

Mercury Zaturn



Instruction book

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

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.

Illustrations, technical information and data in this book are believed to be correct at the time of printing. As it is the policy of HARDI AUSTRALIA to continuously improve our products, we reserve the right to make changes in design, features, accessories, specifications and maintenance instructions at any time and without notice.

HARDI AUSTRALIA is without any obligation in relation to implements purchased before or after such changes.

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

As this instruction book covers more models and features or equipment, which are available in certain countries only, please pay attention to paragraphs dealing with precisely your model.

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Obligations and Liability

Comply with the Instruction Book

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 instructions can lead to injuries and fatal accidents as well as damage to the sprayer and its surroundings.

Follow the safety instructions in this Instruction Book.

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 national 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 Instruction Book.

If you still have queries after reading the Instruction Book, 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

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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 national Machinery Directive 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 instructions and accident prevention regulations.
- read and follow the safety instructions as described in this Instruction Book.
- read the section "Representation of Safety Symbols" in this Instruction Book 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 Instruction Book 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.

Guarantee 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 accept no liability for such incidents caused by the use of non-approved spare parts, wear parts or aids.
- Disasters through the impact of foreign bodies, natural disasters or force majeure.

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Organizational Measures

This Instruction Book

- 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

Representation of Safety Symbols

Explanation of Symbols

Safety symbols are used in the following chapters throughout this Instruction Book to designate, where the reader has to pay extra attention.

The signal word (DANGER, WARNING, ATTENTION or NOTE) describes the severity of the risk.

The 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 indicates handling tips and particularly useful information. This instruction will help you to use all the functions of your sprayer in the best way possible for a better, easier and more safe operation.

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Warning Signs On The Sprayer

Explanation of Labels

The labels on the sprayer are designating potential dangerous areas on the machine. Operators, or anyone in close range of the sprayer, must respect these warnings!

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

Note that not all labels shown hereafter will apply to your sprayer - this depends on the sprayer model which labels apply.



978437 Chemical handling!

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



978443 Service!

Carefully read the Instruction Book before handling the machine. Observe instructions and safety rules when operating.



978436 Service!

Turn off the engine and remove ignition key before performing maintenance or repair.



978440 Service!

Tighten to the torque according to instruction book.



97802100 Risk of death!

Do not attempt to enter tank.



978447 Risk of burn!

Stay clear of hot surfaces.



978444 Risk of injury!

Do not open or remove safety shields while engine is running.



978586 Risk of injury!

Flying objects - keep a safe distance from the machine, as long as the engine is running.



978448 Risk of injury!

Keep sufficient distance away from electrical power lines.



978435 Risk of injury!

Keep hands away.

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978441 Risk of squeezing!
Stay clear of raised and unsecured loads.



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



978434 Risk of squeezing!
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 Grapping area!
Manual handling of the boom etc.



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



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



97829000 Lifting point!



978439 Lifting point!



97831500 Load index!
Max. permitted load rating is 164 at 40 km/h or 5000 kg.



97827000 EasyClean filter service!
Open and clean filter monthly.

97827000

2 - General Safety Instructions

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.

Informal Safety Measures

Additional Safety Instructions

Together with the safety information in this Instruction Book, also comply with the general and national regulations related to

- A. Accident prevention
- B. Environmental protection
- C. 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 demands 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.

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Operator Training

Authorized 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.

Activity	Person	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.

Safety Measures in 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.

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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

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

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.

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 to relieve oil pressure
- turn off the tractor and remove the ignition key
- disconnect the hydraulic hoses connected from the tractor to the sprayer.

Electric system

- turn off the tractor and remove the ignition key
- disconnect the electric cables from the tractor's battery.

Fluid system

- turn off the tractor and remove the ignition key.

Compressed air

- turn off the tractor and remove the ignition key

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.

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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 the 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.

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.

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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 places other than the tractor's driver seat, can result in:

- 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.
- risk of the operator losing his concentration and focus on operating the vehicle correctly

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 fluid or spray fluid to the environment
- can lead to the loss of all warranty claims.

2 - General Safety Instructions

Safety Information For Operators

General Safety and Accident Prevention

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

- 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 in 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 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 damages to your skin or face, immediately seek medical advice. Remember to identify the chemicals used.

Coupling and Uncoupling the Sprayer

Only connect and transport the sprayer with tractors suitable for the task. See the section "Technical Specifications" in this book 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.

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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.

Before connecting the sprayer to or disconnecting the sprayer from the tractor's three-point linkage, secure the operating lever of the tractor hydraulic system, so that unintentional raising or lowering is prevented.

When coupling and uncoupling sprayers, move the support equipment (if available) to the appropriate position (check stability and strength of the support).

When actuating the support equipment, there is a risk of injury from crushing and cutting points.

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 actuating 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 stable.

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, or
- fold the spray boom into the transport position
- turnoff the tractor engine
- remove the ignition key.

When use of the TurboFiller has ended, make sure that all manifold handles are closed / deactivated.

If parking or stopping the tractor with the sprayer pump running, always keep the sprayer under supervision.

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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 and fatalities!

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.

Checking the vehicle

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

1. Spray boom is folded and resting in transport brackets with the intended locks engaged.
2. Engage transport locks on the steering cylinders.
3. Supply lines for hydraulic, electric and pneumatic systems (if installed) are correctly connected.
4. Parking brake is completely disengaged. Safety line is secured (if applicable).
5. Hydraulic pressure from tractor to sprayer is turned off.
6. PTO drive is turned off.
7. Hitch bolt(s) between tractor and sprayer must be secured with a linchpin or other appropriate means.
8. If the sprayer is coupled onto a lift link drawbar, the lower link should be laterally fixed.
9. Traffic lights and reflectors are in good working order, clean and free from damages.
10. Signs or markings on the vehicle regarding road transport are correctly placed and visible.
11. Brakes are in good working order and free from visible damages.
12. Tyre pressure is correct according to the load.
13. No cables or other parts must be strained or caught in the tractors wheels when cornering.
14. Crop residues and dirt are removed.
15. All moveable or loose equipment are securely latched or stowed away in the designated compartments.

Ensure that the tractor has sufficient steering and braking power. If necessary, use front weights to the tractor in a 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 brake delay for the loaded vehicle combination (tractor plus connected sprayer).

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.

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.

Check that the transport equipment, e.g. lighting, warning equipment and protective equipment, is correctly mounted on the sprayer.

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

Adjust your driving speed to the prevailing conditions.

Before driving downhill, switch to a low gear.

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

Do not use the sprayer as a means of transportation of people or goods.

No one is allowed outside the tractor cabin during road transport, as this can lead to fatalities.

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

Hydraulic System

The hydraulic system is operating under a high pressure.

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 infection and serious injuries.

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

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

2 - General Safety Instructions

Electrical System

When working on the electrical system, 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

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. Follow the local law. 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.

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 overfilling, some sprayer functions may be disabled. However, the main tank 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 main tank. The rated volume inside the main tank is stated with large printed numbers on the outside of the tank. If overfilling, 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 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 - General Safety Instructions

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 is preferable 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 tractor and remove the ignition key to prevent unintentional starting
- activate the parking brake to prevent rolling
- put chocks in front of and behind the wheels to prevent 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.

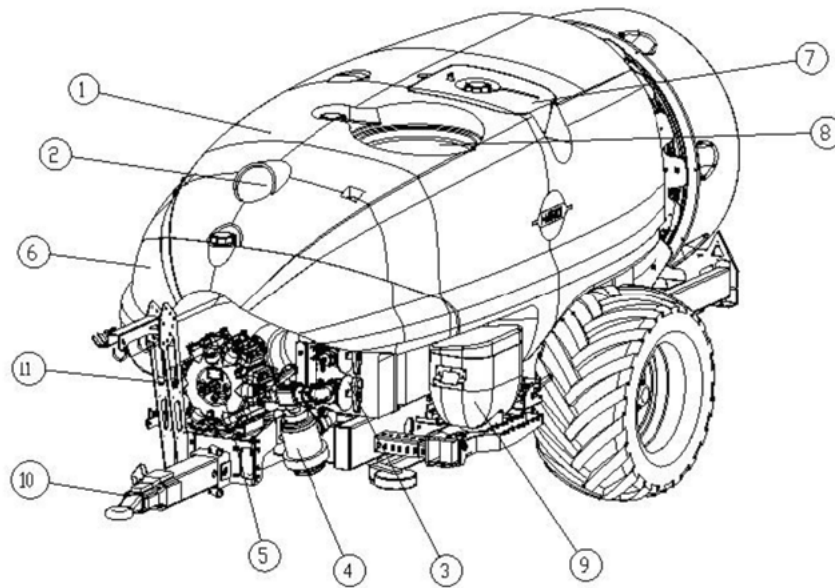
Cleaning of tanks:

- Due to toxic vapours from spray liquids in the main tank, climbing into this tank is very hazardous. Cleaning should only be done from the outside.
- Refrain from entering the main tank.
- Refrain from inspecting any of the tanks with the liquid pump running.

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

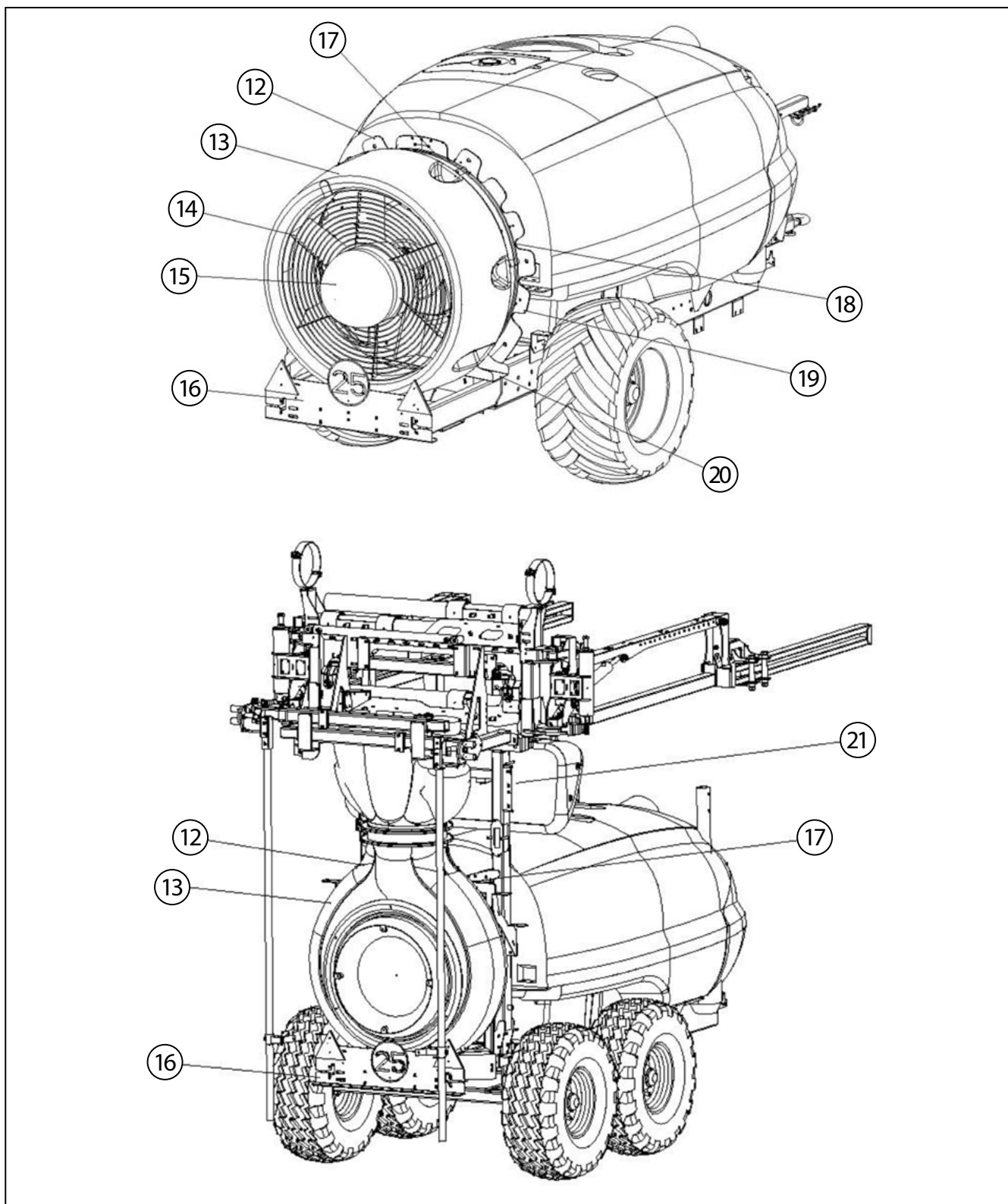
General info

View



- | | |
|---|---------------------------|
| 1. Main tank | 7. Clean water tank |
| 2. Level indicator, optionally on top of the tank | 8. Main lid and strainer |
| 3. Manifold valves | 9. TurboFiller (Not used) |
| 4. Suction filter | 10. Drawbar |
| 5. Pump | 11. Operating unit |
| 6. Rinsing tank | |

3 - Description



12. Chassis

13. Fan house

14. Grid and air guide

15. Centre cover

16. Bumper and light bar

17. Gear box filling point

18. Air outlet

19. Spray line

20. Adjustable bottom deflector

21. Operating unit and hydraulic valves

Use of the mist blower

The HARDI mist blower is designed for applying chemical products used for crop protection. This equipment may only be used for this purpose. The use of this equipment for other purposes is not allowed. If there is no special law in your region which obliges the user to have a permit, it is recommended to be well-prepared for protecting crops in a correct way and for handling chemical products safely so as to avoid unnecessary risks to people and the environment while spraying takes place.

For environmental issues the air kit is offered with option to close either left or right side of the air stream from the blower. These blinds, are mandatory in some sensitive areas, to avoid chemical contaminated air, blowing towards river sides and water channels

Roadworthiness

When driving on public roads and other places where the road safety code or where there are other special rules and regulations for marking and lights on machinery, the machine must be equipped to comply with these regulations.



ATTENTION! For models not fitted with brakes the maximum speed is 25 km/h and 40 km/h for those with. This could vary according to local legislation. Contact your local authorities to find out the current maximum speed limits.

Identification plate

The identification plate is located on the front right-hand side of the machine and is riveted to the chassis. It indicates the make, model, serial number, and date of manufacture.

The serial number is also engraved onto the chassis. The number is found above the identification plate, as indicated in the picture. The serial number consist of five digits.

ILEMO HARDI S.A.U. Pol. Ind. "El Segre", 712-713, 25191 Lleida - Spain www.hardi.es		CE	QR Code
Identification No. []			
Max. Permissible Masses, kg:		Make []	Type []
Gross Vehicle Mass*)	[]		
Axle 1 *)	[]		
Axle 2 *)	[]		
Vertical Load	[]		
Tare Mass	[]	Year []	Model []
*) Depending on tyres Load Index		Capacity, Litres []	Homologation No. []
Made in Spain			

The serial number is also engraved onto the chassis. The number is found above the identification plate, as indicated in the picture. The serial number consist of five digits.



HARDI	
HARDI AUSTRALIA PTY. LTD.	
SERIAL NUMBER []	

Chassis

The monoblock cold-pressed metal chassis is highly durable and built to last under everyday use under extreme conditions. It is manufactured using only the most advanced laser cutting and automated soldering processes. To protect against corrosion it is coated with a polyurethane bi-component paint on top of a highly adherent, steel blasted base.

3 - Description

Tank

The main tank made of impact-proof, UV-resistant and chemical resistant polyethylene has a purposeful design with no sharp corners for easy cleaning. Nominal contents are, 2000, 2300, 3000 or 4000 l. A large, easy to read tank contents indicator is placed on the front - right-hand side and another one is placed on the left side. First one is visible from the tractor cabin. The filling hole is accessible from the left-hand side. This ensures an easy access for the filling of spray liquid, cleaning of the tank, etc. The mistblower is equipped with a clean water tank integrated with the main tank design.

Liquid system

General information

All the suction system functions are operated via a 3-way valve. The pressure valve is also to be found in the pressure circuit. The low pressure circuit is called HLC (Hardi Liquid Circuit).

The liquid circuit

Consist of manifold system in the working zone (front part) where pressure manifold receives liquid from the pump, and distributes to the different options on the sprayer – to the operating unit, to the bottle cleaner, to the Powder mixer in strainer etc., all according to configuration of options. The suction manifold in same area allows suction from main tank, rinsing tank (only on Zaturm) or external water source, if fitted, depending on its configuration.

The pressure side of the liquid circuit is fitted with a safety valve to protect the circuit against misuse of excessive pressure. See chapter "Safety valve"

Diaphragm pump

Pumps with a diaphragm: Models 364/7 or 464/10

They are low pressure and robustly built. Use only grease for lubrication. This type of pump is self-priming, works without oil and can run dry as long as necessary.

Valves

The suction valve is located above the pump and is used to select where to suck liquid from. Either suction from the main tank for spraying or from the rinse tank (Rinse tank only available on Zaturm) for internal cleaning of the liquid circuit. The function is selected by turning the handle of the valve towards the desired function.



ATTENTION! If one of the handles is too tight - or too loose (=liquid loss) - the valve needs to be serviced. For more information, see section on "Maintenance".

Valves and symbols

The valves are identified by coloured discs fitted on the valves themselves. The symbols correspond to the optional accessories, and are located on the discs for quick identification and handling. To activate/open a function, turn the lever to the desired function.



ATTENTION: Only the functions to be used should be activated – the other valves should always be kept closed.



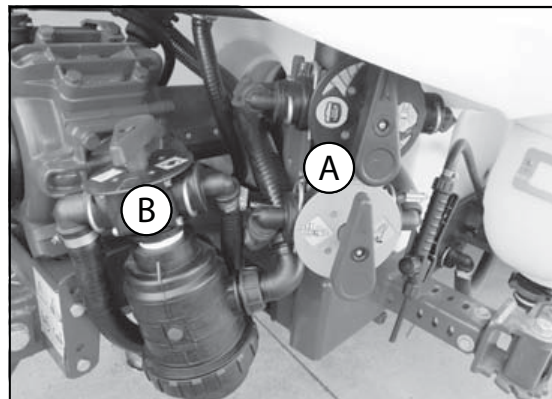
ATTENTION: If the handle of a MANIFOLD valve is too tight – or too loose (loss of fluid)– the valve needs to be serviced. For more information, see the section on 'Maintenance'.

3 - Description

Manifold system (Zaturn only)

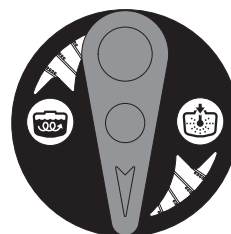
The functions of the spray circuit are operated via the centrally situated MANIFOLD with colour coded plates and pictorial symbols for easy operation.

The modular valve system facilitates the addition of optional extras on both pressure (A) and suction (B) for agitation and for rinsing nozzle (optional equipment).



Agitation / Tank rinse valve (Zaturn only)

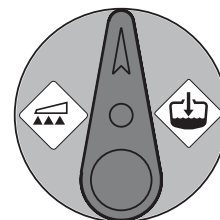
The "Agitation/ Tank rinse valve" can be adjusted for desired agitation, or tank rinse. In vertically position the valve is off.



Pressure valve (Zaturn only)

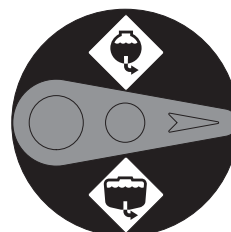
The pressure can be set to pressure to boom or pressure to main tank.

The valve is off in vertical position.



Suction valve (Zaturn only)

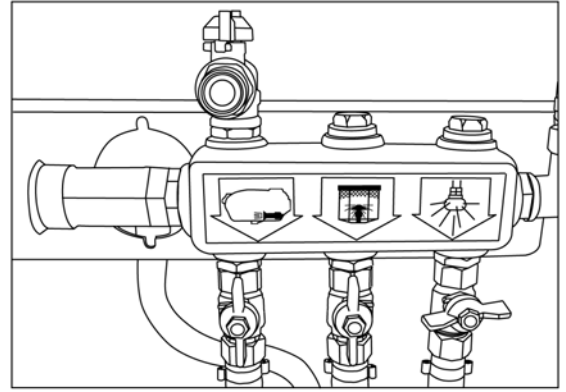
The suction valve can be set to suction from rinse tank or suction from main tank. The valve is off in horizontal position.



Pressure manifold (Mercury only)

This steel part is located at the front of the machine, beside the control unit. Agitation, tank flushing (according to model) and the powder mixer are activated from this manifold using the ball check valves.

It also includes a free ball check valve for connecting the spray gun and the safety valve of the pressure circuit.

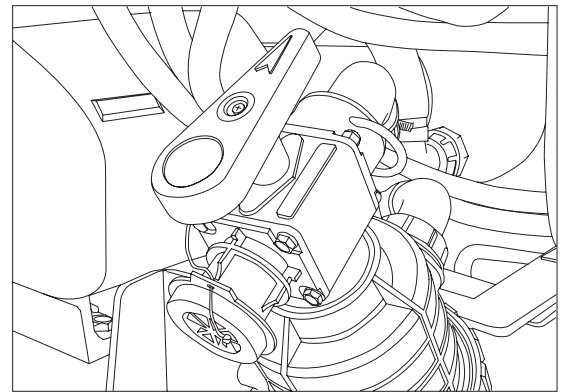


3-way suction valve (Mercury only)

This valve is located above the suction filter and the flow passes through it before reaching the suction MANIFOLD. It enables the selection between suction from the main tank or from the fast filling device.



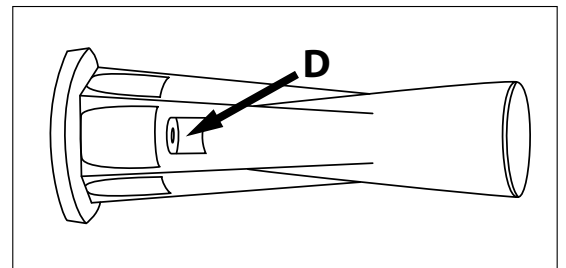
ATTENTION! If any of the valve handles are too stiff –or too loose (loss of fluid)– the valve needs to be serviced. For more information, see the section on 'Maintenance'.



Agitator (Zaturn)

At the front and on each side of the inside of the tank there are two ventury-shaped agitators. The agitators activated by a valve on the pressure manifold.

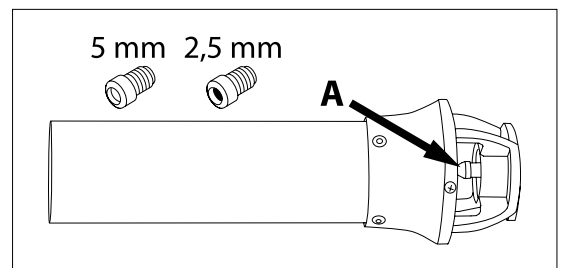
Each agitator has a Ø 3mm nozzle (D).



Agitator (Mercury)

There is a trumpet-type agitator at the back and on each side inside the tank. These agitators are activated by one of the ball check valves in the pressure manifold.

In the inner housing (A), they include a 2.5 mm diameter restrictor as standard. For better tune-up of the machinery, two 5 mm restrictors are also supplied in case of need.



