



The Sprayer

# *Operator's Manual*

## **NAVIGATOR 3000/3500/4000/6000**

**Instruction book**

67021703 - Version 3.01

US - 11.2021



# **NAVIGATOR**

## **3000/3500/4000/6000**

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## Welcome letter

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Dear Owner,

Thank you for purchasing a HARDI® product and welcome to the ever-increasing family of HARDI® sprayer owners.

Our sprayers and accessories are rapidly becoming a familiar sight on North American farms. We believe that this results from growers becoming increasingly conscious of crop protection input costs and the vital need for cost effective spray application equipment.

Please take the time to thoroughly read the Operator's Manual before using your equipment. You will find many helpful hints as well as important safety and operation information.

Some of the features on your HARDI® sprayer were suggested by growers. There is no substitute for "on farm" experience and we invite your comments and suggestions. If any portion of this instruction book remains unclear after reading it, contact your HARDI® dealer or service personnel for further explanation before using the equipment.

**For Product, Service or Warranty Information:**

- Please contact your local HARDI® dealer.

**To contact HARDI® directly:**

- Please use the HARDI® Customer Service number: 1-866-770-7063

- Or send your email to [service@hardi-us.com](mailto:service@hardi-us.com)

**Visit us online at: [www.hardi-us.com](http://www.hardi-us.com)**

**HARDI® NORTH AMERICA INC.**

7301 Vine Street Court  
Davenport, Iowa 52806  
Phone: (563) 386-1730  
Fax: (563) 386-1280



### Operator safety

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#### Symbols

These symbols are used throughout the book to designate where the reader needs to pay extra attention.



This symbol means DANGER. Be very alert as your safety is involved!



This symbol means WARNING. Be alert as your safety can be involved!



This symbol means ATTENTION. This guides you to better, easier and safer operation of your sprayer!



This symbol means NOTE.

---

#### General info

Note the following recommended precautions and safe operating practices before using the sprayer.



Read and understand this instruction book before using the equipment. It is equally important that other operators of this equipment read and understand this book.



If any portion of this instruction book remains unclear after reading it, contact your HARDI® dealer for further explanation before using the equipment.



Local law may demand that the operator is certified to use spray equipment. Adhere to the law.



The driver's seat is the intended working place during operation.



Wear protective clothing. Clothing may differ depending on the chemical being sprayed. Adhere to local law.



Wash and change clothes after spraying. Wash tools if they have become contaminated.



Do not eat, drink or smoke while spraying or working with contaminated equipment. In case of poisoning, immediately seek medical advice. Remember to identify chemicals used.



No persons are allowed in the operation area of the sprayer. Be careful not to hit people or surroundings when maneuvering the sprayer, especially while backing up.



Slow down when driving in uneven terrain as the machine might be in risk of turning over.



Keep children away from the equipment!



Do not attempt to enter the tank.



Do not go under any part of the sprayer unless it is secured. The boom is secure when placed in the transport brackets.



Pressure test with clean water prior to filling with chemicals. Never disconnect the hoses if the machine is in operation.







DANGER! Do not exceed the P.T.O. max. recommended r.p.m.



Rinse and wash equipment after use and before servicing.

## 2 - Safety notes

-  Never service or repair the equipment while it is operating. Always replace all safety devices or shields immediately after servicing.
-  Disconnect electrical power before servicing and depressurize equipment after use and before servicing.
-  If an arc welder is used on the equipment or anything connected to the equipment, disconnect power leads before welding. Remove all inflammable or explosive material from the area.
-  The External Cleaning Device should not be used if essential parts of the equipment have been damaged, including safety devices, high pressure hoses, etc.

### Label explanation

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

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

10532403 - Rotating PTO

Rotating driveline contact can cause death. Keep away!



10533003 - Overhead lines

Do not contact electrical lines when moving or operating!



10533403 - Axle adjust

Risk of serious injury or death from crushing. Securely support sprayer.



10616103 - Paralift™

Risk of serious injury or death from crushing. Do not enter between tank and center frame.



10532503 - Hydraulic hazard

Risk of serious injury or death from escaping hydraulic fluid.



10532603 - Not for drinking

This water must never be used for drinking.



10532703 - Crush fingers

Never place fingers in clutch.



10532803 - Fold wings

Keep away when folding, unfolding wings.



10533203 - Chemicals

Carefully read information about chemicals before handling. Observe all safety rules.



10577603 - Do not weld

Disconnect all electronics before welding. Avoid high pressure spray on components.



10532903 - Tank drain

Tank contents will drain when handle is pulled.



10533103 - General label

Read Operator's manual and chemical manufacturer's instructions.



10533303 - Quick fill

Keep valve closed and capped.



10533603 - Open slowly

Contents under pressure. Open cap slowly.



## 2 - Safety notes

97606603 - Pre-Delivery

Remove tie straps before unfolding boom first time.



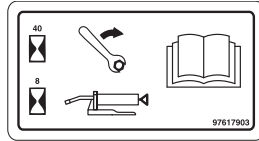
97610103 - Tank return hose

Tank return hose must be connected to a low pressure port.



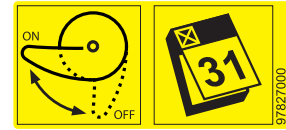
97617903 - Breakaway

See Boom Operator's manual for maintenance.



97827000 - EasyClean filter

Open and clean filter monthly.



978439 - Lifting point



978440 - Bolt torque

Tighten to torque settings according to operator's manual.



10533803 - Red Reflector



10533903 - Amber Reflector



10601403 - SMV Sign

Slow Moving Vehicle.



97607503 - Operator's Manual



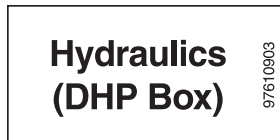
97607803 - Contact Info



97610803 - Fluid Box



97610903 - Hydraulic Box



97802200



97842200



## 2 - Safety notes

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### Local poison information center



If you live anywhere in the United States, the following toll free number will connect you to your Local Poison Information Center.

PHONE NO. 1 - 800 - 222 - 1222



If you live outside the United States, find the number for the poison control center in your phone book and write it in the space below:

PHONE NO. \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_



Keep a list, in the space provided below, of all the chemicals that you have in use.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

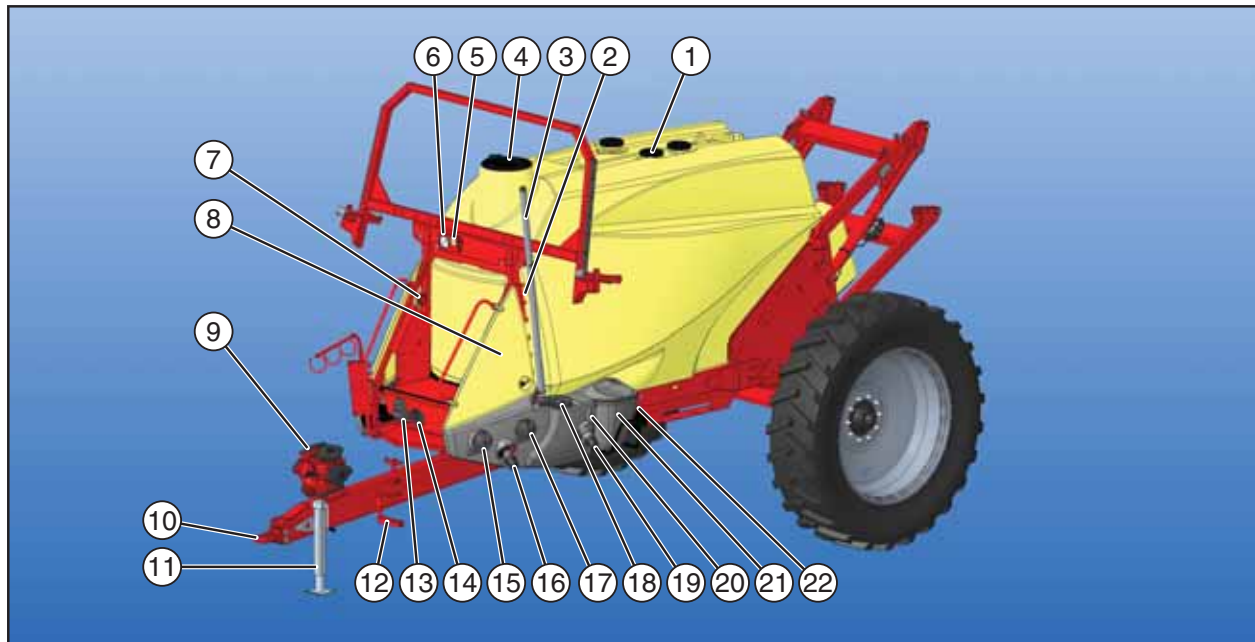
8. \_\_\_\_\_

9. \_\_\_\_\_

10. \_\_\_\_\_

### General Info

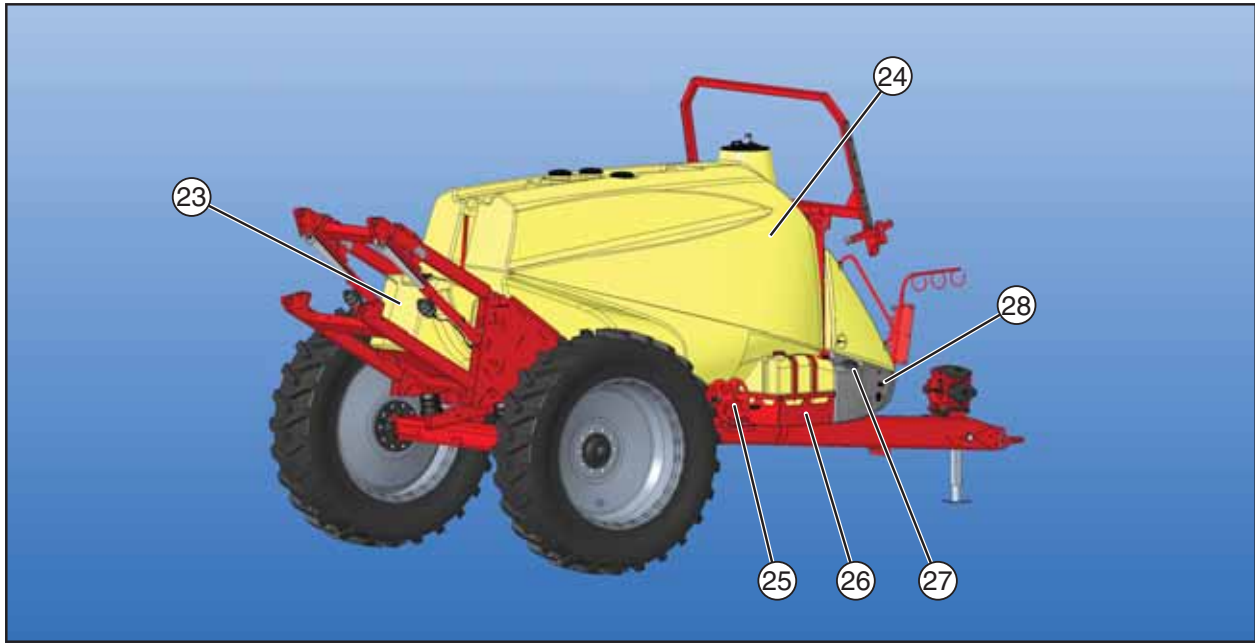
#### View



- |  |  |
|--|--|
| 1. Tank Tube Riser/Pipe Lid            | 12. Step to Platform                             |
| 2. Rinse Tank Level Indicator          | 13. Pressure Regulation Valve (EVC/Std, EFC/DF4) |
| 3. Main Tank Level Indicator           | 14. Agitation Valve                              |
| 4. Main Tank Lid                       | 15. Pressure SmartValve                          |
| 5. EasyClean Filter Clogging Indicator | 16. Rinse Tank Coupler                           |
| 6. Spray Pressure Gauge                | 17. Suction SmartValve                           |
| 7. Clean Water Tank Lid                | 18. EasyClean Filter                             |
| 8. SafetyLocker                        | 19. Main Tank Filling Coupler                    |
| 9. Pump                                | 20. Main Tank Quick Fill Valve                   |
| 10. Drawbar Hitch                      | 21. TurboFiller                                  |
| 11. Support Leg                        | 22. TurboFiller Valves                           |

### 3 - Description

#### View



23. Rinse Tank

24. Main Tank

25. Hose Reel for External Cleaning Device

26. ChemLocker with FoamMarker Tank

27. CycloneFilter

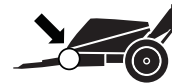
28. Support Leg Storing Position

#### Identification plates

An identification plate fitted on the frame indicates producer name, model and serial number.



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



#### 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 is 25 mph (40 km/h). Be aware that this 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 fertilizers. 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 steel frame with a strong chemical and weather resistant electrostatic powder coat paint. Fasteners (screws, bolts, nuts, etc.) have been DELTA-MAGNI treated to be resistant to corrosion.

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### **Tank**

The main tank (made of impact-proof, UV and chemical resistant polyethylene) has a purposeful design with no sharp corners for easy cleaning. 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 easy access for filling, cleaning the tank, etc. The sprayer is also equipped with a rinse tank (optional) and a clean water tank.

Nominal tank contents: 800 gal (3000 model), 1000 gal (3500 model), 1200 gal (4000 model) or 1600 gal (6000 model).

## 3 - Description

### Liquid System

#### Pump

Diaphragm pump with easily accessible valves and diaphragms. Model 364 or 464 with 6 diaphragms.

Standard = 540 r.p.m. (6 splines). Optional = 1000 r.p.m. (20 or 21 splines). The design of the diaphragm pump is simple, with easily accessible diaphragms and valves that ensure liquid does not contact the vital parts of the pump.

Pump model 464 is shown in the picture.

Centrifugal pump (hydraulic drive), model 150 (Ace 206), model 200 (Ace 304) or model 650 (Ace 650). Standard = 150



Models 150 & 200 not available with rate controller.



#### Valves and Symbols

The possible functions of valves are indicated by colored discs on the function labels. The modular valve system allows for the addition of optional extras on both the pressure and suction side. A function is activated by turning the handle towards the desired function.



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



ATTENTION! If a valve is too tight or too loose to operate (= liquid leakage), then the valve needs to be serviced. Please see "Adjustment of 3-way-valve" on page 94 for further information.

#### Pressure SmartValve (Green Symbols)

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

The active function is indicated by the indicator. The handle is turned so the indicator points to the label for required function. If the handle is turned to a position without label (unused function), the valve is closed.



Spraying



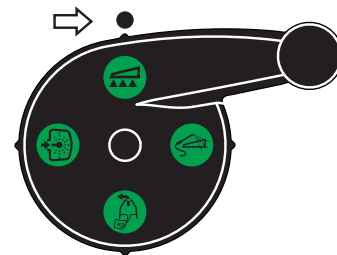
Internal tank rinsing (optional)



TurboFiller (optional)



External tank cleaning (optional)



### Suction SmartValve (Blue symbols)

This valve selects suction from main tank or from the rinse tank.

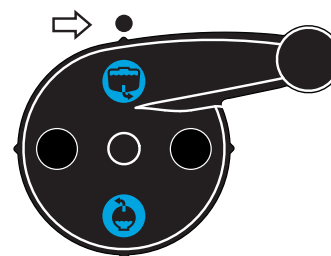
The handle is turned so the label for required function is directed to the indicator. If the handle is turned to a position without label (unused function), the valve is closed.



Main tank



Rinse tank



### Main Tank Quick fill Valve (Blue symbol)

This valve opens and closes the main tank quick fill hose.

The open function is activated when the handle is turned up to point to the indicator. If the handle is turned horizontal or down, the valve is closed.



Main tank Quick fill



### Agitation Valve (Green symbol)

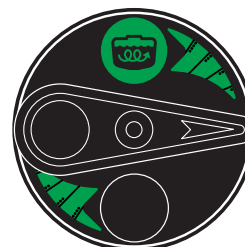
With the adjustable agitation valve, it is possible to combine spraying with a high volume rate at high pressure with agitation at the same time.

This is controlled continuously 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 in less agitation.
- If the handle is turned to a position in the wide end of the arrow, then a large amount of liquid will pass the valve, resulting in more agitation.



Adjustable Agitation



### EVC Control Unit (Std)

Sprayers equipped with the EVC control unit (Electrical Valve Control) are equipped with a pressure regulation valve at the front of the sprayer and ON/OFF boom section valves at the rear of the sprayer. The unit has a built-in mechanical rate controller (HARDI-MATIC) and each boom section valve has manual pressure equalization to maintain constant pressure when one or more sections are turned ON/OFF.

HARDI-MATIC is a mechanical rate controller that ensures a constant volume of spray solution per acre even at varying speeds within the same gear. Maximum performance is obtained with a P.T.O. shaft speed between 300-600 r.p.m. (540 r.p.m. pump) or 650-1100 r.p.m. (1000 r.p.m. pump).

### EFC Control Unit (DF4)

Sprayers equipped with the EFC control unit (Electric Fluid Control) are equipped with a DF4 (DynamicFluid4) pressure regulation system. This includes a DF4 pressure regulation valve at the front of the sprayer, ON/OFF boom section valves at the rear of the sprayer and multiple sensors (speed, flow, pressure, pump r.p.m. and DF4 valve angle).

### 3 - Description

#### DynamicFluid4 Pressure Regulation

DynamicFluid4 regulation is a continuous process that continues even if the nozzles are closed. Two ceramic discs regulate the pressure and ensures quick reaction and zero leakages. Sprayer speed, P.T.O. rpm and number of sections activated are parameters used, and the benefit is more precise application rates from the second the sprayer begins spraying.

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

The 5 sensors are also back-up for each other and ensures the system can continue regulation even if one or more sensor signals fail. Sensors used are:










- Sprayer speed sensor
- Flow sensor
- Pressure sensor
- Pump rpm sensor
- Regulation valve opening angle sensor

The DynamicFluid4 pressure regulation features are:

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

#### Screen Icons

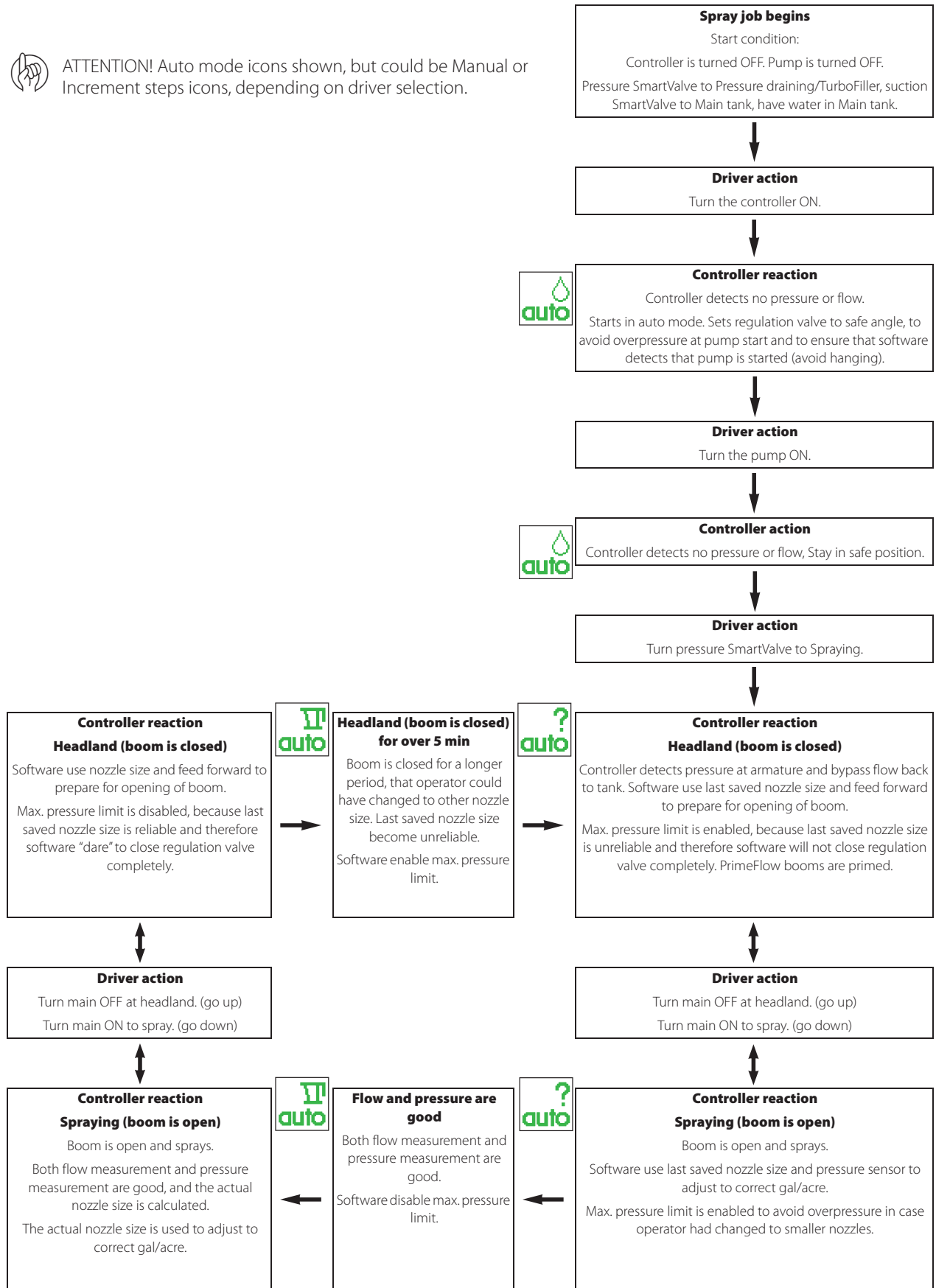
The sprayer driver selects one of three modes Auto, Manual or Increment steps. The sprayer computer detects one of three regulation modes Drop, Question mark or calibration jug. This makes 9 modes in total.

Auto	Manual	Increment steps	
When Automatic Volume Rate button is pressed on the SetBox.	When one of the Manual pressure control buttons is pressed on the SetBox.	When the Volume Rate is changed in steps with %-up or %-down buttons on the Terminal.	
			<b>Calibration jug</b> There is flow to section valves. Nozzle size (G/min at 45 psi) has been calculated.
			<b>Drop</b> There is no flow to section valves. The pump is not started or the pressure SmartValve is set to other function than spraying.
			<b>Question mark</b> There is flow to section valves but pressure and flow has not yet been stable, therefore the nozzle size (G/min at 45 psi) has not been calculated. The system uses the previously stored nozzle size.

### Regulation Valve Function Diagram

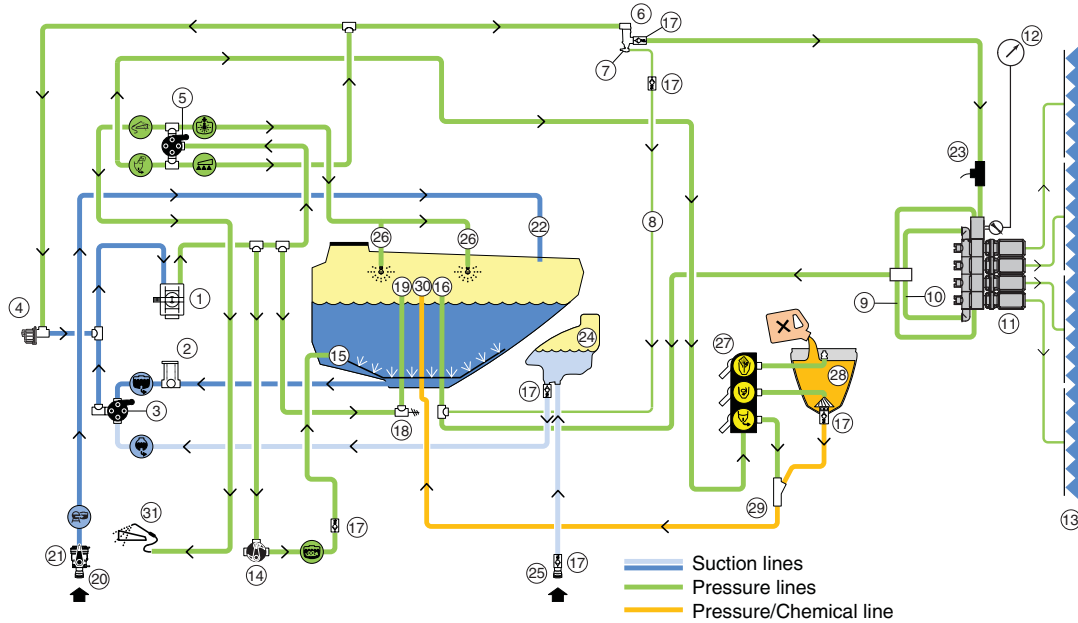


ATTENTION! Auto mode icons shown, but could be Manual or Increment steps icons, depending on driver selection.



