GLOBAL NAVIGATOR

Instruction book

67000104 - Version 1.00

HAU - 03.2008

www.hardi.com.au

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.

As this instruction book does not cover all versions of the equipment, please refer to relevant additional manuals supplied with your trailer.

This book is to be read in conjunction with the "Spray Technique" book and relevant Boom Manual.

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HARDI Australia
Cross Keys Road Cavan
South Australia

To our valued customer:

Congratulations on your purchase and thank you for choosing the HARDI "GLOBAL NAVIGATOR" Series Sprayer. This "Operators Instruction Manual" covers the Safety, Operation and Maintenance procedures for the Global Navigator model, and is to be read in conjunction with the "Boom" and "Spray Controller" manuals supplied with your sprayer.

Warning: Any persons intending to use this equipment, or any of it's parts or systems must read and understand these publications (plus any related material) paying close attention to the Safety warnings prior to operation.

In addition, all operators must be of a suitable age, have undergone appropriate training and hold correct licenses where applicable, as required by state and federal law. The safety sections and warnings in this publication and all related material must be thoroughly read and understood before attempting to operate this equipment.

Danger: Failure to comply with the above may result in personal injury, death or damage to the equipment, property, crops or the environment.

Attention: The technical data contained herein is to the best knowledge of HARDI Australia Pty Ltd correct at the time of publishing. HARDI Australia Pty Ltd reserves the right to make changes in design, features, accessories, specifications and instructions at any time without prior notice and is without obligation in relation to products purchased before or after such changes and assumes no responsibility for any errors, inaccuracies or omissions.

Please visit our web site at: **www.hardi.com.au** for more information about research and development, our product range, spraying techniques and crop protection. For sales, service and spare parts information contact your local HARDI dealer.

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Operator safety

Introduction

This manual contains safety information which could prevent crop damage, personal injury or death. It is compulsory that ***all*** operators intending to use this equipment read and understand this manual *and related literature*. Safety information in each section must be read carefully, and if any doubt remains contact your HARDI dealer for further information.

Safety alert icons

Safety information in this manual is highlighted by the following icons according to the level of potential risk:

Danger: This indicates the highest level of hazard alert. Failure to comply with the information contained here could result in personal injury or death.

Warning: This indicates that mandatory action is required . Failure to comply with the information contained here could result in damage to crops, the equipment and / or the environment.

Attention: This indicates practical information regarding safe and effective use of the equipment and it's systems.

Chemical safety

Danger: Avoid risk of chemical contamination. Always read chemical labels and pressure test the equipment with clean water prior to filling. Never eat, drink or smoke when spraying or working with contaminated equipment. *Never drink water from any of the sprayer's tanks.* Never assume that the contents of the 'clean water' tank is safe to drink.

Remove and store safety wear and clothing after spraying to prevent contamination of the tractor cab. Dispose of, or clean appropriately. If poisoning occurs identify the chemicals and seek medical advice urgently. (for more info see "Chemical Safety").

Mechanical safety

Danger: Never operate any part of the equipment if any of it's components or safety shields are damaged. Never service or repair the equipment while it's operating and replace all safety devices and shields after service procedures.

Always de-pressurise the equipment and disconnect the power after each use and before servicing. Ensure all hydraulics are in the recommended position. Do not walk under any part of the sprayer or the boom unless it is properly secured.

When using an arc welder disconnect any power leads to the sprayer prior to welding and remove any flammable or explosive material from the area.

Danger: Never attempt to enter a tank or allow some one else to do so for any reason.

Attention: The tractor's drivers seat is the only intended working place during operation.

Danger: No persons are allowed in the operations area of the sprayer. Keep unauthorised persons and children away from the equipment at all times. Do not allow any one to ride on the equipment while it is operating.

Danger: Do not exceed the max. recommended RPM for any part of this equipment.

Danger: Local laws may require operators to be certified before using spray equipment and some chemicals. Consult your local authorities before commencing operation.

Warning: Although every effort has been made to include as much safety information as practical, it is impossible to anticipate every hazardous scenario. It is therefore the responsibility of the operator to exercise safe operating practices.

Warning: This equipment is intended for the application of crop protection chemicals and liquid fertilisers only. HARDI Australia does not authorise or endorse it's use for any other purpose.

Beware of overhead power lines!

Danger: Operating agricultural machinery near power-lines presents a potentially fatal hazard. It is the responsibility of the operator to ensure that minimum safe clearances are strictly observed, in particular when transporting the implement, spraying, raising, tilting or lowering the boom. Also be aware that during hot or windy weather sagging or swaying of power lines can reduce safe working clearances.

Power line structures and voltages can vary in different regions of Australia, so it is vitally important to consult your local Electricity Supply Authority for details of minimum safe clearances in your area before proceeding.

A: Minimum safe clearance from conductor for vehicles and implements.

B: Minimum safe clearance from conductor for persons and livestock.

Spray Drift

Warning Serious crop damage can occur as a result of spray drift. Certain climatic conditions can increase the risk of spray drift onto neighbouring crops.

Although calibration information is provided in the Spraying Techniques Manual it is vitally important that you read the chemical manufacturer's recommendations for the correct use of their product.
The manufacturers label will also state the products limitations and warnings.

Wind speed, temperature, humidity and chemical properties should all be considered when determining if conditions are suitable for spraying. Contact your local Department of Primary Industries for details of relevant publications explaining the risks and how best to minimise them. It is the responsibility of the sprayer operator to ensure that the spraying conditions are suitable for the application of the chemical to be used.

Warning: After changing chemicals or crops it is essential that the entire sprayer be flushed. This includes disconnecting hoses from the filters and pressure relief valve and cleaning residue and sediment in the hoses, valves and filters. Failure to do so may potentially lead to serious crop damage.

Chemical Safety

Danger: Chemical contamination poses a serious health risk. It is the responsibility of the operator to ensure safe work practice is observed and correct safety equipment and clothing is used.

Safety equipment

Depending on the type of chemical used, some or all of the following protective clothing and equipment will be required (see diagram to right).

1: Headgear, 2: Safety goggles or face shield, 3: Respirator,

4: Chemical resistant coveralls, 5: Chemical resistant gloves,

6: Chemical resistant boots.

Contaminated clothing and equipment

Contaminated clothing should be carefully removed, safely isolated and then appropriately laundered or disposed of, taking care not to contaminate the inside of the tractor cab. Tools and equipment used must also be safely isolated and carefully washed and decontaminated.

Australian Safety Standards

Protective clothing and equipment must conform to Australian Safety Standards and must always be used when handling chemicals, operating the sprayer and during the cleaning and decontamination process.

Chemical Information

Always read the chemical manufacturer's labels as they contain critical information about your safety and the environment. Always consider the environment when disposing of chemical residue (see section on decontamination). Chemical labels are registered by the National Registration Authority. Laws vary from state to state regarding the purpose for which a chemical may be used so consult your local authorities.

Danger: Agricultural chemicals can be dangerous. Always read chemical labels and carefully follow safety recommendations to the letter.

Attention: Please refer to the chapter on "Cleaning and Decontamination" in the Operation section of this manual for further information.

Disposal of chemical containers

Please note that in addition to normal safe operating practices, and in the interests of a cleaner and safer environment HARDI Australia supports the *"drumMUSTER"* chemical drum recycling program:

-Rinse empty drums immediately after use.

-Puncture metal drums through the base from the inside.

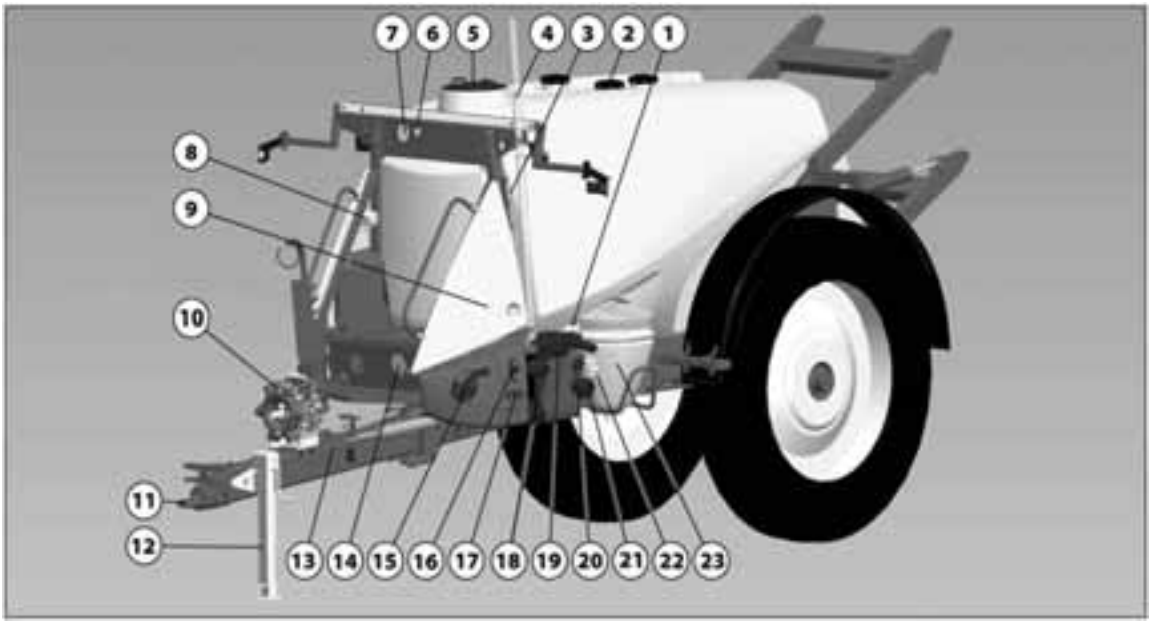
-Remove lids to allow drums to dry completely.

-Recycle with *"drumMUSTER"*

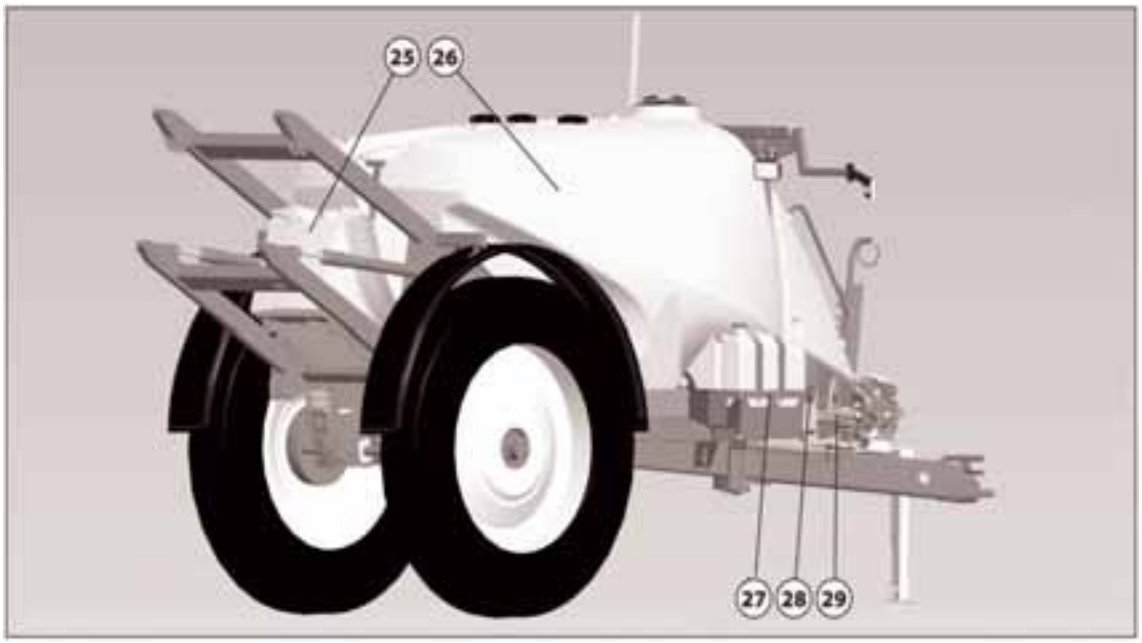
Warning: Used chemical containers pose a severe threat to persons, animals and the environment. Before disposal, contact the Environmental Protection Authority or the Department of Primary Industries in your area for more information.

General info

View



1. EcoFill valve (optional equipment)
2. Tank tube riser pipe lid
3. Rinsing tank level indicator
4. Main tank level indicator
5. Main tank lid
6. EasyClean blockage indicator
7. Spray pressure gauge
8. Clean water tank lid
9. SafetyLocker
10. Pump
11. Drawbar hitch
12. Support leg
13. Steering Cylinder Lock
14. Agitation/External Cleaning Device valve
15. Pressure SmartValve
16. External Filling ON/OFF valve
17. Suction valve
18. External Filling coupler (optional)
19. EasyClean filter
20. Rinsing tank coupler
21. Pressure draining coupler (optional)
22. TurboFiller valves (optional)
23. TurboFiller (optional)
25. Rinsing tank
26. Main tank
27. FoamMarker (optional)
28. CycloneFilter
29. Support leg storing position

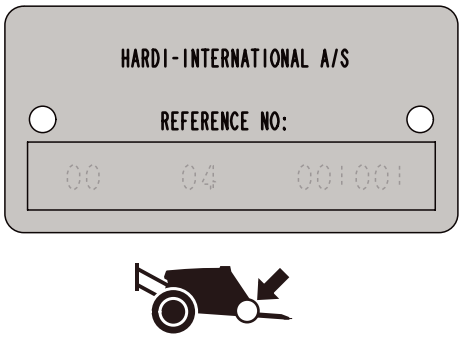


Identification plates

An identification plate fitted on the frame indicates producer name and model. For information about sprayer weight, dimensions and max pressures etc., please refer to chapter 8.

Frame, boom centre frame and other main steel components have identification plates indicating type and part number. (not illustrated)

REFERENCE NO: is the main reference number of the complete machine



ATTENTION! The sprayers serial no. are chipped into the frame in the outer of the right hand frame rail.

Roadworthiness

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

ATTENTION! Max. driving speed for models without brakes and for models equipped with brakes is different. Be aware that these speeds may differ due to local law. Contact local authorities for information of max. driving speeds!

Sprayer use

The HARDI sprayer is for the application of crop protection chemicals and liquid fertilisers. The equipment must only be used for this purpose. It is not allowable to use the sprayer for other purposes. If no local law demands that the operator must be certified to use spray equipment, it is strongly recommended to be trained in correct plant protection and in safe handling of plant protection chemicals to avoid unnecessary risk for persons and the environment when doing your spray job.

Frame

Very strong and compact frame which also has a strong chemical and weather resistant electrostatic powdercoat. Screws, nuts, etc. have been DELTA-MAGNI treated to be resistant to corrosion.

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 3000 or 4000 l. A large, easy to read tank contents indicator is placed beside the platform and is visible from the tractor cabin. The filling hole is placed so it can be accessed from the platform. This ensures an easy access for the filling of sprays, cleaning of the tank, etc. The sprayer can also be equipped with optional rinsing tank and clean water tank.

Liquid system

General info - valve system

All functions of the spray circuits are operated via the centrally situated valve system with colour coded pictorial symbols for easy operation.

Pump

Depending on specific choice, the pumps available are;

3 cylinder diaphragm pump model 1303 or diaphragm pump with 6 diaphragms, models 363 or 463.

Standard = 540 r.p.m. (6 splines). Optional = 1000 r.p.m. (21 splines).

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

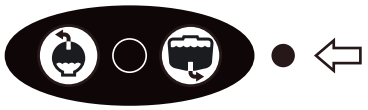
Valves and symbols

The valves at the valve system are distinguished by coloured identification on the function labels. Symbols corresponding to every possible function of use are located on the discs for easy identification and operation. A function is activated by turning the handle towards the desired function.

ATTENTION! If a valve is too tight to operate - or to loose (= liquid leakage) - the valve needs to be serviced. Please see the section 'Maintenance' for further information.

Suction valve = Blue symbols

This valve is to select suction from main tank or from the rinsing tank. The handle is turned so the label for required function is directed to the indicator. If handle is turned to vertical position (indicator not pointing at a label) then the valve is closed.

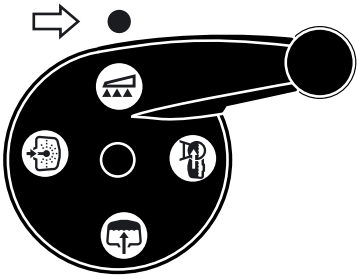


Suction from main tank

Suction from rinsing tank

Pressure valve = Green symbols

The active function is indicated by the indicator.



Filling of main tank

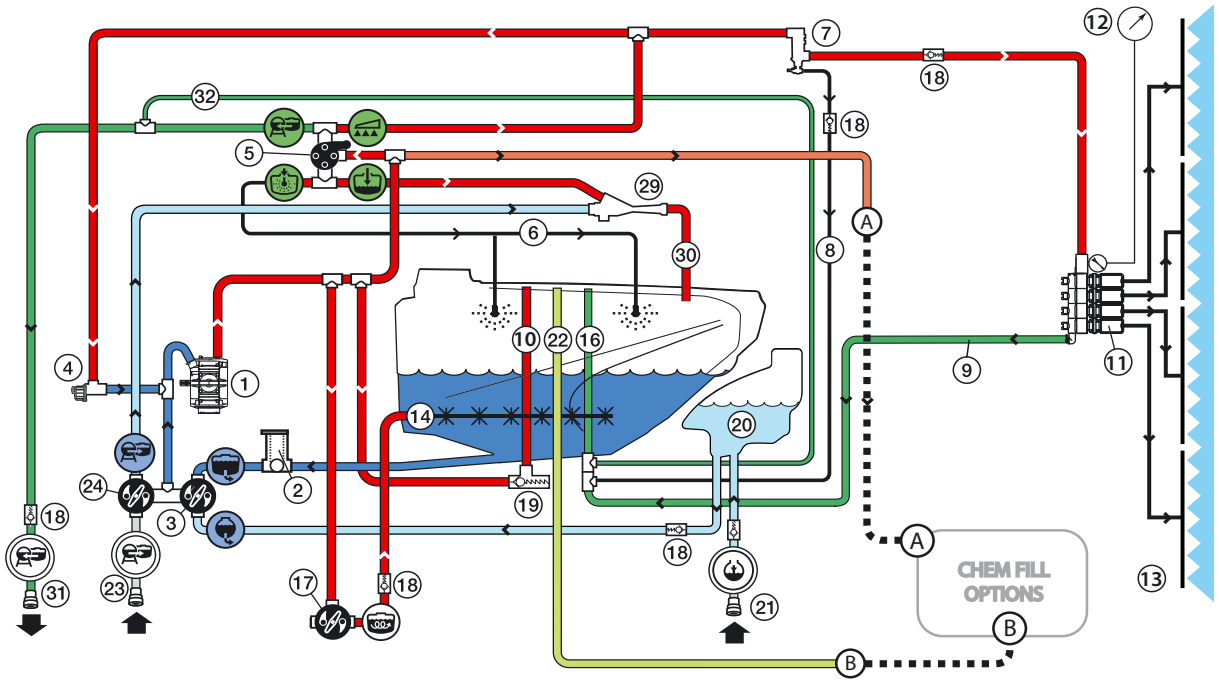
Spraying

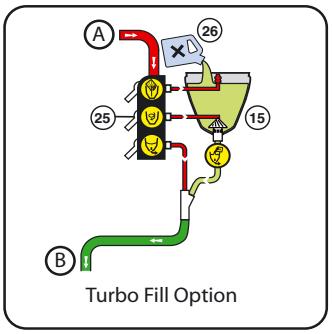
Internal tank cleaning (Rinsing nozzles) (optional equipment)

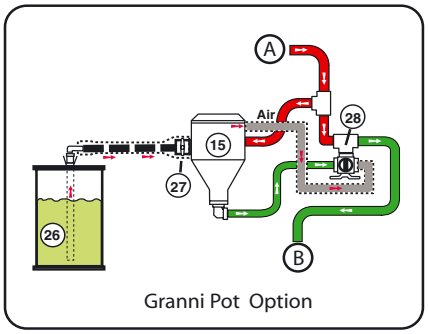
Pressure emptying (optional equipment)

Diagram - Liquid system with optional extras

Global Navigator Fluid System




Turbo Fill Option



Granni Pot Option

1	Pump	17	Agitation Valve
2	EasyClean Filter	18	One Way Check Valve
3	Suction Valve Main Tank/Rinse Tank	19	Pressure Relief Safety Valve
4	Pressure Control Valve	20	Rinse Tank (optional)
5	Pressure SmartValve	21	Rinse Tank Fill Coupler (optional)
6	Tank Rinsing Nozzles	22	Tank Tube for ChemFill (optional)
7	Cyclone Filter	23	Filling Coupler (optional)
8	Return line for boost function	24	Filling Valve (optional)
9	Return Pressure drop	25	Chemical Infill Manifold (optional)
10	Tank Tube PumpFiller (optional)	26	Chemical Source
11	Distribution Valves	27	Granni Pot Vac Valve (optional)
12	Pressure Guage	28	Vacuum Transfer Valve (optional)
13	Spray Boom	29	FastFiller Ejector (optional)
14	Agitation Tube	30	FastFiller hose to tank
15	Chemical Infill Hopper (optional)	31	Pressure Empty (optional)
16	Tank Tube for return lines	32	Pressure drop line for pressure empty (optional)

Filters

A EasyClean suction filter is fitted in the working zone. It has a built-in valve that closes when the filter is opened for inspection or cleaning.

A Cyclone pressure filter is fitted to the sprayers right side just in front of the ChemLocker (optional equipment). It has a built-in self-cleaning function.

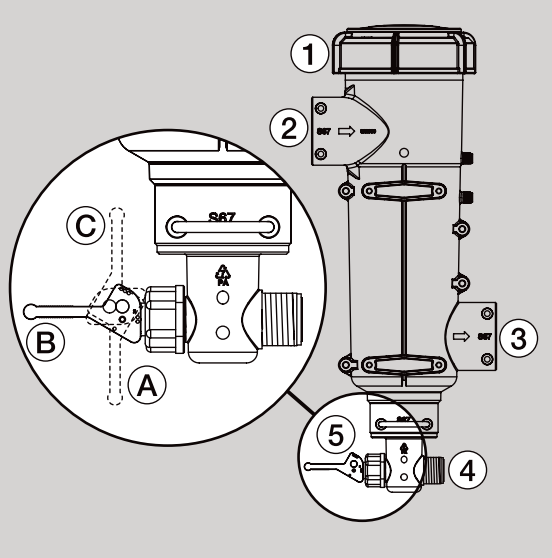
In-line pressure filters can be fitted at each boom section as an option. A secondary boom filter is another available option in place of seperate section filters.

Nozzle filters are fitted at each nozzle.

All filters should always be used and their function checked regularly. Pay attention to the correct combination of filter

CycloneFilter

With the CycloneFilter the impurities that exist in the spray liquid will by-pass the filter and be recirculated back to the tank via the return flow.



DANGER! The suction valve must always be turned to the closed position and the pressure SmartValve to "Main tank" before opening the Cyclone filter! If not then spraying liquid can hit you when opening the filter and drain the main tank content!

ATTENTION! Use of position C is no guarantee for a clean filter. Always regularly do a visual inspection and cleaning of the filter. If needed see "10 hours service - Cyclone filter" in Maintenance section.

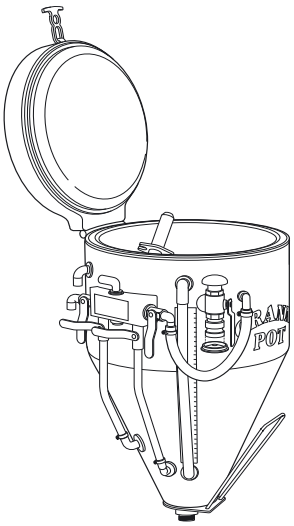
3 - Description

The optional HARDI® GRANNI POT or HARDI® TURBO FILLER are situated on the sprayer's left side, just behind the MANIFOLD valves.

These systems are designed to transfer liquid chemicals direct from a container (eg. Envirodrum, 25L drum, etc) to the calibrated hopper , then to the Main Tank.

Please see the Operation section or refer to your Vacuum Granni Pot or TurboFill Operators Manual for detailed instructions on proper use.

HARDI®GRANNI POT (optional equipment)



The HARDI VACUUM GRANNI POT™ is used for the mixing of plant protection or liquid fertiliser chemicals into a solution, and transferring the solution to your chemical application equipment.

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

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

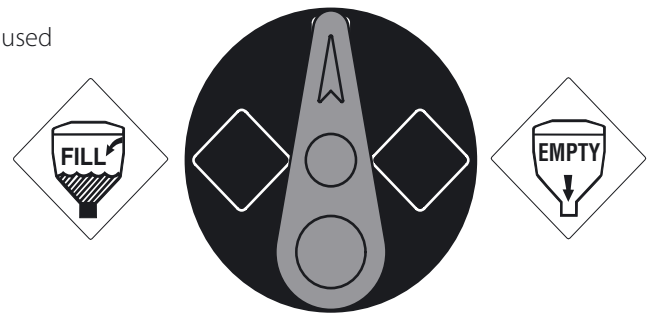
The Granni Pot is supported on a sturdy lift frame and is equipped with two vortex mixing jets, a control manifold and a rotating chemical drum rinse nozzle. The hopper flushing ring is connected to the sight tube to enable decontamination of both together. The unit has a water supply inlet port, and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

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

Featuring a Vacuum and Transfer Valve and an in-line venturi with interchangeable restrictors (based on pump capacity), the unit can transfer liquid from a clean water source or Envirodrum into the hopper, and from the hopper to the main sprayer tank.

Vacuum / Transfer Valve (optional equipment)

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



HARDI®TURBO FILLER (optional equipment)

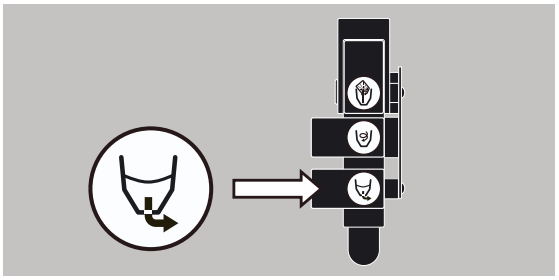
The TurboFiller is situated in the working zone on the sprayers left side. When being used it should be unlocked by pulling the handle (A) situated to the right of the TurboFiller and pushed down (B) by grabbing the handle on the TurboFiller until it clicks into locked down-position.

When retracting the TurboFiller after use, then unlock it by pulling the handle (A) situated to the right of the TurboFiller and pull it back in storing position until it clicks into the lock.

WARNING! Before releasing the lock (A) always keep a hand on the grip to avoid abrubt movement of the TurboFiller!

TurboFiller suction valve (optional equipment)

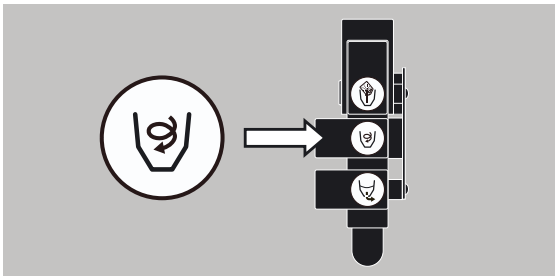
The valve is used simultaneously with the TurboFiller. The valve is the lowest valve situated to the left side of the TurboFiller and is activated in two ways. Push the valve lever down to get a quick soak out in the hopper. Lift the lever to lock it in open position for continous suction from the hopper into main tank. Open valve when chemicals are going to be filled into the TurboFiller.



Filling chemicals without TurboDeflection

TurboDeflector valve (optional equipment)

This TurboDeflector valve activates the Vortex flushing of the TurboFiller. The valve is the middle valve situated to the left side of the TurboFiller and is activated in two ways. Push the valve lever down to get a quick flush in the hopper. Lift the lever to lock it in open position for continous liquid rotation in the hopper.



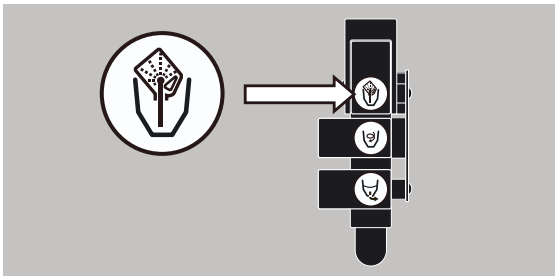
Start TurboDeflector

Chemical container cleaning lever (optional equipment)

The upper lever located to the left of TurboFiller are used for two purposes:

When TurboFiller lid is open: For cleaning empty containers. Put container over the rotating flushing nozzle in the middle of the TurboFiller to rinse inside of the container.

When TurboFiller lid is closed: Use the Chemical Container Cleaning lever to rinse the hopper after filling of chemicals has ended.



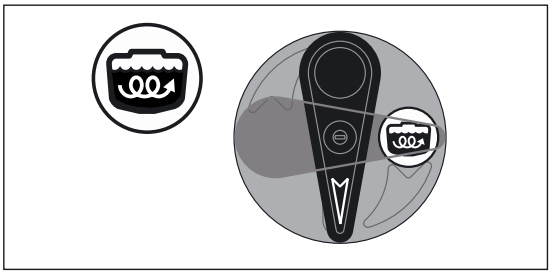
Chemical container cleaning

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

3 - Description

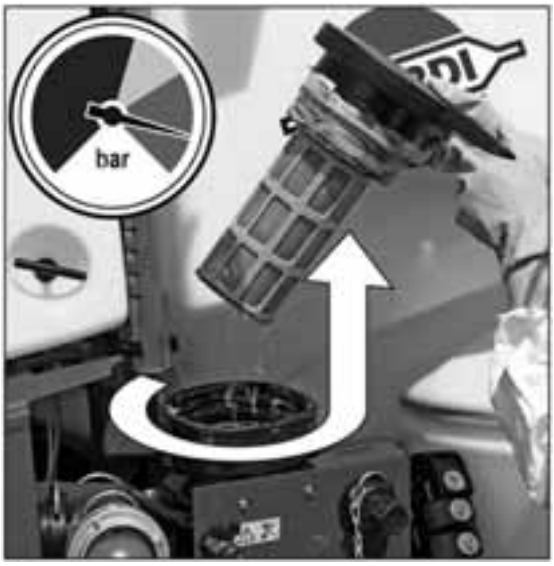
Agitation valve

With the adjustable Agitation valve it is possible to combine spraying with a high volume rate at high pressure with agitation at the same time. This is controlled continously by the valve: The valve is marked with an arrow on the disc that indicates the amount of liquid that passes through the valve. If the handle is turned to a position near the tip of the arrow, then only a small amount of liquid is allowed to pass the valve resulting to a lesser extent of agitation. Otherwise if the handle is turned to a position in the wide end of the arrow then a large amount of liquid will pass through the valve resulting to a large amount of agitation.