3 - Description

Rate Controller DB3610



1-2-3-4. Fluid section. Odd on left / Even on right

5-6-7-8. Hydraulic selectors

9. Menu/Left

10. Up

11. Escape/Right

12. Down

13. Enter/Regulator

14. ON-OFF sonars/Screen views

15. ON/OFF/Pause

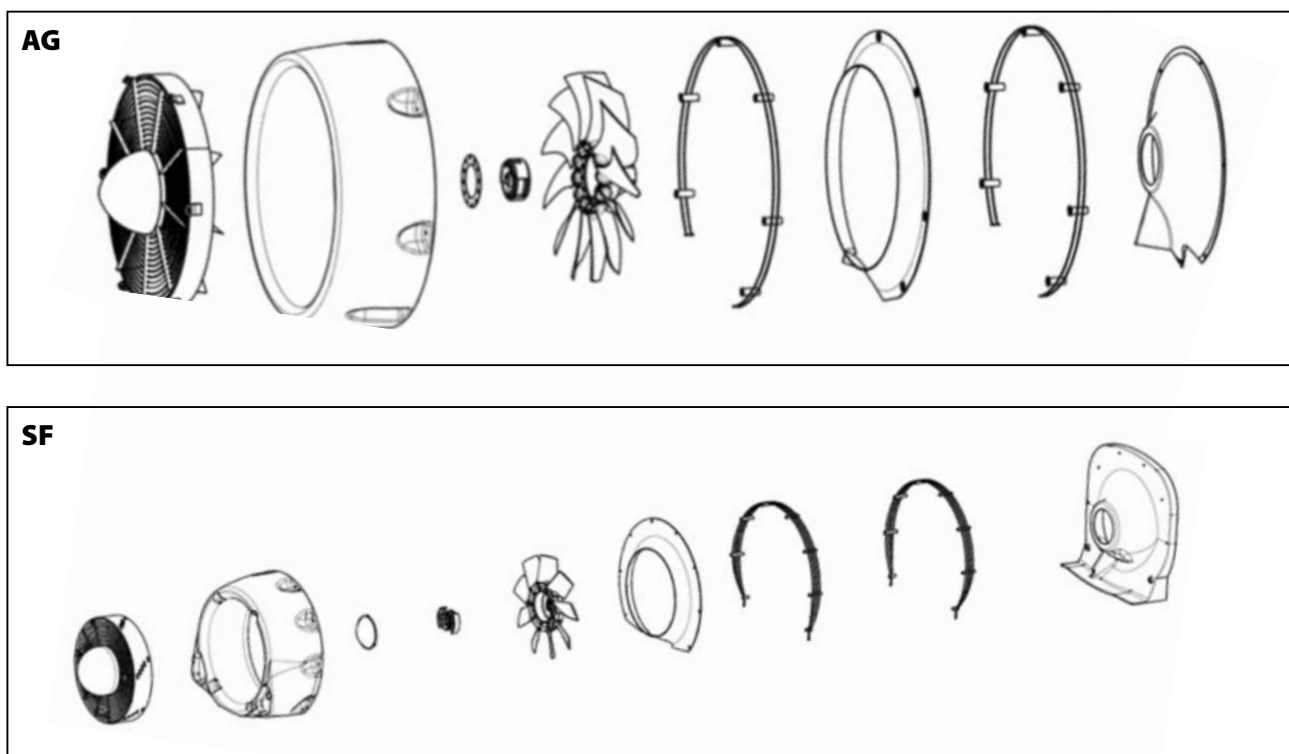
Axial blower units

Technical information

The air kit fitted on the HARDI ZATURN mist blowers are the AG820. The air kit fitted on the HARDI MERCURY can be either a SF65 or SF85. The kits have a polyethylene housing and fan blades made of a hardened synthetic material. Their aerodynamic shape offer a high quantity and perfect air distribution, low noise levels and low power consumption when adjusted to standard levels. The fan clutch enables a smooth start and stop.

AG820 and SF65

The air kits are fitted with a grid with air guides at the air intake, which forms the air flow before reaching the fan, to decrease the imbalance in the airflow. The fan is either 820 or 920mm of diameter and is fitted with blades made of a hardened synthetic material. This reduces the power consumption to a minimum as a result of low material density. There is a channel between the air intake and the cone of the air kit which increases the air speed through the outlet, and ensures that a high uniformity in air distribution is achieved.



DANGER! Never exceed 540 r.p.m. on the tractor P.T.O.! The fan may explode if overspeeded!



DANGER! Keep away from the air inlets and outlets while the fan is on. Some objects may be shot out of the air outlet or a piece of clothing could be sucked into the air inlet.



WARNING! The fan is the most dangerous part of the machine. Do not try to replace any of the parts without consulting your HARDI dealer first. Any service job or modifications on fan and air kit is to be carried out by your HARDI dealers qualified technicians.

3 - Description

Air flow of axial blower Mercury

Blower unit	Speed	Gear ratio	Blade angle	Power	Flow
SF65	1st low	1 - 3.4	35°	22 kW	44000 m3/h
			40°	24 kW	58000 m3/h
			45°	32 kW	63000 m3/h
	2nd. high	1 - 4.4	35°	26 kW	52000 m3/h
			40°	28 kW	66000 m3/h
			45°	46 kW	72000 m3/h

Blower unit	Speed	Gear ratio	Blade angle	Power	Flow
SF85	1st low	1 - 3.4	35°	29 kW	69000 m3/h
			40°	31 kW	77000 m3/h
			45°	35 kW	82000 m3/h
	2nd. high	1 - 4.4	35°	35 kW	77000 m3/h
			40°	36 kW	86000 m3/h
			45°	54 kW	93000 m3/h

Air flow of axial blower Zaturn

Blower unit	Speed	Gear ratio	Power	Flow
AG820	1st low	1 - 3.5	27 kW	43000 m3/h
	2nd. high	1 - 4.4	33kW	50000 m3/h

Protective grid

The air kits are fitted with protection grids. They are fundamental for avoiding accidents and for stopping foreign bodies from getting inside the air kit.



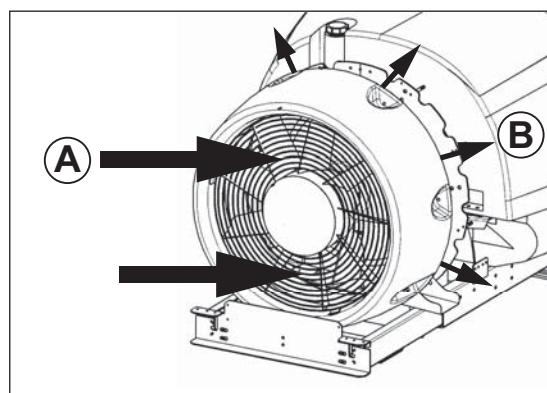
Tractor drivers seat is the intended working place during operation.



This product is designed to be used in agriculture orchard application.

Invers air inhalation

A is air inhale and B is air out let



DANGER! It is strictly forbidden to use the blower unit without the protective grid.



DANGER! Do not approach the fan when in use.



DANGER! Do not introduce foreign bodies through the grid, regardless of whether the fan is in use or not.



DANGER! During the working day, protect your hearing from the noise produced with EN 352-1:1992 approved hearing protection or similar.



DANGER! If you notice vibrations or unusual noise, stop the fan immediately and consult your HARDI dealer.



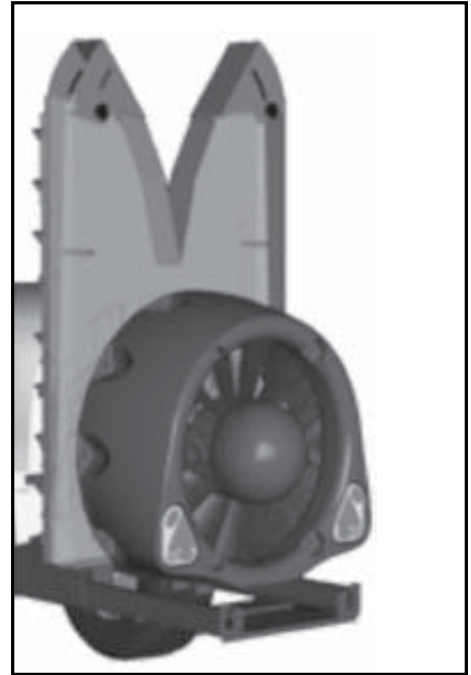
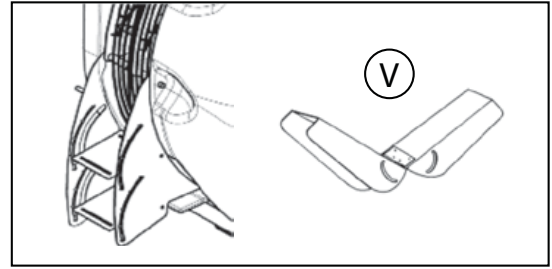
Do never pass 540 rpm on tractor PTO



Deflectors

Axial air sprayer known as well as air sprayers can optionally be equipped with mentioned deflectors.

Deflectors contribute to an increased efficacy in the spray job, as they reduce drift, and provide direction of air and spray mist in direction to the target, according to adjustment.



DUOT

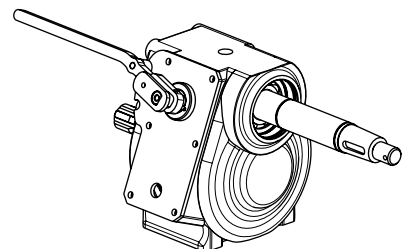
Gearbox

The AG820 and AG920 are fitted with a 2-speed gear box with a neutral position. The front and lower area of the gear box are attached to the chassis. It is fitted with a speed selector that prevent from jumping out of gear when engaged.

The speed ratios are following:

1st speed, low gear: 1 – 3.6

2nd speed, high gear: 1 – 4.4

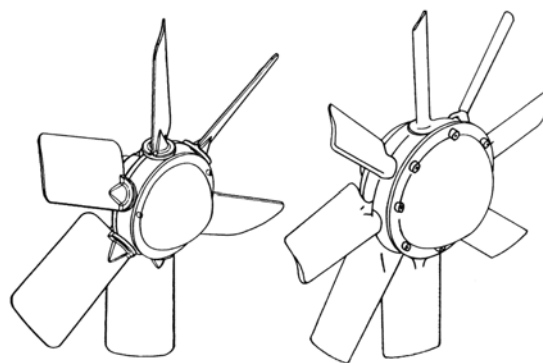


3 - Description

Fan

The axial fan has syntetic, impact proof blades resistant to high and low temperatures as well as chemical products.

The blades have 4 different angle settings to adjust the air flow. To change the angle see the section "Adjusting the fan". (page 5.1).



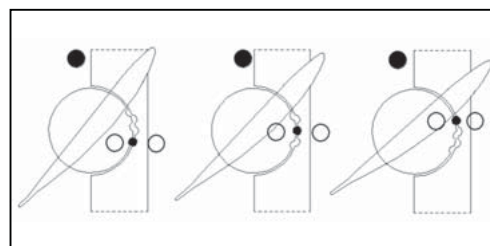
Specific for SF fans

After changing pitch, the fan needs to be balanced.

Position P1 (35°) must coincide with C1, in other words the first groove on the fan blade with the first groove on the crown.

Second position P2 (40°, standard factory setting) must coincide with C2.

Third position P3 (45°) must coincide with C3. After changing pitch, the fan must be calibrated, either at the factory, or by certified shop, under instruction of the factory (HARDI).



Filters

The suction filter captures impurities in the fluid from reaching the pump. It is located on the left side of the front of the mistblower, beside the pump.

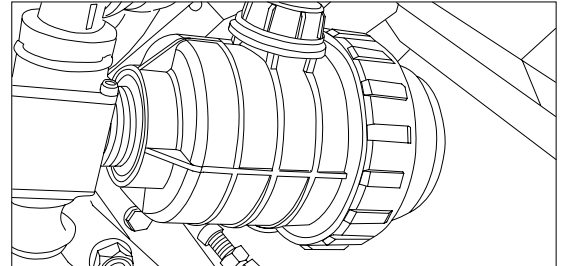
The pressure filters are assembled on the back of the chassis, just behind the blower unit. These filters are assembled as standard on all models.

It is essential that all filters perform their function correctly, so they should be checked regularly. Pay special attention to the filter/mesh size combination.

Suction filter

This filter is assembled under the 3-way valve belonging to the suction circuit.

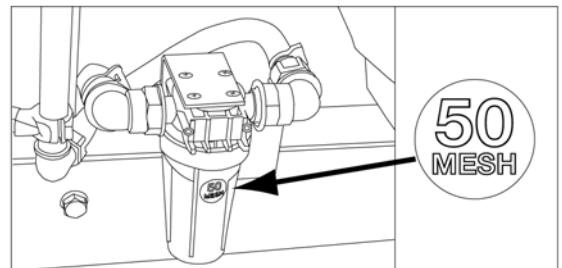
The standard filtering element is white and has a mesh size of 30 (0.58 mm). For more information on the mesh size, see the section on 'Technical specifications'.



Pressure filters

The pressure filters are located in the bumper, beside the air discharge nozzle. In the HLC circuit, the filters are manufactured from synthetic material.

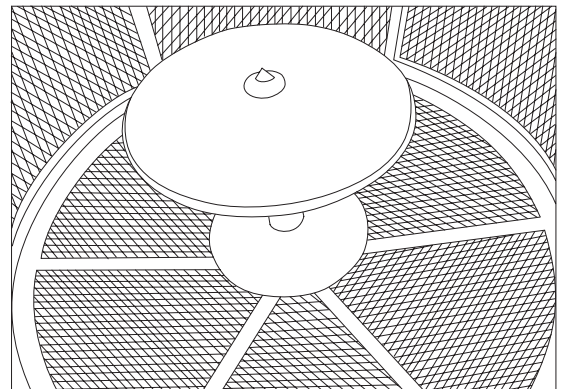
These filters must be in perfect conditions and cleaned regularly. Pay special attention to the correct filter/mesh size combination. The mesh size must always be smaller than the average of the nozzle total flow.



Powder mixer

This is used to rinse the filter basket in tank's filling hole when adding powdered products that do not dissolve properly form lumps on contact with the water in the tank.

After using the powder mixer it must be disengaged as it uses a large amount of the available pump capacity.



3 - Description

Centrifugal Blower Units (Turbines)

General information

The blower unit is located at the back of the machine. It contains a gearbox unit, blanking plate, casing, outlet hoses and nozzles, turbine and clutch. There are two different turbine models: the steel model assembled in P540 and P540D centrifugal blower units, and the aluminium model assembled in HF600 blower units.



ATTENTION! The clutch is one of the most important parts in the blower unit in terms of safety. Make sure that it is in perfect conditions (i.e. that it is not blocked, etc.). Otherwise, it could cause the blower unit to explode.

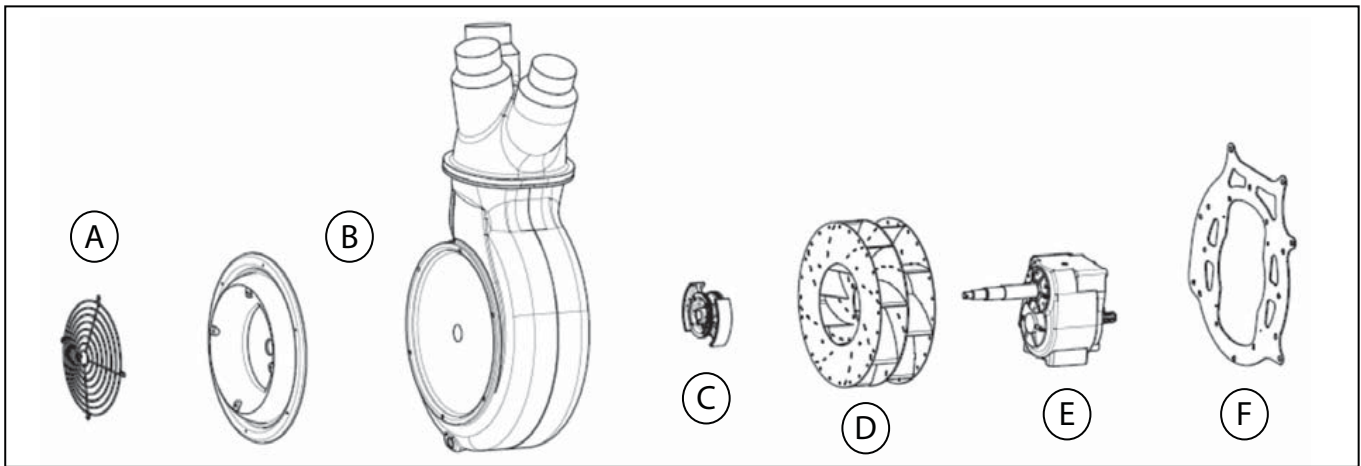
HF640D (TD3-P640 Double)

The air kit should adapt to the requirements of the booms width and crop in order to give the best application results. The following section gives more details about the different pneumatic air kits available.

The letters HF640D means High Flow and Double, respectively. They have a polyethylene casing and turbines of 640 mm diameter.

Components

D. Steel turbine	D. Steel turbine
B. Polyethylene crankcase	E. Gearbox
C. Clutch	F. Chassis



DANGER! UNDER NO CIRCUMSTANCES should you exceed 540 r.p.m. from the tractor PTO as there is a serious danger of air kit explosion.



DANGER! STAY CLEAR of the air inlet and outlet while the turbine is in use. Foreign objects could be expelled from the air outlet or parts of clothing could be sucked into the air inlet.








WARNING! The blower units are the most dangerous part of the machine. Do not attempt to alter any of its components without checking with your nearest distributor first. Manipulating blower units to change their characteristics should only be carried out by qualified personnel that has been expressly authorised by ILEMOHARDI.

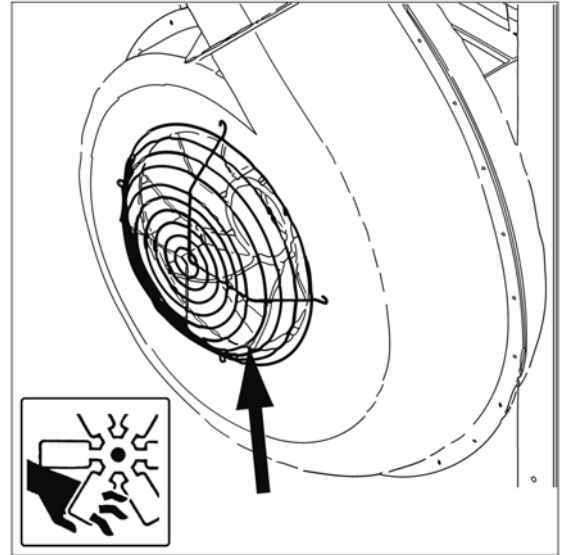
Air flow of HF640D centrifugal turbines

Blower unit	Speed	Gear ratio	Blade angle	Power	Flow
HF640D	1st low	1 - 4.5		24 kW	27000 m ³ /h
TD3-P640	2nd high	1 - 5.7		36 kW	37000 m ³ /h

Protective grid

The blower units have protective grids fitted to the air inlets. They are essential for avoiding accidents and preventing small stones, leaves or other foreign bodies from entering the blower unit that could cause damage inside the grid.

-  **DANGER!** It is strictly forbidden to use the blower unit without the protective grid.
-  **DANGER!** Do not approach the fan when in use.
-  **DANGER!** Do not introduce foreign bodies through the grid, regardless of whether the turbine is in use or not.
-  **DANGER!** During the working day, protect your hearing from the noise produced with EN 352-1:1992 approved earmuffs or similar.
-  **DANGER!** In the case of vibrations or knocking, stop the turbine immediately.



3 - Description

Gearbox

The HF540, HF540D and HF640D blowers have a two-speed gearbox with neutral position.

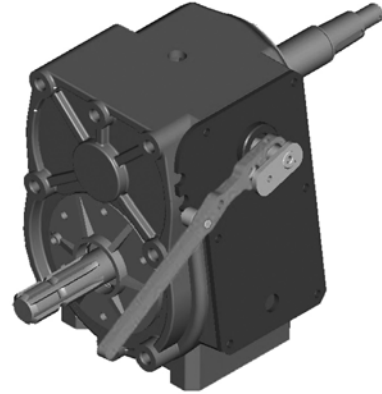
Upper pos: High speed

Middle pos.: Neutral

Lower pos.: Low speed



DANGER! Do not attempt to engage or disengage the speed with the PTO in operation.



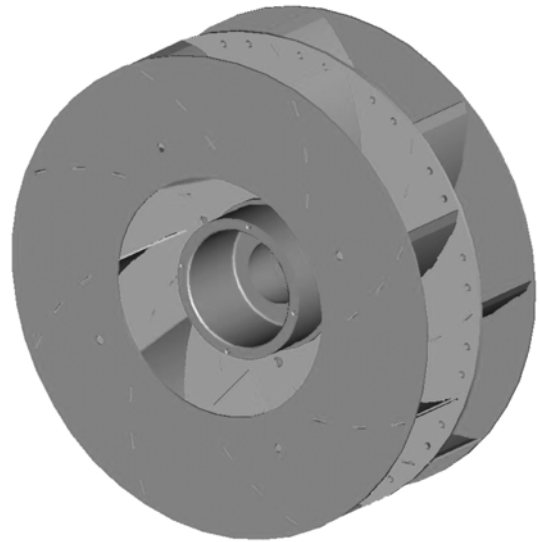
HF 640D Turbines

The centrifugal blower units contain a galvanised steel turbine. The difference between the single model and the double model is that the double provides the same power as two single turbines combined.

The position of the blades in this type of turbine is fixed. Their angle cannot be changed like in axial fans.

The turbines are allowed to turn at a maximum of 540 r.p.m.

The clutch is at the centre of the turbines, which ensures smooth startup and stops - see section "Clutch" for further information.



Clutch (All blower types)

The clutch is integrated at the centre of all the fan models and will ensure a smooth start-up and stop of the fan. The clutch design may vary from model to model, but the functioning and maintenance is the same.



WARNING! The clutch is a vital part in the blower unit. Poor condition could cause the blower unit to break or explode. The condition of this part should be regularly checked. Please carefully read the section on its 'Maintenance'.



DANGER! The clutch is one of the most important parts in the blower unit in terms of safety. Make sure that it is in perfect conditions (i.e. that it is not blocked, etc.) Otherwise, it could cause the blower unit to explode.

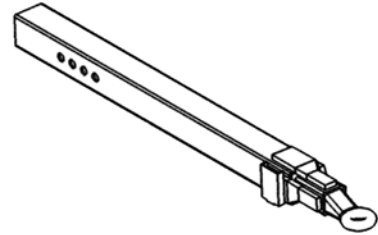


Equipment

Ring drawbar

This is attached near the tractor's rear axle. Before engaging the tractor PTO (Power take-off), make sure the drawbar pin is firmly in place and secured, and that the tractor's wheels do not touch the mistblower when turning.

There needs to be a CV joint on the side of the tractor. The length of the drawbar can be adjusted (see section "Adjusting the length of the drawbar").

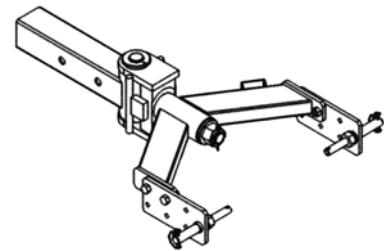


Turnable drawbar

This is attached to the tractor's lift arms. Before engaging the tractor PTO make sure the diameter of the shaft fits the ball couplers at the lift arms. Also make sure to fit the securing pins and check that the tractor's wheels do not touch the mistblower when turning.

This type of coupling allows narrow turns, if a CV joint is fitted at the mist blower's power intake. The length of the drawbar can be adjusted (see section "Adjusting the length of the drawbar").

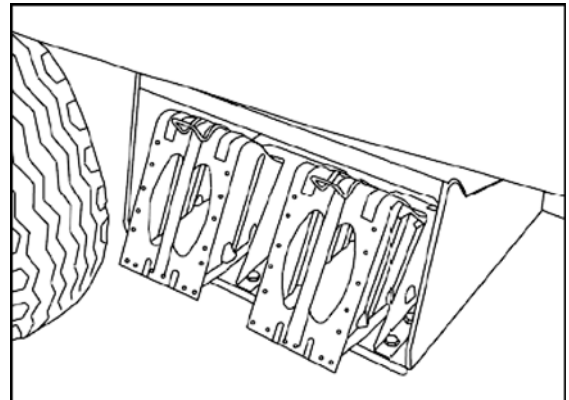
The turnable drawbars, model X and Y are fitted under the rear axle of the tractor, a common arrangement on smaller fruit orchard models of tractors. Important that the two stop bolt are tighten up, to avoid slack



Danger! Angle transmission shaft fitted. Tight turns with PTO engaged may damage the transmission shaft, the pump crank shaft and induce huge vibrations through the gearbox. This may lead to severe damages on gearbox and/or fan.