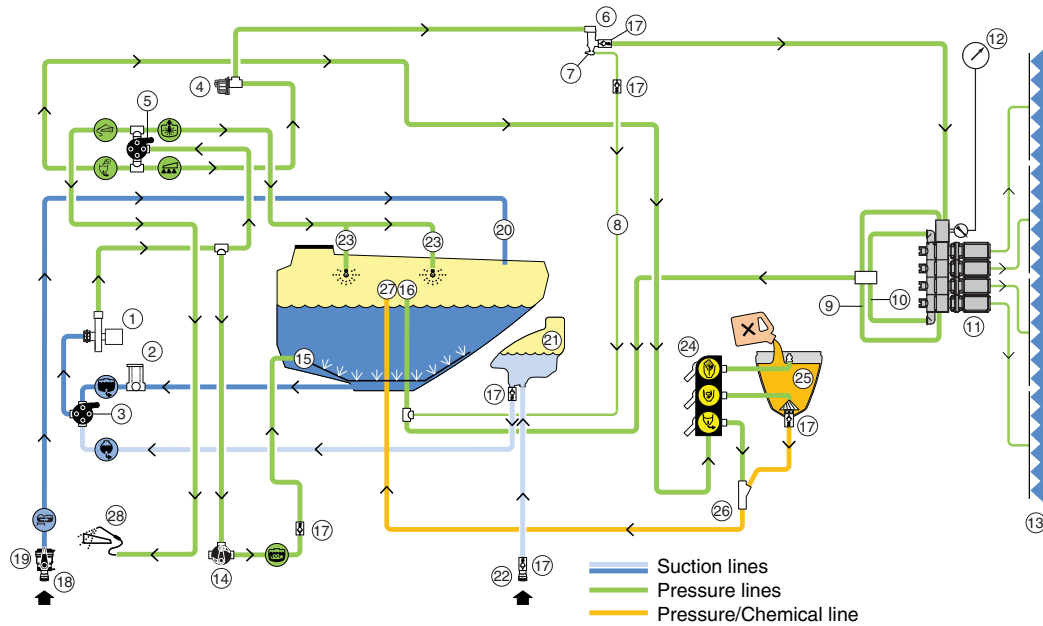
### 3 - Description

**Diagram - EVC Control Unit (Std), Diaphragm Liquid System with optional extras**



- |  |  |
|--|--|
| 1. Pump                                | 17. One-Way Valve                            |
| 2. EasyClean filter                    | 18. Safety Valve                             |
| 3. Suction SmartValve                  | 19. Riser Pipe                               |
| 4. Pressure Regulation Valve (Std/EVC) | 20. Main Tank Quick Fill coupler             |
| 5. Pressure SmartValve                 | 21. Main Tank Quick Fill valve               |
| 6. CycloneFilter                       | 22. Main Tank Quick Fill hose to tank inlet  |
| 7. Purge Valve                         | 23. Flowmeter                                |
| 8. Return Line for Boost Function      | 24. Rinse Tank (optional)                    |
| 9. Return pressure drop                | 25. Rinse Tank Quick Fill Coupler (optional) |
| 10. Return pressure equalization       | 26. Tank Rinsing Nozzles (optional)          |
| 11. Distribution Valves (EVC)          | 27. Valve block TurboFiller (optional)       |
| 12. Remote Pressure Gauge              | 28. Turbofiller (optional)                   |
| 13. Spray Boom                         | 29. Ejector for TurboFiller (optional)       |
| 14. Agitation Valve                    | 30. Tank tube for TurboFiller (optional)     |
| 15. Agitation Tube                     | 31. External Cleaning (optional)             |
| 16. Return Line / Riser Pipe           |  |

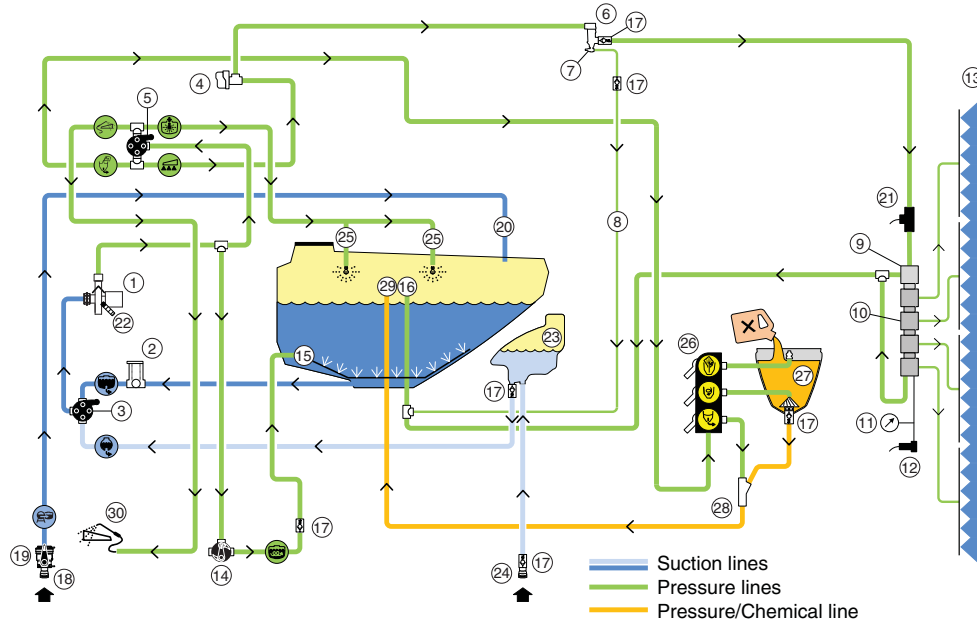
**Diagram - EVC Control Unit (Std), Centrifugal Liquid System with optional extras**



- |  |  |
|--|--|
| 1. Pump                                | 15. Agitation Tube                           |
| 2. EasyClean filter                    | 16. Return Line / Riser Pipe                 |
| 3. Suction SmartValve                  | 17. One-Way Valve                            |
| 4. Pressure Regulation Valve (Std/EVC) | 18. Main Tank Quick Fill coupler             |
| 5. Pressure SmartValve                 | 19. Main Tank Quick Fill valve               |
| 6. CycloneFilter                       | 20. Main Tank Quick Fill hose to tank inlet  |
| 7. Purge Valve                         | 21. Rinse Tank (optional)                    |
| 8. Return Line for Boost Function      | 22. Rinse Tank Quick Fill Coupler (optional) |
| 9. Return pressure drop                | 23. Tank Rinsing Nozzles (optional)          |
| 10. Return pressure equalization       | 24. Valve block TurboFiller (optional)       |
| 11. Distribution Valves (EVC)          | 25. Turbofiller (optional)                   |
| 12. Remote Pressure Gauge              | 26. Ejector for TurboFiller (optional)       |
| 13. Spray Boom                         | 27. Tank tube for TurboFiller (optional)     |
| 14. Agitation Valve                    | 28. External Cleaning (optional)             |

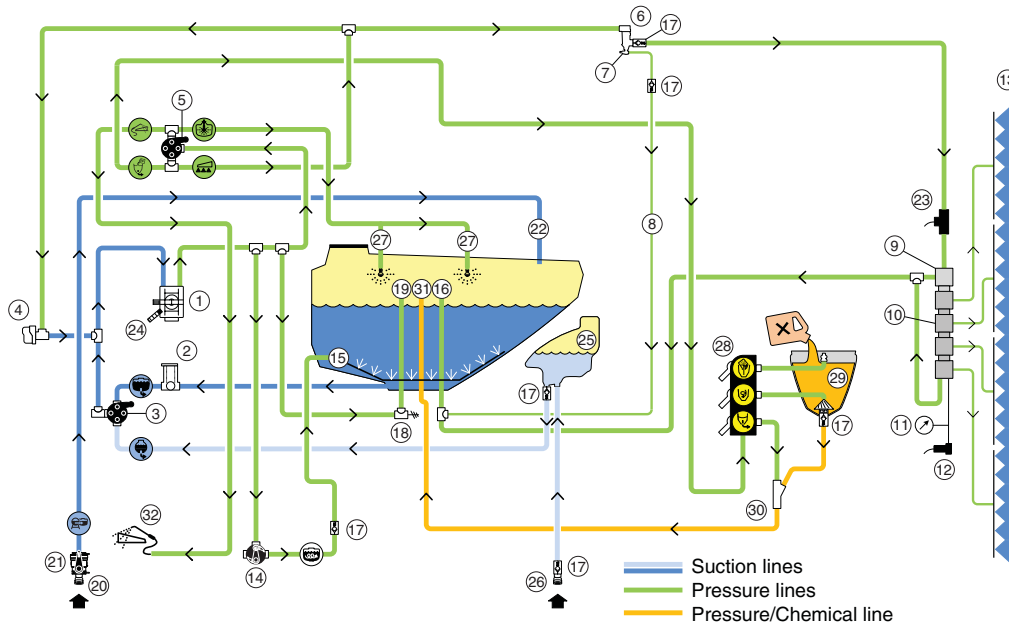
### 3 - Description

**Diagram - EFC Control Unit (DF4), 650 Pump Liquid System with Options**



- |  |   |
|--|---|
| 1. Pump                                | 16. Return Line / Riser Pipe                |
| 2. EasyClean Filter                    | 17. One-Way Valve                           |
| 3. Suction SmartValve                  | 18. Main Tank Quick Fill Coupler            |
| 4. Pressure Regulation Valve (DF4/EFC) | 19. Main Tank Quick Fill Valve              |
| 5. Pressure SmartValve                 | 20. Main Tank Quick Fill hose to tank inlet |
| 6. CycloneFilter                       | 21. Flowmeter                               |
| 7. Purge Valve                         | 22. Speed Sensor for Pump                   |
| 8. Return Line for Boost Function      | 23. Rinse Tank (optional)                   |
| 9. Bypass Valve for Boom               | 24. Rinse Tank Coupler (optional)           |
| 10. Distribution Valves (EFC)          | 25. Rinsing Nozzles (optional)              |
| 11. Pressure Gauge (optional)          | 26. Valve Block for TurboFiller (optional)  |
| 12. Pressure Sensor                    | 27. TurboFiller (optional)                  |
| 13. Spray Boom                         | 28. Ejector for TurboFiller (optional)      |
| 14. Agitation Valve                    | 29. Tank Hose for Turbofiller (optional)    |
| 15. Agitation Tube                     | 30. External Cleaning (optional)            |

**Diagram - EFC Control Unit (DF4), Diaphragm Liquid System with Options**



- |  |   |
|--|---|
| 1. Pump                                | 17. One-Way Valve                           |
| 2. EasyClean Filter                    | 18. Safety Valve                            |
| 3. Suction SmartValve                  | 19. Riser Pipe                              |
| 4. Pressure Regulation Valve (DF4/EFC) | 20. Main Tank Quick Fill Coupler            |
| 5. Pressure SmartValve                 | 21. Main Tank Quick Fill Valve              |
| 6. CycloneFilter                       | 22. Main Tank Quick Fill hose to tank inlet |
| 7. Purge Valve                         | 23. Flowmeter                               |
| 8. Return Line for Boost Function      | 24. Speed Sensor for Pump                   |
| 9. Bypass Valve for Boom               | 25. Rinse Tank (optional)                   |
| 10. Distribution Valves (EFC)          | 26. Rinse Tank Coupler (optional)           |
| 11. Pressure Gauge (optional)          | 27. Rinsing Nozzles (optional)              |
| 12. Pressure Sensor                    | 28. Valve Block for TurboFiller (optional)  |
| 13. Spray Boom                         | 29. TurboFiller (optional)                  |
| 14. Agitation Valve                    | 30. Ejector for TurboFiller (optional)      |
| 15. Agitation Tube                     | 31. Tank Hose for Turbofiller (optional)    |
| 16. Return Line / Riser Pipe           | 32. External Cleaning (optional)            |

## 3 - Description

### Filters

An EasyClean suction filter is fitted in the working zone.

A Cyclone pressure filter is fitted to the sprayer's right side just in front of the ChemLocker. It has a built-in self-cleaning function.

In-line pressure filters can be fitted at each boom section as an option.

All filters should always be in use and their function checked regularly. Pay attention to the correct combination of filter and mesh size (see "Filters and nozzles" on page 106).

### EasyClean Filter

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

- To open filter, turn it counterclockwise and pull it up as shown in picture.
- Pull out the two locks (A) to remove filter element from the lid.

An EasyClean clogging indicator is located beside the spray pressure gauge on the platform:

Clogging indicator color	Filter status
Green indicator.	No cleaning necessary.
Yellow indicator.	It is possible to finish an ongoing spraying job and then clean the filter afterwards.
Red indicator.	Clean the EasyClean Filter immediately, as the filter is clogged.



### CycloneFilter

With the CycloneFilter, any impurities in the spray liquid will by-pass the filter and be re-circulated back to the tank via the return flow.

Function diagram

1. Filter lid
2. From pump
3. To boom
4. Return to tank
5. Return valve

Valve (5) has three positions marked with small dots on the lever:

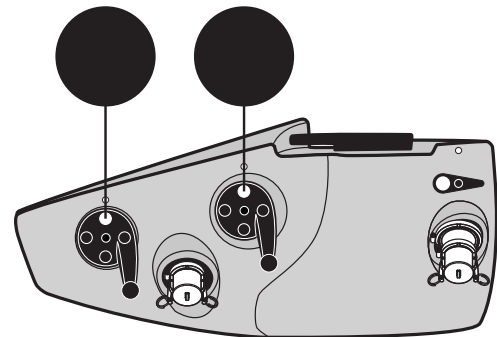
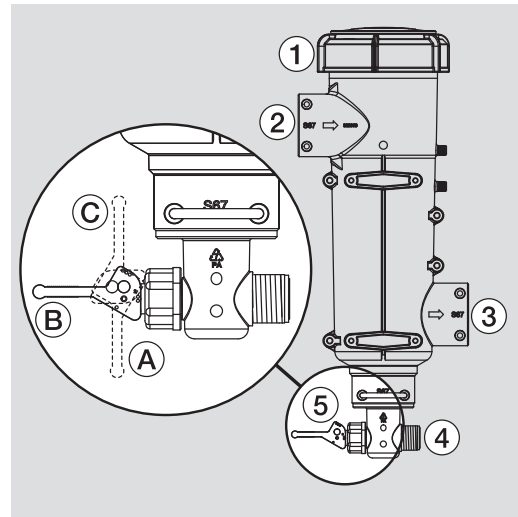
- A. Position marked with 1 dot: There is no return flow. Position is used when rinsing the boom if there is spray liquid in the main tank. Also used when high spraying volume is required.
- B. Position marked with 2 dots: Normal spraying position with return flow to prevent clogging the filter when spraying. Position is used when rinsing the boom if the main tank is empty.
- C. Position marked with 3 dots: Flushing position, which is used if filter is clogged. Lift and hold the lever to use this position which greatly increases return flow and flushes the filter. The pressure SmartValve must be set to "Spraying".



**ATTENTION!** Use of position C is no guarantee for a clean filter. Always regularly do a visual inspection and cleaning of the filter. If necessary, see "10 Hours Service - CycloneFilter" on page 87.



**DANGER!** Never open the Cyclone filter unless the pressure SmartValve and suction SmartValve are both closed (turned to an unused position)! If no unused pressure positions are available, then turn the pressure SmartValve to "Tank Rinse". Otherwise, spraying liquid may hit you when opening the filter, and drain the main tank contents!



### 3 - Description

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#### **Rinse Tank (optional)**

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

The rinse tank level indicator is placed at the platform.

Nominal content: approx. 130 gal (500 liters).

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#### **Clean Water Tank**

A clean water tank is integrated into the right side cover. It is accessed for filling at the sprayer's right side when entering the platform. The ball valve is located on the rear side of the valve cover on the sprayer's left side (near the main tank fill).

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

Capacity: approx. 5 gal (20 liters).



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

### Hydraulic Systems

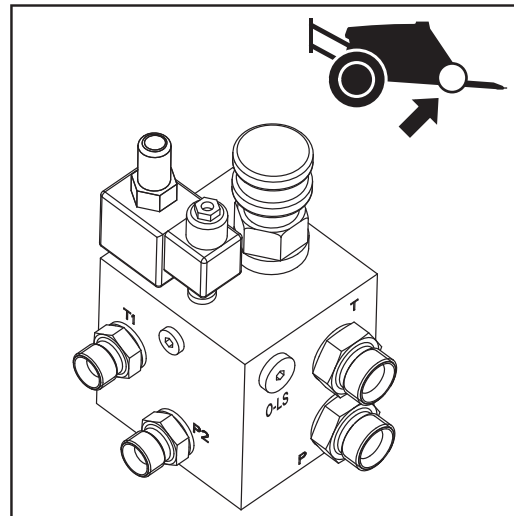
#### PARALIFT™

This hydraulic block manages hydraulic pressure for the PARALIFT™.



#### Open Center Hydraulics

The open center hydraulics block is necessary if the tractor uses open center hydraulics and/or load sensing. For adjustment, see “Open center hydraulics” on page 42.



#### Boom Hydraulics

The boom hydraulics vary depending on the boom model. A separate “Boom Operator’s Manual” is supplied with your sprayer and contains detailed information on the hydraulic components required to operate the boom functions.

#### AutoHeight

On sprayers with AutoHeight, a hydraulic block manages hydraulic pressure for the automatic boom height control functions.



## 3 - Description

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### Boom

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#### Boom Operator's Manual

A separate "Boom Operator's Manual" is supplied with your sprayer and contains detailed information on boom safety, set-up, operation and maintenance.



DANGER! Important information on Safety, Operation and Maintenance specific to your boom configuration is detailed in the "Boom Operator's Manual" supplied with your sprayer. 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.

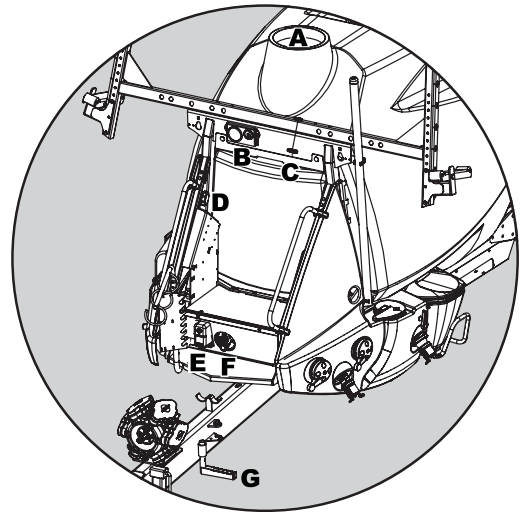
### Equipment

#### Platform

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

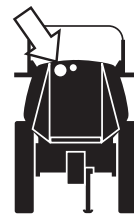
The pressure regulation valve (E) and the Agitation valve (F) are situated in front of the platform floor. The platform gives access to the clean water tank lid (D), the main tank lid (A). Also the main tank drain valve (C) can be operated from the platform. The pressure gauge (B) and EasyClean clogging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

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



#### Nozzle Pressure Gauge

The remote pressure gauge is integrated in the platform. This gauge measures the working pressure at the distribution manifold on the boom center section.



#### Tank Level Indicators

The actual fluid level in the main tank can be observed on the tank level indicator. The scale is displayed in US gallons (liters optional).



**ATTENTION!** The level indicator is only intended as a guide for the tank level.

The accuracy for the level is within 5% when the tank is above 20% filled and within 7.5% when the tank is below 20% filled.

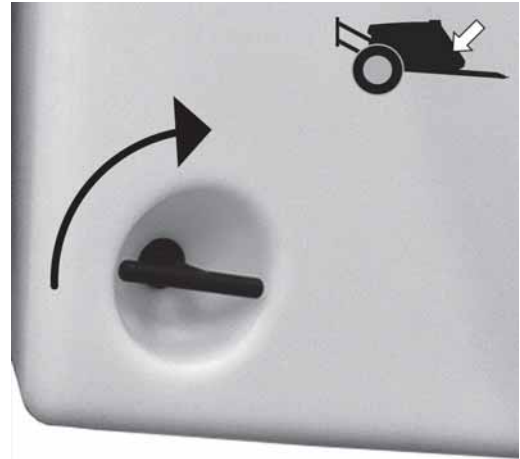
Just behind the main tank scale, a level for the rinse tank is attached to the frame. This is intended as a guide to see if the rinse tank is full or empty. If the indicator ball is at the top, then the rinse tank is full.



### 3 - Description

#### Right Side Cover

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

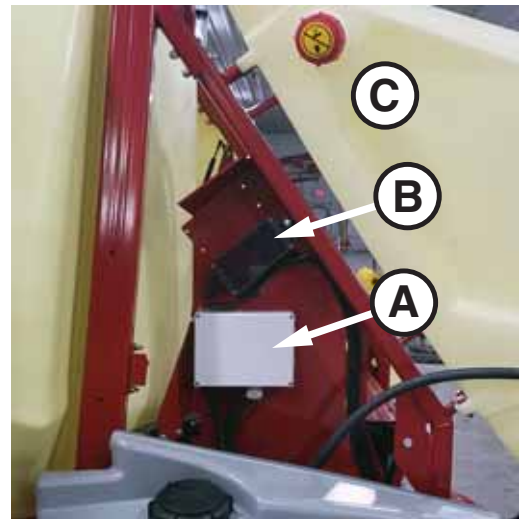


#### Electrical components:

- A. HC5500 box
- B. DHP Break Out box
- C. Clean water tank (integrated in the side cover).

 NOTE! Locations may vary depending on machine components.

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



### ChemLocker

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

If the optional FoamMarker is installed, then the FoamMarker tank may be placed inside the ChemLocker.



ATTENTION! Maximum load 225 lbs./25 gal. (100 kg/100 liters).



### SafetyLocker

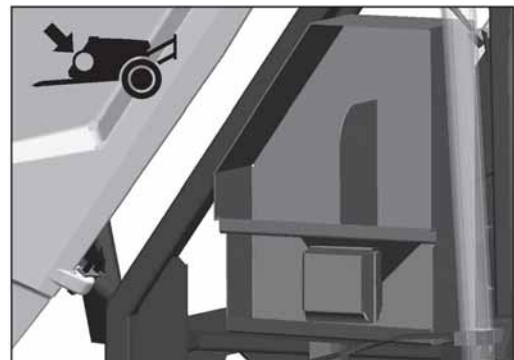
The locker is integrated in the left side, just above the SmartValves.

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.

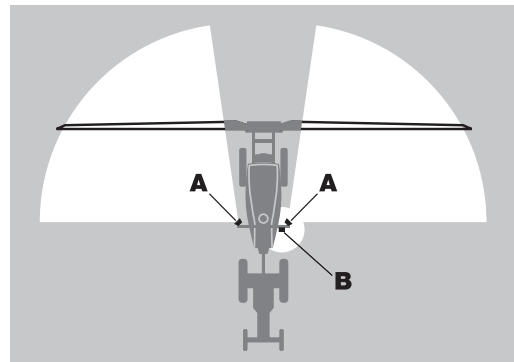


WARNING! Although this locker is meant for storing nontoxic items, it must never be used for storing food, beverage or other things meant for consumption.



### Night Spraying Light (Platform mounted lights)

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 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).



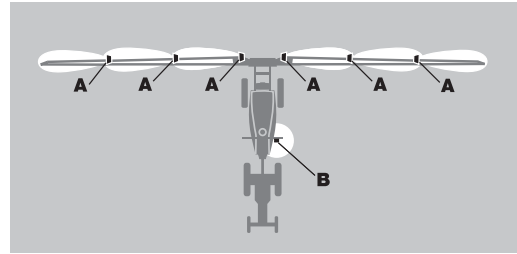
### 3 - Description

#### Night Spraying Light (Boom mounted lights)

Floodlights (A) are mounted on the spray boom, and they are positioned to illuminate both boom wings for spraying at night.

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 lights (A) are turned on/off by the controller unit in the tractor.



The work light (B) is turned on/off by activating a switch inside the left side cover (C).



#### External Cleaning Device (optional)

This equipment is comprised of a hose reel and a spray gun used to clean the complete sprayer externally in the field with clean water. The External Cleaning Device is located on the sprayer's right side just behind the ChemLocker.



**WARNING!** This cleaning device produces a high pressure spray. Incorrect use may result in injuries!



**DANGER!** For the safety of yourself and others, the following rules should always be observed:

- Never point the water jet at people, animals, electrical installations or other sensitive objects.
- Never try to clean clothing or footwear while worn by yourself or others.
- Never operate with bare feet or sandals.
- It is recommended to wear goggles.
- Protect yourself and others in the area from particles bouncing up during cleaning.



### Hydraulic Motor for Liquid Pump



NOTE! This oil motor is an alternative to a transmission shaft (P.T.O.) connected between the tractor and sprayer.

This oil motor is mounted in front of the pump, and two hydraulic hoses are connected directly to the tractor outlets.

When the correct oil flow is applied from the tractor, the oil motor drives the pump at a speed of 540 r.p.m.

If the oil flow from the tractor is too high, flow valves connected to the hydraulic hoses automatically reduce the oil flow to match 540 r.p.m. for the pump. This function is mostly used at start-up, where the oil flow is adjusted.



### Richway® Direct Inject foam marker (optional)

The Richway® Direct Inject foam marker system may be installed behind the ChemLocker on the sprayer's right side. Clean water is drawn from either the 130 gal (500 liter) Rinse Tank or the 25 gal. (100 liter) FoamMarker tank (placed inside the ChemLocker).



### 3 - Description

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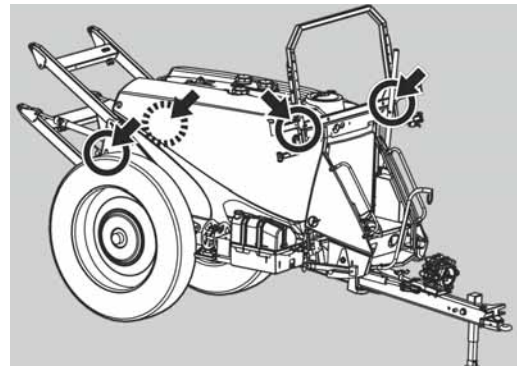
### General info

#### 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.

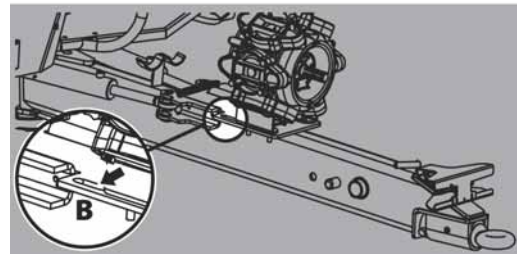
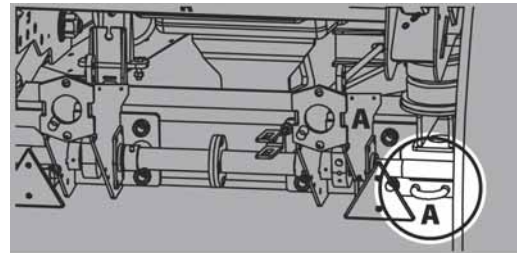


ATTENTION! Only lift the sprayer when the tanks are empty!



#### Pulling the sprayer at the tie down hooks

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

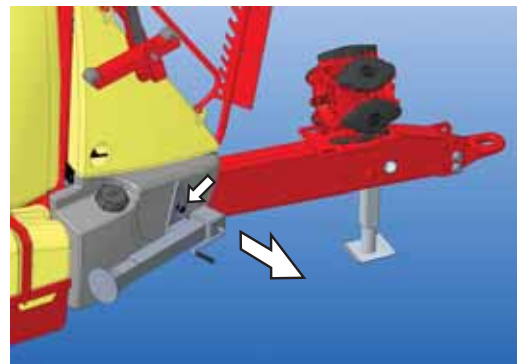


#### Before putting the sprayer into operation

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 anti-corrosion oil (e.g. CASTROL RUSTILO or SHELL ENSIS FLUID) on all metal parts in order to avoid chemicals and fertilizers discoloring the enamel. 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 enamel clean for many years. This treatment should be carried out every time the protection film is washed off.

#### Support jack

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



## 4 - Sprayer setup

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### Jack up the sprayer

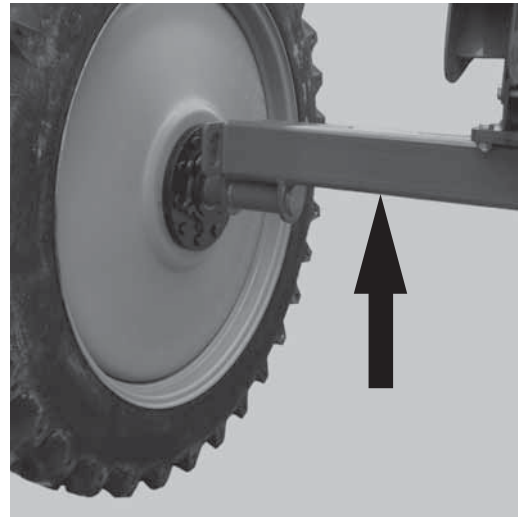
When the sprayer needs wheel mounting, wheel changing, or wheel bearing changing etc. then jack up the sprayer under the axle where shown.



**DANGER!** Be sure to place sprayer on level and firm ground 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: 5' (1.5 meter). 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.



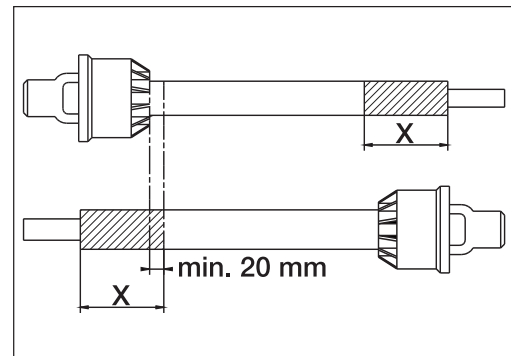
DANGER! ROTATING TRANSMISSION SHAFTS WITHOUT PROTECTION GUARDS ARE FATAL.

#### P.T.O. installation

Always read the manufacturer's instruction book before installation of the transmission shaft!

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

1. Before attaching transmission shaft, attach sprayer to tractor and set sprayer 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, pull the shaft apart. Fit the two shaft parts at tractor and sprayer pump and measure how much the shaft needs to be shortened. Also mark the protection guards with the same length to be shortened.



DANGER! As P.T.O. shafts are dangerous, always read the manufacturer's instruction book before making any changes to the transmission shaft!



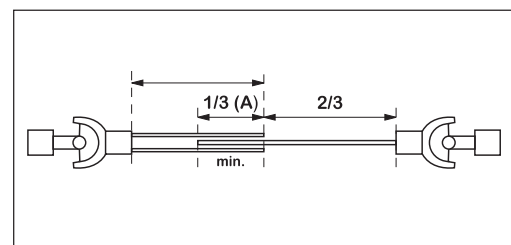
WARNING! The shaft must always have a minimum overlap that varies depending on the pump model.

Pump with 6 splines/540 r.p.m.

The shaft must always have an overlap (A) of minimum 1/3 of the length.

#### Example:

- Shortest distance (A) = 30"
- Each shaft should measure 20" (10" overlap).



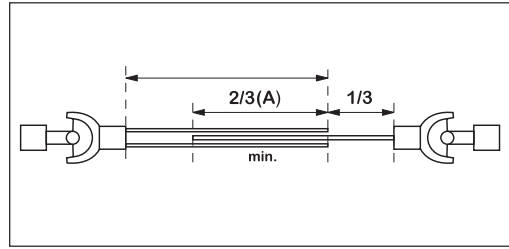
## 4 - Sprayer setup

Pump with 21 splines/1000 r.p.m.

The shaft must always have an overlap (A) of minimum 2/3 of the length.

**Example:**

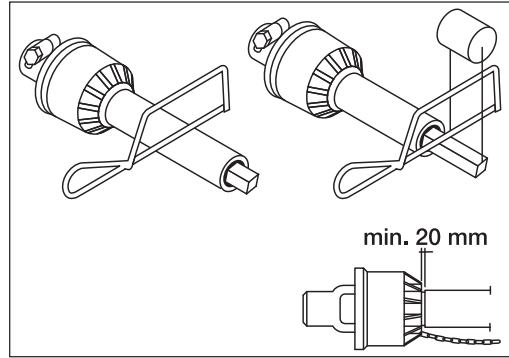
- Shortest distance (A) = 30"
- Each shaft should measure 25" (20" overlap).



