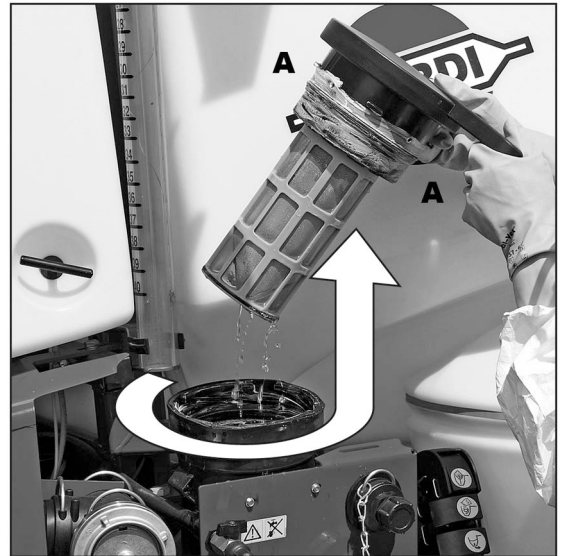
Otherwise, spraying liquid may hit you when opening the filter and this will also drain the MainTank!

10 Hours Service - EasyCleanFilter

This filter has a clogging indicator, but even if this indicator does not show clogging, the filter mostly needs cleaning every 10 hours.

Servicing the Filter

1. Turn the filter lid counter-clockwise to open it.
2. Remove lid and filter from the filter housing.



3. Separate filter element from lid/filter guide by turning locks (A) outwards.
4. Clean filter and if necessary clean the housing for larger impurities.

To Reassemble

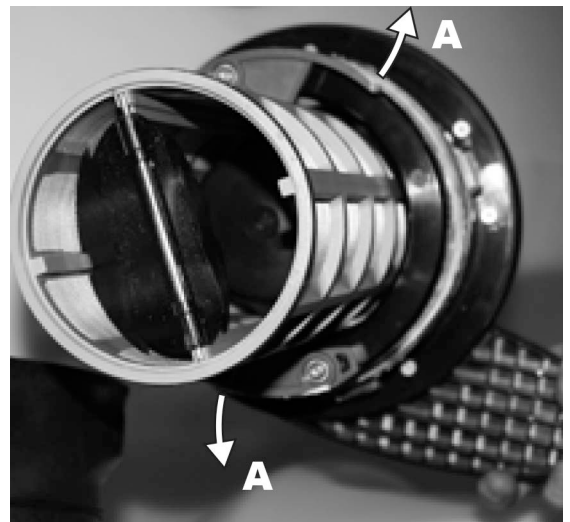
1. Grease the O-ring on the filter lid.
2. Press the filter onto the filter guide/lid. Make sure that it has caught the guide. Locks (A) are turned inwards.
3. Reassemble filter/filter lid into the housing. Make sure that it has caught the guide in the bottom of the housing.
4. Turn the filter lid clockwise to close it.



WARNING! Always wear protective clothing and gloves before servicing the filter!



ATTENTION! If you have difficulties with opening the filter, there is another way to operate it.
See "Emergency Operation - EasyClean Filter" on page 200.



6 - Maintenance

10 Hours Service - CycloneFilter

Servicing the Filter

1. .
2. Unscrew the filter lid (A).
3. Lift lid and filter (B) out of the housing.
4. Turn the two locks (C) outwards to unlock the filter from the lid.
5. Separate the filter from the integrated filter guide in the lid.
6. Clean the filter.

To Reassemble

1. Grease the two O-rings on the lid/filter guide. Due to small space at the lid, use a paintbrush to apply the grease.
2. Fit the filter onto the recess (do not grease the recess) in the lid/filter guide.
3. Turn the two locks (C) inwards to lock the filter into position.
4. Place the filter/filter lid into the housing and screw the lid, until it hits the stop.



WARNING! Always wear protective clothing and gloves, before servicing the filter!



DANGER! !

In addition, turn the boost valve (D) to the closed position.

Otherwise, spraying liquid may hit you when opening the filter and this will also drain the MainTank!

10 Hours Service - In-Line Filter

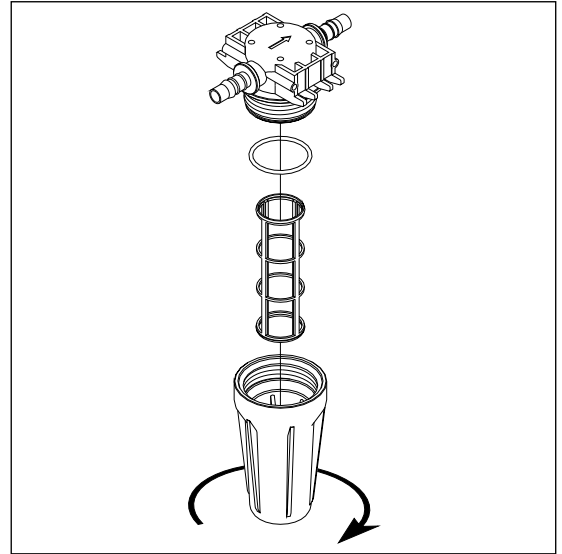
If the boom is equipped with In-Line filters, unscrew the filter bowl to inspect and clean the filter. When reassembling, the O-ring should be greased.

Alternative filter meshes are available. See the section "Filters" on page 205.



WARNING! Be careful not to splash out liquid, when unscrewing the filter bowl.

Always wear protective clothing and gloves, before servicing the filter!



10 Hours Service - Nozzle Filters (If fitted)

The filters are located in the nozzle holder.

Check the filter condition and clean the filter.



10 Hours Service - Spraying Circuit

Fill with clean water and operate all functions.

Check for leaks by regulating the spray pressure up to 10 Bar.

Check nozzle spray patterns visually using clean water.

10 Hours Service - Brakes

Apply the brake pedal and check the function of the trailer brakes.

50 Hours Service - Air compressor

1. Check and clean the air filters. A clogged air filter can seriously affect the efficiency of the compressor and cause overheating and high oil usage. Change if necessary.
2. Clean all external parts of the compressor. A dirty compressor will cause abnormally high discharge temperature and resulting oil carbonisation on internal valve components.

50 Hours First Service ONLY - Air compressor

1. Change the compressor oil after the first 50 Hours.

6 - Maintenance

50 Hours Service - Transmission Shaft (PTO)

1. Check function and condition of the transmission shaft protection guard. Replace any damaged parts.
2. Lubrication. See "Lubrication and Oiling Plan - PTO" on page 151.



50 Hours Service - Greasing the Pump

Grease is necessary every 50 hours with 30 grams (approximately 50 strokes,) of grease into each lubrication point, when operating the pump.

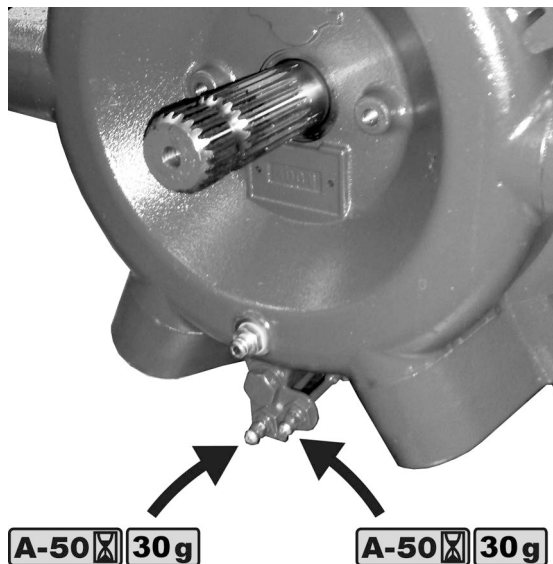
Also refer to "Greasing the Pump" on page 151.



ATTENTION! In order to avoid excessive wear, it is important to use a recommended lubricant! Refer to "Recommended Lubricants" on page 149 for more information.



ATTENTION! When greasing the pump **MUST** be stopped!



50 Hours Service - Ace pump

Checking the seal reservoir fluid level

View the site gauge window (3) on the side of the seal reservoir. A float is included to easily see fluid level.

If the fluid is not visible, add fluid by following these steps:

1. Relieve reservoir air pressure by removing air valve cap(1) and depressing the stem.
2. Remove fill plug on top of seal reservoir.
3. Add barrier fluid (Hardi Part: 29004303) until the level is at top edge of site window.

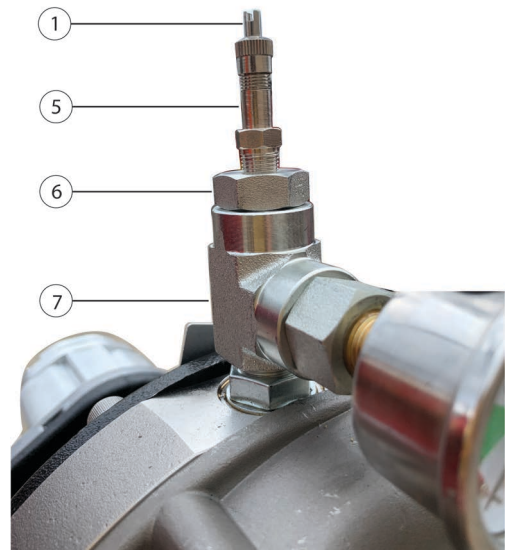
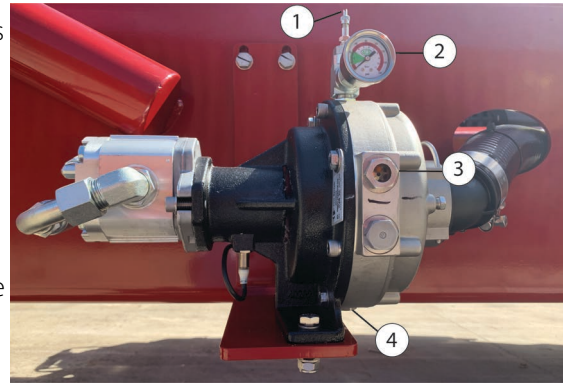


WARNING! Do not overfill.

4. Replace fill plug and recharge the air pressure. See "10 Hours Service - Ace pump" on page 159



NOTE: A small amount of barrier fluid will be consumed under normal operating conditions. If the barrier fluid appears cloudy or discoloured in site gauge, drain until fluid runs clear, refill with clean fluid and recharge pressure. Check again in 50 hours. If fluid is cloudy or discoloured again, this is an indication of inboard seal leakage. A seal kit installation should be scheduled for next machine downtime.



50 Hours Service - Wheel Nuts

Tighten wheel nuts as follows.

Mounting wheel hub to rim plate: Torque 490 Nm.

Tightening sequence for wheel nuts: See illustration and tighten in the numbered order.



ATTENTION! Always refit the plastic nut covers on the nuts after the wheels have been mounted or re-tightened.



50 Hours Service - Tyre Pressure

Check the tyre pressure according to the table in "Tyre Pressures" on page 206.



DANGER! Never inflate tyres more than to the pressure specified in the table. Over-inflated tyres can explode and cause severe injuries!



WARNING! If renewing tyres, always use tyres with minimum load index as specified. See "Tyre Pressures" on page 206.

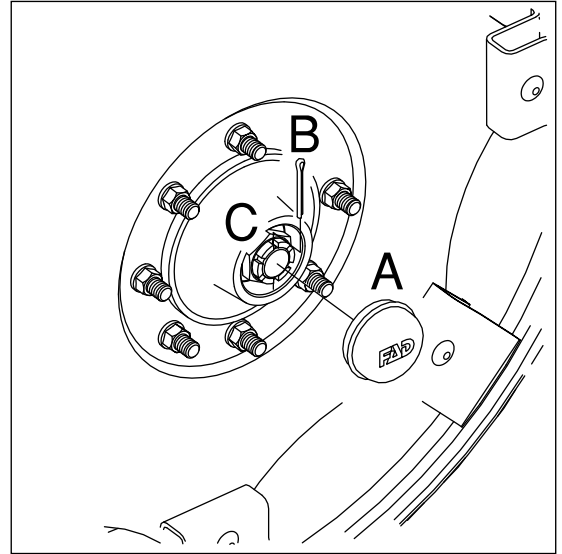


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250 Hours Service - Wheel Bearings

Check for play in the wheel bearings:

1. Place chocks in front of and behind the left wheel and jack up the right wheel.
2. Support the trailer with axle stands.
3. Rock the right wheel to discover possible play in the bearings.
4. If any play, support the wheel axle to prevent the trailer from falling down from the jack.
5. Remove hub cap (A) and cotter pin (B). Turn the wheel and tighten the castle nut (C), until feeling a slight resistance in the wheel rotation is felt.
6. Loosen the castellated nut until the first notch aligns with the cotter pin hole in the shaft.
7. Fit a new cotter pin and bend it to keep it in place.
8. Refit the hub cap to the hub.
9. Repeat the procedure for the left wheel.



NOTE! Some hub caps are attached with machine screws. Make sure that the seal is intact and replace if worn or damaged.

250 Hours Service - Hydraulic Circuit

Check the hydraulic circuit for leaks. Repair if needed.

Refill following nitrogen accumulators:

- ParaLift suspension (if fitted)
- Wheel axle suspension (if fitted)
- Yaw suspension (if fitted)



WARNING! Nitrogen accumulators may contain oil under pressure.

250 Hours Service - Hoses and Tubes

Check all hoses and tubes for possible damage and proper attachment. Replace damaged hoses or tubes.

In general, always replace a hose or tube if:

- It is leaking.
- Reinforcement material inside the hose is visible due to cracks in the outer layers.

250 Hours Service - Adjustment of Wheel Brakes

1. Jack up the rear of the sprayer from the ground and support with axle stands placed under the wheel axle.

Make sure the sprayer is stable and secured before carrying out any adjustments.

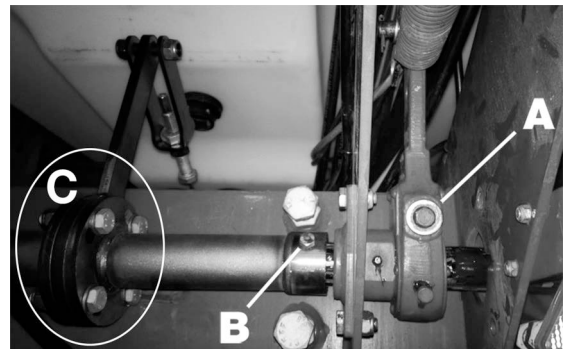
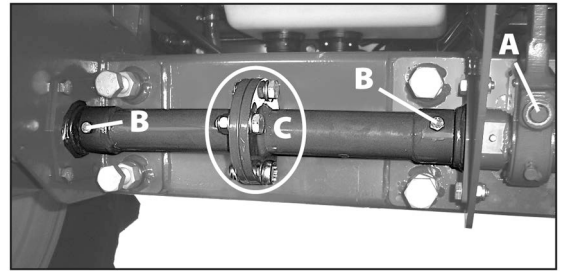


ATTENTION! There are two versions of the parking brake system available, one of the pictures should show your system at hand.

2. Loosen the hand brake cable at the rigging screw below the sprayer.
3. Loosen the 4 bolts at the brake connector (C) between the brake arms. Also loosen the screw (B) in each end of the brake connector.
4. Adjust the nut (A) counter-clockwise. This moves the brake arm backwards. Turn the nut 60° (1/6 turn) at a time - alternate between left and right brake.

Continue the adjustment, until resistance occurs when rotating the hub/wheel by hand (difficult to turn the wheel by hand).

5. Turn the nut 60° (1/6 turn) clockwise to loosen brake. Hub/wheel should rotate freely now.
6. Tighten the brake connector (C) bolts again.
7. Adjust the parking brake cable again (see separate section).



250 Hours Service - Hydraulic Brakes

Apply brakes to full pressure and inspect brake lines for damage or leaks. Replace damaged components.

If the hydraulic brake lines have been dismantled, the hydraulic circuit must be bled afterwards:

1. Have an assistant to apply the brakes.
2. Loosen the brake hose at the left brake cylinder.
3. The assistant continues applying the brakes, until brake fluid without air bubbles comes out.
4. Tighten the brake hose, before releasing the brakes.
5. Repeat step 1-4 to bleed the right brake cylinder.



WARNING! Always bleed the circuit if the hydraulic brake lines have been dismantled.