Wedges

The wedges are located on the left-hand side of the machine. They should always be carried in their support so they are available when required.



3 - Description

Boom

The boom fitted to the MERCURY COVAMAX has numerous features that enable flexibility for operators when setting up and operating. Some of the benefits are;

- Lift
- Fold
- Tilt
- Breakaway Arms
- Adjustable nozzle positioning and directing
- Low maintenance



Breakaway Arms

To minimise damage to equipment or crops should the boom collide with an object, a breakaway feature is incorporated into the boom. A pivoting hinge mounted on a rear spar of the boom centre allows the boom tubes to independently move out should the boom arm come in contact with an object.



Hydropneumatic spray system

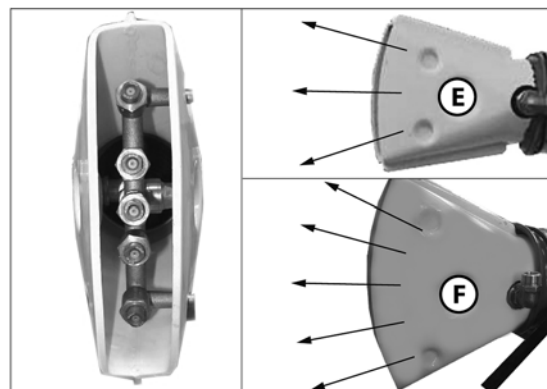
The hydropneumatic system is medium-high pressure. This system takes advantage of higher turbulence in the low-volume conical nozzle and sprays the liquid with an even distribution. The air reaches high speed in the spout, spraying the liquid in a fan.

There are three spout models with three or five nozzles. These two models cannot be combined.

E. Spout with 3 nozzles.

F. Spout with 5 nozzles.

Where not all the nozzles are required in treating the crop, the nozzles can be replaced for caps.



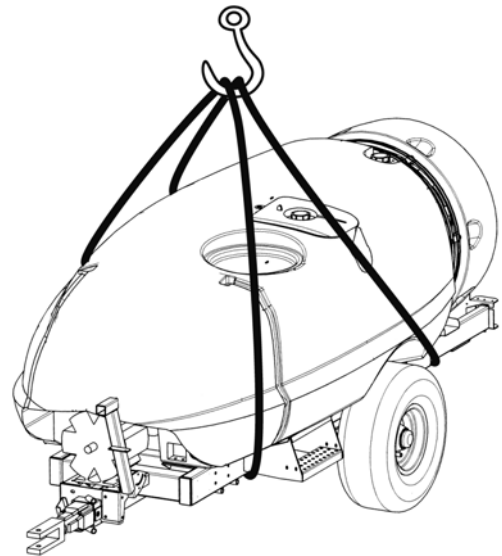
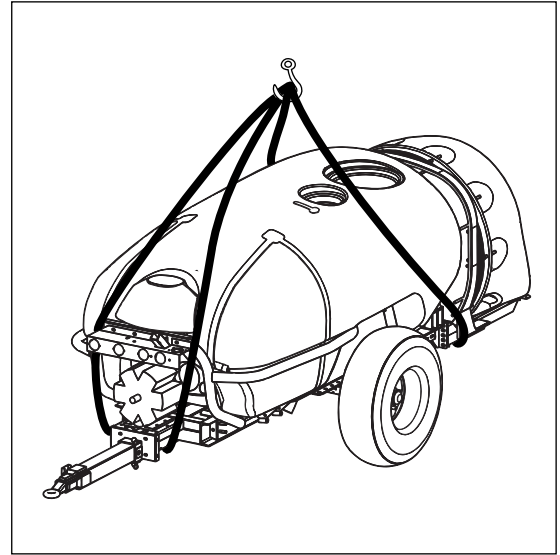
General information

Unloading the mistblower from the truck

When unloading the mistblower from a van or truck with the aid of a hoist or crane, use the lifting points shown in the illustration, and make sure that the straps or cords used for the purpose are strong enough.



DANGER! Do not stand underneath or beside the machine when it is being loaded or unloaded.



Before starting up for the first time

Although the metal parts of the mistblower have received a strong protective surface treatment, a film of anti-corrosion oil (e.g. CASTROL RUSTILLO or SHELL ENSIS FLUID) should be applied to all metal parts to prevent the enamel from being discoloured by the chemical products; it will also make it easier to clean the mistblower.



ATTENTION! This treatment should be repeated whenever the protective film wears off.

Counterweights

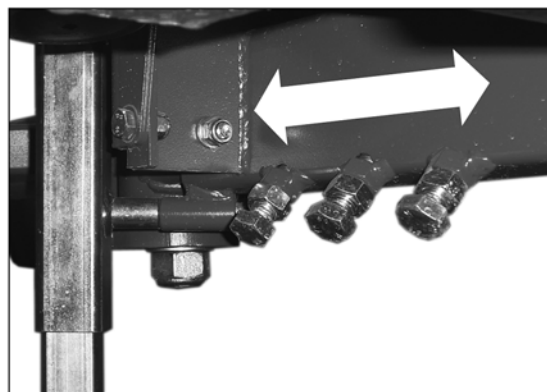
Check whether a counterweight is required on the front of the tractor when coupled to the machinery to prevent excessive rocking or an accident from occurring.

4 - Sprayer setup

Mechanical connections

Adjusting the drawbar length

1. Place the jockey wheel in the position indicated in the photo.
2. Loosen the three bolts (A), located in the area where the drawbar is connected in the chassis.
3. Remove the bolt (B).
4. Adjust the drawbar to the desired position.
5. Replace bolt (B), making sure that it passes through the holes in the chassis and the shaft.
6. Tighten the bolts (A) and the locknut again.



Jockey wheel

The jockey wheel allows the mistblower to be coupled to or uncoupled from the tractor. The illustration shows the position when the mistblower is uncoupled from the tractor; when it is coupled, it will be fastened to the left side of the mistblower chassis using two pins.

The height of the machine can be regulated by turning the handle (C).



Connecting the ring drawbar

This is attached to the standard clevis-type coupler close to the tractor body. Before connecting the PTO make sure that the drawbar is correctly attached and secured, and that the tractor wheels do not touch the mistblower when turning. A transmission shaft with CV joint is required on the tractor's side. It is possible to adjust the length of the drawbar.

Adjust the drawbar if necessary as explained in another section



Connecting the articulated drawbar

This is attached to the tractor's lower linkage arms. Before connecting the PTO make sure that the diameter of the pins matches the ball diameter on the lower links, that the snap locks are engaged and check that the tractor wheels do not touch the mistblower when turning. Of the three hitch types this is the one that permits the tightest turns, but a transmission shaft with CV joint is then required on the mistblower's power intake side. The length of the drawbar is adjustable.

Adjust the drawbar if necessary as explained in another section.



Lock device on turnable drawbar

The turnable drawbars are fitted with a lock device, once down in forward and horizontal position; the pivoting effect is very limited. If the tractor has a weight 2 X the sprayer, it can be used in hilly conditions, where risk of tumbling the sprayer exists, but it is recommended to use the drawbar unlocked.

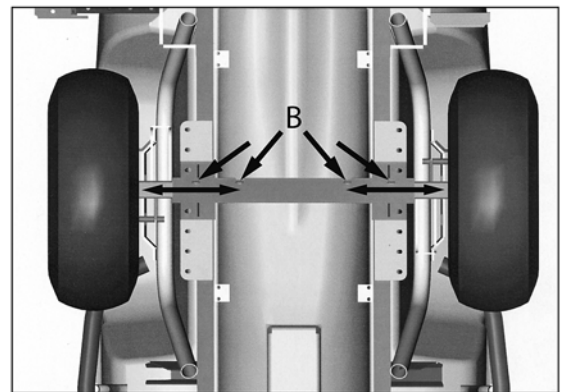


Adjusting the track width (only available on some model)

To adapt the track width to the terrain, a simple adjustment of the semi-axes needs to be performed.

Proceed as follows to correctly adjust the width:

1. Raise the machine at the back so the wheels do not touch the ground.
2. Loosen the two nuts and bolts (B) that fasten the axle inside the housing.
3. Push the axle inwards or outwards, depending on whether greater or less track width is required.
4. When the axle is in the correct position, tighten the bolts (A) and the locknuts (B) again.
5. Repeat this operation with the other axle.



DANGER! Do not remove the axle from the housing more than that allowed. The correct position for the axle is when the axle is properly fastened with the two bolts (b) in the housing.

Adjusting the axle position (Wheel base)

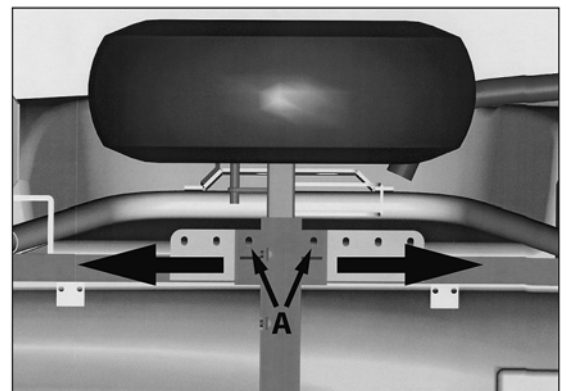
Depending the air kit fitted to the equipment and the adjustment made to the chosen drawbar, the position of the axle may need to be adjusted to improve the machine's stability.



DANGER! Risk of personal injury. Before working underneath the machine make sure it is lifted and supported properly! Never rely on a hydraulic jack only.

Proceed as follows to correctly adjust the width:

1. Raise the machine at the back so the wheels do not touch the ground.
2. Remove the semi-axes.
3. Loosen and remove the two bolts (A) that fasten the axle housing on both sides of the frame.
4. The housing needs to be fitted further back if the machine jumps at the front when empty.
5. Tighten the bolts (A) again when the housing is in the desired position.
6. Re-fit the semi-axes.



ATTENTION! Always retighten all bolts again after a few hours work.

4 - Sprayer setup

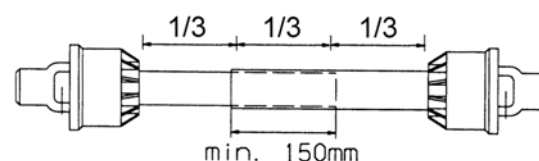
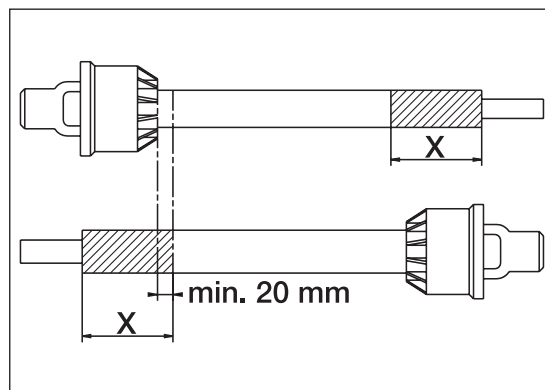
Connecting the transmission shaft

Initial installation of the driveshaft may involve having to cut the axle to adapt it to the tractor to which it will be hitched. To hitch it for the first time, proceed as follows:

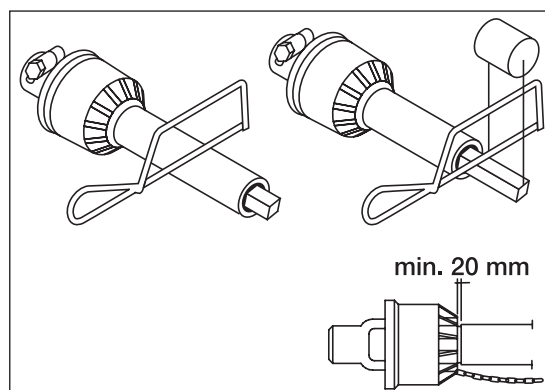
1. Attach the mistblower to the tractor in such a way that the distance between the PTO shaft and the mistblower pump is the shortest possible.
2. Stop the engine and remove the ignition key.
3. If the driveshaft needs to be shortened, pull the two parts of the shaft apart. Fit the two parts of the shaft, one to the tractor and the other to the mistblower crankshaft and measure out the length that needs to be removed. Mark the protection guards.



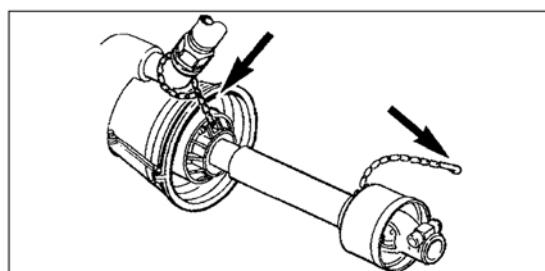
ATTENTION! The shafts must always have a minimum overlap of one third of their working length.



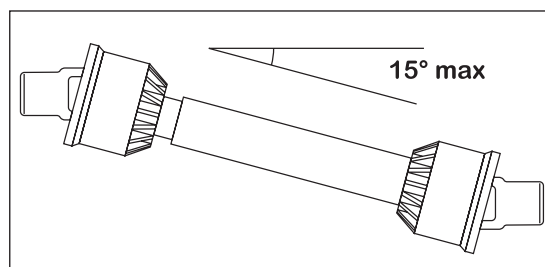
4. Cut both parts equally, using a saw. File the profiles afterwards to remove burrs.
5. Grease the profiles and reassemble male fitting and female fitting.
6. Fit the shaft to the tractor PTO and to the mistblower pump shaft.



7. Place the input part towards the tractor. Fit the chains to prevent the protection guards from rotating with the shaft.



ATTENTION! To ensure long life of the driveshaft and prevent possible damage to the equipment, try to avoid working at angles of more than 15°.



Hydraulic connections

General information

Make sure that the couplings are clean before fitting them!

After pressing the brake pedal and when the system is filled with oil, check the level of hydraulic oil in the tractor and refill if required.



DANGER! Testing the hydraulic system should be done with care. Air may have entered the system and cause sudden movements.



DANGER! Oil leakage: Do not use your hands under any circumstances to locate a leakage in any point in the hydraulic system. Due to the system's high pressure, the oil could penetrate the skin.

4 - Sprayer setup

Electrical connections

General information

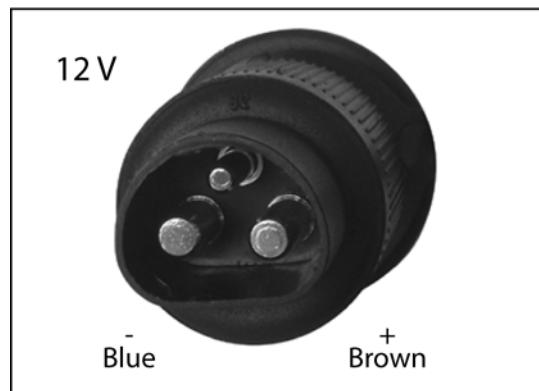
If your equipment includes an electrical component, please note the following information to correctly connect the equipment and to prevent problems when working.

The voltage required by the electrical components is 12 V. Before connecting any component, make sure that the polarity is correct.

Red wire = 12 V (+ positive)

Black wire = (- negative)

This is the standards for the majority of modern tractors. If your tractor has another type of power supply connector, the supplied connector will need to be removed and adapted to the tractor connector.



Operating unit

Find a place in the tractor's cab where it is possible to fit the control box so you can operate it as comfortable as possible. The most recommended place is to the right of the driver's seat.

The control box must be properly attached to prevent it from being hit or from excessive vibrations.

The connector type is universal and it should be able to be connected to any tractor. Do not connect into coincidently wires in tractor cabin, as it will not secure stable power and current.

Minimum requirement: min 11V max 13 V Amp. Per SV section 2.5

Amp. Per CB section 0.75

As an emergency solution, remove the connector and splice the wires directly to the battery, remember to have fuse in between.



ATTENTION! The control box must be properly attached to prevent it from being hit or excessive vibrations.

The connector type is universal and it should be able to be connected to any tractor.

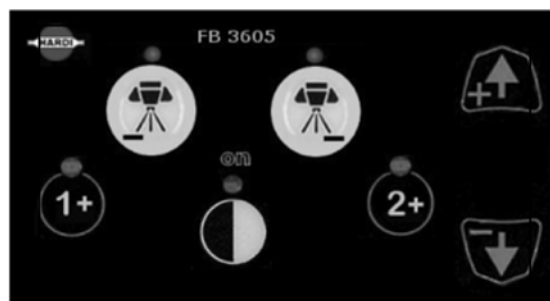
As an emergency solution, remove the connector and splice the wires directly to the battery.



WARNING! Always remember: Red wire (+) Black wire (-)

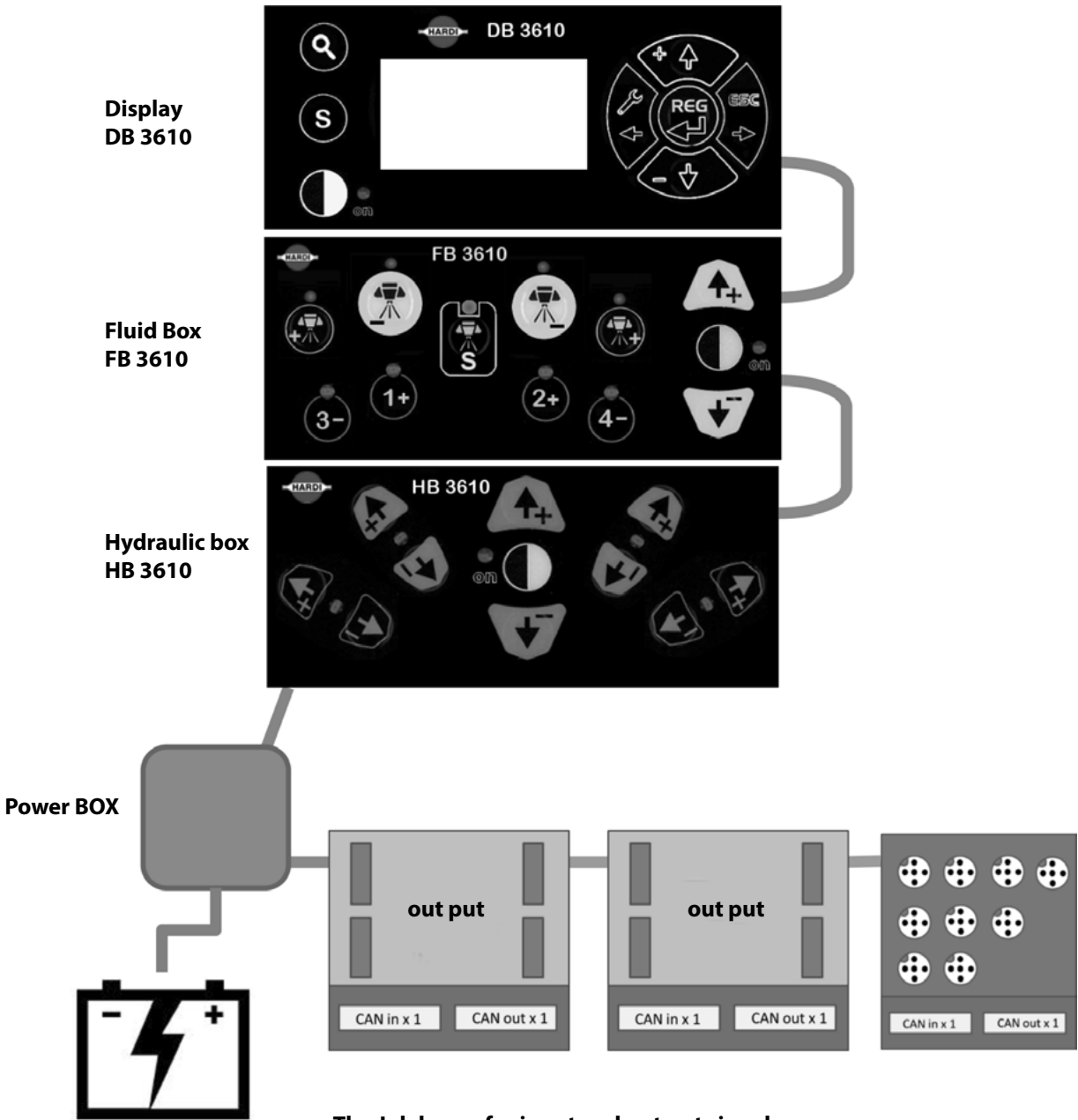


DANGER! Always turn off any spray computer before you unplug the power supply and cable to the sprayer. Data transmission must stop, before power supply is stopped.



Rate controller

Rate controller DB 3610



The Job boxes for input and out put signals

4 - Sprayer setup

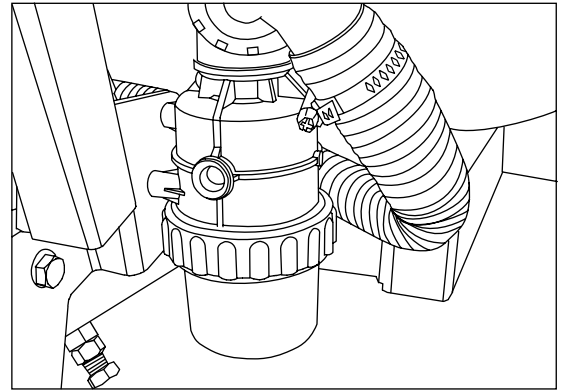
Fluid circuit

Suction filter

The mesh size of the standard filter is 50 mesh. 80 and 100 mesh filters are available and can be changed by opening the top lid of the filter. Check the o-ring before replacing the lid and replace it if it is damaged.



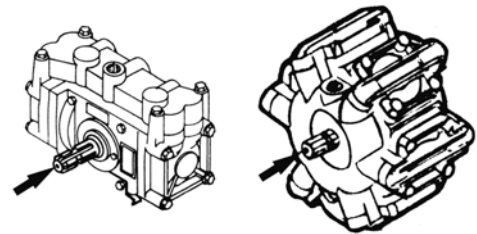
ATTENTION! For better sealing between the lid and the o-ring, coat the area between the joint and the lid with grease. This will make the O-rings seal and avoid suction of false air.



Diaphragm pump

Before starting to use the machine, make sure the diaphragm pump is well greased to prevent wear.

The pump is greased from factory, but should be greased again during bedding in.



Deflectors

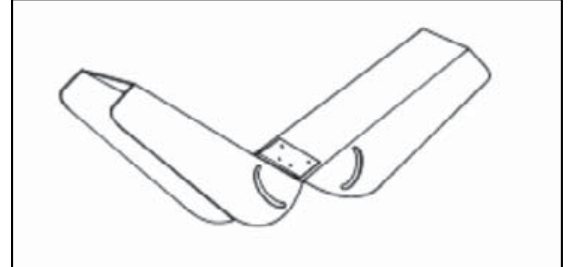


ATTENTION! Never access area or adjust deflector or any other part near the air kit, while tractor is started.

V deflector

Park the sprayer in the orchard, between 2 tree rows, adjusted it visually to point towards the tree top.

Tight up adjustment bolts, test with clean water. And verify target is well sprayed.



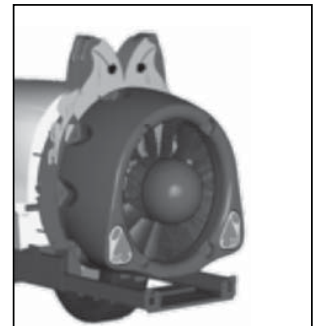
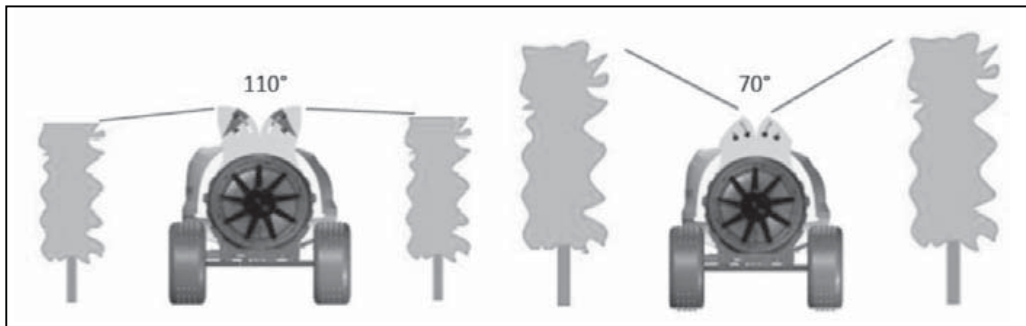
Top S or L

S is for the short version L the slightly higher version..