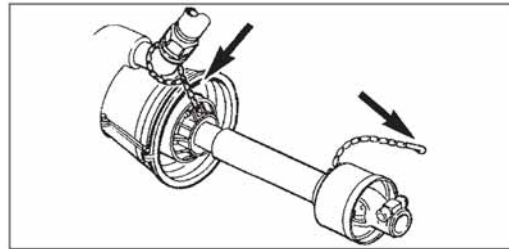
4. The two parts are shortened equally. Use a saw, and file the profiles afterwards to remove burrs.
5. Grease the profiles and assemble male and female parts again.
6. Fit the shaft to tractor P.T.O. and sprayer pump shaft.



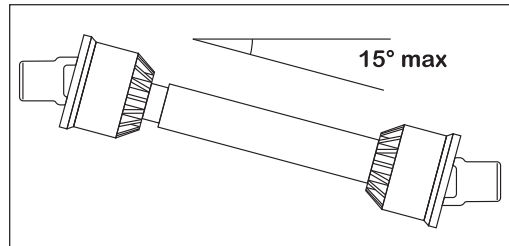
ATTENTION! Female part marked with a tractor towards tractor!



7. Fit the chains to prevent the protection guards from rotating with the shaft.



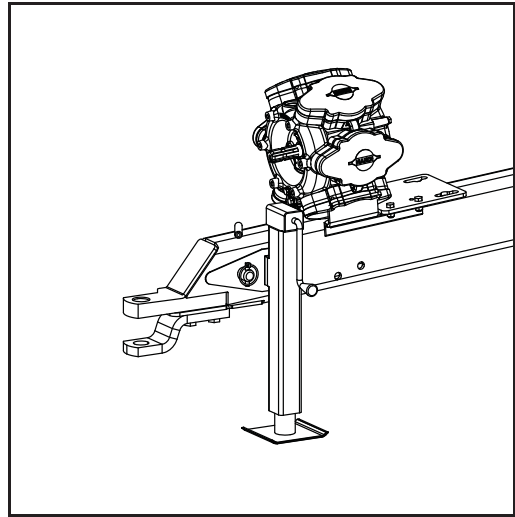
8. To ensure long life of the transmission shaft, try to avoid working angles greater than 15°.



### Mechanical connections

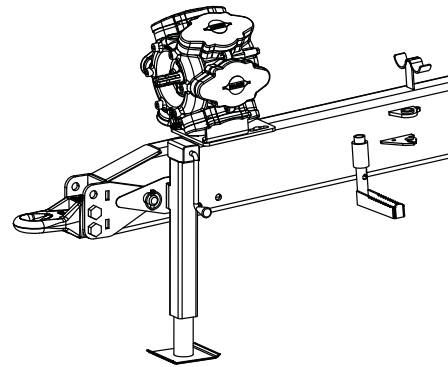
#### Hitch - adjustment

The Navigator is equipped with a clevis hitch. The lower plate is attached with two bolts and may be removed if needed. No other adjustment is possible.



#### Hitch - adjustment (Navigator 6000)

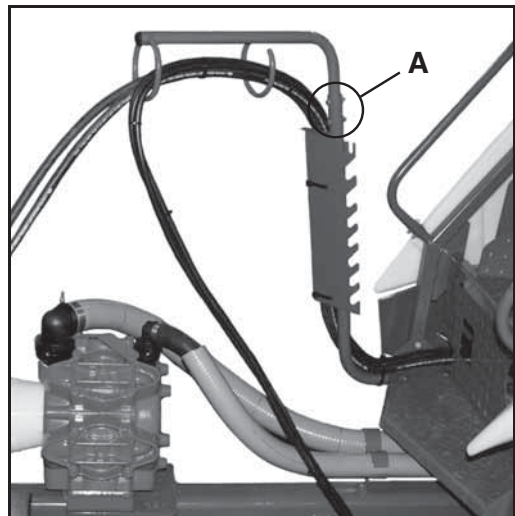
The Navigator 6000 is equipped with a category 3 hitch. The height of the hitch may be adjusted by removing two bolts and moving the hitch.



#### Swivel hose 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.

There are two bolts (A) that can be changed to adjust the swivel hose support. By removing the bottom bolt, the hose support is free to swivel as the sprayer turns. The top bolt can be placed in one of three holes to vary the height of the support.



## 4 - Sprayer setup

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### Hydraulic systems

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#### General Info

Ensure that the quick couplers are clean before connection!



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



DANGER! Due to the variation in tractor hydraulic systems and capacities, care should be exercised when initially operating the sprayer hydraulic cylinders. There may be air trapped in the system which can cause violent movements of the boom. 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 is bled of any air, if necessary.



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.

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#### Requirements - tractor (SPB/SPC HY-model)

The hydraulic system requires:

- One single acting outlet for the lift function of the spray boom.
- One double acting outlet for the folding function.
- One double acting outlet for the operation of the hydraulic pump drive (optional). The system has a built-in flow regulator that maintains constant speed on hydraulic movements.
- Minimum oil pressure of 2,175 psi (150 bar), max. oil pressure of 3,050 psi (210 bar) and an oil capacity of approx. 6.6 gal (25 liters).

---

#### Requirements - tractor (SPB/SPC HZ-model)

The hydraulic system requires:

- One double acting outlet for the electro-hydraulic operation of the boom functions.
- One double acting outlet for the operation of the hydraulic pump drive (optional). The system has a built-in flow regulator that maintains constant speed on hydraulic movements.
- Oil flow between 3 - 11 gal/min. (10 and 40 l/min) and a min. pressure of 2500 psi (170 bar).

The hydraulic hoses are marked with arrows or colored tie straps to indicate direction of oil flow. Red tie strap = pressure. Green tie strap = Return to tank. The hoses must be hooked up to the correct outlet for the hydraulics to function properly (pressure hose to pressure outlet, return hose to tank outlet).

---

#### Requirements - tractor (DTZ model)

The hydraulic system requires:

- One double acting outlet for the electro-hydraulic operation of the boom functions.
- One double acting outlet for the operation of the hydraulic pump drive (optional). The system has a built-in flow regulator that maintains constant speed on hydraulic movements.
- Oil flow between 4 - 21 gal/min (15 and 80 l/min) at a pressure of 2900 psi (200 bar).
- Minimum oil pressure is 2600 psi (180 bar) to obtain correct operation. Maximum oil pressure is 3050 psi (210 bar).
- Return flow restriction of the connected tractor must be maximum 220 psi (15 bar).
- For Load Sensing systems, an oil flow of approximately 1.3 gal/min (5 l/min) at 360 psi (25 bar) is supplied by the sprayer hydraulics. If a greater flow is required, a different orifice must be installed between the "open center" hydraulic block and the load sensing (LS) hydraulic line - see "Open center hydraulics" on page 42 for more information.

The hydraulic hoses are marked with arrows or colored tie straps to indicate direction of oil flow. Red tie strap = pressure. Green tie strap = Return to tank. The hoses must be hooked up to the correct outlet for the hydraulics to function properly (pressure hose to pressure outlet, return hose to tank outlet).



### Hydraulic Motor for Liquid Pump

Connect the two hydraulic hoses (A, B) to the tractor outlets with the highest priority for oil distribution.

From the factory, the hoses are mounted in the ports on the motor to match the standard setting for the direction of the pump rotation. If the hoses are swapped, e.g. when replacing worn hoses, the motor will rotate the opposite way. The pump performance will, however, remain unchanged.

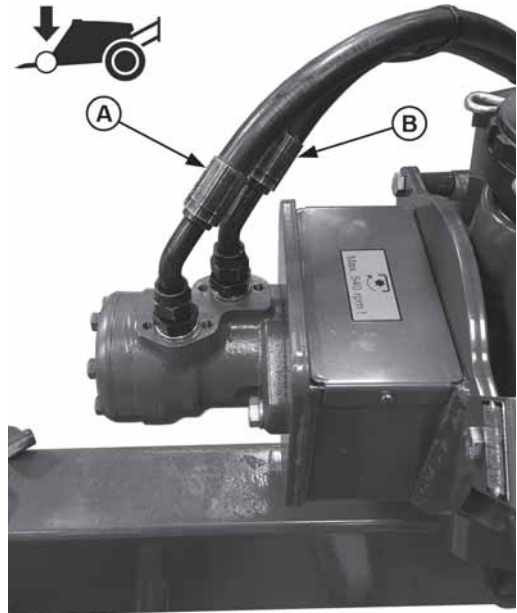
### Adjustment of Oil Flow

The oil flow from the tractor is set for a pump speed of maximum 540 r.p.m.

1. Make sure that you have liquid in the sprayer's main tank.
2. Set the valve positions for  and for .
3. Apply hydraulic oil flow gently from the tractor.  
If your tractor allows, set the oil flow to 9.5 gpm (36 l/min).  
Otherwise, continue with step 4.
4. While increasing the oil flow, check the pump speed reading on the controller display (if a speed sensor is mounted on the pump).

At the same time, adjust the spray pressure to 45 psi (3 bar).

When the pump speed reaches 540 r.p.m. at 45 psi (3 bar), the oil flow from the tractor is correctly set at 9.5 gpm (36 l/min). Keep this setting for the tractor.



**ATTENTION!** This adjustment is made every time the sprayer is coupled to the tractor, or if the tractor outlets have been used for other hydraulic functions.

### Inaccurate Oil Flow

Oil flow from the tractor is too high:

- This will reduce the capacity of the liquid pump caused by a pressure drop at the flow valve.
- It is a waste of energy. The built-in flow valve for safety is adjusted to 10 gpm (38 l/min).

Oil flow from the tractor is too low:

- The pump speed is decreased - e.g. the suction from the TurboFiller is slow when filling chemicals. Adjust the oil flow once again in the tractor, or repair the fault on the oil flow system.

## 4 - Sprayer setup

### Open center hydraulics

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

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

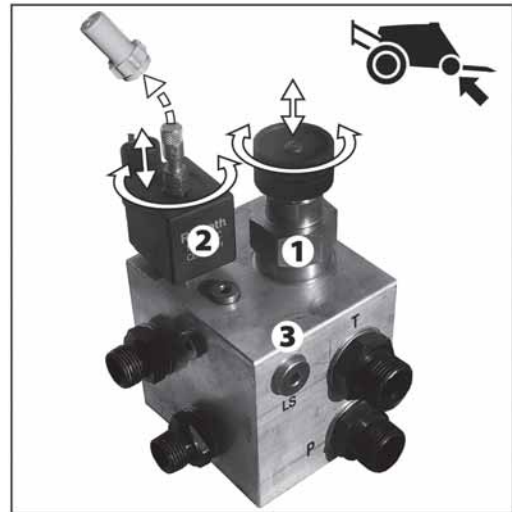
Certain tractor models are able to use Load Sensing without connecting an external sensing line. But if optimal sensing control pressure cannot be obtained, an external sensing line needs to be mounted (3). Please consult your tractor dealer for correct setup and correct connection.

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.

List of setting combinations for flow element and circuit value:

Valve no.	1	2	3 (LS port)
Open center	Out	Out	Not connected
Closed center	In	In	Not connected
Load sensing (LS)	In	Out*	Connected

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



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



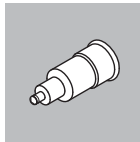
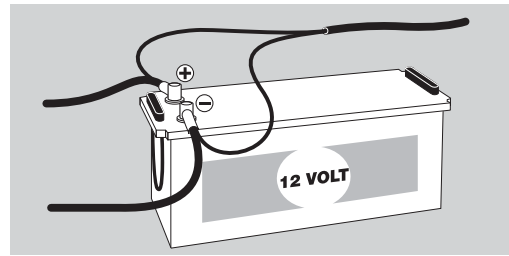
**WARNING!** It is of essential importance that connectors on sensing line are kept totally clean. Failure to do so can result in impurities entering the pump and thereby cause damages to vital pump parts.

### Electrical Connections

#### Power supply

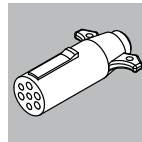
Power requirement is 12V DC. Always note polarity! For proper function of the electric equipment, the wires must have the following recommended cross sectional areas and correct fuses to ensure a sufficient power supply. The supplied power connectors follow the standard of most newer tractors. If using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

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

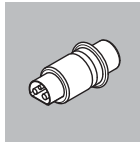


#### LIGHTER CONNECTOR

Spray control unit requires:  
Wire 2.5 mm<sup>2</sup>, Fuse 10 Amp  
Hydraulic control unit requires:  
Wire 4.0 mm<sup>2</sup>, Fuse 16 Amp

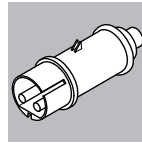


#### 7 POLE TRAFFIC LIGHT CONNECTOR



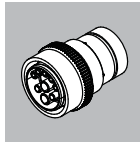
#### JOB COM CONNECTOR

The unit requires:  
Wire 6.0 mm<sup>2</sup>, Fuse 25 Amp



#### WORKING LIGHT CONNECTOR

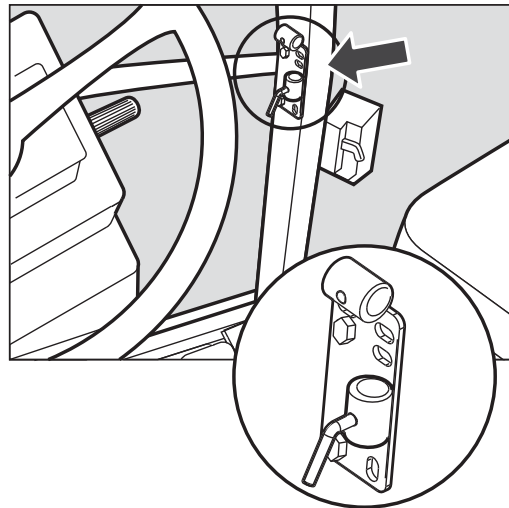
The unit requires:  
Wire 10.0 mm<sup>2</sup>, Fuse 30 Amp



#### ISO POWER CONNECTOR

#### 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.



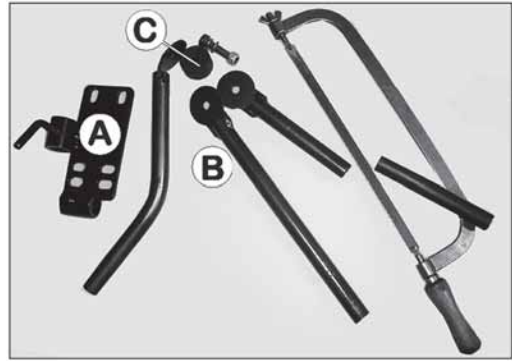
## 4 - Sprayer setup

### Installation of control unit brackets

The supplied tractor pillar bracket (A) has a hole spacing of 3.9 in. (100mm) and 4.7 in. (120mm). 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 your tractor or vehicle.

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



### Speed Sensor for Sprayer

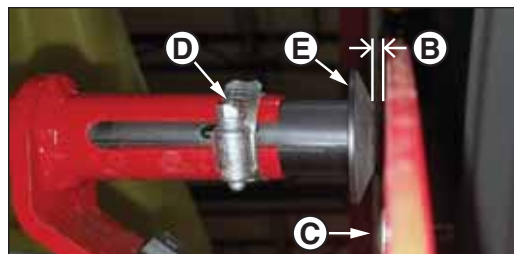
The speed sensor and speed ring are located at the inside of the sprayer's right wheel. The sensor is an inductive type that requires a metallic protrusion like a speed ring to pass by it to trigger a signal.

#### Adjustment

1. Assure that the speed ring is correctly fitted to the wheel, so that the arrow (A) follows the rotation of the wheel in the forward driving direction.
2. Check that the sensor lines up in the (radial) center of the air gaps from bottom/inside to top/outside of the speed ring.
3. If necessary, adjust plate on axle.
4. Adjustment of the air gap (B) begins with the sensor directly opposite one of the carriage bolts (C) holding the speed ring.
5. Loosen the clamp (D) to move the sensor (E) in or out of the red tube. Re-tighten the clamp when finished.
6. Adjust the air gap (B) between sensor and speed ring to  $5/32"$  (4 mm). Use a feeler gauge or similar tool.
7. After adjustment, rotate the wheel. Verify air gap variation of less than  $\pm 0.02"$  ( $\pm 0.5$  mm). Check this for the entire circumference.
8. Verify the speed on the controller.



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



### Road traffic lights

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 ANSI/ASAE S279.11. See "Road traffic lights" on page 109.



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

### 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!** Never open the Cyclone filter unless the pressure SmartValve and suction SmartValve are both closed (turned to an unused position)! If no unused pressure positions are available, then turn the pressure SmartValve to "Tank Rinse". Otherwise, spraying liquid may hit you when opening the filter, and drain the main tank contents!



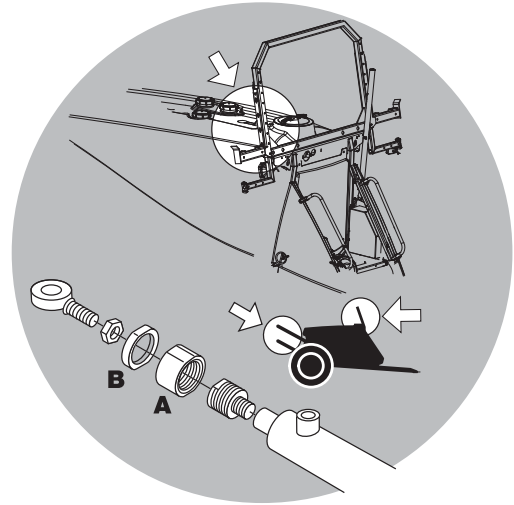
## 4 - Sprayer setup

### Transport

#### 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 inches.
4. If the boom rests too far in on the transport brackets, loosen the nut (B) 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 go out 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.

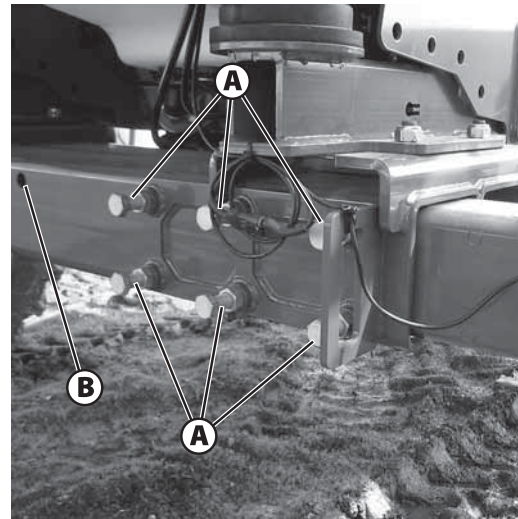


### Track width, axles and wheels

#### Altering the track width (optional combo axle)

The track width of the adjustable combo axle on the Navigator 3000/3500/4000 can be infinitely adjusted from 60" to 120". No adjustment is necessary on the fixed 60" or fixed 120" axle.

1. Measure the current track width (center RH tire to center LH tire). 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 jam nuts and bolts (A) for LH wheel axle.
5. Extend or retract the axle. Never extend axle insert too far. Some part of the axle insert must always be visible through sight hole (B).
6. Tighten the clamp bolts (A) to a torque of 290 Ft/lb (390 Nm) and lock the bolts with the jam nuts.
7. Repeat the procedure on RH wheel.
8. Check if the distance from center of tire to center of rear frame is equal at RH and LH. Make sure both axle inserts are visible through sight hole (B). It may be necessary to change the wheel offset in order to achieve desired distance (see instructions below).
9. Re-tighten bolts and wheel bolts to specified torque after 8 hours of work.



See "50 Hours Service - Wheel nuts" on page 88 for proper torque and tightening sequence of wheel hubs to rims.



**WARNING!** Securely support the sprayer during axle adjustments. Never attempt to adjust axles with liquid in the tank. Always block wheels on opposite side when adjusting axles.



**WARNING!** Place a jack under the axle and lift the wheel to remove load from the clamps before tightening the clamp bolts to the specified torque.



**WARNING!** The front and rear axle inserts must always be visible through the sight hole (B), located in the front and rear of the axle assembly. Otherwise, axle is extended too far to be safe and warranty will be voided.



**ATTENTION!** Sight hole (B), located in the front and rear of the axle assembly, may be used as a quick reference for a 120" axle width. When the end of each axle insert is centered in the whole, the axle spacing will be 120" with proper wheel offset.

#### Changing the wheel offset

1. To change the wheel offset, the LH and RH wheels must be swapped in order to turn the rim dish and keep the correct tread direction (tread up in front).
2. Jack up the frame behind both wheels, support and secure sprayer body.
3. Remove both LH and RH wheels and swap sides (keeping the tread direction the same). Tighten wheel bolts to specified torque.

See "50 Hours Service - Wheel nuts" on page 88 for proper torque and tightening sequence of wheel hubs to rims.



**WARNING!** Securely support the sprayer while swapping wheels. Never attempt to swap wheels with liquid in the tank. Always secure the rear frame when swapping wheels.

## 4 - Sprayer setup

### Dual tire setup (optional)

Two different dual tire kits are available for the Navigator:

22" row spacing (88"/132")

30" row spacing (60"/120")

1. Attach the sprayer to tractor and engage tractor parking brake.
2. Place stop wedges in front of, and behind RH wheel. Jack up LH wheel, support and secure sprayer body.
3. Remove 8 of the 10 wheel nuts, leaving 2 wheel nuts opposite each other to secure the inner wheel.



NOTE! Longer stud bolts (A) are included for earlier model sprayers with shorter stud bolts.

4. Attach dual spacer (B) or (C) to inner rim using the 8 wheel nuts (D) removed in step 3.

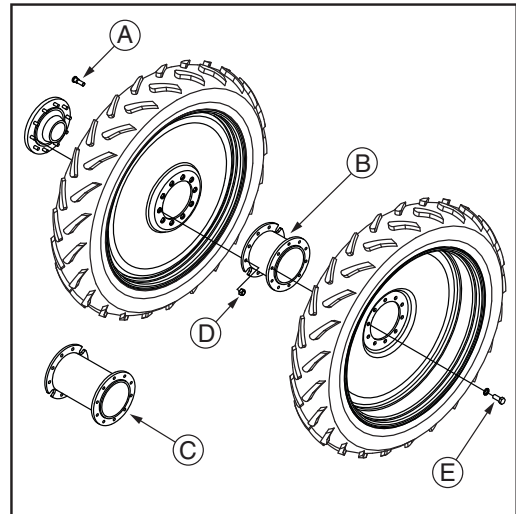


NOTE! Inner side of dual spacer has 2 notches to allow space for wheel nuts left on inner wheel. Outer side of dual spacer is threaded for outer wheel bolts.

5. Attach outer LH tire to dual spacer with supplied wheel bolts and lock washers (E). Make sure the distance between the center of inside tire to center of outside tire is 22" or 30". Wheels may need to be reversed and exchanged.
6. See "50 Hours Service - Wheel nuts" on page 88 for proper torque and tightening sequence.
7. Repeat the procedure for RH wheels.
8. Re-tighten bolts and wheel nuts to specified torque after 8 hours of work.
9. Check the distance between the center of inside LH tire to center of inside RH tire. The distance must be 88" for 22" duals, or 60" for 30" duals. If necessary, adjust the track width. See "Altering the track width (optional combo axle)" on page 47.



WARNING! Securely support the sprayer during axle adjustments. Never attempt to adjust axles with liquid in the tank. Always block wheels on opposite side when adjusting axles.

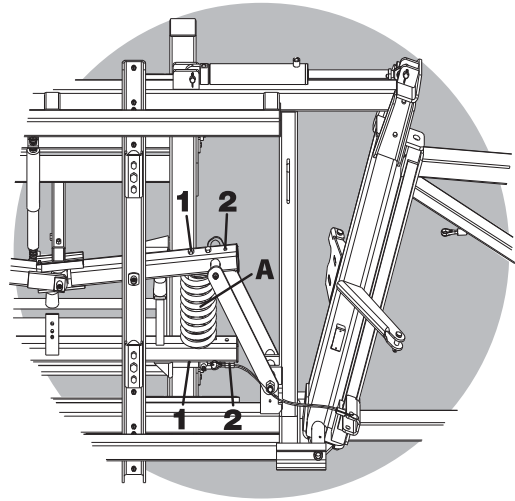


### Boom

#### Suspension effect adjustment (80'-100' SPC only)

The SPC boom features adjustable suspension for 80'-100' booms. The spring (A) has two assembly positions as shown on the illustration below. Position (1) can be used for 80'-90' booms and position (2) can be used for 100' booms.

Moving the assembly position further away from center (e.g. from pos. 1 to pos. 2) gives stiffer trapeze effect. The factory setting is position (1).



## 4 - Sprayer setup

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**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.



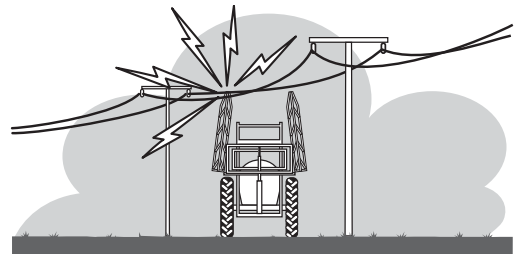
**DANGER!** Always follow the guidelines listed below when driving in areas with overhead power lines:

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

Unintended boom movements can cause contact with overhead power lines.



**ATTENTION!** A label (ref. no. 10533003) is located on the sprayer's drawbar. This label must be visible to the operator when hooking up the sprayer.

**Maneuvering of the SPB and SPC booms - HY-versions**

Both SPB and SPC booms with hydraulic HY-version are operated as follows:

1. Activate the single acting hydraulic outlet to raise the boom to release it from the transport brackets.
2. Activate the double acting hydraulic 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.



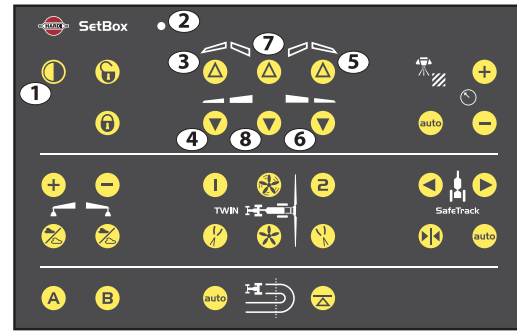
**ATTENTION!** Only unfold and fold the boom while stationary on level ground.

## 5 - Operation

### Maneuvering of the SPB, 80'-100' SPC booms - (ISOBUS / HC 8600 / HC9600)

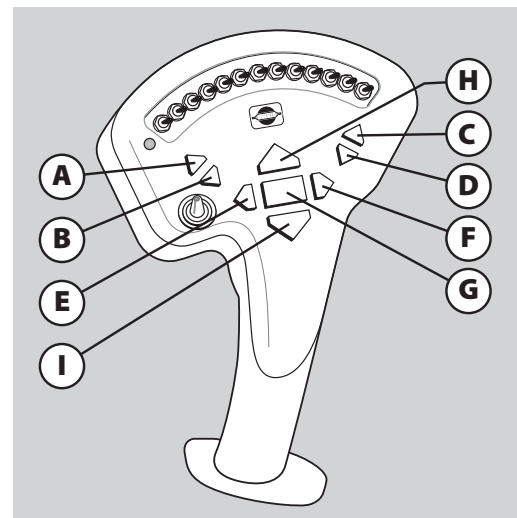
To unfold the boom, do the following:

1. Press switch (H) to raise the boom clear of the transport brackets.
2. Press switches (B) and (D) to lower individual tilt rams.
3. Press switches (4) and (6) to unfold the boom. Rear transport hooks disengage automatically.
4. If only one side of the boom is to be used for spraying, first unfold the boom completely. Then press switch (3) or (5) to fold the desired side back in. Turn off the spray sections for the folded side on the spray control unit.
5. Press switch (I) to lower the boom to correct height above crop or ground level.
6. If equipped with Dual Fold boom, push switch (7) to fold 2nd outer sections in to reduced working width.



To fold the boom, do the following:

1. If equipped with Dual Fold boom, start with boom at maximum working width. If necessary, unfold 2nd outer sections using switch (8).
2. Press switch (H) to raise the boom to highest possible position.
3. Press switches (3) and (5) to fold the boom. Make sure to fold the boom against the vertical slide pads.
4. Press switches (A) and (C) to raise the individual tilt rams.
5. Press switch (I) to lower the boom until the rear transport hooks are firmly engaged.
6. Press switches (B) and (D) to lower the individual tilt rams until they rest on the transport brackets.



**DANGER!** Be careful to avoid electrical lines when folding/unfolding Dual Fold boom. Outer sections fold/unfold vertically.