250 Hours Service - Air compressor

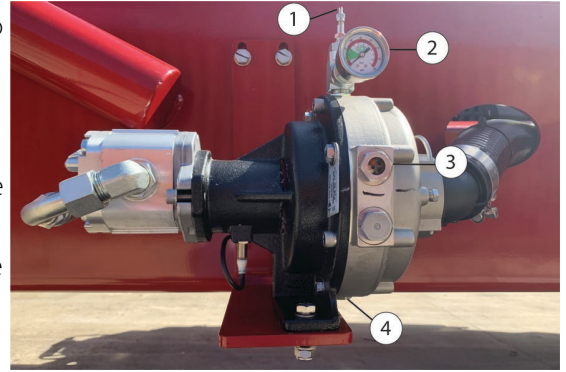
1. Inspect the entire system for air leaks, check that the sump breather hose is clear and not kinked to vent excessive pressure.
2. Inspect for oil contamination or degradation and change if necessary.

6 - Maintenance

1000 Hours Service - Ace pump

Seal reservoir fluid change

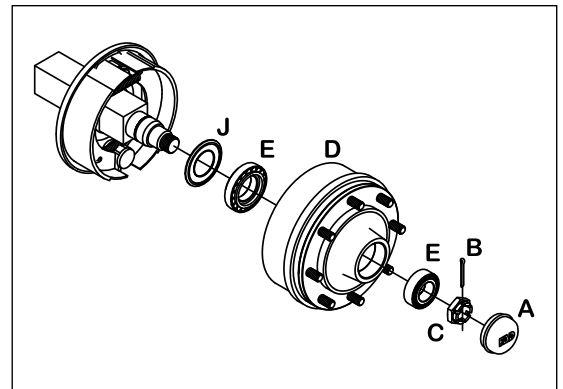
1. Remove drain plug (4) and drain barrier fluid from the reservoir into a clean bucket.
2. If the fluid is clear, reinstall plug, refill with new barrier fluid and recharge air pressure.
3. If the fluid is cloudy, discoloured or contains water, this could be the indication that a seal leak is developing.
4. Replacement of the seal kit is recommended to ensure trouble free operation for the next season.



1000 Hours Service - Wheel Bearings and Brakes

Check the condition of the bearings and brake wear parts in the following way:

1. Place brake chocks in front of and behind the left wheel. To service, jack up the right wheel.
2. Support the trailer with axle stands.
3. Remove the wheel.
4. Unscrew the 6 bolts and remove the hub cap (A), cotter pin (B) and castle nut (C).
5. Pull off the brake drum (D). Use a wheel puller if necessary.
6. Vacuum the brake drum (D) for brake dust, or rinse it with water.



⚠ DANGER! Brake dust can cause severe health injuries! Avoid inhalation of brake dust! Wear a dust mask when servicing the brakes. Do not clean brakes with compressed air! Use a vacuum cleaner or rinse with water to avoid blowing brake dust around.

7. Rinse the remaining parts on the brake carrier plate with water and wipe them off.
8. Remove roller bearings (E), clean all parts with a degrease detergent and wipe them.
9. Check the brake drum diameter (K) and lining thickness (L). Replace if worn.

Max. wear rates on brake components:

- Max. drum diameter (K): 302 mm (Small drums)
- Min. lining thickness (L): 2.0 mm



WARNING! Never exceed the specified minimum lining thickness (L) is the absolute minimum. Replace the parts, if they would reach the above dimensions before the next service inspection.



WARNING! It is necessary to renew brake linings or brake drums for both sides at the same time.



ATTENTION! If removing the brake drum from the wheel hub, a hydraulic press is required to press the wheel studs out.

10. Remove the clevis pin between the air diaphragm cylinder and the brake cam lever.
11. Remove the cotter pin (G), castle nut (F) and the brake shoe anchor bolt (H), and slide the brake shoes over the cam. Twist the pair of brake shoes to remove the shoe return springs (I). If the linings are worn, replace the brake shoes.
12. Apply a small amount of copper paste on moving parts, reassemble the brake shoes, and shoe return springs (I).



WARNING! Do not get copper paste in contact with the brake linings and drums.

13. Fit the shoe assembly with the anchor bolt (H) first. Then pull the shoes away from each other and slide them over the cam afterwards. Tighten the anchor bolt castle nut (F) again, and fit a new cotter pin (G).
14. Check roller bearings for discolouration and wear. Replace if worn or damaged.
15. Assemble drum (D) and bearings (E) using a new sealing ring (J).
16. Fill the hub and bearings with new grease, before fitting them to the wheel axle.



WARNING! Do not get oil or grease in contact with the brake linings and drums.

17. Fit the castle nut (C). Rotate the brake drum (D) and tighten the castle nut (C), until a slight rotation resistance is felt.
18. Loosen the castle nut (C) again, until the first notch aligns with the cotter pin hole in the axle.

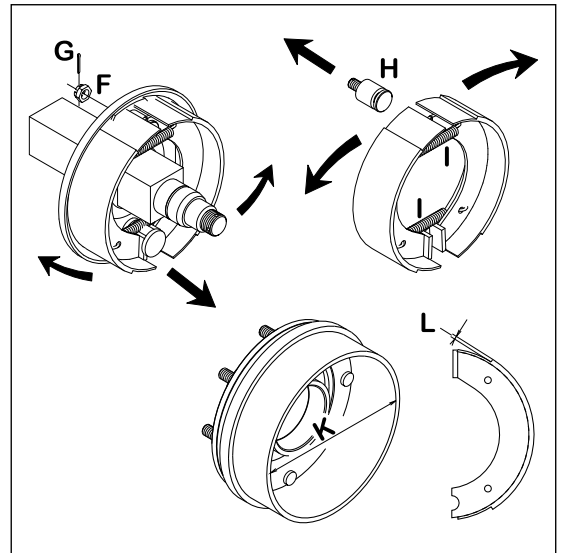


ATTENTION! The shaft has a vertical and a horizontal cotter pin hole. Use the one first aligned with the notch when loosening the castle nut.

19. Fit a new cotter pin (B) and bend it to keep it in place.
20. Fit the hub cap (A) to the hub. Slightly tighten the 6 bolts.
21. Adjust the brakes as described in "250 Hours Service - Adjustment of Wheel Brakes" on page 167.
22. Fit the wheel again and tighten the wheel nuts. See "Tightening Bolts and Nuts" on page 156 regarding torque wrench setting. Tighten all bolts to half the specified torque at first, and then tighten to the specified torque.
23. Tighten again after 10 hours of work. Check the torque every day, until it is stabilised.
24. Repeat the steps for servicing the left wheel. Remember to place chocks on both sides of the right wheel.



WARNING! If you do not feel confident changing wheel bearings or brakes, then contact your local HARDI dealer.



1000 Hours Service - Air compressor

1. Replace compressor oil, oil should remain at centre of sight glass.
2. Replace the air filter.



NOTE! Replacement may be necessary more often under poor operating conditions.

3. Check the head, cylinder and hold down bolt torque. Bolt torque: 24Nm (18ft-lb).
4. Clean compressor and check for leaks.

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6.4 Occasional Maintenance

General Info

The maintenance and service intervals for the following components will depend very much on the operating conditions, and therefore it is almost impossible to specify the intervals beforehand.

The operator must select appropriate intervals for the occasional maintenance.

If in doubt, contact your local HARDI dealer.

Level Indicator Adjustment

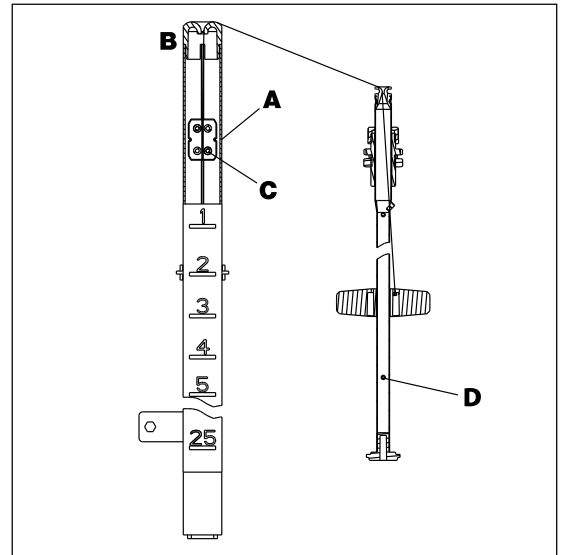
The level indicator reading should be checked regularly. When the tank is empty, the float should lie on the stop pin (D) of the rod, and the O-ring on the indicator should be positioned at the top position line (A).

If any deviation is found, do the following:

1. Pull out the plug (B).
2. Loosen screws (C).
3. Adjust the length of the cord, until it reads correctly.
4. Push the plug (B) back into place.



NOTE! To obtain the best accuracy, the adjustment shall be done with the sprayer attached to the tractor normally used.



Level Indicator Cord Renewal

If the cord on the level indicator has to be changed, the float guide pole is removed.

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



DANGER! Do not enter the tank inside - the parts can be changed from the outside of the tank!

3-Way Valve Adjustment

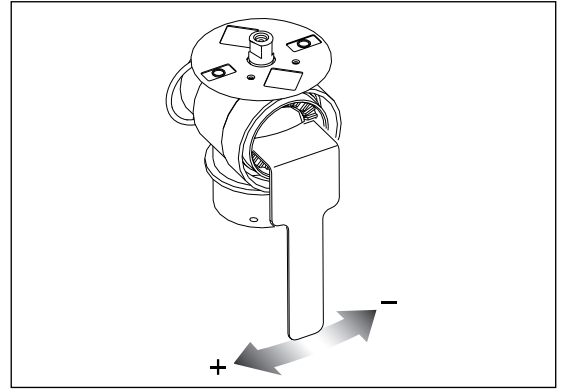
The large ball valve used for SmartValves and valves for filling equipment (type s93) can be adjusted, if it is too tight to operate - or if it is too loose (= liquid leakage).

- Correct setting is when possible to operate the valve smoothly by one hand.

Use a suitable tool and adjust the toothed ring inside the valve as shown on the drawing.



ATTENTION! Adjustment not possible for the small ball valves (type s67).



Lifting and Removing the Pump

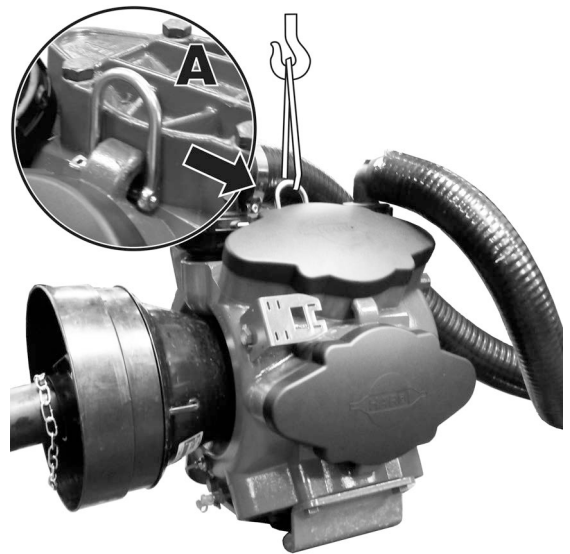
When lifting and removing the pump, use a shackle fitted to the built-in lifting eye located between the heads (A).



WARNING! To prevent damages in case of a free-falling pump, use lifting gear and a steel shackle with at least 3.5 tonnes min. tensile strength.



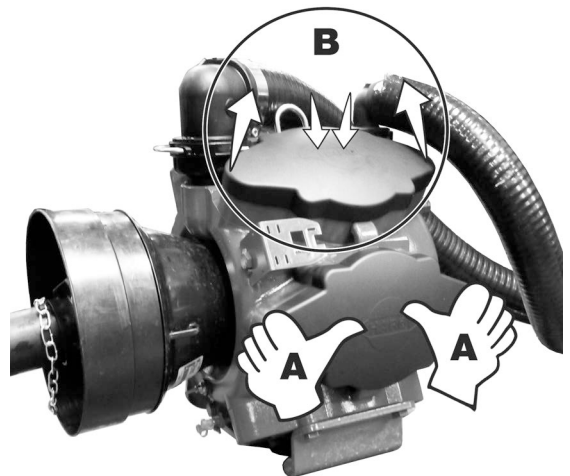
NOTE! Pump weight is approximately 75 kg.



Pump Valves and Diaphragms Renewal

Pump model: 364 and 464.

1. Lift off the plastic covers (C) with your hands (A) by pulling with the fingertips while pushing with the thumbs in the centre, as shown in (B).



6 - Maintenance

Valves

2. Loosen the 4 head bolts (1).
3. Remove the head (2).
4. Change the valves (3) - note their orientation, in order to replace them correctly!



ATTENTION! Recommended is to use new seals (4), when changing or checking the valves.

Diaphragms

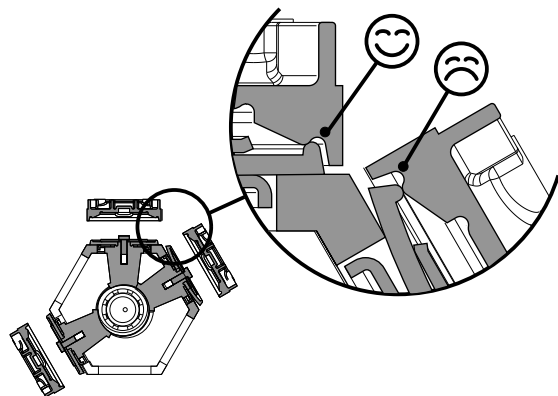
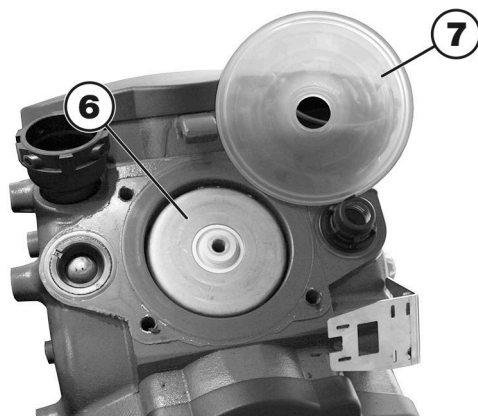
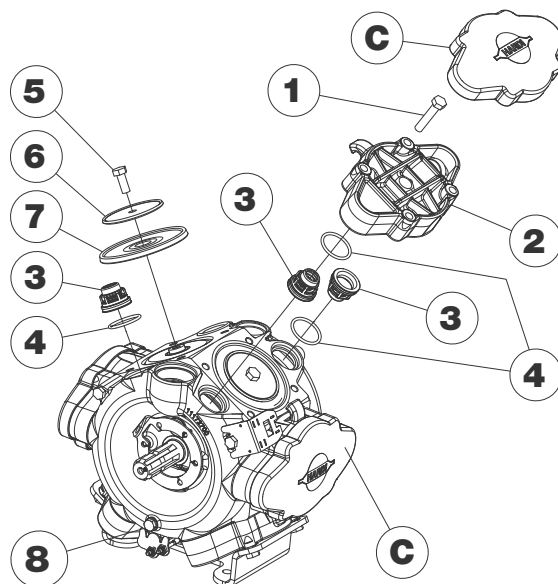
5. Loosen the diaphragm bolt (5).
6. Remove the diaphragm washer (6).
7. The diaphragm (7) may then be changed.
8. Check that the drain hole (8) at the bottom of the pump is not blocked.
9. Apply a small amount of pump grease on the surface between diaphragm washer (6) and diaphragm (7).
10. Reassemble the pump with the following torque setting.
 - Diaphragm head bolts (1): 90 Nm.
 - Diaphragm bolt (5): 90 Nm.
11. Refit the plastic covers (C).



NOTE! The diaphragm bolt on 1000 RPM pumps must be secured with a locking compound.



ATTENTION! Before tightening the 4 bolts for the head (2), the diaphragm must be positioned between centre and top to ensure correct sealing between diaphragm pump housing and diaphragm cover. Turn the crankshaft if necessary.



Lubrication after Assembly

After disassembling the pump for diaphragm renewal, etc., you **MUST** lubricated with 200 g grease into each lubrication point.

HARDI pump grease cartridge (400g): HARDI item no. 96200604

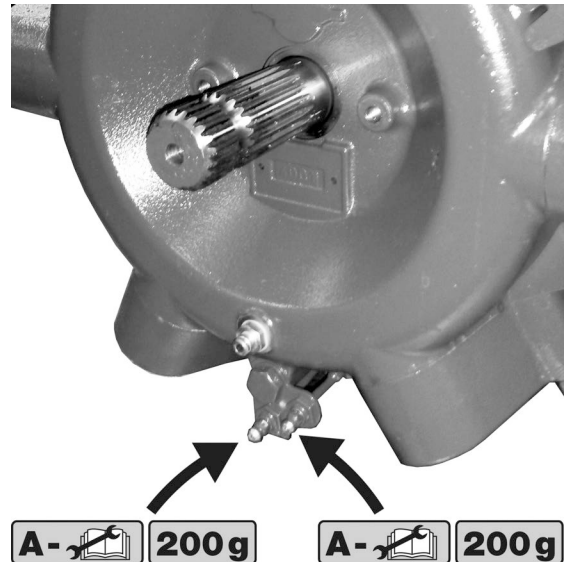
Overhaul Kit

Pump model: 364 and 464.