Parked between rows, orientate the adjustable air outlet towards the target, and test with clean water.

Top S adjust from 90° to 50°

Top L adjust from 110° to 70°

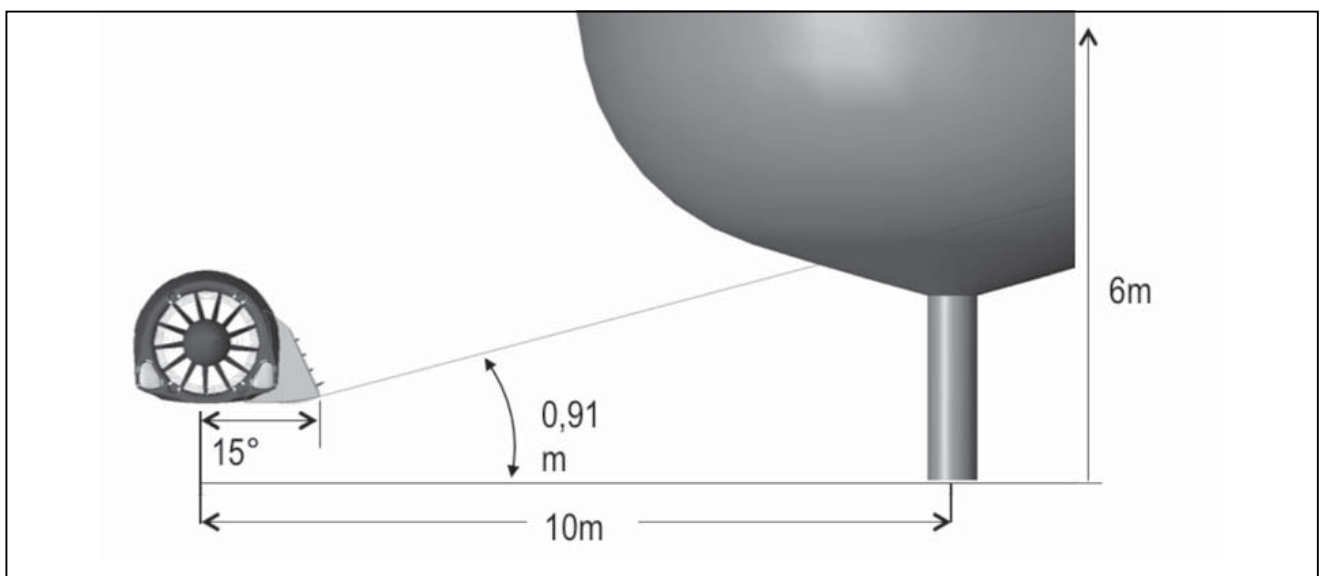
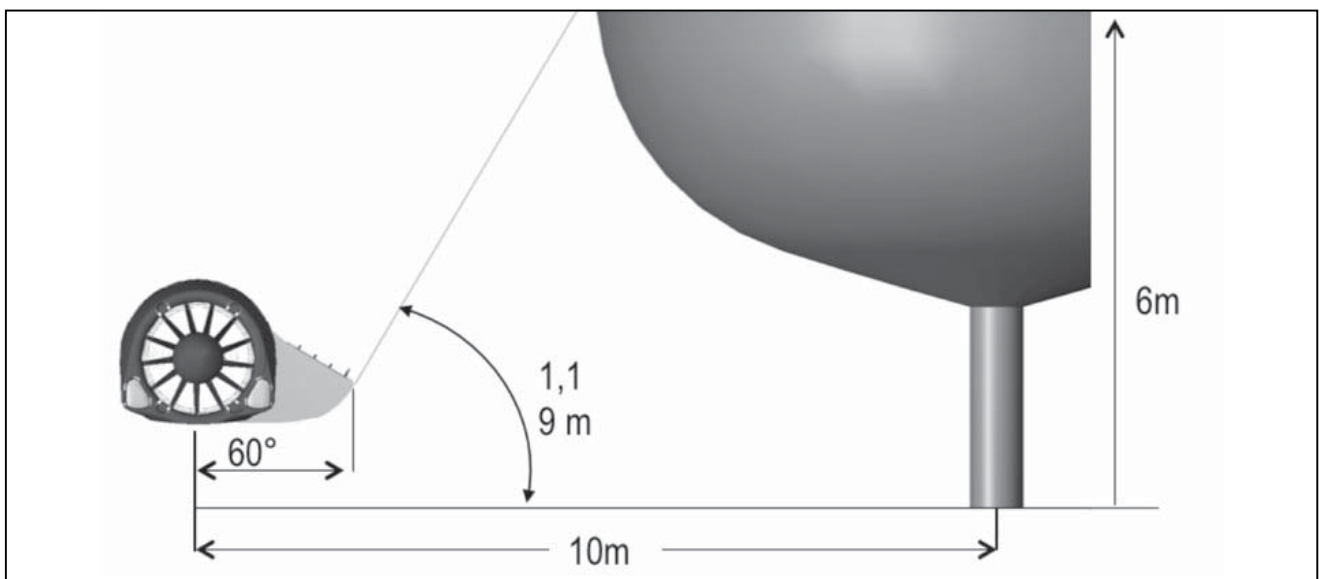
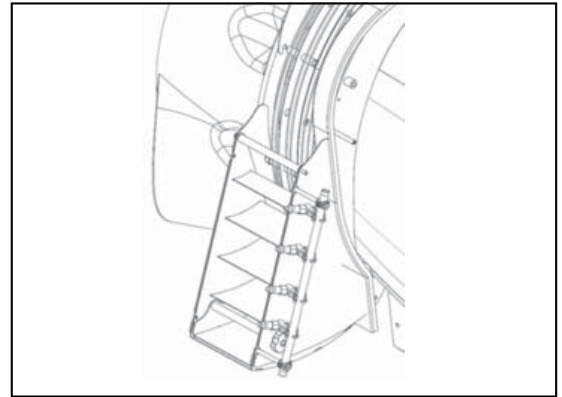


4 - Sprayer setup

Adjustable bottom deflector

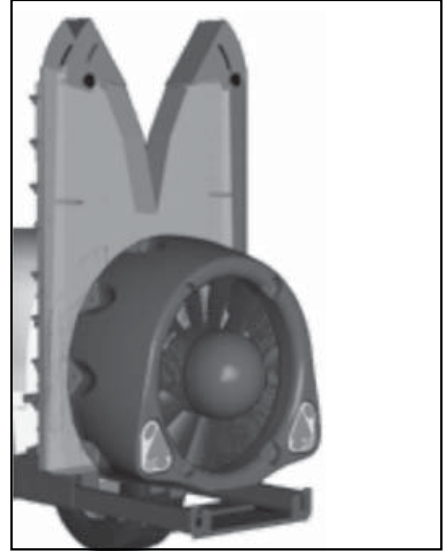
Allows directing the air upwards avoiding air turbulence on the ground and stems, as often used in e.g. plum orchards

Adjust it between rows, test with clean water.



DUO T and V deflector

Provide adjust-ability in the top of the deflector, to secure direction of air and spray mist towards the target. Loose the hand wheel, position the adjustable part in visual direction to the target, tighten up the hand wheel and test with clean water.



4 - Sprayer setup

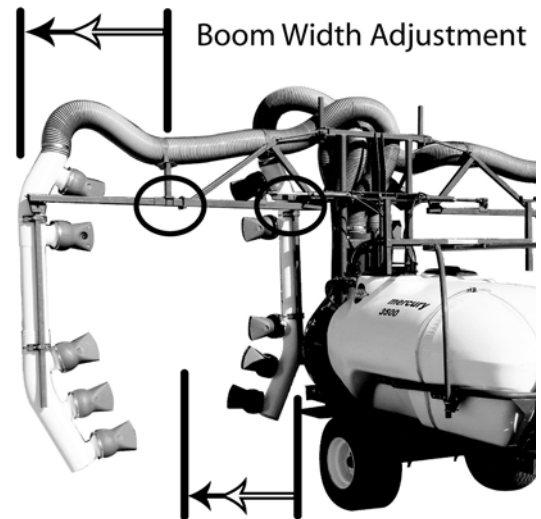
Boom Adjustments

Boom Width - Row Spacing

The position of the out reaching arms can be regulated to alter the width of the boom, in order to adapt the machine to match the row spacing. Adjustment is achieved by loosening clamps on the horizontal bar and extending or shortening the telescopic tubes to the desired width. Once the required position has been chosen re-tighten clamps to prevent any movement of the bar.



Note: Both the inner and outer boom sections may be repositioned to suit user requirements.



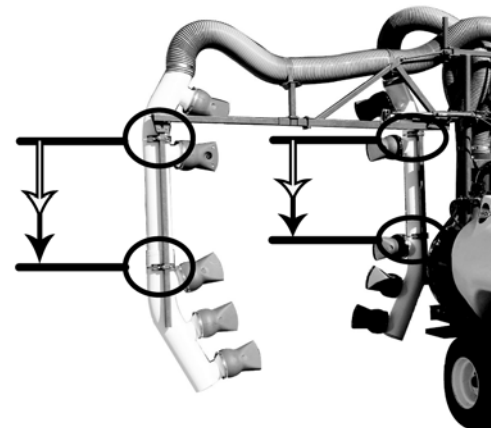
Crop Height Adjust

As with the adjustment it is also possible to adjust the crop height. Vertical delivery tubes are clamped to the vertical boom member. By loosening the clamps the whole tube assembly can be repositioned higher or lower to suit current crop heights.



Note: Both the inner and outer boom sections tube lengths may be altered to suit user requirements.

Crop Height Adjustment



Adjustable Boom Tube Length & nozzle positioning

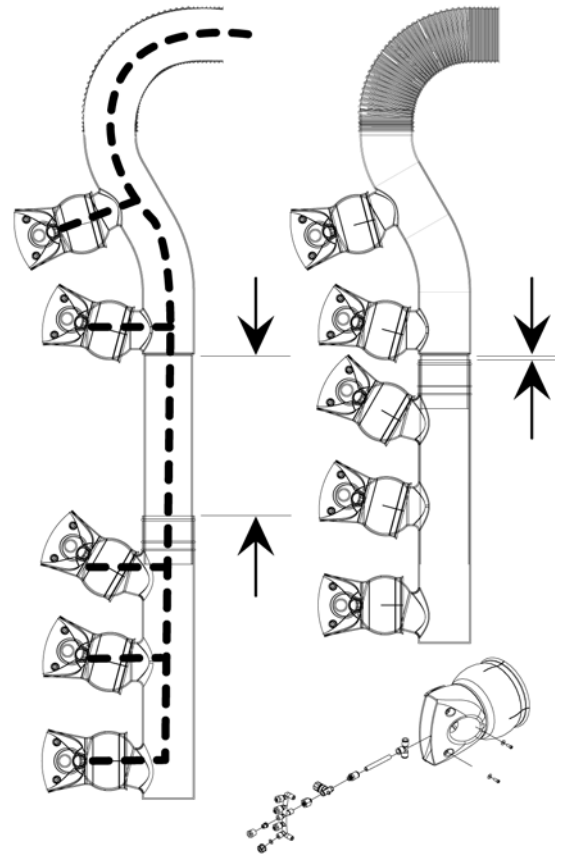
The boom tubes and nozzles for the MERCURY COVAMAX include features that enable the operator to set the machine to suit their particular spray application needs. These features are;

- Boom Tube length adjustment
- Positional Nozzles

Boom Tube Adjustment

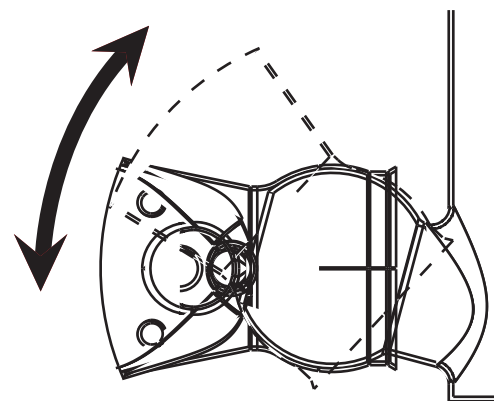
The boom tubes are able to be trimmed to length to suit your spraying needs. By removing the band clamp fitted to the lower section of the boom tubes and then removing the lower section, the upper section may be cut to the desired length then reassembled with the lower section.

Located inside the boom tubes and nozzle shrouds are fluid supply lines and nozzle body assemblies. Care should be taken not to damage any of these items when making adjustments to the boom tubes.



Nozzle Positioning

The ball and socket joint design of the nozzles allows for independent positioning of the nozzles to aid even dispersion of spray to gain better results in your spray application.



Fluid Hoses

The high pressure tubes inside the booms that feed fluid to the nozzle bodies are all connected through the use of 'push-in' quick release fittings similar to the picture shown. To disconnect a tube from the fitting, push the plastic ring in towards the body of the fitting and pull the tube out of the fitting. If the tube will not release try slightly pushing the tube into the fitting then back out again while making sure the plastic ring is pushed in.

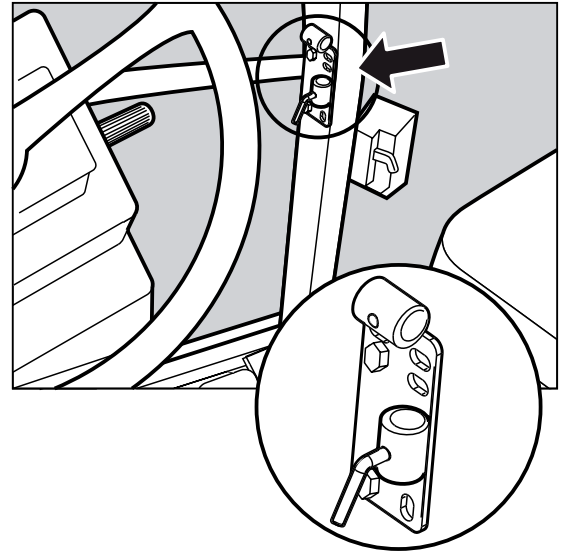


4 - Sprayer setup

Electrical connections

Installation of control unit brackets

Find a suitable place in the tractor cabin to mount the control units. Best recommended position is to the right of the driver seat.



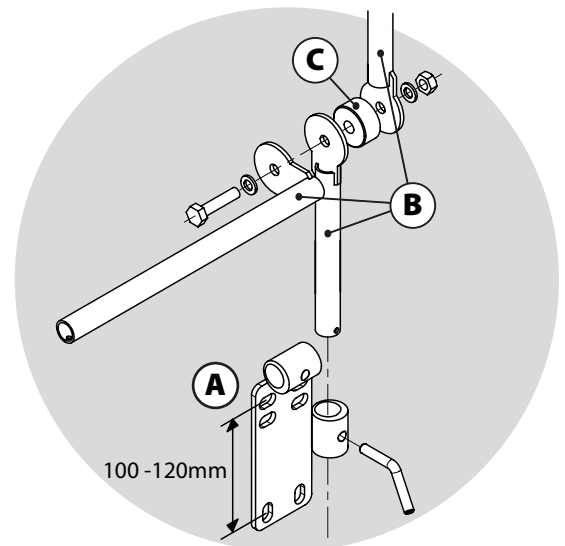
The supplied tractor pillar bracket (A) has a hole spacing of 100 and 120 mm that fits most tractors. Threaded mounting holes may be hidden behind front corner cover. Check tractor instructions manual for information regarding attachment points.

Three mounting tubes (B) are supplied. 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.

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



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



Road safety kit

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 ISO 1724. See section in "Technical specifications".

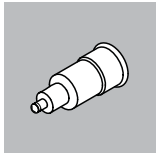
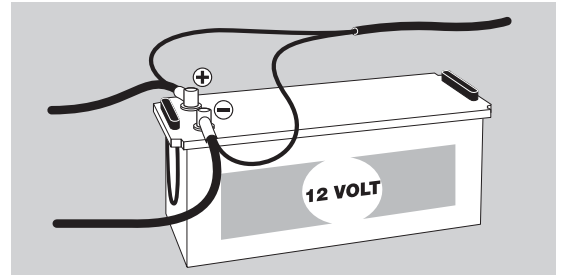


ATTENTION! Turn OFF all work lights when driving on public roads!

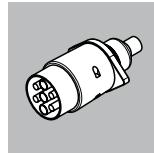
Power supply

Power requirement is 12V DC. Always note polarity! For proper function of the electric equipment, the wires must have the following recommended cross sectional areas and correct fuses to ensure a sufficient power supply. The delivered power connectors follows the standard of most newer tractors. If you have a tractor with another power connector, it is necessary to disassemble the connector and fit it to the actual tractor connector.

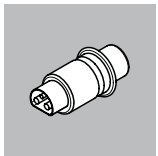
The number and the type of connectors may vary on the specific sprayer, depending on its equipment.



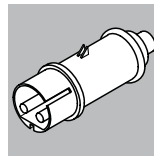
CIGAR CONNECTOR
Spray control unit requires:
Wire 2.5 mm², Fuse 10 Amp
Hydraulic control unit requires:
Wire 4.0 mm², Fuse 16 Amp



7 POLE TRAFFIC LIGHT CONNECTOR



JOBCOM CONNECTOR
The unit requires:
Wire 6.0 mm², Fuse 25 Amp



WORKING LIGHT CONNECTOR
The unit requires:
Wire 10.0 mm², Fuse 30 Amp



ISO POWER CONNECTOR



13 POLE POWER CONNECTOR

General info

Environmental info

For environmental info, please refer to the following parts in the Mistblowing Technique book:

- Spray quality.
- Fan speed
- Spraying speed.

5 - Operation

Blower unit

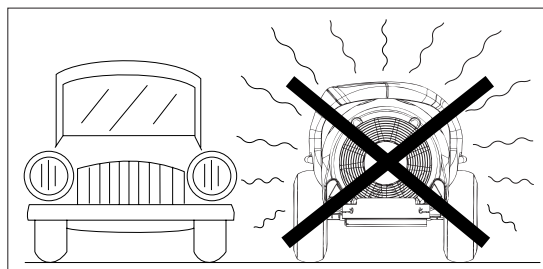
Safety information

The fan must not be in operation when driving on public roads. The nozzle opening function should never be used on public roads. Any failures could cause injury to persons and animals or damage to crops

In the event that the machine needs to be in operation (agitation) while driving along public roads until reaching the field, make sure that the gearbox speed selector is switched to neutral position.



DANGER! If any unusual noise or excessive vibration in the air kit is detected then stop the equipment immediately and have it serviced by an authorised HARDI technician.



Selecting the gear

The low or high gear can be selected using the specially designed lever.

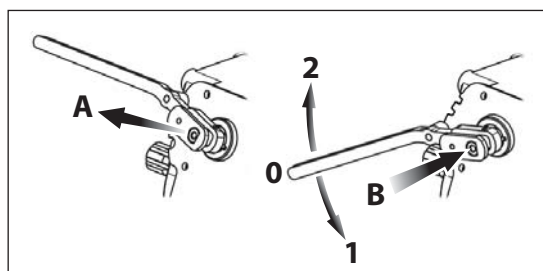
On the rear, left-hand side of the machine the selection lever is accessed between the tank and fan.

To change the speed, pull the lever outwards (A) and then move it up or down as required. Lock the lever in the selected position (at the lid)

Bottom position: 1st gear or low speed (1).

Top position: 2nd gear or high speed (2).

Centre position: Neutral (0).



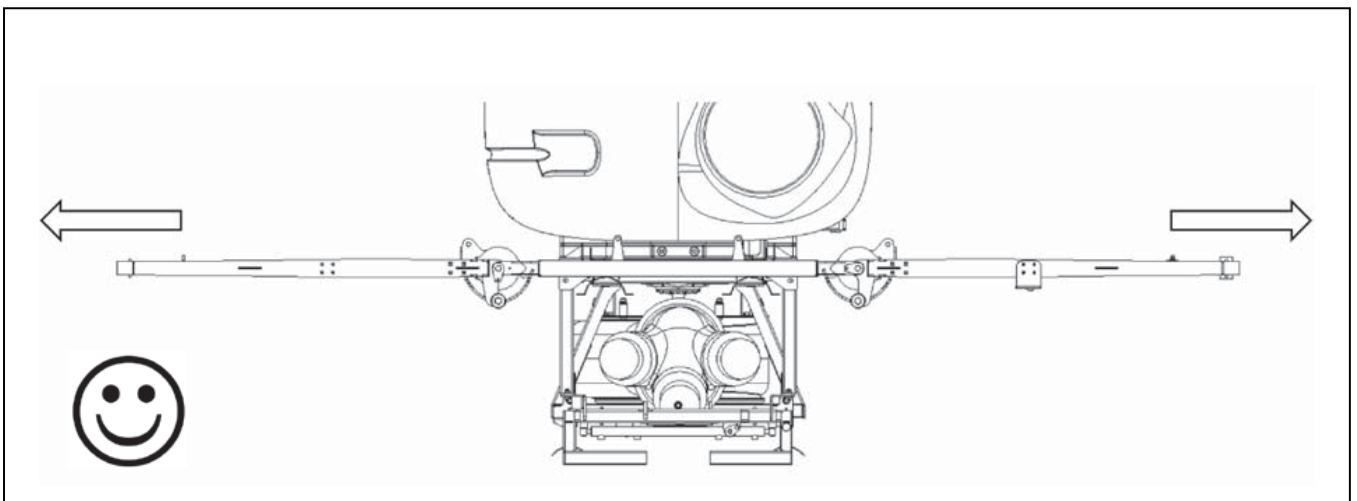
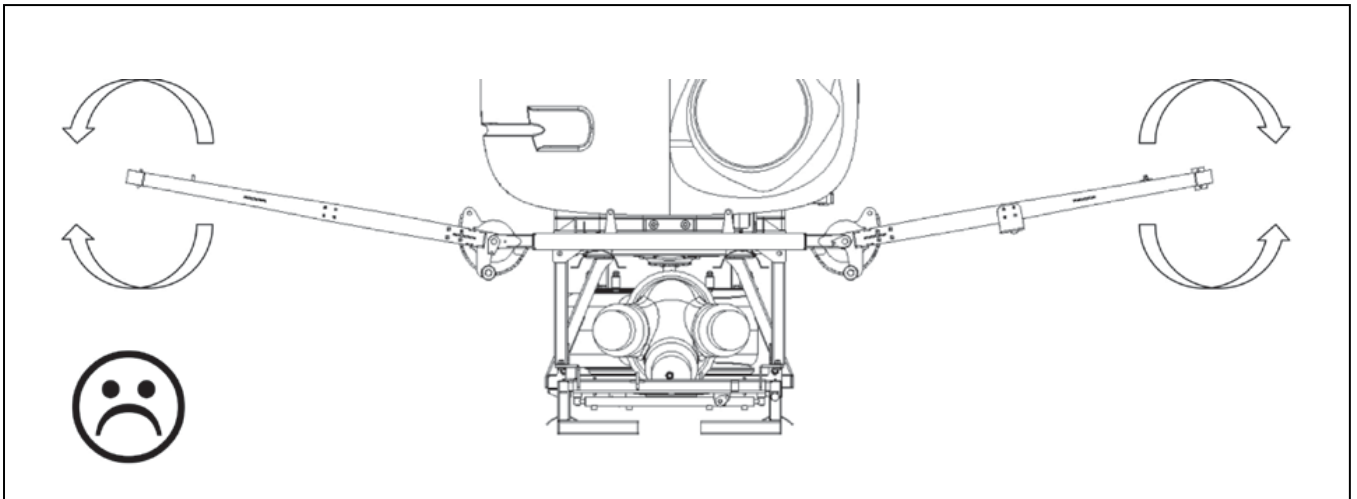
While moving the Sprayer

The booms must be 100% unfolded or resting in the transport bracket.