**WARNING!** Ensure that the boom is clear from the transport brackets before unfolding.



**WARNING!** The folding functions (switches 3 - 8) must only be operated when the sprayer is stationary! Failure to do so will damage the boom.



**ATTENTION!** There are stop switches located in the hydraulic lines of Dual Fold booms to prevent accidental damage by folding/unfolding the 2nd outer sections while in transport position. Switches (7) & (8) (vertical fold) will only function when the inner wings (horizontal fold) are completely unfolded in the operating position.



**ATTENTION!** The SPB, SPC & Dual Fold SPC HZ booms cannot be operated with the tractor's hydraulic levers.

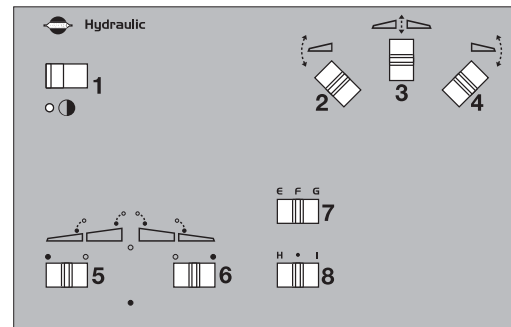


**ATTENTION!** It is not advisable to go directly from transport position to spray position with one side only. Both wings must first be completely unfolded and then one side folded back in.

### Maneuvering of the SPB and SPC booms - HZ-versions

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

1. Power ON/OFF
2. Boom tilt left
3. Boom lift raise/lower
4. Boom tilt right
5. Boom folding (left side)
6. Boom folding (right side)
7. Optional function
8. Optional function



To unfold the boom, 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.
3. Push switch (5) to the left and (6) to the right to unfold the boom. Rear transport hooks disengage automatically.
4. Push switch (3) downwards to lower the boom to correct height above crop or ground level.

To fold the boom, do the following:

1. Push switch (3) upwards to raise the boom to highest possible position.
2. Push switch (5) to the right and (6) to the left to fold the boom. Make sure to fold the boom against the vertical slide pads.
3. Push switches (2) and (4) upwards to raise the individual tilt rams.
4. Push switch (3) downwards to lower the boom until the rear transport hooks are firmly engaged.
5. Push switches (2) and (4) downwards to lower the individual tilt rams until they rest on the transport brackets.



**WARNING!** Ensure that the boom is clear from the transport brackets before unfolding.



**WARNING!** The folding functions (switches 5 and 6) must only be operated when the sprayer is stationary! Failure to do so will damage the boom.



**ATTENTION!** The boom cannot be operated with the tractor's hydraulic levers.

### Single-sided folding (All HZ versions except Dual Fold)

It is possible to spray with only one side of the boom unfolded. If this is needed, first tilt down and unfold the boom completely. Then push switch (5) or (6) inwards to fold in the left or right wing only. On the spray control unit also turn off the spray sections placed on the folded side.



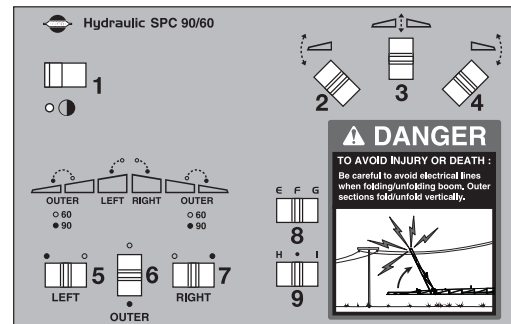
**ATTENTION!** It is not advisable to go directly from transport position to spray position with one side only. Both wings must first be completely unfolded and then one side folded back in.

## 5 - Operation

### Maneuvering of the 90'/60' SPC Dual Fold boom - HZ

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

1. Power ON/OFF
2. Boom tilt left
3. Boom lift raise/lower
4. Boom tilt right
5. Boom folding (left)
6. Boom folding (outer)
7. Boom folding (right)
8. Optional function
9. Optional function



To unfold the boom, 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.
3. Push switch (5) to the left and (7) to the right to unfold the boom. Rear transport hooks disengage automatically. Boom will be at 90' working width.
4. Push switch (3) downwards to lower the boom to correct height above crop or ground level.
5. For 60' working width, push switch (6) upwards to simultaneously fold both of the outer wings completely in.
6. Remember to set the outer section valves on the spray control unit to match the working boom width.

To fold the boom, do the following:

1. Start with the sprayer stationary and boom completely unfolded in either 90' or 60' working width.
2. If at 60' working width, push switch (6) downwards to simultaneously unfold both of the outer wings.
3. Push switch (3) upwards to raise the boom to highest possible position.
4. Push switch (5) to the right and (7) to the left to fold the boom. Make sure to fold the boom against the vertical slide pads.
5. Push switches (2) and (4) upwards to raise the individual tilt rams.
6. Push switch (3) downwards to lower the boom until the rear transport hooks are firmly engaged.
7. Push switches (2) and (4) downwards to lower the individual tilt rams until they rest on the transport brackets.



**DANGER!** Be careful to avoid electrical lines when folding/unfolding boom. Outer sections fold/unfold vertically.



**WARNING!** Ensure that the boom is clear from the transport brackets before unfolding.



**WARNING!** Never transport sprayer with boom in 60' working width. The front end of the folded boom will be taller and further forward. Always check for safe clearance from tractor, overhead wires, etc.



**WARNING!** The folding functions (switches 5, 6 and 7) must only be operated when the sprayer is stationary! Failure to do so will damage the boom.



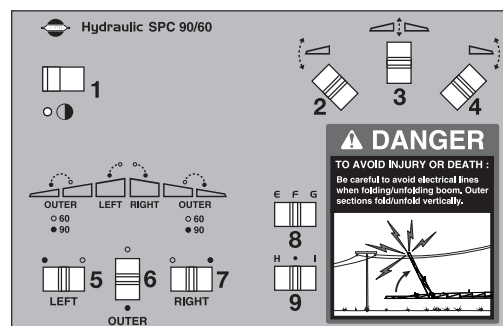
**ATTENTION!** There are stop switches located in the hydraulic lines to prevent accidental damage to the boom by folding/unfolding the outer boom while in transport position. Switch (6) for the outer wings (vertical fold) will only function when the inner wings (horizontal fold) are completely unfolded in the operating position.



**ATTENTION!** The boom cannot be operated with the tractor's hydraulic levers.

### Single-sided folding of the 90'/60' SPC Dual Fold boom

It is possible to spray with only one side of the boom unfolded. If this is desired, start with the boom completely unfolded in either the 90' or 60' spraying position. Then push switch (5) or (7) inwards to fold in the left or right wing only. On the spray control unit also turn off the spray sections placed on the folded side.



**WARNING!** Take extra care while operating with one side folded at 60' working width. The front end of the folded side will be taller and further forward. Always check for safe clearance from tractor, overhead wires, etc.



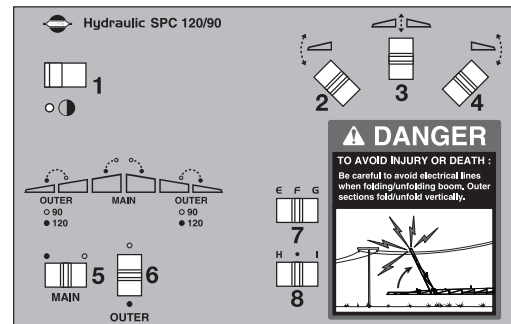
**ATTENTION!** It is not advisable to go directly from transport position to spray position with one side only. Both wings must first be completely unfolded and then one side folded back in.

## 5 - Operation

### Maneuvering of the 120'/90' SPC Dual Fold boom - HZ

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

1. Power ON/OFF
2. Boom tilt left
3. Boom lift raise/lower
4. Boom tilt right
5. Boom folding (main)
6. Boom folding (outer)
7. Optional function
8. Optional function



To unfold the boom, 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.
3. Push switch (5) to the left to simultaneously unfold the main boom sections. Rear transport hooks disengage automatically.
4. Push switch (3) downwards to lower the boom to correct height above crop or ground level. Boom will be at 90' working width.
5. For 120' working width, push switch (6) downwards to simultaneously unfold the outer boom sections.
6. Remember to set the outer section valves on the spray control unit to match the working boom width.

To fold the boom, do the following:

1. Start with the sprayer stationary and boom completely unfolded in either 120' or 90' working width.
2. If at 120' working width, push switch 6 upwards to simultaneously fold both of the outer wings completely in.
3. Push switch (3) upwards to raise the boom to highest possible position.
4. Push switch (5) to the right to fold the boom completely in.
5. Push switches (2) and (4) upwards to raise the individual tilt rams. Make sure the boom is against the vertical slide pads.
6. Push switch (3) downwards to lower the boom until the rear transport hooks are firmly engaged.
7. Push switches (2) and (4) downwards to lower the individual tilt rams until they rest on the transport brackets.



**DANGER!** Be careful to avoid electrical lines when folding/unfolding boom. Outer sections fold/unfold vertically.



**WARNING!** Ensure that the boom is clear from the transport brackets before unfolding.



**WARNING!** The folding functions (switches 5 and 6) must only be operated when the sprayer is stationary! Failure to do so will damage the boom.



**ATTENTION!** There are stop switches located in the hydraulic lines to prevent accidental damage to the boom by folding/unfolding the outer boom while in transport position. Switch (6) for the outer wings (vertical fold) will only function when the inner wings (horizontal fold) are completely unfolded in the operating position.



**ATTENTION!** The boom cannot be operated with the tractor's hydraulic levers.



**ATTENTION!** Single-sided folding of the 120'/90' SPC Dual Fold boom is not possible.

## Maneuvering of the 80'-132' DTZ Booms - (ISOBUS / HC 8600 / HC9600)



**WARNING!** The center lock automatically turns ON when pressing one of the boom folding buttons. Boom folding is not possible if the center is unlocked. A manual override of the center lock is possible by activating switches (2) or (3) on the SetBox.



**WARNING!** Only operate the folding functions when the sprayer is stationary! Failure to do so may damage the boom. The center lock automatically opens at speeds exceeding 0.9 mph (1.5 km/h)!



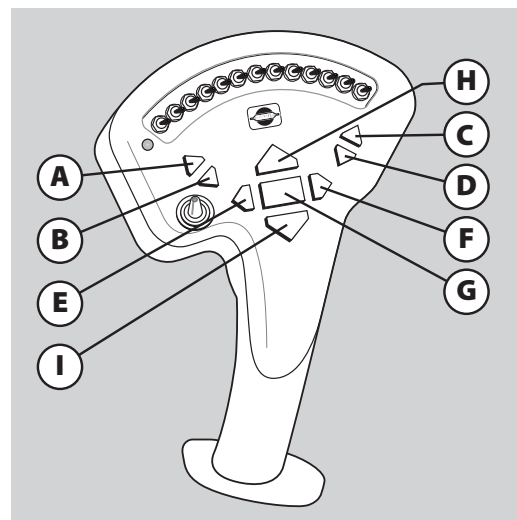
**ATTENTION!** If a folding sequence is not completed, a warning message on the HARDI® display will ask you to complete this sequence before starting the next sequence.



**ATTENTION!** The boom can not be operated with the tractor's hydraulic levers.

### To unfold the boom

1. Press the boom lift button (H) to lift the boom clear of the transport brackets.
2. If necessary, press and hold (A) and (C) to tilt boom wings up enough to clear the transport brackets.
3. Press and hold button (5) to unfold the inner sections completely (approximately 5 sec. or a warning will appear). Check that the center locked symbol is visible in the display. If not, press button (3) to engage the center lock.
4. Press and hold (B) and (D) to tilt boom wings down.
5. Press and hold button (7) to unfold the 1st outer sections.
6. Press and hold button (9) to unfold the 2nd outer sections (120'-132' tri-fold booms only).
7. Press and hold the boom down button (I) to lower the boom to the correct working height.
8. If not unlocked, then press button (2) and symbol appears in display until center is unlocked.

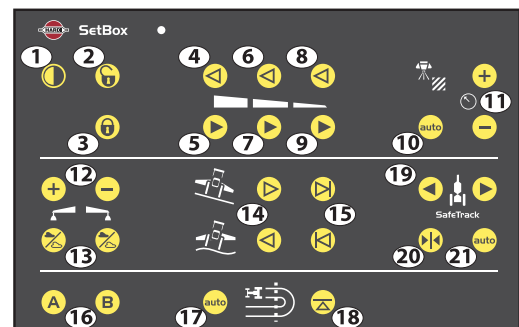


### To fold the boom

1. Press the boom lift button (H) to raise the boom to the highest possible position.
2. Press and hold button (8) to fold the 2nd outer sections (120'-132' tri-fold booms only). The symbol appears in display until center is locked.
3. Press and hold button (6) to fold the 1st outer sections. Check that the center lock symbol is visible in the display.
4. Press and hold (A) and (C) to tilt boom wings up until they reach the alignment indicators (For further information, see Operator's manual).
5. Press and hold button (4) to fold the inner sections.
6. Press the boom down button (I) to lower the boom until it rests in the transport locks.



Press and hold (B) and (D) to tilt boom wings down into the transport rests if necessary.



## 5 - Operation

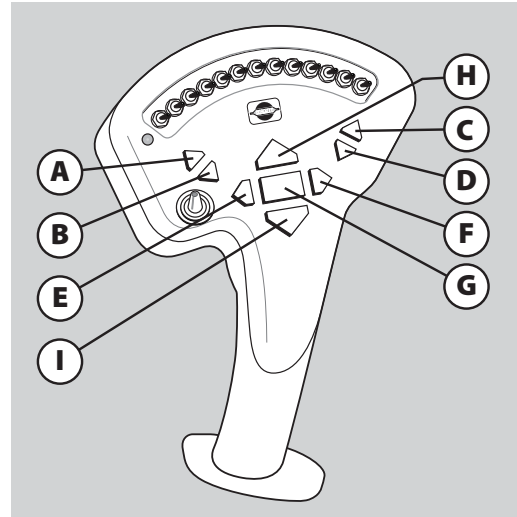
### Boom Tilt Function

The following boom tilt function controls enables you to adjust the boom height individually in the right and left hand side.

Boom tilt is adjusted by pushing the buttons (A), (B), (C) and (D) on the grip control.

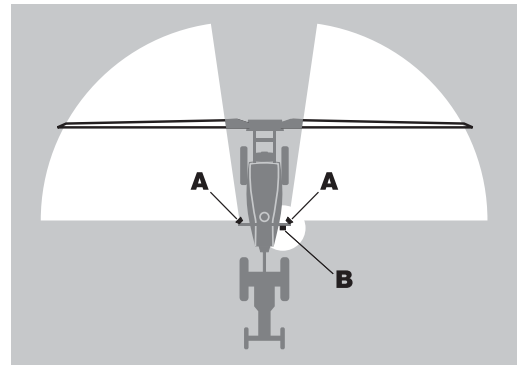


ATTENTION! Applicable for ISOBUS, HC 8600 and HC 9600.



### Night Spraying Light (Platform mounted lights)

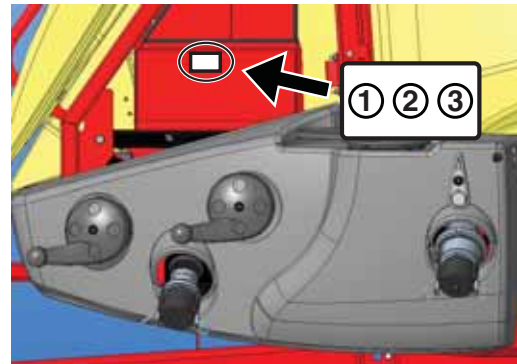
The 2 boom flood light lamps (A) are mounted to the railing of the platform (one at each side) and are positioned to illuminate both boom wings. The work light lamp (B) is also mounted to the railing of the platform above the valves. This lamp is positioned to light the HARDI® TurboFiller and the valve system.



### Work light selector switch

The boom and work lights selector switch is placed inside the SafetyLocker (behind door) and has three positions:

1. Boom lights ON
2. Lights OFF (neutral position)
3. Work light ON



ATTENTION! If the lights do not function, check the cable connections and check if the fuses are blown. See "Electrical Schematic for Boom and Work Lights (SPB/SPC Booms)" on page 109.



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.



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



ATTENTION! Check frequently that the lights are clean and without damage. Clean with a dry cloth if needed. Replace if broken.

### Night Spraying Light (Boom mounted lights)

Floodlights (A) are mounted on the spray boom, and they are positioned to illuminate both boom wings for spraying at night.

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 lights (A) are turned on/off from the tractor:

- SPB/SPC booms - Hydraulic box optional function.
- DTZ booms - SetBox A/B optional function.

The work area light (B) is turned on/off by opening the left side cover (C). Switch (D) inside the left side cover activates the light when the side cover is open.



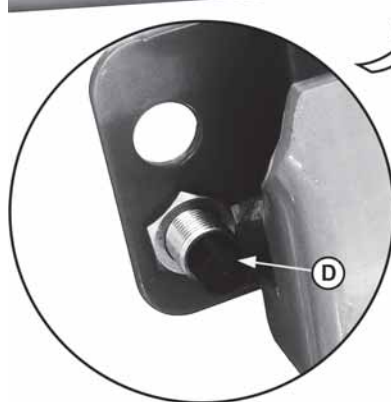
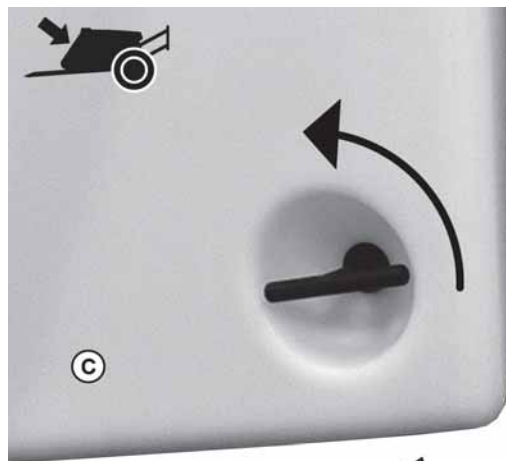
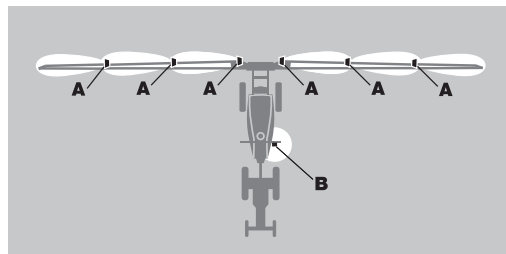
ATTENTION! Turn OFF all boom and work lights when driving on public roads!



ATTENTION! If the lights do not function, check the cable connections and check if the fuses are blown. See "Electrical Schematic for Boom and Work Lights (DTZ Booms)" on page 110.



ATTENTION! Check frequently that the lights are clean and without damage. Clean with a dry cloth if needed. Replace if broken.



## 5 - Operation

### Liquid System

#### Filling/washing location requirements

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

##### At a dedicated filling site

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

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

If no other requirements of distances exist, the filling location should be no closer than:

1. 50 yards (meters) from any water supplies for drinking purposes, and
2. 25 yards (meters) from treatment sumps and sewer drainage systems, and
3. 50 yards (meters) from surface water (watercourses, lakes and coastal waters) and from nature reserves.

##### In the field

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

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

1. 300 yards (meters) from any water supplies for drinking purposes, and
2. 50 yards (meters) from surface water (watercourses, lakes and coastal waters), treatment sumps, sewer drainage systems and nature reserves.



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



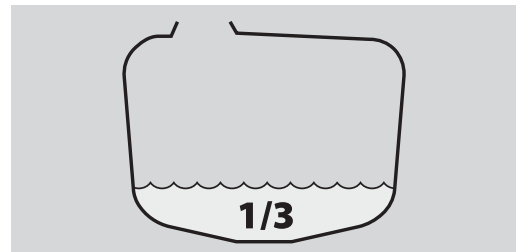
ATTENTION! It is the responsibility of the sprayer owner/operator to comply with all relevant legislation. HARDI® cannot undertake any responsibilities for incorrect operation and use.

#### Filling of water

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



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

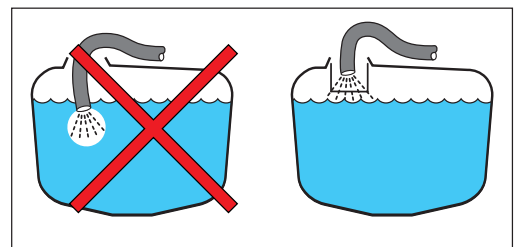


#### Filling through tank lid

Water is filled into the tank by removing the tank lid located at front of the sprayer tank which is accessible from the platform. It is recommended to use water as clean 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.



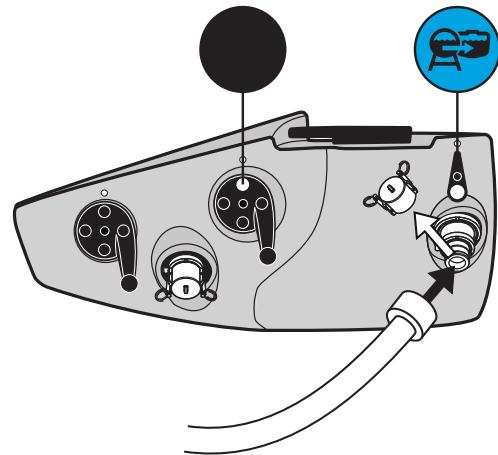
WARNING! Do not let the filling hose enter the tank. Keep it outside the tank, pointing towards the filling hole. If the hose is lowered into the tank and the water pressure drops at the water supply plant, chemicals may be siphoned back and contaminate the water supply lines and source.



### Filling of main tank using Quick fill

The Quick Filling Device is operated as follows:

1. Turn Suction SmartValve to unused function (closed).
2. Remove cap from Quick Fill valve and connect filling hose from water supply.
3. Turn handle on Quick Fill valve towards indicator (up).
4. Keep an eye on the main tank level indicator in order not to overfill the tank.
5. Close the Quick Fill valve (horizontal) and remove the filling hose.
6. Replace the cap on the Quick Fill coupler when filling is complete.



**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!** Do not leave the sprayer while filling the tank. Keep an eye on the level indicator in order NOT to overfill the tank.

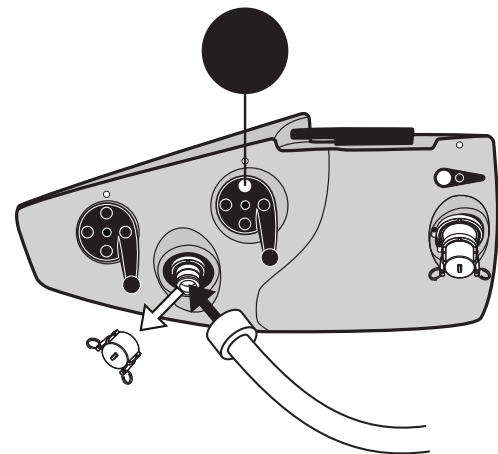


**WARNING!** If filling hose/filter is carried on the sprayer during spraying, it can be contaminated by spray drift which will be transferred to water source when filling!

### Filling of Rinse Tank using Quick fill

A rinse tank is integrated into the rear of the sprayer and is filled via the rinse tank quick coupler located near the SmartValves.

1. Remove cap from Quick Fill coupler and connect filling hose from water supply.
2. Fill rinse tank to desired level.
3. Keep an eye on the rinse tank level indicator located on the platform behind the main tank level indicator.
4. Stop filling and remove the filling hose.
5. Replace the cap on the Quick Fill coupler when filling is complete.



**ATTENTION!** Only fill rinse tank with clean water! To avoid algae developing in the rinse tank, always drain this tank if the sprayer is not in use for a long period of time.



**ATTENTION!** For cleaning purposes etc., the rinse tank is also accessible via the tank lid on top of 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!** Do not leave the sprayer while filling the tank. Keep an eye on the level indicator in order NOT to overfill the tank.



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

## 5 - Operation

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### Filling of Clean Water Tank

To fill the clean water tank:

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

For use of water:

- Turn the ball valve lever to open. The ball valve is located on the valve cover below the EasyClean filter on the sprayer's left side.
- The water from this tank is for hand washing, cleaning of clogged nozzles etc.



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

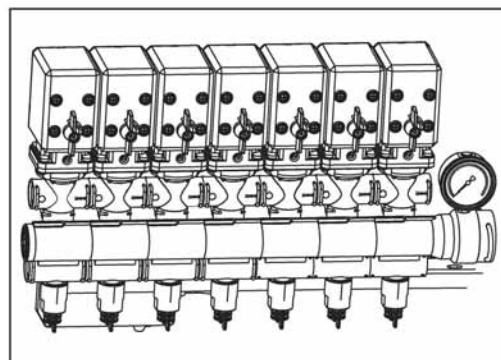


**WARNING!** Although the clean water tank is only filled with clean water, this water must NEVER be used for drinking.

### 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. Put the tractor in neutral and adjust the P.T.O. and thereby the number of revolutions of the pump corresponding to the intended traveling speed. Remember the number of revolutions on the P.T.O. must be kept between 300-600 rpm (pump 540 rpm) or 650-1100 rpm (pump 1000 rpm).
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 is 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.
4. Adjust the next section valves in the same way.



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

1. YOU CHANGE TO NOZZLES WITH OTHER CAPACITIES
2. THE NOZZLE OUTPUT INCREASES AS THE NOZZLES WEAR
3. AT THE START OF SPRAYING SEASON EACH SPRING

## 5 - Operation

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### Safety Precautions - Crop Protection Chemicals



WARNING! Always be careful when working with crop protection chemicals!



WARNING! Always wear proper protective clothing before handling chemicals!

#### Personal protection

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

- Gloves
- Waterproof boots
- Headgear
- Respirator
- Safety goggles
- Chemical resistant 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 chemicals.



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.

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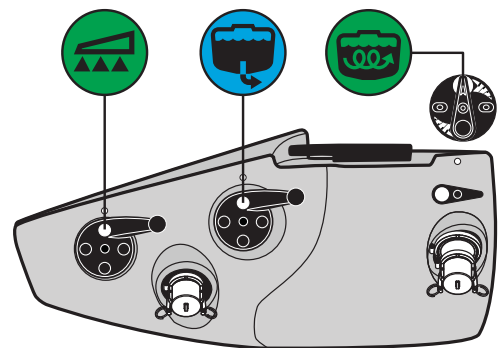
### Filling Chemicals Through Tank Lid

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 suction SmartValve towards "Suction from main tank", Agitation valve towards "Agitation" and pressure SmartValve towards "Spraying".
3. Engage the pump and set P.T.O. revolutions to recommended pump r.p.m.
4. Add the chemicals through the main tank hole.
5. Keep P.T.O. engaged so the spray liquid is continuously agitated until it has been sprayed on the crop.



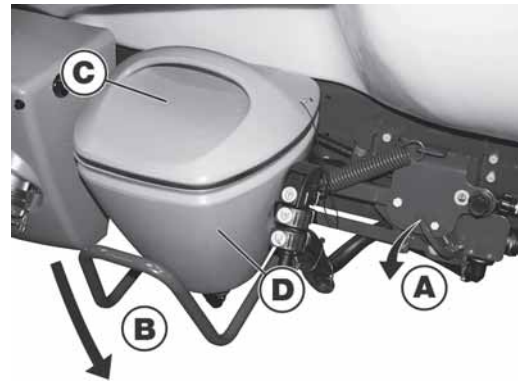
### Operating the TurboFiller

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

Capacity: approximately 9 gallons (35 liters).

#### Before use

- Pull the locking lever (A) down to unlock the position of the TurboFiller.
- Grab the handle (B) and pull the TurboFiller downwards.
- Lower the TurboFiller to the stop and let go of the locking lever (A) to lock the position.
- Lift off the lid (C) and place it at the handle in front of the hopper (D) (See paragraph "After use" on page 66).
- Place the chemicals for the coming spray job nearby, ready to be filled into the TurboFiller.



Below is a short description on how to operate the valves by using the levers on the side of the TurboFiller.

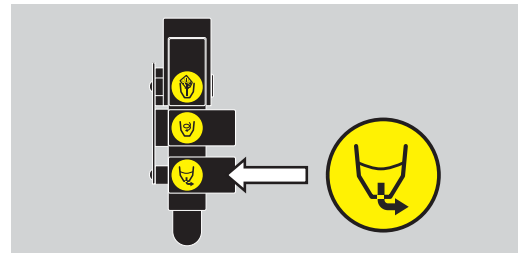
For more details, see the following sections in this instruction book about the procedure for operating the TurboFiller while filling chemicals.