It is possible to order an overhaul kit for the diaphragm pump (valves, seals, diaphragms etc.). Detect the pump model - order the overhaul kit at the local dealer.

Model 364: HARDI item no. 75585900.

Model 464: HARDI item no. 75586000.



Speed Transducer for the Pump

The speed transducer that measures rotations per minute (RPM), is located at the inner side of the PTO or drive coupler shield.

The sensor is an inductive type, which requires metallic protrusions to pass by it to trigger a signal.

If exchanging the sensor, it must installed accurately to function properly.

Adjustment

1. Adjust the air gap (A) between sensor tip and the protruding pump part by turning the counter nuts at the support bracket for the sensor.

The air gap (A) must be set to 1 mm (+0.3/-0.0 mm).

Use a feeler gauge or similar tool to verify.

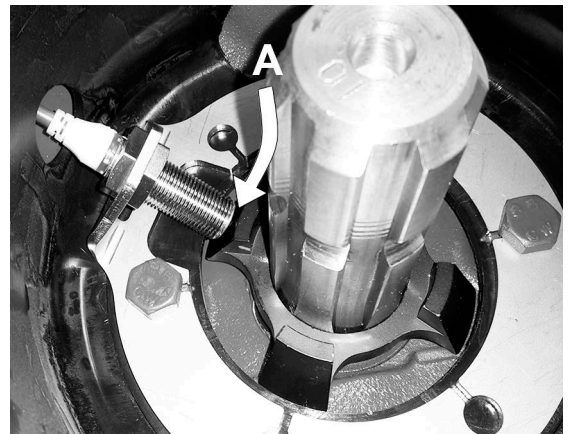
2. Verify transducer function on the controller:

- HC 5500:

Correct fitting is indicated by continuous flashing from transducer, when the shaft is rotating.

- HCM3:

Monitor the speed on the front screen.



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Drain Valve Seal Replacement

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

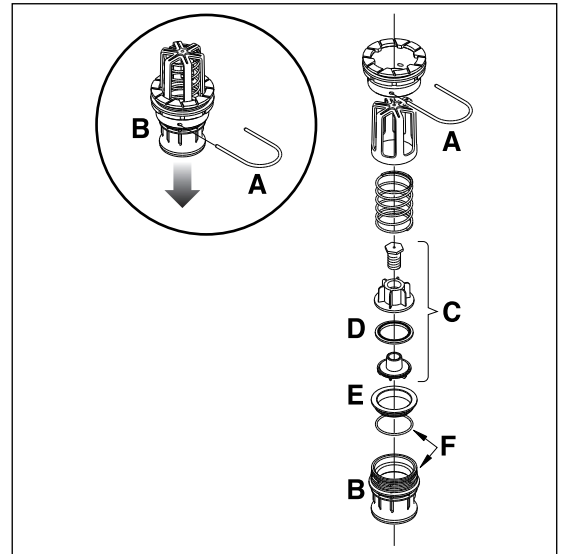


DANGER! Do not enter the inside of the tank - the parts can be changed from the outside of the tank!



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

1. Make sure that the tank is empty and clean.
2. The valve must be closed and the string must be loose.
3. Pull out the clip (A) and pull down the 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 reassemble.
5. Reassemble the valve using a new valve seat (E). Lubricate O-rings (F) before assembly.
6. Fit clip (A) again.

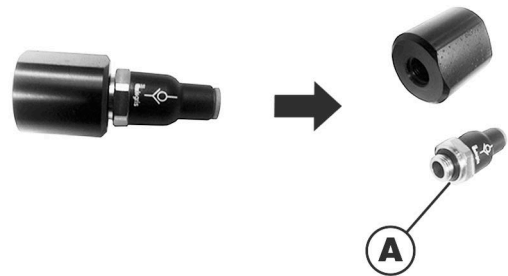


ATTENTION! Check the valve function using clean water, before filling the tank with chemical.

BoomPrime One-Way Valve

If the one-way valves for the BoomPrime system are clogged, they must be cleaned.

1. Disassemble the two parts.
2. Clean the parts as needed.
3. Check the state of the black O-ring (A).
4. Assemble the parts again and tighten with a torque of 1 Nm.



ATTENTION! If any part is worn or damaged, it should be replaced.

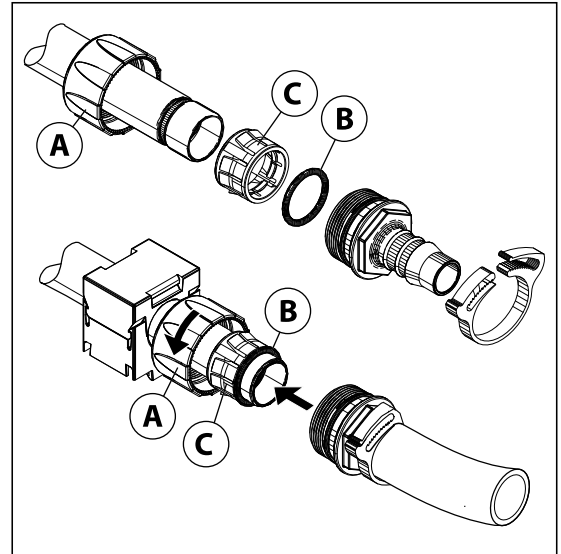
Feed Pipe Snap-Lock Assembly

Disassembly

1. Unscrew the union nut (A) completely.
2. Pull the feed piping and hose barb apart.
3. Take out the O-ring (B).
4. Inspect and oil O-ring (B). Change the O-ring (B) if worn, before reassembly.

Reassembly

1. Check that the barbed lock ring (C) is fitted to the feed pipe with barb pointing away from pipe opening.
2. Fit the oiled O-ring (B) on top of the lock ring (C).
3. Push the feed pipe and hose barb together.
4. Screw the union nut (A) on the hose barb and tighten union nut (A) by hand.

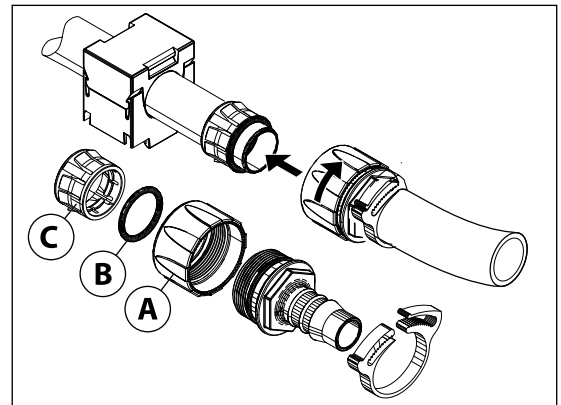


Initial Assembly of Fittings



ATTENTION! This method can only be used for pipes not fitted into pipe clamps.

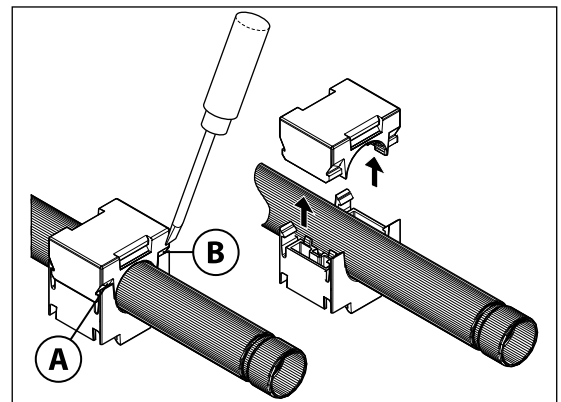
1. Fit the barbed lock ring (C) to the feed pipe with barb pointing away from pipe opening.
2. Fit the oiled O-ring (B) on top of the lock ring.
3. Screw the union nut (A) on the hose barb.
4. Press the feed pipe and hose barb together.
5. Tighten the union nut (A) by hand if needed.



Feed Pipe Clamp Assembly

Remove a feed pipe from the pipe clamps the following way:

1. Use a flat bladed screwdriver to prize the cover off the first corner (A).
2. Hold the clamp top with your hand and prize off the opposite corner (B) with the screwdriver.
3. Prize off the other side of the pipe clamp with the screwdriver.
4. Take out the feed pipe.



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Nozzle Holder Assembly

If leaks of fluid occur in the nozzle holders on the spray boom, it is necessary to check the sealing. To locate the O-rings disassemble the nozzle holder.

Recommendation is occasional maintenance of the O-rings and nozzle holders.

Usually is poor sealing caused by:

- Missing O-rings.
- Damaged or incorrectly seated O-rings.
- Dry or deformed O-rings.
- Foreign objects.

In Case of Leaks

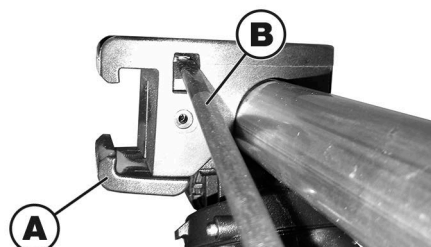
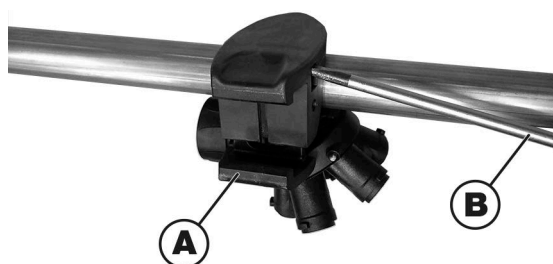
Disassemble the nozzle holder and check condition of the O-rings. Replace, if damaged or cracked.

Disassemble Nozzle Holders

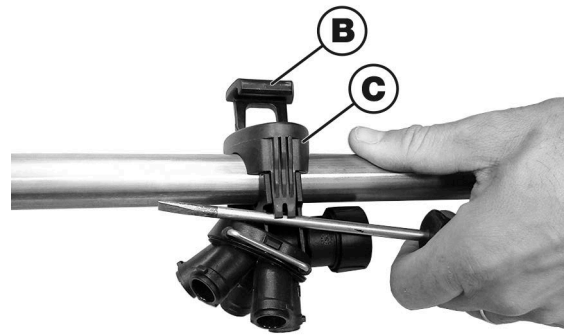
1. Example of an assembled nozzle holder, fitted to the spray boom.



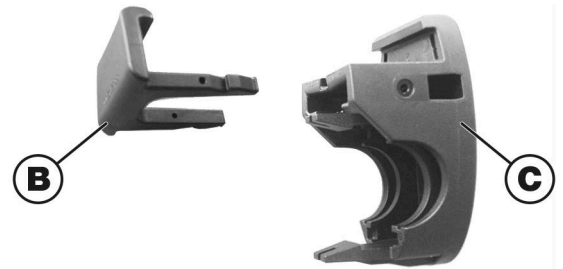
2. Snapped together are the black plastic parts. To disassemble, insert a flat screwdriver (B) and press, until the locking piece (A) snaps out.



3. With the locking piece (B) removed, place the screwdriver as shown and pull to remove the upper part (C) of the nozzle holder.



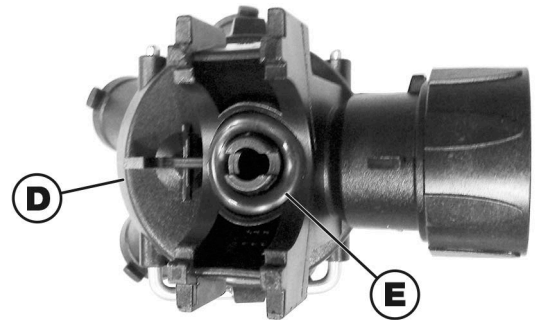
Here the separate locking piece (B) and the upper part (C).



4. Inside the lower part (D), the O-ring (E) is located.
5. Check condition and position of the O-ring. Replace and lubricate, if damaged or cracked.

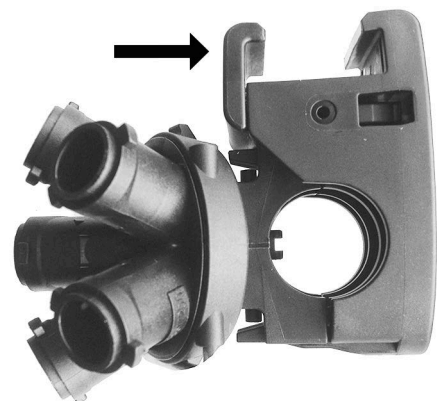
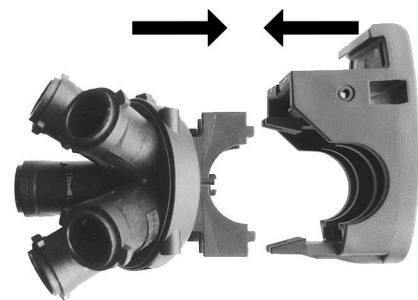
i NOTE! When seated, the O-ring is supposed to be a little out of shape when it fits tightly around the hole in the nozzle pipe.

6. If reused, clean and lubricate, the O-ring.



Reassemble Nozzle Holder

1. Lubricate the O-ring all the way around using a silicone lubricant or vegetable oil.
2. Place the O-ring inside the lower part.
3. Place the lower part on the nozzle pipe, so that the O-ring fits around the hole in the nozzle pipe, where the spray liquid exits to the nozzle holder.
4. Place the upper part on the opposite side of the nozzle pipe.
5. Press the parts together until they interlock.
6. Insert the locking piece in the upper part to secure it on the spray boom.



6 - Maintenance

Nozzle Pipe Assembly

If fluid leaks occur from the pipelines on the spray boom, it is necessary to check the sealing. It is necessary to disassemble the pipe fitting to locate the O-ring.

Recommendation is occasional maintenance of the O-rings and pipe assemblies.

Usually poor sealing is caused by:

- Missing O-ring or gasket.
- Damaged or incorrectly seated O-rings.
- Dry or deformed O-rings or gaskets.
- Foreign objects.

In Case of Leaks

DO NOT overtighten the union nut. Instead, disassemble the pipe fitting and check condition of the O-ring. Replace, if damaged or cracked.

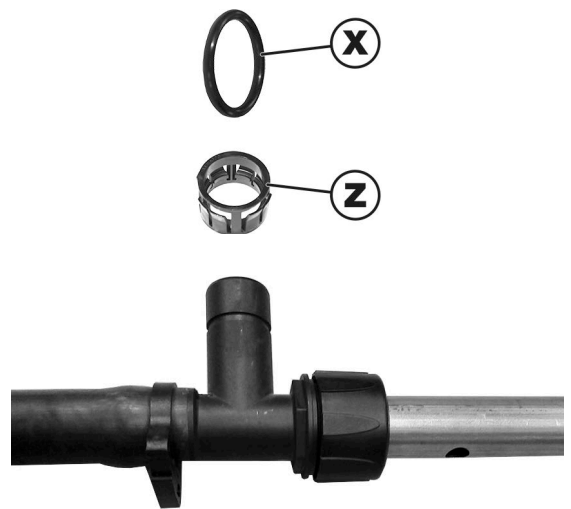
Fitting Types

There is only one size for boom pipes in use, Ø25 mm. They share the same union nut, t-pieces, etc.

- X. O-ring for 25 mm pipes (part no. 24263000).
- Z. Lock ring Ø25 mm (part no. 33515500).

Disassemble Pipe Fittings

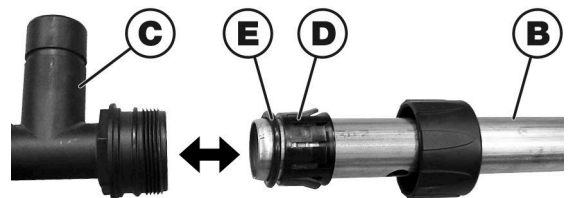
1. Example of an assembled pipe fitting.



2. Unscrew the union nut (A).



3. Pull the nozzle pipe (B) away from the T-piece (C).
4. A lock ring (D) and an O-ring (E) is located at the end of the pipe.
5. Check condition and position of the O-ring. Replace, if damaged or cracked.
6. If reused, clean and lubricate the O-ring.