 Adjustable Agitation

EasyClean filter



The EasyClean filter is fitted in the working zone. It has a built-in valve that automatically closes when the filter is opened for inspection and cleaning. To open filter then turn it counterclockwise and pull it up, like shown on picture.

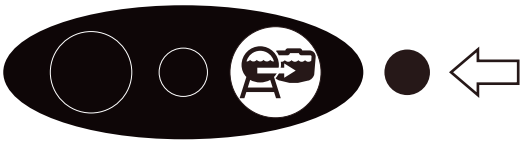
Beside the spray pressure gauge on the platform a EasyClean clogging indicator is located.

Green indicator: No cleaning necessary.

Yellow indicator: It is possible to finish an ongoing spraying job and then clean filter afterwards.

Red indicator: Clean EasyClean filter immediately as filter is clogged.

External Filling Device valve (optional equipment)



The valve is used when filling from an external tank or reservoir. Activating valve starts/stops the filling proces. Note that the suction valve must be closed for maximum filling capacity.

When the sprayer is equipped with ProFlow (optional equipment), this valve is replaced by the special ProFlow valve.

 Suction from external tank

EVC control unit

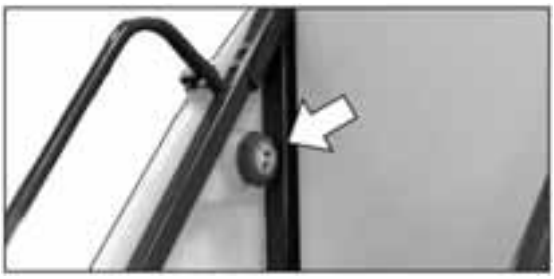
EVC - Electrical Valve Control. The ON/OFF is linked to the section valves, which results in a very quick response to ON/OFF. The operating unit is of modular design and is electrically controlled via a remote control box. The unit has a build-in HARDI MATIC.

Rinsing tank

A rinsing tank can be mounted to the rear of the sprayer. Tank is made of impact-proof and chemical resistant polyethylene.

Nominal content: appr. 450 litres.

Filling of clean water tank



A clean water tank is integrated into the right side cover which is fitted above the Cyclone filter. It is accessed for filling at the sprayers right side when entering the platform (see subject "Platform"). The ball valve is located on the valve cover below the EasyClean filter on sprayers left side.

The water from this tank is for hand washing, cleaning of clogged nozzles etc. Only fill the clean water tank with clean water from a safe and reliable water source.

Capacity: appr. 20 litres.

WARNING! Although the clean water tank is only filled with clean water, this water must never be used for drinking.

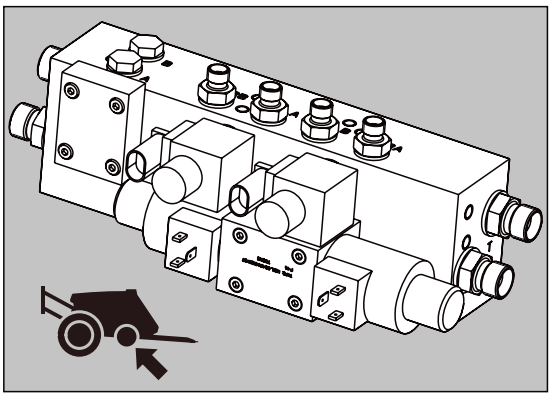
Hydraulic systems

PARALIFT hydraulics (optional)

This PARALIFT hydraulic block manages hydraulic pressure for the PARALIFT.

IntelliTrack hydraulics (optional)

This IntelliTrack hydraulic block manages hydraulic pressure for the IntelliTrack steering functions.



Boom

Boom configurations, terminology and Operators Manual

The Global Navigator range is available with a choice of optional boom configurations and widths. For this reason a separate "Boom Operators and Maintenance Manual" is supplied with your sprayer and contains detailed information on boom safety, set-up, operation, maintenance and spare parts.

⚠ Danger: Important information on Safety, Operation and Maintenance specific to your boom configuration is detailed in the "Boom Operators Manual" supplied with your sprayer's documentation. It must be read and fully understood by anyone intending to operate this equipment. Failure to do so could result in serious personal injury or death.

SPB / SPC Booms

The SPB and SPC booms are available in two different hydraulic system versions :

1. SPB / SPC - Direct Hydraulics (DH) - requires 2 double acting hydraulic outlets

This type of boom is operated directly from the tractor hydraulics. This model features hydraulic lift cylinder for boom height adjustment and two cylinders for simultaneous boom wing fold and unfold.

2. SPB / SPC - Electric over Hydraulic (EOH) - requires 1 double acting hydraulic outlets

These type of booms have the same features as the above mentioned DH-model, but is provided with more advanced hydraulics. EOH also has an optiion of two boom wing tilt cylinders that give the ability to obtain individual boom wing tilt as well as individual boom wing fold.

The hydraulics on the EOH are controlled via a control box.

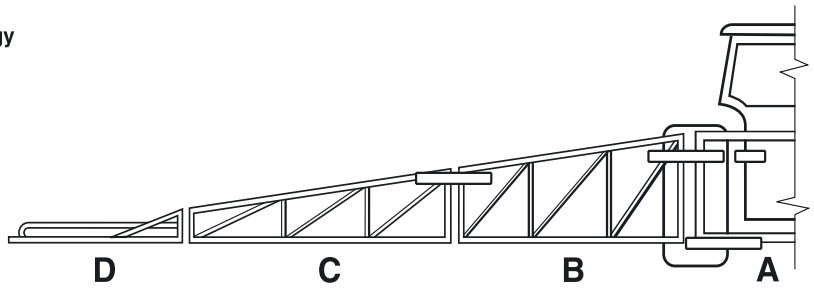
Outer sections incorporate spring loaded breakaway and all booms have bi-fold wings.

The SPB boom is available in 15,18,20,21m working widths.

The SPC boom is available in 24, 28 & 30m working widths.

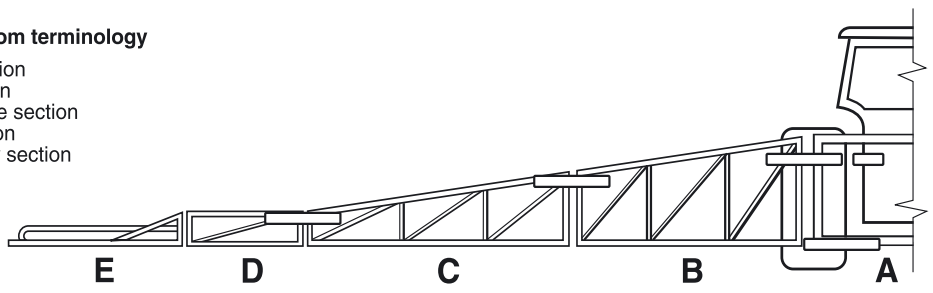
Two fold boom terminology

A: Centre section
B: Inner section
C: Outer section
D: Break-away section



Three fold boom terminology

A: Centre section
B: Inner section
C: Intermediate section
D: Outer section
E: Break-away section



Delta Boom

The Delta boom is available in two different hydraulic system versions :

1. Delta LPY- Direct Hydraulics (DH) - requires 2 double acting hydraulic outlets

This type of boom is operated directly from the tractor hydraulics. This model features hydraulic lift cylinder for boom height adjustment and two cylinders for simultaneous boom wing fold and unfold, which is suspended in a strong, stable parallelogram boom lift.

2. Delta LPZ - Electric over Hydraulic (EOH) - requires 1 double acting hydraulic outlets

These type of booms are pendulum suspended and fully hydraulically operated. They have the same features as the above mentioned DH-model, but are provided with more advanced hydraulics. EOH also has two boom wing tilt cylinders that give the ability to obtain individual boom wing tilt as well as individual boom wing fold.

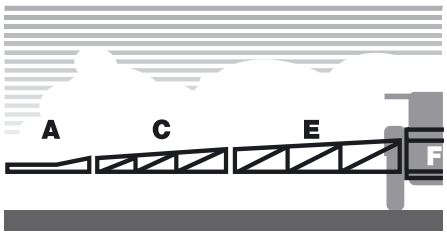
The hydraulics on the EOH are controlled via a control box.

Outer sections incorporate a spring loaded breakaway.

The boom is available in 18, 20, 21, 24, 27 and 28 m working width. All booms are 2-folded.

For the LPZ version the boom can also be used in half folded position. Half folded lengths are the following:

Full working width	1/2 folded
18 metres	12 metres
20 metres	12 metres
21 metres	12 metres
24 metres	12 metres
27 metres	14 metres
28 metres	14 metres



For 2-folded booms the terminology is as follows;

A - Breakaway section

C - Outer section

E - Inner section

F - Centre section

PRO Boom

The PRO Boom can be fitted as a VHY or VHZ boom. Both booms are supported by a trapeze which is fitted to the tank frame.

The trapeze helps the boom to stay horizontal when unfolded and it protects the boom against vibrations and shocks when driving on uneven ground. This ensures longer boom life and improves boom stability for better spray distribution.

Booms are available in 12, 15, 16 and 18 m working width. All booms are provided with spring loaded breakaway.

The PRO boom is available in two different hydraulic system versions :

1. PRO (VHY) - Direct Hydraulics (DH) - requires 2 double acting hydraulic outlets

This type of boom is operated directly from the tractor hydraulics. This model features hydraulic lift cylinder for boom height adjustment and two cylinders for simultaneous boom wing fold and unfold.

2. PRO (VHZ) - Electric over Hydraulic (EOH) - requires 1 double acting hydraulic outlets

These type of booms have the same features as the above mentioned DH-model, but is provided with more advanced hydraulics. EOH also has two boom wing tilt cylinders that give the ability to obtain individual boom wing tilt as well as individual boom wing fold.

The hydraulics on the EOH are controlled via a control box.

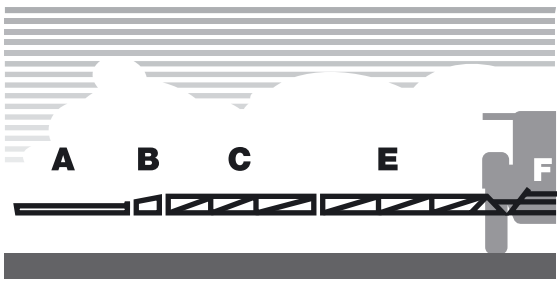
A - Breakaway section

B - Short outer section (2)

C - Large outer section (1)

D - Intermediate section

E - Centre section



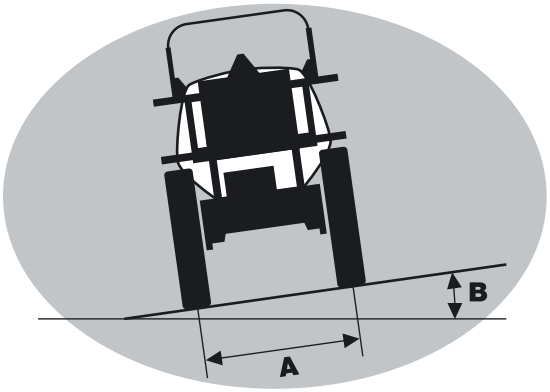
Equipment

IntelliTrack (optional equipment)

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

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

Driving technique for IntelliTrack



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

To avoid overbalancing, pay attention to these guidelines:

1. Avoid sudden, tight turns.

2. Slow down before entering a curve or turning, and drive with a constant, low speed during the turn.

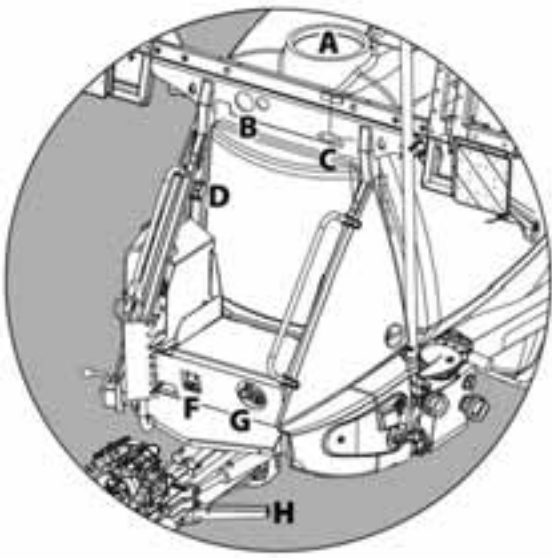
3. Never slow down too fast, never brake heavily and never stop suddenly in a curve, or when turning on a hillside, when the sprayer is articulated.

4. Be careful when turning on uneven ground.

5. Set the track width (A) as wide as possible.

6. The proper function of the hydraulic system is essential to obtain good stability.

Platform



To get access to the platform lift and swing the step (H) on the drawbar out until it clicks into locked out-position. To retract step, then pull it and swing step to retracted locked in-position.

The pressure regulation valve (F) and the Agitation valve (G) are situated in front of the platform floor. The platform gives access to the clean water tank lid (D), the main tank lid (A). Also the main tank drain valve (C) can be operated from the platform. The pressure gauge (B) and EasyClean clogging indicator (B) are visible at the top of the platform.

By removing the platform floor, the valve components are accessible.

Right side cover

The right side cover is opened by turning the handle in the lower rear corner of the cover and lifting the cover up. Lifting the right side cover gives access to the Jobcom (A), box for work and road lights (B) if fitted (optional equipment). The clean water tank is integrated in to the side cover and is filled from the platform when the right side cover is closed.

ATTENTION! Only open the right side cover when the clean water tank is empty!

Tank level indicator

The actual tank level in the main tank can be observed on the tank level indicator. The scale is displayed in litres.

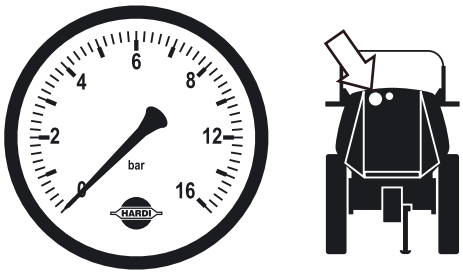
The level indicator is only a guidance for the tank level. The total deviation of accuracy for the level is 7.5% for below 20% filled tank. For above 20% filled tank the total deviation of accuracy is 5%.

Just behind the main tank scale a level for the rinsing tank is fitted to the frame. This is a guidance to see if rinsing tank is full or empty. If the guidance ball is in top then the rinsing tank is full.

Remote pressure gauge

The remote pressure gauge is integrated in the platform. This gauge measures the working pressure in the boom tubes as close to the nozzles as possible.

The outputs stated in the nozzle charts are always based on the pressure measured at the nozzle. Always adjust pressure when calibrating and spraying according to readings at the remote pressure gauge.



ChemLocker (optional equipment)

A ChemLocker for storage of chemical containers etc. can be mounted on the sprayers right side.

If the optional FoamMarker is selected then the ChemLocker option is replaced by the FoamMarker.

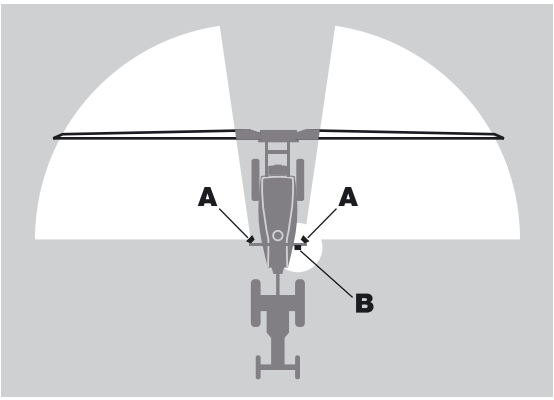
ChemLocker Max. load 100 Kgs./100 litre.

SafetyLocker

The locker is integrated to the left side of the platform and is accessible behind the left side cover. It is for the purpose of storing non-contaminated protective gear, soap for hand washing etc. The locker is split in two compartments for the separation of clean clothes from gloves with risk of contamination.

WARNING! Although this locker is meant for storing nontoxic items, it must never be used for storing food, beverage or other things meant for consumption.

Night Spraying Light (optional equipment)



The 2 boom flood light lamps (A) are mounted to the railing of the platform (one at each side) and are positioned to illuminate both boom wings. The work light lamp (B) is also mounted to the railing of the platform above the valves. This lamp is positioned to light up the HARDI TurboFiller and the valve system. The boom and work lights selector switch is placed just below the SafetyLocker (between valve shield and EasyClean filter).

ATTENTION! It is recommended to switch OFF the rear working lights of the tractor in order to save power consumption and to avoid reflection. Power supply is via the 2-pin socket. Please see the Installation Instruction in Technical specifications section.

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

Filtered FastFill (optional equipment)

As an option, a Filtered FastFill coupling can be fitted which enables the ejector to suck chemicals directly from chemical source at an increased rate of flow over standard filling options.

ProFlow (optional equipment)

The ProFlow system eases the tank filling process for the operator. A flowmeter in the suction line measures the volume filled, and when the required volume is reached, the electric valve automatically closes the system.

The ProFlow display is located below the SafetyLocker (behind the front cover) and the ProFlow valve is situated above the suction valve.

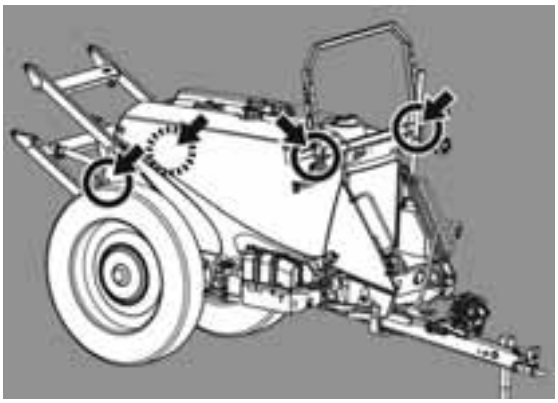
The ProFlow only works with in combination with the PumpFiller coupler.

General info

Unloading the sprayer from the truck

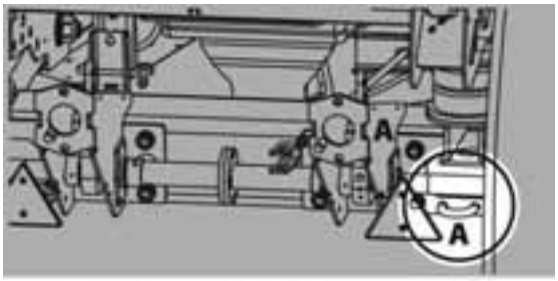
For the unloading of the sprayer, you need a crane. When unloading with a crane please observe the lifting points as shown on the picture, and make sure that the straps or belts used for lifting are strong enough.

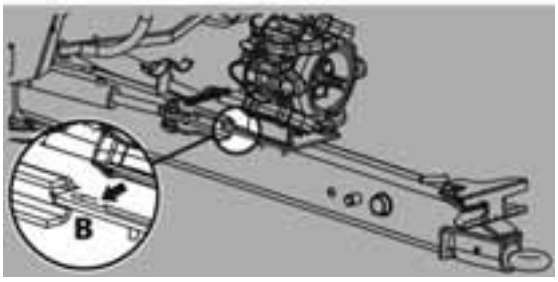
ATTENTION! Only lift the sprayer when the tanks are empty!



Pulling the sprayer at the tie down hooks

For moving the sprayer or loading it to e.g. a truck it can be pulled by the hooks at the rear-end (A) or a hook can be fastened into the hole in the front end of the sprayer (B).



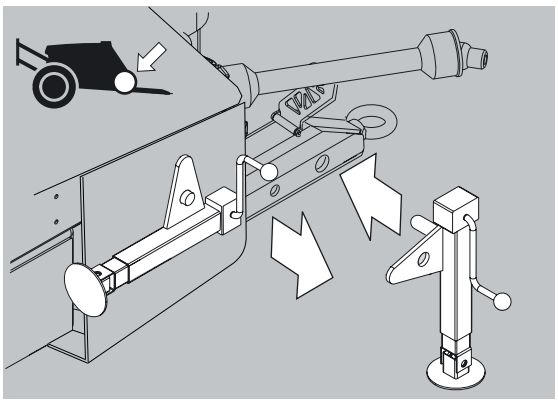


Before putting the sprayer into operation

Although the sprayer has been applied with a strong and protective surface treatment on steel parts, bolts etc. in the factory, it is recommended to apply a film of anticorrosion oil (e.g. CASTROL RUSTILO or SHELL ENSIS FLUID) on all metal parts in order to avoid chemicals and fertilisers discoloring the powder coating. If this is done before the sprayer is put into operation for the first time, it will always be easy to clean the sprayer and keep the powder coating clean for many years. This treatment should be carried out every time the protection film is washed off

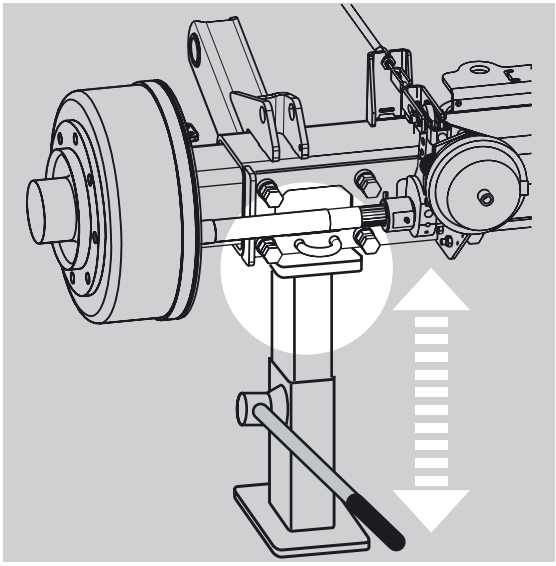
Support leg

The support leg is stored in the bracket on the sprayer's right side when the sprayer is attached to the tractor. To use the support leg: Lift the leg off the storage bracket. The support leg can then be mounted to the drawbar extension on both sides as preferred and secured by a linch pin. To remove the support leg: Lift the leg, remove the linch pin and pull out the support leg. Secure the leg at the storage bracket with the linch pin.



Jack up the sprayer

When the sprayer needs wheel mounting, wheel changing, brake or wheel bearing changing etc. then jack up the sprayer under the axle as shown.



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

DANGER! Never work on a trailer supported only by a jack. Use chassis stands or support blocks to to avoid sprayer falling down from the jack.

ATTENTION! It is good safety practice to use stop wedges at the opposite wheel!

Transmission shaft

Operator's safety

1. Always STOP ENGINE before attaching the transmission shaft to tractor P.T.O. - most tractor P.T.O. shafts can be rotated by hand to facilitate spline alignment, when engine is stopped.

2. When attaching the shaft, make sure that the snap lock is FULLY ENGAGED - push and pull shaft until it locks.

3. Always keep protection guards and chains intact and make sure that it covers all rotating parts, including CV-joints at each end of the shaft. Do not use without protection guard.

4. Do not touch or stand on the transmission shaft when it is rotating - safety distance: 1.5 metre. Also NEVER cross over a rotating P.T.O. shaft to reach the other side of the sprayer.

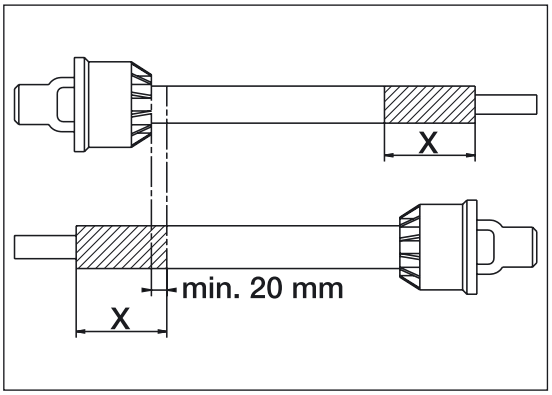
5. Prevent protection guards from rotating by attaching the chains allowing sufficient slack for turns.

6. Make sure that protection guards around tractor P.T.O. and implement shaft are intact.

7. Always STOP ENGINE and remove the ignition key before carrying out maintenance or repairs to the transmission shaft or implement.

⚠ DANGER! ROTATING TRANSMISSION SHAFTS WITHOUT PROTECTION GUARDS CAN BE FATAL!

P.T.O. installation



Always read the manufacturers instruction book before applying any installation of the transmission shaft!

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

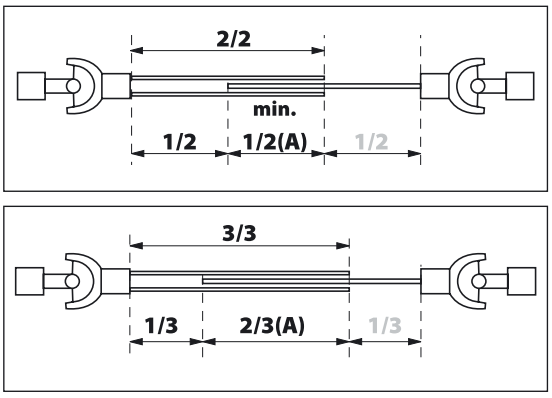
1. Attach sprayer to tractor and set sprayer height in the position with shortest distance between the tractor and sprayer pump P.T.O. shafts.

2. Stop engine and remove ignition key.

3. If transmission shaft must be shortened, the shaft is pulled apart. Fit the two shaft parts at tractor and sprayer pump and measure how much it is necessary to shorten the shaft. Mark the protection guards.

⚠ WARNING! The shaft must always have an overlap of minimum a half length of the shaft!

The recommended overlap (A) of the two shaft parts is 2/3 of the length. The shaft must always have an overlap (A) of minimum 1/2 of the length.

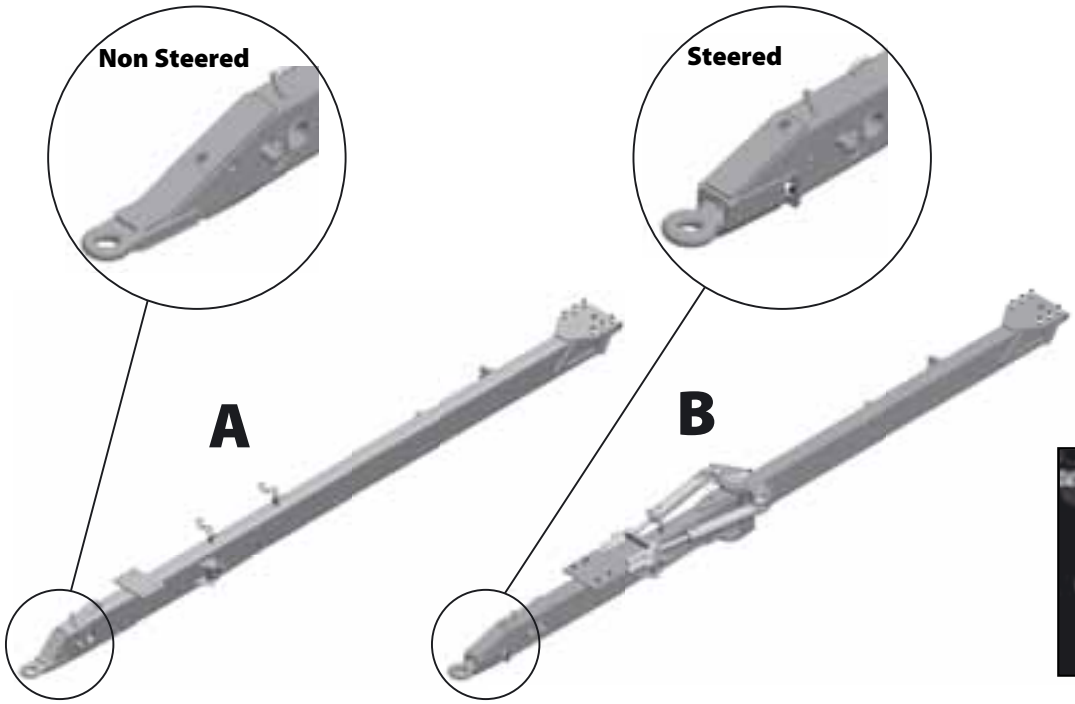


⚠ DANGER! As P.T.O. shafts are dangerous always read the manufacturers instruction book before applying any changes to the transmission shaft!

Mechanical connections

Drawbars

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



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

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

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

The following drawbar hitches are available;

A: Fixed Drawbar

B: Steering Drawbar

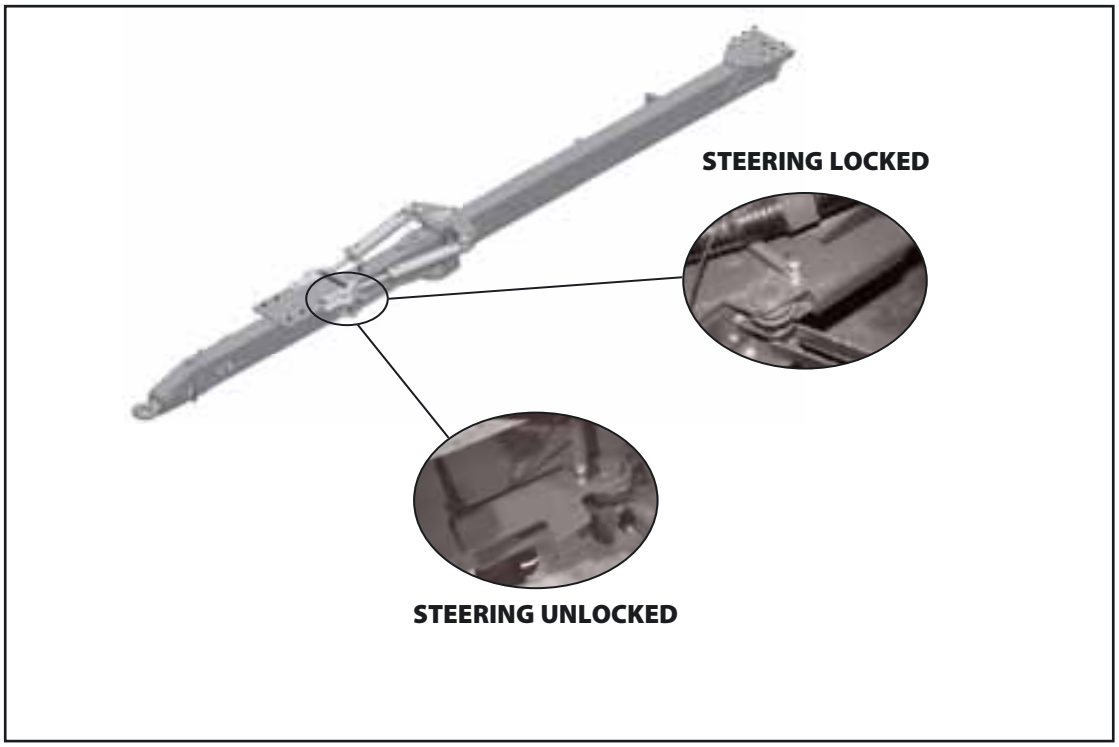
Hose package support

To prevent hoses and wiring from being damaged by the tractor wheels, P.T.O. shaft etc. all hoses, cables and wires are held by the hose bracket fitted to the sprayer platform. Check that the length of the hoses and cables are sufficient by tight turns.