#### TurboFiller Suction Valve

The valve is used simultaneously with the TurboFiller. The valve has 2 settings:

1. Push the valve lever down to get a quick suction out of the hopper.
2. Pull the lever to lock it in the open position for continuous suction from the hopper into the main tank.

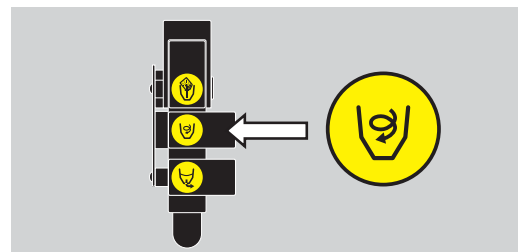
Open the valve by pulling the lever up when chemicals are to be filled into the TurboFiller and transferred to main tank.



#### TurboDeflector Valve

This TurboDeflector valve activates the vortex flushing of the TurboFiller. The valve has 2 settings:

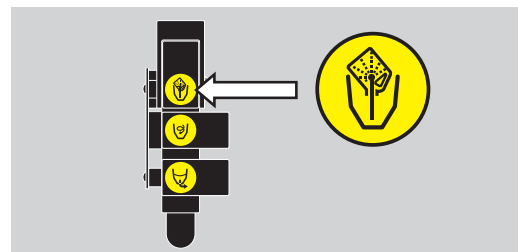
1. Push the valve lever down to get a quick flush in the hopper.
2. Pull the lever to lock it in the open position for continuous liquid rotation in the hopper.



#### Chemical Container Rinsing Lever

The upper lever is used for two purposes:

1. When the TurboFiller lid is open:  
For rinsing empty containers. Place the container over the rotating rinsing nozzle in the middle of the TurboFiller to rinse the inside of the container.
2. When the TurboFiller lid is closed:  
Use the Chemical Container Rinsing lever to rinse the hopper when the filling of chemicals is completed.



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

## 5 - Operation

### After use

- Clean the inside of the TurboFiller with the spray gun (E) to remove chemical residues.
- Place the spray gun in its storing position.
- Put the lid on top of the TurboFiller.
- Pull the locking lever (A) down to unlock the position of the TurboFiller.
- Grab the handle above and pull the TurboFiller upwards.
- Raise the TurboFiller to the storage position and let go of the locking lever to lock the position.



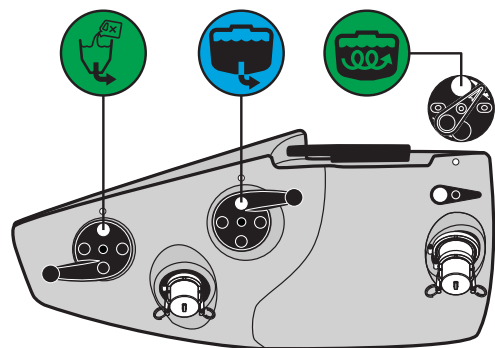
### Filling liquid chemicals by HARDI® TurboFiller (optional)

1. Fill the main tank at least 1/3 with water (unless otherwise stated on the chemical container label).
2. Turn the handle of the suction SmartValve towards "Suction from Main tank". Turn pressure SmartValve towards "TurboFiller". Adjust Agitation valve to desired setting.



ATTENTION! For increased suction from the TurboFiller, the Agitation valve can be kept closed.

3. Engage the pump and set P.T.O. speed at 540 r.p.m. or 1000 r.p.m. (depending on pump model).
4. Open TurboFiller lid. Measure the correct quantity of chemical and fill it into the hopper.



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



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

5. Engage the hopper transfer device by opening the TurboFiller suction valve to transfer chemicals to the main tank. The TurboFiller suction valve must be open for at least 20 seconds after the chemical is no longer visible in the hopper in order to completely empty the transfer hoses into the main tank.



DANGER! If the TurboFiller and the transfer hoses are not completely emptied, there is a risk of chemicals being siphoned out of 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 container cleaning lever.

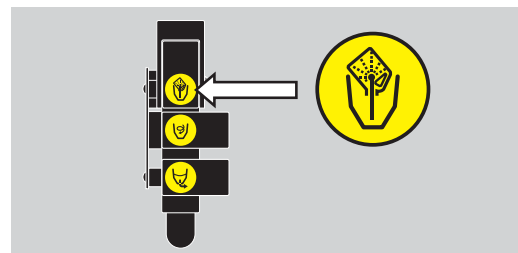
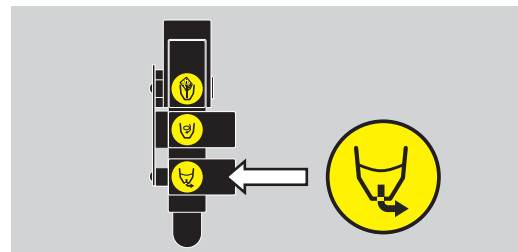


DANGER! In order to avoid spray liquid hitting the operator, do not press the lever unless the multi-hole nozzle is covered by a container, as spray liquid may otherwise hit the operator!



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

7. Flush the TurboFiller with clean water from the Rinse tank by turning suction SmartValve towards "Suction from Rinse tank". The TurboFiller suction valve must be open for at least 20 seconds after the rinse water is no longer visible in the hopper in order to empty the transfer hoses completely into the main tank.



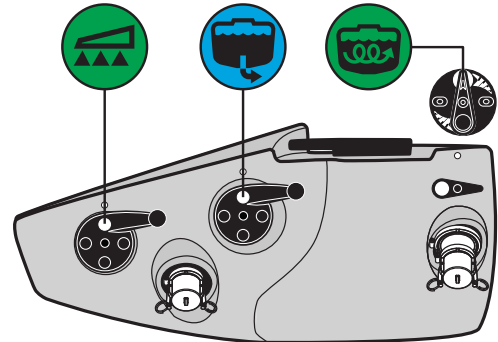


ATTENTION! If not flushed with clean water, the hopper rinsing device uses spray liquid for rinsing the hopper! Cleaning the TurboFiller must always be done when the spray job is ended, and together with cleaning the entire sprayer. A cleaning after the last filling, and before spraying, does not ensure a clean TurboFiller!

8. Close the TurboFiller suction valve when the hopper has been rinsed and close the lid.
9. If closed, turn the Agitation valve towards "Agitation".
10. When the spray liquid is well agitated, turn handle of the pressure SmartValve towards "Spraying" position. Keep P.T.O. engaged, so that the spray liquid is continuously agitated until it has been sprayed on the crop.



ATTENTION! If foaming is a problem, turn down the agitation.



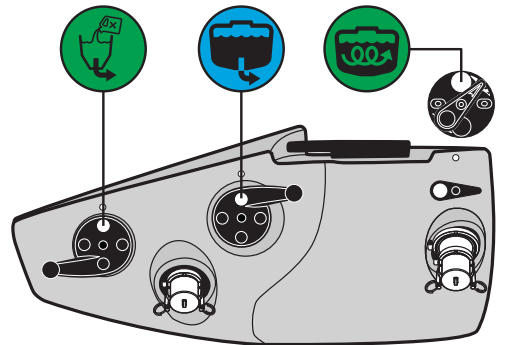
### Filling Powder Chemicals by using HARDI® TurboFiller (optional)

1. Fill the main tank at least 1/2 with water (unless otherwise stated on the chemical container label). See section "Filling of water".
2. Turn the handle of the suction SmartValve towards "Suction from Main tank". Turn pressure SmartValve towards "TurboFiller". Adjust Agitation valve to desired setting.



ATTENTION! For increased suction from the TurboFiller, the Agitation valve can be kept closed.

3. Engage the pump and set P.T.O. speed at 540 r.p.m. or 1000 r.p.m. (depending on pump model).
4. Open TurboFiller lid. Open TurboDeflector valve and TurboFiller suction valve.
5. Measure the correct amount of powdered chemical and sprinkle it into the hopper as fast as the transfer device can flush it down. The TurboFiller suction valve must be open for at least 20 seconds after the chemical is no longer visible in the hopper in order to completely empty the transfer hoses into the main tank.



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



DANGER! If the TurboFiller and the transfer hoses are not completely emptied, there is a risk of chemicals being siphoned out of the main tank!

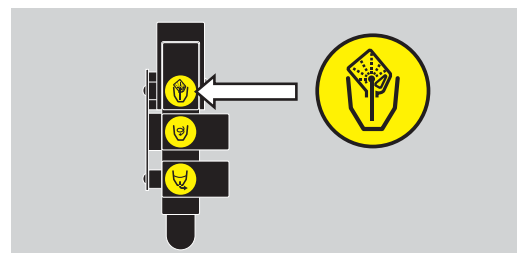
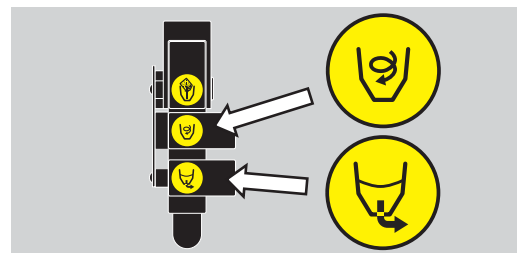
6. If the chemical container is empty, it can be rinsed by the Chemical Container Cleaning device. Place the container over the multi-hole nozzle and push the container cleaning lever.



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



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



## 5 - Operation

7. Flush the TurboFiller with clean water from the Rinse tank by turning suction SmartValve towards "Suction from Rinse tank". The TurboFiller suction valve must be open for at least 20 seconds after the rinse water is no longer visible in the hopper in order to empty the transfer hoses completely into the main tank.

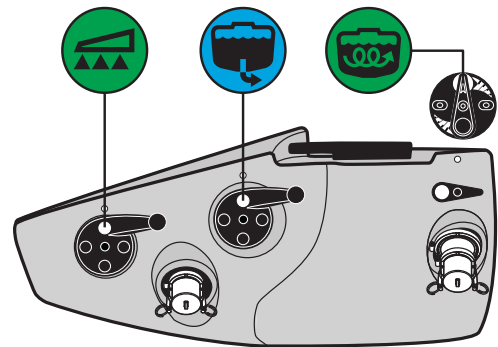


ATTENTION! If not flushed with clean water, the hopper rinsing device uses spray liquid for rinsing the hopper! Cleaning the TurboFiller must always be done when the spray job is ended, and together with cleaning the entire sprayer. A cleaning after the last filling, and before spraying, does not ensure a clean TurboFiller!

8. Close the TurboFiller suction valve when the hopper has been rinsed and close the lid.
9. If closed, turn the Agitation valve towards "Agitation".
10. When the spray liquid is well agitated, turn handle of the pressure SmartValve towards "Spraying" position. Keep P.T.O. engaged, so that the spray liquid is continuously agitated, until it has been sprayed on the crop.



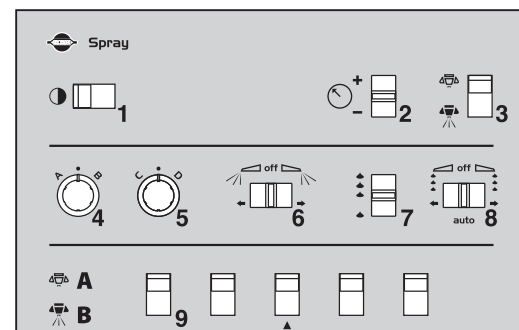
ATTENTION! If foaming is a problem, turn down the agitation.



### Operating the control unit while spraying (Std)

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

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



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.

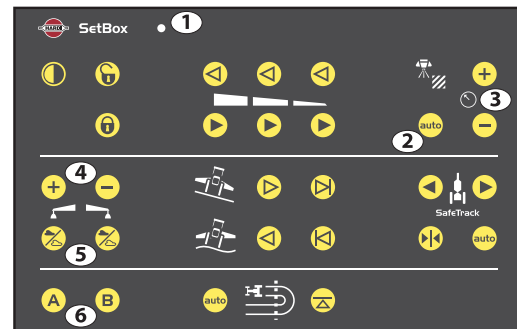
In order to close one or more sections of the boom, switch the relevant distribution valve (9) to off position (A). The pressure equalization ensures that the pressure does not rise in the sections which are to remain open (B).

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

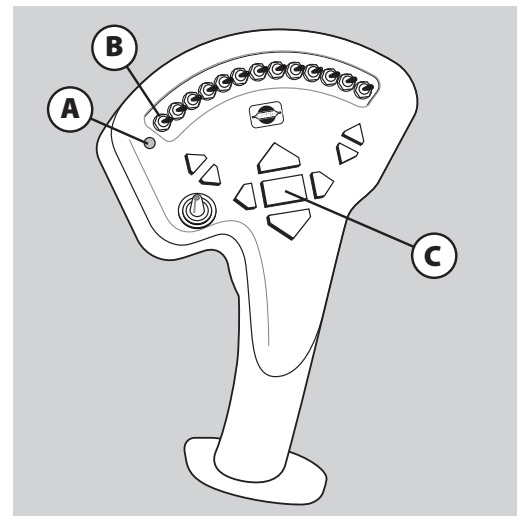
### Operating the Control Units While Spraying (DF4)

The control units in the tractor control the following functions in the field:

1. Power ON/OFF status LED. The light must be ON.
2. Automatic spray pressure regulation.  
The regulation valve controls the main spray pressure. This is the default selection when the controller is powered ON, and it should remain here during normal spraying.
3. Manual spray pressure regulation.  
During normal spraying, these controls should not be used, as the regulation valve does this automatically.
4. Foam marker blob interval. Regulates the blob interval for the optional foam marker.
5. Foam marker (Left/Right). Turns the optional foam marker ON for each side.
6. Optional function, A or B.  
If extra equipment is added, it can be controlled from here.



- A. Power ON/OFF/status LED. The light must be ON.
- B. Section valves for spray boom. Turns separate sections ON or OFF.
  - Lever up is OFF.
  - Lever down is ON.
- C. Main valve ON/OFF.



**NOTE!** Check the current volume application rate on the display, or see the instruction book for the spray controller for more information.

### Before Returning to Refill the Sprayer

If the sprayer is to be refilled at a filling location without a dedicated filling site (with hard surface and drain to a closed reservoir), the sprayer should be rinsed in the field before returning to refill.

Dilute the residues of the spraying circuit and spray it on the crop. Then rinse the outside of the sprayer with the External Cleaning Device (optional) before returning to refill.



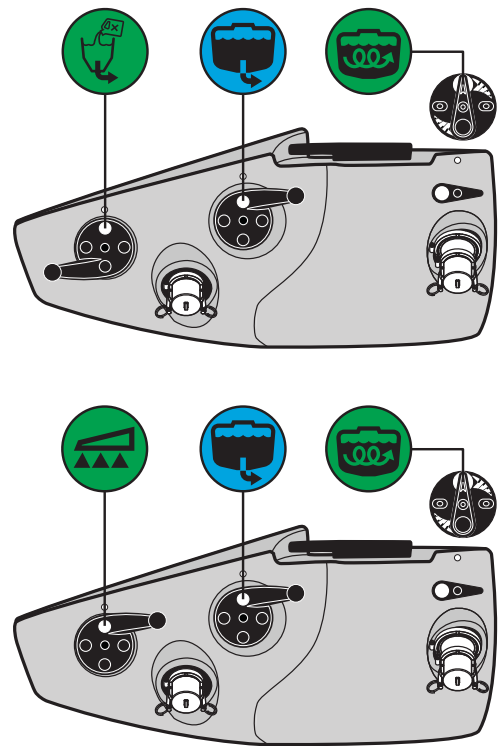
**WARNING!** Always follow local legislation in force at any time.

## 5 - Operation

### 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 the handle at the suction SmartValve towards "Suction from Main tank". Turn Pressure SmartValve towards "TurboFiller". Turn the AgitationValve towards "Agitation".
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. Once the chemicals are mixed, spraying can resume. Turn pressure SmartValve towards "Spraying" and start spraying again.



### TurboFiller Rinsing

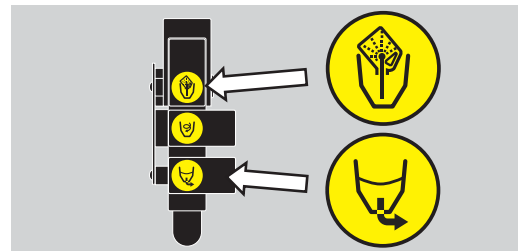


NOTE! It is important to use clean water from the rinse tank.


Rinse the TurboFiller and chemical containers as follows:

#### Cleaning empty containers - TurboFiller lid is open

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



#### TurboFiller rinsing - TurboFiller lid is closed

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



ATTENTION! The TurboFiller needs to be cleaned thoroughly after finishing spraying. This is to ensure that it is clean before spraying other crops that may be sensitive to the chemicals just used. See section "Cleaning" on page 72 for details.

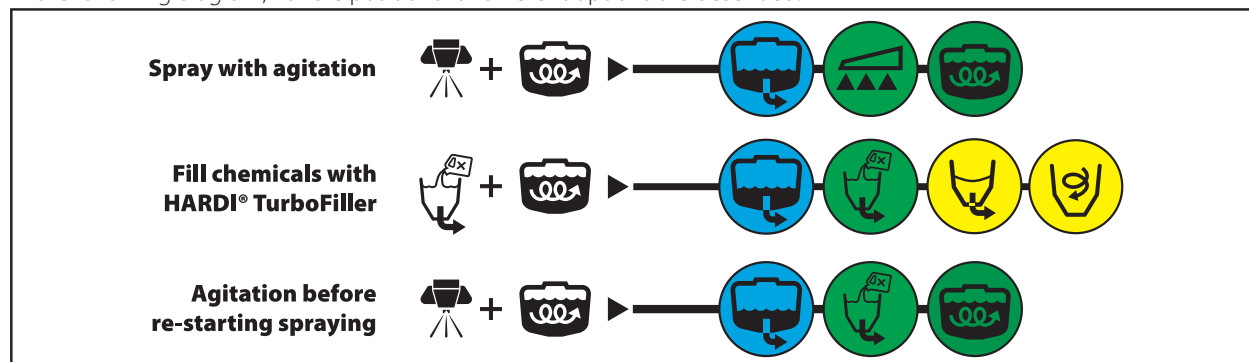
### Parking the Sprayer

To avoid spot contamination, the sprayer must always be parked at either the filling/washing location or under a roof to avoid rainfall washing chemical residues from the sprayer's surfaces.

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

### Quick reference - Operation

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



## 5 - Operation

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### Cleaning

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#### 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 if it requires facilities which are not available, then please leave the job to your HARDI® dealer's workshop for safety reasons.



ATTENTION!

Clean sprayers are safe sprayers.

Clean sprayers are ready for action.

Clean sprayers cannot be damaged by pesticides and their solvents.

#### Guidelines

- 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.
- Be familiar with local legislation regarding disposal of pesticides washings, mandatory decontamination methods, etc. Contact the appropriate department, e.g. Dept. of Agriculture if you are in doubt.
- Pesticide washings can usually be sprayed out on the field just sprayed or at a suitable cultivated area. Avoid emptying the washings at the same spot every time and keep sufficient distance to the water environment. You must prevent seepage or runoff of residue into streams, watercourses, ditches, wells, springs, etc. The washings from the cleaning area must not enter sewers. Alternatively the washings can be retained in an appropriate receptacle, diluted and distributed over a larger cultivated area - see also "Filling/washing location requirements" on page 60.
- Cleaning starts with the calibration, as a well calibrated sprayer will ensure the minimal amount of remaining spray liquid.
- 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. It is strongly advised to perform an internal cleaning of the sprayer when high concentrations of acids or chloride are present in the active ingredients, or if the spray liquid is corrosive.
- 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. Children, animals and unauthorized persons must not have access to the sprayer under these circumstances.
- 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.
- The sprayer must always be parked under a roof to avoid rainfall washing off chemical residues as well as build-up of spot contamination in the soil. If parked outside, the sprayer should be parked on the filling/washing location in order to retain possible pesticides.

### Standard Cleaning



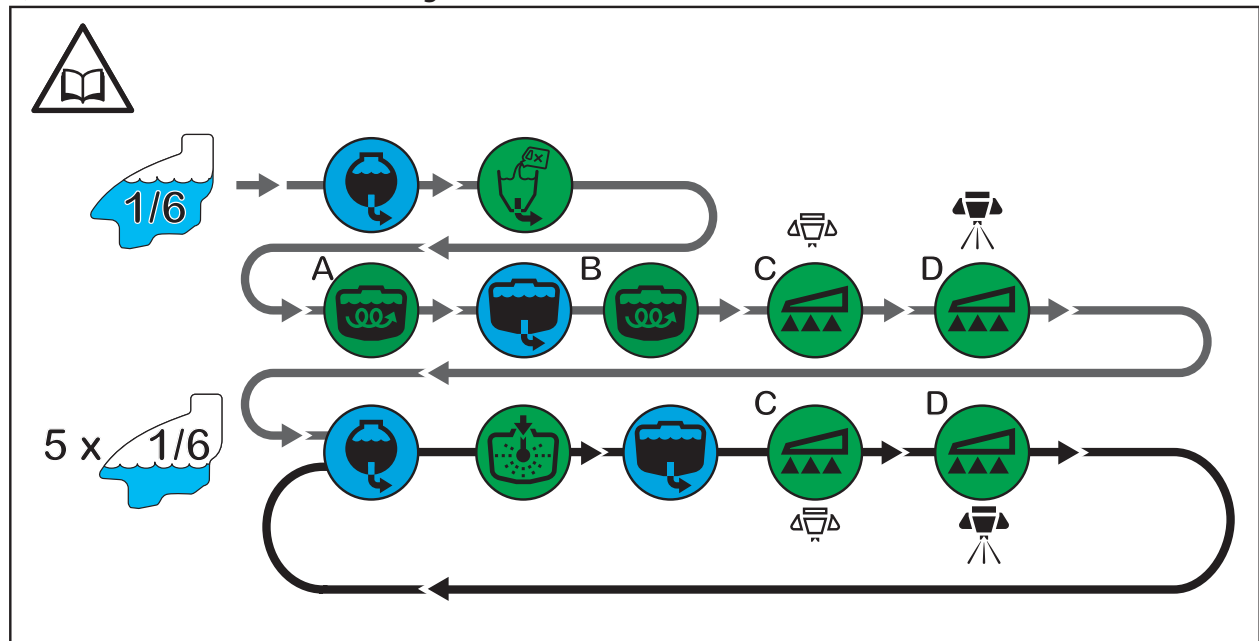
ATTENTION! For cleaning between spray jobs where crops are not very sensitive towards chemicals just sprayed.

1. Engage pump with tractor in idle, so that pump speed is as low as possible (250/550 r.p.m., depending on pump type).
2. Turn suction SmartValve towards and the pressure SmartValve towards until approximately 1/6 of the rinse tank contents are transferred into the main tank. It is important to have full agitation for approximately 20 seconds, and then close agitation valve completely.
3. Turn suction SmartValve towards and the pressure SmartValve towards with all sections off for approximately 45 seconds.
4. Turn all sections on. Spray until air comes out of nozzles. When pressure drops, increase the pressure (regulation valve closed/max. pressure). When the boom is completely empty, decrease the pressure for a few seconds (regulation valve partially open) to avoid a pressure spike when restarting.

#### Repeat the following 3 steps 5 times:

1. Turn suction SmartValve towards and the pressure SmartValve towards until approximately 1/6 of the rinse tank contents are transferred into the main tank.
2. Turn suction SmartValve towards and the pressure SmartValve towards with all sections off for approximately 45 seconds.
3. Turn all sections on. Spray until air comes out of nozzles. When pressure drops, increase the pressure (regulation valve closed/max. pressure). When the boom is completely empty, decrease the pressure for a few seconds (regulation valve partially open) to avoid a pressure spike when restarting.

### Quick Reference - Standard Cleaning



NOTE! Pump speed 250-280 r.p.m.

- A. Turn On.
- B. Turn Off.
- C. Minimum 45 seconds with nozzle Off.
- D. Spray until air comes out of nozzles. When pressure drops, increase the pressure (regulation valve closed/max. pressure). When the boom is completely empty, decrease the pressure for a few seconds (regulation valve partially open) to avoid a pressure spike when restarting.

## 5 - Operation

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### Cleaning the Tank and Liquid System



ATTENTION! Thorough cleaning of the sprayer is to be carried out when shifting to crops which are very sensitive to chemicals just sprayed, or prior to storage for a longer period of time.



NOTE! Prior to this procedure, a standard cleaning should be carried out (See "Standard Cleaning" on page 73).

- Select and use the appropriate protective clothing. Select detergent suitable for cleaning and suitable deactivating agents if necessary.
  - Rinse and clean sprayer and tractor externally. Use detergent if necessary.
1. Remove tank and suction filters and clean. Be careful not to damage the filter mesh. Replace suction filter top. Replace all filters when the sprayer is completely clean.
  2. With the pump running, rinse the inside of the tank. Do not forget to clean 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 or dedicated filling site.
  3. 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. Special detergents for sprayer cleaning are recommended as some also lubricate ball valves, etc.
  4. Start the pump and operate all controls, enabling the liquid to come into contact with all the components. Leave the distribution valves until last. Some detergents and deactivating agents work best if they are left in the tank for a short period. Check the label. Flush the CycloneFilter return line by engaging the lever in the bottom to flush position.
  5. Drain the tank and let the pump run dry. Rinse inside of the tank, again letting the pump run dry.
  6. Stop the pump. If the pesticides used have a tendency to block nozzles and filters, remove and clean them immediately.
  7. Replace all the filters and nozzles and store the sprayer. If it is noted, from previous experiences, that the solvents in the pesticides 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 spraying pressure to 20 psi (1.5 bar), 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 washer, lubrication of the entire machine is recommended.

---

### Cleaning and Maintenance of Filters

Clean filters ensure:

- Sprayer components such as valves, diaphragms and operating units are not hindered or damaged during operation.
- Nozzle blockages do not occur while 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 Rinse Tank and Rinsing Nozzles

The integrated rinse tank can be used for two different purposes:

- A. In-field diluting before cleaning.
- B. Flushing when main tank is not empty.










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





#### A. In-field diluting before cleaning

In-field diluting of remaining spray liquid residue in the spraying circuit should be carried out in the field before cleaning the sprayer.

Rinse the main tank and liquid system:

1. Empty the sprayer as much as possible. Close the Agitation valve (no agitation) and spray until air comes out of all nozzles.
2. Turn suction SmartValve to  and pressure SmartValve to  (or  if not equipped with TurboFiller).
3. Engage and set the pump to approximately 300 or 560 r.p.m. (depending on pump type). Increase the spraying pressure to 85 psi (6 bar).
4. When 1/3 of the contents in the rinse tank are used, turn suction SmartValve to  and operate all valves on the pressure side of the system in the following order, so that all hoses and components are rinsed:
  - a. If equipped with TurboFiller, turn the pressure SmartValve to  and open the TurboFiller suction valve.
  - b. Open the TurboDeflector valve and close it again when clean water comes out of nozzles.
  - c. Close the TurboFiller lid and squeeze the Chemical Container Cleaning lever to clean this device.
  - d. Open the TurboFiller lid again, and make sure that the TurboFiller is empty.
  - e. When empty, close the TurboFiller suction valve.
5. Turn the suction SmartValve to  and the pressure SmartValve to  and spray the liquid in the field just sprayed.

Cleaning of Main Tank:

6. Turn the suction SmartValve to  and the pressure SmartValve to . Remove the filling strainer to avoid any cleaning shadows behind it.
7. When another 1/6 of the contents in the rinse tank are used, turn the suction SmartValve to .
8. Turn pressure SmartValve towards , and spray the liquid in the field just sprayed.
9. Repeat step 6 - 8 one more time.



WARNING! When critical chemicals (like sulphonylurea) have been used, or a cleaning detergent is recommended, do an extra cleaning:

10. Fill the rinse tank again.
11. Fill the main tank with 130 gal. (500 liters) of clean water. See appropriate "Filling of water" section for filling procedure.
12. Add the cleaning detergent to the main tank by using the TurboFiller. Follow instructions on the label of the cleaning agent.
13. Clean the whole system again.
14. To get the best cleaning effect, the filter meshes for the EasyClean and CycloneFilter should be washed with clean water.
15. Rinse the sprayer with clean water afterwards.



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



## 5 - Operation

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### B. Flushing when main tank is not empty

Flushing the pump, operating unit, spray lines, etc. in case of interruption in spraying before main tank is empty (e.g. because of rain, etc.).

Cleaning of the liquid system:

1. Turn suction SmartValve to . (Keep pressure SmartValve in -position).
2. Close Agitation valve (no agitation) and turn CycloneFilter return valve to position A (marked with 1 dot) to prevent return flow from diluting main tank contents.
3. Engage and set the pump to approximately 300 or 560 r.p.m. (depending on pump type). Increase the spraying pressure to 85 psi (6 bar). Spray the water from the rinse tank into the field until all nozzle tubes/nozzles have been flushed with clean water.
4. Disengage the pump.