Remove Lock Ring

If necessary to replace the lock ring, remove the old one the following way:

1. Fit a union nut (A) in reverse direction.
2. Push the union nut (A) over the lock ring (D).

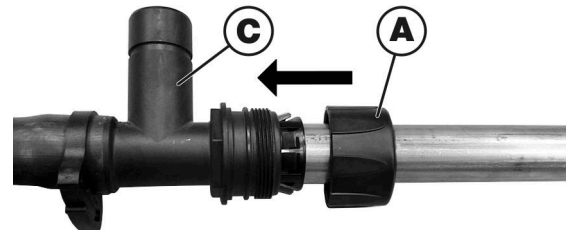
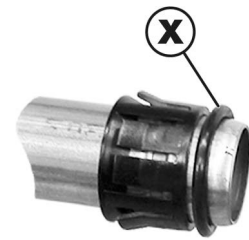
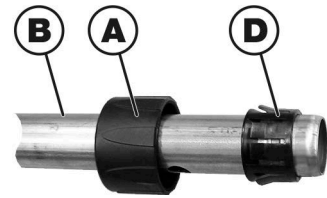


- Place the union nut (A) right behind the lock ring and pull to remove the lock ring (D) from the pipe.



Reassemble Pipe Fittings

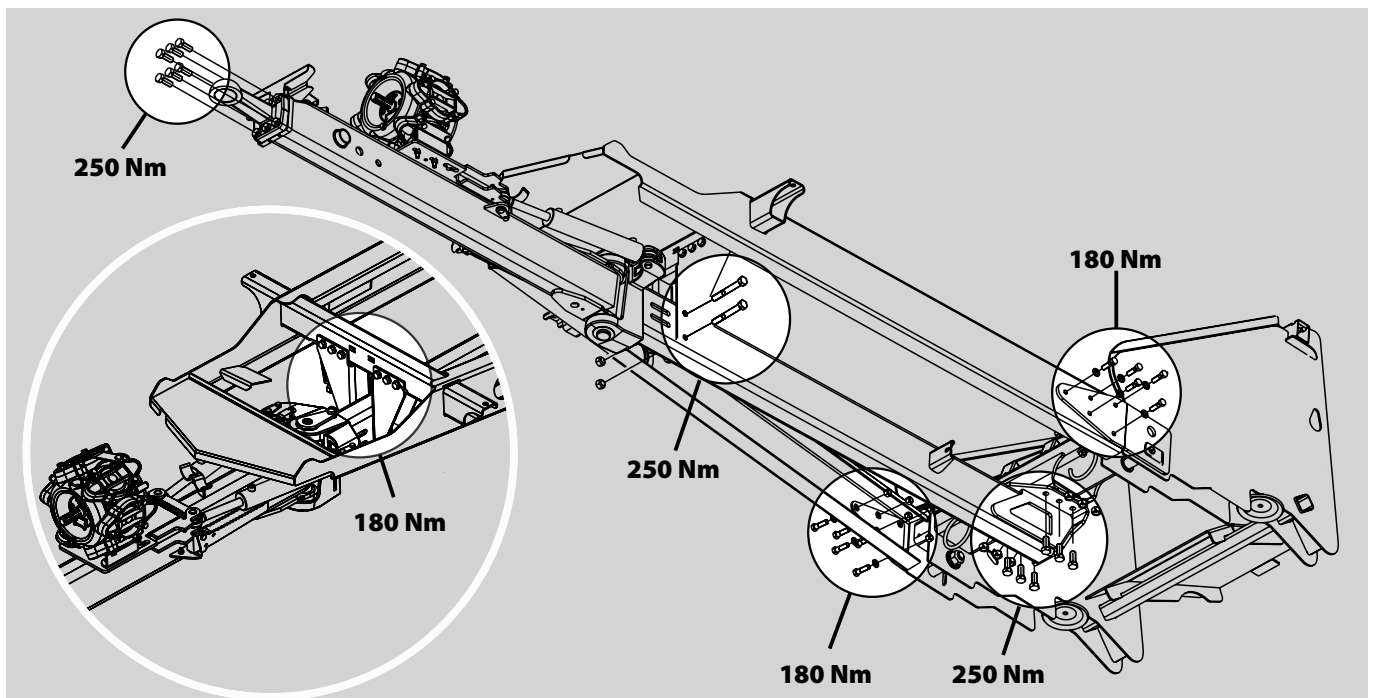
- Place the union nut (A) and lock ring (D) on the pipe (B) in that order.
- Lubricate the O-ring all the way around using a silicone lubricant or vegetable oil.
- Place the O-ring (X) on the end of the pipe.
- Screw the union nut (A) onto the T-piece (C) and tighten the union nut (A) by hand.



ATTENTION! Do NOT use tools for tightening the union nut!

Retightening the Chassis

The chassis consists of two sections bolted together. Also the drawbar is bolted to the chassis. These bolts need to be tightened correctly. Check regularly if the bolts are tightened according to the specified torques below.

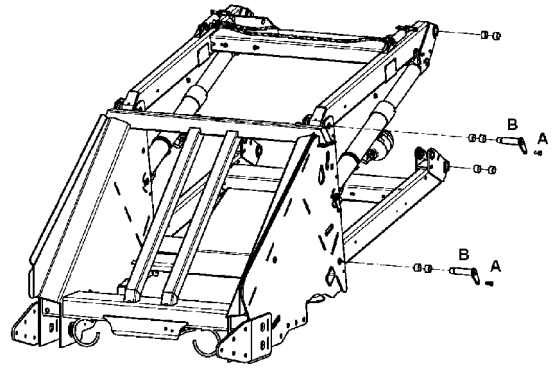


6 - Maintenance

Wear Bushing Replacement on ParaLift

Inspect and renew the wear bushes before they worn through.

1. Connect the trailer to a tractor and unfold the boom to working position.
2. Lift the boom centre frame with a lifting device and support it, until the load relieved from the parallelogram arms.
3. Remove the screw (A), and pull out the pin (B) at one of the upper parallelogram arms.
4. Replace the wear bushes.
5. Refit the arm.
6. Repeat this on the other upper arm.
7. Disconnect the lower arms simultaneously, when changing wear bushes here.
8. Apply grease into all grease nipples.
9. Remove the lifting gear again.

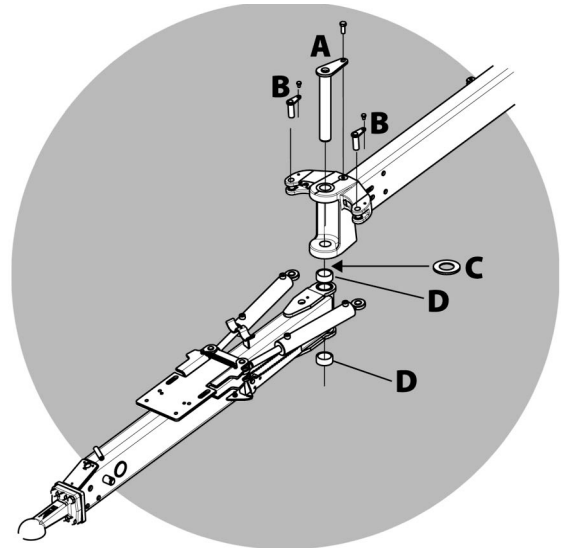


IntelliTrack - Wear washer and bearing renewal

If there is too much play in the steering drawbar the wear washer (C) and bearings (D) must be renewed.

To replace these parts, proceed as follows:

1. Put wheel chocks in front of and behind both wheels.
2. Jack up the frame and support it properly.
3. Remove the steering cylinders from the drawbar by loosening the small lock bolts and remove the two pins (B).
4. Support the drawbar and remove the main drawbar pin (A). Remove the wear washer (C) and bearings (D).
5. Replace the washer (C) and bearings (D) with new ones.
6. Assembly is the reverse operation of disassembly.
7. Grease all of the pins.
8. Remove all supports and wheel chocks.

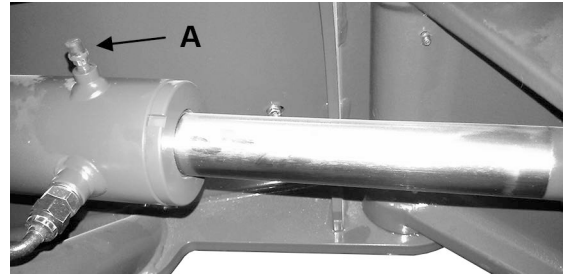
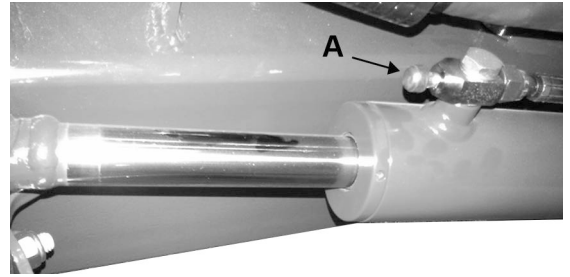


Venting the Steering Hydraulics

If the steering cylinder hydraulics have been dismantled, it is necessary to vent the cylinders.

Depending on the sprayer size, the venting screws (A) are installed as shown on the pictures.

1. Remove the dust cap from the venting screw (A) on the left side steering cylinder.
2. Fit a clear 5 mm hose to the venting screw and lead it into a catch can.
3. Open the venting screw 1/8 turn and then fully steer to the left (retract cylinder).
4. Hold the steering position, until air is no longer visible in the hose.
5. Close the venting screw (A) again.
6. Repeat the procedure for the right side cylinder.
7. Fully steer from the left to right 8-10 times.
8. Complete the venting procedure again to ensure that there is no air in the system.
9. Fit the dust caps onto the venting screws again.

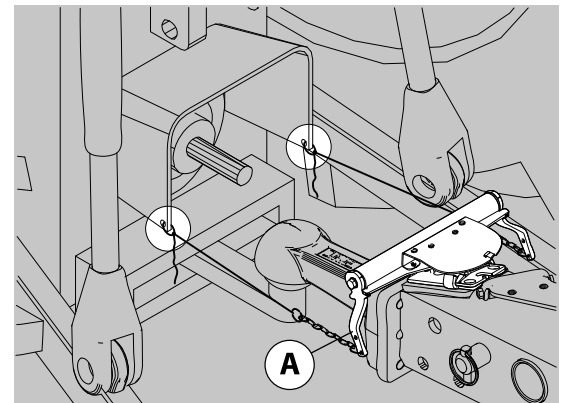


DANGER! Be careful when operating the steering! Make sure that there is space enough to steer the sprayer from side to side! Only persons working on the sprayer is allowed in the moving area of the sprayer!

IntelliTrack Potentiometer Calibration

If the IntelliTrack potentiometer on the drawbar can not be mounted correctly (with the bar not perpendicular to drawbar), then the following must be done.

1. Align the drawbar by measuring the blank part of the hydraulic cylinder pistons. The sprayer's drawbar is aligned, when the two cylinder pistons have the same length, plus/minus 2 mm. Adjust with manual track button on the controller.
2. Place the transverse potentiometer bar (A) absolutely perpendicular to the drawbar.
3. .



DANGER! Be careful when operating the steering! Make sure that there is space enough to steer the sprayer from side to side! Only persons working on the sprayer is allowed in the moving area of the sprayer!

Suspension Rubber Dampers

If the rubber dampers loose their efficiency, they should be replaced.

1. Connect the sprayer to a tractor to prevent overbalancing.
2. Lift the rear end of the sprayer with e.g. a crane. Use lifting points as described in "Sprayer setup".
3. Loosen the nut below the suspension rubber dampers.
4. Remove the suspension rubber dampers and replace with new ones.
5. Tighten the nut below the suspension rubber dampers.
6. Lower the rear of the sprayer again.

Replacement of the Transmission Shaft Shield

- See the manufacturer's instruction book.

6 - Maintenance

Replacement of Transmission Shaft Cross Journals

- See the manufacturer's instruction book.
-

Light Bulb Change

1. Switch off the light.
2. Loosen the screws on the lamp and remove the cover or lens.
3. Remove the bulb.
4. Fit a new bulb, refit the cover and tighten the screws.



ATTENTION! If halogen bulbs are used, never touch the bulb with your fingers. Natural moisture in the skin will cause the bulb to burn out, when the light is switched on. Always use a clean cloth or tissue when handling halogen bulbs.

Safety Valve Activation

To make the fluid system work perfectly over time, it is good practice regularly to provoke opening of the safety valve.

This prevents clogging and ensures proper function of the safety valve. Open the valve by turning the pressure SmartValve to "Pressure draining" or an unused function, when the pump is running. This is good practice for all sprayers; particularly for sprayers without optional equipment.



DANGER! Before turning pressure the SmartValve to "Pressure empty", it is very important to ensure correct fitment of the quick coupler cap to the filling coupler. Failure to do so causes a risk of contamination and injury from the quick coupler lid becoming a projectile when pressurized. If the lid is unable to be fitted completely, lubricate the rubber seals and the grip hooks.

Tyre Change



DANGER! If it is time to change tyres, it is recommended to leave this job to a specialist and follow the rules below. Some mounting instructions are usually printed on the tyre itself.

Failure to understand the mounting instructions will result in a bad seating of the tyre on the rim, and it could cause the tyre to burst leading to serious injury or death!

Never mount or use damaged tyres or rims! Use of a damaged, ruptured, distorted, welded or brazed rim is not allowed!

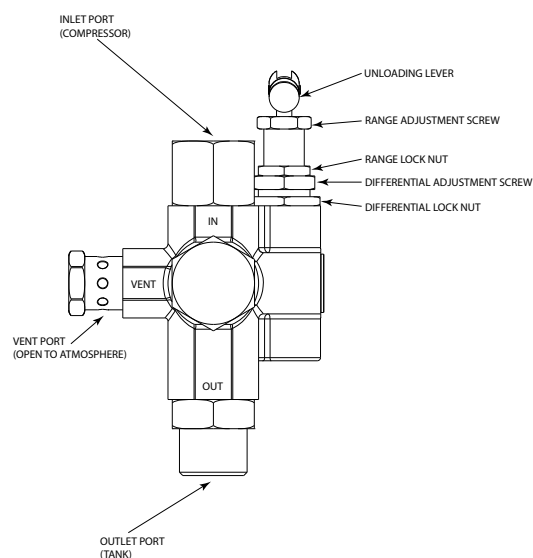
Mounting Instructions

- Always clean and inspect the rim before mounting a new tyre.
- Always check that the rim diameter corresponds exactly to the rim diameter moulded on the tyre.
- Always inspect the tyre inside for cuts, penetrating objects or other damages. Repairable damages should be repaired before installing the tube. Tyres with non-repairable damages must never be used.
- Always inspect the inside of the tyre for dirt or foreign objects. Remove this before installing a new tyre tube.
- Always use new tubes of recommended size. When fitting new tyres, always fit new tubes. Do not use tubes for tubeless tyres.
- 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, because they may damage the tyre. Using the appropriate lubricant will prevent the tyre from slipping on the rim.
- Always use specialised tools for mounting the tyres as recommended by the tyre supplier.
- Make sure that the tyre is centred, and that the beads are perfectly seated on the rim - otherwise tearing of the bead wire may occur.
- Inflate the tyre to 1-1.3 bar (14.5-19 psi), then check whether both beads are seated perfectly on the rim. If any of the beads do not seat correctly, deflate the assembly and re-centre the beads, before starting inflation of the tyre.
If the beads are seated correctly on the rim at 1-1.3 bar (14.5-19 psi), inflate the tyre to a maximum of 2.5 bar (36 psi), until they seat perfectly on the rim.
- Never exceed the maximum mounting pressure moulded on the tyre!
- After mounting the tyres, adjust the inflation pressure to the operation pressure as recommended.

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Adjustment Procedure for MK IV LGM Load Genies

1. Ensure the machine is turned off and all pressure is released from the air tank.
2. Loosen the differential lock nut and screw the differential adjustment screw fully home (finger tight). Using a spanner, tighten the differential screw an additional $\frac{1}{4}$ turn past finger tight. This causes the valve ball to seat itself in to the valve body fully.
3. Back off the differential adjustment screw $\frac{1}{2}$ turn.
4. Loosen the range lock nut.
5. Run compressor to pressure cut-out. Set the cut-out adjustment to between 7.5-8.0 bar using the range adjustment screw. Screw in for higher cut-out and screw out for lower cut-out.
6. Bleed air from the tank and note the cut-in pressure. Set the cut-in pressure to between 6.5 and 7.0 bar using the differential adjustment screw. Screw in for lower cut-in and screw out for higher cut-in.
7. Re-check the cut-out pressure as adjustments made in step 6 will affect the cut-out pressure. Adjust as necessary.
8. Run compressor again to cut-out pressure. If air is rapidly bleeding from around the unloading lever, it can often be stopped by biasing the adjustment screws to one side or the other with your thumb. Once the position for minimum leakage is found, hold it there and tighten the differential lock nut.
9. Tighten the range lock nut.