ATTENTION! A sprayer with IntelliTrack requires more slack in the cables. Make sure cables are long enough in tight turns when fully steered.

Tracking drawbar and transport lock (optional equipment)

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



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

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

4 - Sprayer setup

Hydraulic systems

General info

Ensure that snap couplers are clean before connection!

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

Connecting the hydraulics

Make sure the hydraulic quick couplings are clean and dry taking care to connect the correct hoses to "Pressure" and "Tank" (the hoses are clearly marked for positive identification).

The size and number of hydraulic hoses to connect depends on the optional equipment fitted to the sprayer. To assist in identifying the right hoses they have been tagged with colour coded "Zip-ties"

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

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

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

Requirements - tractor (SPB/SPC) DH Version

Connection requirements are:

• One single acting outlet for the lift function of the spray boom.

• One double acting outlet for the folding function.

Ensure that snap couplers are clean before connection!

The hydraulic system requires a minimum oil pressure of 150 bar, max. oil pressure of 210 bar and an oil capacity of approx. 25 litres.

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

WARNING! Due to the variation in tractor hydraulic systems and capacities, care should be exercised when initially operating the sprayer hydraulic cylinders. It is advisable to adjust the hydraulic flow control down to the minimum rate before operating the system. Adjust/increase the flow control after the system has bled of any air, if necessary.

Requirements - tractor (SPB/SPC) EOH Version

The hydraulic system requires a double acting hydraulic outlet. The hydraulic hoses are marked with arrows to indicate direction of oil flow.

The hydraulic system requires an oil flow between 25 and 130 l/min and a min. pressure of 170 bar (2500 p.s.i.).

Open centre hydraulics (optional)

The open centre hydraulics block is needed if the tractor uses open centre hydraulics and/or if load sensing will be used.

The valve (1) on the side of the block is factory set for open centre hydraulics, but if closed centre hydraulics will be used (also in combination with load sensing) then screw in the valve.

Certain tractor models are able to use Load Sensing without connecting an external sensing line. But if optimal sensing control pressure cannot be obtained, an external sensing line needs to be mounted (3). Please consult your tractor dealer for correct setup and correct connection.

Before operating the hydraulics, the valve should be adjusted according to the specific tractor model. If you have doubt about which type of hydraulic system your tractor is equipped with, please consult your tractor dealer.

Schedule with combinations of settings for flow element and circuit value:

Valve no.	1	2	3 (LS port)
Open centre	out	out	Not conn.
Closed centre	in	in	Not conn.
Load sensing (LS)	in	out*	Connected

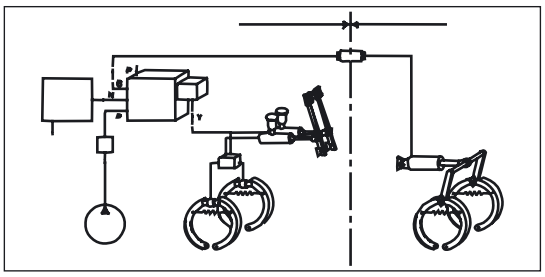
*if tractor requires pressure relief.

WARNING! Always be sure to fully extract or retract the open/closed center selection valve (1). Failure to do so can result in damage to vital pump parts.

WARNING! It is of essential importance that connectors on sensing line are kept totally clean. Failure to do so can result in impurities entering the pump and thereby cause damages to vital pump parts.

Brakes

Hydraulic activated brakes (optional equipment)



The trailers hydraulic brakes require a trailer brake proportioning valve fitted to the tractor's hydraulic brake system. Connect the quick coupler to the tractors trailer brake outlet. When the tractor brakes are applied, the trailer brakes will work proportionally to the tractor brakes, and ensure safe and effective braking.

Warning! Do not connect the sprayer's brakes directly to the tractor's hydraulic braking circuit without first checking the tractor is equipped with a TRAILER BRAKE PROPORTIONING VALVE! Poor braking control will result causing a dangerous situation and potential injury.

WARNING! Maximum fluid pressure is 120 bar (2175 p.s.i.) in the brake line. Brakes should only be connected to a dedicated brake line to avoid damage or personal injury.

Electrical connections

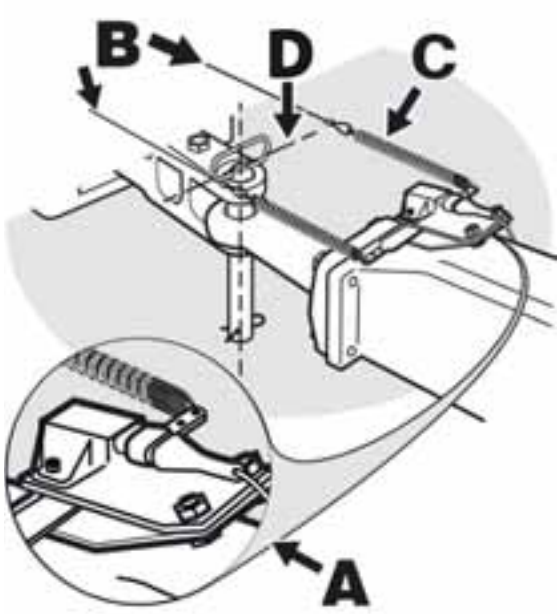
Potentiometer connection (IntelliTrack models only)

Connect the potentiometer **(A)** to the tractor **(B)** via the 2 springs **(C).**

In order to ensure a high level of precision, attach the springs as close as practical to the centreline **(D)** of the drawbar pin. The springs **(C)** need to be attached so they are horizontal and parallel to one another.

If no suitable attachment points for the springs are available, a bracket may need to be fabricated.

Make sure also they are fitted with even tension, so that the potentiometer returns to the neutral (centre) position when the sprayer is aligned perfectly behind the tractor.



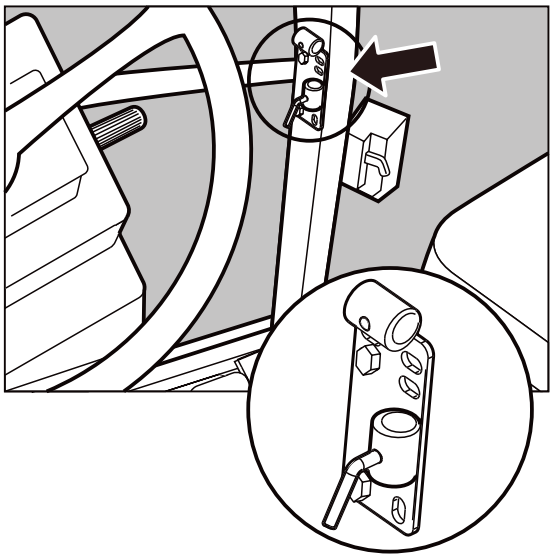
Attention! Make sure that enough tension is on the springs to prevent them from oscillating or bouncing when the sprayer is in motion.

Attention! For further set-up instructions and calibration of the Safe Track system please refer to the HC 5500 or the HC 6500 operators manual supplied with your sprayer

Attention! Ensure that the potentiometer bar does not have any abrupt movements. The bar should move smoothly through the complete turning range.

Control units

Find a suitable place in the tractor's cabin to secure the control units from movement. Best recommended placement is to the right of the driver seat. The supplied bracket will fit most tractors. Threaded mounting holes may be hidden behind front corner cover.

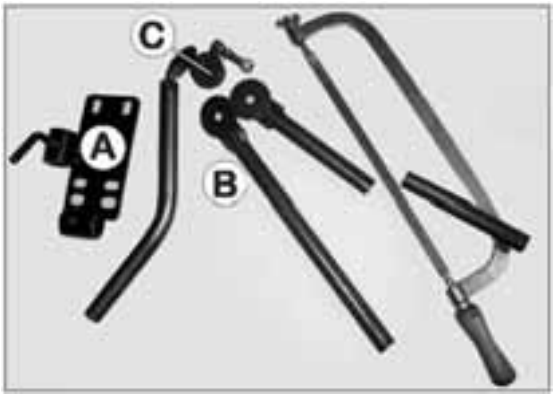


Installation of control unit brackets

The supplied tractor pillar bracket (A) has a hole spacing of 100 and 120 mm. Check tractor instructions manual for information regarding attachment points.

Three tubes (B) are supplied. One, two or all 3 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 you and your tractor / vehicle.

Tube (B) has an offset mounting plate, so if correctly orientated all control boxes will line up.



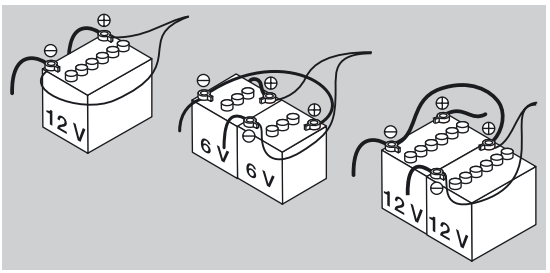
Road safety kit

Connect plug for rear lights to the tractor's 7-pin socket, and check 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".

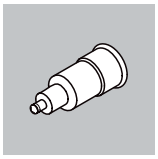
ATTENTION! Turn OFF all the work lights when driving on public roads!

Power supply

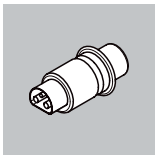


Power requirement is 12V DC. Always note polarity! For proper function of the electric equipment, the wires must have the following recommended cross sectional areas and correct fuses to ensure a sufficient power supply. The delivered power connectors follows the standard of most newer tractors. If having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

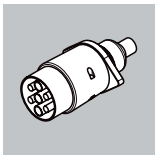
The number and kind of connectors can vary on the specific sprayer, depending on its equipment.



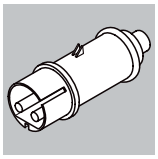
CIGAR CONNECTOR
Spray control unit requires:
Wire 2.5 mm, Fuse 10 Amp
Hydraulic control unit requires:
Wire 4.0 mm, Fuse 16 Amp



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

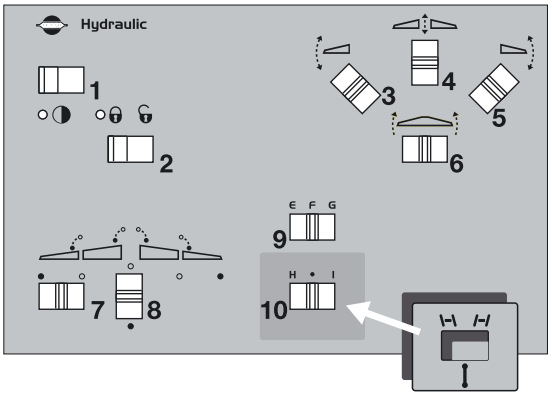


TRAFFIC LIGHT CONNECTOR



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

Label for manual steered version (optional equipment)



When having a manually steered model of the sprayer, there is no hydraulic controls for the steering at hydraulic control unit. So to control the steering then one of the optional switches (10) on the hydraulic control unit is used. Place the "Manual steering" label (part no. 72542800) on the control unit at the sign originally meant for optional function (10).

Speed sensor

The speed sensor (A) is an inductive type and requires a metallic protrusion like a bolt head to trigger the signal. In this case a slotted ring (B) mounted on the inside of the right hand wheel rim is used.

The sensor should be located in the centre of the openings along the vertical axis. The recommended distance (or 'air-gap') between the sensor and the slotted ring is 3 to 5 mm.

The air-gap can be adjusted if necessary by:

1) Loosen the bolt and nut holding the sensor mounting bracket (C).

2) Find something 3 to 5mm thick to use as a gauge and check that the clearance is within specification.

3) Re-tension the bolt and nut and re-check your adjustment.

Liquid system

CycloneFilter

Standard filter size is 80 mesh. Filters of 50 and 100 mesh are available and can be changed by opening the filter top.

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

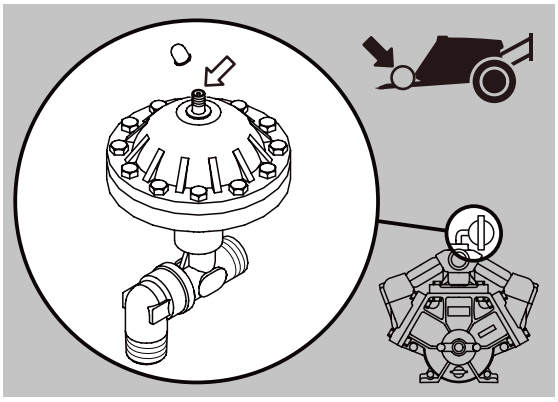
⚠ DANGER! Suction valve must always be closed and the pressure SmartValve to "Main tank" before opening the Cyclone filter! If not then spraying liquid can hit you when opening the filter and drain the main tank content!

Pulsation damper (if fitted)

The air pressure in the pulsation damper is factory preset at 2 bar to cover spray working pressures between 3 and 15 bar.

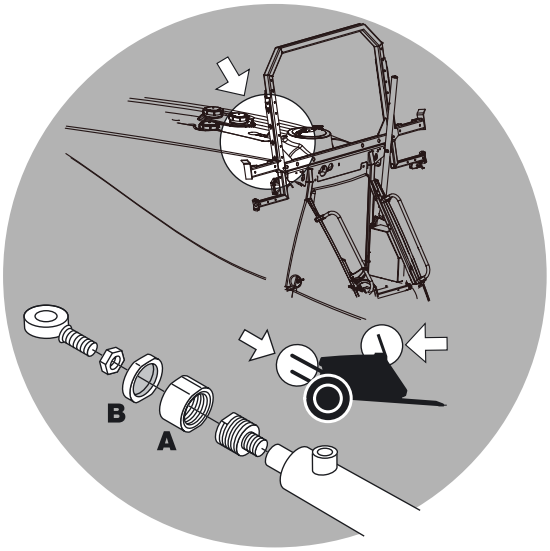
When using spray pressures outside this range, the air pressure should be adjusted as shown in the diagram. The diagram is embossed on the damper.

Spray pressure	Damper pressure
Bar	Bar
1.5 - 3	0 - 1
3 - 15	1 - 3
15 - 25	3 - 4



Boom Adjustments

Adjusting boom transport position



If the boom wings do not rest accurately in the transport brackets, the wings can be adjusted as described below:

1. Lift the boom all the way to the top.

2. Fold the boom into transport position. With the fold cylinder pressurized, determine if the boom wings need to be adjusted inwards or outwards.

3. Relieve the pressure from the fold cylinder by unfolding the boom a few centimetres.

4. If the boom rests too far in on the transport brackets, loosen the nut (B) on fold cylinder and adjust collar (A) in towards the cylinder housing.

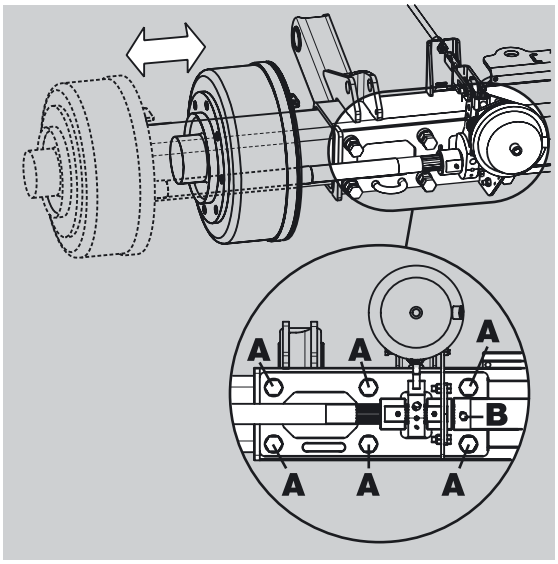
5. If the boom rests too far out on the transport brackets, the collar (A) has to move out away from the cylinder housing.

6. Secure jam nut (B).

7. Pressurize the cylinder to see if the boom is properly adjusted. If not, repeat the above procedure until it is correctly adjusted.

Track width, axles and wheels

Altering the track gauge (optional equipment)



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

1. Measure the current track width (centre RH tyre to centre LH tyre). Each side must be extended or retracted half the desired alteration.

2. Attach the sprayer to tractor and engage tractor parking brake.

3. Place stop wedges in front of and behind RH wheel. Jack up LH wheel, support and secure sprayer body.

4. Loosen the counternut at the bolts (A) and the bolts (A) for LH wheel axle.

5. If brakes are fitted, loosen the pointed screw (B) on the brake operating arm.

6. Extend or retract the axle.

7. Lower down the LH wheel.

8. Tighten the clamp bolts (A) to a torque of 250 Nm and lock the bolts with the counternuts.

9. Tighten the pointed screw (B) again.

10. Repeat the procedure on RH wheel.

11. Check if the distance from centre tyre to centre of rear frame is equal at RH and LH.

12. Retighten bolts and wheel bolts to torque value specified in Maintenance section and recheck torque after 8 hours of work.

ATTENTION! Depending on configuration of the machine the track gauge can be altered in the range from 1500 mm to 2000 mm, or from 1800 mm to 2250 mm in combination of above adjustment and turning of the rims (offset).

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

Turning rim and rim plate

Track width can be altered by turning the rim.

Offset:

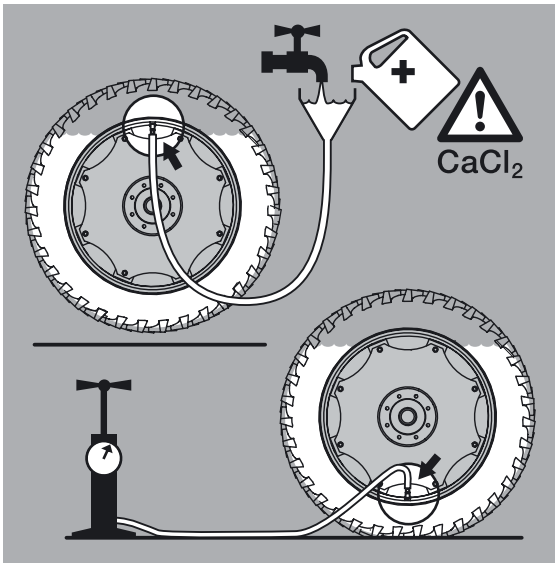
+ 61 mm

- 50 mm

ATTENTION! When wheels have been mounted or re-tightened, the plastic nut covers must be placed on the nuts afterwards and recheck torque after 8 hours of work.

Refer to torque value specified in Maintenance section and recheck torque after 8 hours of work when ever wheel nuts have been loosened for any task.

Counter weight



To improve stability on articulated models, extra weight can be added by means of liquid-filled tyres. The standard tyre valve is an universal air-water valve. The tyres can be filled with liquid to max. 75% of their total volume.

Use a mixture of water and CaCl2 to avoid frost damage as described below:

200 g (7.1 oz) CaCl2 per litre water gives protection to -15°C (30.6°F)

300 g (10.6 oz) CaCl2 per litre water gives protection to -25°C (12.6°F)

435 g (15.4 oz) CaCl2 per litre water gives protection to -35°C (-5.4°F)

TO FILL THE TYRES:

1. Jack up the wheel and rotate wheel till the valve is positioned at "12 o'clock".

2. Remove the valve body and fill liquid until it reaches the valve.

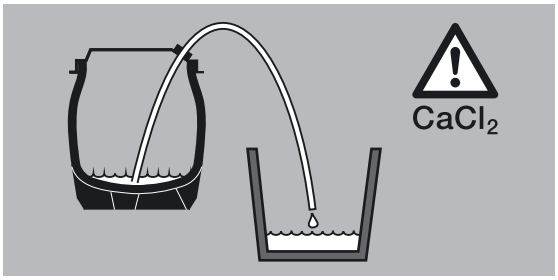
3. When surplus liquid is drained through the valve stem fit the valve body again.

4. Adjust tyre pressure and lower the wheel. (Please refer to table for correct tyre pressure).

DANGER! It is very important that the CaCl2 is added to the water and agitated until it is fully dissolved. Never pour water on to CaCl2! If you get CaCl2 in the eyes, flush instantly with cold water for at least 5 minutes and seek medical advice afterwards.

WARNING! The tyres must be liquid filled to max. 75 % of total tyre volume. Fill only the qty. of liquid necessary to obtain sufficient stability of the sprayer. Do not fill liquid and CaCl2 mixture in tyres without tubes!

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



TO EMPTY THE TYRES:

1. Rotate wheel till the valve is positioned at "6 o'clock".

2. Remove the valve body and let out the liquid. Retain liquid in an appropriate container.

3. To empty the tyre completely the tyre is inflated and a thin drain tube is lead to the bottom of the tyre. The air pressure will now empty the remaining liquid.

4. Remove the drain tube, fit the valve and inflate the tyre to specified pressure. See the table "Tyre pressure".

ATTENTION! Disposal of CaCl2 has to take place according to local legislation.

Boom

Safety info

The boom must not be folded/unfolded while driving! Never use the folding/unfolding functions before sprayer has been stopped! Failure to do so will cause damage to the boom.

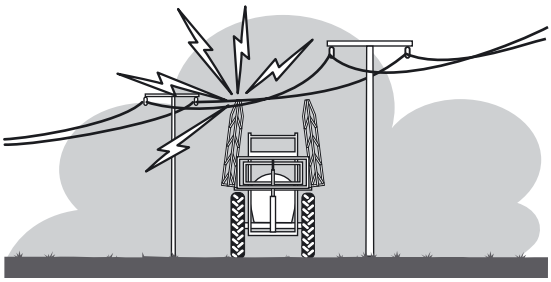
DANGER! Before unfolding the boom it is important to connect the sprayer to the tractor to prevent overbalancing of the sprayer.

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

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

Never use the folding/unfolding functions in areas with overhead power lines.

Unintended boom movements can cause contact with overhead power lines.



ATTENTION! Warning Label (ref. no. 978448) must be placed in the cabin at a place visible from the operator's seat.

Manoeuvring of the boom - DH-versions

Both SPB and SPC booms with Direct Hydraulics are operated as follows:

1. Raise the boom to release it from the transport brackets.

2. Activate the double acting hydraulics outlet to unfold the boom. Both wings will now unfold simultaneously.

3. When the boom is completely unfolded, it can be raised or lowered to the desired spray height by activating the single acting hydraulic outlet.

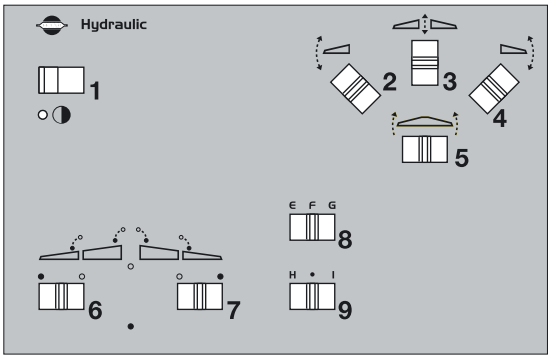
4. Before attempting to fold the boom back into transport position, it should be raised all the way to the top by activating the single acting outlet.

5. The boom is folded by activating the double acting outlet in the opposite direction that was used to unfold the boom. The boom can now be lowered into the transport brackets.

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

WARNING! Ensure that the pendulum lock is locked before using the fold functions.

Manoeuvring of the boom - EOH-versions



The switches on the hydraulic control box controls the following functions:

1. Power ON/OFF
2. Boom tilt left
3. Boom lift raise/lower
4. Boom tilt right
5. Slant
6. Boom folding left
7. Boom folding right
8. Optional function
9. Optional function (used for steering if sprayer is manual steered)

For unfolding of the boom then do the following:

1. Push switch (3) upwards to lift the boom clear of the transport brackets.
2. Push switches (2) and (4) downwards to lower individual tilt rams. (if fitted)
3. Push switch (6) and (7) to unfold the boom.
4. Push switch (3) downwards to lower the boom to correct height above crop or ground level.

For folding of the boom then do the following:

Push switch (5) to set neutral slant angle (no slant). (if fitted)

Push switch (3) upwards to raise the boom to highest possible position.

Push switches (2) and (4) upwards to raise the individual tilt rams. (if fitted)

Push switch (6) to the right and (7) to the left to fold the boom. Make sure to fold the boom against the vertical slide pads.

Push switch (3) downwards to lower the boom until the rear transport hooks are firmly engaged.

Push switches (2) and (4) downwards to lower the individual tilt rams until they rest on the transport brackets.

WARNING! Ensure that transport safety chains are removed and the boom is clear from the transport brackets before unfolding.

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

ATTENTION! The boom can not be operated with the tractors hydraulic levers.

Hydraulic slanting control (optional equipment)

A hydraulic slanting control kit can be mounted on the centre section. This enables slanting of the entire boom in order to match the local topography. This is advantageous when spraying along hillsides. Always reset position to neutral before folding the boom.

Single-sided folding

It is possible to spray with only a single side of the boom unfolded. In case this is needed then only unfold the right or left boom wing by pressing swich (6) or (7) outwards. On the spray control unit also turn off the spray sections placed on outer boom sections.

Half boom width

It is possible to spray with boom only half unfolded. In case this is needed then only unfold inner sections by pressing switch (8) downwards. On the spray control unit also turn off the spray sections placed on outer boom sections.

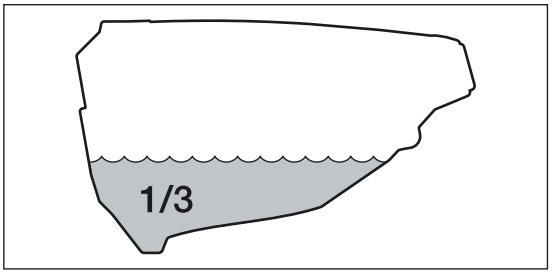
Boom tilt function (optional)

The boom tilt function controls (2) and (4) enables you to adjust the boom height individually in right and left-hand side.

Liquid system

Filling of water

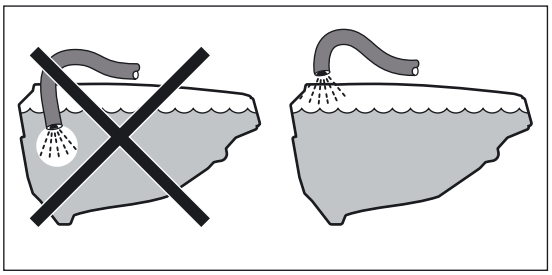
Tank should normally be filled 1/3 with water before adding chemicals. Always follow instructions given on the chemical container!



WARNING! If the sprayer is put aside with liquid in the main tank all MANIFOLD valves must be closed.

Filling through tank lid

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



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

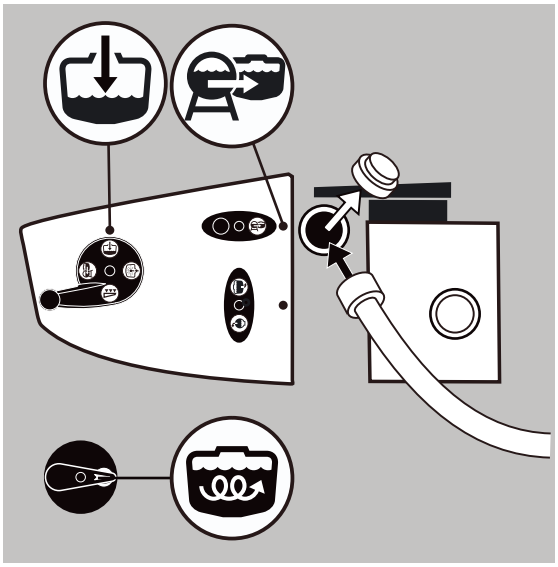
DANGER! Avoid contamination or personal injury. Do not open suction valve towards Suction Filling Device unless pump is running and filling hose is connected. If this valve is opened without pump running, liquid will stream out of the coupler.

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

External Filling Device (optional equipment)

The External Filling Device is operated as follows:

1. Remove cover and connect suction hose.
2. Turn handle on pressure SmartValve towards Main tank. Keep the suction valve closed.
3. With the P.T.O. at 540 r/min or 1000 r/min (depending on pump model), turn external suction handle towards external suction to start filling.
4. Keep an eye on the main tank level indicator.
5. Close external suction valve to stop filling.
6. Disconnect suction hose and replace cover.



ATTENTION! Turn handle towards operating unit before turning away from Fast Filler in order to avoid peak pressure blowing the safety valve!

WARNING! Do not leave the sprayer whilst filling the tank and keep an eye on the level indicator in order NOT to overfill the tank.

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

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

ProFlow (optional equipment)

When having the ProFlow system the tank filling process as follows;

1. Turn the ProFlow ON at the switch (A) located on the left side of the display panel.

2. After initializing, the upper left corner of the display panel shows the (last used) volume to be filled. If the volume to be filled should be changed, then press and hold the "Cal." button (B) until display changes to "STOP TO : XXXX".

3. Change the volume to be filled by pressing "+" (STOP/START button (C)) or "-" (0 button (D)). Holding the buttons will make the display count faster.

4. Confirm the setting by pressing "Cal." button (A) and display jumps back to work screen.

5. Connect the hose from external source to the external filling coupler on the sprayer.

6. Turn pressure SmartValve to "Main tank" and close the suction valve.

7. Engage the pump and set P.T.O. speed at 540 rpm or 1000 rpm (depending on pump model).

8. Press "STOP/START" button (C) to enable the filling. This is indicated in the lower right corner of the display when active.

9. Turn the ProFlow valve (E) to "filling from external tank". Then filling begins, and the upper right corner of the display shows the volume being filled.

10. When the volume to be filled has been reached, then ProFlow automatically stops the filling by closing the ProFlow valve (E). To avoid over-filling of the tank, ProFlow automatically stops the filling when main tank is full, if the pre-selected volume to be filled exceeds the possible volume to be filled into the main tank.

11. Turn ProFlow OFF at the switch (A) and disconnect the filling hose again.

WARNING! Do not leave the sprayer whilst filling the tank and keep an eye on the level indicator in order NOT to overfill the tank.

Filling of rinsing tank

A rinsing tank is integrated into the rear end of the sprayer and is filled via a 2" Banjo connection at the valve system:

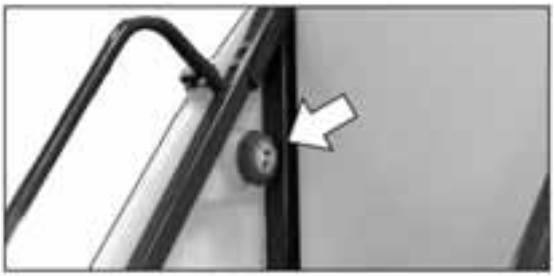
1. Fit the external water hose to the threaded connection piece on the sprayer.
2. Engage external water pump, if any.
3. Keep an eye on the level indicator situated on the platform behind the Main Tank sight gauge.
4. Stop filling and replace the cover.

Capacity: approx. 450 litres.

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.

For cleaning purposes etc. the rinsing tank is also accessible via the tank lid on top of tank.