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

---

### Technical Residue

An amount of spray liquid will inevitably remain in the system. It cannot be sprayed properly on the crop, as the pump takes in air when the tank is just about empty.

This technical residue is defined as the remaining amount of liquid in the system when the first clear pressure drop appears on the pressure gauge.

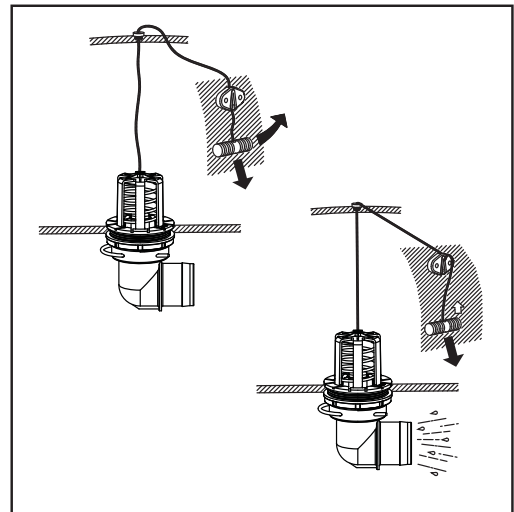
The residues in the tank should be diluted immediately in a ratio of 1:10 with clean water and then sprayed on the crop just sprayed with increased driving speed. It is to be noted, however, that the liquid in the spray lines (with original concentration) will be sprayed out first. Therefore, there should be an untreated patch available to spray this onto. In addition, the rinse tank is to be used to separately rinse pump, linkage and armature.

---

### Using the Drain Valve

The drain valve is operated from the platform just beside the main tank lid.

1. Pull the string to open the drain valve.
2. The valve is spring-loaded, but can be kept open by pulling the string upwards in the V-shaped slit.
3. To release, pull the string downward and the valve will close automatically.



### Full Internal Cleaning (Soak Wash)







ATTENTION! This cleaning procedure is always used if one or more of these situations occur:

- A. The next crop to be sprayed is at risk of being damaged by the chemical just used, or
- B. The sprayer is not going to be used right away for the same chemical or crop right away, or
- C. Before any repair or maintenance job is going to be carried out on the sprayer.



ATTENTION! Washing the sprayer between jobs with incompatible crops must be done according to instructions from the chemical manufacturer. Use e.g. AllClearExtra, as this is a commonly used cleaning agent. If your chemical prescribes another cleaning agent and/or another cleaning procedure, you must follow that.

Procedure for washing with a cleaning agent such as AllClearExtra:

1. Rinse the sprayer in the field (See "Use of Rinse Tank and Rinsing Nozzles" on page 75).
2. Drive to the filling location. Prepare sprayer for cleaning with cleaning agent. Fill water in the main tank to 10% of its capacity. Fill the rinse tank completely. This water is later used for rinsing.
3. Turn suction SmartValve to  and the pressure SmartValve to  with all sections off. Set agitation valve to "Full agitation".
4. Engage and set the pump speed at approximately 300 r.p.m. or 560 r.p.m. (depending on pump type).
5. Allow the liquid to circulate in the system for 3 minutes.
6. Close Agitation valve (no agitation) and turn the pressure SmartValve to unused function (or "TurboFiller" without activating) for a minimum of 10 seconds in order to burst and flush the safety valve.
7. Open the TurboFiller transfer valve and the deflector valve. Allow the liquid to circulate for 3 minutes.
8. Close the TurboFiller lid and activate the container rinsing valve to clean the hopper inside.
9. Shut off all three valves on the TurboFiller again.
10. Verify that all nozzles are shut at the main ON/OFF button on the grip.
11. Turn the pressure SmartValve to .
12. Allow the liquid in the main tank to circulate for minimum 3 minutes with the nozzles shut. This is done to clean the return lines from boom to tank.
13. Turn the pressure SmartValve to . Allow the liquid to circulate for 3 minutes.
14. Spray out water with cleaning agent and chemical residue. Set the spray pressure at 45-75 psi (3-5 bar). Note that the washing water still contains active chemical and choose an appropriate area to spray this out. Alternatively, the washings can be dumped at the filling/washing location and retained in an appropriate receptacle (e.g. slurry tank or similar) - see "Filling/washing location requirements" on page 60 for more information. Spot contamination and accumulation must be prevented. Continue to spray until all liquid is expelled from the boom tubes and nozzles.
15. Shut off all nozzles by the main ON/OFF switch.
16. Rinse the sprayer again with clean water to rinse out all remains of the cleaning agent - see "Use of Rinse Tank and Rinsing Nozzles" on page 75. This is to remove the cleaning agent from the fluid system, which could contaminate the next spray chemical filled into the main tank.
17. Include rinsing of the TurboFiller in step 16. Operate all 3 valves during this process.
18. Dismantle all filters (suction, pressure, in-line and nozzle filters) and clean the filter screens using clean water and detergent.



WARNING! It is the responsibility of the sprayer operator or owner, that the sprayer is cleaned sufficiently to prevent contamination of the environment, crop damages and health and safety hazards to the operator and the public. HARDI® cannot be held responsible for any damages or incidents related to insufficient cleaning.



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

## 5 - Operation



### Outside Cleaning - Use of External Cleaning Device (optional)

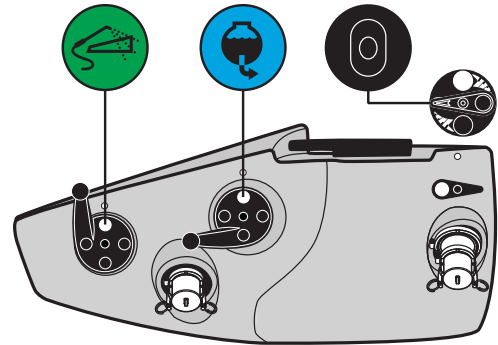
Use the External Cleaning Device to wash everything on the outside of the sprayer. This prevents contamination of the storage sight and helps the sprayer last longer.

When the External Cleaning Device is going to be used, swing out the hose reel on the sprayer's right side. Cleaning gun is located in the holder at the frame.

1. Open the valve near the hose reel and unroll the hose.
2. Engage pump speed to approximately 250 r.p.m. or 560 r.p.m., depending on pump model.



3. Turn suction SmartValve to  and pressure SmartValve to  and clean the sprayer.
4. After cleaning, close the valve near the hose reel and close the pressure SmartValve.
5. Roll the hose onto the reel again and swing reel in to storage position.



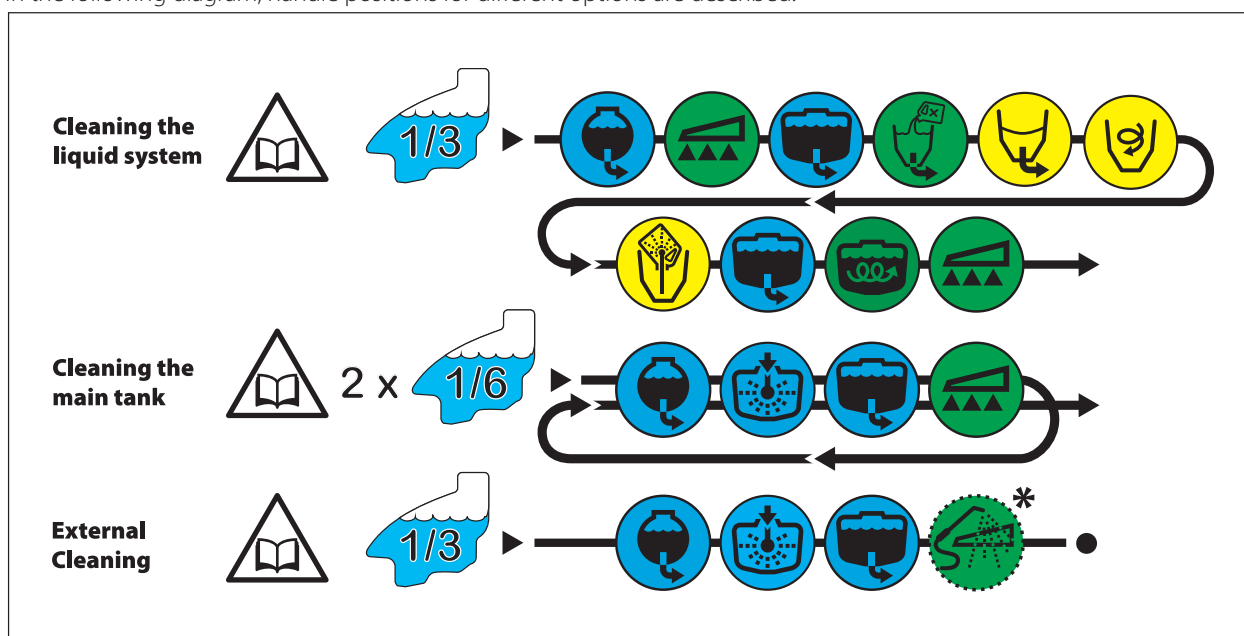
ATTENTION! If the safety valve is activated, then lower the P.T.O. speed to minimize the amount of rinsing water being lost into the main tank.



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

## Quick reference - Cleaning

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



\*designates an optional function.



### Lubrication

#### General Info

Always store lubricants clean, dry and cool - preferably at a constant temperature - to avoid contamination from dirt and condensed water. Keep oil filling jugs, hoppers and grease guns clean, and clean the lubricating points thoroughly before lubricating. Avoid skin contact with oil products for longer periods.

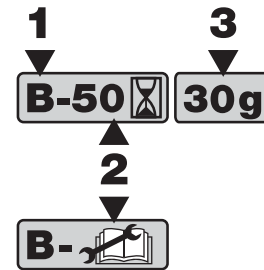
Always follow the quality and quantity recommendations. If no quantity is recommended, feed the lubricator until new grease becomes visible.

#### Pictograms in lubrication & oiling plans designate:

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



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



#### Recommended lubricants



##### BALL BEARINGS:

Universal Lithium grease, NLGI No. 2  
CHEVRON Multifak EP 2  
SHELL RETINAX EP2  
CASTROL LMX GREASE



##### SLIDE BEARINGS:

Lithium grease with Molybdenumdisulphide or graphite  
SHELL RETINAX HDM2  
CASTROL MOLYMAX



##### OIL LUB. POINTS:

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



##### PUMPS:

Complex Lithium grease, NLGI No. 1  
Viscosity @104°F (40° C) > 460 cSt  
SHELL Gadus S3 V550L 1  
Mobilgrease XHP 462  
TOTAL Multis Complex SHD 460

#### Grease Nipple

When lubricating the sprayer, please use a greasing gun which fits the dimensions of the grease nipple.

Nipple head type: DIN 71412

Nipple head size (A): 6.5 mm



ATTENTION! If grease is leaking from the nipple near its threaded part, when grease is being applied, please tighten the nipple by using a wrench or socket. Replace the nipple if it is damaged or bent out of shape.



ATTENTION! If applying grease into the nipple seems difficult, unscrew the nipple. Check if the nipple is blocked inside, or if the spring-loaded ball is stuck. Clean or repair as needed.



## 6 - Maintenance

### Grease Gun Calibration

Before lubricating the sprayer, you must calibrate your grease gun to ensure that the correct amount of grease is applied to each lubrication point. The correct amount of grease applied will prolong the lifetime of the sprayer.

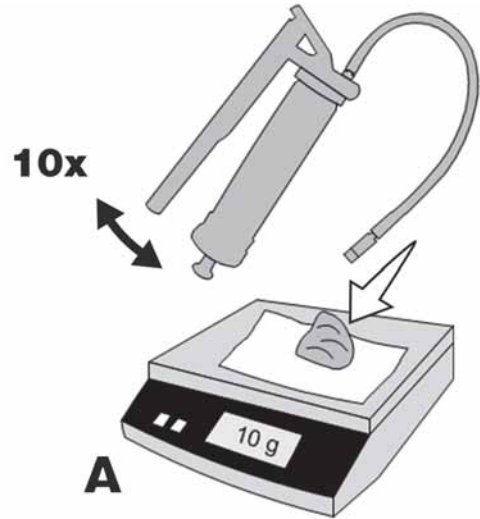
#### Calibration example

1. Insert the correct grease cartridge in your grease gun.
2. Apply grease onto a tissue or a piece of paper. Complete 10 full strokes of the grease gun.
3. Place the paper with grease on a scale (A).
4. If your grease pile weighs for example 10 grams (0.4 oz.), then 1 stroke equals 1 gram (0.04 oz.) of grease.

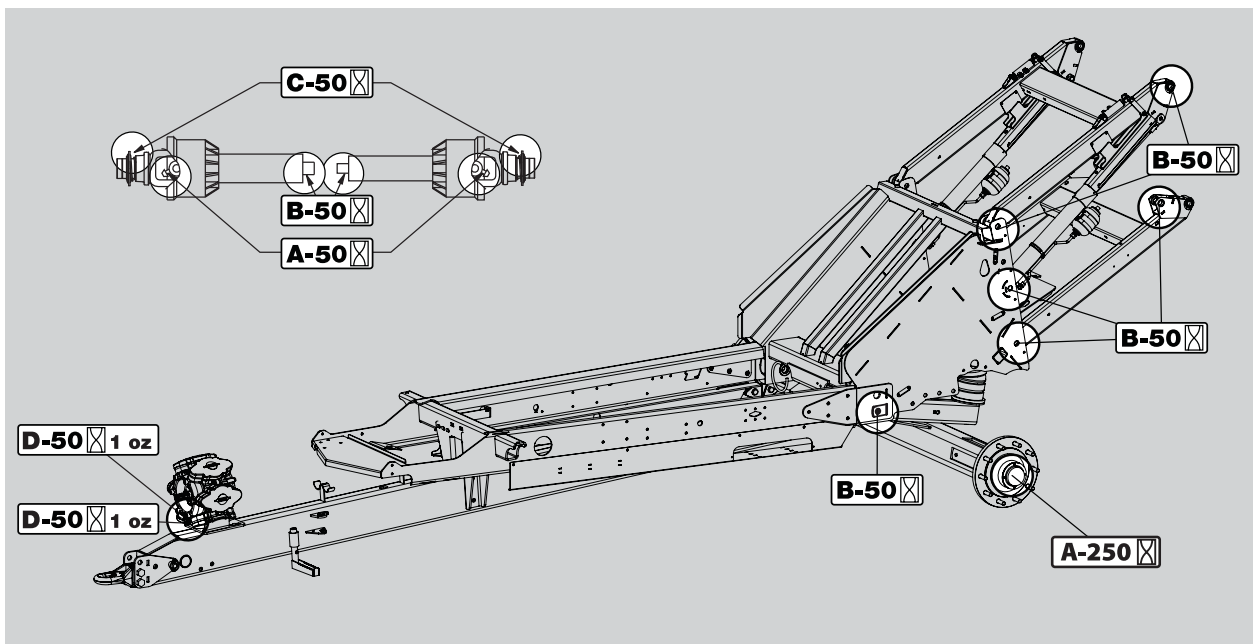
When calibrated, you can count how many strokes to complete when lubricating the different grease points on the sprayer, according to the specifications.

#### Alternative method

1. Count the strokes, until you have 10 grams (0.4 oz.) of grease piled up on the scale (A).
2. Now you can figure out how many strokes to use for applying a certain amount of grease to a lubrication point.



### Lubrication & Oiling Plan - Trailer/ParaLift™



### Boom Lubrication & Oiling Plan

A separate "Boom Operator's Manual" is supplied with your sprayer and contains detailed information on boom safety, set-up, operation and maintenance.



**DANGER!** Important information on Safety, Operation and Maintenance specific to your boom configuration is detailed in the "Boom Operator's Manual" supplied with your sprayer. 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.

### Greasing the Pump

The pump is greased as follows:

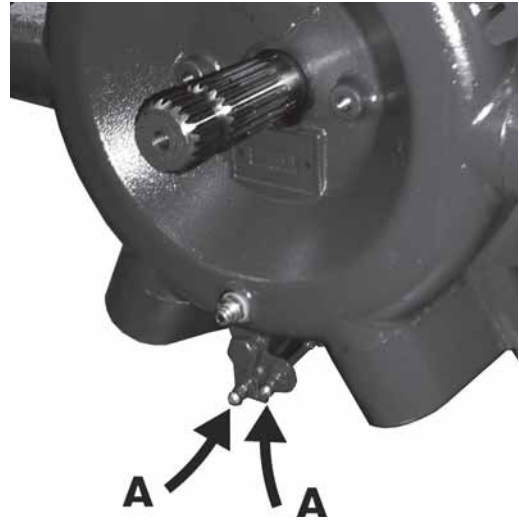
- Factory greased:  
10 oz. (300 grams) grease into each lubrication point (A).
- Normal operation:  
Grease every 50 hours with 1 oz. (30 grams) of grease into each lubrication point (A). See "50 Hours Service - Greasing the pump" on page 88.
- After disassembling the pump (diaphragm replacement, etc.):  
Grease with 7 oz. (200 grams) of grease into each lubrication point (A).



ATTENTION! In order to prevent excessive wear, it is important to use a recommended lubricant! See "Recommended lubricants" on page 81.



ATTENTION! The pump **MUST** be stopped during greasing!



## 6 - Maintenance

### Service and Maintenance intervals

#### General Info

The periodic service and maintenance work in this section may be carried out by the user. Contact your HARDI® dealer if in doubt. If this work is completed correctly, the sprayer will run efficiently and its lifetime will be prolonged.

#### Tightening Bolts and Nuts

When tightening bolts and nuts as a part of periodic service or due to replacement of spare parts, it is important to apply the correct torque. This will prevent accidents and prolong the lifetime of the parts included in the bolted joints.

If not otherwise stated in this book, please tighten bolts and nuts using the following torques.

Bolt size	Recommended torque (Ft/lb)
M4	2
M5	4
M6	6
M8	15
M10	30
M12	50
M14	85
M16	135
M18	175
M20	260
M22	360
M24	445
M27	720
M30	960



WARNING! Applying too little torque will result in these risks:

- bolted joints will rattle and thus fail under fatigue
- bolts are being worn quickly and thus will not fulfill their design purpose
- bolted joints will come loose
- accidents caused by assembled parts coming apart due to bolts or nuts failing or falling off.



WARNING! Exceeding the maximum torque will result in these risks:

- damaging or stripping the threads and deforming the fastener
- bolt heads will be broken
- bolted joints will come loose
- accidents caused by assembled parts coming apart due to bolts breaking at a later time.

### Tightening Hydraulic Hoses

When tightening hydraulic hoses as a part of periodic service or due to replacement of spare parts, it is important to apply the correct torque. This will prevent accidents and prolong the lifetime of the parts connected with the hoses.

If not otherwise stated in this book, please tighten hydraulic hoses using the following torques:

Hose size (")	Fitting thread size (")	Wrench size (mm)	Recommended torque (Ft/lb)
1/4	9/16	19	21
3/8	11/16	22	32
1/2	13/16	24	46
3/4	13/16	36	96



**DANGER!** A hydraulic hose or joint leaking or coming apart with the oil under pressure can cause severe injuries to persons standing nearby! The oil can be very hot, around 176° F (80 °C), and the oil streaming out can penetrate human skin. Risk of burns on the skin, internal injuries and facial injuries.



**WARNING!** Applying too little torque will result in these risks:

- hydraulic joints will leak due to the high oil pressure
- hydraulic joints will rattle and thus fail under fatigue
- hydraulic joints are being worn quickly and thus will not fulfill their design purpose
- accidents caused by sudden loss of oil pressure due to hydraulic parts coming apart.



**WARNING!** Applying too much torque will result in these risks:

- damaging or stripping the threads and deforming the hydraulic joints
- fittings will be broken
- hydraulic joints will leak
- accidents caused by assembled parts coming apart due to bolts breaking at a later time.



**WARNING!** When assembling a hydraulic joint, this is often being twisted around in different directions to make it fit between other components on the sprayer. Remember to finish by applying the correct torque.



**NOTE!** The sealing system for hoses and fittings is ORFS type (O-Ring Face Seal). This ensures a high level of sealing and good vibration resistance. The fittings use the O-ring compression mechanism to seal.

## 6 - Maintenance

### 10 Hours Service - 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.

#### Servicing the filter

1. Turn the filter lid counterclockwise to open it.
2. Remove lid and filter from the filter housing.



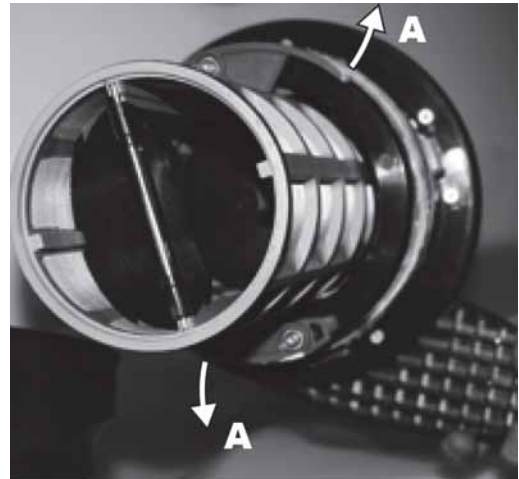
3. Separate filter element from lid/filter guide by turning locks (A) outwards.
4. Clean filter and, if necessary, clean the housing for larger impurities.

#### To reassemble

1. Grease the O-ring on the filter lid.
2. Press the filter onto the filter guide/lid. Make sure that it has caught the guide. Turn locks (A) inwards.
3. Reassemble filter/filter lid into the housing. Make sure that it has caught the guide in the bottom of the housing.
4. Turn the filter lid clockwise to close it.



**WARNING!** Always wear protective clothing and gloves before servicing the filter!



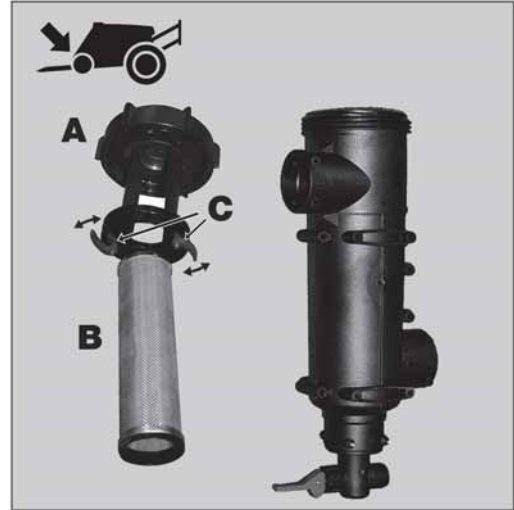
### 10 Hours Service - CycloneFilter

#### Servicing the filter

1. Turn the pressure SmartValve to an unused function or to tank cleaning nozzles.
2. Unscrew the filter lid (A).
3. Lift lid and filter (B) from the housing.
4. Turn the two locks (C) outwards to unlock the filter from the lid.
5. Separate filter from the integrated filter guide in the lid and clean the filter.

#### To reassemble

1. Grease the two O-rings on the lid/filter guide. Due to small space at lid, use for example a brush to apply the grease.
2. Mount the filter onto the recess (which may not be greased) in the lid/filter guide.
3. Turn the two locks (C) inwards to lock the filter to the lid.
4. Place the filter/filter lid into the housing and tighten the lid until it hits the stop.



WARNING! Always wear protective clothing and gloves, before servicing the filter!



DANGER! Never open the Cyclone filter unless the pressure SmartValve and suction SmartValve are both closed (turned to an unused position)! If no unused pressure positions are available, then turn the pressure SmartValve to "Tank Rinse". Otherwise, spraying liquid may hit you when opening the filter, and drain the main tank contents!

### 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.

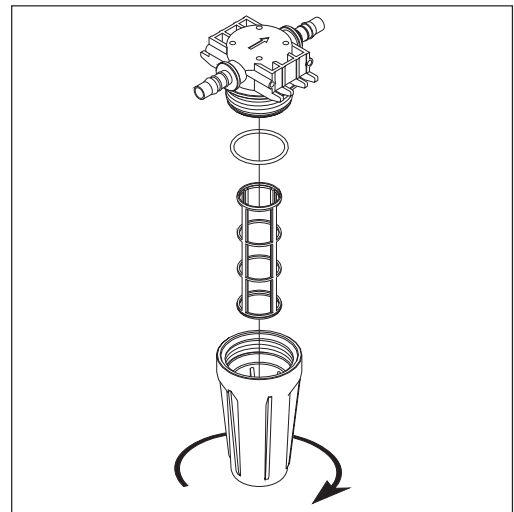
Alternative filter meshes are available. See section on Technical specifications - Filters and nozzles.



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.

## 6 - Maintenance

### 50 Hours Service - Greasing the pump

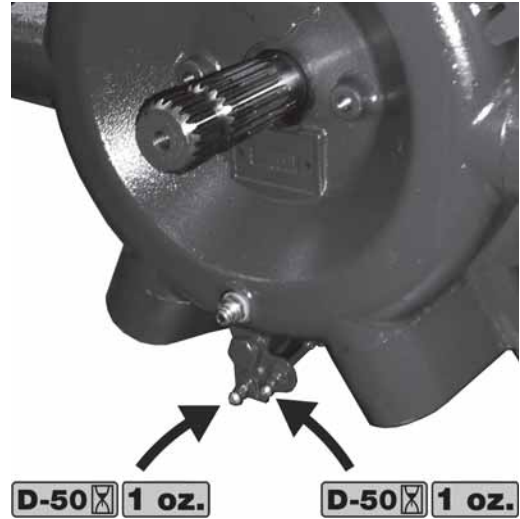
When operating the pump, it **MUST** be greased every 50 hours with 1 oz. (30 grams) grease into each lubrication point.



ATTENTION! In order to avoid excessive wear, it is important to use a recommended lubricant (i.e. HARDI® part no. 28164600). See "Recommended lubricants" on page 81.



ATTENTION! The pump **MUST** be stopped during greasing!



### 50 Hours Service - Transmission Shaft (P.T.O.)

1. Check function and condition of the transmission shaft protection guard. Replace any damaged parts.
2. Lubrication. See "Lubrication & Oiling Plan - Trailer/ParaLift™" on page 82.
3. See the manufacturer's instruction book.

### 50 Hours Service - Wheel nuts

Tighten wheel nuts as follows with following torque wrench settings:

Wheel hub to rim plate: 250 Ft/lb (340 Nm)

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



### 50 Hours Service - Tire Pressure

Check the tire pressure according to the table "Tire Pressure" on page 107.



**DANGER!** Never inflate tires more than to the pressure specified in the table. Over-inflated tires can explode and cause severe personal injuries!



**WARNING!** If replacing tires, always use tires with min. load index as specified.

### 250 Hours Service - Hydraulic circuit

Check the hydraulic circuit for leaks and repair if any.



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

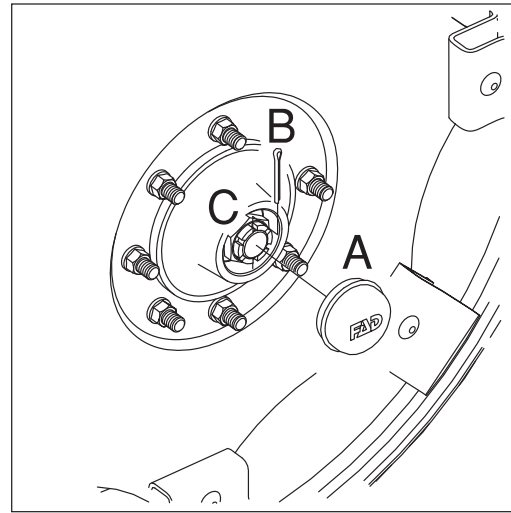
### 250 Hours Service - Hoses and tubes

Check all hoses and tubes for possible damages and proper attachment. Replace 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 castle nut (C) until a slight resistance in the wheel rotation is felt.
5. Loosen the castle 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.