6.5 Off-Season Storage

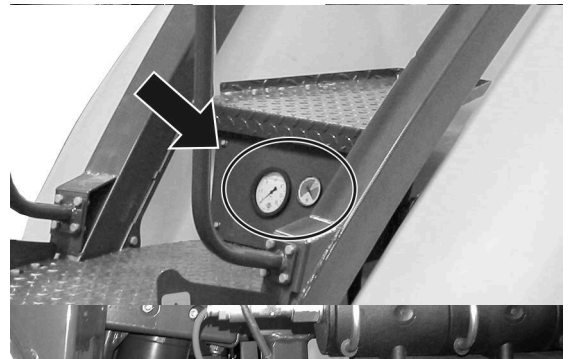
General Info

To preserve the sprayer condition and to protect its components, carry out following off-season storage program.

Before Storage

When the spraying season is over, you should devote some extra time to the sprayer. If chemical residue is left over in the sprayer for long periods, it may reduce the life of individual components.

1. Clean the sprayer completely both inside and outside as described under "5.4 Cleaning" on page 138. Make sure there is no chemical residue left in the sprayer by cleaning all valves, hoses and auxiliary equipment with a cleaning agent and flushing with clean water afterwards.
2. Replace any damaged seals and repair any leaks.
3. Completely empty the sprayer, and let the pump work for a few minutes. Operate all valves and handles to drain as much water out off the liquid system as possible. Let the pump run, until air comes out of all nozzles. Also, drain the rinsing tank.
4. Lubricate all lubricating points according to the lubricating schemes - regardless of intervals stated.
5. When the sprayer is dry, remove rust from scratches or damage in the paint, if any, and touch up the paint.
6. Apply a thin layer of anti-corrosion oil (e.g. SHELL ENSIS FLUID, CASTROL RUSTILO or similar) on all metal parts. Avoid oil on TWIN air bags, rubber parts, hoses and tyres.
7. Fold the boom into transport position and relieve the pressure from all hydraulic functions.
8. All unplugged electric plugs and sockets are to be stored in a dry plastic bag to protect them against moisture, dirt and corrosion.
9. Remove the control boxes and computer display from the tractor. Store them dry and clean (indoor) in a non-condensing environment.
10. Wipe hydraulic snap couplers clean and fit the dust caps.
11. Apply grease to all hydraulic cylinder rods that are not fully retracted in the barrel to protect against corrosion.
12. Place the wheel axle on jack stands to prevent moisture damage and deformation of the tyres. Apply tyre black to the tyre walls to preserve the rubber.
13. Drain the air tank for condensed water.
14. Cover the sprayer with a tarpaulin to protect against dust. Ensure ventilation to prevent condensation.



6 - Maintenance

After Storage

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

1. Remove the tarpaulin.
2. Remove the jack stands from the wheel axle, and adjust the tyre pressure.
3. Wipe off the grease from the hydraulic ram piston rods.
4. Connect the sprayer to the tractor, including hydraulic, electric and electronic connections. Check that the hoses and cables are free to move along when driving with the sprayer. No rubbing or stretching of cables and hoses.
5. Check the hydraulic hoses for damage and correct connection to the tractor (see flow directions marked on the hoses).
6. Check for correct connection between the PTO shaft and the tractor, and protection guards are in good working order. See the PTO instruction manual delivered for more about correct installation.
7. Fill with clean water and check all functions. Do a liquid test:
 - Fill a small amount of water into the MainTank and circulate it around the liquid system.
 - Manually set spray pressure to 5 bar.
 - Check for leaks and repair if any.
 - Check spray patterns and water jets from the nozzles.
8. Rinse the entire sprayer liquid system with clean water.
9. Check that the MainTank is clean inside and check the function of the drain valve.
10. Check that hydraulic brake hoses are intact and correctly connected to the tractor, and without damage.
11. Check the working order of the brakes. Please note reduced brake power, until the rust worn off the drums. Always brake lightly until the drums are clean.
12. Check that the electric cables to the tractor are intact and correctly connected. Also, check that:
 - Cable sheaths are without damage due to wear, stretching or rubbing.
 - Electric plugs are without copper corrosion and damage.
 - Electric boxes are without cracks.
13. Check trailer lights are visible and in good working order. Check the protection glass is clean and without damage.
14. Check the speed sensor and other sensors are in good condition and free of dirt.
15. Check that the spray boom folds correctly. Make adjustments if needed and repair oil leaks if any.
16. Check that the boom hydraulic hoses and electric cables are in place, and follow the folding movements without being damaged.

7.1 Operational Problems

General Info



DANGER! Trained personnel should be involved in fault finding, as this is hazardous work! It may be necessary to have the sprayer operating to complete the fault finding.

Operational incidents are often due to the same reasons:

- A suction leak reduces the pump pressure and may interrupt suction completely. It can also cause pulsation in the pressure hoses.
- A clogged suction filter may reduce suction or interrupt and prevent the pump from running normally.
- A clogged pressure filter increases pressure in the fluid system in front of the pressure filter. This may open the safety valve.
- Clogged in-line filters or nozzle filters increase pressure in the pressure gauge, but it decreases pressure at the nozzles.
- Impurities sucked in by the pump may prevent the valves from closing correctly, thus reducing the pump flow.
- A poor reassembly of the pump elements, especially the diaphragm covers, can cause air intakes or leaks and reduces the pump flow.
- Rusted or dirty hydraulic components cause bad connections and premature wear.
- A poorly charged or faulty battery causes failure and faults in the electrical system.

Therefore ALWAYS check

- Suction and pressure filters, as well as nozzles, are clean.
- Hoses are free of leaks, cracks, and kinks, especially on suction hoses.
- Gaskets and O-rings are present and in good condition.
- Pressure gauges are in good working order. Application rate accuracy depends on it.
- Operating unit functions properly. Use clean water to check.
- Hydraulic components are clean.
- The tractor battery and its connectors are in good condition.

7 - Fault Finding

Liquid System

FAULT	PROBABLE CAUSE	CONTROL / REMEDY
No spray from boom when turned on.	SmartValve valve position is incorrect.	Set correct valve position for spraying.
	Suction/pressure filters are clogged.	Clean suction and pressure filters.
	No suction from tank.	See if suction fitting in main tank sump is free of sedimentation. Clean if needed.
Lack of pressure.	Incorrect assembly.	Boost valve has a defect (it is located at the bottom of the cyclone filter). The valve seat is worn or missing.
	Air in system.	Fill suction hose with water for initial priming.
	Too much agitation.	Close the agitation valve.
	Pump valves are clogged or worn.	Check for obstructions and wear.
	Clogged filters.	Clean all filters.
	Defective pressure gauge.	Check for dirt at inlet of pressure gauge.
Pressure dropping.	Filters are clogging.	Clean all filters. Fill with cleaner water. If using powders, make sure agitation is on.
	Nozzles are worn.	Check nozzle output. Replace nozzles, if the deviation in output exceeds 10%.
	Sucking air towards end of tank load.	Reduce pump rpm.
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.
		Reduce pump rpm.
		Check safety valve is tight.
		Ensure returns inside the tank are present. Use a foam damping additive.
Operating unit is not functioning, or it is having a malfunction.	Blown fuse(s).	Check mechanical function of micro switches. Use cleaning/lubricating agent if the switch does not operate freely.
		Check motor current, max. 450-500 mA. If over, change the motor.
	Wrong polarity.	Brown to positive (+). Blue to negative (-).
	Valves not closing properly.	Check valve seals for obstructions.
		Check micro switch plate position. Loosen the screws holding the plate a 1/2 turn.
	No power.	Wrong polarity. Check that brown is positive (+), blue is negative (-).
		Check print plate for dry solder joints or loose connections.
		Check fuse holder is tight around fuse.

Pump

FAULT	PROBABLE CAUSE	CONTROL / REMEDY
Liquid leaks from the bottom of the pump.	Damaged diaphragm.	Replace diaphragm.
Grease leaks from the bottom of the pump.	Grease used has too low viscosity.	Change to recommended grease type.
Grease leaks from the shaft grease seals.	Grease used has too low viscosity.	Change to recommended grease type.
	Bearings worn/too high friction.	Replace pump bearings and grease seals.
Lack of pressure.	Pump valves are clogged or defect.	Check for obstructions or, if needed, replace valves.
	Clogged filters in fluid system.	Clean filters.
Vibrations in system and unpleasant noise from the pump.	Pump valves are clogged or defect.	Check for obstructions or, if needed, replace valves.
	Air is being sucked into system.	Check for leaks, pinholes in suction hoses, tightness / gaskets / O-rings of all fittings on the suction side.
Lack of flow / capacity.	Internal wear on conrod and conrod ring.	Poor greasing. Replace parts as needed and observe proper grease quality and intervals.
	Pump valves are clogged or defect.	Check for obstructions or, if needed, replace valves.
Extreme internal erosion on diaphragm covers and housing.	Too high vacuum caused by clogged suction filter or excessive pump speed (rpm).	Replace affected pump parts. Clean suction filter and observe maximum pump rpm.
	Lack of internal cleaning.	Use recommended cleaning procedures and add extra cleaning agents (e.g. AllClearExtra or similar).
	Lack of conservation of the fluid system during storage.	Always use a proper mixture of antifreeze during storage.
Short lifetime for diaphragm.	Overspeeding of the pump.	Observe maximum pump rpm.
	Too high vacuum when filling from external source:	
	Hose dimension is too small.	Fit a larger hose to the External Filling Device.
	Too long filling hose.	Park sprayer closer to the external tank and use a shorter hose.
	Bad filling conditions, e.g. too high water column when transferring water from a buried tank.	Change external water supply to obtain a lower water column.

Ace pump - Hydraulic Drive motor

Hydraulic seal failures are typically caused by high continuous pressure or pressure spikes in the return line. The motor seal is rated for 250 PSI (17.2 bar). Maintaining return line pressure below 100 PSI (6.9 bar) will extend motor seal life. Minimize back pressures in the return line by plumbing an unobstructed return back to the hydraulic reservoir or motor return port. Avoid returning the oil through remote valves, couplers, and long undersized hoses.



ATTENTION! Do not install any hydraulic components in series on the return line of the motor.

7 - Fault Finding

Hydraulic System, Z-version

FAULT	PROBABLE CAUSE	CONTROL/REMEDY
No boom movements when activated.	Insufficient hydraulic pressure.	Check oil pressure. Check tractor hydraulic oil level.
	Insufficient oil supply.	Oil flow must be 15 - 80 l/min (depending on the equipment on the sprayer). Check tractor hydraulic oil level.
	The operator has interrupted the boom folding by releasing the folding button in the tractor. Built-in timers automatically inhibit boom movements that may damage the machine.	Unfold the boom completely. Start folding again without letting go of the activated folding buttons for more than 10 seconds at a time, until the folding is completed.
	Blown fuse(s).	Check / replace fuse on tractor harness.
	Bad / corroded electrical connections.	Check / clean connections, multi plugs etc.
	Insufficient power supply.	Voltage on activated solenoid valve must be more than 8 volts. Use wires of at least 4 mm for power supply.
	Defective relay / diodes in junction box.	Check relays, diodes and soldering at PCB in junction box. LED diodes indicate boom functions.
	Clogged restrictors in bypass block.	Remove and clean restrictors in bypass block (See hydraulic diagram). Change hydraulic oil + filter.
	Wrong polarity.	Check polarity. Red positive (+), black negative (-).
ParaLift lock does not lock. Boom lift raises to max. position, when tractor hydraulics are engaged.	Back pressure in return line exceeds 15 bar.	Connect the return line with a free flow to hydraulic oil reservoir.
		Divide return line in two and lead return oil back to reservoir via two spool valves.
Oil heats up in Closed Centre systems.	Bypass valve does not close properly.	Check / close (screw in) by-pass valve.
	Internal leaks in flow regulator.	Replace flow regulator O-rings and backup rings. Replace flow regulator.
Individual hydraulic cylinder does not move.	Clogged restrictor.	Dismantle and clean restrictor.

IntelliTrack

FAULT	PROBABLE CAUSE	CONTROL/REMEDY
IntelliTrack steers slowly or erratically.	Air in system.	Vent the IntelliTrack cylinders - see "Venting the Steering Hydraulics"
	Front potentiometer bar/springs move erratically.	Re-arrange the spring setup, so that the potentiometer bar moves freely.
IntelliTrack has non-linear steering or is not following the tractor's track.	Front potentiometer springs are not parallel.	Refit springs to parallel position and check potentiometer reading - see "IntelliTrack Front Potentiometer Calibration".

HCH508 Controller fault codes

Below is a table that display a list of conditions that may be required for a fault to be detected.

CONDITION	DESCRIPTION
SC_HYD_BYPASS_LS_ON	Hydraulic Bypass low-side switch is ON
SC_HYD_BYPASS_LS_OFF	Hydraulic Bypass low-side switch is OFF
SC_FLOW_FWD_LS_ON	Flow Forward low-side switch is ON
SC_FLOW_FWD_LS_OFF	Flow Forward low-side switch is OFF
SC_FLOW_REV_LS_ON	Flow Reverse low-side switch is ON
SC_FLOW_REV_LS_OFF	Flow Reverse low-side switch is OFF
SC_PARA_RAISE_LS_ON	Paralift Raise low-side switch is ON
SC_PARA_RAISE_LS_OFF	Paralift Raise low-side switch is OFF
SC_PARA_LOWER_LS_ON	Paralift Lower low-side switch is ON
SC_PARA_LOWER_LS_OFF	Paralift Lower low-side switch is OFF
SC_PEND_LOCK_FX_INACTIVE	Pendulum locking functions are inactive
SC_NONE	SC_NONE
RELEASE CONDITION	DESCRIPTION
RC_VT_RESET_BTN	The operator has "pressed" the fault reset button on the screen.

Below is a table of alarms and warnings relevant for the hydraulic control unit which may occur in the terminal display. Cross reference the DTC (Diagnostic Trouble Code,) to the description.

DTC	CATEGORY TYPE	DESCRIPTION	CONDITION	RELEASE BEHAVIOR
SPN: 1005		CPU core error - check source code and EMI		
SPN: 1006		Memory error		
SPN: 1007		Error during watchdog startup - check watchdog timing constraints		
SPN: 1013		Battery voltage fell below lower threshold		
SPN: 1014		Battery voltage exceeds upper threshold		
SPN: 1015		Temperature at lower threshold		
SPN: 1016		Temperature at upper threshold		
SPN: 1049		HARDI Grip - CAN Timeout		
SPN: 1058		ISOBUS Ground Speed - CAN Timeout		
SPN: 9000		RH Boom Fold Proxy - Low voltage / short to ground		RC: RC_VT_RESET_BTN
SPN: 9001		RH Boom Fold Proxy - High voltage / short to power		RC: RC_VT_RESET_BTN
SPN: 9002		RH Boom Fold Proxy -Voltage out of valid range		RC: RC_VT_RESET_BTN
SPN: 9003		RH Boom Fold Proxy - SW parameter invalid		RC: RC_VT_RESET_BTN
SPN: 9004		RH Boom Fold Proxy - SW initialization error		RC: RC_VT_RESET_BTN

7 - Fault Finding

DTC	CATEGORY TYPE	DESCRIPTION	CONDITION	RELEASE BEHAVIOR
SPN: 9005		Pendulum Locked Proxy - Low voltage / short to ground		RC: RC_VT_RESET_BTN
SPN: 9006		Pendulum Locked Proxy - High voltage / short to power		RC: RC_VT_RESET_BTN
SPN: 9007		Pendulum Locked Proxy - Voltage out of valid range		RC: RC_VT_RESET_BTN
SPN: 9008		Pendulum Locked Proxy - SW parameter invalid		RC: RC_VT_RESET_BTN
SPN: 9009		Pendulum Locked Proxy - SW initialization error		RC: RC_VT_RESET_BTN
SPN: 9010		Pendulum Unlocked Proxy - Low voltage / short to ground		RC: RC_VT_RESET_BTN
SPN: 9011		Pendulum Unlocked Proxy - High voltage / short to power		RC: RC_VT_RESET_BTN
SPN: 9012		Pendulum Unlocked Proxy - Voltage out of valid range		RC: RC_VT_RESET_BTN
SPN: 9013		Pendulum Unlocked Proxy - SW parameter invalid		RC: RC_VT_RESET_BTN
SPN: 9014		Pendulum Unlocked Proxy - SW initialization error		RC: RC_VT_RESET_BTN
SPN: 9015		Slant Angle Sensor - Short to power		RC: RC_VT_RESET_BTN
SPN: 9016		Slant Angle Sensor - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9017		Slant Angle Sensor - Invalid parameter		RC: RC_VT_RESET_BTN
SPN: 9018		Slant Angle Sensor - Unknown internal error		RC: RC_VT_RESET_BTN
SPN: 9019		Boom Height Sensor - Short to power		RC: RC_VT_RESET_BTN
SPN: 9020		Boom Height Sensor - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9021		Boom Height Sensor - Invalid parameter		RC: RC_VT_RESET_BTN
SPN: 9022		Boom Height Sensor - Unknown internal error		RC: RC_VT_RESET_BTN
SPN: 9038		Pendulum Lock & Unlock - Open load		RC: RC_VT_RESET_BTN
SPN: 9039		Pendulum Lock & Unlock - Short to power		RC: RC_VT_RESET_BTN
SPN: 9040		Pendulum Lock & Unlock - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9041		Pendulum Lock & Unlock - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9042		Yaw Fold Unlock - Open load		RC: RC_VT_RESET_BTN
SPN: 9043		Yaw Fold Unlock - Short to power		RC: RC_VT_RESET_BTN
SPN: 9044		Yaw Fold Unlock - Short to ground		RC: RC_VT_RESET_BTN