Filling of clean water tank

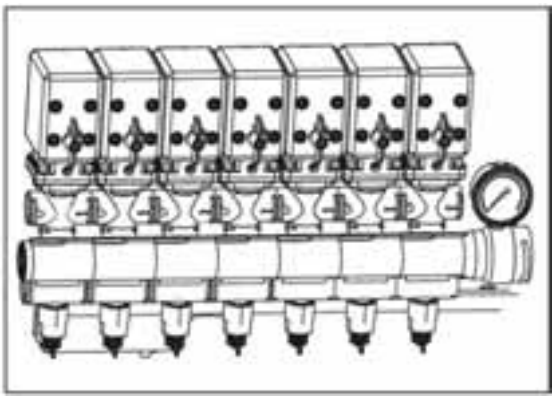


To fill the clean water tank, remove tank lid. Fill with clean water and re-secure tank lid.

To use clean water tank, turn the ball valve lever to open tap. The ball valve is located on the valve cover below the EasyClean filter on sprayers left side. The water from this tank is for hand washing, cleaning of clogged nozzles etc. Only fill the clean water tank with clean water from the well.

WARNING! Although the clean water tank is only filled with clean water, this water must never be used for drinking.

Adjustment of EVC operating unit



Before spraying, the EVC operating unit is adjusted using clean water (without chemicals).

1. Choose the correct nozzle for the spray job by turning the TRIPLET nozzle bodies. Make sure that all nozzles are the same type and capacity. See the "Spray Technique" book.

2. The main on/off switch is set to ON at the spray control unit.

3. All distribution valve switches are turned ON at the spray control unit.

4. The pressure regulation switch on the spray control unit is pressed down until the emergency handle on the valve stops rotating (minimum pressure).

5. Engage tractor park brake then put the tractor in neutral and adjust the P.T.O.,check that the number of revolutions of the pump corresponds to the intended travelling speed. Remember the number of revolutions on the P.T.O. must be kept between 300-600 rpm (pump 540 r/min) or 650-1100 rpm (pump 1000 r/min).

6. The pressure regulation switch on the spray control unit is pressed up until the required spray pressure is shown on the pressure gauge.

Adjustment of pressure equalization are now done for every single section valve:

1. Close the first section valve on the spray control unit.

2. Turn the adjusting screw for the corresponding valve until the pressure gauge again shows the same pressure as when all sections were open.

3. Open the section valve again.

3. Adjust the next section valves in the same way.

ATTENTION! HEREAFTER ADJUSTMENT OF PRESSURE EQUALISATION WILL ONLY BE NEEDED WHEN:

1. YOU CHANGE TO NOZZLES WITH OTHER CAPACITIES

2. THE NOZZLE OUTPUT INCREASES AS THE NOZZLES WEAR

Safety precautions - crop protection chemicals

Always be careful when working with crop protection chemicals!

WARNING! Always wear correct protective clothing before handling chemicals!

Personal protection

Depending on chemical type, protective gear /equipment should be worn to avoid contact with the chemicals, e.g.:

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

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

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

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

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

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

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

Filling chemicals through tank lid

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

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

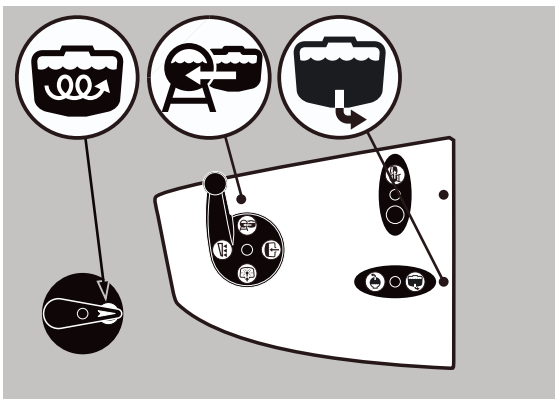
1. Make sure the spray control unit is switched off.

2. Set the valves to correct position. Suction Valve valve towards "Suction from main tank", Agitation valve towards "Agitation". Other valves should be closed,turned to unused function or turned to Pressure draining.

3. Engage the pump and set P.T.O. revolutions to 540 r.p.m.

4. Add the chemicals through the main tank hole.

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



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

Chemical Infilling

It is possible to use either the Hardi Granni Pot or the Hardi Turbo Filler as a means to infill chemicals into the main tank.

Both units can be used for;

1. Induction of Dry Granules, Powders or Flowables by adding chemical product to hopper.
2. Induction of Liquid Chemicals by adding chemical product to hopper.

The Granni Pot has a further option to allow vacuum transfer of chemical product from Envirodrums or other sources.

Please choose to read the sections relevant to your choice of Chemfill option

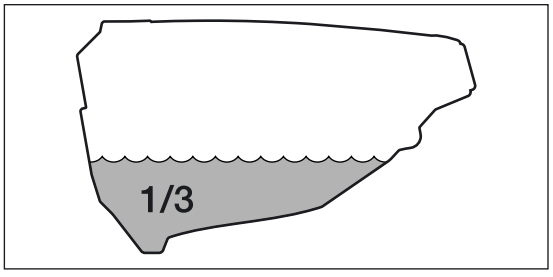
WARNING! Only compatible and complimentary chemicals should be mixed.
When combined, incompatible chemicals may cause a potentially dangerous reaction, or result in unwanted effects on the crop to be sprayed. ALWAYS follow label instructions!

WARNING! To prevent severe damage to equipment and crops, before moving sprayer ensure Granni Pot is empty, the lid closed and fastened, and the hopper is secured in Transport position.

WARNING! Do not attempt to lift the Granni Pot or TurboFiller into Transport position unless the hopper is completely empty.

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

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

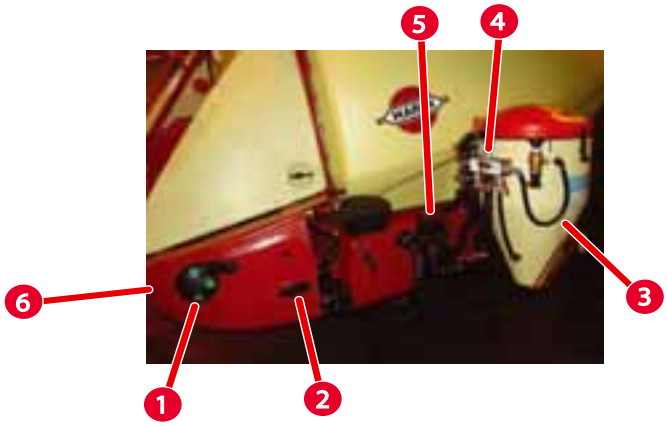


Chemical Induction by Granni Pot (optional)

The Granni Pot chemical induction can be carried out in any one of the three following methods;

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

Granni Pot System Components



1. Pressure Control SmartValve

2. Suction Control Valve

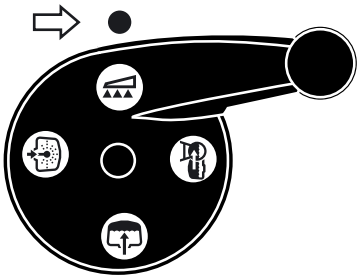
3. Granni Pot Hopper

4. Granni Pot Control Manifold

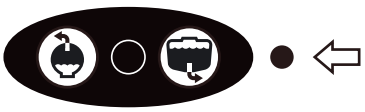
5. Vacuum Transfer Valve

6. Agitation Valve

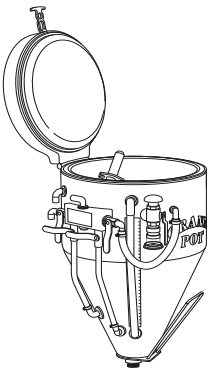
1 Pressure Control Valve



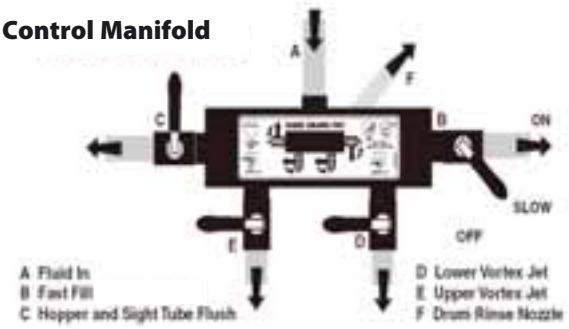
2. Suction Control Valve



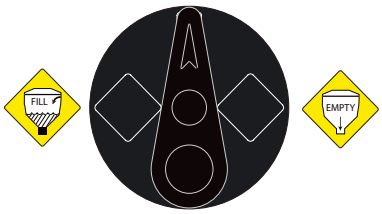
3. Granni Pot Hopper



4. Control Manifold

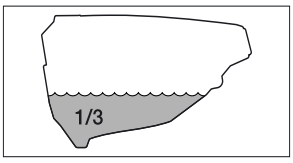


5. Vacuum / Transfer Valve



6. Agitation Valve

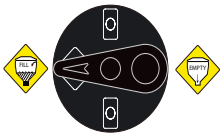
Filling the Hopper with water



Engage the pump. Set at 540 or 1000 rpm, whichever is relevant to your pump.

Before using the Granni Pot to add chemical solution/s to your sprayer, fill the main sprayer tank with water to 1/3 of required spray liquid volume.

Set Vacuum and Transfer Valve to Fill position



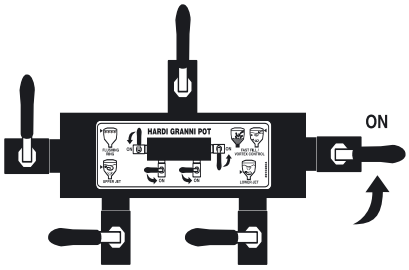
Turn the Pressure Manifold Valve on your sprayer toward the Pressure Draining icon. This will allow you to activate the Granni Pot system.

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

Turn Fast Fill handle on, to fill hopper.

Watch the level of water. Fill to the 25 Litre level, which will be just above the upper jet. (NOTE: Sight gauge is a guide only to fluid volume in hopper).

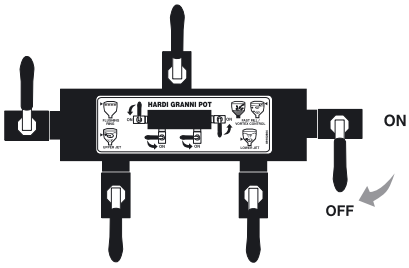
When sufficient water is in the hopper turn Fast Fill handle off.



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

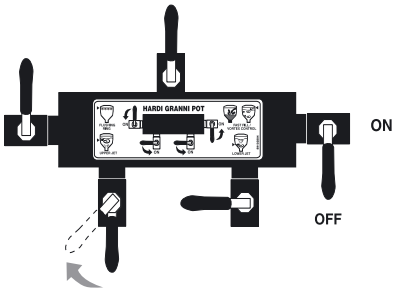
Do not use faulty equipment.

Vortex Generation (General)



To start a vortex in the hopper by turning Upper & Lower Jet handles ON and turn Fast Fill handle to OFF.

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

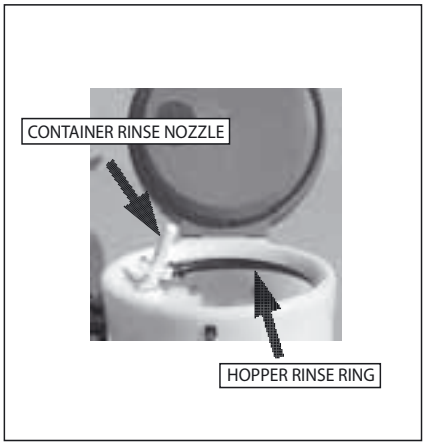


CAUTION! At this stage no fluid is being removed from the hopper - Do Not Overfill.

Granni Pot Rinsing

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

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



Chemical Container Rinsing Device

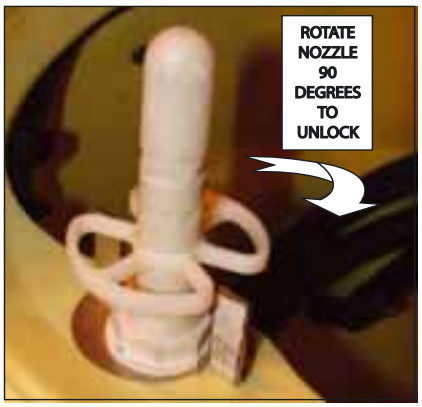
DANGER! Do not press the nozzle unless it is covered by a container to avoid spray liquid hitting the operator.

ATTENTION! Rinsing device uses spray liquid to rinse containers. Always rinse the chemical containers with clean water several times before disposal.

The rinse nozzle lock is released by turning the upper section 90 degrees

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

Once unlocked, the rinse nozzle can be used by placing a container upside down on top of the nozzle and pressing down. The will force a powerful jet of water up into the inside of the container.



Hopper Rinsing Ring

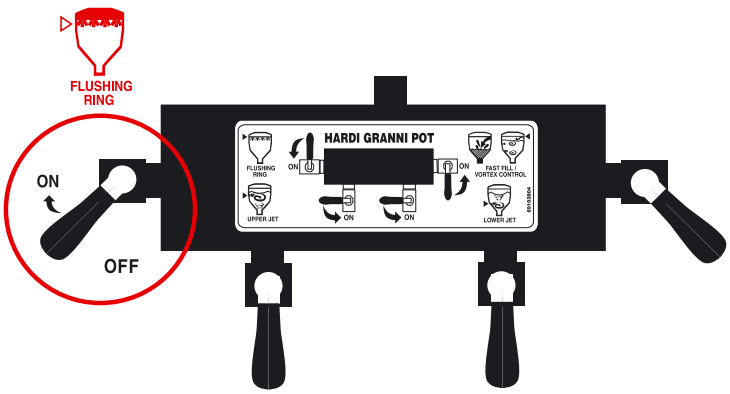
DANGER! Do not activate the rinse ring unless the hopper lid is closed to avoid spray liquid hitting the operator.

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

With the lid closed, flush the hopper using the rinse ring.

Control the rinse by turning flush ring handle on Granni Pot control manifold to the ON / OFF position.


HOPPER RINSE RING
(viewed from inside hopper)



ATTENTION! The hopper rinsing devices use spray liquid for rinsing the hopper. The Granni Pot must always be cleaned/decontaminated together with the rest of the sprayer with fresh water when the spray job is complete.

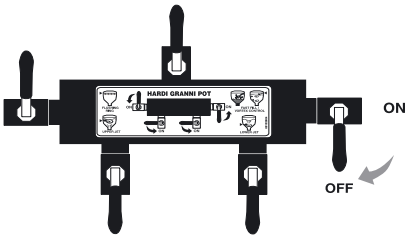
Filling with liquid or granular chemicals by Granni Pot (optional equipment)

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

1. Fill the hopper with water to the 25 litre level.

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

2. Start a swirling action in the hopper by turning ON the upper and lower jet handles and turning Off the Fast Fill handle.



WARNING! At this stage no fluid is being removed from the hopper Do Not Overfill.

3. Pour pre-measured chemical amount into vortex stream (not into centre of hopper). Vortex action will be reduced during the addition of chemical.

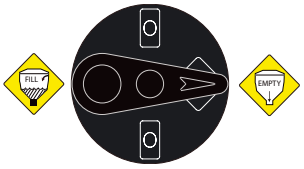
Note: Large unmixed chemical will be held by centrifugal force to the outside wall of the hopper. Continue mixing in the hopper until chemical is fully integrated into water.

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

4. When all chemical has been thouroughly mixed, close vortex jet handles.

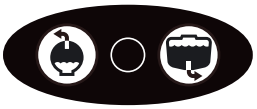
Transfer chemicals to Main Tank by Granni Pot

5. To transfer the mixture to the sprayer tank. Close lid of Granni Pot Hopper, turn the Vacuum Transfer Valve to the EMPTY position. This will allow a venturi to create a vacuum inside the Granni Pot hopper and allow the hopper contents to flow through to the main tank.



6. With the lid still closed, flush the hopper using the hopper rinse ring between batches of chemical.

7. After all chemicals have been added to the sprayer tank, and the Granni Pot Hopper is empty, set the suction ball valve on the sprayer manifold to Flush Tank in order to flush the Granni Pot system with clean water.



8. Refill the hopper with clean water, operate all valves as in mixing procedure, empty and repeat until the system is clear of residue chemical.

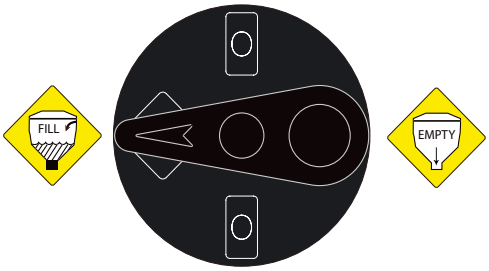
Filling chemicals by Vacuum Granni Pot Method (optional equipment)

Before adding any chemicals fill, hopper with water to test functions as described under Filling Granni Pot with water section.

1. Connect Chem Probe camlock to Ball Valve on Granni Pot Hopper, OR

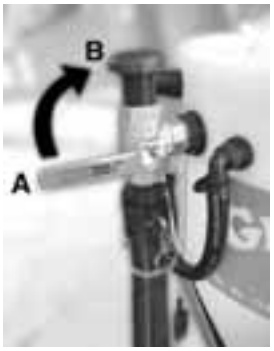
   Connect suction hose to the camlock fittings on the ball valve of the hopper and the Drum coupling.

2. With lid of Granni Pot closed, turn the Vacuum and Transfer Valve to FILL position, to activate the venturi, which will create a vacuum inside the hopper.



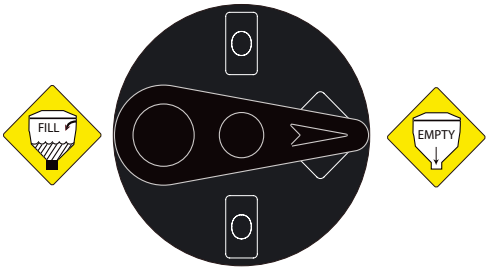
3. The vacuum is controlled by the ball valve and vent. In the CLOSED (A) position,the ball valve is open to the suction line,

and liquid chemical will be drawn from the drum into the hopper.



4. To stop the flow of liquid chemical from the drum, move the ball valve to OPEN (B) position - this allows air from the atmosphere to be introduced to the hopper through the vent, and closes off the suction line.

5. To transfer measured volume of chemical mixture to the sprayer tank, turn the Vacuum and Transfer valve to EMPTY.

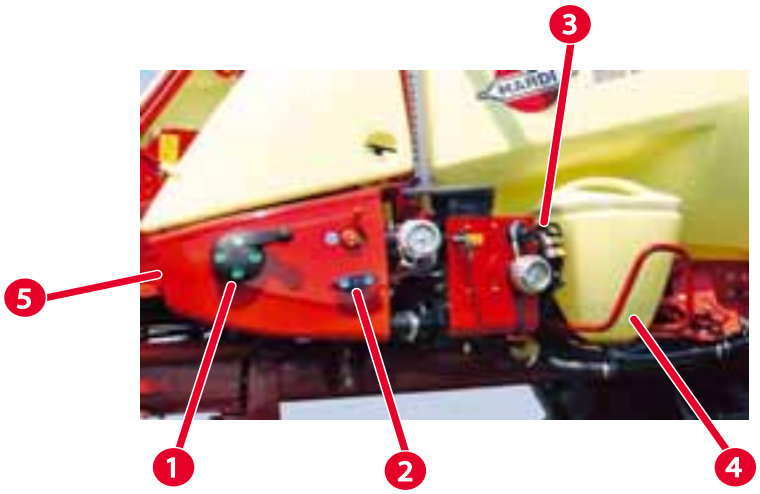


6. Flush Hopper and Sight Tube between different chemicals.

ATTENTION! The hopper rinsing devices use spray liquid for rinsing the hopper. The Granni Pot must always be cleaned/decontaminated together with the rest of the sprayer with fresh water when the spray job is complete.

Chemical induction by HARDI TurboFiller (optional equipment)

Component Locations



1. **Pressure Control SmartValve**
2. **Suction Control Valve**
3. **Turbofill Control Manifold**
4. **Turbofill Hopper**
5. **Agitation Valve**

Lowering Chemical Hopper to work level

The Turbofill hopper is lowered to a suitable working height by pulling the locking mechanism handle out to disengage lock while applying downward pressure on the hopper handle to lower the hopper. When the hopper reaches the proper work height the locking mechanism will lock in place and hold the hopper at operation height.

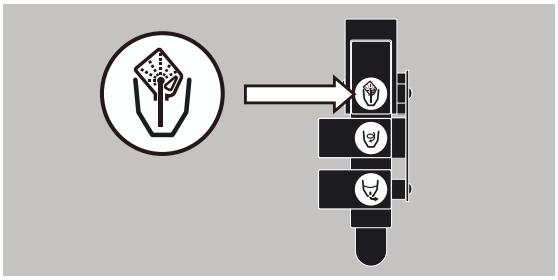
To return the hopper to the transport position use the same procedure while lifting the hopper handle. Ensure the lock has fully engaged.

DANGER! To prevent severe damage to equipment and crops, before moving sprayer ensure TurboFiller is empty, the lid closed and fastened, and the hopper is secured in Transport position.

WARNING! Do not attempt to lift the TurboFiller into Transport position unless the hopper is completely empty.

Turbofill Control Manifold

Chemical container cleaning lever (optional equipment)



The upper lever located to the left of TurboFiller are used for two purposes:

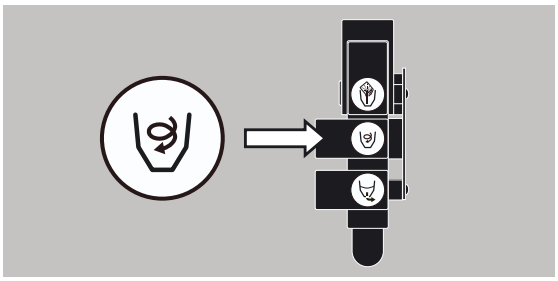
When TurboFiller lid is open: For cleaning empty containers. Put container over the rotating flushing nozzle in the middle of the TurboFiller to rinse inside of the container.

When TurboFiller lid is closed: Use the Chemical Container Cleaning lever to rinse the hopper after filling of chemicals has ended.

Chemical container cleaning

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

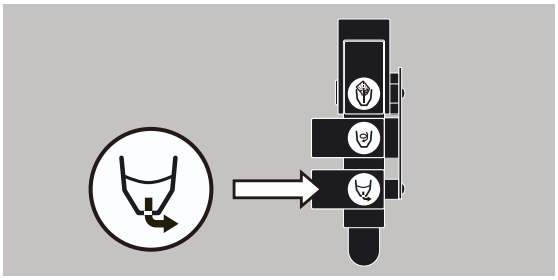
TurboDeflector valve (optional equipment)



This TurboDeflector valve activates the Vortex flushing of the TurboFiller. The valve is the middle valve situated to the left side of the TurboFiller and is activated in two ways. Push the valve lever down to get a quick flush in the hopper. Lift the lever to lock it in open position for continous liquid rotation in the hopper.

Start TurboDeflector

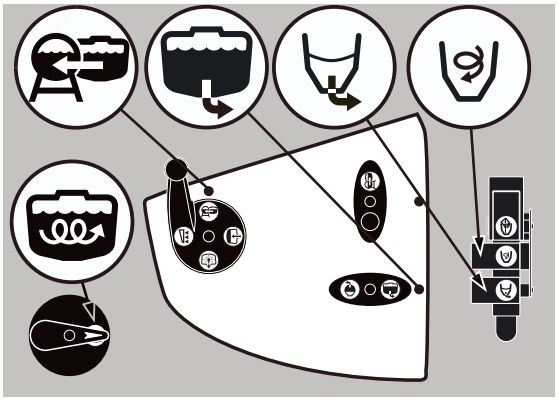
TurboFiller suction valve (optional equipment)



The valve is used simultaneously with the TurboFiller. The valve is the lowest valve situated to the left side of the TurboFiller and is activated in two ways. Push the valve lever down to get a quick soak out in the hopper. Lift the lever to lock it in open position for continous suction from the hopper into main tank. Open valve when chemicals are going to be filled into the TurboFiller.

Filling chemicals without TurboDeflection

Filling powder chemicals by HARDI TurboFiller (optional equipment)



1. Fill the main tank at least 1/2 with water (unless something else is stated on the chemical container label). See section "Filling of water".

2. Turn the handle at the suction valve towards "suction from Main tank". Turn Pressure SmartValve towards "pressure draining" or an unused function. Turn the AgitationValve towards "Agitation". Close remaining valves.

3. Engage the pump and set P.T.O. speed at 540 r/min or 1000 r/min (depending on pump model).

4. Open TurboFiller lid. Open TurboDeflector valve and TurboFiller suction valve.

5. Measure the correct quantity of chemical and sprinkle it into the hopper as fast as the transfer device can flush it down.

6. If the chemical container is empty it can be rinsed by the Chemical Container Cleaning device. Place the container over the multi-hole nozzle and push the upper lever to the left of the TurboFiller.

7. Close TurboFiller suction valve again when the hopper is rinsed.

8. Close the TurboFiller lid again.

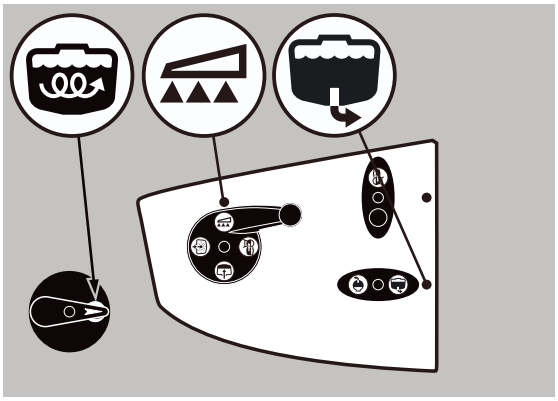
DANGER! Before turning Pressure SmartValve to "Pressure draining" it is very important to be sure that the quick coupler lid is correct and completely mounted to the filling stud into its locked position. Failure to do so may cause risk of contamination and injury from quick coupler lid being "shot"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

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

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

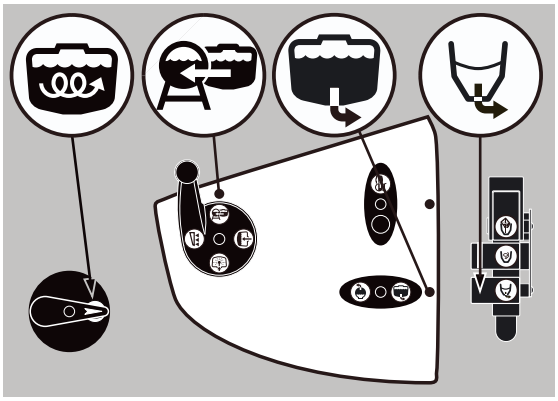
ATTENTION! The hopper rinsing device is using spray liquid for rinsing the hopper for concentrated chemical! The FILLER must always be cleaned together with the rest of the sprayer when the spray job is done.

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



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

Filling liquid chemicals by HARDI TurboFiller (optional equipment)



1. Fill the main tank at least 1/3 with water (unless something else is stated on the chemical container label).

2. Turn the handle at the suction valve towards "suction from Main tank". Turn Pressure SmartValve towards "Pressure draining" or an unused function. Turn the AgitationValve towards "Agitation".

3. Engage the pump and set P.T.O. speed at 540 r/min or 1000 r/min (depending on pump model).

4. Open TurboFiller lid. Measure the correct quantity of chemical and fill it into the hopper.

5. Engage the hopper transfer device by opening the TurboFiller suction valve and the chemical is being transferred to the main tank.

6. If the chemical container is empty it can be rinsed by the Chemical Container Cleaning device. Place the container over the multi-hole nozzle and push the upper lever to the left of the TurboFiller.

7. Close TurboFiller suction valve again when the hopper is rinsed.

8. Close the TurboFiller lid again.

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

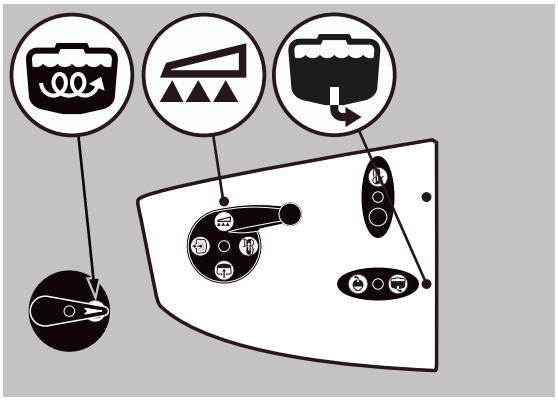
ATTENTION! The scale in the hopper can only be used if the sprayer is parked at level ground! It is recommended to use a measuring jug for best accuracy.

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

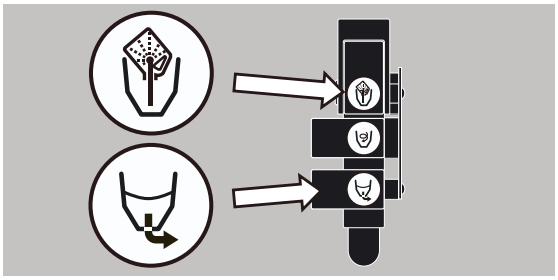
ATTENTION! Rinsing device uses spray liquid to rinse containers for concentrated chemicals. Always rinse the chemical containers with clean water several times until they are clean before disposal.

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

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



TurboFiller rinsing

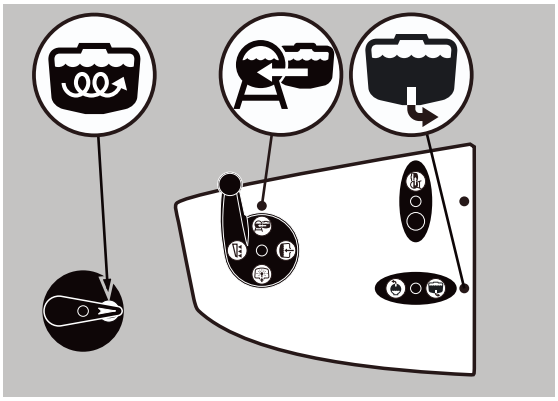


Rinsing the TurboFiller and chemical containers are done in the following two ways:

When TurboFiller lid is open: For cleaning empty containers. Put container over the rotating flushing nozzle in the middle of the TurboFiller so that the nozzle is inside the container. Press the Chemical Container Cleaning lever and TurboFiller suction valve at the same time to activate the flushing nozzle in the middle of the TurboFiller and empty out the TurboFiller rinsing liquid.

When TurboFiller lid is closed: Use the Chemical Container Cleaning lever to rinse the hopper after filling of chemicals has ended. Press the Chemical Container Cleaning lever and TurboFiller suction valve at the same time to activate the flushing nozzle in the middle of the TurboFiller and empty out the TurboFiller rinsing liquid. Do this 3 times and after last flushing then open lid to inspect if the TurboFiller is empty. If not, then place lid again and press TurboFiller suction valve until the TurboFiller is empty.