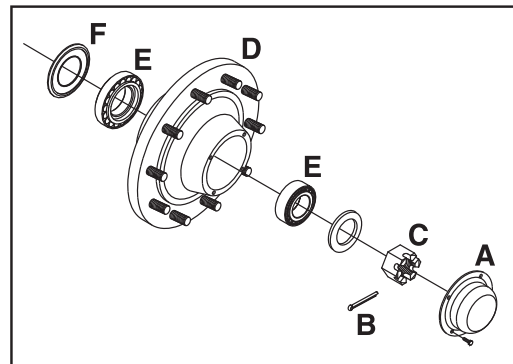
### 1000 Hours Service - Transmission shaft

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

### 1000 Hours Service - Wheel bearings

Check the condition of the bearings 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 4 Allen bolts and remove the hub cap (A), cotter pin (B) and castle nut (C).
5. Pull off the wheel hub assembly (D). Use a wheel puller if necessary.
6. Remove roller bearings (E), clean all parts in degreasing detergent and dry them. Inspect bearings (E) and replace if necessary.
7. Pack bearings (E) with fresh wheel bearing grease and re-install using a new seal (F).
8. Turn the wheel and tighten the castle nut (C) until a slight resistance in the wheel rotation is felt.
9. Loosen the castle nut until the first notch (horizontal or vertical) is aligned with the cotter pin hole on the shaft.
10. Fit a new cotter pin and bend it.
11. Fill the hub cap with fresh grease and re-attach it onto the hub.
12. Repeat the procedure on the LH wheel.



**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, contact your HARDI® dealer's workshop.

## 6 - Maintenance

### Occasional maintenance

#### General info

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

#### Lifting and Removing the Pump

When lifting and removing the pump, use a shackle fitted to the built-in lifting eye located between the heads (A).



**WARNING!** To prevent damages in case of a free-falling pump, use lifting gear with at least 4 tons max. tensile strength.



**NOTE!** Pump weight is approximately 165 lbs. (75 kg.).



#### Pump valves and diaphragms replacement

Diaphragm pump overhaul kit (valves, seals, diaphragms etc.) can be ordered. Detect the pump model - kit can be ordered using correct HARDI® part No.:

Model 364: part No. 75585900

Model 464: part No. 75586000

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



### Valves

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



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

### Diaphragms

5. Loosen the diaphragm bolt (5).
6. Remove the diaphragm washer (6).
7. The diaphragm (7) may then be changed.
8. Check that the drain hole (8) at the bottom of the pump is not blocked.
9. Apply a small amount of pump grease on the underside of the diaphragms (between diaphragm and connecting rod washer).
10. Reassemble the pump with the following torque setting:
  - Diaphragm head bolts (1): 67 Ft/lb (90 Nm)
  - Diaphragm bolt (5): 67 Ft/lb (90 Nm)
  - Refit the plastic covers (C).



NOTE! The diaphragm bolt on 1000 r.p.m. pumps must be secured with a locking compound such as Loctite® 262 (HARDI® Part No.: 28045503).



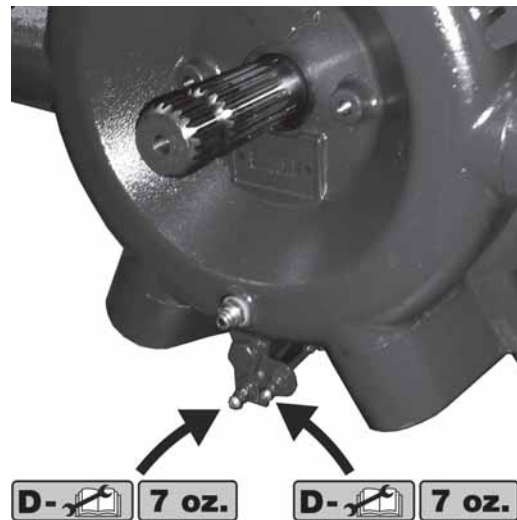
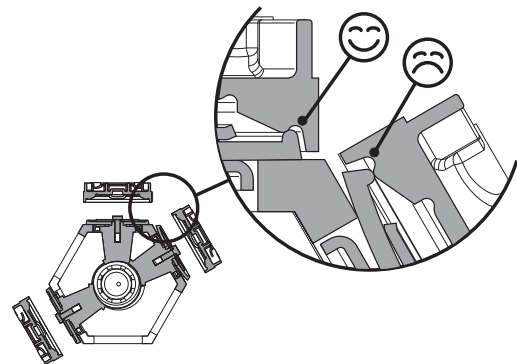
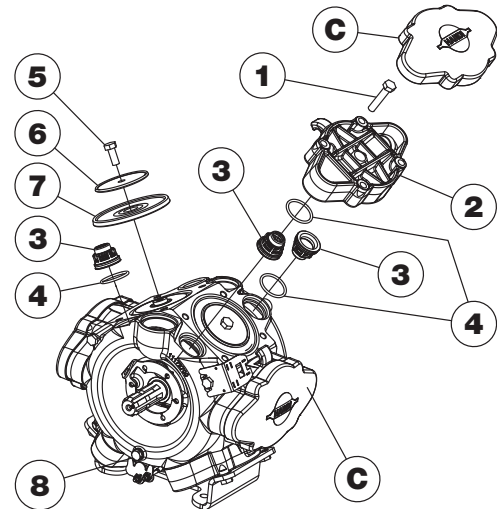
ATTENTION! Before tightening the 4 bolts for the head (2), the diaphragm must be positioned between the center and top to ensure correct sealing between the diaphragm pump housing and diaphragm cover. Turn the crank shaft if necessary.

### Re-lubrication after assembly

After disassembling the pump (diaphragm replacement, etc.), the pump MUST be lubricated with 7 oz. (200 grams) grease into each lubrication point.



ATTENTION! In order to avoid excessive wear, it is important to use a recommended lubricant (i.e. HARDI® part no. 28164600). See "Recommended lubricants" on page 81.



## 6 - Maintenance

### Speed Transducer for Pump

The speed transducer, measuring rounds per minute (r.p.m.), is located at the inner side of the P.T.O. shield. This sensor is an inductive type, which requires metallic protrusions to pass by it to trigger a signal.

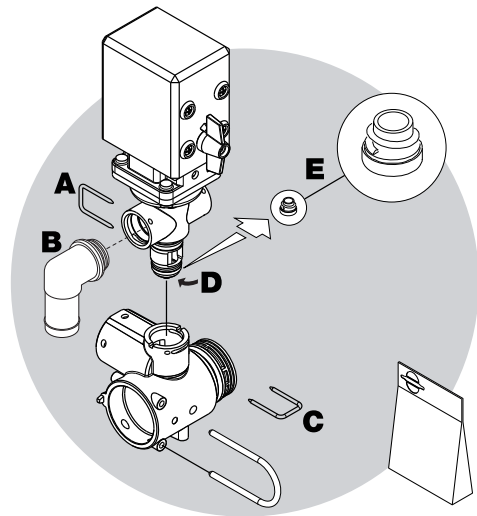
#### Adjustment

1. Adjust air gap (A) to 3/16" (4 mm). Use a feeler gauge or similar tool.
2. After adjustment, turn the pump shaft. Verify air gap variations less than  $\pm 0.02$ " ( $\pm 0.5$  mm). Check this for the entire circumference.
3. Verify transducer function:
  - HC 6500/ISOBUS VT:  
Monitor the menu [4.5.4.9.6 P.T.O. pump frequency].



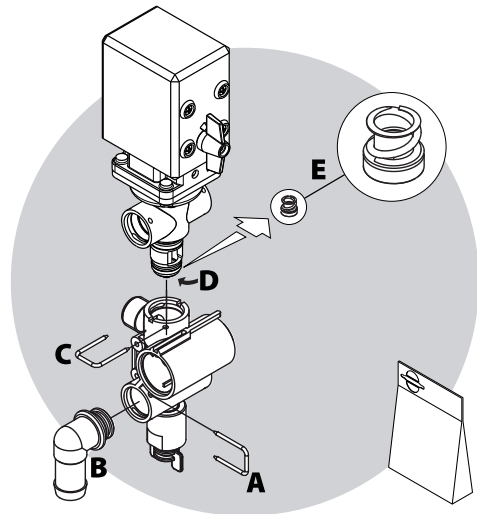
### Cone check/replacement for EFC distribution valve

Periodically check the distribution valves for proper sealing. Do this by running the sprayer with clean water and open all distribution valves. Cautiously remove the clip (A) and pull out the hose (B) for the return line. When the housing is drained, there should be no liquid flow through the return line. If there is any leakage, the valve cone (E) must be changed. Remove the clip (C) and lift the motor housing off the valve housing. Then unscrew the screw (D) and replace the valve cone (E). Reassemble in reverse order.



### Cone check/replacement for EVC distribution valve

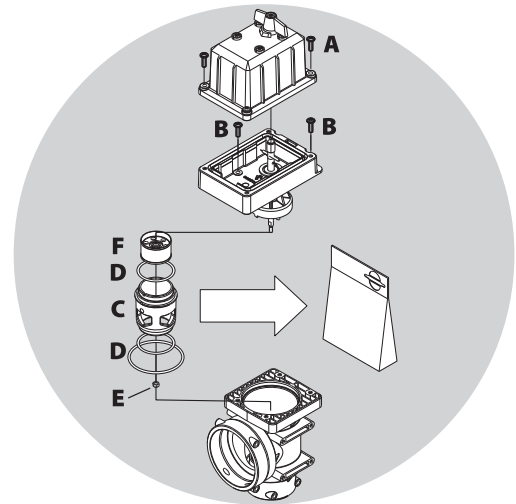
Periodically check the distribution valves for proper sealing. Do this by running the sprayer with clean water and open all distribution valves. Cautiously remove the clip (A) and pull out the hose (B) for the return line. When the housing is drained, there should be no liquid flow through the return line. If there is any leakage, the valve cone (E) must be changed. Remove the clip (C) and lift the motor housing off the valve housing. Then unscrew the screw (D) and replace the valve cone (E). Reassemble in reverse order.



### Cone check/replacement for pressure regulation valve (EVC)

If it becomes difficult to build up sufficient pressure or if pressure fluctuations occur, it may be necessary to replace 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.



### Level Indicator Adjustment

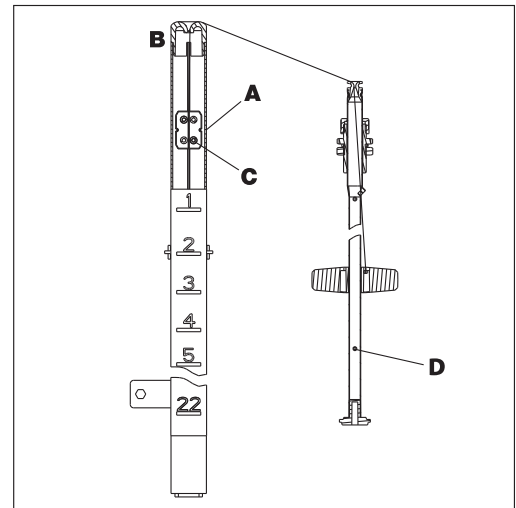
The level indicator reading should be checked regularly. When the tank is empty, the float should lie on the stop pin (D) of the rod, and the O-ring on the indicator should be positioned at the top position line (A).

If any deviation is found, do the following:

1. Pull out the plug (B).
2. Loosen screws (C).
3. Adjust the length of the cord, until it reads correctly.
4. Push the plug (B) back into place.



**NOTE!** To obtain the best accuracy, the adjustment should be done with the sprayer attached to the tractor normally used.



### Level Indicator Cord Replacement

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

1. Remove the tank drain valve (see "Drain valve seal replacement" on page 94) and loosen the fitting holding the pole in position.
2. Pull the pole down through the drain valve hole, until it is free in the top of the tank.
3. The pole can now be taken out of the tank through the filling hole.



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

## 6 - Maintenance

### Drain valve seal replacement

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

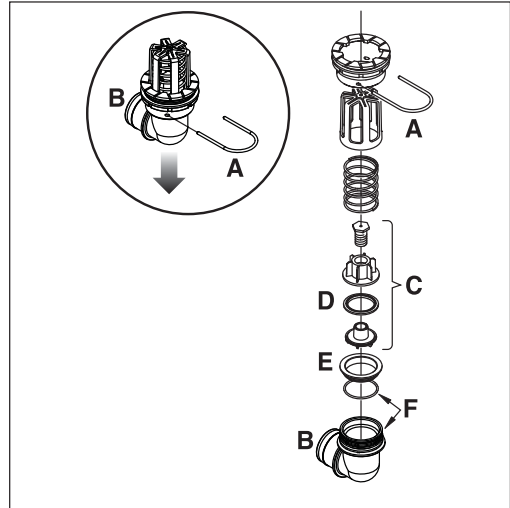


**DANGER!** Do not enter the inside of the tank - the parts can be changed from the outside of the tank!



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

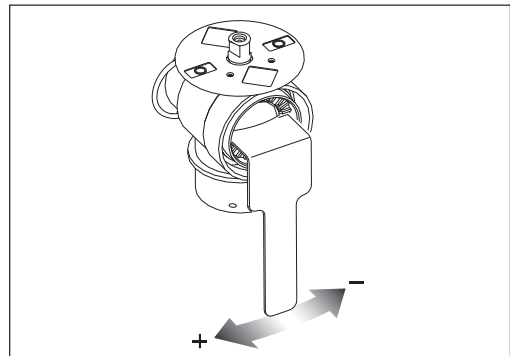
1. Make sure the tank is empty and clean.
2. The valve must be closed and the string loose.
3. Pull out the clip (A) and pull down connecting piece (B). The entire valve assembly can now be pulled out.
4. Check cord and valve flap assembly (C) for wear, replace seal (D) and assemble again.
5. Assemble 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.

### 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.



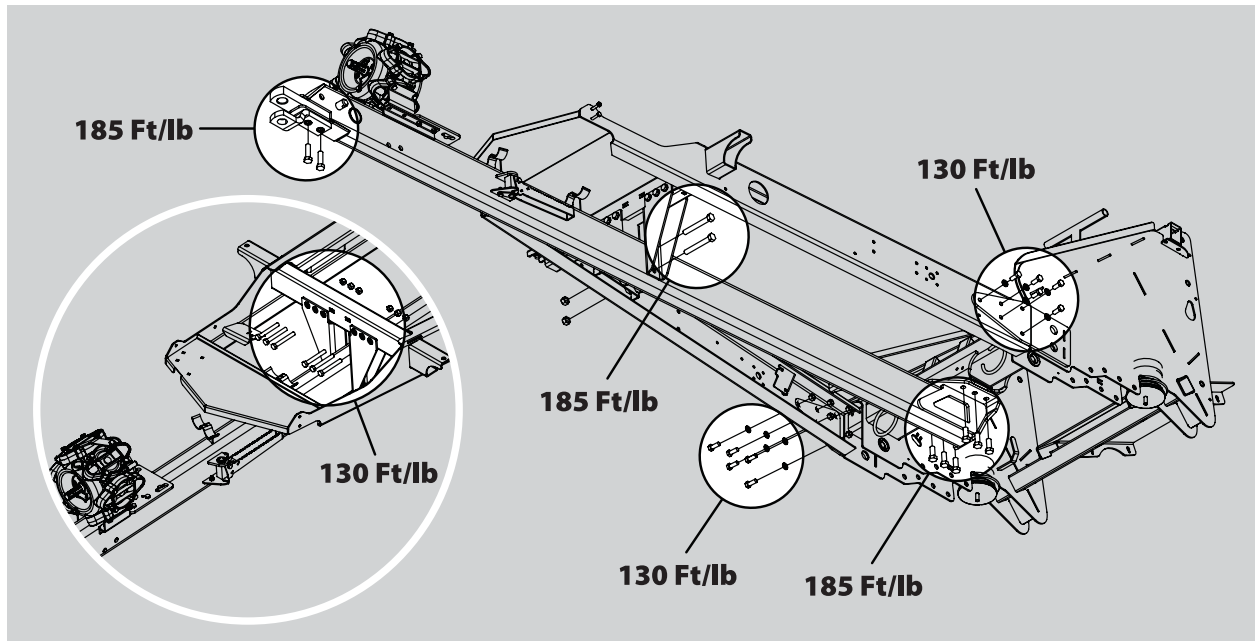
### Safety Valve Activation (Diaphragm pump systems only)

To make the fluid system work perfectly over time, it is good practice to regularly provoke opening of the safety valve.

This prevents clogging and ensures proper function of the safety valve. Opening of the valve is done by turning the pressure SmartValve to an unused function (or "TurboFiller" without activating) when the pump is running. This is good practice for all sprayers; particularly for sprayers without optional equipment.

### Re-tighten the frame

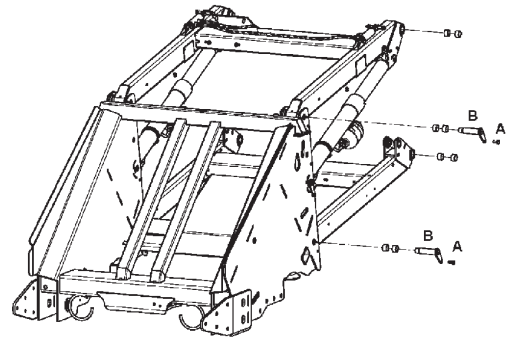
The frame is two sections bolted together. Also the drawbar is bolted to the frame. These bolts need to be tightened correctly. Regularly check if bolts are tightened to the specified torques below.



### Wear Bushing Replacement on Boom Lift

The wear bushings are inspected and replaced before they are worn through.

1. Connect the trailer to a tractor and unfold the boom to working position.
2. Lift the boom center 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) for the upper parallelogram arms and replace the wear bushings.
4. Re-attach the arms.
5. Repeat this procedure with the lower arms.
6. Apply grease into all grease nipples.



### Suspension Rubber Dampers (optional)

If the shock absorbers lose 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.

## 6 - Maintenance

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### 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.

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### Shield Replacement on Transmission Shaft (P.T.O.)

- See the manufacturer's instruction book.

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### Replacement of Transmission Shaft Cross Journals (P.T.O.)

- See the manufacturer's instruction book.

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### Change of Tires



DANGER! If it is necessary to change tires, it is recommended to leave this job to a specialist and follow the rules below. Some mounting instructions are usually printed on the tire itself.

- Always clean and inspect the rim before mounting a new tire.
- Always check that the rim diameter corresponds exactly to the rim diameter molded on the tire.
- Always inspect the tire inside for cuts, penetrating objects or other damages. Repairable damages should be repaired before installing the tube. Tires with non-repairable damages must never be used.
- Also inspect inside the tire for dirt or foreign objects. Remove before installing the tube.
- Always use tubes of recommended size and in good condition. When fitting new tires, always use new tubes.
- Before mounting, always lubricate both tire 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 tire. Using the appropriate lubricant will prevent the tire from slipping on the rim.
- Always use specialized tools for mounting the tires as recommended by the tire supplier.
- Make sure that the tire is centered, and that the beads are perfectly seated on the rim. Otherwise tearing of the bead wire may occur.
- Inflate the tire to 15-19 psi (1-1.3 bar), then check whether both beads are seated perfectly on the rim. If any of the beads do not seat correctly, deflate the assembly and re-center the beads before starting inflation of the tire. If the beads are seated correctly on the rim at 15-19 psi (1-1.3 bar), inflate the tire to a maximum of 36 psi (2.5 bar) until they seat perfectly on the rim.
- Never exceed the maximum mounting pressure molded on the tire!
- After mounting tires, adjust inflation pressure to operation pressure recommended by the tire manufacturer.
- Do not use tubes in tubeless tires.



DANGER! Not observing mounting instructions will result in a bad seating of the tire on the rim and could cause the tire to burst, leading to serious injury or death!



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

### **Safety valve activation (Diaphragm pump systems only)**

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 "Off" (unused position) when pump is running. If no unused positions are available, turn the pressure SmartValve to "TurboFiller" (with all valves closed). This is good practice for all, but particularly for sprayers without optional equipment.

## 6 - Maintenance

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### Off-season storage

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#### 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 in the chapter "Cleaning" on page 72. 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. Replace 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 flush tank also.



**ATTENTION!** If the sprayer is equipped with a centrifugal pump, do not run pump dry for longer than 3 seconds. Otherwise severe damage to the pump will occur.

4. Pour appr. 13 gal. (50 liters) anti-freeze mixture (1/3 propylene glycol anti-freeze and 2/3 water) into the main tank. This mixture should include any remaining water in the fluid system.
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 glycerin-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 RUSTILLO or similar) on all metal parts. Avoid oil on rubber parts, hoses and tires.
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 tires. Tire blacking can be applied to the tire walls to preserve the rubber.
16. To protect against dust, the sprayer can be covered by a tarpaulin. Ensure ventilation to prevent condensation.

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#### 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 tire 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 electrics.
6. Check all hydraulic and electric functions.
7. Empty the tank of remaining anti-freeze.
8. Rinse the entire liquid circuit on the sprayer with clean water.
9. Fill with clean water and check all functions.

### Operational problems

---

#### General Info



DANGER! Specialized persons should be involved in fault finding, as this is hazardous work! It might be necessary to have the sprayer operating to complete the fault finding.

Operational incidents are often due to the same reasons:

- A suction leakage reduces the pump pressure and may interrupt suction completely.
- A clogged suction filter may hinder or interrupt suction and prevent the pump from running normally.
- A clogged pressure filter increases pressure in the fluid system before the filter, but decreases pressure at the nozzles. This may blow the safety valve.
- Clogged in-line filters or nozzle filters increase pressure in the pressure gauge, but decreases pressure at the nozzles.
- Impurities sucked in by the pump may prevent the valves from closing correctly, thus reducing the pump flow.
- Poor reassembly of the pump, especially the diaphragm covers, allows air intakes or leaks and reduces the pump flow.
- Rusted or dirty hydraulic components cause bad connections and early wear.
- A poorly charged or faulty battery causes failure and misbehavior in the electrical system.

#### Therefore ALWAYS check that

- Suction, pressure and nozzle filters are clean.
- Hoses are free of leaks and cracks, particularly suction hoses.
- Gaskets and O-rings are present and in good condition.
- Pressure gauges are in good working order. Dosage accuracy depends on it.
- Operating unit functions properly. Use clean water to check.
- Hydraulic components are clean.
- The tractor battery and its connectors are in good condition.

## 7 - Fault finding

### Liquid system

FAULT	PROBABLE CAUSE	CONTROL/REMEDY
No spray from boom when turned on.	SmartValve/Pressure valve positions are wrong. Suction/pressure filters are clogged. No suction from tank.  Air leak on suction line	Set correct valve positions for spraying. Clean suction and pressure filters. See if suction fitting in main tank sump is free of sedimentation. Clean if needed. Check if suction filter O-ring is sealing. Check tightness of pump diaphragm and valve covers.
Lack of pressure.	Incorrect assembly.  Air in system (Centrifugal pump). Too much agitation. Pump valves clogged or worn.  Defective pressure gauge.	Boost valve has a defect (located at the bottom of the pressure filter). The valve seat is worn or missing. Fill suction hose with water for initial priming. Close the agitation valve. Check for obstructions and wear.  Check for dirt at inlet of gauge.
Pressure dropping.	Filters are clogging.  Nozzles are worn.  Sucking air towards end of tank load.	Clean all filters. Fill with cleaner water. If using powders, make sure agitation is on. Check nozzle output. Replace nozzles if the deviation in output exceeds 10%. Lower pump r.p.m.
Pressure increasing.	Pressure filters beginning to clog.	Clean all filters. Make sure bottom valve on CycloneFilter is not left in closed position (marked with 1 dot) after flushing boom. Operating position (marked with 2 dots) keeps CycloneFilter clean.
Formation of foam.	Air is being sucked into system.  Excessive liquid agitation.	Check tightness/gaskets/O-rings of all fittings on suction side. Reduce pump speed (r.p.m.). Check safety valve is tight (diaphragm systems only). Ensure returns inside tank are present. Use foam damping additive.
Operating unit not functioning or having a malfunction.	Blown fuse(s).  Wrong polarity. Valves not closing properly.  No power.	Check mechanical function of microswitches. Use cleaning/ lubricating agent if the switch does not operate freely. Check motor current, max. 450-500 mA. If over, change motor. Brown to positive (+). Blue to negative (-). Check valve seals for obstructions. Check microswitch plate position. Loosen the screws holding the plate 1/2 turn. Wrong polarity. Check that brown is positive (+), Blue is negative (-). Check print plate for dry solders or loose connections. Check fuse holder is tight around fuse.

### Pump

FAULT	PROBABLE CAUSE	CONTROL/REMEDY
Liquid leaks from the bottom of the pump.	Damaged diaphragm.	Replace diaphragm. See maintenance section.
Grease leaks from the bottom of the pump.	Grease used has too low viscosity.	Change to recommended grease type.
Grease leaks from the shaft grease seals.	Grease used has too low viscosity.	Change to recommended grease type.
	Bearings worn/too high friction.	Replace pump bearings and grease seals.
Lack of pressure.	Pump valves are clogged or defective.	Check for obstructions or, if needed, replace valves.
	Clogged filters in fluid system.	Clean all filters.
Vibrations in system and unpleasant noise from the pump.	Pump valves are clogged or defective.	Check for obstructions or, if needed, replace valves.
	Air is being sucked into system.	Check for leaks, pinholes in suction hoses, tightness/gaskets/O-rings of all fittings on the suction side.
Lack of flow/capacity.	Internal wear on connecting rod and ring.	Poor greasing. Replace parts as needed and observe proper grease quality and intervals.
	Pump valves are clogged or defective	Check for obstructions or, if needed, replace valves.
Extreme internal erosion on diaphragm covers and housing.	Too high vacuum caused by clogged suction filter or excessive pump speed (r.p.m.).	Replace affected pump parts. Clean suction filter and observe maximum pump speed (r.p.m.).
	Lack of internal cleaning.	Use recommended cleaning procedures and add extra cleaning agents (e.g. AllClearExtra or similar).
	Lack of conservation of the fluid system during storage.	Always use a proper mixture of anti-freeze during storage.
Short lifetime for diaphragm.	Over speeding of the pump	Observe maximum pump speed (r.p.m.).

### Hydraulic System, Z-version

FAULT	PROBABLE CAUSE	CONTROL/REMEDY
ParaLift™ lock does not lock. Boom lift raises to max. position, when tractor hydraulics are engaged.	Back pressure in return line exceeds 220 psi (15 bar).	Connect the return line with a free flow to hydraulic oil reservoir.  Divide return line in two and lead return oil back to reservoir via two spool valves.
Oil heats up in Closed Center systems.	Bypass valve does not close properly. Internal leaks in flow regulator.	Check / close (screw in) by-pass valve. Replace flow regulator O-rings and backup rings. Replace flow regulator.
Individual hydraulic piston does not move.	Clogged restrictor.	Dismantle and clean restrictor.



NOTE! See the "Fault Finding" chapter of the "Boom Operator's Manual" for more information.