7 - Fault Finding

DTC	CATEGORY TYPE	DESCRIPTION	CONDITION	RELEASE BEHAVIOR
SPN: 9045		Yaw Fold Unlock - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9046		Slant CW & CCW - Open load		RC: RC_VT_RESET_BTN
SPN: 9047		Slant CW & CCW - Short to power		RC: RC_VT_RESET_BTN
SPN: 9048		Slant CW & CCW - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9049		Slant CW & CCW - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9050		Yaw Fold LH & RH - Open load		RC: RC_VT_RESET_BTN
SPN: 9051		Yaw Fold LH & RH - Short to power		RC: RC_VT_RESET_BTN
SPN: 9052		Yaw Fold LH & RH - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9053		Yaw Fold LH & RH - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9055		Override Slant CW - Short to power		RC: RC_VT_RESET_BTN
SPN: 9056		Override Slant CW - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9057		Override Slant CW - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9059		Override Slant CCW - Short to power		RC: RC_VT_RESET_BTN
SPN: 9060		Override Slant CCW - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9061		Override Slant CCW - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9062		Inner Fold LH #1 - Open load		RC: RC_VT_RESET_BTN
SPN: 9063		Inner Fold LH #1 - Short to power		RC: RC_VT_RESET_BTN
SPN: 9064		Inner Fold LH #1 - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9065		Inner Fold LH #1 - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9066		Paralift Lock - Open load		RC: RC_VT_RESET_BTN
SPN: 9067		Paralift Lock - Short to power		RC: RC_VT_RESET_BTN
SPN: 9068		Paralift Lock - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9069		Paralift Lock - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9070		Outer 1 Fold LH #1 - Open load		RC: RC_VT_RESET_BTN
SPN: 9071		Outer 1 Fold LH #1 - Short to power		RC: RC_VT_RESET_BTN

7 - Fault Finding

DTC	CATEGORY TYPE	DESCRIPTION	CONDITION	RELEASE BEHAVIOR
SPN: 9072		Outer 1 Fold LH #1 - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9073		Outer 1 Fold LH #1 - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9074		Outer 2 Fold LH #1 - Open load		RC: RC_VT_RESET_BTN
SPN: 9075		Outer 2 Fold LH #1 - Short to power		RC: RC_VT_RESET_BTN
SPN: 9076		Outer 2 Fold LH #1 - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9077		Outer 2 Fold LH #1 - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9078		Hydraulic Bypass HS - Open load	SC_HYD_BYPASS_LS_ON	RC: RC_VT_RESET_BTN
SPN: 9079		Hydraulic Bypass HS - Short to power		RC: RC_VT_RESET_BTN
SPN: 9080		Hydraulic Bypass HS - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9081		Hydraulic Bypass HS - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9082		Paralift Raise HS - Open load	SC_PARA_RAISE_LS_ON	RC: RC_VT_RESET_BTN
SPN: 9083		Paralift Raise HS - Short to power		RC: RC_VT_RESET_BTN
SPN: 9084		Paralift Raise HS - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9085		Paralift Raise HS - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9086		Paralift Lower HS - Open load	SC_PARA_LOWER_LS_ON	RC: RC_VT_RESET_BTN
SPN: 9087		Paralift Lower HS - Short to power		RC: RC_VT_RESET_BTN
SPN: 9088		Paralift Lower HS - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9089		Paralift Lower HS - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9090		TDZ Flow Forward HS - Open load	SC_FLOW_FWD_LS_ON	RC: RC_VT_RESET_BTN
SPN: 9091		TDZ Flow Forward HS - Short to power		RC: RC_VT_RESET_BTN
SPN: 9092		TDZ Flow Forward HS - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9093		TDZ Flow Forward HS - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9094		TDZ Flow Reverse HS - Open load	SC_FLOW_REV_LS_ON	RC: RC_VT_RESET_BTN
SPN: 9095		TDZ Flow Reverse HS - Short to power		RC: RC_VT_RESET_BTN
SPN: 9096		TDZ Flow Reverse HS - Short to ground		RC: RC_VT_RESET_BTN

7 - Fault Finding

DTC	CATEGORY TYPE	DESCRIPTION	CONDITION	RELEASE BEHAVIOR
SPN: 9097		TDZ Flow Reverse HS - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9098		Tilt LH - Open load		RC: RC_VT_RESET_BTN
SPN: 9099		Tilt LH - Short to power		RC: RC_VT_RESET_BTN
SPN: 9100		Tilt LH - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9101		Tilt LH - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9102		Tilt RH - Open load		RC: RC_VT_RESET_BTN
SPN: 9103		Tilt RH - Short to power		RC: RC_VT_RESET_BTN
SPN: 9104		Tilt RH - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9105		Tilt RH - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9108		Hydraulic Bypass LS - Short to ground	SC_HYD_BYPASS_LS_OFF	RC: RC_VT_RESET_BTN
SPN: 9109		Hydraulic Bypass LS - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9112		Paralift Raise LS - Short to ground	SC_PARA_RAISE_LS_OFF	RC: RC_VT_RESET_BTN
SPN: 9113		Paralift Raise LS - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9116		Paralift Lower LS - Short to ground	SC_PARA_LOWER_LS_OFF	RC: RC_VT_RESET_BTN
SPN: 9117		Paralift Lower LS - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9120		TDZ Flow Forward LS - Short to ground	SC_FLOW_FWD_LS_OFF	RC: RC_VT_RESET_BTN
SPN: 9121		TDZ Flow Forward LS - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9124		TDZ Flow Reverse LS - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9125		TDZ Flow Reverse LS - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9128		Sensor Supply Relay LS - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9129		Sensor Supply Relay LS - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9131		Override Tilt RH Up - Short to power		RC: RC_VT_RESET_BTN
SPN: 9132		Override Tilt RH Up - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9133		Override Tilt RH Up - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9135		Override Tilt RH Down - Short to power		RC: RC_VT_RESET_BTN

7 - Fault Finding

DTC	CATEGORY TYPE	DESCRIPTION	CONDITION	RELEASE BEHAVIOR
SPN: 9136		Override Tilt RH Down - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9137		Override Tilt RH Down - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9139		Override Tilt LH Up - Short to power		RC: RC_VT_RESET_BTN
SPN: 9140		Override Tilt LH Up - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9141		Override Tilt LH Up - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9143		Override Tilt LH Down - Short to power		RC: RC_VT_RESET_BTN
SPN: 9144		Override Tilt LH Down - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9145		Override Tilt LH Down - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9147		Override Main Down - Short to power		RC: RC_VT_RESET_BTN
SPN: 9148		Override Main Down - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9149		Override Main Down - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9151		Override Main Up - Short to power		RC: RC_VT_RESET_BTN
SPN: 9152		Override Main Up - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9153		Override Main Up - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9154		Pendulum lock/unlock sensor disparity	SC_PEND_LOCK_FX_INAC	
SPN: 9155		Pendulum lock timeout		
SPN: 9156		Pendulum unlock timeout		
SPN: 9157		Auto centre failed due to timeout		
SPN: 9178	Type: Info	Emergency mode activated		
SPN: 9186		Inner Fold RH #1 - Open load		RC: RC_VT_RESET_BTN
SPN: 9187		Inner Fold RH #1 - Short to power		RC: RC_VT_RESET_BTN
SPN: 9188		Inner Fold RH #1 - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9189		Inner Fold RH #1 - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9190		Outer 1 Fold RH #1 - Open load		RC: RC_VT_RESET_BTN
SPN: 9191		Outer 1 Fold RH #1 - Short to power		RC: RC_VT_RESET_BTN

7 - Fault Finding

DTC	CATEGORY TYPE	DESCRIPTION	CONDITION	RELEASE BEHAVIOR
SPN: 9192		Outer 1 Fold RH #1 - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9193		Outer 1 Fold RH #1 - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9194		Outer 2 Fold RH #1 - Open load		RC: RC_VT_RESET_BTN
SPN: 9195		Outer 2 Fold RH #1 - Short to power		RC: RC_VT_RESET_BTN
SPN: 9196		Outer 2 Fold RH #1 - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9197		Outer 2 Fold RH #1 - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9198		Inner Fold 1 - Open load		RC: RC_VT_RESET_BTN
SPN: 9199		Inner Fold 1 - Short to power		RC: RC_VT_RESET_BTN
SPN: 9200		Inner Fold 1 - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9201		Inner Fold 1 - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9202		Inner Fold 2 - Open load		RC: RC_VT_RESET_BTN
SPN: 9203		Inner Fold 2 - Short to power		RC: RC_VT_RESET_BTN
SPN: 9204		Inner Fold 2 - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9205		Inner Fold 2 - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9206		Outer Fold 1 - Open load		RC: RC_VT_RESET_BTN
SPN: 9207		Outer Fold 1 - Short to power		RC: RC_VT_RESET_BTN
SPN: 9208		Outer Fold 1 - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9209		Outer Fold 1 - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9210		Outer Fold 2 - Open load		RC: RC_VT_RESET_BTN
SPN: 9211		Outer Fold 2 - Short to power		RC: RC_VT_RESET_BTN
SPN: 9212		Outer Fold 2 - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9213		Outer Fold 2 - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9214		FTZ Flow Forward HS - Open load		RC: RC_VT_RESET_BTN
SPN: 9215		FTZ Flow Forward HS - Short to power		RC: RC_VT_RESET_BTN
SPN: 9216		FTZ Flow Forward HS - Short to ground		RC: RC_VT_RESET_BTN

7 - Fault Finding

DTC	CATEGORY TYPE	DESCRIPTION	CONDITION	RELEASE BEHAVIOR
SPN: 9217		FTZ Flow Forward HS - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9218		FTZ Flow Reverse HS - Open load		RC: RC_VT_RESET_BTN
SPN: 9219		FTZ Flow Reverse HS - Short to power		RC: RC_VT_RESET_BTN
SPN: 9220		FTZ Flow Reverse HS - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9221		FTZ Flow Reverse HS - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9224		FTZ Flow Forward LS - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9225		FTZ Flow Forward LS - Internal driver error		RC: RC_VT_RESET_BTN
SPN: 9228		FTZ Flow Reverse LS - Short to ground		RC: RC_VT_RESET_BTN
SPN: 9229		FTZ Flow Reverse LS - Internal driver error		RC: RC_VT_RESET_BTN

VT Popup Messages - Boom

VT POPUP MESSAGE	REASONS FOR ACTIVATION
SYSTEM NOT CONFIGURED. A valid boom type must be selected in the MST.	No boom type has been selected in the MST. (Cf03BoomType->BoomType)
Complete the folding of the 1st outer wing.	Inner fold button pressed when the 1st outer is not folded. 1st outer fold button must be held for the configured time (Cf03Fold->Outer1FoldTime) before it is considered folded.
Lock the pendulum before folding the inner or 1st outer wings.	Inner fold or 1st outer fold buttons pressed while the pendulum is not locked.
Complete the folding of the 2nd outer wing.	1st outer fold button is pressed when 2nd outer is not folded. 2nd outer fold button must be held for the configured time (Cf03Fold->Outer2FoldTime) before it is considered folded.
Unfold the inner wing before folding the outer wings.	1st outer fold or 2nd outer fold button pressed when inner RH boom has not been unfolded. Inner RH boom sensor is still reading folded or a sensor fault has occurred.
Centre the boom before folding or unfolding.	Any fold or unfold button pressed when the pendulum has not been centred (Cf02Pendulum->SlantAngle). Pendulum not at the configured centre position, or the slant angle sensor has a fault.
Raise the boom before folding or unfolding the inner wing.	Inner fold or inner unfold button pressed when the boom is not above the configured paralift fold height (Cf01Paralift->FoldEnableHeight). Paralift not at the configured fold height, or the height sensor has a fault.
Stop the vehicle before folding or unfolding.	Any fold or unfold button pressed when the vehicle speed is still above the zero-speed threshold (Cf05Speed->SpeedZeroThreshold).
Pendulum lock failed!	Pendulum lock function times out after configured time (Cf02Pendulum->LockTimeout) – expected lock feedback was not achieved. Potential issue with sensor feedback, cylinder position or hydraulic controls.
Pendulum lock state unknown!	Any function button pressed (apart from pendulum lock / unlock) when the pendulum state cannot be determined as locked or unlocked. The lock cylinder is not fully extended or retracted, or the feedback sensors have a fault.
Pendulum unlock failed!	Pendulum unlock function timed out when the vehicle was below the zero-speed threshold. (Cf02Pendulum->UnlockTimeout) (Cf05Speed->SpeedZeroThreshold) Potential issue with sensor feedback, cylinder position or hydraulic controls.
STOP! PENDULUM LOCKED!	Pendulum unlock function timed out when the vehicle was moving faster than the zero-speed threshold. (Cf02Pendulum->UnlockTimeout) (Cf05Speed->SpeedZeroThreshold) Potential issue with sensor feedback, cylinder position or hydraulic controls.
Centre the boom before locking the pendulum.	Pendulum lock button pressed while the boom is not centred.
Complete the unfolding of the 1st outer wing.	2nd outer unfold button is pressed when the 1st outer is not unfolded. 1st outer unfold button must be held for the configured time (Cf03Fold->Outer1UnfoldTime) before it is considered folded.
Complete the unfolding of the inner wing.	1st outer or 2nd outer unfold buttons pressed when the inner RH boom is not fully unfolded. Inner RH boom sensor is still reading folded or a sensor fault has occurred.
Boom angle sensor fault.	Any fold or unfold button pressed when the boom angle sensor has a fault (voltage outside expected range 0.2...4.8V).
Boom height sensor fault.	Inner fold or unfold button pressed when the boom height sensor has a fault (voltage outside expected range 0.2...4.8V).
Inner RH boom fold sensor fault.	Any fold or unfold button pressed when the inner RH boom fold sensor has a fault (voltage outside high/low logic levels: 0.5...1.5V, 4.9...5.0V).
Pendulum lock sensor fault.	Any fold or unfold button pressed when the pendulum lock sensor has a fault (voltage outside high/low logic levels: 0.5...1.5V, 4.9...5.0V).
Pendulum unlock sensor fault.	Any fold or unfold button pressed when the pendulum unlock sensor has a fault (voltage outside high/low logic levels: 0.5...1.5V, 4.9...5.0V).
Auto-centre failed due to timeout.	Auto-centre process stopped due to the boom angle feedback not reaching the centre position within the configured time (Cf02Pendulum -> AutoCentreTimeout).
Unfold the inner wing before unlocking the pendulum.	Pre-condition: FTZ boom selected and pendulum lock option has been enabled. Pendulum unlock button pressed while the inner wing is still folded.

7 - Fault Finding

7.2 Mechanical Problems

Emergency Operation - Liquid System

In case of a power failure, it is possible to operate all functions of the operating unit manually.



NOTE! The handle on the distribution valve has a peg that acts as a mechanical stop.

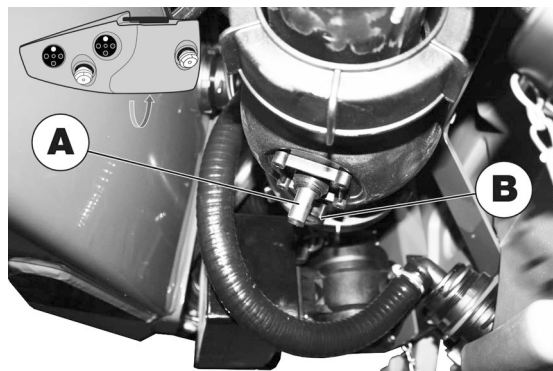
Emergency Operation - EasyClean Filter

If difficulties with opening the filter and closing the built-in valve occur, it can be emergency handled by using a 13 mm spanner on the key profile (A) located at the bottom of the filter housing.

Also the filter can be drained before filter element at the drain plug (B).



WARNING! Always wear protective clothing and gloves before opening the filter!