Agitation before re-starting spraying



If a spraying job has been interrupted for a while, severe sedimentation can occur depending on chemicals being used. When re-starting spray job it might be necessary to agitate sedimented material first.

1. Turn handle at the suction valve towards "Suction from main tank". Turn pressure SmartValve towards "Pressure emptying" or not used function and turn the Agitation valve towards "Agitation". Other valves closed.

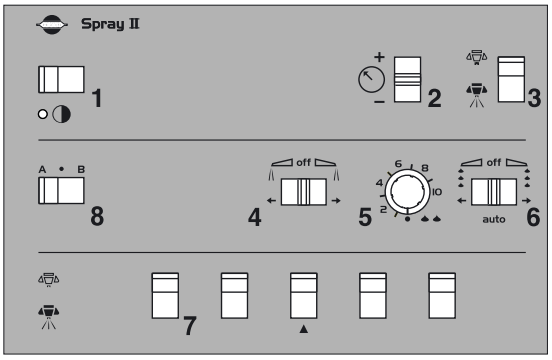
2. Engage the pump and set P.T.O. speed at 540 r/min or 1000 r/min (depending on pump model).

3. Agitation has started and should be continued for at least 10 minutes.

4. Resume of the spraying can begin. Turn pressure SmartValve towards "Spraying" and start spraying..

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

Operating the control unit while spraying



The switches on the spray control unit controls the following functions:

1. Power ON/OFF
2. Spray pressure regulation
3. Main valve ON/OFF
4. End nozzle (Left/OFF/Right)
5. Foam Marker frequency interval
6. Foam Marker (Left/OFF/Right)
7. Section Valves
8. Optional function

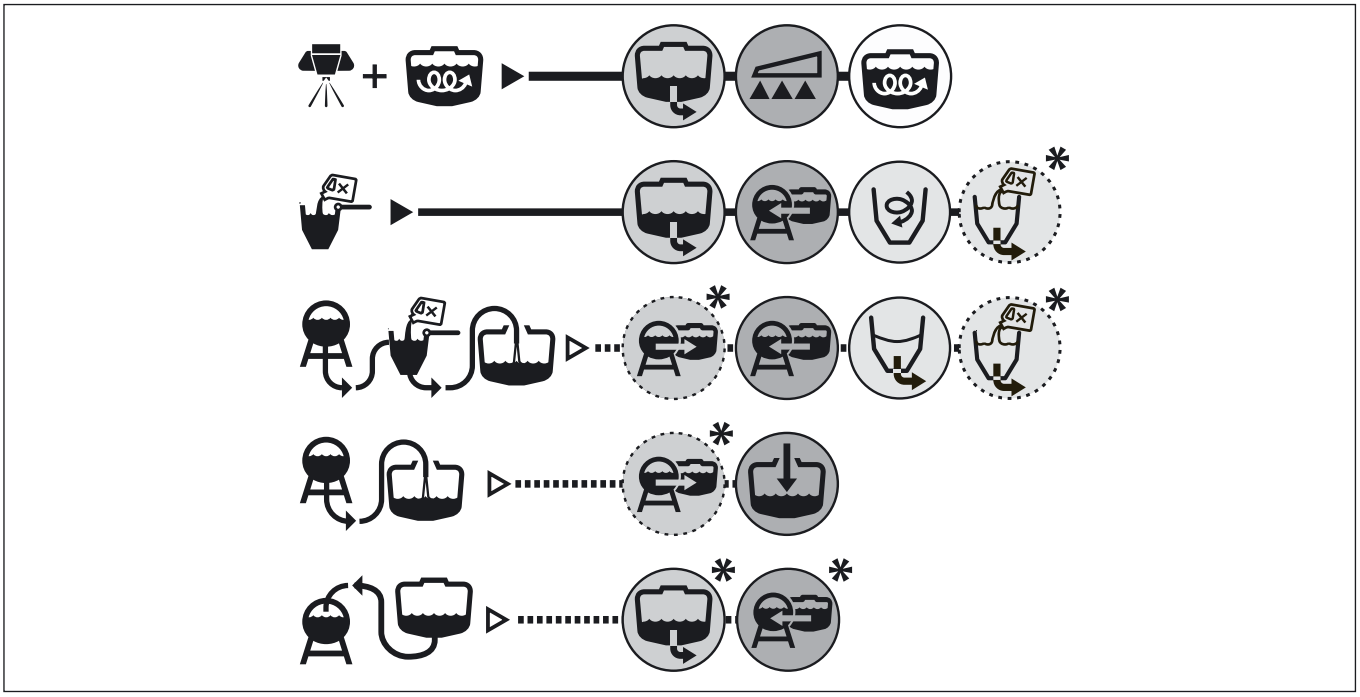
In order to close the entire boom, switch main ON/OFF (3) to OFF position. This returns the pump output to the tank through the return system. The diaphragm Non-drip valves ensure instantaneous closing of all nozzles.

In order to close one or more sections of the boom, switch the relevant distribution valve (9) to off position (A). The pressure equalisation ensures that the pressure does not rise in the sections which are to remain open (B).

On the sprayer the suction valve should be turned toward "Suction from Main tank" and pressure SmartValve should be turned toward "Spraying". Turn the agitation valve to "Agitation" if necessary.

Quick reference - Operation

In the following diagrams handle positions for different options are described.



*designates an optional function.

Cleaning

General info

In order to derive full benefit from the sprayer for many years the following service and maintenance program should be followed.

ATTENTION! Always read the individual paragraphs. Read instructions for service/maintenance jobs carefully before starting on the job. If any portion remains unclear or requires facilities which are not available, then for safety reasons please leave the job to your HARDI dealer's workshop.

ATTENTION!

Clean sprayers are safe sprayers.

Clean sprayers are ready for action.

Clean sprayers cannot be damaged by pesticides and their solvents.

Guidelines

1. Read the whole chemical label. Take note of any particular instructions regarding recommended protective clothing, deactivating agents, etc. Read the detergent and deactivating agent labels. If cleaning procedures are given, follow them closely.

2. Be familiar with local legislation regarding disposal of pesticides washings, mandatory decontamination methods, etc. If in doubt then contact the appropriate department, e.g. Dept. of Agriculture.

3. Pesticide washings can usually be sprayed out on a soakaway. This is an area of ground that is not used for cropping. You must avoid seepage or runoff of residue into streams, water courses, ditches, wells, springs, etc. The washings from the cleaning area must not enter sewers. Drainage must lead to an approved soakaway. The at any time existing law must always be followed.

4. Cleaning starts with the calibration, as a well calibrated sprayer will ensure the minimal amount of remaining spray liquid.

5. It is good practice to clean the sprayer immediately after use and thereby rendering the sprayer safe and ready for the next pesticide application. This also prolongs the life of the components.

6. It is sometimes necessary to leave spray liquid in the tank for short periods, e.g. overnight, or until the weather becomes suitable for spraying again. Unauthorised persons and animals must not have access to the sprayer under these circumstances.

7. If the product applied is corrosive, it is recommended to coat all metal parts of the sprayer before and after use with a suitable rust inhibitor.

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 field you have 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 sprayer 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. Remember the tank roof. Rinse and operate all components and any equipment that has 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 in 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 sprayer. 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.

Cleaning and maintenance of filters

Clean filters ensure:

• Sprayer components such as valves, diaphragms and operating unit are not hindered or damaged during operation.

• Nozzle blockages do not occur whilst spraying.

• Long life of the pump. A blocked suction filter will result in pump cavitation. The main filter protecting sprayer components is the suction filter. Check it regularly.

Use of rinsing tank and rinsing nozzles (optional equipment)

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

A. In-field diluting of remaining spray liquid residue in the spraying circuit for spraying the liquid in the field, before cleaning the sprayer. This cleaning procedure is divided in three main steps:

Cleaning of the liquid system:

1. Empty the sprayer as much as possible. Close the AgitationValve (no agitation) and spray till air comes out of all nozzles.

2. Turn suction valve towards "Rinsing tank" and pressure SmartValve towards "Main tank".

3. Engage and set the pump at approximately 300 r.p.m.

4. When 1/3 of content in rinsing tank are used, turn suction valve towards "Main tank" and operate all valves on the pressure side of the system in the following order, so all hoses and components are rinsed: Turn the pressure SmartValve towards "Filling of main tank" to activate ejector and open 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 assure that TurboFiller is empty. When empty then close the TurboFiller suction valve again. Open pressure draining (make sure cap is fitted), Activate agitation and close it again.

Take care that the External fast filling connection and the line is not contaminated with chemicals.

5. Turn the suction valve towards "Main tank" and pressure SmartValve towards "Spraying" and spray liquid in the field you have just sprayed.

Cleaning of Main tank:

6. Turn the suction valve towards "Rinsing tank" and pressure SmartValve towards "Internal Tank Cleaning". The filling strainer should be away, so there is no cleaning shadow behind the filling strainer.

7. When another 1/6 of content in rinsing tank are used, then turn suction valve towards "suction from Main tank".

8. Turn pressure SmartValve towards "Spraying" and spray liquid in the field you have just sprayed.

9. Repeat point 6 - 8 one more time.

WARNING! When critical chemicals (like sulphonyl urea) have been used or a cleaning adjutant is recommended do an extra cleaning:

1. Fill the rinse tank again.
2. Fill main tank with 500 l clean water. See subject "External Filling device" for filling procedure.
3. Ad the cleaning chemical to main tank by using the TurboFiller.
4. Clean the whole system again.
5. To get the best cleaning effect the EasyClean and the CycloneFilter sieves should be washed with clean water.

Outwards cleaning:

10. Turn suction valve towards "Rinsing tank" and pressure SmartValve towards "Internal Tank Cleaning".

11. When another 1/3 of content in rinsing tank are used, then turn suction valve towards "Main tank".

12. Turn pressure Agitation valve towards "External Cleaning Device" and wash the sprayer with the cleaning device located on sprayers right side.

13. Disengage pump again.

B. 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 SmartValve in "Spraying"-position).

2. Close AgitationValve (no agitation).

3. Engage the pump and spray water from rinsing tank in the field until all nozzle tubes/nozzles are flushed with clean water.

4. Disengage pump again.

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 going to be sprayed afterwards!

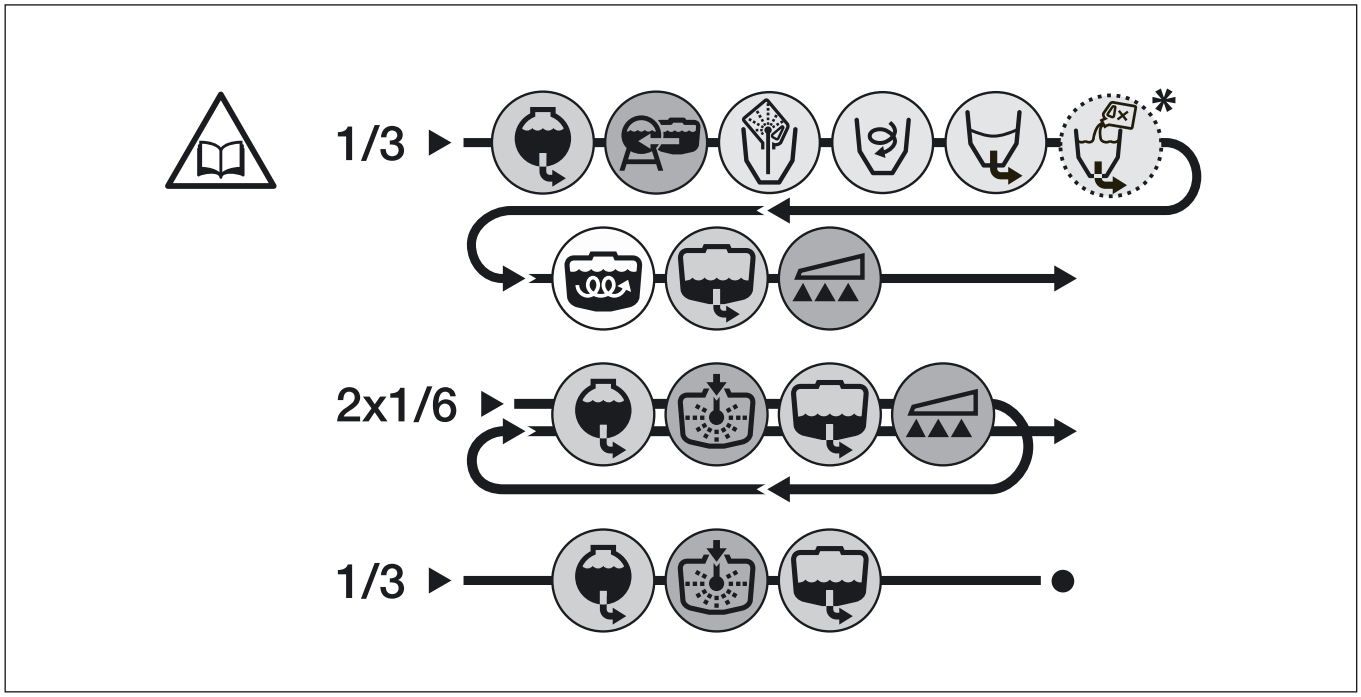
ATTENTION! It is advisable to increase the forward speed (double if possible) and reduce the pressure to 1.5 bar (20 psi) when spraying diluted remaining liquid in the field just sprayed.

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.

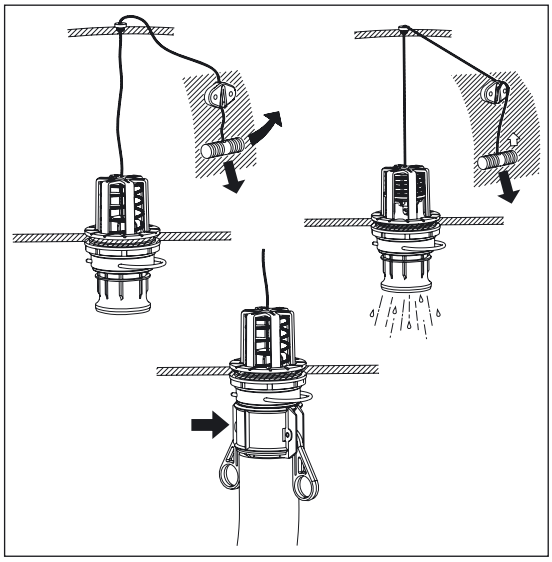
Quick reference - Cleaning

In the following diagrams handle positions for different options are described.



*designates an optional function.

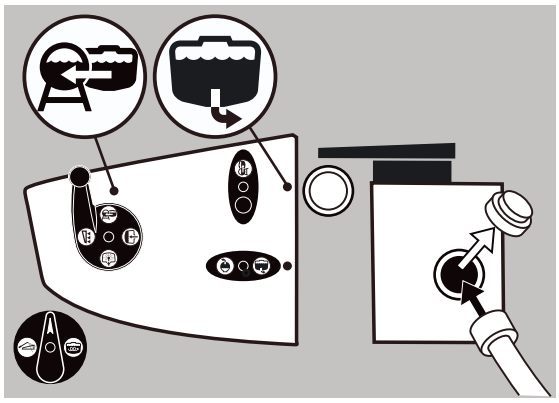
Using the drain valve



The drain valve is located and operated from the platform just beside the main tank lid. Pull the string to open the drain valve. The valve is spring-loaded, but can be kept open by pulling the string upwards in the V-shaped slit. To release, pull the string downward and the valve will close automatically.

If draining residues, e.g. liquid fertilizer into a reservoir, a snap-coupler with hose can rapidly be connected to the drain valve and the liquid safely drained.

Pressure draining (optional equipment)



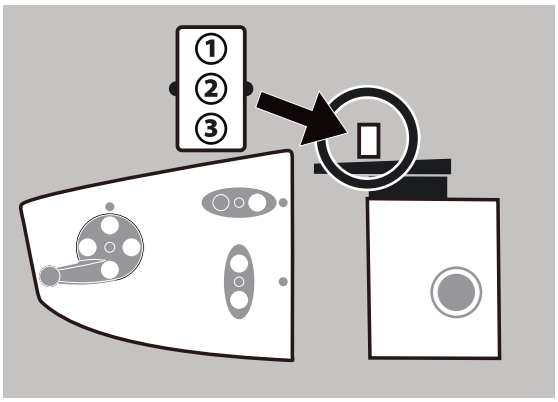
It is possible to drain to an external tank. This is done the following way:

1. Connect a hose from an external tank to the pressure quick coupler on the sprayer.
2. Turn the Pressure SmartValve towards "External tank".
3. Turn the Suction Valve towards "Suction from main tank".
4. Engage the P.T.O to start the pump.
5. When tank is drained then turn off P.T.O. again.
6. Disconnect hose and refit the quick coupler lid.

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

ATTENTION! If the safety valve is activated, then lower P.T.O. revolutions to avoid rinsing water being lost into main tank.

Work light selector switch



The boom and work lights selector switch is placed just below the SafetyLocker (between valve shield and EasyClean filter) and has three positions:

1. Boom lights ON

2. Lights OFF (neutral position)

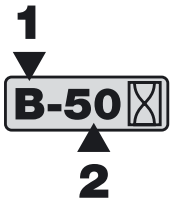
3. Work light ON

It is recommended to switch OFF the rear lights of the tractor in order to save power consumption and to avoid reflection.

ATTENTION! If preferred the work lights can be controlled from the tractor cabin. Connect from J4 in the work lights junction box to the optional function on the spray control unit.

Lubrication

General info



Always store lubricants in a clean, dry and cool environment - 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 directions concerning recommended quantity. If no recommended quantity is given, feed lubricator till new grease becomes visible.

Pictograms in lubrication & oiling plans tell the following:

1. Lubricant to be used (see "Recommended lubricants").

2. Operating hours before next lubrication.

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

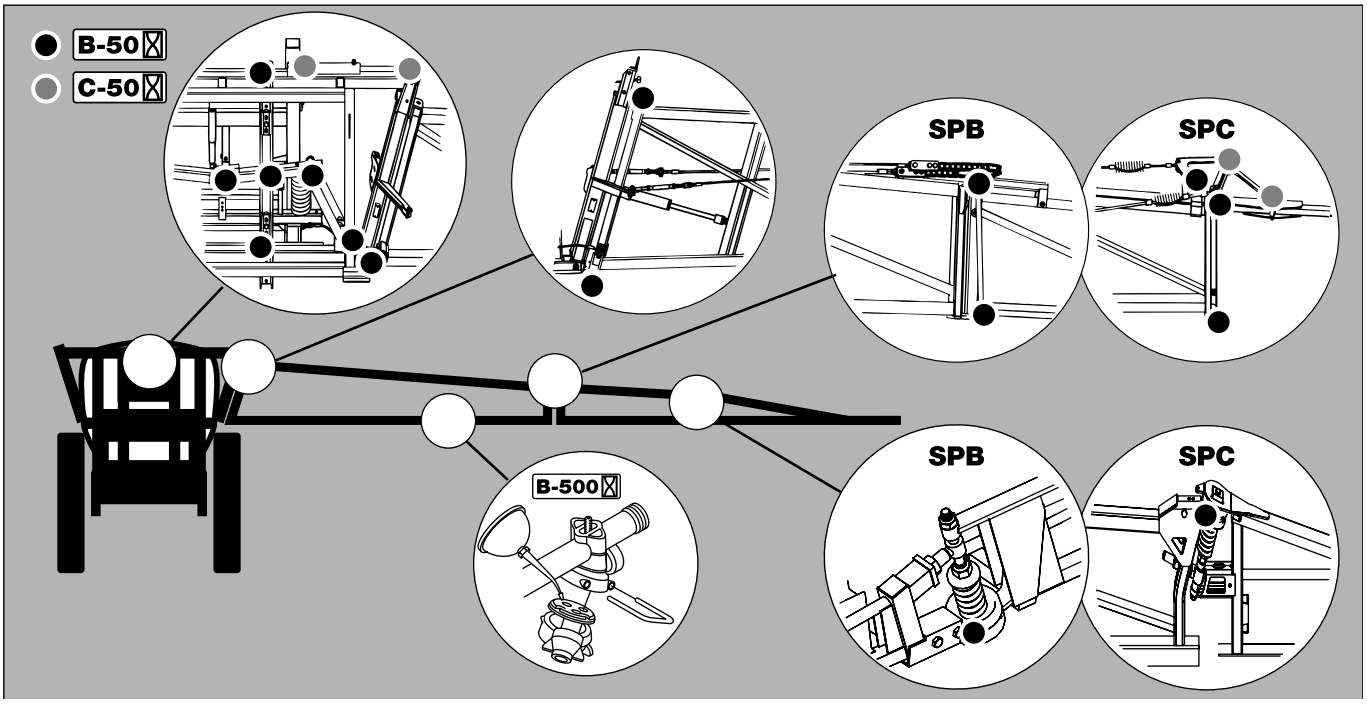
Recommended lubricants

A
BALL BEARINGS:
Universal Lithium grease, NLGI No. 2
SHELL RETINAX EP2
CASTROL LMX GREASE

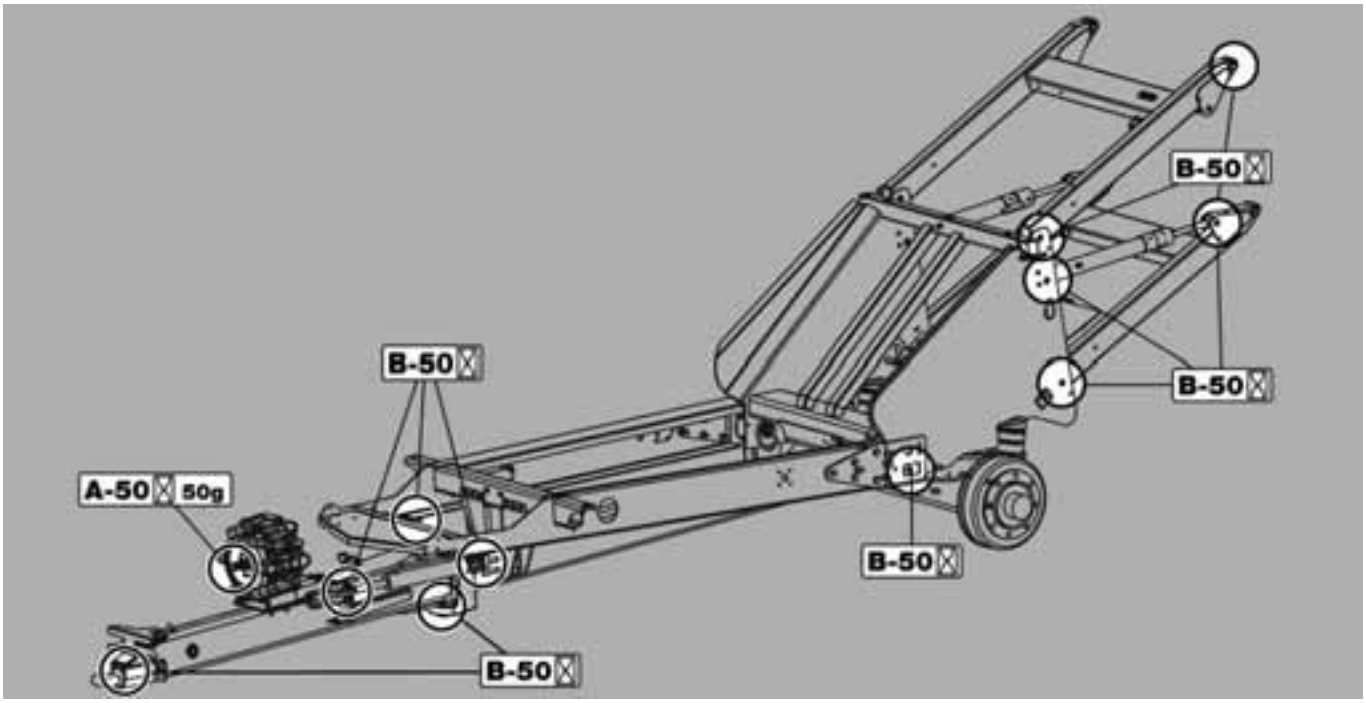
B
SLIDE BEARINGS:
Lithium grease with
Molybdenumdisulphide or graphite
SHELL RETINAX HD 2 (or HDX 2)

C
OIL LUB. POINTS:
TOTAL Transmission TM
SAE 80W/90
Castrol EPX 80W/90
SHELL Spirax 80W/90
Mobil Mobilube 80W/90

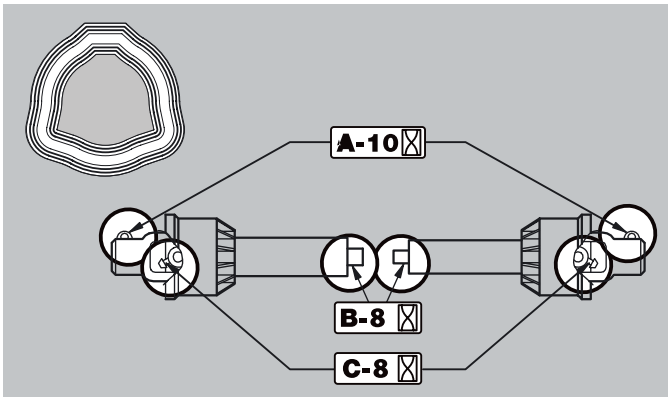
Boom lubrication & oiling plan

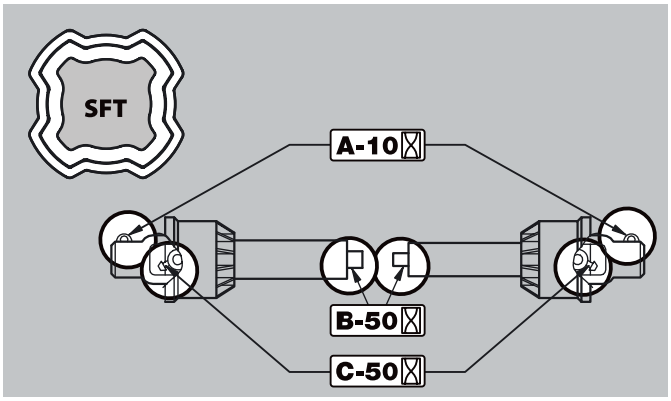


Trailer lubrication & oiling plan



P.T.O. lubrication & oiling plan





Service and Maintenance intervals

10 hours service - Cyclone filter

To service the Cyclone filter:

1. Close the suction valve and turn the pressure SmartValve to "Main tank" or an unused function.

2. Unscrew filter lid (A).

3. Lift the lid and filter (B) from housing.

4. Seperate filter from the integrated filter guide in the lid and clean the filter.

To reassemble:

1. Grease the two O-rings on the lid/filterguide. Due to small space at lid for example use a brush to grease with.

2. Mount the filter onto the recess (which may not be greased) in the lid/filterguide.

3. Place the filter/filterlid into housing and screw the lid until it hits the stop.

DANGER! Suction valve must always be closed and the pressure SmartValve to "Main tank" before opening the Cyclone filter! If not then spraying liquid can hit you when opening the filter and drain the main tank content!

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

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

10 hours service - EasyClean filter

This filter has a clogging indicator as mentioned in the "Description" chapter, but even if this indicator does not show clogging it should be cleaned every 10 hours.

To service the EasyClean filter:

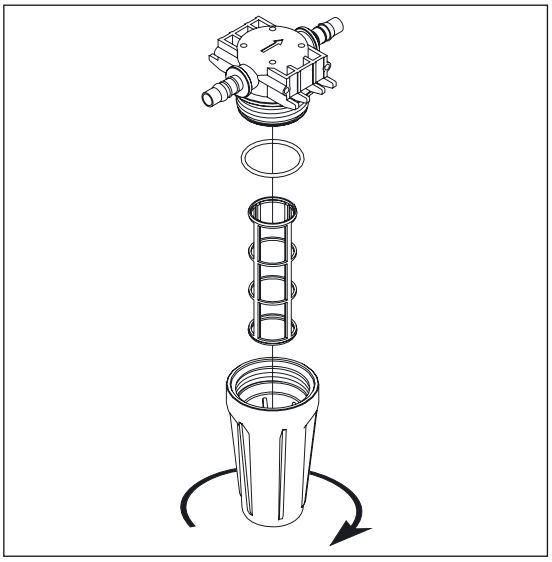
1. Turn the filter lid counter clockwise to open.
2. Remove lid and filter from filter housing.
3. Seperate filter element from lid/filter guide.
4. Clean filter and if necessary clean the housing for larger impurities.

To reassemble:

1. Grease the O-ring on the filter lid.
2. Press the filter onto filterguide/lid and be sure it is secured on to the guides.
3. Reassemble filter/filter lid into housing and be sure it contacts the guides in the bottom of housing.
4. Turn filter lid clockwise to close lid.

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

10 hours service - In-Line filter (optional equipment)



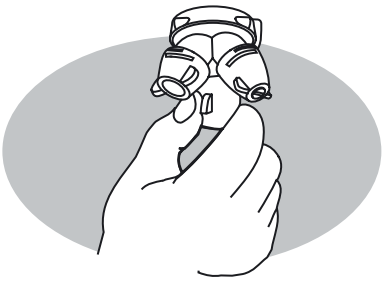
If the boom is equipped with In-Line Filters unscrew the filter bowl to inspect and clean the filter. When reassembling the O-ring should be greased.

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!

10 hours service - Nozzle filters



Check and clean.

10 hours service - Spraying circuit

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

10 hours service - Brakes (optional equipment)

Apply brake pedal and check function of trailer brakes.

50 hours service - Transmission shaft

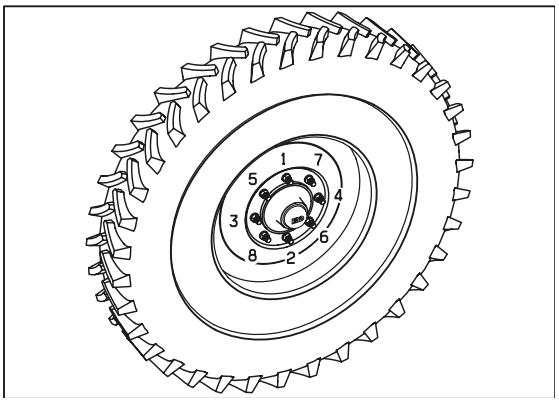
Check function and condition of the transmission shaft protection guard. Replace possible damaged parts.

50 hours service - Wheel bolts and nuts

Tighten wheel nuts as follows with following torque wrench settings:

Wheel hub to rim plate: 650 Nm (480 lbft)

Tightening sequence: See illustration and tighten in order of numbering.



ATTENTION! When wheels has been mounted or re-tightened, the plastic nut covers must be placed on the nuts afterwards.

50 hours service - Tyre pressure

Check the tyre pressure according to the table in "Technical specifications".