### 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

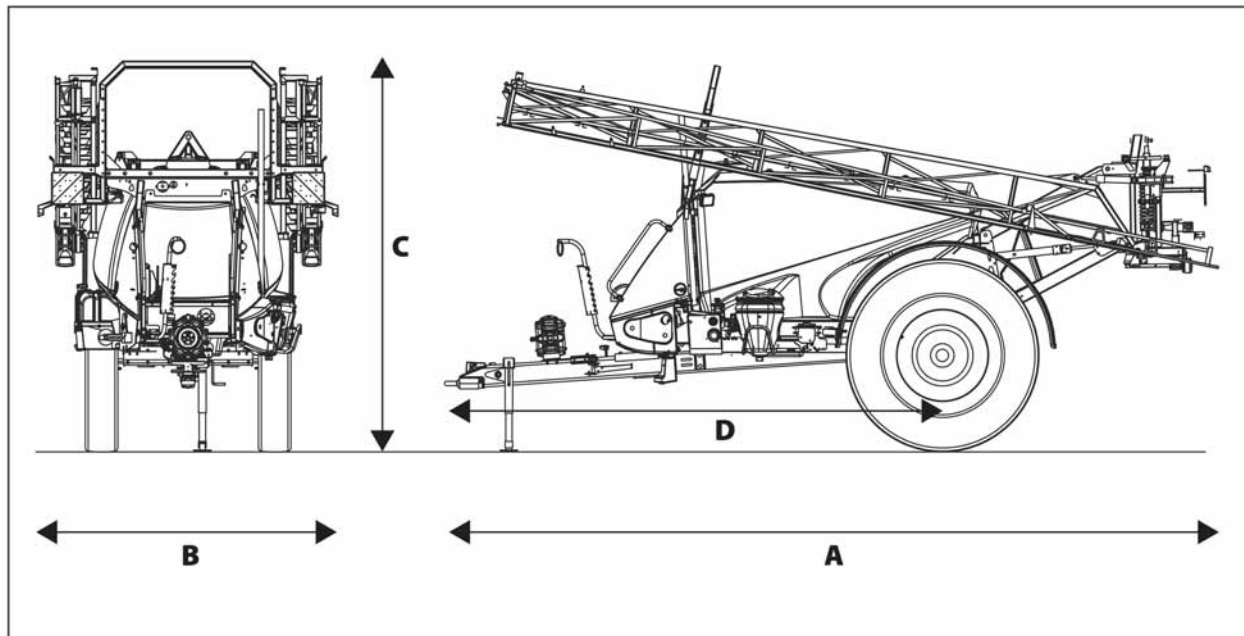


### Dimensions

#### General info

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

#### Overall dimensions



Suspended axle:

Wheels	12.4x42"	320/90 R46"	380/90 R46"
A - Total length	23'2"	23'2"	23'2"
B - Total width	11'5"	11'5"	11'5"
C - Total height	12'0"	12'3"	12'3"
D - Draw to axle	14'9"	14'9"	14'9"

Non-suspended axle:

Wheels	12.4x42"	320/90 R46"	380/90 R46"
A - Total length	23'2"	23'2"	23'2"
B - Total width	11'5"	11'5"	11'5"
C - Total height	11'9"	12'0"	12'0"
D - Draw to axle	14'9"	14'9"	14'9"

#### Tank capacities

Main tank capacity	800, 1000, 1200 or 1600 gallons (3000, 3500, 4000 or 6000 Liters)
Clean water tank capacity	5 gallons (20 Liters)
Flush tank capacity	130 gallons (500 Liters)
Foam marker tank capacity	25 gallons (100 Liters)

## 8 - Technical specifications

### Weight

#### Navigator 3000 with Eagle™ boom

Boom Width	Empty tank					Full tank*				
	Folded in transport		Unfolded		Total Weight	Folded in transport		Unfolded		Total Weight
	Axle load	Hitch load	Axle load	Hitch load		Axle load	Hitch load	Axle load	Hitch load	
45 ft. SPB	5104	462	5236	330	5566	10853	2387	10985	2255	13240
50 ft. SPB	5148	473	5313	308	5621	10897	2398	11062	2233	13295
60 ft. SPB	5236	484	5456	264	5720	10985	2409	11205	2189	13394
66 ft. SPB	5280	495	5555	220	5775	11029	2420	11304	2145	13449
80 ft. SPC	6886	660	7568	-22	7546	12635	2585	13317	1903	15220
90 ft. SPC	6974	682	7722	-66	7656	12723	2607	13471	1859	15330
100 ft. SPC	7172	704	8030	-154	7876	12921	2629	13779	1771	15550

All weights in pounds (lbs)

\*Main tank capacity: 800 gal (3028 L), Rinse tank capacity: 122 gal (460 L), filled with water

#### Navigator 3500 with Eagle™ boom

Boom Width	Empty tank					Full tank*				
	Folded in transport		Unfolded		Total Weight	Folded in transport		Unfolded		Total Weight
	Axle load	Hitch load	Axle load	Hitch load		Axle load	Hitch load	Axle load	Hitch load	
45 ft. SPB	5148	473	5247	374	5621	12080	2880	12179	2781	14960
50 ft. SPB	5192	484	5324	352	5676	12124	2891	12256	2759	15015
60 ft. SPB	5280	495	5467	308	5775	12212	2902	12399	2715	15114
66 ft. SPB	5324	506	5566	264	5830	12256	2913	12498	2671	15169
80 ft. SPC	6930	671	7579	22	7601	13862	3078	14511	2429	16940
90 ft. SPC	7018	693	7733	-22	7711	13950	3100	14665	2385	17050
100 ft. SPC	7216	715	8041	-110	7931	14148	3122	14973	2297	17270

All weights in pounds (lbs)

\*Main tank capacity: 1000 gal (3785 L), Rinse tank capacity: 122 gal (460 L), filled with water

#### Navigator 4000 with Eagle™ boom

Boom Width	Empty tank					Full tank*				
	Folded in transport		Unfolded		Total Weight	Folded in transport		Unfolded		Total Weight
	Axle load	Hitch load	Axle load	Hitch load		Axle load	Hitch load	Axle load	Hitch load	
45 ft. SPB	5258	484	5324	418	5742	13376	3370	13442	3304	16746
50 ft. SPB	5302	495	5401	396	5797	13420	3381	13519	3282	16801
60 ft. SPB	5390	506	5544	352	5896	13508	3392	13662	3238	16900
66 ft. SPB	5434	517	5643	308	5951	13552	3403	13761	3194	16955
80 ft. SPC	7040	682	7656	66	7722	15158	3568	15774	2952	18726
90 ft. SPC	7128	704	7810	22	7832	15246	3590	15928	2908	18836
100 ft. SPC	7326	726	8118	-66	8052	15444	3612	16236	2820	19056
120 ft. SPC	9266	719	10505	-519	9985	17384	3605	18623	2367	20990

All weights in pounds (lbs)

\*Main tank capacity: 1200 gal (4542 L), Rinse tank capacity: 122 gal (460 L), filled with water

#### Navigator 6000 with Eagle™ boom

Boom Width	Empty tank					Full tank*				
	Folded in transport		Unfolded		Total Weight	Folded in transport		Unfolded		Total Weight
	Axle load	Hitch load	Axle load	Hitch load		Axle load	Hitch load	Axle load	Hitch load	
80 ft. SPC	9064	1001	9680	385	10065	19668	4741	20284	4125	24409
90 ft. SPC	9152	1023	9834	341	10175	19756	4763	20438	4081	24519
100 ft. SPC	9350	1045	10142	253	10395	19954	4785	20746	3993	24739
120 ft. SPC	11290	1038	12529	-200	12328	21894	4778	23133	3540	26673

All weights in pounds (lbs)

\*Main tank capacity: 1600 gal (6056 L), Rinse tank capacity: 122 gal (460 L), filled with water

## 8 - Technical specifications

### Weight (cont.)

#### Navigator 4000 with Delta Force boom

Boom Width	Empty tank					Full tank*				
	Folded in transport		Unfolded		Total Weight	Folded in transport		Unfolded		Total Weight
	Axle load	Hitch load	Axle load	Hitch load		Axle load	Hitch load	Axle load	Hitch load	
90 ft. DTZ	7546	836	8547	-165	8382	15664	3722	16665	2721	19386
100 ft. DTZ	7612	869	8590	-209	8481	15730	3755	16808	2677	19485
120 ft. DTZ	9379	803	10934	-752	10182	17497	3689	19052	2134	21186
132 ft. DTZ	9368	814	10934	-752	10182	17486	3700	19052	2134	21186

All weights in pounds (lbs)

\*Main tank capacity: 1200 gal (4542 L), Rinse tank capacity: 122 gal (460 L), filled with water

#### Navigator 6000 with Delta Force boom

Boom Width	Empty tank					Full tank*				
	Folded in transport		Unfolded		Total Weight	Folded in transport		Unfolded		Total Weight
	Axle load	Hitch load	Axle load	Hitch load		Axle load	Hitch load	Axle load	Hitch load	
90 ft. DTZ	9548	1170	10571	147	10718	20152	4910	21175	3887	25062
100 ft. DTZ	9614	1203	10714	103	10817	20218	4943	21318	3843	25161
120 ft. DTZ	11381	1137	12958	-440	12518	21985	4877	23562	3300	26862
132 ft. DTZ	11370	1148	12958	-440	12518	21974	4888	23562	3300	26862

All weights in pounds (lbs)

\*Main tank capacity: 1600 gal (6056 L), Rinse tank capacity: 122 gal (460 L), filled with water

### Wheel and Axle Dimensions

Sprayer model	Wheel	60" fixed axle	120" fixed axle	60"-120" adj. axle	60"-90" adj. axle	Clearance*
3000/3500/4000	320/90 R46	61"	120"	61"-120"	N/A	31"
3000/3500/4000	380/90 R46	N/A	120"	64"-120"	N/A	31"
3000/3500/4000	320/90 R50	N/A	N/A	N/A	61"-90"	30"
6000	320/90 R50	N/A	120"	N/A	61"-90"	30"
6000	380/90 R46	N/A	120"	N/A	64"-90"	28"
6000	480/80 R46	N/A	120"	N/A	68"-90"	31"

\* below wheel axle  
N/A: Not Applicable

## 8 - Technical specifications

### Specifications

#### Diaphragm pumps

Pump model 364/5.5	PSI	RPM	GPM	HP
	0	1000	51.2	4.2
	220	1000	47.6	7.8

Pump model 364/10.0	PSI	RPM	GPM	HP
	0	540	51.2	2.4
	220	540	47.0	8.3

Pump model 464/6.5	PSI	RPM	GPM	HP
	0	1000	92.2	4.3
	220	1000	78.7	13.8

Pump model 464/12.0	PSI	RPM	GPM	HP
	0	540	88.2	3.0
	220	540	81.9	13.0

#### Centrifugal pumps

##### Pump model 150 - ACE 206 hydraulic

Output will vary with PSI and usage.

##### Pump model 200 - ACE 304 hydraulic

Output will vary with PSI and usage.

##### Pump model 650 - ACE 650 hydraulic

Output will vary with PSI and usage.

#### 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: 36° F to 104° F (2° to 40° C)

Operating pressure for safety valve: 220 psi (15 bar)

Max. pressure on the pressure manifold: 290 psi (20 bar)

Max. pressure on the suction manifold: 22 psi (1.5 bar)

Hydraulics:

Operating temperature range: 36° F to 176° F (2° to 80° C)

Max. operating pressure:

Tractor: 3046 psi (210 bar)

## 8 - Technical specifications

### Tire Pressure

Tire size (")	Load index	Navigator 3000		Navigator 3500		Navigator 4000			Navigator 6000	
		SPB	SPC	SPB	SPC	SPB	SPC	DTZ	SPC	DTZ
320/90 R46	148 A8	36	48	42	52	50	52	52	N/A	N/A
380/90 R46	156 A8	22	35	26	42	35	44	48	N/A	N/A
320/90 R50	169 D	20*	24*	20*	30*	24*	35*	40*	64*	66*
320/90 R50	169 D	10**	10**	10**	12**	10**	15**	18**	22**	24**
380/90 R46	168 A8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	68	72
480/90 R46	168 A8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	50	52

\*Single

\*\*Dual

N/A: Not Applicable



NOTE! Be aware of the specific data for your sprayer.



ATTENTION! Legislation and requirements regarding maximum allowable axle load, when driving on public roads, may vary by region. Always follow local legislation in force at any time.



WARNING! If changing tires, always use tires with minimum load index as specified.



DANGER! Never inflate tires to more than the pressure specified in the table. Over-inflated tires can explode causing severe personal injuries! See "Change of Tires" on page 96.

### Power consumption

Sprayer	Hp	kW
3000	100	75
3500	110	82
4000	115	86
6000	145	109

## 8 - Technical specifications

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### Materials and recycling

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#### Disposal of the Sprayer

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

Materials used:

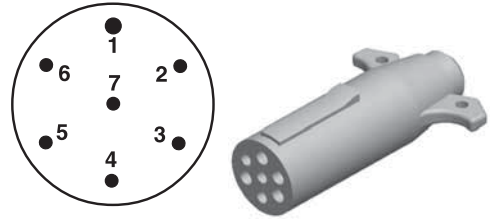
Tanks:	Plastic (HDPE)
Chassis, frame:	Steel (various types)
Boom:	Steel (various types)
Tires:	Rubber
Pump housing:	Grey cast iron (GG200)
Pump diaphragms:	Plastic (PUR)
Hoses (suction):	Plastic (PVC)
Hoses (pressure):	Rubber (EPDM)
Valves:	Glass reinforced plastic (PA)
Hose and pipe fittings:	Glass reinforced plastic (PA)
Filter housings:	Plastic (PP)
Nozzles:	Plastic (POM)

### Electrical Connections

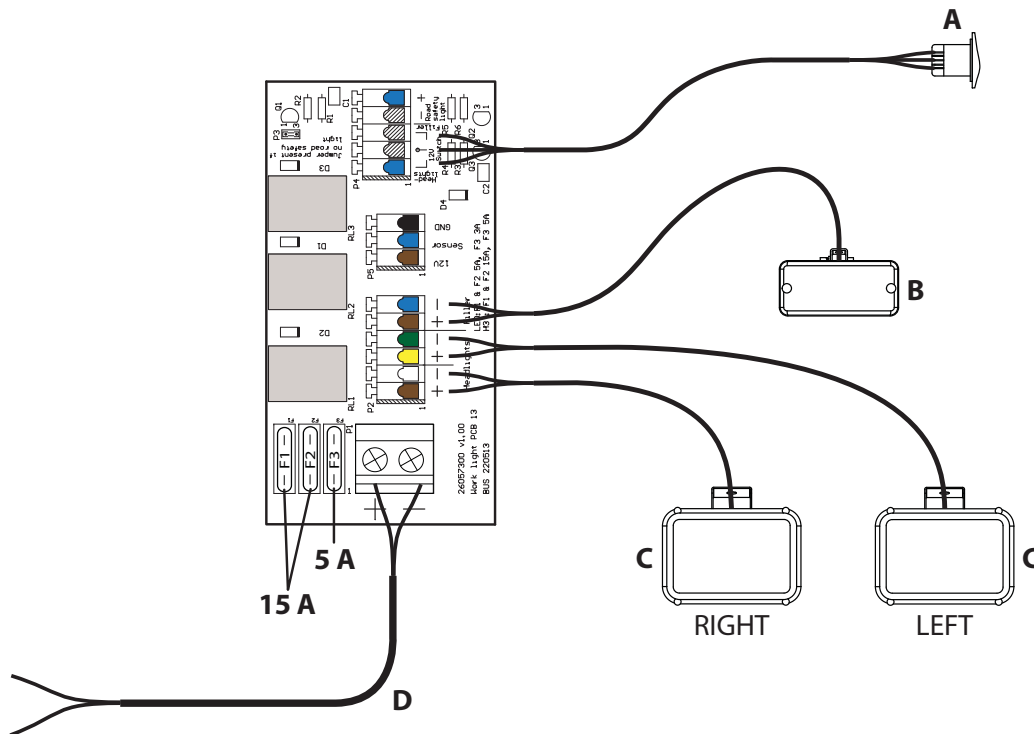
#### Road traffic lights

The wiring is in accordance with ANSI/ASAE S279.11.

Position	Wire color
1. Ground	White
2. Work lamps	Black
3. LH flashing & turn indicator	Yellow
4. Free	Red
5. RH flashing & turn indicator	Green
6. Free	Brown
7. Free	Blue



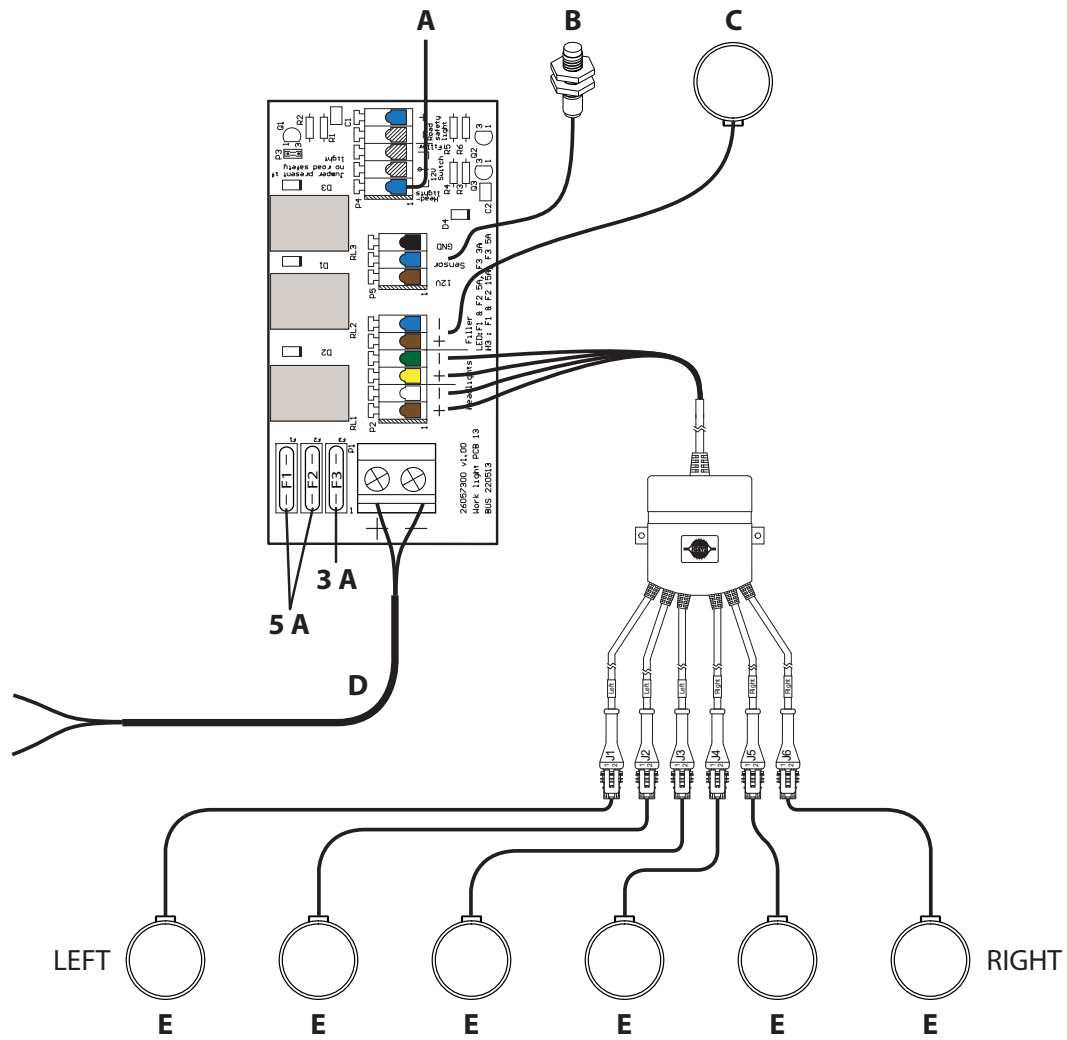
#### Electrical Schematic for Boom and Work Lights (SPB/SPC Booms)



- A Switch for work/boom lights
- B Work light
- C Boom lights
- D Cable to JobCom

## 8 - Technical specifications

### Electrical Schematic for Boom and Work Lights (DTZ Booms)



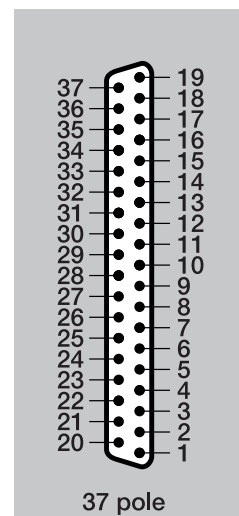
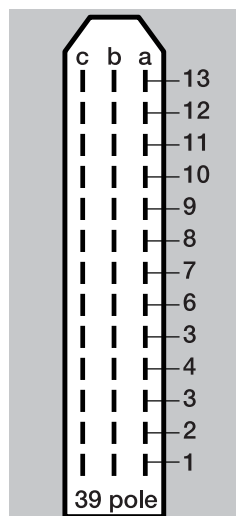
A	Input from tractor to activate
B	Sensor for work light
C	Work light
D	Cable to JobCom
E	Boom lights

## 8 - Technical specifications

### Electrical connections for SPRAY II

39 or 37 poled plug with cable.

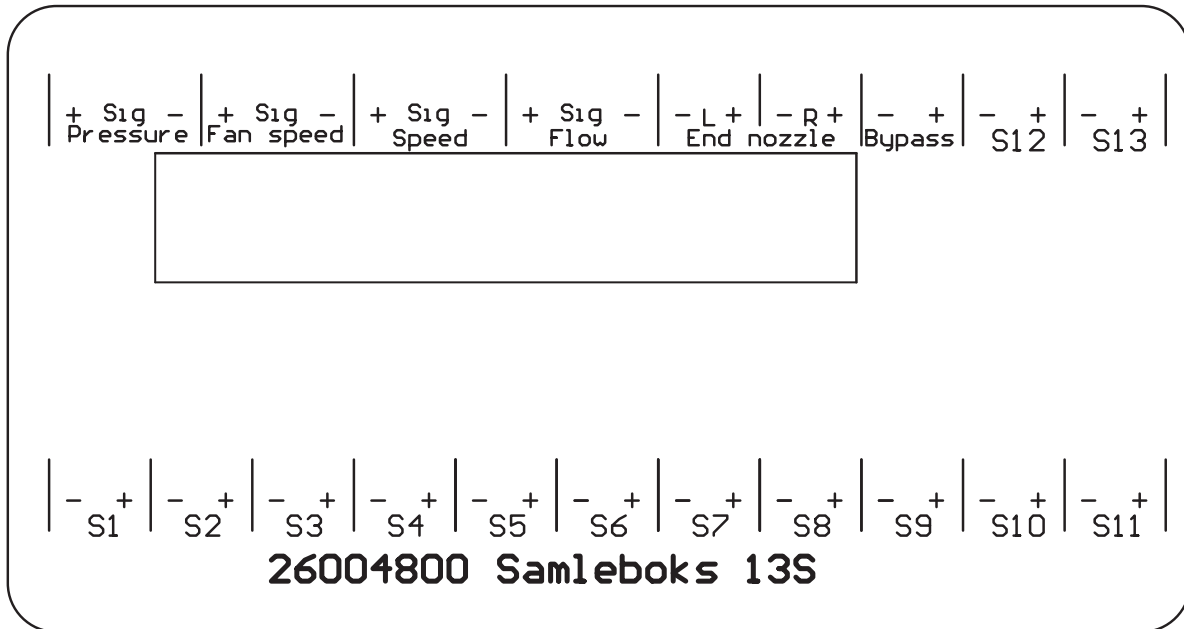
39-pole	37-pole	SPRAY II
1a	5	S1+
1b	6	S1-
1c	26	End nozzle L
2a	7	S2+
2b	8	S2-
2c	25	End nozzle R
3a	9	S3+
3b	10	S3-
3c	29	+12V sensor
4a	11	S4+
4b	12	34-
4c	4	PWM 1TX
5a	14	S5+
5b	15	S5-
5c	27	GND
6a	16	S6+
6b	17	S6-
6c	13	Optional 5 Reg.
feedback		
7a	18	S7+
7b	19	S7-
7c	33	Option 1 4-20mA
8a	37	S8+
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/EFC

The EVC/EFC operating unit fulfills 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 5500/HC 6500	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 end nozzle	Pendulum lock at HAY/LPY	Brn		Blu		
Reg (Yellow)		Brn		Blu		
Bypass	EC on/off	Brn		Blu		
Sec 9	User defined A&B 2	x		x		
Sec 8	User defined A&B 1	x		x		
Sec 7	Twin speed	Brn		Whi		
Sec 6	Twin angle	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	2	6	5	1	3

### Diagrams

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#### Boom Operator's Manual

A separate "Boom Operator's Manual" is supplied with your sprayer and contains detailed information on boom safety, set-up, operation and maintenance.



DANGER! Important information on Safety, Operation and Maintenance specific to your boom configuration is detailed in the "Boom Operator's Manual" supplied with your sprayer. 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.



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### Warranty policy and conditions

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HARDI® NORTH AMERICA INC., 7301 Vine Street Court, Davenport, Iowa, USA hereinafter called "HARDI®", offers the following limited warranty in accordance with the provisions below to each original retail purchaser of its own manufacturer, from an authorized HARDI® dealer that such equipment is at the time of delivery to such purchaser, free from defects in material and workmanship and that such equipment will be warranted for a period of one year from the time of delivery to the end user, providing the machine is used and serviced in accordance with the recommendations in the Operator's Manual and is operated under normal farm conditions.

1. This limited warranty is subject to the following exceptions:
  - a)Parts of the machine not manufactured by HARDI®, (i.e. engines, tires, tubes, electronic controls and other components or trade accessories, etc.) are not covered by this warranty but are subject to the warranty of the original manufacturer. Any claim falling into this category will be taken up with the manufacturer concerned.
  - b)This warranty will be withdrawn if any equipment has been used for purposes other than for which it was intended or if it has been misused, neglected, or damaged by accident, let out on hire or furnished by a rental agency. Nor can claims be accepted if parts other than those manufactured by HARDI® have been incorporated in any of our equipment. Further, HARDI® shall not be responsible for damage in transit or handling by any common carrier and under no circumstances within or without the warranty period will HARDI® be liable for damages of loss of use, or damages resulting from delay or any consequential damage.
2. We cannot be held responsible for loss of livestock, loss of crops, loss because of delays in harvesting or any other expense or loss incurred for labor, supplies, substitute machinery, rental for any other reason, or for injuries either to the owner or to a third party, nor can we be called upon to be responsible for labor charges, other than originally agreed, incurred in the removal or replacement of components.
3. The customer will be responsible for and bear the costs of:
  - a)Normal maintenance such as greasing, maintenance of oil levels, minor adjustments including the boom.
  - b)Transportation of any HARDI® product to and from where the warranty work is to be performed.
  - c)Dealer travel time to and from the machine or to deliver and return the machine from the service workshop for repair unless otherwise dictated by state law.
  - d)Dealer traveling costs.
4. Parts defined as normal wearing items, (i.e. Pump Diaphragms, Valves, O-rings, Tires and V-belts) are not in any way covered under this warranty.
5. This warranty will not apply to any product which is altered or modified without the express written permission of the HARDI® Service and Engineering Departments and/or repaired by anyone other than an Authorized HARDI® Dealer.
6. Warranty is dependent upon the strict observance by the purchaser of the following provisions:
  - a)That this warranty may not be assigned or transferred to anyone.
  - b)That the Warranty Registration Certificate has been correctly completed by dealer and purchaser with their names and addresses, dated, signed and returned to the appropriate address as given on the Warranty Registration Certificate within 30 days of delivery to the purchaser.
  - c)That all safety instructions in the operator's manual shall be followed and all safety guards regularly inspected and replaced where necessary.
7. No warranty is given on second-hand products and none is implied.
8. Subject to the following terms, conditions and contributions, HARDI® extends the warranty on polyethylene tanks (excluding fittings, lids and gaskets) to FIVE YEARS on field sprayers. To qualify for this extended warranty, the tank must be drained and flushed with fresh water after each day's use. HARDI®'s liability is limited to replacement of defective parts FOB our HARDI® facility at no cost to the purchaser for the first twelve months after date of purchase; at 20% of the then current retail price during the second year; at 40% during the third year; at 60% during the fourth year; and at 80% during the fifth year. This extended warranty is subject, in each instance, to the tank being inspected and approved for replacement or repair by HARDI® personnel before HARDI® will accept any liability hereunder.

## 9 - Warranty

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9. Subject to the following terms, conditions and contributions, HARDI® extends the warranty on HARDI® diaphragm pumps (excluding wearing parts such as diaphragms, valves and o-rings) to FIVE YEARS. To qualify for this extended warranty, the pump must be drained and flushed with fresh water after each day's use. HARDI®'s liability is limited to replacement of defective parts, FOB our HARDI® facility at no cost to the purchaser during the first twelve months after date of purchase; at 20% of the then current retail price during the second year; at 40% during the third year; at 60% during the fourth year; and at 80% during the fifth year. This five year extended warranty is subject, in each instance, to the pump being inspected and approved for replacement or repair by HARDI® personnel before HARDI® will accept any liability hereunder.
10. HARDI® reserves the right to incorporate any change in design in its products without obligation to make such changes on units previously manufactured.
11. The judgement of the HARDI® Service Department in all cases of claims under this warranty shall be final and conclusive and the purchaser agrees to accept its decisions on all questions as to defect and the repair or exchange of any part or parts.
12. No employee or representative is authorized to change this warranty in any way or grant any other warranty unless such change is made in writing and signed by the CEO in the Davenport office. Approval of warranty is the responsibility of the HARDI® Service Department.
13. Any warranty work performed which will exceed \$1000.00 MUST be approved IN ADVANCE by the Service Department. Warranty claims filed without prior approval will be returned.
14. ANY pump replacement MUST be approved by the HARDI® Service Department.
15. Claims under this policy MUST be filed with the HARDI® Service Department within thirty (30) days of when the work is performed or warranty shall be void unless prior arrangements are made.
16. Parts which are requested for return by the HARDI® Service Department must be returned prepaid within thirty (30) days for warranty settlement.
17. Warranty claims must be COMPLETELY filled out including part numbers and quantities or claims will be returned to the submitting dealer.

### DISCLAIMER OF FURTHER WARRANTY

THERE ARE NO WARRANTIES, EXPRESSED OR IMPLIED, EXCEPT AS SET FORTH ABOVE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION OF THE PRODUCT CONTAINED HEREIN. IN NO EVENT SHALL THE COMPANY BE LIABLE FOR INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES (SUCH AS LOSS OF ANTICIPATED PROFITS) IN CONNECTION WITH THE RETAIL PURCHASER'S USE OF THE PRODUCT.

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