The boom must unfold, and stay firmly, stiff, not wobbly. If the boom is not held firmly unfolded during spraying, it will auto destroy structure due to movements, caused from lack of firm position.

See maintenance and starting up (Adjustment of hydraulic fold).

Secure folding cylinder is correctly adjusted, and eventually the stop positions / stop bolts, are adjusted correctly in order to secure that the boom stays rigid and firm while working. To reinforce, eventually a trapeze or pendulum suspension can be activated, but it can't be rigid, it must be movable and floating.



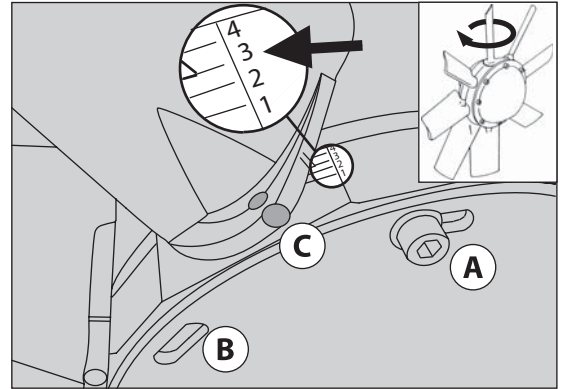
5 - Operation

Adjusting the fan A6820 and SF65/SF85

The angle of the fan blades can be adjusted to 4 positions. The factory setting is pos. 3 (40°). Decreasing the angle of the blades (minimum angle, pos. 1 (30°)), reduces the air flow and power consumption. Increasing the angle (maximum angle, pos. 4 (45°)), will increase the air flow and power consumption. It allows the mist blower to be adapted to the different spray jobs and tractor sizes.

To change the angle of the fan blades you should follow these steps::

1. Loosen the Allen screws without taking them out completely.
2. Loosen the Allen screws whilst holding the nut at the back of the fan.
3. With both hands on opposite blades, turn them to the desired position between 1 and 4. All the blades should turn at the same time.
4. Finally, check that all the blades are in the correct position.
5. Tighten all the screws.



ATTENTION! The fan must be calibrated correctly after changing the pitch setting. For technical details ask your dealer and factory.

Single side blinds (Optional)

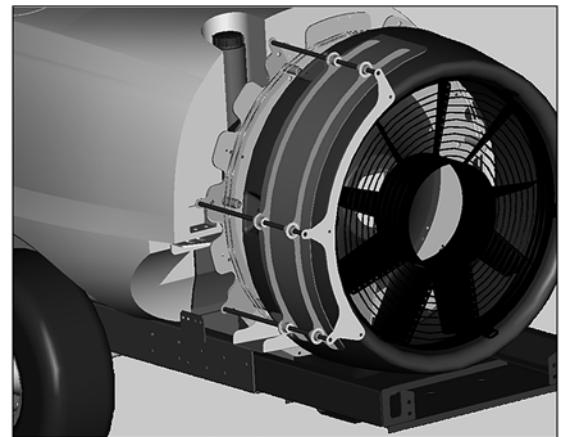
The air stream can be blocked to one side to prevent spray drift towards sensitive areas.

This is used when one section valve is shut during spraying along orchard edges, streams, open waters or other sensitive areas where spray drift must be kept away.

Loosen the nuts, slide the blind over the air outlet and tighten the nuts again.



ATTENTION! Only slide the blind of one side at the time. Never close both sides at the same time!



Fluid circuit

Filling/washing location requirements

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

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

Any spillage or washings should be retained and diluted in order to be distributed on a larger area 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 could be used. Not closer than:

- 1) 50 metres from public water supplies for drinking purposes,
 - 2) 25 metres from non-public water supplies for drinking purposes, treatment sumps and cesspools of drainage systems, and
 - 3) 50 metres from surface water (watercourses, lakes and coastal waters) and from nature reserves.
- B. 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 be established closer than:

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



ATTENTION! Legislation and requirements vary from country to country. Always follow local legislation in force at any time.



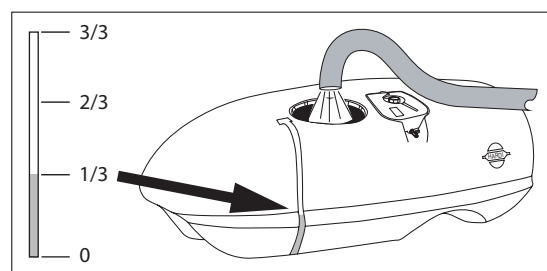
NOTE! It is the responsibility of the sprayer owner/operator to comply with all relevant legislation. HARDI cannot undertake any responsibilities for incorrect operation and use.

Filling with water

The tank should be filled to a third of its capacity with clean water before adding the chemical product. Always follow the instructions given on the product label!



WARNING! If spray liquid is left in the tank, for safety reasons all valves must be shut.



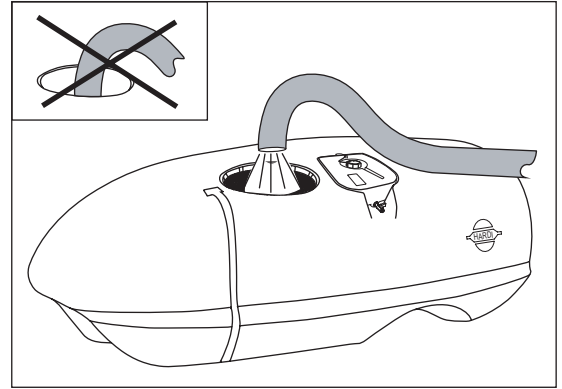
5 - Operation

Filling through tank lid

The tank is filled with water through the filling hole by removing the lid located on the top of the tank. The water used should be as clean as possible to obtain best results.

Fill the tank using the filter to prevent impurities from entering the tank.

For greater filling capacity, an overhead tank can be used.



DANGER! Do not place the filling hose inside the tank. Keep it out of the tank at all times and only point it towards the filling hole. If the pressure hose were placed inside the tank and there was a drop in water supply pressure, the chemical product could be syphoned back and contaminate the water supply lines, plant and well.



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



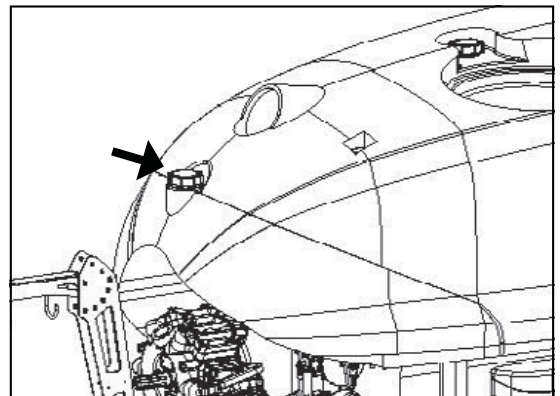
ATTENTION! The water supply should be provided with a meter to avoid spillage by over-filling. Follow local legislation in force at any time.

Filling the rinsing tank

The rinsing tank is integrated with the main tank.

Capacity: 2000 and 3000 litres main tanks

The illustration shows the location of the rinse tank.



ATTENTION! Not available on Mercury

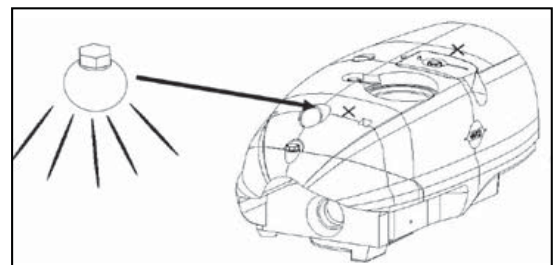


ATTENTION! Only fill rinsing tank with clean water! To avoid algae developing in the rinsing tank always drain the rinsing tank if the sprayer is not in use for a longer period of time.

Rinsing nozzle

This is located inside the main tank. When the nozzle engaged it rotates fast and spray clean water in all directions.

If the machine is fitted with a rinsing system, there are two rinsing nozzles.



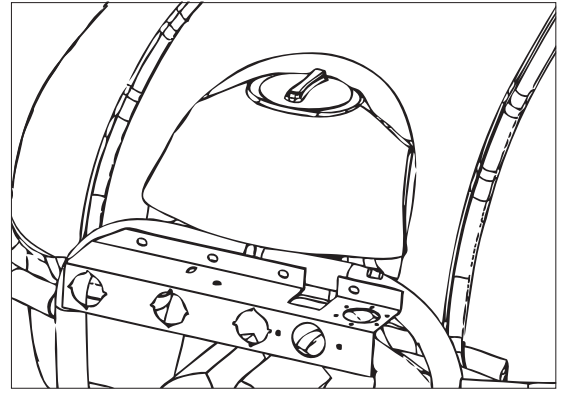
ATTENTION! Not available on Mercury

Filling the clean water tank Mercury

The clean water tank is located at the front of the tank and fitted into the top front part of the main tank. It is used for cleaning hands, gloves, nozzles, etc. after contact with chemicals.



WARNING! Although this tank is completely separate from the main tank and should only be filled with clean water, this does not mean that the water is suitable for drinking.

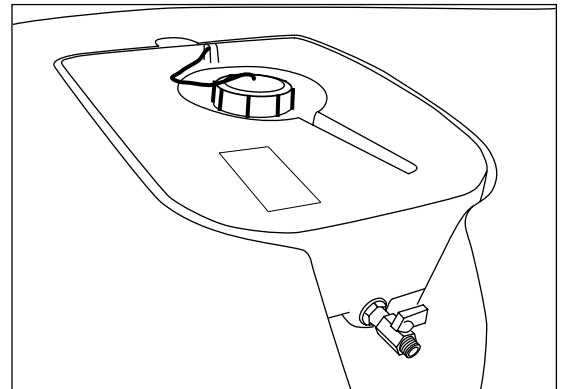


Filling the clean water tank

The clean water tank is located at the front and integrated in the main tank design. It is used for washing hands, gloves and cleaning clogged nozzles, etc.



WARNING! Although this tank is completely separate from the main tank and should only be filled with clean water, this does not mean that the water is suitable for drinking.



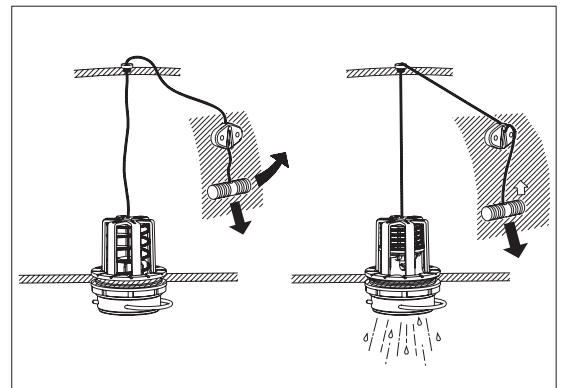
Drain valve

The valve for safe draining is located on the underneath of the tank. To access it, you must crouch on the left side of the equipment, where the jockey wheel is attached to the chassis when the equipment is hitched to the tractor.

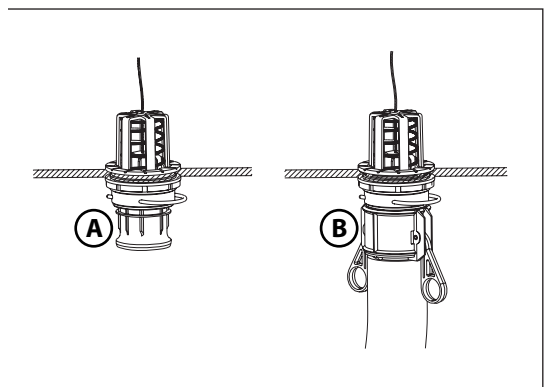
To empty the tank, pull the handle towards the valve. To fill the tank again, pull the valve handle toward the front of the equipment and it will close.



WARNING! When opening the valve, take care to ensure that the liquid does not spill over your hands or feet.



To empty the residual liquid in a special tank or container for storage, the quick release A of the drain valve can be adapted to connect a hose with the fitting B so that liquid can be emptied safely.

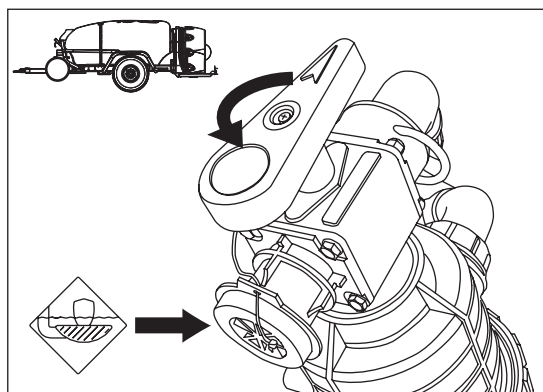


5 - Operation

Fast filling device

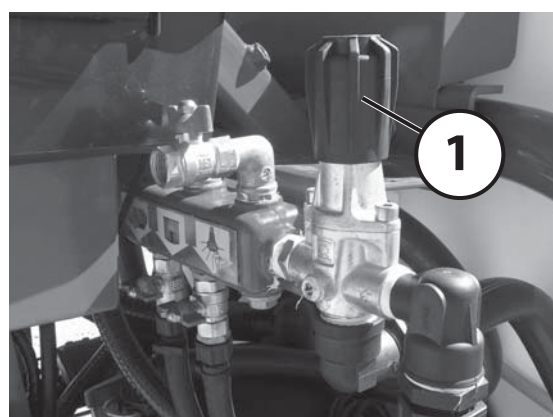
To fill the tank from an outside source, river, reservoir, etc. you must use the fast filling device.

It is connected to the 3-way valve supplied with the equipment by using a quick fitting. To load, turn the pump on at 540 r.p.m and turn the 3-way valve lever towards the position indicated in the illustration.



SV operating unit

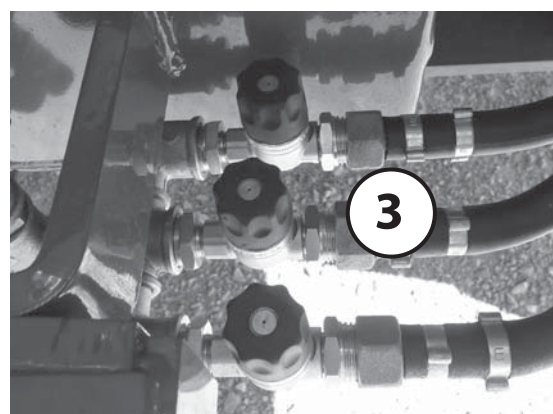
1. Manual pressure regulation, turn left for less pressure, right for higher pressure.



2. Spray pressure gauge.

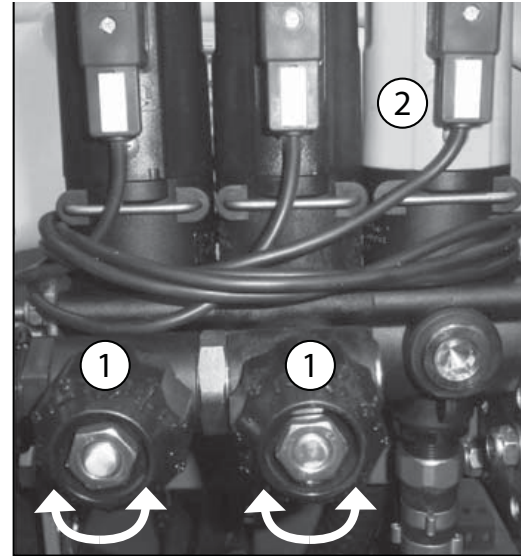


3. The section valve. No adjustment is needed.



CB operating unit

1. Pressure equalisation device on the section valve. Turn left, or right to increase or decrease the pressure change that occurs when turning the section off/on. This is done once for all. If nozzles are changed, it may require to repeat the procedure.
2. Pressure regulation, no adjustment is needed. This photo illustrates a 2 section operating unit CB2.



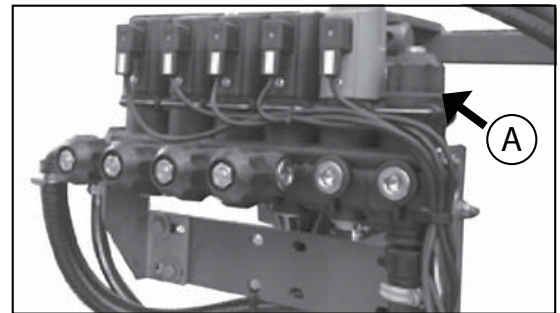
CB operating unit with bypass valve

The operating unit is used in case of low dose rates, as it is often the case in pneumatic sprayers, equipped with an additional bypass valve.

Open the valve to allow a certain quantity of flow return freely to tank. This provides a pressure drop in the system, and allows the pressure A to come very low..

Clock wise = closing

Anti-clock wise = opening



5 - Operation

Control boxes

FB 3610 (optional)

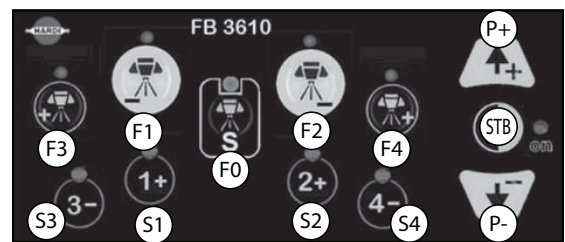
F0. Main Switch valves section

F1-F3 / F2-F4 Fluid sections: Odd on left / Even on right

S1-S2 / S3-S4. Hydraulic selectors

P+ / P- PRESSURE Regulation + & -

STB. ON / OFF



Rate controller DB3610

- Enter the screen to change L / ha – hold down 3 sec
- Exit the change L / ha - 1 touch
- Go from one menu to another - 1 touch
- SONAR activation (if any)

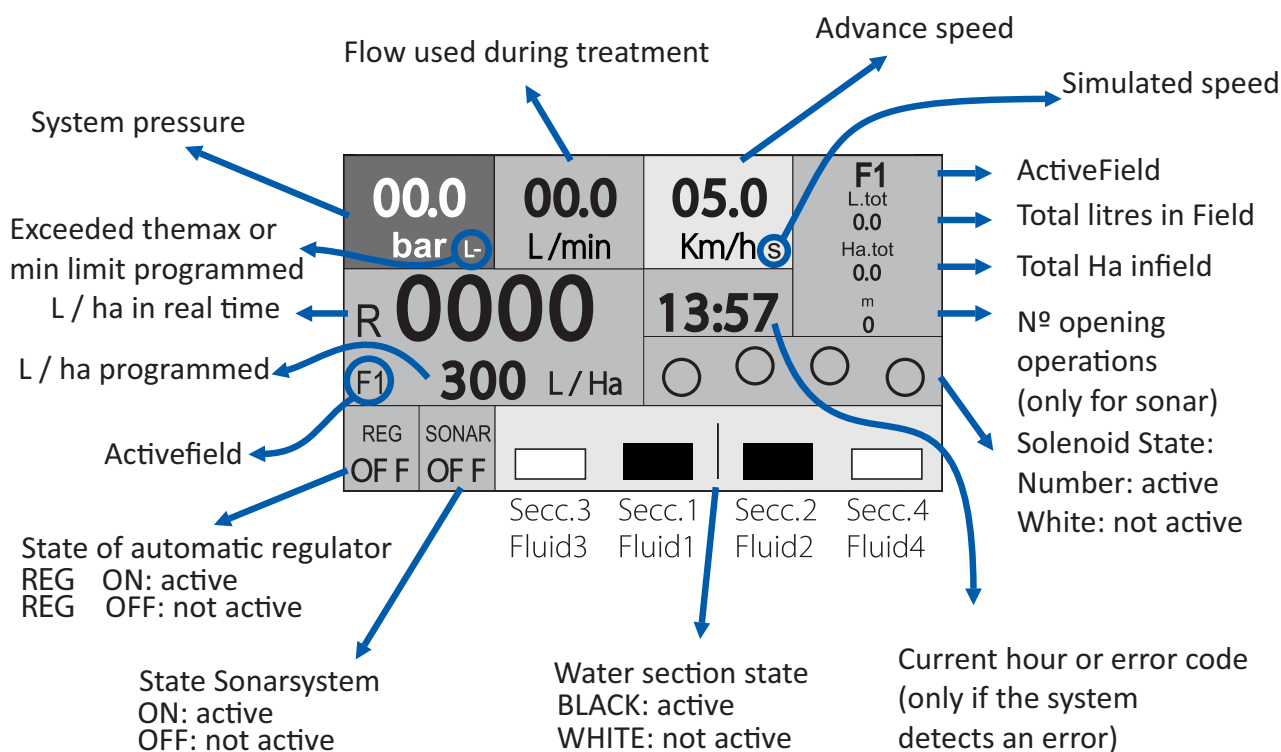
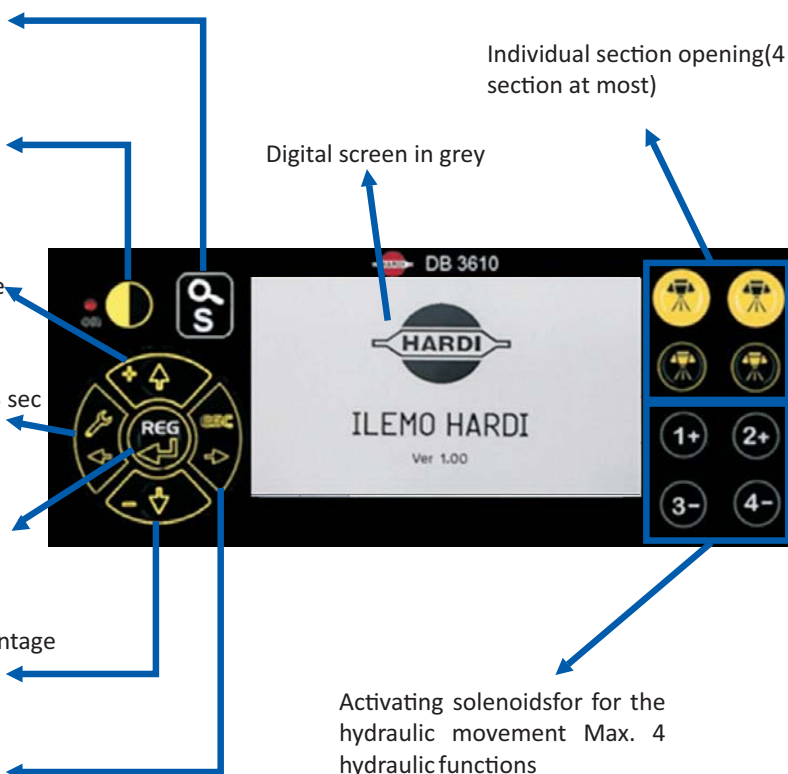
- Switch on the system - 1 touch
- Switch off the system - hold down 3 sec
- Opening and closing all sections

- With regulator REG Off-increase pressure
- With regulator REG ON- increase percentage of L / ha + 5% (up to + 20%)
- Increase value


- Accessing configuration menus – hold down 3 sec
- Exit the configuration menus - 1 touch
- Move the cursor to the left in a value
- Enable and disable the automatic regulator
- Put a value in edit mode
- Save the changes made on a value

- With regulator REG OFF-decrease pressure
- With regulator REG ON- decrease the percentage of L / ha -5% (up 20%) L / ha -5% (up 20%)
- Decrease a value



- Move the cursor to the right in one value.