DANGER! Never inflate tyres more than to the pressure specified in the table. Over-inflated tyres can explode and cause severe personal injuries! See the part "Occasional maintenance - Change of tyre".

WARNING! If renewing tyres always use tyres with min. load index as specified.

250 hours service - Readjustment of the boom

See section "Occasional maintenance".

250 hours service - Hydraulic circuit

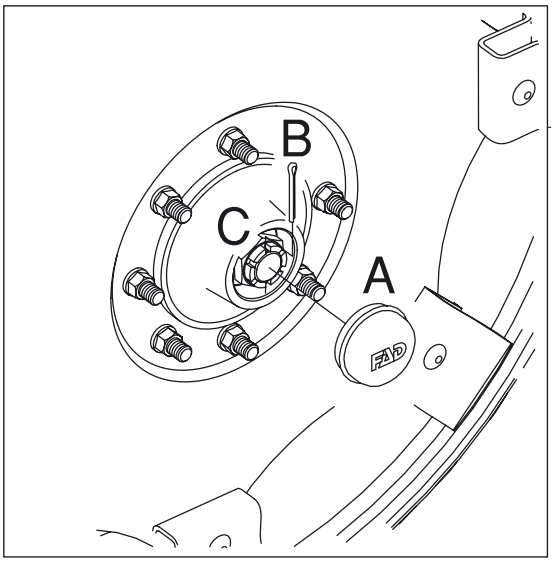
Check the hydraulic circuit for leaks and repair any leaks if found.

WARNING! Hoses for boom lifting device must be changed after every 5 years of use.

250 hours service - Hoses and tubes

Check all hoses and tubes for possible damages and proper attachment. Renew damaged hoses or tubes.

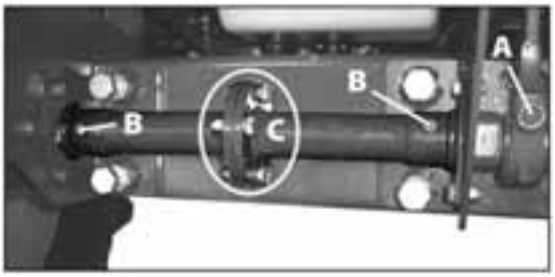
250 hours service - Wheel bearings



Check for play in the wheel bearings:

1. Place stop wedges in front of and behind LH wheel and jack up RH wheel.
2. Rock the RH wheel to discover possible play in the bearings.
3. If any play, support the wheel axle to prevent the trailer from falling down from the jack.
4. Remove hub cap (A) and cotter pin (B). Turn the wheel and tighten the castellated nut (C) until a slight resistance in the wheel rotation is felt.
5. Loosen the castellated nut until the first notch - horizontal or vertical - is aligned with the cotter pin hole in the shaft.
6. Fit a new cotter pin and bend it.
7. Fill the hub cap with fresh grease and screw it on to the hub again.
8. Repeat the procedure on LH wheel.

250 hours service - Brake adjustment



As the brakes become worn through normal service in the field, the clearance between the brake shoes and the brake drums increases resulting in slower braking response and the need for adjustment.

Adjustment procedure

To adjust the brakes proceed as follows:

1. Prepare the sprayer for maintenance / service procedures (see "Preparation" in the safety notes at the beginning of this section).

2. Lift the axle assembly off the ground (two lifting jacks, placed underneath the axle is recommended) and secure with safety stands.

3. Adjustment can now be checked by rotating the wheel/drum and feeling the amount of contact between the drum and the brake shoes.

4. To adjust the brakes, depress the locking collar (A) and turn the hex head adjuster (B) clockwise through 90° (1/4 turn at a time) until light resistance is felt from the brake shoes coming in contact with the drum (there should be some light resistance when turning by hand).

5. Adjust each side equally and remember to apply lubricant to the grease nipple (C) in the usual fashion.

6. Once service is completed test the brakes for response and binding.

Warning: This adjustment must be carried out on both sides of the sprayer at the same time.

250 hours service - Hydraulic brakes

Apply brakes to full pressure and inspect brake lines for damages or leaks. Replace damaged parts. If the hydraulic brake lines have been dismantled the circuit must be primed afterwards:

1. Loosen brake hose at both brake cylinders.

2. Apply brake until oil without air bubbles come out.

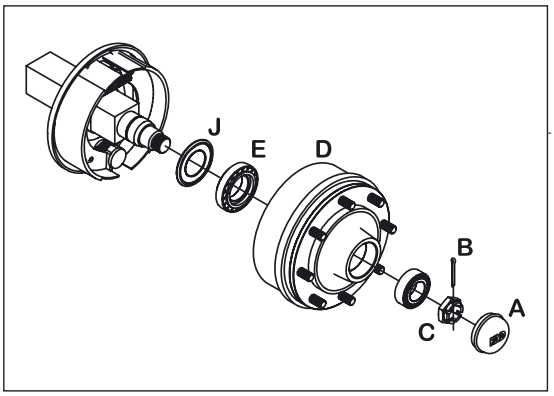
3. Tighten brake hose before relieving the brake again.

WARNING! Always prime the circuit if the hydraulic brake lines have been dismantled.

1000 hours service - Transmission shaft

Change the protection tube nylon bearings as described under "Shield renewal on transmission shaft".

1000 hours service - Wheel bearings and brakes



Check the condition of the bearings and brake wear parts in the following way:

1. Place stop wedges in front of and behind LH wheel and jack up RH wheel.

2. Support the trailer with axle stands.

3. Remove the wheel.

4. Unscrew the 6 Allen bolts and remove the hub cap (A), cotter pin (B) and castle nut (C).

5. Pull off the wheel hub and brake drum assembly. Use a wheel puller if necessary.

6. Vacuum clean the brake drum (D) for brake dust or rinse with water.

7. Rinse the remaining parts on the brake carrier plate with water and dry them.

8. Remove roller bearings (E), clean all parts in degreasing detergent and dry them.

9. Check the brake drum diameter and lining thickness - renew if worn.

Max. wear rates on brake components:

Max. drum diameter:

For 3000 and 4000 litre sprayers: 402 mm (15.8388 in)

Min. lining thickness:

For 3000 and 4000 litre sprayers: 4.0 mm (0.15748 in)

10. Remove the clevis pin between the air diaphragm cylinder and brake cam lever.

11. Remove the cotterpin (G) and nut (F), the brake shoe anchor bolt (H) and slide the brake shoes over the cam. Twist the pair of brake shoes to remove the shoe return springs (I). Replace brake shoes if the linings are worn.

12. Apply a small qty. of copper paste on moving parts and assemble the brake shoes and shoe return springs again.

13. Fit the shoe assembly with the anchor bolt first. Then pull the shoes away from each other and slide them over the cam afterwards. Tighten the anchor bolt castellated nut again and fit a new cotter pin.

14. Check roller bearings for discoloration and wear - renew if worn or damaged.

15. Assemble the hub and bearings using a new sealing ring.

16. Fill the hub and bearings with fresh grease before fitting it to the shaft.

17. Fit the castellated nut. Rotate the hub and tighten the castellated nut until a slight rotation resistance is felt.

18. Loosen the castellated nut again until the first notch is aligned with the cotter pin hole in the shaft.

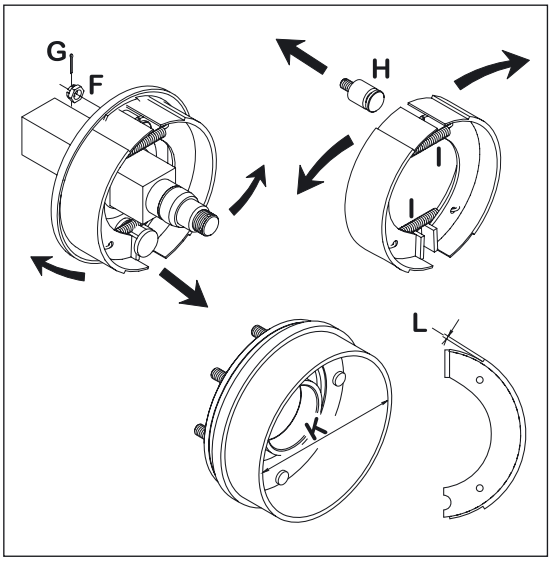
19. Fit a new cotter pin and bend it.

20. Fill the hub cap with fresh grease and carefully press it on to the hub. Slightly tighten the 6 Allen bolts.

21. Adjust the brakes as described in "250 hours service".

22. Fit the wheel again and tighten the wheel nuts. See section "50 hours service" regarding torque wrench setting. Tighten all bolts to half the specified torque first, then to the full specified torque.

23. Tighten again after 10 hours of work. Check the torque every day until it is stabilised.



DANGER! Brake dust can cause severe health injuries! Avoid inhalation of brake dust! Use respirator when servicing the brakes. Do not clean brakes with compressed air! Use vacuum cleaner or rinse with water to avoid brake dust being blown around.

WARNING! The specified min. thickness is the absolute minimum which must never be exceeded. Renew the parts if they would reach the above dimensions before next service inspection.

WARNING! Renewal of brake linings or brake drums must be done on both sides at the same interval to ensure even braking application in use.

ATTENTION! If the brake drum must be removed from the hub, a hydraulic press is required to press the wheel studs out.

WARNING! Do not get oil, grease or copper paste in contact with the brake linings and drums.

ATTENTION! The shaft has a vertical and an horizontal cotter pin hole. Use the one first aligned with the notch when loosening the castellated nut.

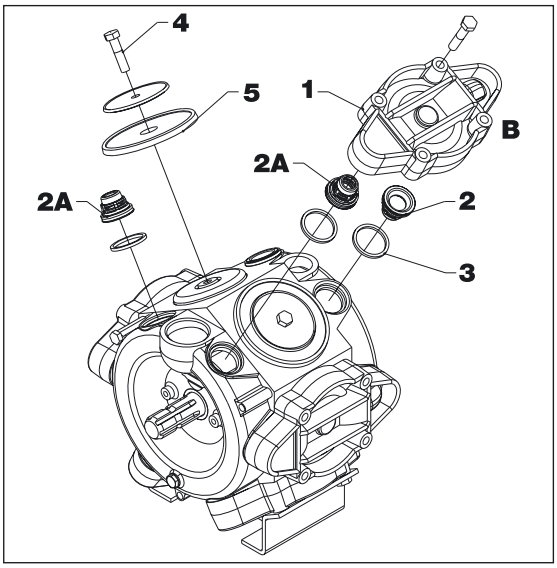
WARNING! If you do not feel totally confident changing wheel bearings or brake shoes contact your HARDI dealers workshop.

Occasional maintenance

General info

The maintenance and renewal intervals for the following will depend very much on the conditions under which the sprayer will be operated and are therefore impossible to specify.

Pump valves and diaphragms renewal



Model 363 and 463 pumps:

Notice this instruction may contain pump models not available for the specific sprayer.

Diaphragm pump overhaul kit (valves, seals, diaphragms etc.) can be ordered. Detect whether the pump is a 363 or a 463 model - kit can be ordered at following HARDI part No.:

Model 363: part No. 750342

Model 463: part No. 750343

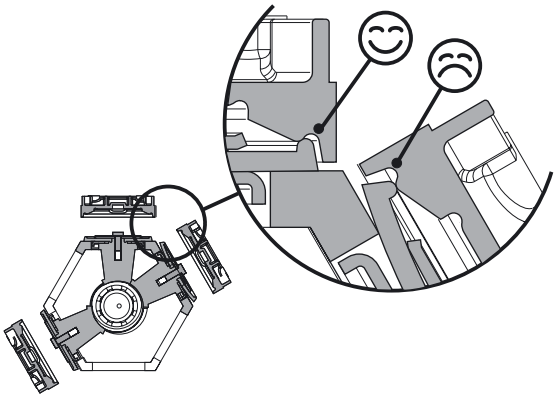
Valves

Remove valve cover (1) before changing the valves (2) - note their orientation so they are replaced correctly!

ATTENTION! A special valve with white flap (2A) is used at the two upperside inlets. It has to be placed in the valve openings as shown. All others are the type with black flap. It is recommended to use new gaskets (3) when changing or checking the valves.

Diaphragms

Remove the diaphragm cover (1). The diaphragm (5) may then be changed. If fluids have reached the crankcase, re-grease the pump thoroughly. Also check that the drain hole at the bottom of the pump is not blocked. Reassemble with the following torque setting.



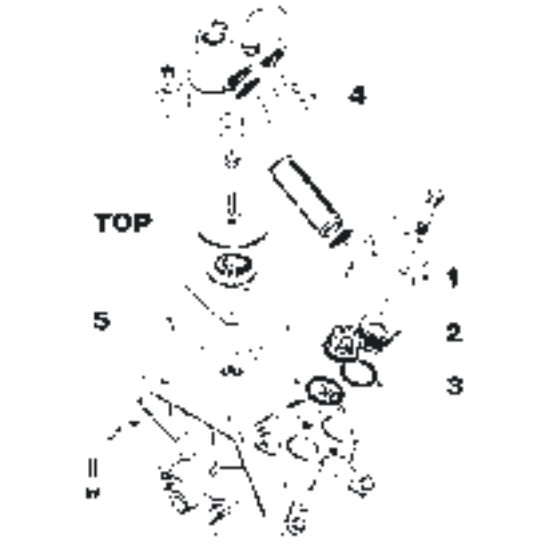
Reassemble pump model 363/463 with the following torque setting.

Diaphragm cover: 90 Nm / 66.6 lbft

Diaphragm bolt: 90 Nm / 66.6 lbft

ATTENTION! Before tightening the 4 bolts for the diaphragm cover (B) the diaphragm must be positioned between centre and top to ensure correct sealing between diaphragm pumphousing and diaphragm cover. Turn crank shaft if necessary.

Pump valves and diaphragms renewal



Model 1203, 1303 - Diaphragms

Notice this instruction may contain pump models not available for the specific sprayer.

Remove the diaphragm cover (4). The diaphragm (5) may then be changed. If fluids have reached the crankcase, re-grease the pump thoroughly. Also check that the drain hole at the bottom of the pump is not blocked. Reassemble with the following torque setting.

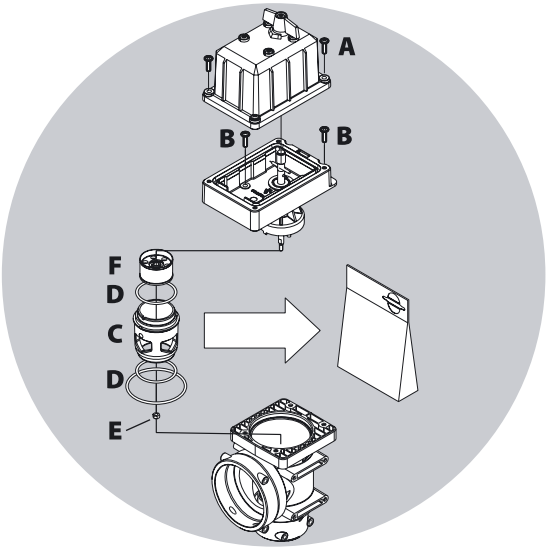
Reassemble pump model 1203 or 1303 with the following torque setting.

Valve cover: 80 Nm / 59.0 lbft

Diaphragm cover: 80 Nm / 59.0 lbft

Diaphragm bolt: 80 Nm / 59.0 lbft

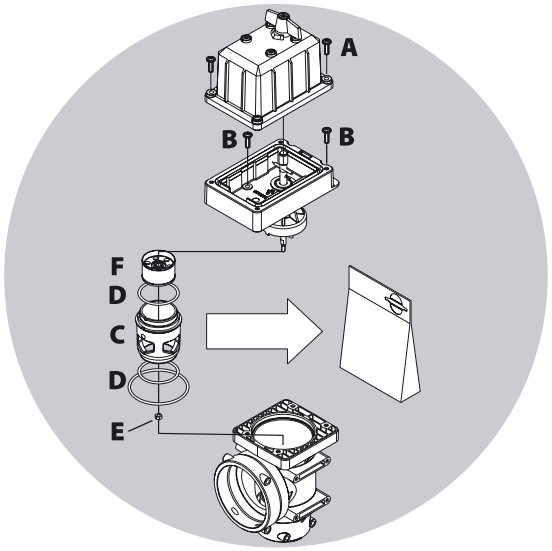
Cone check/renewal for pressure regulation valve



If it becomes difficult to build up sufficient pressure or if pressure fluctuations occur, it may be necessary to renew cone and cylinder.

1. Remove 4 x screws (A) and remove the housing.
2. Remove 4 x screws (B).
3. Replace cylinder (C) and O-ring (D).
4. Loosen the nut (E), remove and replace the cone (F).
5. Reassemble in reverse order.

Cone check/renewal for EFC Pressure Regulation Valve



If it becomes difficult to build up sufficient pressure or if pressure fluctuations occur, it may be necessary to renew cone and cylinder. A spare parts kit can be ordered - contact your local dealer to service the unit.

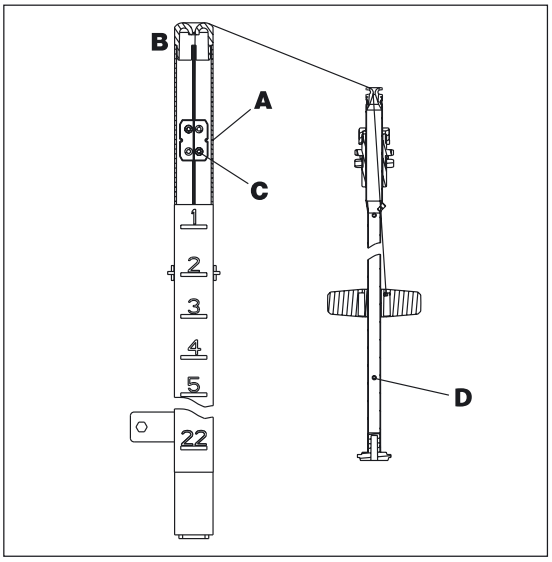
1. Remove 4 x screws (A) and remove the housing.
2. Remove 4 x screws (B) and remove cone.
3. Loosen nut (C) in bottom of the cone.
4. Replace with parts from spare parts kit.
5. Reassemble in reverse order.

6 - Maintenance

Level indicator adjustment

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

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



Level indicator cord renewal

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

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

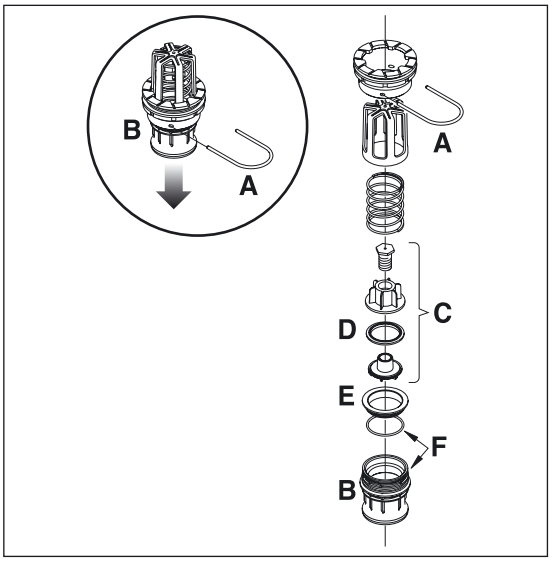
DANGER! Do not enter the inside of the tank - the parts can be changed from the outside of the tank!

Drain valve seal renewal

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

DANGER! Do not enter the inside of the tank - the parts can be changed from the outside of the tank!

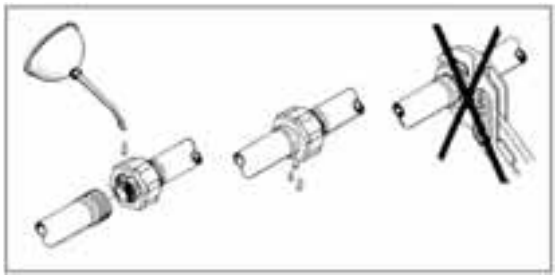
WARNING! Use eye / face protection mask when dismantling the tank drain valve!



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

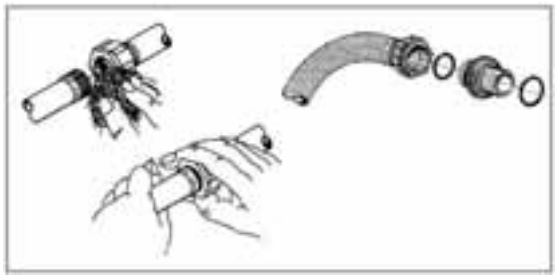
ATTENTION! Check function of valve with clean water before filling chemicals into the tank.

Nozzle tubes and fittings



Poor seals are usually caused by:

- Missing O-rings or gaskets
- Damaged or incorrectly seated O-rings
- Dry or deformed O-rings or gaskets
- Foreign bodies



In case of leaks:

DO NOT overtighten.

Disassemble, check condition and position of O-ring or gasket. Clean, lubricate and reassemble.

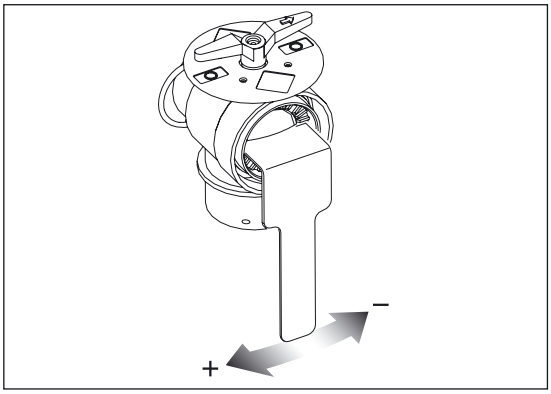
The O-ring must be lubricated ALL THE WAY ROUND before fitting on to the nozzle tube. Use non-mineral lubricant.

For AXIAL connections, a little mechanical leverage may be used.

For RADIAL connections only hand-tighten them.

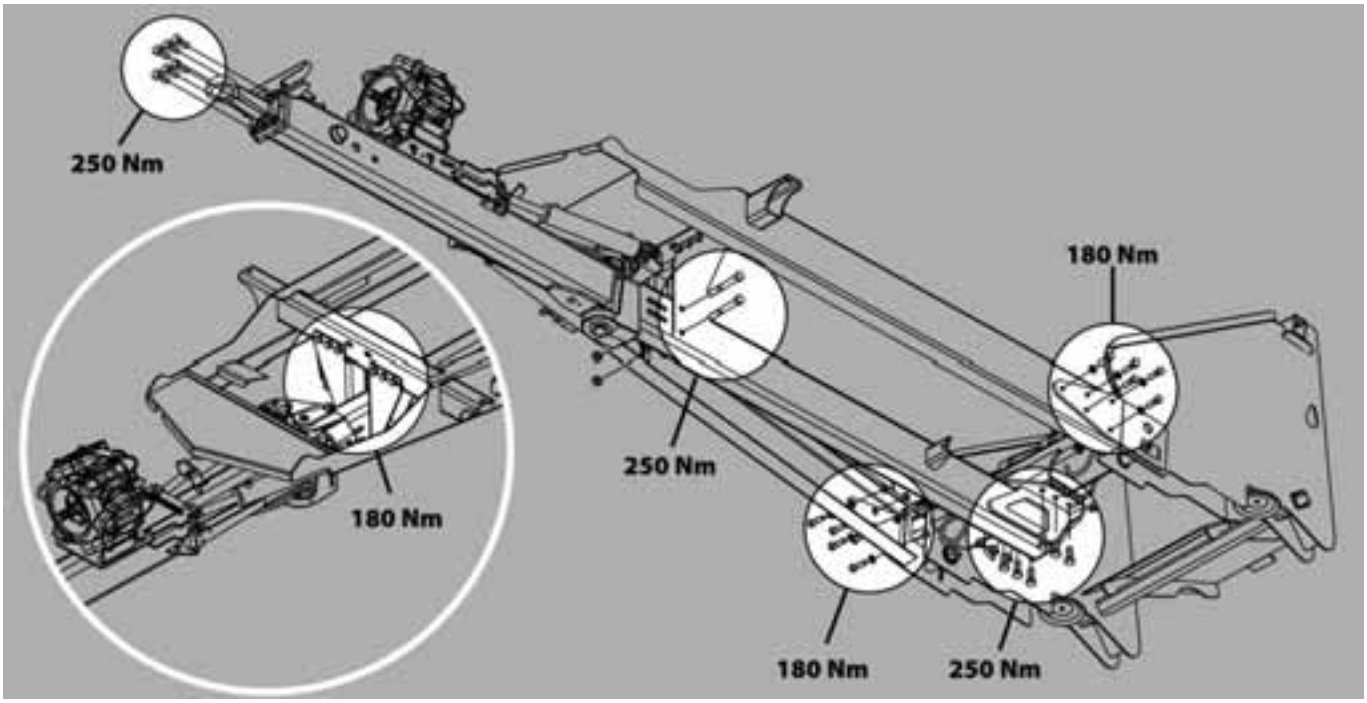
Adjustment of 3-way-valve

The MANIFOLD valve can be adjusted if it is too tight to operate - or if it is too loose (=liquid leakage). Correct setting is when the valve can be operated smoothly by one hand. Use a suitable tool and adjust the toothed ring inside the valve as shown on the drawing.



Retighten the frame

The frame are two sections bolted together. Also the drawbar is bolted to the frame. These bolts need to be tightened



correctly. Regularly check if bolts are tightened to the specified torque below.

Readjustment boom - general info

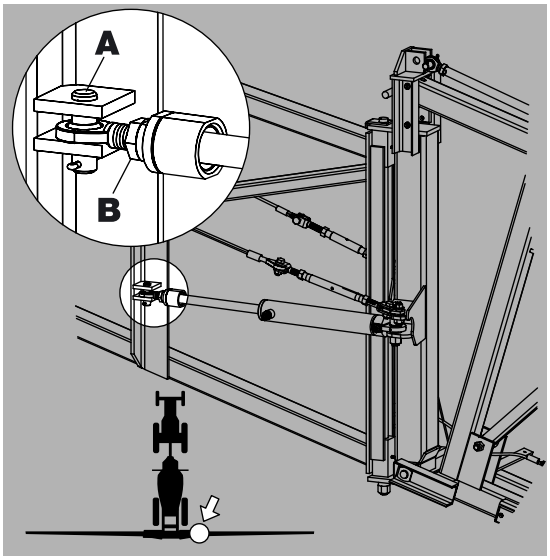
Before commencing adjustment jobs please go through this check list.

1. The sprayer must be well lubricated (see part about lubrication).
2. Connect the sprayer to the tractor.
3. Place tractor and sprayer on level ground (horizontal).
4. Unfold boom.
5. Set slanting angle to neutral position (horizontal).

Adjustment of hydraulic cylinders are done without pressure in the system.

WARNING! Nobody is allowed to be under the boom whilst adjustment is carried out.

Alignment of centre and inner wing sections



1. Unfold the boom and check alignment of the inner section with the centre section.

2. If adjustment is necessary, relieve pressure from the cylinder by folding the boom a few centimetres.

3. Disconnect cylinder rod eye (A) from the inner section. Note that some cylinder rods have a machined flat which can be used for adjustments. If using this one for adjustment, leave the rod eye pinned to the boom.

4. Loosen jam nut (B) and adjust the length of the rod eye (A).

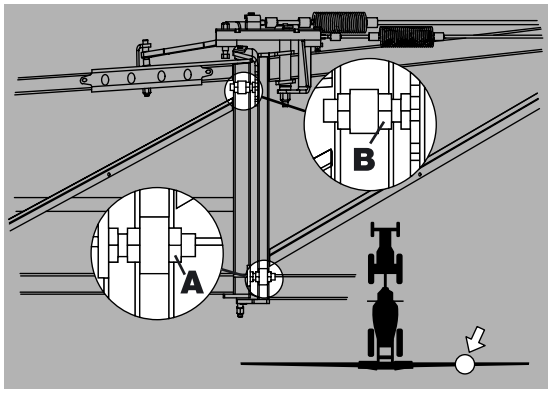
IN = to move the boom forward

OUT = to move the boom rearward

5. Tighten the jam nut (B) again. (Reattach the cylinder rod to the boom again, if it has been loosened).

6. Pressurize the cylinder to check boom alignment.

Alignment of inner and outer wing sections



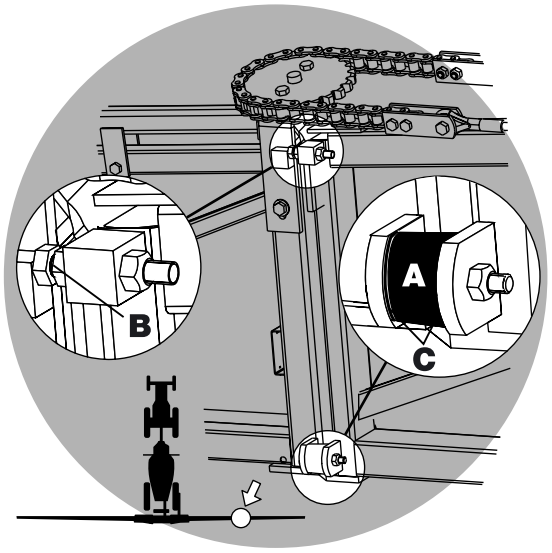
1. Unfold the boom and check that the boom wing is aligned. If adjustment is needed:

2. SPB type: Remove stop device (A) from the inner section. SPC type: Loosen stop device (A).

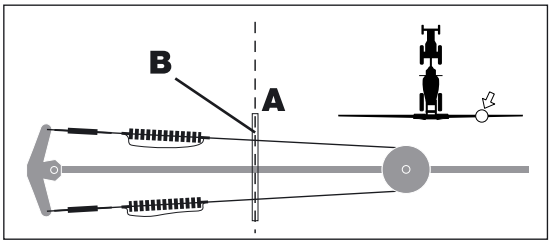
3. Adjust the position of the adjusting bolt (B) on the inner section so that the cap of the bolt head (B) contacts top stop plate on outer section with inner and outer sections aligned. Tighten it in this position.

4. SPB type: Fit stop device (A) again. SPC type: Tighten stop device (A) again.

SPB only: Please note that the rubber stop (= stop device (A)) should be compressed 3-5 mm. Therefore, check that the distance between the tabs (C) is a little less than the length of the rubber stop itself. The rubber stop may need to be spaced out with 1 or more flat washers in order to obtain correct compression. Tighten nut to hold it in place.

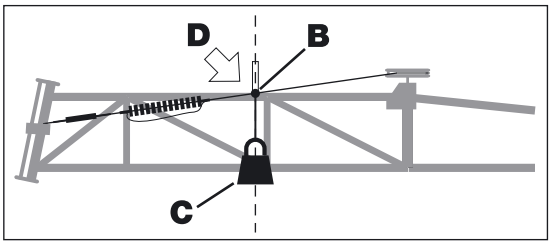


Adjusting the front fold cable



The performance of the SPB/SPC boom while spraying depends very much on the front fold cable adjustment. A correctly adjusted cable will also control the movement of the outer section.