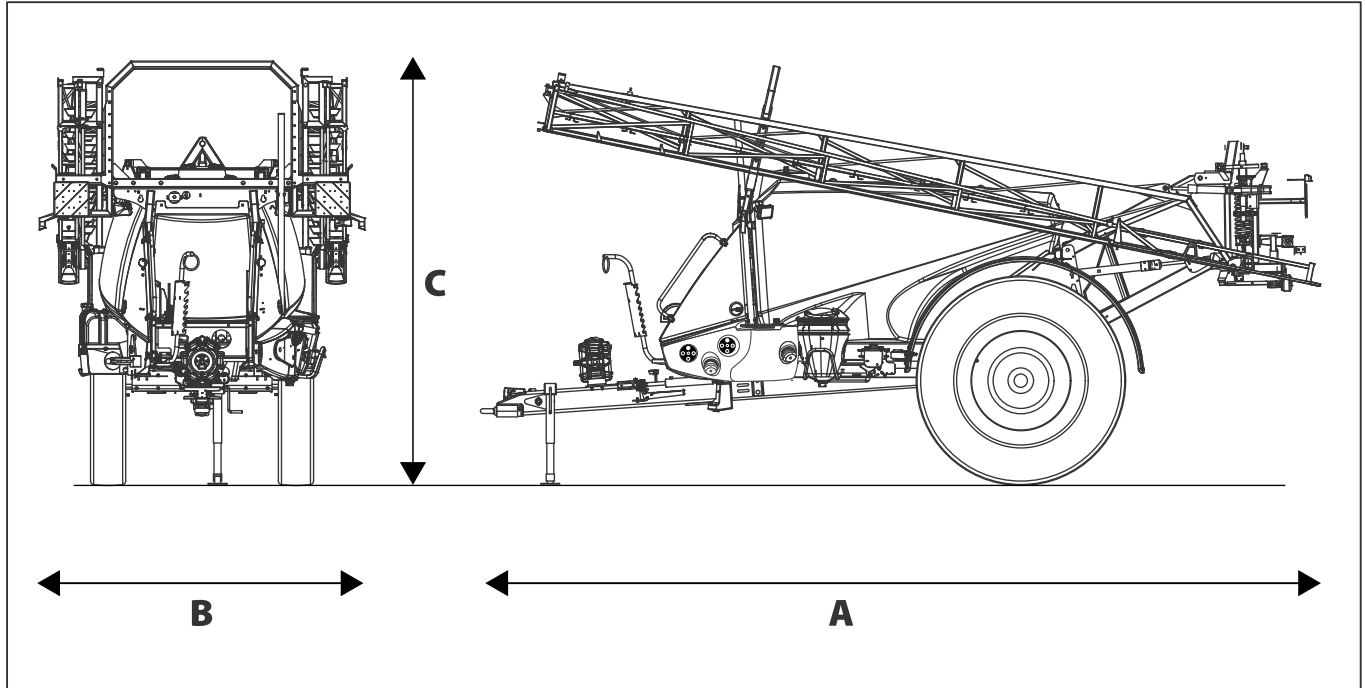


8.1 Dimensions

General Info

All measures, values and weights are depending on mounted options and specific adjustments.

Overall Dimensions



Dimension	Total Length
A	Max. 8.20 m
B	Max. 2.55 m
C	Max. 3.95 m

Wheel and Axle Dimensions

Wheel Size	Track Width Fixed Axle	Track Width Short Axle	Track Width Long Axle	Mudguards	Clearance***
270/95 R48*	1800 or 2000 mm	1500-2000 mm	1800-2250 mm	345 mm	700 mm
300/95 R46*	1800 or 2000 mm	1520-2000 mm	1800-2250 mm	345 mm	705 mm
300/95 R52*	1800 or 2000 mm	1520-2000 mm	1800-2250 mm	N/A	790 mm
340/85 R48*	1800 or 2000 mm	1520-2000 mm	1800-2250 mm	345 mm	735 mm
380/90 R46	1800 or 2000 mm	1520-2000 mm	1800-2250 mm	590 mm	753 mm
460/85 R38*	1800 or 2000 mm	1650-2000 mm	1800-2250 mm	590 mm	675 mm
520/85 R38*	1800 or 2000 mm	N/A	1800-2250 mm	590 mm	695 mm
520/85 R42**	N/A	N/A	1800-2250 mm	590 mm	780 mm
520/85 R46**	N/A	N/A	1800-2250 mm	590 mm	835 mm
650/65 R42**	N/A	N/A	1950-2250 mm	590 mm	780 mm
900/50 R42**	N/A	N/A	2115-2250 mm	890 mm	785 mm

* Mostly for sprayers with tanks of 3000 or 4000 litres.

** Mostly for sprayers with tanks of 5000 or 6000 litres.

*** Distance from ground to wheel axle.

N/A: Not Applicable.

8 - Technical Specifications

Weight

There are differences up to ± 300 kg depending on the specifications of the sprayer.

Conditions for the weight indications in the tables below:

- Rated full main tank (nominal volume).
- Full RinseTank, 500 litres.
- Folded spray boom.

Tank 3000 litres

Boom Width	Empty Tanks			Full Tanks		
	Axle Load (kg)	Drawbar Load (kg)	Total Weight (kg)	Axle Load (kg)	Drawbar Load (kg)	Total Weight (kg)
24 m	3850	440	4290	6459	1333	7792
27 m	3940	450	4390	6549	1343	7892
28 m	3970	450	4420	6579	1343	7922
30 m	3990	460	4450	6599	1353	7952
32 m	4026	470	4496	6635	1363	7998
33 m	4056	480	4536	6665	1373	8038
36 m	4086	490	4576	6695	1383	8078
39 m	4086	490	4576	6695	1383	8078

Tank 4000 litres

Boom Width	Empty Tanks			Full Tanks		
	Axle Load (kg)	Drawbar Load (kg)	Total Weight (kg)	Axle Load (kg)	Drawbar Load (kg)	Total Weight (kg)
24 m	3878	442	4320	7298	1494	8792
27 m	3968	452	4420	7388	1504	8892
28 m	3998	452	4450	7418	1504	8922
30 m	4018	462	4480	7438	1514	8952
32 m	4054	472	4526	7474	1524	8998
33 m	4084	482	4566	7504	1534	9038
36 m	4114	492	4606	7534	1544	9078
39 m	4114	492	4606	7534	1544	9078

Tank 5000 litres

Boom Width	Empty Tanks			Full Tanks		
	Axle Load (kg)	Drawbar Load (kg)	Total Weight (kg)	Axle Load (kg)	Drawbar Load (kg)	Total Weight (kg)
24 m	4680	820	5500	8730	2070	10800
27 m	4760	840	5600	8810	2090	10900
28 m	4780	840	5620	8830	2090	10920
30 m	4800	850	5650	8850	2100	10950
32 m	4832	860	5692	8882	2110	10992
33 m	4862	870	5732	8902	2120	11022
36 m	4892	880	5772	8922	2130	11052
39 m	4892	880	5772	8922	2130	11052

Tank 6000 litres

Boom Width	Empty Tanks			Full Tanks		
	Axle Load (kg)	Drawbar Load (kg)	Total Weight (kg)	Axle Load (kg)	Drawbar Load (kg)	Total Weight (kg)
24 m	4680	840	5520	9410	2410	11820
27 m	4770	850	5620	9490	2430	11920
28 m	4800	850	5650	9520	2430	11950
30 m	4820	860	5680	9530	2450	11980
32 m	4852	870	5722	9562	2460	12022
33 m	4882	880	5762	9582	2470	12052
36 m	4912	890	5802	9602	2480	12082
39 m	4912	890	5802	9602	2480	12082

8.2 Pump Specifications

Pump Model 464/5.5

HARDI HARDI INTERNATIONAL A/S HERTHADALVEJ 10, 4840 NØRRE ALSLEV, DENMARK				
No.				
Type 464/5.5		Max. 1100 rpm		
rpm	l/min	bar	kW	
1000	293	0	3.1	
1000	245	max. 15	8.7	

97619300

Pump Model 464/6.5

HARDI HARDI INTERNATIONAL A/S HERTHADALVEJ 10, 4840 NØRRE ALSLEV, DENMARK				
No.				
Type 464/6.5		Max. 1100 rpm		
rpm	l/min	bar	kW	
1000	349	0	3.2	
1000	298	max. 15	10.3	

97619400

Pump Model 464/10.0

HARDI HARDI INTERNATIONAL A/S HERTHADALVEJ 10, 4840 NØRRE ALSLEV, DENMARK				
No.				
Type 464/10		Max. 700 rpm		
rpm	l/min	bar	kW	
540	280	0	1.8	
540	259	max. 15	8.3	

97619500

Pump Model 464/12.0

HARDI HARDI INTERNATIONAL A/S HERTHADALVEJ 10, 4840 NØRRE ALSLEV, DENMARK				
No.				
Type 464/12		Max. 600 rpm		
rpm	l/min	bar	kW	
540	334	0	2.2	
540	310	max. 15	9.7	

97619600

8 - Technical Specifications

Pump Model FMCWS-650-HARDI-CD-RPM

High performance pump

- Maximum flow 681 LPM
- Maximum pressure 11 bar

WetSeal technology

- Prevents run dry failure
- Isolates seals from chemicals and fertiliser

Maximum reliability


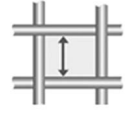
- Nominal 4400 rpm operating speed
- Stainless steel wet end



8.3 Other Specifications

Filters

The higher the number of mesh, the finer the filtration.

			Filter Name/Position				
			EasyCleanFilter	SelfCleaningFilter	In-Line	Tank Strainer	Nozzle
Mesh	Mesh Size	Colour					
18	1.00 mm	White	-	-	-	Yes	-
30	0.58 mm	Green	Yes	-	-	-	-
50	0.30 mm	Blue	Yes, standard	-	Yes*	-	Yes*
80	0.18 mm	Red	Yes	Yes, standard	Yes*	-	Yes*
100	0.15 mm	Yellow	-	-	Yes*	-	Yes*

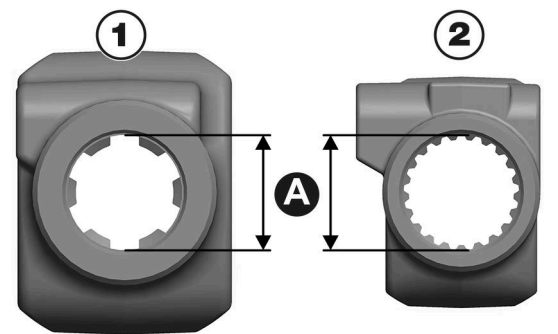
*depending on selected nozzles

Transmission Shaft

Options at the tractor hitch point:

A Dimension: 1 3/8" (35 mm)

- Yoke with 6 splines.
Normally used for pump working speed = 540 RPM.
- Yoke with 21 splines.
Normally used for pump working speed = 1000 RPM.



The tractor must follow the international standard ISO 500-1:2014 regarding general specifications, safety requirements, dimensions for master shield and clearance zone for rear-mounted power take-off types 1, 2, 3 and 4 on agricultural tractors.



Chemical Residue

Residue in the dilutable volume is mentioned in the table below.

The non-dilutable volume varies depending on the boom width and installed options in the fluid system including EFCM and Active Air section control.

Worst case chemical residue for the sprayer with the largest tank, largest fluid system and widest spray boom is stated below. Smaller booms and fluid systems with less options will have less residue.

Sprayer combination	Dilutable volume for tank and fluid system
Main tank: 3000 & 4000 litres	41 litres
5000 & 6000 litres	54 litres
Boom width: ALL meters	

8 - Technical Specifications

Tyre Pressures

Tyre pressure depends on:

- Actual axle load.
- Tyre size.
- Actual speed of the sprayer.

This means that it is often not possible to drive a fully loaded sprayer at maximum speed, when having narrow wheels mounted.



NOTE! Be aware of the specific data for your sprayer.

Tyre Size	Load Index	Tyre Pressure (bar)	Speed: 10 km/h	Speed: 25 km/h	Speed: 30 km/h	Speed: 40 km/h
			Max. Axle Load (kg)	Max. Axle Load (kg)	Max. Axle Load (kg)	Max. Axle Load (kg)
460/85 R38 [18.4R38]	149 A8	1.9	7800	N/A	N/A	N/A
380/90 R46 [14.9R46]	175 A8	2.0	7780	8020	N/A	7400
480/80 R46	176 A8	2.4	N/A	N/A	N/A	N/A
520/85 R46	157 A8*	1.6	11060	N/A	8830	8250
	167 A8	1.4	10070	N/A	8040	7510

N/A: Data is not available from tyre supplier.



WARNING! Never inflate tyres to more than the pressure specified in the table. Over-inflated tyres can explode causing severe injuries! Always check the information about pressure on the tyre itself.



WARNING! If changing tyres, always use tyres with minimum load index as specified in the table.



WARNING! Liquid fertiliser is significantly heavier than all plant protection mixes. Due to the increase in the tyre / axle load, it is recommended that the transport and spray speed is decreased by 10km/h.



ATTENTION! Legislation and requirements regarding maximum allowable axle load, when driving on public roads, may vary from country to country. Always follow local legislation in force at any time.



NOTE! The axle load is two times the tyre load for the sprayer. Be aware of the specific data for your sprayer.

Data for Load Index

Load Index	Max. Wheel Load (kg)	Load Index	Max. Wheel Load (kg)
100	800	143	2725
101	825	144	2800
102	850	145	2900
103	875	146	3000
104	900	147	3075
105	925	148	3159
106	950	149	3250
107	975	150	3350
108	1000	151	3450
109	1030	152	3550
110	1060	153	3650
111	1090	154	3750
112	1120	155	3875
113	1150	156	4000
114	1180	157	4125
115	1215	158	4250
116	1250	159	4375
117	1285	160	4500
118	1320	161	4625
119	1360	162	4750
120	1400	163	4875
121	1450	164	5000
122	1500	165	5150
123	1550	166	5300
124	1600	167	5450
125	1650	168	5600
126	1700	169	5800
127	1750	170	6000
128	1800	171	6150
129	1850	172	6300
130	1900	173	6500
131	1950	174	6700
132	2000	175	6900
133	2060	176	7100
134	2120	177	7300
135	2180	178	7500
136	2240	179	7750
137	2300	180	8000
138	2360	181	8250
139	2430	182	8500
140	2500	183	8750
141	2575	184	9000
142	2650	185	9250

Symbol	Speed (km/h)
A1	5
A2	10
A3	15
A4	20
A5	25
A6	30
A7	35
A8	40
B	50
D	65
F	80
J	100

8 - Technical Specifications

8.4 Tractor Requirements

Engine Output

Sprayer Power Consumption

Recommended tractor engine output are as follows. For sprayers with TWIN air system, an extra output of 60 horsepower (hp) must be added.

Main Tank Volume (litres)	Output (hp)	Output (kW)
3000	100	75
4000	115	85
5000	130	96
6000	145	107

8.5 Electrical Specifications

Voltage

The sprayer is designed for the following voltage only:

Voltage	12 V DC.
Tolerance for voltage	-1.5 V / +3.0 V
Current from tractor	40 A peak
Blade fuses on the sprayer	25 A*

* The blade fuses usually allow up to 50 A for a few seconds before blowing.

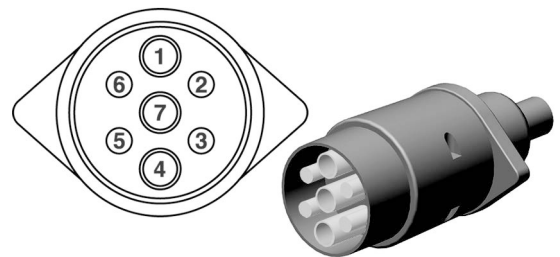


DANGER! If the tolerances for voltage are exceeded, the electrical system can fail. Risk of fire. Risk of defect or malfunctioning components.

Rear Lights

The wiring is in accordance with AS 4177.5-2004.

Position	Designation	Wire Colour
1	Left direction indicator	Yellow
2	Reverse	Blue
3	Ground	White
4	Right direction indicator	Green
5	Not used	Brown
6	Stop lamps	Red
7	Tail lamps	Black

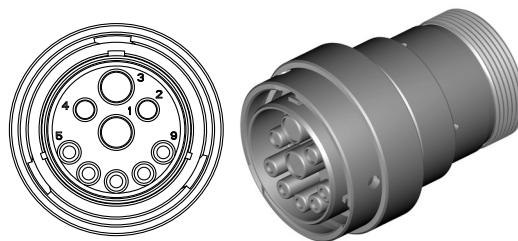


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ISO 11783 Plug

The wiring is in accordance with ISO 11783-2.