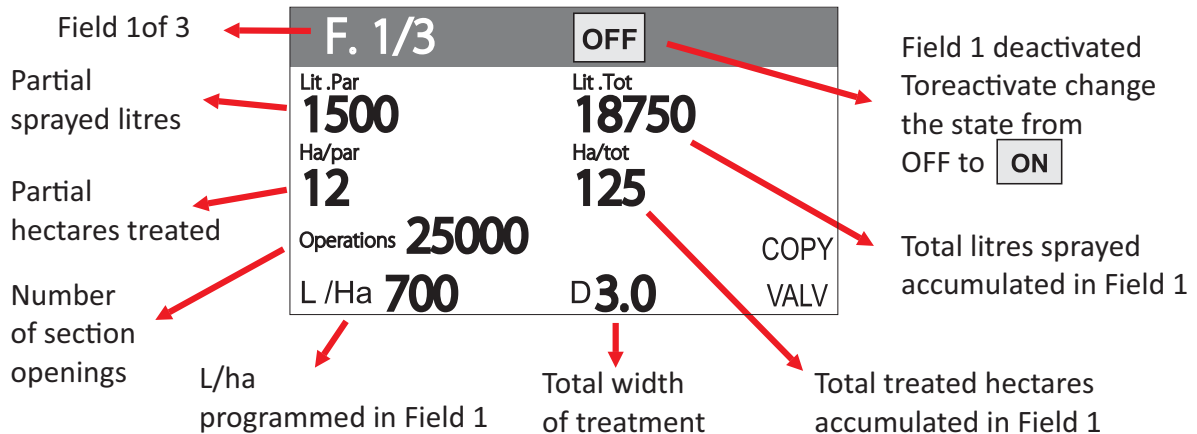










5 - Operation

Press the on / off  button (1 pulse). The system starts to load the configuration that is in the computer memory. When the charging is completed, the main screen, which is the working screen, appears.








- SPRAYING: Changing the application volume (L / ha)

To enter the litres per hectare, press  until the following screen appears. The first step is to activate the field, 1, 2 or 3, you want to change the L / ha. Press  to activate it.



Press the  button. The litres per hectare will be shown in a box. Press  to make the value of litres per hectare go into edit mode. The value is modified digit by digit. To change the value use the  or  to increase or decrease it. To switch from one number to the next one press  or . To end press  to save the new value. Finally, press  to return to the main screen.

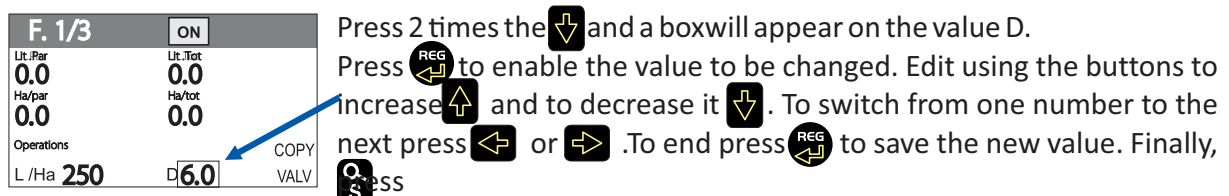
- SPRAY: Spraying with automatic regulation

To start the spray job, press the button . The state of the automatic regulator REG will change to . The pressure will increase or decrease depending on the speed. If you need to close all open water sections at a time when getting to the end of a line (represented by a black square ), it only takes one press of the button . The sections on the screen will become a white square . When you enter the new line, press again . The active sections will open again and the square will change to black .

- SPRAY: Changing the width of treatment

If you spray fields with different line widths, you must change the treatment width (represented by a D on the screen).

To change this value, press the button  and the following screen appears.



The D value is expressed in meters. It refers to the width of a complete treatment. If you spray using a bar sprayer (for vineyards), treatments could be made up to 4 complete lines. In this case, the value of D must be the result of the multiplication of the line width by the number of fully treated rows. For example: A line width of 3 m, a boom of 4 half-surfaces (2 complete lines) would be the same as multiplying $3\text{ m} \times 2 = 6$. You should introduce 6 in the D value.

The same machine in a line width of 3.5 m would be $3.5 \times 2 = 7$ m as a D value. (Continues)

A part from the treatment width, it is also necessary to indicate the system what percentage of the sprayed volume will each water section use. By doing so, when a water section is closed, the system will do the correct calculation to continue spraying the programmed dose.

To change this value follow the steps bellow:

F. 1/3		ON
Lit.Par	0.0	Lit.Tot
Ha/par	0.0	Ha/tot
Operations		
L /Ha	250	D6.0
		COPY VALV

Press **Q** for 3 seconds to enter the Fields screen (F. * / *). Press **↓** button repeatedly until a box appears on **VALV**.

Press the button to enter **REG** the valves menu. In this menu you can change the percentage of the volume used by each water section and the percentage of the total distance that treats each one.

VA2/15 Fld 1	
Lit (%)	25
d (%)	25

On the top of the menu you'll see the valve on which we will change values. In this case is the fluid **valve 1 (FLD)**, which refers to the water section 1. The value Lit(%) refers to the percentage of litres that this section will spray out of the total. To calculate the percentage is very simple, $100\% / 4 \text{ sections (one line per section)} = 25\%$ each valve. To change the value press **REG** and edit it with the arrows.

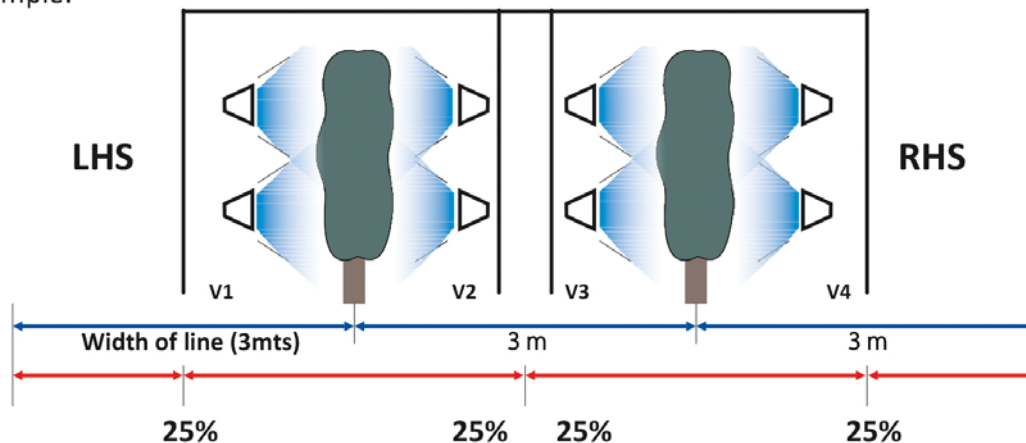
VA2/15 Fld 1	
Lit (%)	25
d (%)	25

Now you must change the percentage of the total treatment distance of each water section. If we have a line width of 3 m and treat complete lines this means you are treating 6 mts in total. As we have 4 sections of water, each section (valve) will process 25% of the total distance.

Press **REG** to change a value. Use the buttons to increase **↑** or to decrease **↓** the value. To switch from one number to the next press **←** or **→**. Finally **REG** press to save the new value. Press **→** to change the width of the fluid valve 2 (**FLD 2**) and so on with the other valves. Always remember that the valves have an order that is shown in the main screen description in the first page of this guide. **FLd 1** is always the valve on the left and closer to the machine. Valve **Fld2** is the nearest on the right, valve **Fld3** is the furthest on the left and valve **Fld4** the most distant on the right.

Percentages of litres and distance do not always coincide in all sections as in the case we have learned when programming.

For example:



To exit press **←** until the Field screen appears again and press **REG**.

5 - Operation

Cleaning

General information

In order to be able to use your mistblower for many years, a maintenance programme needs to be followed. This programme should include a comprehensive cleaning procedure.



ATTENTION! Always read the individual sections. Carefully read the maintenance task instructions before starting. If any part of these instructions is unclear, for safety reasons, please contact your HARDI dealer for further information.



ATTENTION!

A clean mistblower is a safe mistblower.

A clean mistblower is always ready for action.

Clean mistblowers are not damaged by pesticides and their solvents.

Steps to follow:

1. Fully read the chemical product's label. Take note of any special instructions regarding protective clothing, deactivating agents, etc. Read the labels on the detergents and deactivating agents. If any cleaning procedure is specified, follow it accordingly.
2. Familiarise yourself with local legislation regarding the disposal of pesticides, mandatory decontamination methods, etc. Contact the appropriate department, e.g. Department of Agriculture.
3. Pesticide washings can usually be emptied out on a soakaway or retained at a washing location (See "Filling/washing location requirements"). This must be an area not used for crop growing. You must avoid seepage or runoff of residue into watercourses, wells, springs, pools, etc. The fluid remaining after rinsing the equipment cannot be disposed of down a sewer. It must be emptied into a suitable soakaway.
4. Cleaning starts with calibration. A properly calibrated mistblower ensures a minimal amount of fluid remaining.
5. It is good practice to clean the mistblower immediately after use, leaving it safe and ready for the next spray job. This prolongs the life of the parts.
6. At times, the spray liquid may need to be left in the tank for a short time e.g. overnight or until weather is suitable for spraying. Unauthorised persons or animals should not have access the mistblower under these circumstances.
7. If the product applied is corrosive, all metal parts of the machine before and after use should be coated with a suitable rust inhibitor.

Cleaning and maintaining the filters

Clean filters ensure:

- Mistblower parts, such as the valves, diaphragms and operating units, are not blocked or damaged during use.
- Nozzles are not blocked during spraying.
- The pump has a long service life. A clogged suction filter will result in pump cavitation. The main filter that protects the mistblower parts is the suction filter. Check it regularly.

Cleaning the tank and liquid system

1. Dilute remaining spray liquid in the tank with at least 10 parts of water and spray the liquid out in the crop/orchard just sprayed.
2. Select and use the appropriate protective clothing. Select detergent suitable for cleaning and suitable deactivating agents if necessary.
3. Rinse and clean mistblower and tractor externally. Use detergent if necessary.
4. Remove tank and suction filters and clean. Be careful not to damage the mesh. Replace suction filter top. Replace filters when the sprayer is completely clean.
5. With the pump running, rinse the inside of the tank. Don't forget the tank roof. Rinse and operate all components and any equipment that have been in contact with the chemical. Before opening the distribution valves and spraying the liquid out, decide whether this should be done in the field again or on the soakaway.
6. After spraying the liquid out, stop the pump and fill at least 1/5 of the tank with clean water. Note that some chemicals require the tank to be completely filled. Add appropriate detergent and/or deactivating agent, e.g. washing soda or Triple ammonia.
7. Start the pump and operate all controls enabling the liquid to come into contact with all the components. Leave the distribution valves until last. Some detergents and deactivating agents work best if left in the tank for a short period. Check the label.
8. Drain the tank and let the pump run dry. Rinse inside of the tank, again letting the pump run dry.
9. Stop the pump. If the pesticides used have a tendency to block nozzles and filters, remove and clean them immediately.
10. Replace all the filters and nozzles and store the mistblower. If, from previous experiences, it is noted that the solvents in the pesticide are particularly aggressive, store the sprayer with the tank lid open.



ATTENTION! It is advisable to increase the forward speed (double, if possible) and reduce the pressure to 1.5 bar (20 psi) when spraying diluted remaining liquid in the field just sprayed.



ATTENTION! If a cleaning procedure is given on the chemical label, follow it closely.



ATTENTION! If the sprayer is cleaned with a high pressure cleaner, lubrication of the entire machine is recommended.

Use of rinsing tank and rinsing nozzles (Zaturn)

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



ATTENTION! If a cleaning procedure is given on the chemical label, follow it closely.

In-field diluting before cleaning

In-field diluting of remaining spray liquid residue in the spraying circuit, before cleaning the sprayer.

Rinsing the tank and liquid system:

1. Empty the sprayer as much as possible. Close the Agitation Valve (no agitation) and spray till air comes out of all nozzles.
2. Turn suction valve towards "Rinsing tank" and pressure valve towards "Spraying".
3. Engage and set the pump at approximately 300 r.p.m.
4. When 1/3 of the contents in the rinsing tank is used, turn suction valve towards "Main tank" and operate all valves on the pressure side of the system in the following order so that all hoses and components are rinsed:
 - Turn the pressure valve towards TurboFiller (if fitted) and open the TurboFiller suction valve.
 - Open TurboDeflector valve and close it again when clean water comes out of nozzles.
 - Close TurboFiller lid and squeeze the Chemical Container Cleaning grip to clean this device.
 - Open TurboFiller lid again and make sure that TurboFiller is empty.

5 - Operation

- When empty, close the TurboFiller suction valve again.
- Turn the suction valve towards "Main tank" and the pressure valve towards "Spraying" and spray the liquid in the field just sprayed.

Cleaning of Main tank:

5. Turn the suction valve towards "Rinsing tank" and the pressure valve towards "Internal Tank Rinsing". Remove the filling strainer to avoid any cleaning shadows behind it.
6. When another 1/6 of the contents in the rinsing tank is used, turn the suction valve towards "suction from Main tank".
7. Turn pressure valve towards "Spraying" and spray the liquid in the crop/orchard just sprayed.
8. Repeat point 6 - 8 one more time.



WARNING! When critical chemicals have been used, before spraying another crop/orchard sensitive to the chemical just used or a cleaning detergent is recommended, do an extra cleaning:

9. Fill the rinse tank again.
10. Fill the main tank with 500 l clean water.
11. Add the cleaning detergent to the main tank by using the TurboFiller. Follow instructions on the label of the cleaning agent.
12. Clean the whole system again.
13. To get the best cleaning effect the Self-Cleaning Filter and the Suction Filter sieves should be washed with clean water.
14. Rinse the sprayer with clean water afterwards.



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

Rinsing when main tank is not empty

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

Cleaning of the liquid system:

1. Turn suction valve towards "Rinsing tank". (Keep pressure valve in "Spraying"-position).
2. Close AgitationValve (no agitation).
3. Engage the pump and spray the water from the rinsing tank in the field until all nozzle tubes/nozzles have been flushed with clean water.
4. Disengage pump again.



ATTENTION! It is advisable to increase the forward speed (double, if possible) and reduce the pressure to 1.5 bar (20 psi) when spraying diluted remaining liquid in the field just sprayed.



ATTENTION! If the sprayer is cleaned with a high pressure cleaner, lubrication of the entire machine is recommended.

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.

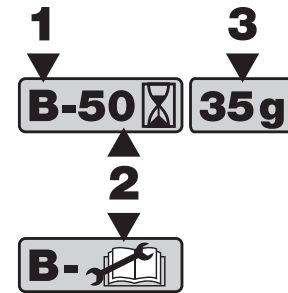
Always follow the quality and quantity recommendations. If no quantity is recommended, grease the nipple until new grease becomes visible.

Pictograms in Lubrication & Oiling Plans Designate:

1. Lubricant to be used (see "Recommended lubricants" below).
2. Recommended intervals. Shown in hours or with a symbol for occasional maintenance.
3. Amount to be used. Only shown if an amount is specified.



ATTENTION! If the sprayer has been cleaned with a high pressure washer, lubrication of the entire machine is recommended.



Recommended lubricants



BALL BEARINGS:

Universal Lithium grease, NLGI No. 2
SHELL RETINAX EP2
CASTROL LMX grease



SLIDE BEARINGS:

Lithium grease enhanced with molybdenum or grafitte disulphate
SHELL RETINAX HDM2
CASTROL MOLYMAX



OIL LUBRICATION:

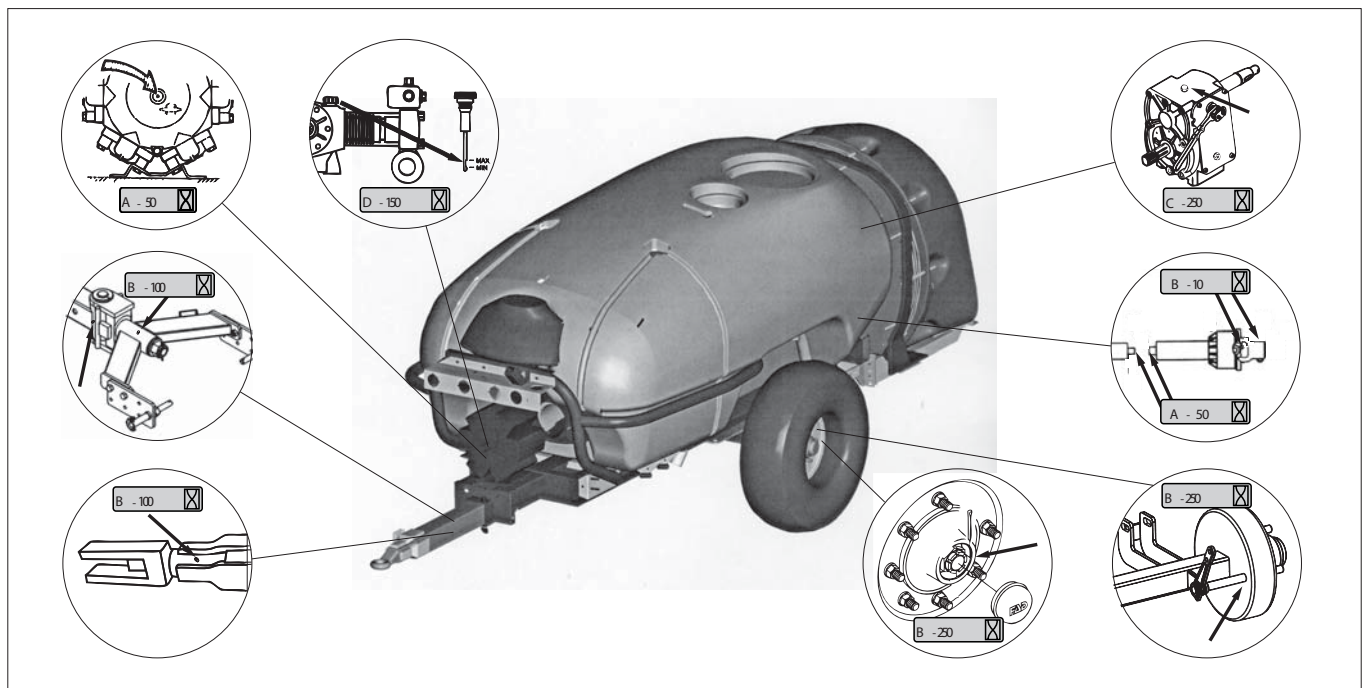
TOTAL Transmission TM
SAE 80W/90
Castrol EPX 80W/90
SHELL Spirax 80W/90
Mobil Mobilube 80W/90



OIL LUBRICATION:

SAE 30W
SAE 20W/50

Lubricating and greasing the mistblower



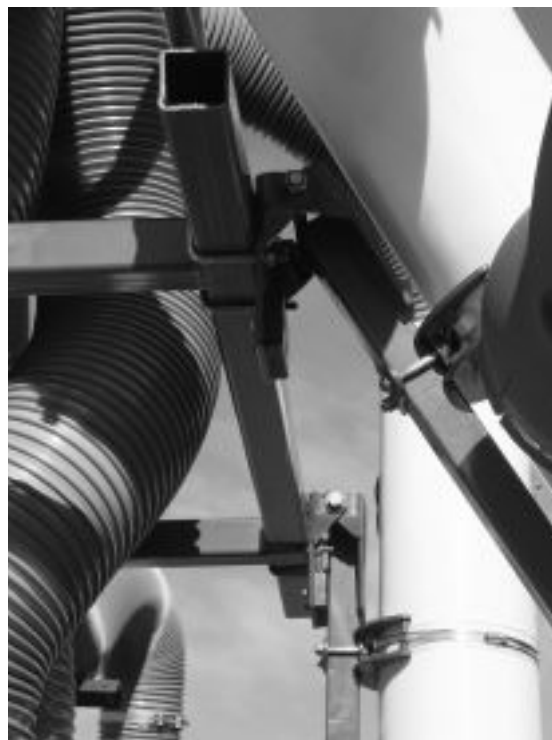
6 - Maintenance

Boom lubrication

The boom contains several points requiring lubrication as listed below. It is recommended to lubricate these points regularly to maintain boom efficiency.

Fold Cylinder Pivots

Tilt Cylinder Pivots



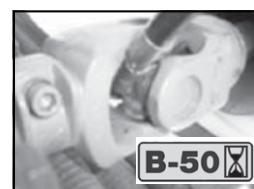
Tank transmission shaft

Loosen the two nuts on the PTO protection in ends, pumps and gear box.

Twist and pull back the protection.

Grease the yoke .

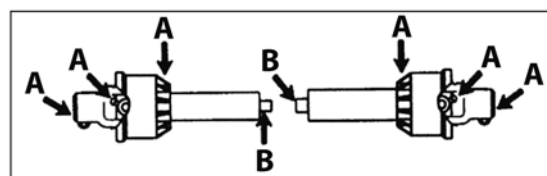
Put back both protections and tighten the nuts.



Driveshaft

The universal joints and bearings should be lubricated with grease. At points marked (A), this should be done after every 10 working hours, and the tubes and axles (B) every 50 hours.

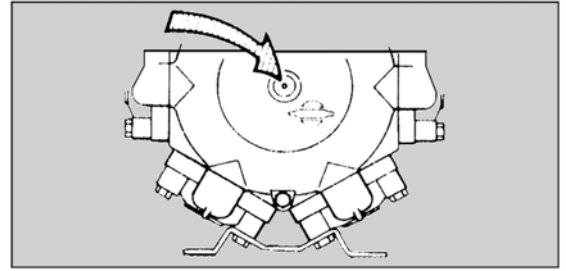
Remember to lubricate the joints of the transmission shaft between pump and fan gearbox as well.



Diaphragm pump

Grease the pump every 50 working hours or once a month, through the grease nipple situated on the crankshaft axle. The grease goes along the grooves in the crankshaft to reach the crankcase where it is distributed around bearings, conrods, etc.

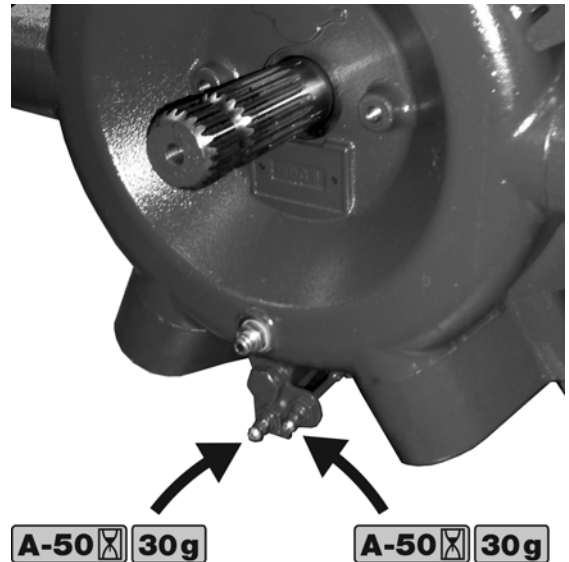
Greasing is carried out in the same way on both pump models 363 and 463.



Pump model 364 and 464 have external central grease nipples



ATTENTION! Insufficient greasing of the pump could cause it to overheat and break the moving parts inside.



Filters and fittings

Revise the filters every 50 working hours. Apart from ensuring that they are clean, make sure that the mesh is in good condition. Otherwise, the effectiveness of the filter will be nil.

Whenever dismantling any filter or hose pipe, take care not to pinch the o-rings fitted to them. When replacing the pipe fitting, smear the o-ring with oil or grease so that it falls easily into place in its groove.



ATTENTION! If the filter is not in good condition, it could cause numerous undesired stoppages during the working day, extending the working time required.



ATTENTION! Each time you remove a fitting to check the condition of its o-ring or for any other reason, remember to lubricate the seal with oil or grease to prevent it from being pinched or breaking when reassembling the fitting in its housing



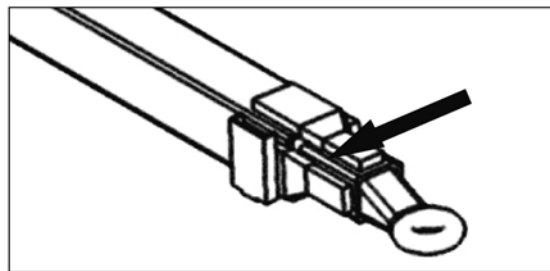
ATTENTION! Insufficient greasing of the pump could cause it to overheat and break the mobile parts inside.