WARNING! The rear cable can snap and injure you or someone else if tensioned when the boom is unfolded. Always adjust the front cable first - with the boom unfolded and the rear cable last - with the boom folded in transport position.



1. Unfold the boom.

2. Check security of turnbuckle anchors to its hinges.

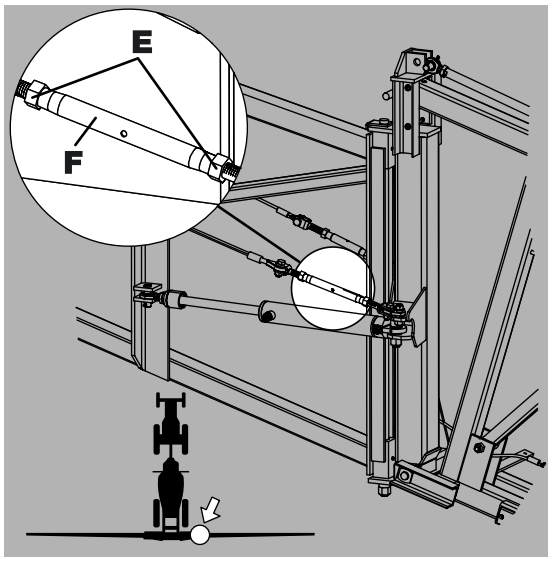
3. Slide a straight edge (A) down the underside of the inner section (D) until it contacts the front cable = contact point (B).

4. Suspend a weight of 4.5 kg (C) from the straight edge-tocable contact point (B) and check deflection by measuring the distance from the straightedge to the cable. Cable should deflect 13-22 mm (D).

If adjustment is needed:

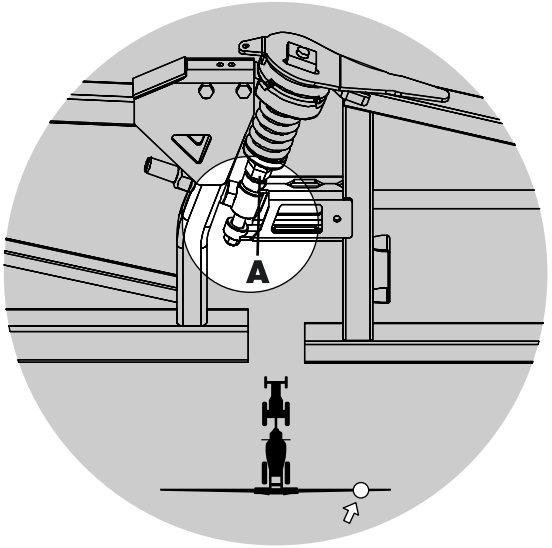
5. Loosen jam nuts (E) on the turnbuckle assembly and adjust turnbuckle (F) for proper cable deflection.

6. Tighten jam nuts (E) again and remove weight.



WARNING! Check boom alignment again. If front cable was tightened, the wing assembly will move a bit forward. If front cable was loosened, the wing assembly will move a bit rearward. Therefore, adjust fold cylinder, if necessary, as described in the section 'Alignment of centre section and inner wing sections'.

Breakaway section adjustment

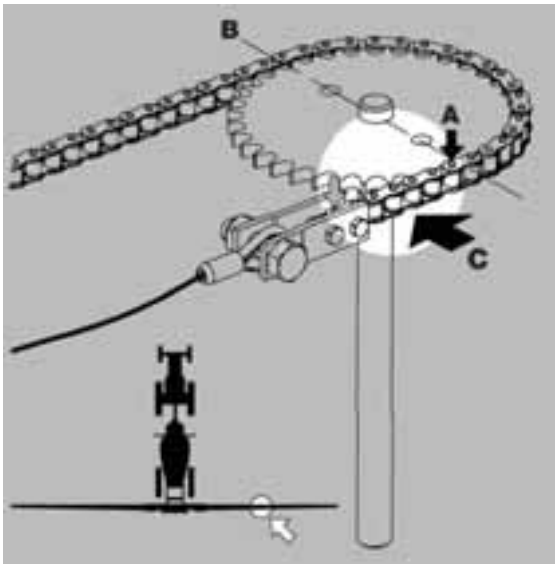


The function of the breakaway section is to prevent or reduce boom damage, should it strike an object or the ground.

Adjust the screw (A) until the breakaway will release at a force of 80 N at the extremity. Please note that the clutch must be well greased before adjustment is commenced.

SPC type breakaway is shown here. Same principle applies for SPB type.

Check/adjust sprocket timing (SPB only)



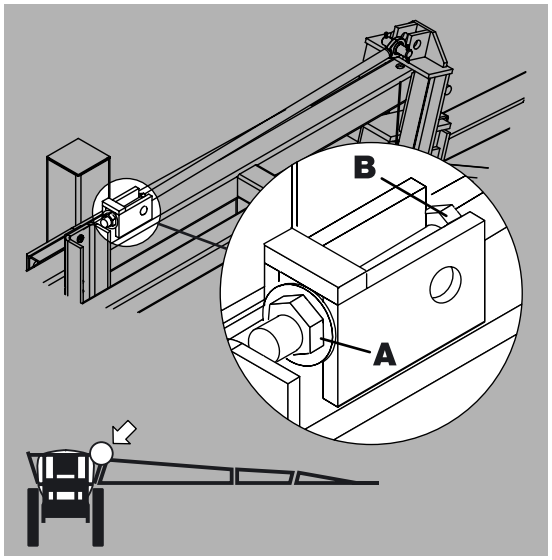
1. Unfold the boom and stand on its rear side.

2. Check that the pin connection (A) in the timing chain is aligned with the centre line (B) between the sprocket. Note forward driving direction (C) - adjustment is done at rearside of the boom. (A) is the 7th pin connection on the chain.

3. To adjust timing, loosen turnbuckles on the front and rear cables until slack.

4. Line up the chain and sprocket as indicated in step 2 above.

Adjusting boom level to ground



Unfold the boom and check that the boom sections are parrallel to the centre frame and level to the ground. Adjust if necessary, as decribed below. Adjustment is carried out with the boom unfolded.

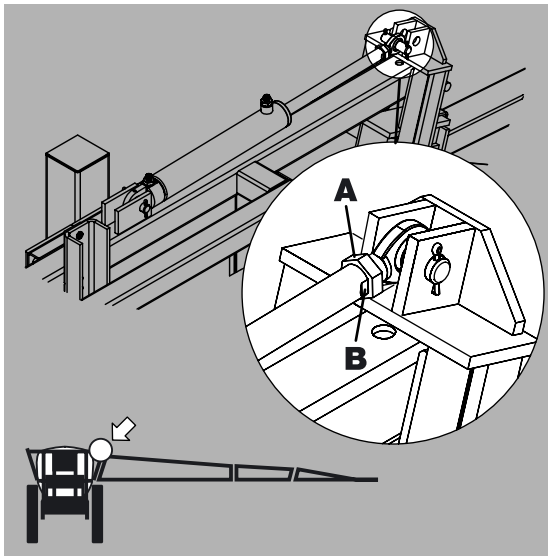
For SPB-DH & SPC-DH models the following procedure is used:

1. Loosen lock nut (A).

2. Adjust nut (B) - in or out - until boom wing is level to the ground.

3. Secure lock nut (A) again.

Same procedure applies to both sides.



For SPB-EOH & SPC-EOH models the following procedure is used:

1. Ensure that cylinder is fully extended.

2. Loosen jam nut (A).

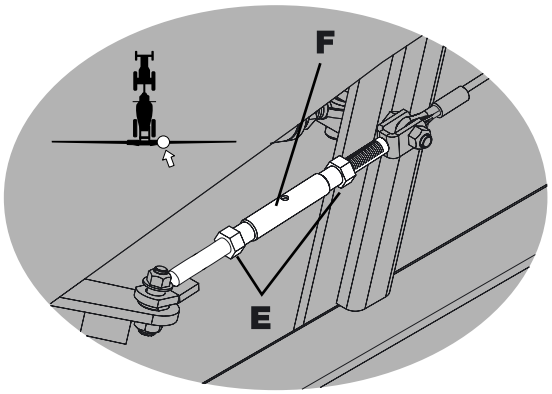
3. Apply an adjustable wrench to the machined surface at (B).

4. Turn the cylinder rod until boom is level to the ground.

5. Secure jam nut (A) again.

Same procedure applies to both sides.

Adjusting rear cable



1. Raise boom to its highest position. Fold it to transport position with tilt cylinders fully extended. Make sure that fold cylinders are pressurized and that the boom is folded all the way in.

2. Ensure the boom transport brackets are in contact with the outer wing. Adjust if necessary.

3. Loosen the jam nuts (E) on the ends of turnbuckle (F). Adjust the turnbuckle (F) so that the outer section contacts the boom transport bracket.

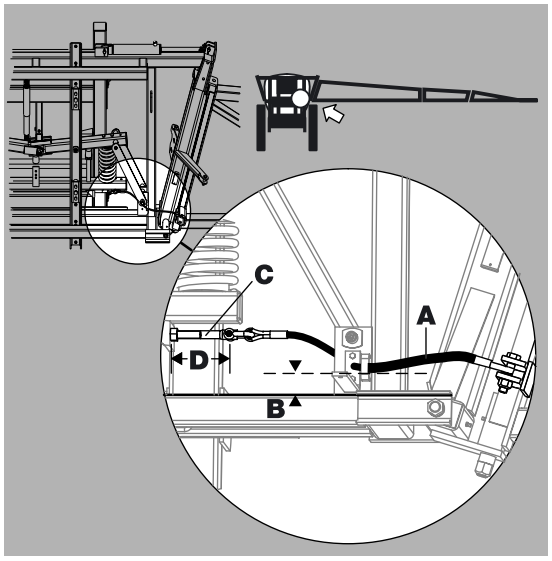
If 18-21 m boom: Turn the turnbuckle another 4 complete turns.

If 24-28 m boom: Turn the turnbuckle another 3 complete turns.

4. Secure jam nuts (E) again.

WARNING! The rear cable can snap and injure you or someone else if tensioned when the boom is unfolded. Always adjust the front cable first - with the boom unfolded and the rear cable last - with the boom folded in transport position.

Adjusting centre section cables



The centre section cables keep the centre frame in correct position during folding procedure or when spraying with one side raised and folded (SPB-EOH only).

1. Fold the boom into transport position.

2. Check that the tilt cylinders are completely extended. Adjust if necessary (SPB-EOH only).

3. Check that centre section cable (A) is routed over centre section nozzle bracket (B).

4. Loosen jam nuts on the bolt assembly (C). This applies both boom wings.

5. Adjust the threaded bolt(s) (C). Alternate from side-to-side while making adjustments. As a guideline for adjustment, the distance (D) shown at the bolt assembly should be 110 mm. Properly adjusted cables will be very tight and only deflect a small amount (mm) when pulled by hand. Note that cables will be loose when the boom is unfolded.

6. Tighten jam nuts on the bolt assembly (C) again.

7. Unfold the boom and inspect that the centre frame is correctly centred.

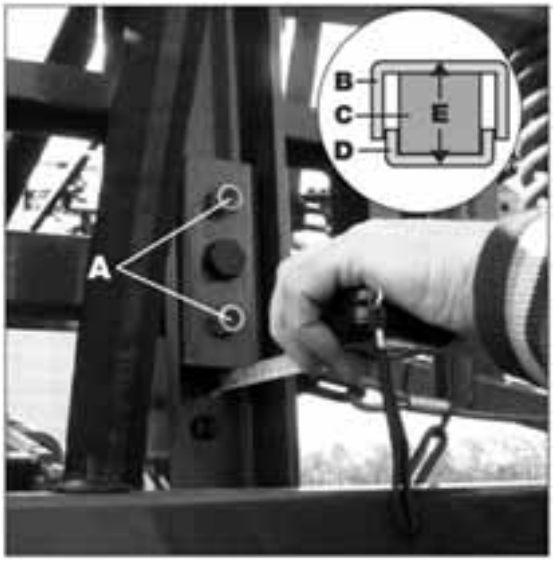
ATTENTION! Adjust both boom wings in one sequence. Adjust one cable a small amount at the time, and then the other cable, to equalize cable tension and maintain a level centre frame.

WARNING! Never adjust the centre cables without having folded the boom all the way into the transport position.

Jaw rubber dampers (SPC only)

Inspect basic adjustment of the rubber jaw dampers. Basic adjustment = The compression of the jaw (C) should correspond to a distance (E) of 34 mm (+/- 0,5). Measure and adjust the jaw if necessary by means of the two M12 bolts (A).

On figure the channel section (B) is a part of the centre section frame, and yaw (C) is hold by the fixing (D).



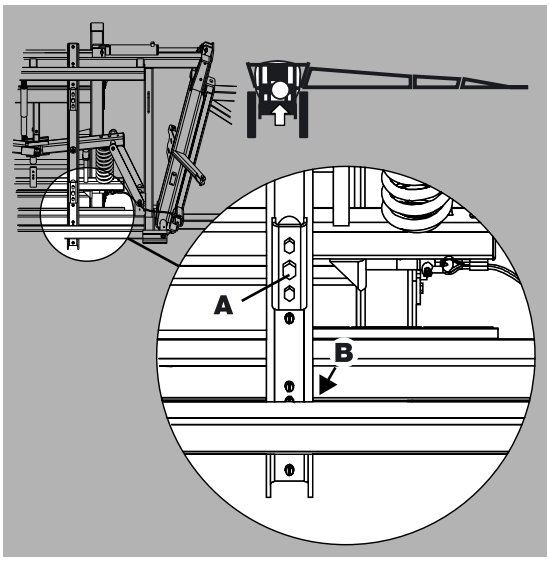
Yaw damping

Tighten/loosen bolt (A) to adjust slack at point (B).

If boom does not work smoothly or if it works in 'steps': Loosen bolt (A).

If boom works to loosely or swings uncontrollable: Tighten bolt (A).

ATTENTION! Do not stress the bolt (A). Only tighten till contact is reached at point (B).

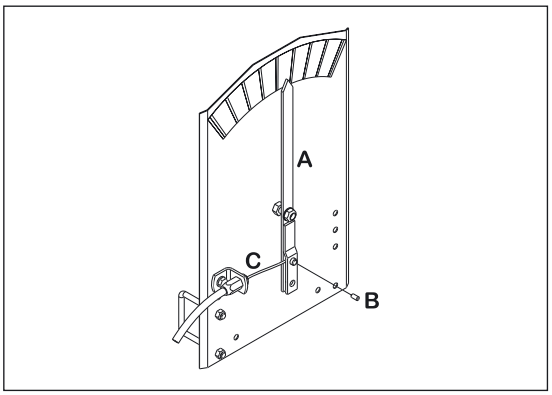


Slanting indicator adjustment (optional equipment)

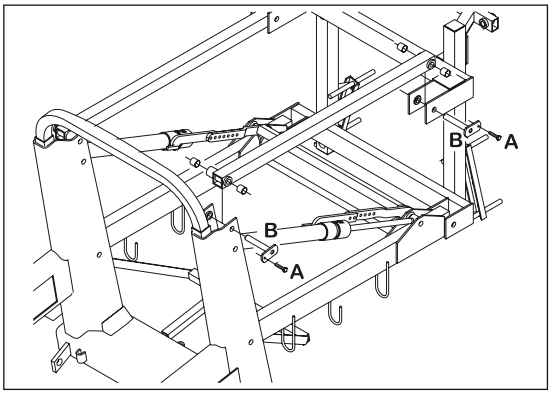
If the position of the pointer on the indicator does not correspond to the actual boom position, the pointer (A) can be adjusted.

1. Loosen the small bolt (B) sufficiently to allow the wire (C) to be adjusted.

2. Place the pointer (A) in correct position and fasten bolt (B) against the wire (C) again.



Wear bushing renewal on boom lift



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

1. Connect the trailer to a tractor and unfold the booms to working position.

2. Lift the boom centre frame with a lifting device and support it until the load is taken off the parallelogram arms.

3. Remove the screws (A), and pull out the pins (B) at one of the upper parallelogram arms and renew the wear bushes.

4. Refit the arm.

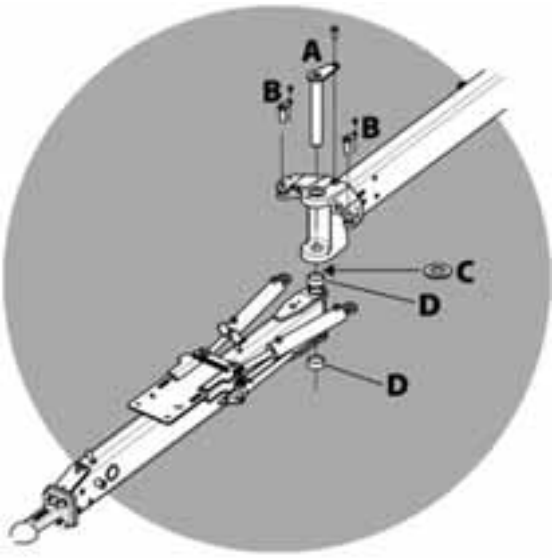
5. Repeat this on the other upper arm.

6. The lower arms must be disconnected simultaneously.

7. Grease all grease nipples.

8. Remove the lifting gear again.

Wear washer and bearing renewal on IntelliTrack



If having a steering drawbar with or without IntelliTrack and too much play is found in the drawbar, wear washer (C) and bearings (D) must be renewed.

1. Place stop wedges in front of and behind both wheels.

2. Jack up the frame and support it properly.

3. Without dismantling the hydraulic system the hydraulic rams are removed from the drawbar by loosening the small lock screws and remove the two pin bolts (B).

4. Support the drawbar and remove the washer (C) and bearings (D) and the pin (A).

5. Move the drawbar to the side and support it.

6. Replace the washer (C) and bearings (D) with new ones.

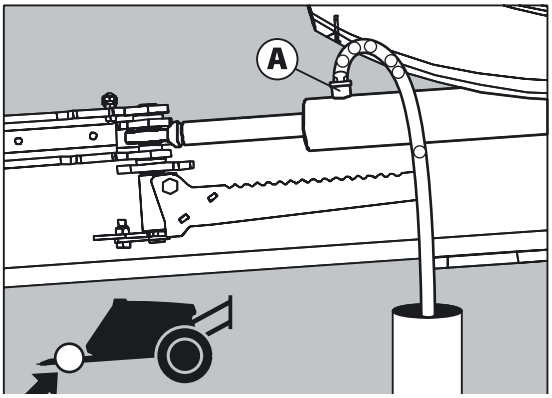
7. Assemble again in reverse order.

8. Grease through grease nipples.

9. Fit the extension piece in the drawbar again and place the sprayer on the support leg.

10. Remove jack and wedges.

Venting the steering hydraulics



If the steering cylinder hydraulics have been dismantled it is necessary to vent the cylinders.

1. Remove the dust cap from the venting screw (A) on the left side steering cylinder.
2. Mount a clear 5 mm hose to the venting screw (A) and lead into a catch can.
3. Open the venting screw (A) 1/8 turn and then steer fully to left (retract cylinder).
4. Keep steering until air is no longer visible in the hose.
5. Close the venting screw (A) again.
6. Repeat the procedure for the right side cylinder.
7. Steer fully from left to right 8-10 times.
8. Do the venting procedure again to assure there is no air in the system.
9. Mount the dust caps to the venting screws (A) again.

⚠ DANGER! Be careful when operating the track! Be sure there is space enough to steer the sprayer from side to side! Only persons working on the sprayer is allowed in the moving area of the sprayer!

Change of bulbs

1. Switch off the light.
2. Loosen the screws on the lamp and remove the cover or lens.
3. Remove the bulb.
4. Fit a new bulb, refit the cover and tighten the screws.

ATTENTION! If halogen bulbs are used, never touch the bulb with the fingers. Natural moisture in the skin will cause the bulb to burn out when the light is switched on. Always use a clean cloth or tissue when handling halogen bulbs.

Suspension rubber dampers (optional equipment)

If the shock absorbers loose their efficiency, they should be replaced.

1. Connect the sprayer to a tractor to prevent overbalancing.
2. Lift the rear end of the sprayer with e.g. a crane. Use lifting points as described in “Sprayer setup”.
3. Loosen the nut below the suspension rubber dampers.
4. Remove the suspension rubber dampers and replace with new ones.
5. Tighten the nut below the suspension rubber dampers.
6. Lower the rear of the sprayer again.

Shield renewal on transmission shaft

See the manufacturers instruction book.

Replacement of transmission shaft cross journals

See the manufacturers instruction book.

Change of tyre

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

1. Always clean and inspect the rim before mounting.

2. Always check that the rim diameter corresponds exactly to the rim diameter moulded on the tyre.

3. Always inspect inside of the tyre for cuts, penetrating objects or other damages. Repairable damages should be repaired before installing the tube. Tyres with unrepairable damages must never be used.

4. Also inspect inside of the tyre for dirt or foreign bodies and remove it before installing the tube.

5. Always use tubes of recommended size and in good condition. When fitting new tyres always fit new tubes.

6. Before mounting, always lubricate both tyre beads and rim flange with approved lubricating agent or equivalent anti-corrosion lubricant. Never use petroleum based greases and oils because they may damage the tyre. Using the appropriate lubricant the tyre will never slip on the rim.

7. Always use specialised tools as recommended by the tyre supplier for mounting the tyres.

8. Make sure that the tyre is centred and the beads are perfectly seated on the rim. Otherwise danger of bead wire tear can occur.

9. Inflate the tyre to 100-130 kPa (14.5-19 p.s.i.) then check whether both beds are seated perfectly on the rim. If any of the beads do not seat correctly, deflate the assembly and re-centre the beads before starting inflation of the tyre. If the beads are seated correctly on the rim at 100-130 kPa inflate the tyre to a maximum of 250 kPa (36 p.s.i.) until they seat perfectly on the rim.

10. Never exceed the maximum mounting pressure moulded on the tyre!

11. After mounting tyres adjust inflation pressure to operation pressure recommended by the tyre manufacturer. See also "Technical specifications".

12. Do not use tubes in tubeless tyres.

⚠ DANGER! Non observance of mounting instructions will result in the bad seating of the tyre on the rim and could cause the tyre to burst leading to serious injury or death!

⚠ DANGER! Never mount or use damaged tyres or rims! Use of damaged, ruptured, distorted, welded or brazed rim is not allowed!

IntelliTrack front potentiometer calibration

If the IntelliTrack front potentiometer on the drawbar can not be mounted correctly (bar not perpendicular to drawbar), then the following must be done.

1. Align the drawbar by measuring the blank part of the hydraulic cylinder pistons. The sprayers drawbar is aligned when the two cylinder pistons have the same length, plus/minus 2 mm. Adjust with manual track button on the HC 5500.

2. Place the transverse potentiometer bar absolute perpendicular to the drawbar.

3. Go to menu 4.7 in the HC 5500 and check if the potentiometer reading F is 2.50 Volt.

4. Adjust the Potentiometer housing until the HC 5500 reads 2.50 volt.

5. Tighten potentiometer body screws again.

⚠ DANGER! Be careful when operating the track! Be sure there is space enough to steer the sprayer from side to side! Only persons working on the sprayer is allowed in the moving area of the sprayer!

Safety valve activation

To make the fluid system work perfectly over time, it is good practice to regularly provoke opening of the safety valve. This avoids clogging and assures proper function of the safety valve. This is done by turning the pressure SmartValve to "Pressure draining" or an unused function when pump is running. This is good practice for all but particularly for sprayers without optional equipment.

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

Grease the ProFlow valve (optional equipment)

If the ProFlow valve works tight, it should be greased. This is done at the two nipples on the upperside of the valve which is located behind the valve cover at the place where ProFlow external filling handle is. It is possible to reach out for the nipples between the valve cover and the EasyClean filter.

Greasing:

Turn the nipple one turn clockwise around to grease the valve. When the nipple cup cannot be turned further in (=empty) then turn it counterclockwise to dismantle it. Then refill the cup with grease and reassemble to the nipple. Use universal lithium grease, NLGI No. 2 (e.g. SHELL RETINAX EP2).

Off-season storage

Off-season storage program

When the spraying season is over, you should devote some extra time to the sprayer. If chemical residue is left over in the sprayer for longer periods, it can reduce the life of the individual components. To preserve the sprayer intact and to protect the components, carry out following off-season storage program.

1. Clean the sprayer completely - inside and outside - as described under "Cleaning of the sprayer". Make sure that all valves, hoses and auxiliary equipment have been cleaned with detergent and flushed with clean water afterwards, so no chemical residue is left in the sprayer.

2. Renew possible damaged seals and repair possible leaks.

3. Empty the sprayer completely and let the pump work for a few minutes. Operate all valves and handles to drain as much water off the spraying circuit as possible. Let the pump run until air is coming out of all nozzles. Remember to drain the rinsing tank also.

4. Pour appr. 50 litre (11 Imp.gal) anti-freeze mixture consisting of 1/3 automotive anti-freeze and 2/3 water into the tank.

5. Engage the pump and operate all valves and functions, operating unit, chemical inductor etc. allowing the anti-freeze mixture to be distributed around the entire circuit. Open the operating unit main on/off valve and distribution valves so the anti-freeze is sprayed through the nozzles as well. The anti-freeze will also prevent O-rings, seals, diaphragms etc. from drying out.

6. Lubricate all lubricating points according to the lubricating scheme - regardless of intervals stated.

7. When the sprayer is dry, remove rust from possible scratches or damages in the paint and touch up the paint.

8. Remove the glycerine-filled pressure gauges and store them frost free in vertical position.

9. Apply a thin layer of anti-corrosion oil (e.g. SHELL ENSIS FLUID, CASTROL RUSTILO or similar) on all metal parts. Avoid oil on rubber parts, hoses and tyres.

10. Fold the boom in transport position and relieve pressure from all hydraulic functions.

11. All electric plugs and sockets are to be stored in a dry plastic bag to protect them against damp, dirt and corrosion.

12. Remove the control boxes and computer display from the tractor, and store them dry and clean (in-house). A non-condensing environment is recommended.

13. Wipe hydraulic snap-couplers clean and fit the dust caps.

14. Apply grease on all hydraulic ram piston rods which are not fully retracted in the barrel to protect against corrosion.

15. Chock up the wheels, to prevent moisture damage and deformation of the tyres. Tyre blacking can be applied to the tyre walls to preserve the rubber.

16. Drain air brake tank for condensed water.

17. To protect against dust the sprayer can be covered by a tarpaulin. Ensure ventilation to prevent condensation.

Preparing the sprayer for use after storage

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

1. Remove the cover.
2. Remove the support from the wheel axle and adjust the tyre pressure.
3. Wipe off the grease from hydraulic ram piston rods.
4. Fit the pressure gauges again. Seal with Teflon tape.
5. Connect the sprayer to the tractor including hydraulics and electric's.
6. Check all hydraulic and electric functions.
7. Empty the tank for remaining anti-freeze.
8. Rinse the entire liquid circuit on the sprayer with clean water.
9. Fill with clean water and check all functions.
10. Check function of brakes. Please note that brake power will be reduced until the rust are worn off the drums. Always brake lightly until the drums are clean.

Spare parts

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.

Operational problems

General info

In cases where breakdowns have occurred, the same factors always seem to come into play:

1. Minor leaks (false air) on the suction side of the pump will reduce the pump capacity or stop the suction completely.
2. A clogged suction filter will hinder or prevent suction so that the pump does not operate satisfactorily.
3. Clogged up pressure filters will result in increasing pressure at the pressure gauge but lower pressure at the nozzles.
4. Foreign bodies stuck in the pump valves with the result that these cannot close tightly against the valve seat. This reduces pump efficiency.
5. Poorly reassembled pumps, especially diaphragm covers, will allow the pump to suck air resulting in reduced or no capacity.
6. Hydraulic components that are contaminated with dirt result in rapid wear to the hydraulic system.
7. Poor power supply causes failures and misbehavior to the electric system.

Therefore ALWAYS check:

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

7 - Fault finding

Liquid system

FAULT	PROBABLE CAUSE	CONTROL/REMEDY
No spray from boom when turned on.	Air leak on suction line.	Check if suction filter O-ring is sealing.
		Check suction tube and fittings.
		Check tightness of pump diaphragm and valve covers.
	Air in system.	Fill suction hose with water for initial prime.
	Suction/pressure filters clogged.	Clean filters.
		Check yellow suction pipe is not obstructed or placed too near the tank bottom.
Lack of pressure.	Incorrect assembly.	Boost valve is open.
		Too little distance between yellow suction pipe and tank bottom.
	Pump valves blocked or worn.	Check for obstructions and wear.
	Defect pressure gauge.	Check for dirt at inlet of gauge.
Pressure dropping.	Filters clogging.	Clean all filters. Fill with cleaner water. If using powders, make sure agitation is on.
	Nozzles worn.	Check flow rate and replace nozzles if it exceeds 10%.
	Tank is air tight.	Check vent in tank lid is clear.
	Sucking air towards end of tank load.	Lower pump r.p.m.
Pressure increasing.	Pressure filters beginning to clog.	Clean all filters.
Formation of foam.	Air is being sucked into system.	Check tightness/gaskets/O-rings of all fittings on suction side.
	Excessive liquid agitation.	Reduce pump r.p.m.
		Check safety valve is tight.
		Ensure returns inside tank are present.
		Use foam damping additive.
Liquid leaks from bottom of pump.	Damaged diaphragm.	Replace. See changing of valves and diaphragms.
Operating unit not functioning or having malfunction.	Blown fuse(s).	Check mechanical function of microswitches. Use cleaning/lubricating agent if the switch does not operate freely.
		Check motor. 450-500 milli-Amperes max. Change motor, if over.
	Wrong polarity.	Brown - pos. (+). Blue - neg. (-).
	Valves not closing properly.	Check valve seals for obstructions.
		Check microswitch plate position. Loosen screws holding plate a 1/2 turn.
	No power.	Wrong polarity. Check that brown is pos. (+), Blue is neg. (-).
		Check print plate for dry solders or loose connections.
		Check fuse holder are tight around fuse.

Hydraulic system - I.A.H.

FAULT	PROBABLE CAUSE	CONTROL/REMEDY
Boom slow/eradic.	Air in system.	Loosen ram connection and activate hydraulics until oil flow has no air in it (not whitish).
	Regulation valve incorrectly set.	Open or close until desired speed is achieved (clockwise = less speed).
		Remember oil must be at operating temperature.
	Insufficient hydraulic pressure.	Check output pressure of tractor hydraulics. Minimum for sprayer is 170 bar.
	Insufficient amount of oil in tractor reservoir.	Check and top if needed.
Ram not functioning.	Restrictor or regulation valve blocked.	Secure boom. Dismantle and clean.
Hydraulic system fold/tilt functions will not operate.	Power supply.	Check for proper 12V power supply.
One function (fold or tilt) will not operate.	Various.	Check for defective switch(s).
		Check continuity of cables.
		Check for operation of applicable solenoid (coil not activating or plunger stuck).
		Check for short circuit in wiring junction box at rear of sprayer.
		Dirt in the restrictor port of the cylinder.
Multiple hydraulic functions with one switch activated.	Various.	Check for correct solenoid electric/hydraulic hook-up.
		Check for short circuit in wiring in the junction box at rear of sprayer.