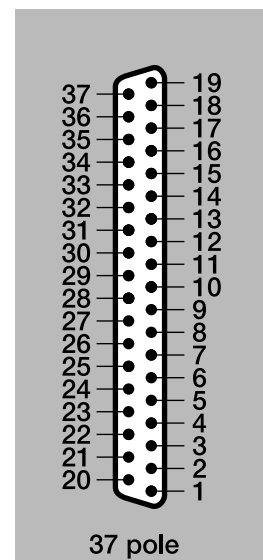
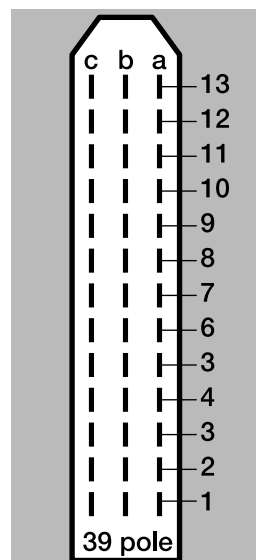
Pin no.	Name	Wire Colour	Comments
1	GND	Black	Connected separately from ECU_GND to the tractor's power source (battery) negative terminal. Connected to chassis ground on both tractor and implement. All major power loads (lights, motors, etc.) shall use this return path. Connection to chassis ground assures that there is no potential or static charge difference between the implement and tractor.
2	ECU_GND	Black	Circuit to be limited to providing electrical return for electronic control units mounted on tractors or implements. This pin shall further be electrically isolated from GND, and shall be connected to the tractor's power source (battery) negative terminal.
3	PWR	Red	Power for all lights, motors, etc. that normally require significant power and tend to generate transients on the supply line. On implements that are so equipped, lighting normally powered by the ISO 1724 connector may be powered by this pin.
4	ECU_PWR	Orange	Intended to provide a good source of clean positive battery power for ECUs mounted on implements.
5	TBC_DIS	N/R	Exists only within the connectors (i.e. not for external connections) to control relay for automatic terminating bias connection/removal. Connected to Pin 4 on implement connector plug.
6	TBC_PWR	Red	Power for the TBCs; shall not be used for any other purpose.
7	TBC_RTN	Black	Provides return path for TBCs; shall not be used for any other purpose.
8	CAN_H	Yellow	Data transmission line pulled toward higher voltage in dominant state.
9	CAN_L	Green	Data transmission line pulled toward lower voltage in dominant state.



Electrical Connections for SprayBox II and III

39- or 37-poled plug with cable.

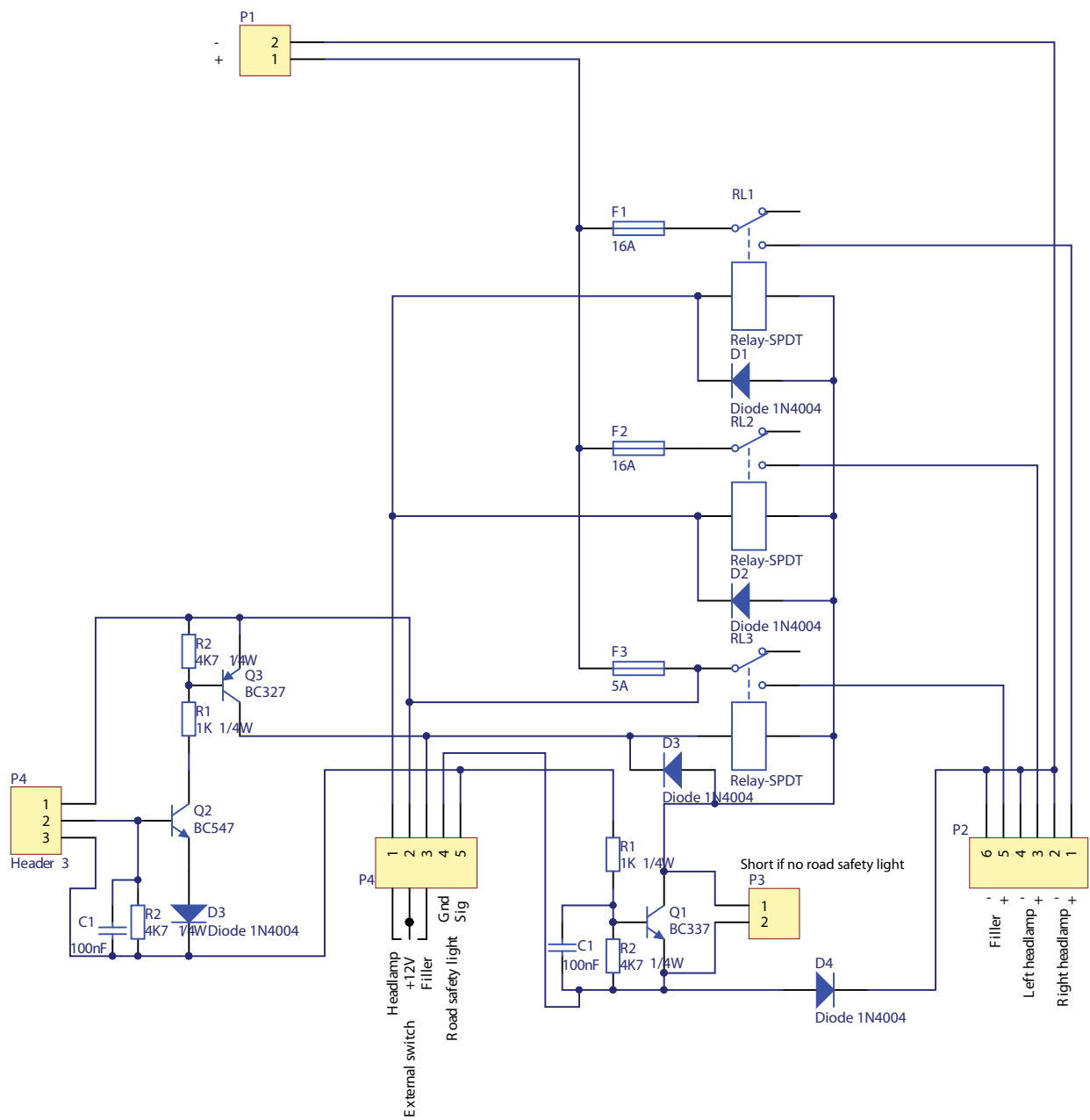
39-pole	37-pole	SprayBox II and III
1a	5	S1+
1b	6	S1-
1c	26	End nozzle L
2a	7	S2+
2b	8	S2-
2c	25	End nozzle R
3a	9	S3+
3b	10	S3-
3c	29	+12V sensor
4a	11	S4+
4b	12	S4-
4c	4	PWM 1TX
5a	14	S5+
5b	15	S5-
5c	27	GND
6a	16	S6+
6b	17	S6-
6c	13	Optional 5 Reg. feedback
7a	18	S7+
7b	19	S7-
7c	33	Option 1 4-20mA



39-pole	37-pole	SprayBox II and III
8a	37	S8+
8b	36	S8-
8c	32	Option 2 Frq
9a	35	S9+/Air angle 0-5V
9b	34	S9-/Fan speed 0-5V
9c	not connected	Option 3/Tank gauge
10a	21	On/off+
10b	22	On/off-
10c	not connected	PWM Output option
11a	23	Pressure+
11b	24	Pressure-
11c	28	Flow
12a	20	Foam blp 0-5V
12b	1	Option 4 Rx
12c	31	Speed
13a	3	FM L
13b	2	FM R
13c	30	Gnd sensor

8 - Technical Specifications

Electrical Specifications for Work lights PCB 13



8.6 Hydraulic Specifications

Hydraulic System

Max. operating temperature	80 °C
Max. operating pressure from the tractor	210 bar
Min. operating pressure from the tractor	180 bar
Max. flow from tractor	120 l/Min
Min. flow from tractor @ 200 bar	50 - 80 l/Min*
Max. oil filter rating	10 µm

* Depending on scope of supply.



DANGER! If one or more the values are exceeded, this may cause damages and sudden leaks on the sprayer. Risk of injuries and fatal accidents.

Hydraulic Oil

Oil from the tractor to the sprayer must have been filtered according to ISO 4406 20/14 as a minimum. Particles bigger than 25 micron in size must be filtered from the oil (Filtration quotient β_{25-75} , ISO 4572-81 Multipass test).

- Follow the tractor oil change schedule as directed.
- Choose hydraulic oil with anti-foam and anti-oxidant additives.

Be especially cautious where the tractor transmission oil is also used for the sprayer hydraulics. Consult the tractor dealer if in doubt.

Type	Hydraulic oil with anti-foam and antioxidant additives.
Purity	ISO 4406 20/14. Filtration quotient β_{25-75} , ISO 4572-81.
Multipass test	25 micron absolute.
Viscosity	Minimum: 10 mm ² /s (cSt).
	Maximum: 100 mm ² /s (cSt).
	At normal operation: 15 - 35 mm ² /s (cSt).

8 - Technical Specifications

Brakes

Hydraulic Brakes

Max. hydraulic oil pressure	150 bar
Min. hydraulic oil pressure	120 bar
Max. hydraulic oil flow	30 litres/min
Min. hydraulic oil flow	10 litres/min



ATTENTION! The hydraulic circuit for the brakes is different from the implement hydraulic circuit.

Brake drum dimensions

Maximum wear rates on brake components:

Sprayer Volume	Drum Dimensions	Max. Drum Diameter	Min. Lining Thickness
3000, 4000, 5000, 6000 litres	400 x 80 mm	403 mm	4.0 mm

8.7 Materials and Recycling

Disposal of the Sprayer

When the equipment has completed its working life, it must be thoroughly cleaned.

The tanks, hoses and synthetic fittings can be incinerated at an authorized disposal plant.

The metallic parts can be scrapped. Steel parts are made of various types of treated steel.

Always follow local legislation regarding disposal.

Materials Used

Parts	Materials
Tanks:	Plastic (HDPE)
Chassis:	Steel
Boom:	Steel, aluminium
Tyres:	Rubber
Mudguards:	Plastic (PE)
Grey side shields:	Plastic (PE)
Air blower housing:	Steel
Air impeller blades:	Glass reinforced plastic (PA)
Air guide on boom:	Aluminium
Bag for air guide:	Plastic (PVC)
Pump housing:	Grey cast iron (GG200)
Pump diaphragms:	Plastic (PUR)
Hoses (suction lines):	Plastic (PVC)
Hoses (pressure lines):	Rubber (EPDM)
Valves:	Glass reinforced plastic (PA)
Hose and pipe fittings:	Glass reinforced plastic (PA)
Filter housings:	Plastic (PP)
Nozzles:	Plastic (POM)

Disposal of Cleaning Water

Protect the environment.

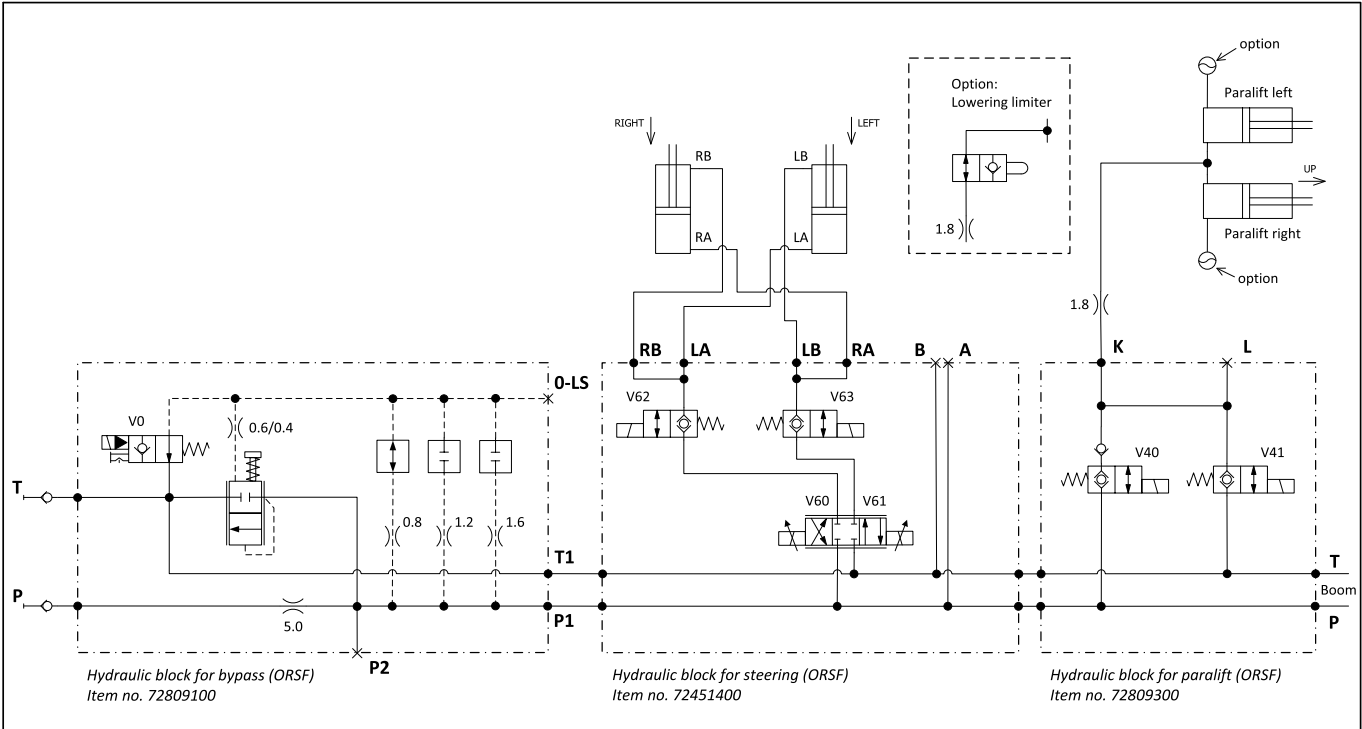
When cleaning the sprayer inside and outside, dispose of chemical residues in the liquid system and water containing cleaning agent according to local regulations.

8 - Technical Specifications

8.8 Hydraulic Diagrams

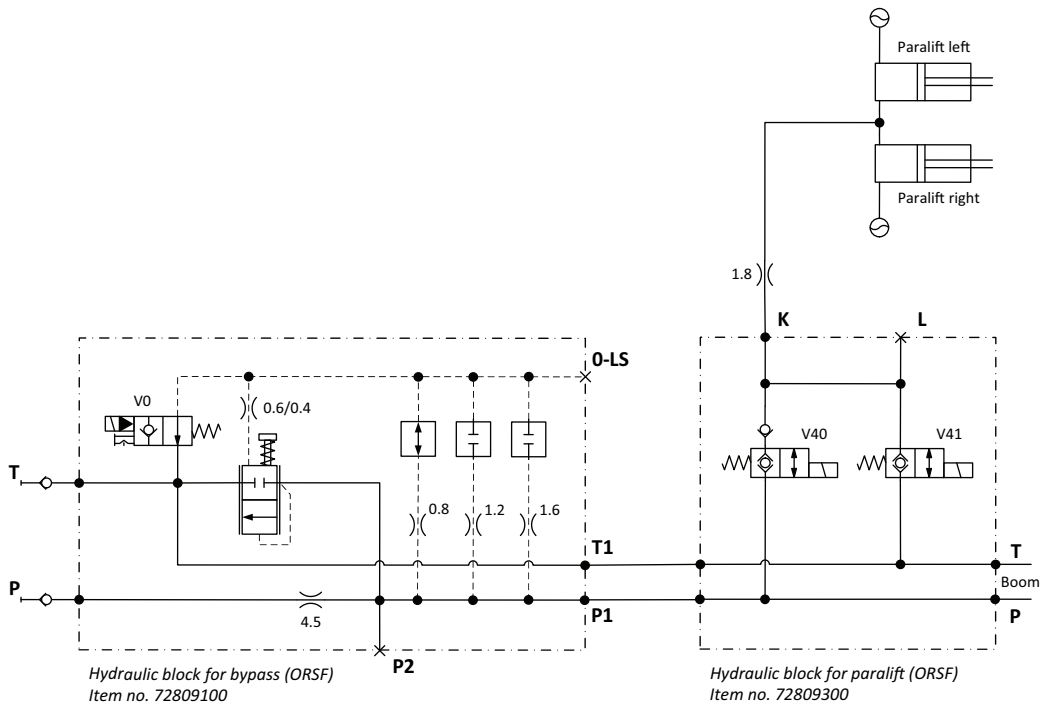
Hydraulics for Chassis (Z-version)

With IntelliTrack



Hydraulics for Chassis (Z-version)

Without IntelliTrack



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Spare Parts Information

To see updated spare part information, visit the Agroparts website on the internet.

Here all parts information can be accessed in the spare parts catalogue:

1. Go to www.agroparts.com, register for free and log in.
2. Select "HARDI" in the menu on the left.
3. Select "Spare parts catalogue" and find your spare part.
4. Online ordering is also possible.
5. Contact your HARDI dealer for further information on spare parts.



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