6 - Maintenance

Ring drawbar

Keep the moving parts greased through the grease nipple to avoid wear and seizing up.

Also grease the contact faces of hitch ring and drawbar clevis.

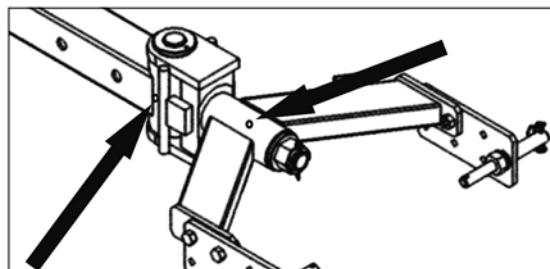


Articulated drawbar

Keep the moving parts greased through the grease nipple to avoid wear and seizing up.

In the pivoting axle of the articulated drawbar a second grease nipple is to be greased.

Also grease the moving parts between pins and lower link balls.



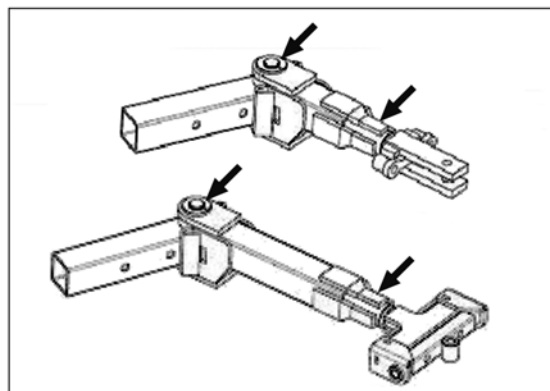
The turnable drawbars, must be greased as per every 100 hours, through indicated grease nipples.



ATTENTION! The turn stop welded to the ball prevents the equipment from performing too tight turns that could cause it to break. Do not force turns beyond this point as this may damage the drawbar parts.



DANGER! Always stop the PTO when taking very tight turns, even when using a transmission shaft with wide-angle CV joint. Tight turns with the PTO on may cause the CV or the pump crankshaft to break and cause major vibrations in the gearbox. This may lead to damages of the fan or air kit.



Service and maintenance intervals

General information

The maintenance and replacement intervals of the elements listed as follows will depend on the conditions under which the mistblower will be used, and hence are impossible to assess.



WARNING! If you do not feel confident in carrying out some of the maintenance jobs described below, then contact your HARDI dealer's workshop for assistance.

Every 10 working hours – Spray circuit

Fill the tank with clean water, activate all the functions and check for leaks using higher spray pressure than normal.

Visually check the cone of the nozzles to detect for imperfections.



After using the sprayer, hose it down; apply a thin layer of anti-corrosion oil, as described in the table reed out Suitable Lubricants



Before storing, as well clean the liquid circuit, and mix in anti-freeze liquid or as minimum sun flower oil of equivalent, see the chapters, Cleaning and storing the mistblower, for more details.

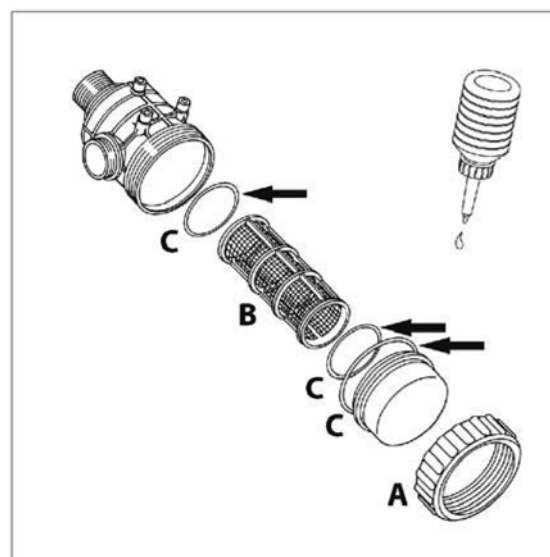
Every 10 working hours – Suction filter

To service the suction filter, proceed as follows:

1. Unscrew the nut and open the filter.
2. Remove the filter from its housing.
3. Replace the o-rings if necessary.

To reassemble it:

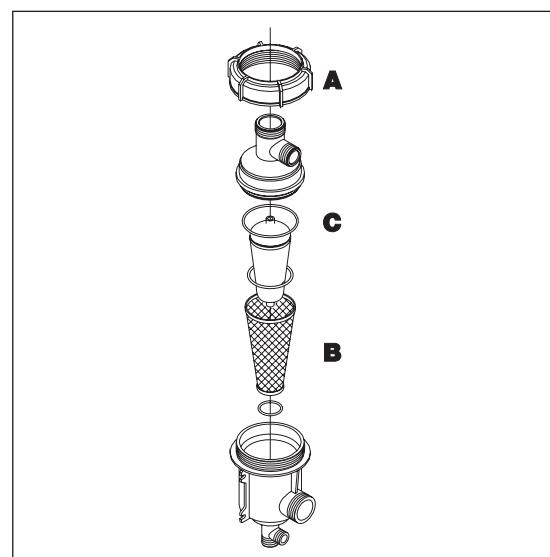
4. Grease the o-rings.
5. Fit the filter in its housing.
6. Grease the o-ring of the filter lid.
7. Refit the lid and screw it on fully.



Every 10 working hours – Pressure filters

To remove the pressure filter, unscrew the filter housing to inspect and clean the filter. When you reassemble the filter, grease the o-ring.

There are different mesh widths. See the section 'Technical specifications – Filters and nozzles'.



6 - Maintenance

10 hours service - In-Line filter (not PrimeFlow)

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.

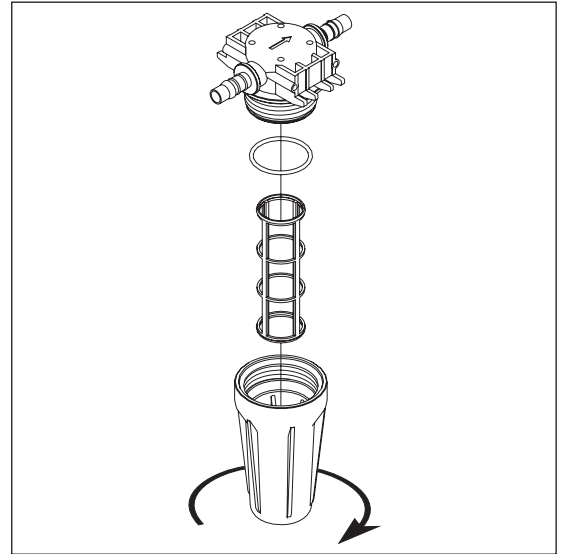
Alternative filter meshes are available. See section on Technical specifications - Filters and nozzles.



WARNING! Be careful not to splash out liquid when unscrewing the filter bowl.



WARNING! Always wear protective clothing and gloves before opening the filter!



Every 10 working hours – Nozzles

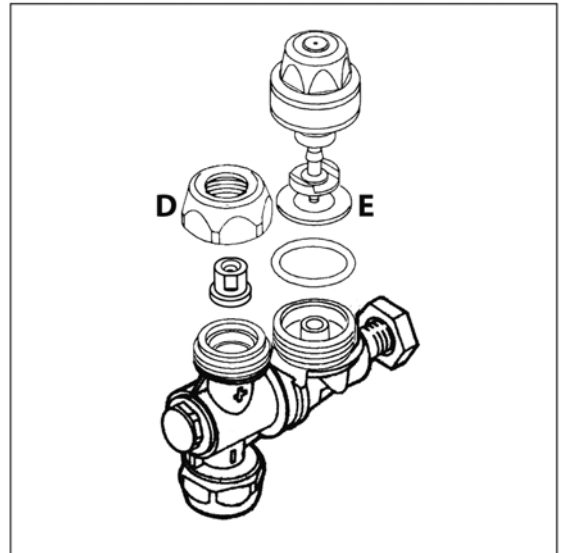
To clean or replace the nozzles, use a spanner to undo the nut (D). Remove the nozzle and clean it with air, water or a toothbrush.



ATTENTION! Never use a piece of wire or a needle as this could cause irreparable damage to the nozzle.

If any of the nozzles leak on closing the spray zone, the non-drip diaphragm should be replaced (E).

The nozzles should be replaced when their unit flow varies more than 10%. If not, the damaged nozzle could cause damage to the crop or not sufficiently treat the crop.



Every 50 working hours – Driveshaft, chassis, air pressure and diaphragm pump

Check the condition of the driveshaft protection guard. Replace any damaged parts as required.

Re-tighten the bolts of the wheels and the areas under the greatest stress or torque.

Check/adjust tyre pressure

Grease the diaphragm pump.

Every 100 working hours – Drawbar

Grease the drawbar or ball of the mistblower.

Check that the turning axles are not blocked or deformed.

Every 250 working hours – Wheels, brakes, hoses and gearbox

Check and grease the hub and the wheel braking system.

Verify the hydraulic brake.

Check all the hoses in the circuit.

Check the gearbox support and re-tighten the bolts holding it in place.

Every 1000 working hours or annual, whichever comes first – Full service

Perform a full service on all the parts described previously

Change the gearbox oil.

Dismantle and grease the transmission shaft and joints going through the main tank.

Dismantle the fan clutch and clean/lubricate.

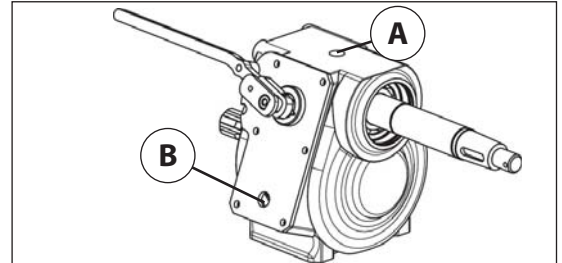
Every 1000 working hours - Gearbox oil change

Change the oil after the first 150 working hours then every 1000 working hours or once a year - which ever comes first.

Run the mistblower until the gearbox has reached normal operating temperature before draining the oil.



ATTENTION! Clean the gearbox and area around filling hole and drain plug before changing the oil



Fill with Fresh oil until the level reaches the level hole (B). See section "Recommended lubricants" for oil specification.

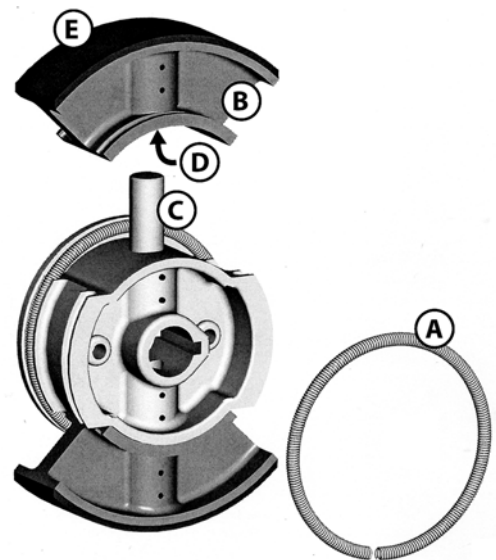
Capacity: Approximately 1.25 litres

- A. For Oil filling
- B. Oil Level indicator

Every 1000 working hours - Fan clutch inspection

Every 1000 working hours or once a year the fan clutch is dismantled for inspection, cleaning and lubrication.

1. Remove the fan clutch from the fan using the puller tool (Part No. 289659)
2. Remove the springs (A) and the two wings (B) using a mallet.
3. Polish the two axles (C) of the core with a fine emery cloth to remove dirt and rust.
4. Also polish the inside hole of the wing (D).
5. Check that the discharge hole in the ferodes (E) is not blocked.
6. Lubricate the axles of the wings and inside the core lightly with oil before re-assembling.
7. Check that the springs still work properly.
8. Re-assemble in reverse order.



WARNING! If the clutch is not maintained it may malfunction and cause severe damages to the fan unit!

6 - Maintenance

Every 1000 working hours - Fan transmission shaft inspection

Every 1000 working hours or once a year - whichever comes first - the transmission shaft between pump and gearbox is dismantled for cleaning, inspection and lubrication.

1. Remove the protection cover between pump and main tank.
2. Detach the cardan joints from the pump and gearbox shafts
3. Detach the suction and pressure hoses and the 4 bolts holding the pump. Lift the pump away.
4. Pull the transmission shaft out of the tunnel.
5. Separate the male and female part of the shaft
6. Clean the profile tubes (inside and outside) thoroughly with a degreasing fluid (Alt. petrol, white spirit or similar) and wipe them dry.
7. Inspect the cardan joints for wear - replace journal crosses if necessary.
8. Grease the cardan journal crosses.
9. Grease the profile tubes and the splined shafts of the pump and gearbox
10. Assemble again in reverse order, tighten bolts and ensure protection covers are in place



WARNING! If the transmission shaft is not cleaned and lubricated as described it will not be able to extend or retract during operation when load is applied. This may overload the bearings on pump and gearbox or cause vibrations in the transmission and fan!

Annual maintenance of tank PTO

The PTO through the tank must be kept in good and well-greased shape, to secure it telescopes.

If it does not, it will provoke destructive pressure against the pump and gear box.

A non-telescoping PTO as well might provide destructive vibrations in the spray.

Unbolt the PTO from pump and gear box.

Unbolt and take the pump out with a crane.

Take the PTO shaft out.

Pull the PTO apart in male and female parts.

Clean it well.

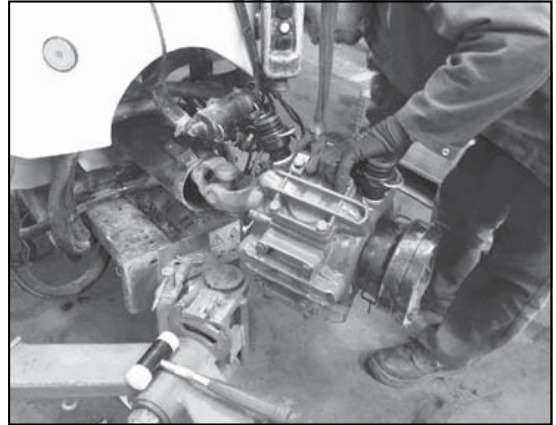
Grease it.

Grease Gearbox PTO tap and pump PTO tap.

Put back in the PTO shaft and bolt on the gear box tap.

Put back the pump with a crane and bolt it to the chassis.

Bolt on the PTO to the pump.



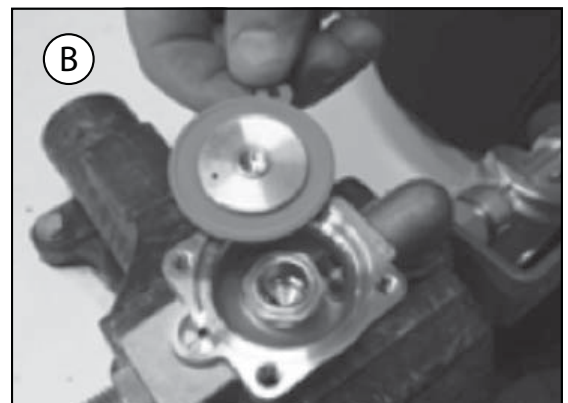
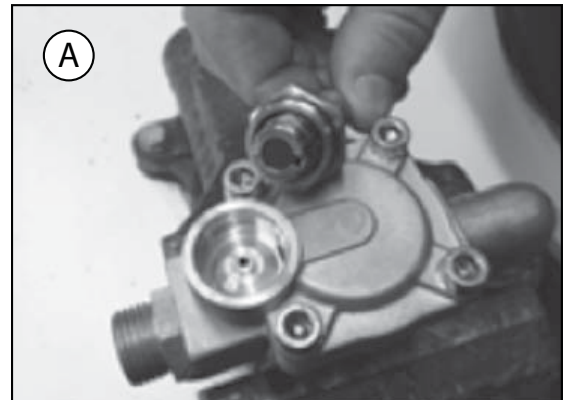
WARNING! If the transmission shaft is not cleaned and lubricated as described it will not be able to extend or retract during operation when load is applied. This may overload the bearings on pump and gearbox or cause vibrations in the transmission and fan!

6 - Maintenance

Occasional maintenance

SV operating unit

The SV operating unit open and close via a pilot line as in picture A, a small piston activated by the solenoid , opens up a small hole, hereinafter the liquid pressure opens op the larger diaphragm B in the valve, and allows the liquid to flow to the nozzles. The pilot line can block due to sedimentation of chemicals. Unscrew the 4 Allen bolt, lift up the piston as in picture A, rinse out and reassemble.

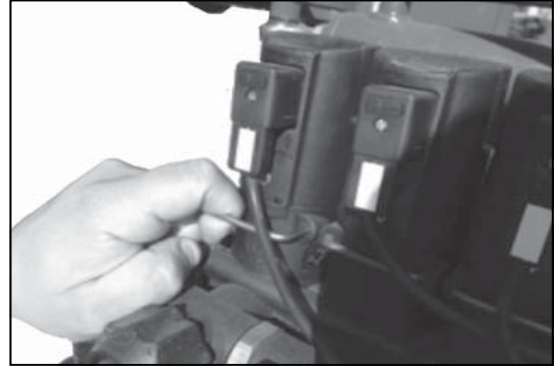


CB Section valve

The CB operating motor valve, is fitted with an end stop, a micro switch. It can be worn out, if that is the case; the electrical supply is not cut by the micro switch. Therefore the motor keep turning unlimited.

It will burn the fuse.

Pull out the clip as illustrated, lift gently up the gear motor; replace the micro switch as illustrated in the picture showing the gear motor end



Sealing in the operating unit.

Wear and tear parts in the on/off function of the valve, need to be replaced if the nozzle keeps on spraying weakly after closing a section or the main valve.



6 - Maintenance

Apply thread sealant on the seat and screw it on the end of by-pass hole up to beat. Use the socket wrench. Do not exceed with torque.

Apply the thread sealant on sleeve assembly, and tighten on valve body up to beat using the wrench.

Tighten up to beat the stud B on the seat forcing lightly to obtain a tighten connection.

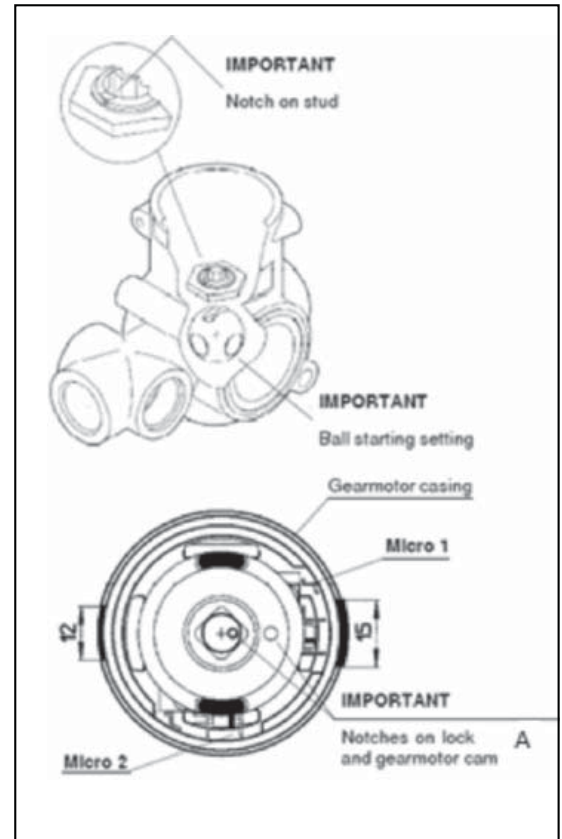
Insert spring and lock into sleeve

Apply some lubricant inside handle. Place sealant at the end of stud B thread and screw on handle C up to overlap the last notch on valve body.

Screw on and lock up to beat the nut holding the handle while tightening.



WARNING! To operate the gear motor unit 1, install 1.25A fuse on 12Vdc line.



The mark on lock A and gear motor cam must be aligned as illustrated. These marks are referred to notch on gear motor crankcase. To obtain the correct position, connect the brown cable to + pole of battery and the blue one to - pole.

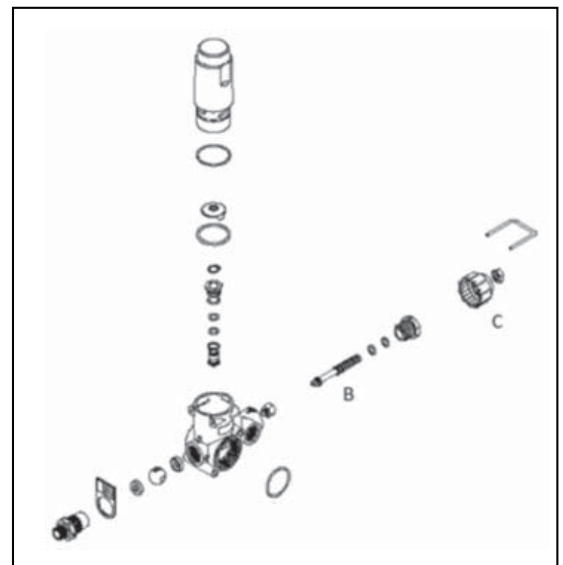
Lubricate the gear motor crankcase and O Rings. Insert the gear motor unit inside the valve body. The gear motor cap must beat on valve body.

Assemble the lock.

Assemble all accessories and connect wiring.



ATTENTION! Brown cable to + pole to obtain this position



Cleaning the air kit



ATTENTION! Never access area or adjust deflector or any other part near the air kit, while tractor is started.



ATTENTION! Cleaning of air kit: to prevent unbalance that can cause danger destructive vibrations with dangerous outcome for surroundings.

Inspect for dust and or dirt sedimentation in the air kit.

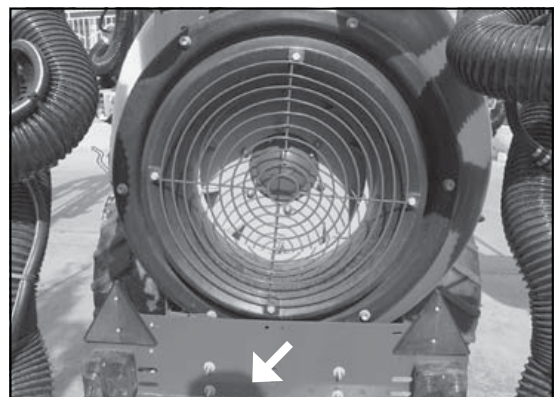
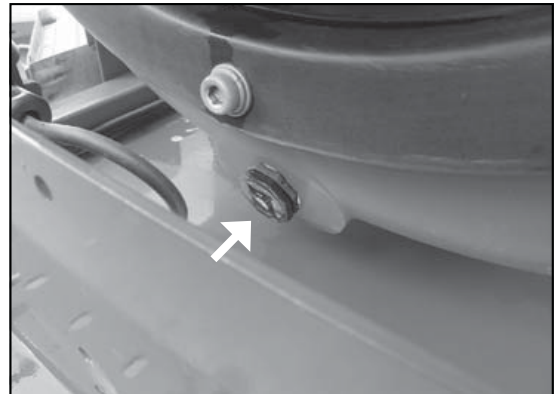
Hose out the air kit occasionally to prevent dust sedimentation to build up. If it built up, and drop of in uneven locations, it creates unbalance in the air kit, and destroys drive line and the air kit itself.

Rinse the fan blade and inner fan house wall and back end of the air kit. The axial air is designed with natural drain that will let the water out on left and right side.



ATTENTION! Do not rinse with high pressure on sealing, as e.g. in the centrifugal clutch area, see separate chapter for clutch maintenance.

The turbine air kit is fitted with a drain plug that must be removed when rinsing out the dust and other dirt sedimentation from the turbine.