IntelliTrack

FAULT	PROBABLE CAUSE	CONTROL/REMEDY
IntelliTrack steers slow/eradic.	Air in system.	Vent the Intellitrack cylinders - see "Venting the IntelliTrack hydraulics"
	Front potentiometer bar/springs moves eradic.	Re-arrange the spring setup so potentiometer bar moves freely.
IntelliTrack has non-linear steering or not following tractors track.	Front potentiometer springs are not parallel.	Refit springs to parallel position and check potentiometer reading - see "IntelliTrack potentiometer connection".

Mechanical problems

Mechanical problems

FAULT	PROBABLE CAUSE	CONTROL/REMEDY
Boom will not fold in or out.	Cylinder.	Adjust the fold cylinder.
Boom will not fold completely.	Cables.	Check adjustment of centre cables.
Boom not aligned.	Cables.	Adjust and grease complete boom cables and stops.
Boom will not stay in spraying position.	Various.	Check for hydraulic leaks through solenoid block. Check for a solenoid that is stuck open.
Wing to be kept folded swings out when unfolding other side of the boom.	Various.	Boom must be completely unfolded - then fold out the desired boom wing. Check for hydraulic leaks through solenoid block. Check for a solenoid that is stuck open.

Emergency operation - Liquid system

In case of power failure it is possible to operate all functions of the operating unit manually. First disconnect the multi plug from the control box. Now manually turn the emergency control knobs.

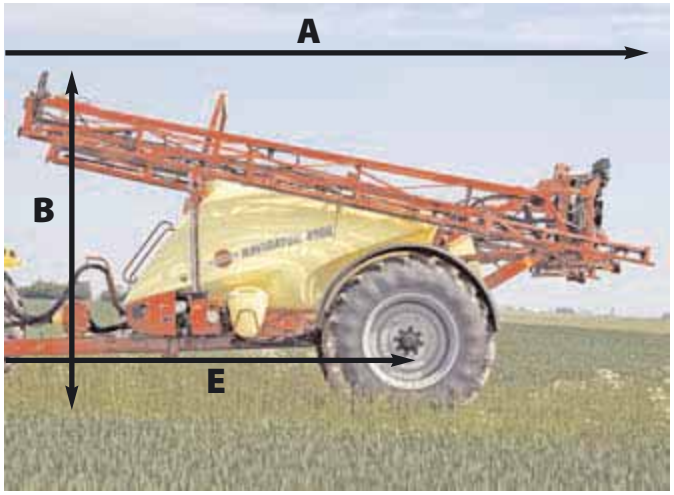
The problem may be due to a blown fuse. A fuse is placed inside the box. Fuse type: Thermo

Dimensions

General info

All measures, values and weights are depending on mounted options and specific adjustments.

Overall dimensions



		3000	4000
Total length, m	A	7.21	7.21
Total height, with PRO boom, m	B	3.05	3.05
Total height, with EAGLE and DELTA boom, m	B	3.80	3.80
Width with EAGLE boom, m	C	3.00	3.00
Width with DELTA boom, m	C	2.55	2.55
Width with PRO boom, m	C	2.55	2.55
Track width fixed axle, m	D	1.80 / 2.00	1.80 / 2.00
Track width adjustable axle, m	D	1.50 – 2.25	1.50 - 2.25
Length draw to axle, m	E	4.61	4.61
Clearance, m	F	0.8 (18.4 x 30)	0.8 (18.4 x 38)

Wheels Options	3000	4000
	11.2 x 48	12.4 x46
	12.4 x 46	18.4 x 38
	18.4 x30	

EAGLE boom Weight in kg

Boom width	Empty tank Axle load	Empty tank Drawbar load	Empty tank Total weight	Full tank Axle load	Full tank Drawbar load	Full tank Total weight	Tyres
NAVIGATOR 3000							
18m	3165	140	3305	5797	1008	6805	18.4 x 30
20m	3177	143	3320	5807	1013	6820	
21m	3195	145	3340	5820	1020	6840	
24m	3120	280	3400	5810	1090	6900	
27m	3152	283	3435	5863	1092	6935	
28m	3162	288	3450	5872	1098	6950	
30m	3210	300	3510	5900	1110	7010	
NAVIGATOR 4000							
18m	3180	150	3330	6669	1151	7830	18.4 x 38
20m	3192	153	3345	6680	1155	7845	
21m	3210	155	3365	6695	1160	7865	
24m	3135	290	3425	6725	1170	7925	
27m	3167	293	3460	6785	1195	7960	
28m	3177	298	3475	6795	1200	7975	
30m	3225	310	3535	6825	1210	8035	

DELTA boom

Boom width	Empty tank Axle load	Empty tank Drawbar load	Empty tank Total weight	Full tank Axle load	Full tank Drawbar load	Full tank Total weight	Tyres
NAVIGATOR 3000							
18m	2924	414	3338	5532	1306	6838	11.2 x 48
20m	2942	423	3365	5549	1316	6865	
21m	2948	428	3376	5554	1322	6876	
24m	2970	440	3410	5574	1336	6910	
27m	2998	452	3450	5602	1348	6950	
28m	3001	454	3455	5605	1350	6955	
NAVIGATOR 4000							
18m	2943	420	3363	6453	1410	7863	12.4 x 46
20m	2961	429	3390	6471	1419	7890	
21m	2967	434	3401	6477	1424	7901	
24m	2989	446	3435	6499	1436	7935	
27m	3017	458	3475	6527	1448	7975	
28m	3020	460	3480	6530	1450	7980	

PRO boom

Boom width	Empty tank Axle load	Empty tank Drawbar load	Empty tank Total weight	Full tank Axle load	Full tank Drawbar load	Full tank Total weight	Tyres
NAVIGATOR 3000							
12m	2720	120 2	840	5420	920	6340	11.2 x 48
15m	2745	139	2884	5445	939	6384	
16m	2750	150	2900	5450	950	6400	
18m	2810	170	2980	5510	970	6480	
NAVIGATOR 4000							
12m	2735	130	2865	6340	1025	7365	12.4 x 46
15m	2760	149	2909	6365	1044	7409	
16m	2765	160	2925	6370	1055	7425	
18m	2825	180	3005	6430	1075	7505	

The data is measured with booms in transport position, main tank filled to net volume, RinseTank full and TurboFiller.

The weight can differ up to +/- 200 kg depending on sprayer specifications.

Conversion factors, SI to Imperial units

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

	SI unit	**Imperial unit**	**Factor**
Weight	kg	lb	x 2.205
Surface area	ha	acres	x 2.471
Length	cm	in	x 0.394
	m	ft	x 3.281
	m	yd	x 1.094
	km	mile	x 0.621
Velocity	km/h	mile/h	x 0.621
	km/h	m/s	x 0.277
Quantities/Area	l/ha	gal/acre	x 0.089
Volume	ml	fl. oz	x 0.0352
	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	Nm	lb.ft.	x 0.74

Filters and nozzles

Filter gauze width
30 mesh: 0.58 mm
50 mesh: 0.30 mm
80 mesh: 0.18 mm
100 mesh: 0.15 mm

Temperature and pressure ranges

Spray liquid:
Operating temperature range: 2° to 40° C (36°F to 104°F)
Operating pressure for safety valve: 15 bar (220 psi)
Max. pressure on the pressure manifold: 20 bar (290 psi)
Max. pressure on the suction manifold: 7 bar (100 psi)

Hydraulics:
Operating temperaure range: 2° to 75° C (36°F to 167°F)
Max. operating pressure:
Tractor: 210 bar (3046 psi)

Brakes

Max. wear rates on brake components:
Max. drum diameter: For 3000 and 4000 litre sprayers: 402 mm (15.8388 in)
Min. lining thickness: For 3000 and 4000 litre sprayers: 4.0 mm (0.15748 in)

HYDRAULIC BRAKES:
Max. hydraulic pressure: 150 bar (2176 p.s.i.)

Power consumption

Sprayer	Hp	kW
3000	100	75
4000	115	86

Tyre pressure

Tyre pressure depends on the actual axle load, tyre size and the actual speed of the sprayer. This means that it is often not possible to drive fully loaded sprayer at maximum speed when having narrow wheels mounted. Be aware of specific datas for your sprayer.

Note that not all the tyre sizes in the chart will apply to your sprayer.

Tyre size (“)	Load index 40/50 km/h	Max axle load (kg) 10km/h (Rec. tyre pressure)	Max axle load (kg) 25km/h (Rec. tyre pressure)	Max axle load (kg) 40km/h (Rec. tyre pressure)	Max axle load (kg) 50km/h (Rec. tyre pressure)
11.2x38	139 A8	7250 (4.4 bar)	5995 (3.6 bar)	4860 (3.6 bar)	N/A
11.2x48	142 A8	7950 (4.4 bar)	5883 (3.6 bar)	5300 (3.6 bar)	N/A
12.4x46	147 A8	9225 (4.4 bar)	6827 (3.6 bar)	6150 (3.6 bar)	N/A
12.4x52	147 B	10125 (4.4 bar)	7493 (3.6 bar)	6750 (3.6 bar)	6143 (3.9 bar)
13.6x48	151 A8	10350 (4.4 bar)	7659 (3.6 bar)	6900 (3.6 bar)	N/A
16.9x38	138 B	7725 (1.6 bar)	5717 (1.6 bar)	5150 (1.6 bar)	4687 (1.6 bar)
18.4x38	143 B	9000 (1.6 bar)	6660 (1.6 bar)	6000 (1.6 bar)	5460 (1.6 bar)
20.8x38	150 B	10950 (1.6 bar)	8103 (1.6 bar)	7300 (1.6 bar)	6643 (1.6 bar)
650/65R42	158B	12750 (1.7 bar)	9435 (1.4 bar)	8500 (1.4 bar)	8500 (1.8 bar)
20.8x42	152 B	11625 (1.6 bar)	8603 (1.6 bar)	7750 (1.6 bar)	7053 (1.6 bar)

WARNING! If renewing tyres always use tyres with min. load index as specified.

DANGER! Never inflate tyres more than to the pressure specified in the table. Over-inflated tyres can explode and cause severe personal injuries! See the part “Occasional maintenance - Change of tyre”.

Materials and recycling

Disposal of the sprayer

When the equipment has completed its working life, it must be thoroughly cleaned. The tank, hose and synthetic fittings can be incinerated at an authorised disposal plant. The metallic parts can be scrapped. Always follow local legislation regarding disposal.

Materials used:

Tanks: HDPE

Frame etc.: Steel

Pump: Cast iron

Diaphragms: PUR

Hoses (suction): PVC

Hoses (pressure): EPDM

Valves: Glass reinforced PA

Filters: PP

Nozzles: Unfilled POM

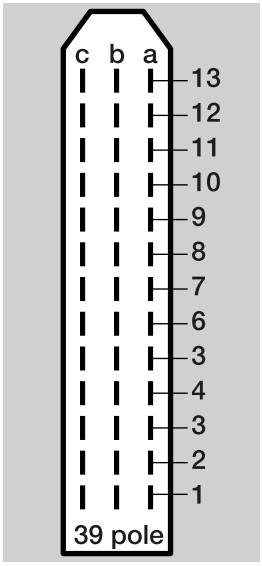
Fittings: Glass reinforced PA

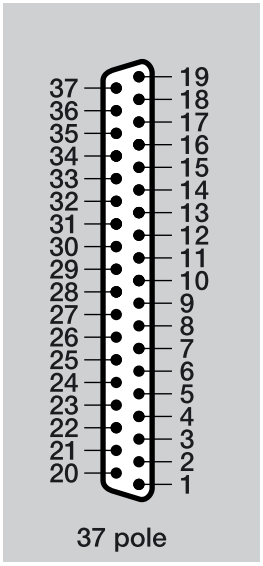
Electrical connections

Electrical connections for SPRAY II

39 or 37 poled plug with cable.

39-pole	37-pole	SPRAY II
1a	5	S1+
1b	6	S1-
1c	26	End nozzle L
2a	7	S2+
2b	8	S2-
2c	25	End nozzle R
3a	9	S3+
3b	10	S3-
3c	29	+12V sensor
4a	11	S4+
4b	12	S4-
4c	4	PWM 1TX
5a	14	S5+
5b	15	S5-
5c	27	GND
6a	16	S6+
6b	17	S6-
6c	13	Optional 5 Reg. feedback
7a	18	S7+
7b	19	S7-
7c	33	Option 1 4-20mA
8a	37	S8+
8b	36	S8-
8c	32	Option 2 Frq
9a	35	S9+/Air angle 0-5V
9b	34	S9-/Fan speed 0-5V
9c	not connected	Option 3/Tank gauge
10a	21	On/off+
10b	22	On/off-
10c	not connected	PWM Output option
11a	23	Pressure+
11b	24	Pressure-
11c	28	Flow
12a	20	Foam blop 0-5V
12b	1	option 4 Rx
12c	31	Speed
13a	3	FM L
13b	2	FM R
13c	30	Gnd sensor

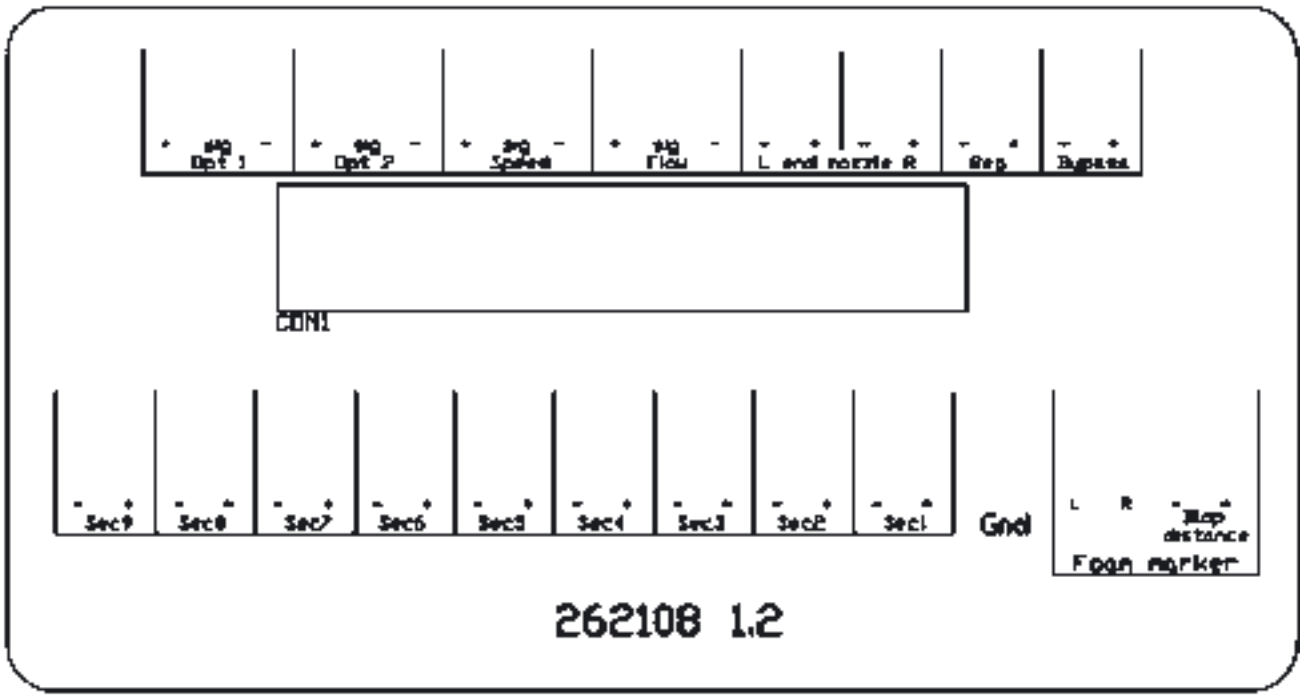




8 - Technical specifications

EVC

The EVC operating unit fulfils the EC noise reduction standards.



When connecting an optional function, be aware that maximum current for every connector is 2 Amp. Total current for the whole connector box may not exceed 10 Amp.

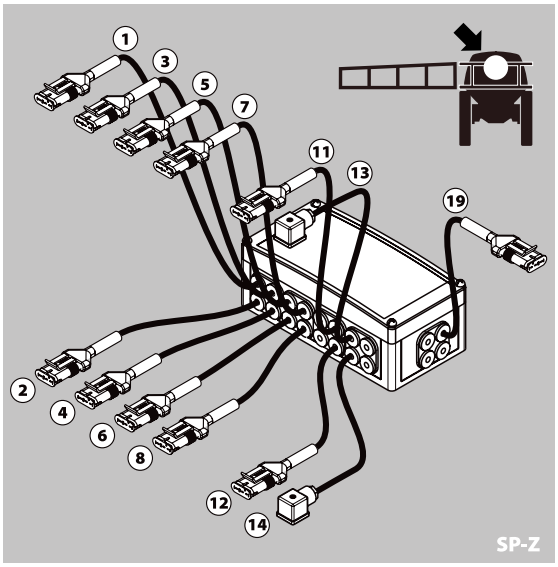
HC 2500	Function	+	Sig.	-
Opt 1	Pressure sensor	Brn	Blu	-
Opt 2	RPM sensor	Brn	Blu	Blk
Speed		Brn	Blu	Blk
Flow		Brn	Blu	Blk
L end nozzle	Pendulum lock at HAY/LPY	Brn		Blu
R end nozzle	Pendulum lock at HAY/LPY	Brn		Blu
Reg (Yellow)		Brn		Blu
Bypass	EC on/off	Brn		Blu
Sec 9		x		x
Sec 8	User defined A&B	x		x
Sec 7		Brn		Whi
Sec 6		Yel		Gre
Sec 5		Brn		Blu
Sec 4		Brn		Blu
Sec 3		Brn		Blu
Sec 2		Brn		Blu
Sec 1		Brn		Blu

		Gnd	L	R	-	+
Foam marker	No. 4 Not used	Blk	Brn	Red		Or

HC 5500	Function	+	Sig.	-
Opt 1	Pressure sensor	Brn	Blu	-
Opt 2	RPM sensor or anemometer	Brn	Blu	Blk
Speed		Brn	Blu	Blk
Flow		Brn	Blu	Blk
L end nozzle	Pendulum lock at HAY/LPY	Brn		Blu
R endnozzle	Pendulum lock at HAY/LPY	Brn		Blu
Reg (Yellow)		Brn		Blu
Bypass	EC on/off	Brn		Blu
Sec 9		x		x
Sec 8	User defined A&B	x		x
Sec 7		Brn		Whi
Sec 6		Yel		Gre
Sec 5		Brn		Blu
Sec 4		Brn		Blu
Sec 3		Brn		Blu
Sec 2		Brn		Blu
Sec 1		Brn		Blu

		Gnd	L	R	-	+
Foam marker	No. 4 Not used	Blk	Brn	Red		Or

Plug positions for SP-EOH hydraulics



1. Slant
2. Slant
3. Fold left
4. Fold left
5. Tilt left down
6. Tilt left up
7. Tilt right down
8. Tilt right up
11. Fold right
12. Fold right
13. (B) flow reverse
14. (A) flow forward
19. Fold sensor

Road safety kit

The wiring is in accordance with ISO 1724.

Position	Wire colour
1. LH direction indicator	Yellow
2. Free	Blue
3. Frame	White
4. RH direction indicator	Green
5. RH rear position lamp	Brown
6. Stop lamps	Red
7. LH rear position lamp	Black

ProFlow electrical connections

Power supply: 12 V DC

Brown wire: Positve

Blue wire: Negative

Electric control valve connection: 12 V DC; Max. 5 Ampere.

Pin1: Free

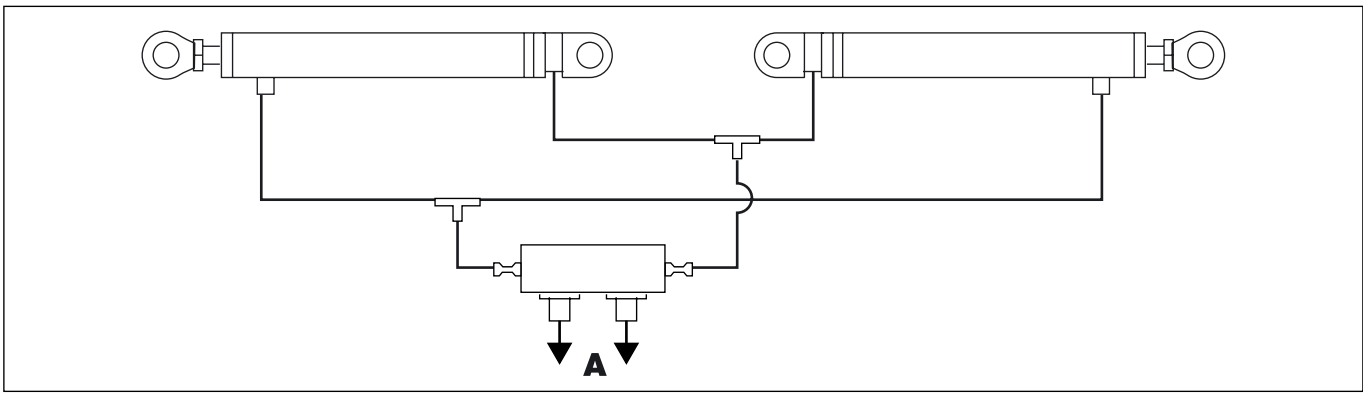
Pin 2: Free

Pin 3: Positive

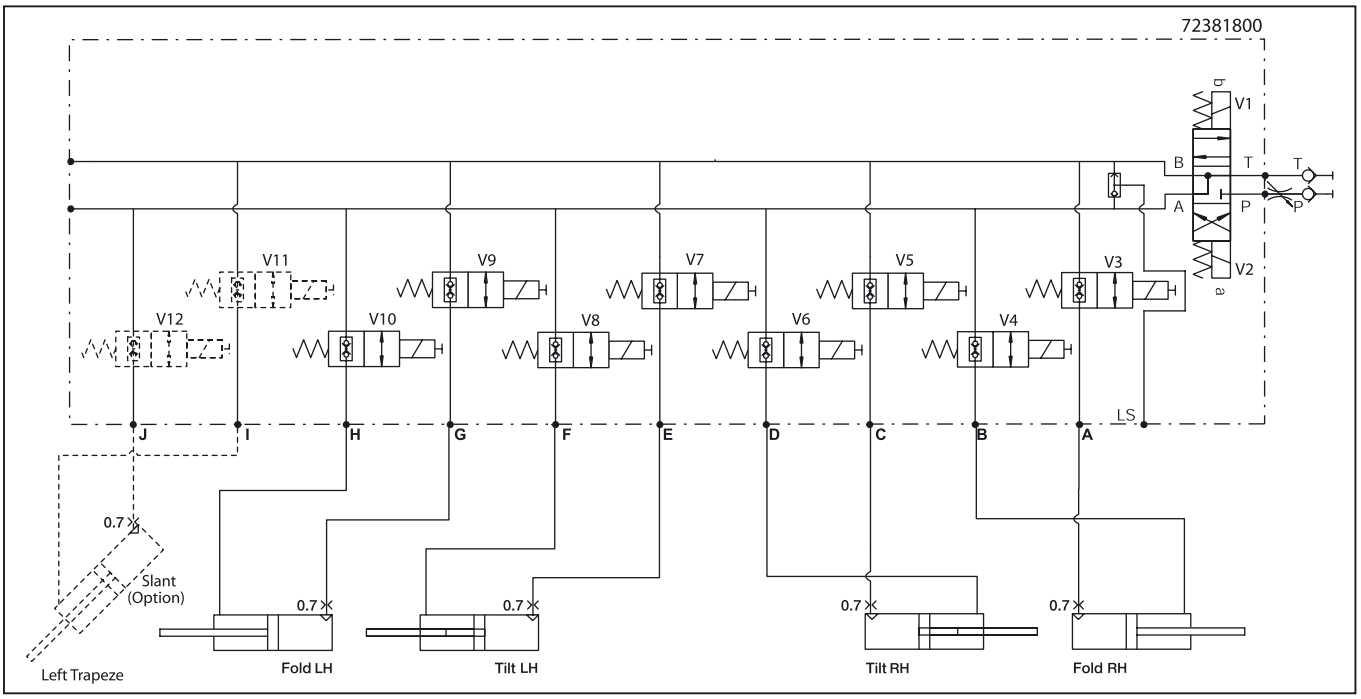
Pin 4: Negative

Charts

Boom hydraulic - DH

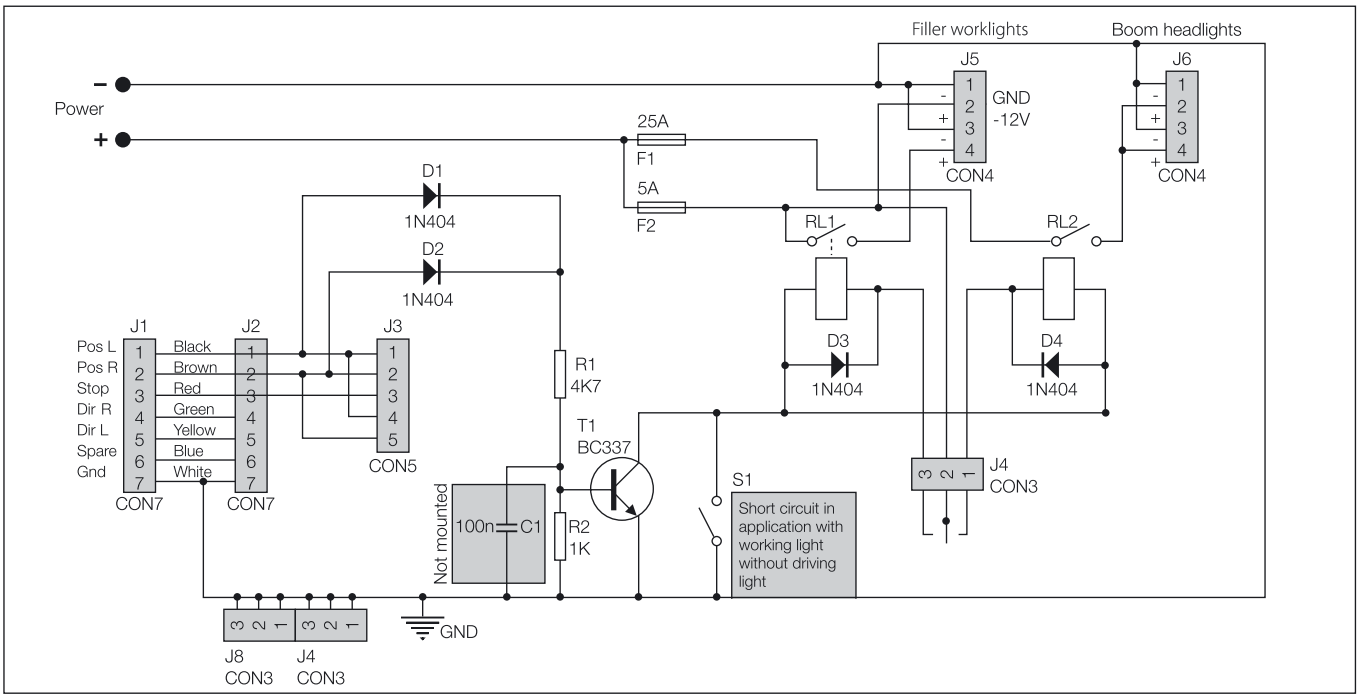


Boom hydraulic - EOH

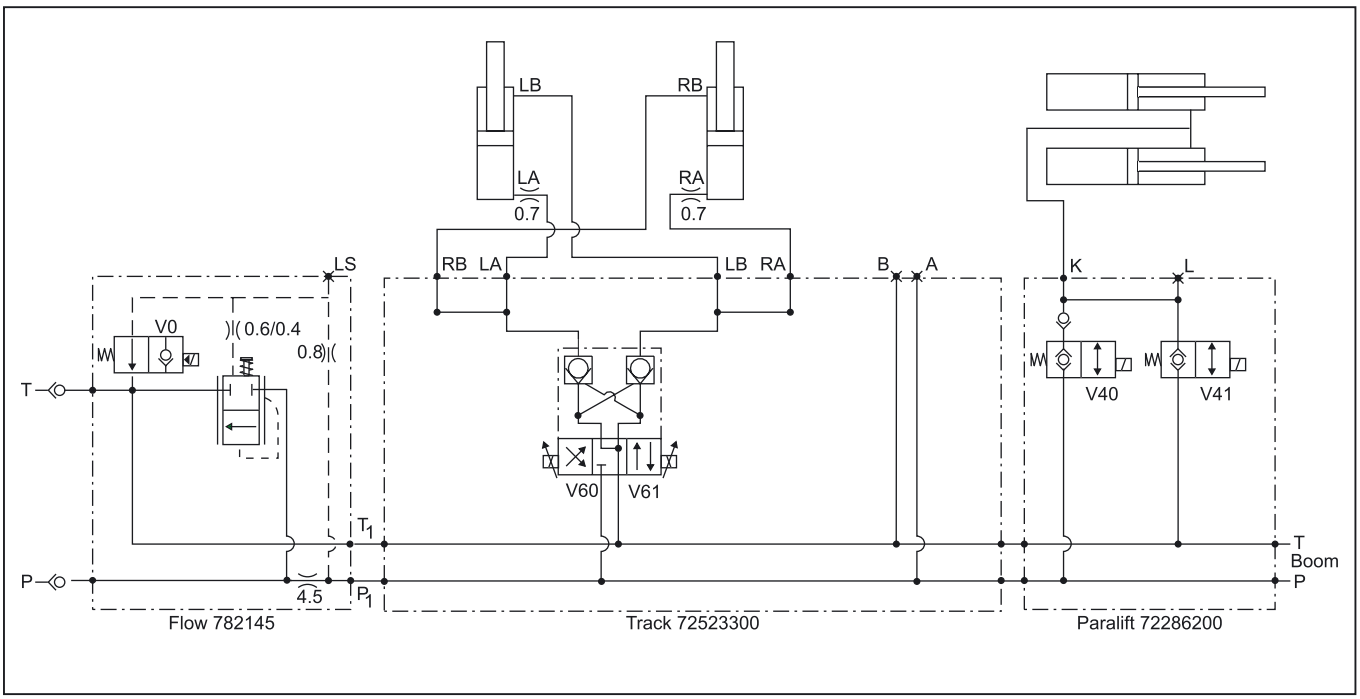


8 - Technical specifications

Electrical specifications for boom and work light



Sprayer hydraulic - EOH type ManualTrack



Sprayer hydraulic - EOH-type IntelliTrack