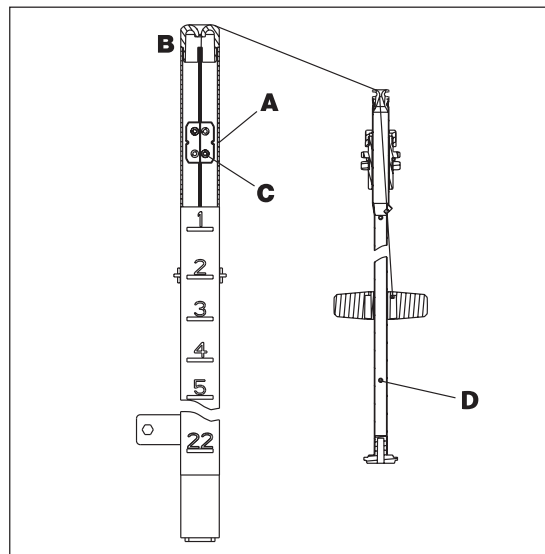


6 - Maintenance

Tank level indicator adjustment

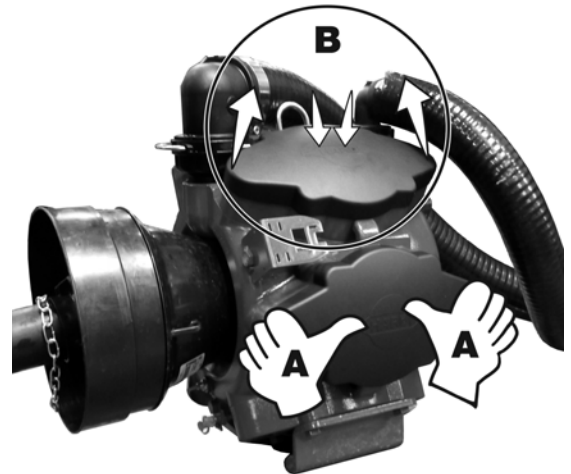
The level indicator reading should be checked regularly. When the tank is empty, the float should lie on the stop pin, of the rod, and the O-ring on the indicator should be positioned at the top position line (A).

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



364/464 Pump Valves and Diaphragms Renewal

1. Lift off the plastic covers (C) with your hands (A) by pulling with the finger tips while pushing with the thumbs in the centre, as shown in (B).

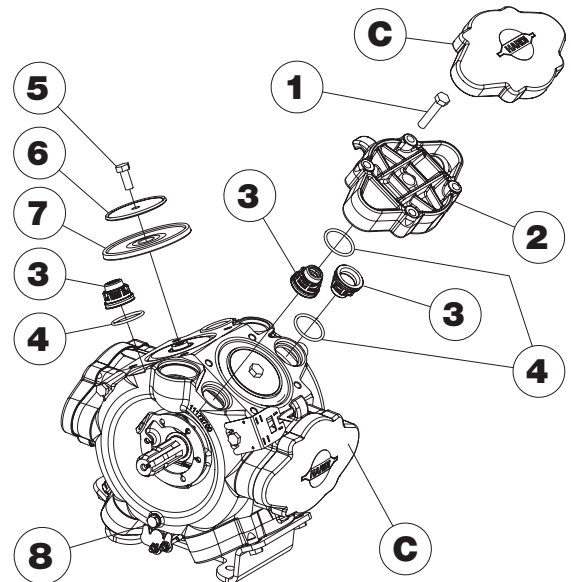


Valves

2. Loosen the 4 head bolts (1).
3. Remove the head (2).
4. Change the valves (3) - note their orientation, so that they are replaced correctly!



ATTENTION! It is recommended to use new gaskets (4), when changing or checking the valves.



Diaphragms

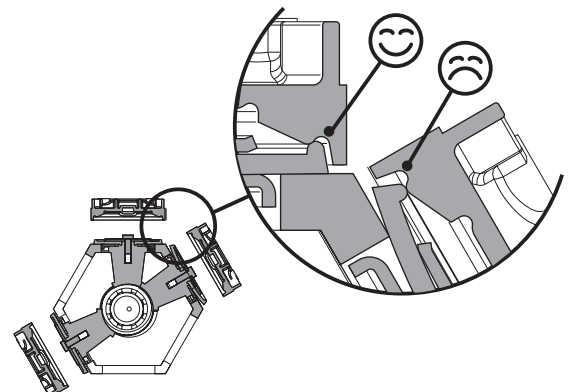
5. Loosen the diaphragm bolt (5).
6. Remove the diaphragm washer (6).
7. The diaphragm (7) may then be changed.
8. Check that the drain hole (8) at the bottom of the pump is not blocked.
9. Apply a small amount of pump grease on the underside of the diaphragms (between diaphragm and conrod washer).
10. 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 r.p.m. pumps must be secured with 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 crank shaft if necessary.



6 - Maintenance

Re-lubrication after assembly

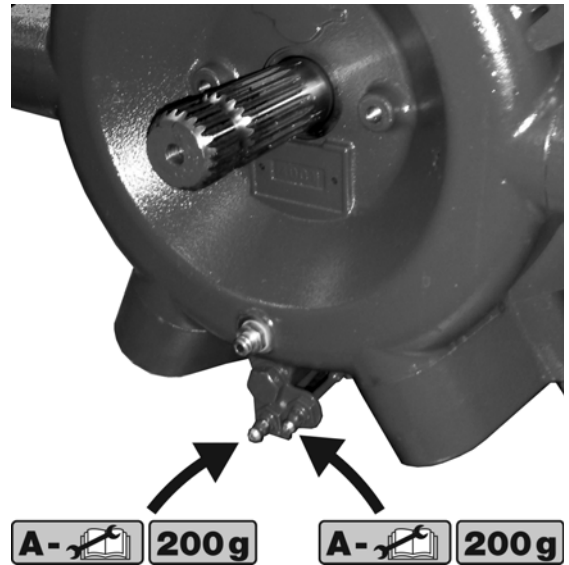
After disassembling the pump (diaphragm renewal, etc.) the pump **MUST** be lubricated with 200 g grease into each lubrication point. Hardi pump grease cartridge (400g): Item no. 28164600

Overhaul Kit

Pump model: 364 and 464.

Diaphragm pump overhaul kit (valves, seals, diaphragms etc.) can be ordered. Detect the pump model - the overhaul kit can be ordered by your local dealer.

Model 364: Item no. 75585900. Model 464: Item no. 75586000.



Replacing the seal on the drain valve

If the drain valve leaks, the seal and the seat can be replaced as follows:

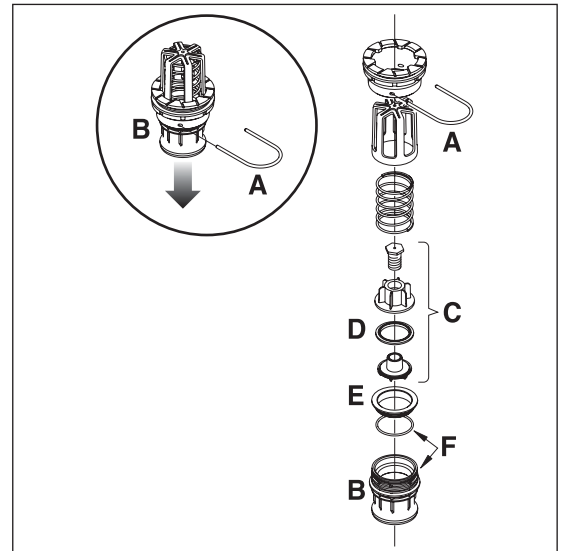
1. Make sure that the tank is empty and clean.
2. The valve must be closed and the lever loose.
3. Remove the U-clip A and pull the connection part B. Now the whole valve can be removed.
4. Check the condition and wear of the cord and the valve C, replace the seal D and reassemble.
5. Grease all o-rings F before assembling.
6. Fit the U-clip A again.



DANGER! Do not enter the tank – the parts can be replaced from outside the tank!



WARNING! Use a protective face mask when disassembling the drain valve!

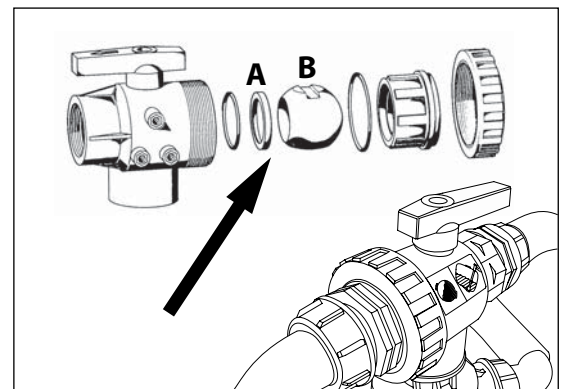


Adjusting the 3-way valve

The 3-way valve can be adjusted if it is too tight or too loose (liquid loss). It is correctly adjusted when the valve handle can be turned using one hand only.

To ease operation clean the mating faces between ball (B) and the seat (A) of the valve.

Grease the valve every time you dismantle it for cleaning. This will extend the service life of ball and seat.

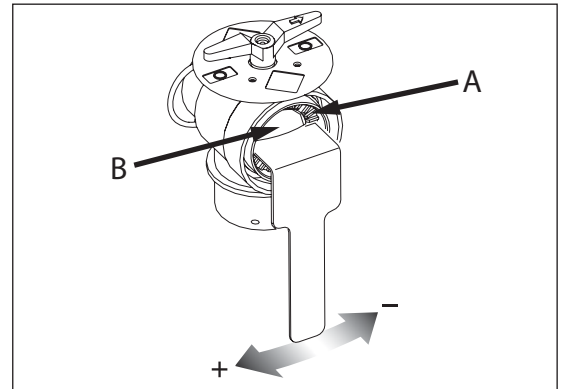


Adjusting the MANIFOLD valve

The MANIFOLD valve can be adjusted if it is too stiff or too loose (loss of fluid) when turning. The valve is adjusted correctly when the valve lever can be turned easily with one hand.

To aid turning of the lever, keep the area between the ball (B) and the seat (A) of the valve clean.

Grease the valve each time it is removed for cleaning. This will extend the life of the seat and the ball.

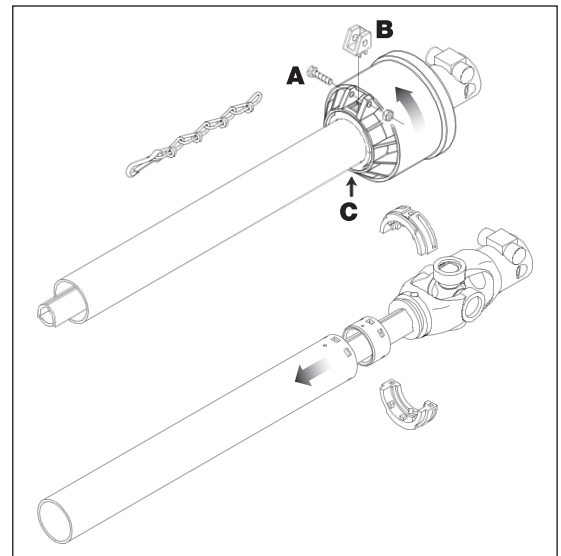


Replacing the transmission shaft protection guard

1. Remove the screw (A), cap (B) and grease nipple (C): Twist the cover a quarter of a turn and pull it back.
2. Remove the synthetic bearings and the protection guard.
3. Remove the inner bush from the protection guard.
4. Re-assemble in the reverse order, using new parts if necessary. Remember to assemble the chains again.
5. Grease the bearings.

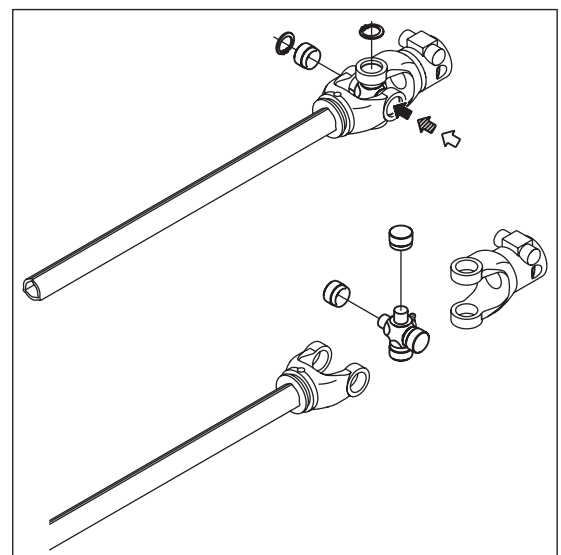


ATTENTION! Only use original HARDI parts to repair the driveshaft.



Replacing the transmission shaft cross journals

1. Remove the protection guard as described previously.
2. Remove the Seger rings.
3. Press the crossheads to one side (use a hammer and mandrel if necessary).
4. Remove the crosshead bearings and then remove the crosshead.
5. Remove the bearings from the new crosshead carefully and then install it. Before fitting the bearings again, check that the unit is assembled correctly. Protect the new bearings from dirt and dust.



6 - Maintenance

Storing the mistblower at the end of the season

When the spraying season is over, you should devote some extra time on the machine before storing it. If any chemical residues are left on the mistblower for a long period, it can reduce the service life of the components. To keep the mistblower intact and protect the components, you should perform the tasks as part of an off-season storage programme.

1. Clean the mistblower completely inside and out, as described in 'Cleaning the mistblower'. Make sure that all the valves, hoses and auxiliary equipment have been washed with detergent and rinsed with clean water afterwards, to ensure that no traces of chemical products are left on the mistblower.
2. Replace the o-rings and repair any possible leaks.
3. Empty the mistblower completely and let the pump work for five minutes. Open all the valves to drain as much water as possible from the circuit.
4. Pour approximately 50 litres of anti-freeze mixture in the tank (1/3 anti-freeze and 2/3 water).
5. Start the pump and operate the controls of the 3-way valves, operating unit, etc. so that the anti-freeze is distributed throughout the entire circuit. Open the main ON/OFF valve and the distribution valves so that the anti-freeze is delivered through the nozzles also. The anti-freeze prevents the o-rings, seals, diaphragms, etc. from drying out.
6. Lubricate all the lubrication points according to the lubrication scheme. Disregard the normal lubrication intervals in this case.
7. When the mistblower is dry, remove the rust from any possible scratches or marks in the paint, and touch up the paintwork.
8. Remove the pressure gauge and store it in a vertical position in a frost-free location.
9. Apply a thin layer of anti-corrosion oil (e.g. SHELL ENSIS FLUID, CASTROL RUSTILLO or similar) to all metal parts. Do not apply to hoses or rubber parts.
10. All the electric plugs and sockets must be kept in plastic bags to protect them from damp, dirt and rust.
11. Remove the control box from the tractor (if fitted), and store it in a clean, dry place (in-house).
12. To protect the mistblower against dust, it can be covered with a tarpaulin. Make sure that it is ventilated to prevent condensation.

Preparing the machine for use after storage

After storage, the machine should be prepared for safely starting work at the beginning of the season. To start up the machine correctly, proceed as follows:

1. Remove the tarpaulin protecting the machine if there is one.
2. Fit the pressure gauge again. Replace the old Telfon tape.
3. Connect the equipment to the tractor, including electric wires and hydraulic cables.
4. Check the brake.
5. Empty the tank of any remaining anti-freeze.
6. Rinse out the entire fluid circuit with clean water.
7. Fill the tank with clean water and check all functions.
8. If the outer section is too high when folded. Loosen nut **E** and turn nut **F** one turn clockwise, loosen nut **I** and turn **J** one turn counter clockwise. Work has to be done evenly on nut **F** and **J** otherwise it will change the vertical adjustment.
9. Fold the outer wing again to see how it fits on the inner section brackets. if necessary unfold the wing again and adjust.
10. When the outer section sits perfect on the brackets. The bolt joints nuts needs to be tightened very hard use a spanner with 1m extension.

Operational problems

General info

Operational incidents are frequently due to the same reasons:

1. A suction leak reduces the pump pressure and may interrupt suction completely, it also causes pulsing in the pressure hoses.
2. A clogged suction filter may damage suction or interrupt and prevent the pump from running normally.
3. A clogged pressure filter increases pressure in the fluid system in front of the pressure filter. This may blow the safety valve.
4. Clogged In-line or nozzle filters increase pressure in the pressure gauge but decrease pressure at the nozzles.
5. Impurities sucked by the pump may prevent the valves from closing correctly, thus reducing the pump flow.
6. A poor reassembly of the pump elements, especially the diaphragm covers, causes air leaks and reduces the pump flow.
7. Rusted or dirty hydraulic components cause bad connections.
8. A badly charged or faulty battery causes failures and misbehaviour in the electrical system.

Therefore ALWAYS check

1. Suction and pressure filters, as well as nozzles, are clean.
2. Hoses for leaks and cracks, paying particular attention to suction hoses.
3. Gaskets and O-rings are present and in good condition.
4. Pressure gauge is in good working order. Dosage accuracy depends on it.
5. Operating unit functions properly. Use clean water to check.
6. Hydraulic components are clean.
7. The good condition of the tractor battery and its connectors.

7 - Fault finding

Fluid circuit

FAULT	PROBABLE CAUSE	POSSIBLE SOLUTION
On activating, the system doesn't spray	Air in the suction line.	Check the suction filter o-ring. Check the suction tube and fittings. Check the assembly of the pump crankcase covers and diaphragms.
	Air in the system.	Prime the pump by filling the hose with water
	Suction or pressure filters blocked.	Clean the filters Check the suction fitting and make sure that it is not too close to the outlet on the tank floor.
Loss of pressure	Incorrect assembly	The safety valve's spring is damaged.
		The suction fitting is blocked
		The suction filter is clogged
	Pump valves clogged or worn	Check for obstructions and wear
Pressure jumps	Defective pressure gauge	Check for dirt in the intake
	Filters clogged	Clean the filters. Clean with clean water. If powdered product is being used, check that agitation is on.
	Worn nozzles	Check that the air flow does not exceed 10%.
	Tank suction clogged	Check the suction tube
	Air suction	Reduce revolutions in the PTO
Increase in pressure	Pressure filters blocked	Clean the filters
Foam formed	Air in the circuit	Check the o-rings, gaskets, hoses and suction fittings
	Excessive agitation.	Reduce revolutions in the PTO
		Check the voltage of the safety valve of the self-cleaning filter
		Make sure that there is return to the tank Use anti-foaming agent
Leak of pump liquid	Diaphragms damaged	Replace
The operating unit does not work	Fuse blown	Check the limit switches. Oil with lubricant if the limit switch does not make proper contact.
	Incorrect polarity	Control box: Red - pos (+) Black - neg (-). Solenoid valves: Brown - pos (+), Blue - neg. (-).
	The valves do not close correctly.	Check for obstructions in the valves
		Check the limit switches
	No power	Incorrect polarity. Brown is pos. (+), Blue is neg. (-) Check the electric board Check that the fuse box makes contact with the bracket.

Blower unit

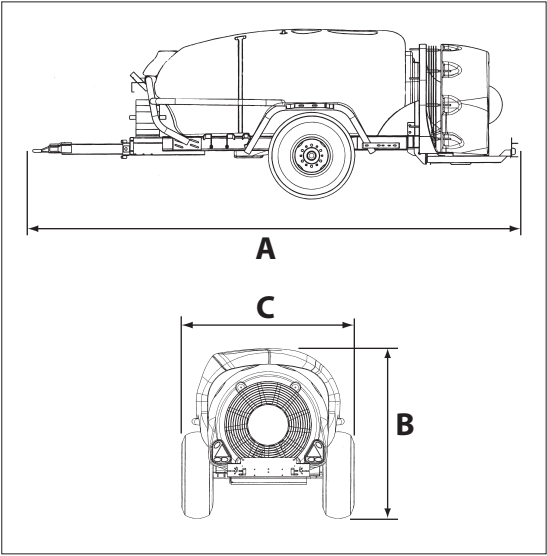
FAULT	PROBABLE CAUSE	POSSIBLE SOLUTION
Excessive noise or vibrations in the blower unit	The fan is incorrectly counterbalanced	Balance the fan again
	The nuts that hold the air kit are loose.	Tighten the nuts.
	The clutch pads are broken or worn.	Change the pads and the clutch springs or replace the clutch for a new one
Vibrations or noises in the gearbox	The gear is not properly engaged.	Move the gear lever to the correct position
	Worn gears	Replace the gears
	Oil level below minimum	Fill to the correct level and check for possible internal damage

AXIAL dimensions and weight

Dimensions

Model	Measurements AxBxC (cm)
Zaturn 2000 DUO T /AG820	4300x2500x1500
Zaturn Plus 3000	
Mercury 2300 SF65	4600x1900x1650
Mercury 4000 SF85	4850x2050x1900

Measurement 'A' for sprayer fitted with ring drawbar



Tare weight

Model	Weight (kg)
Zaturn 2000 DUO T /AG820	1025
Zaturn Plus 3000	1140
Mercury 2300 SF65	850
Mercury 4000 SF85	870

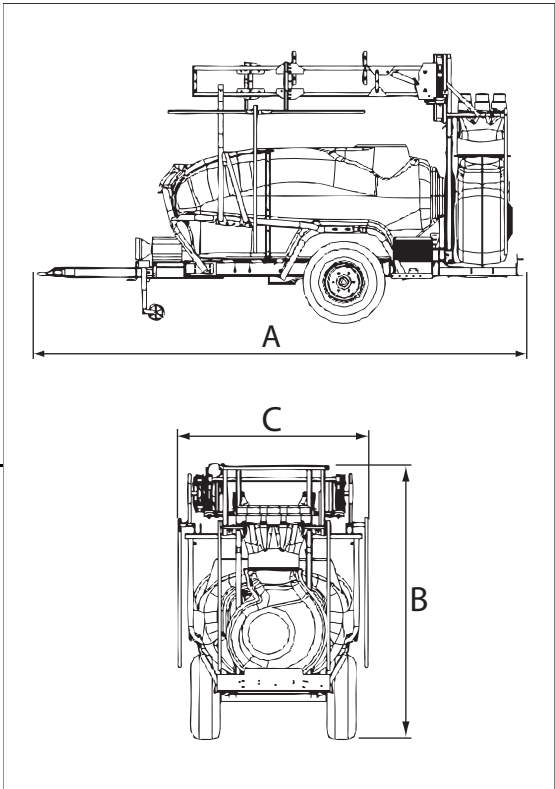
8 - Technical specifications

TURBINE dimensions and weight

Dimensions

Model	Measurements A x B x C (cm)
Zaturn 2000 plus Covamax	
Zaturn 3000 Covamax	4800x3800x2600
Mercury 4000 Covamax	

Measurement 'A' for sprayer fitted with ring drawbar



Tare weight

Model	Weight (kg)
Zaturn 2000 plus Covamax	
Zaturn 3000 Covamax	
Mercury 4000 Covamax	

8 - Technical specifications

Conversion factors (SI to Imperial)


All units used in this instruction book are SI. In some cases, imperial units are used. Use these factors to convert between SI and Imperial units:

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

8 - Technical specifications

Specifications

Pump Model 464/10.0

HARDI		HARDI INTERNATIONAL A/S TAASTRUP DENMARK	
Type 464/10		 r/min.max. 700	
No.			
r/min.	l/min.	bar	kW
540	280	0	1.8
540	259	max.15	8.3

9769500

Filters and nozzles

Filter mesh width

30 mesh: 0.58 mm

50 mesh: 0.30 mm

80 mesh: 0.18 mm

100 mesh: 0.15 mm

Temperature and pressure range

Working temperature range: 2° – 40° C. (36°F – 104°F)

Pressure that activates the safety valve: 20 bar in HLC Maximum pressure in the pressure valve: 20 bar in HLC Maximum pressure in the suction valve: 7 bar

8 - Technical specifications

Materials and recycling

Disposal of the sprayer

When the mistblower has reached the end of its useful working life, it must be thoroughly cleaned. The tank, hoses and synthetic fittings can be incinerated in an authorised disposal depot. The metal parts can be scrapped. Always comply with existing local regulations.

Materials used:

Tank: MDPE

Hoses: EPDM

Valves: mainly PA+FG.

Fittings: PA+FG.

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Spare parts

To see updated spare part information the website www.agroparts.com can be visited. Here all parts information can be accessed when free registration has been made.



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