Contents

MASTER-HFA/HFY

Instruction book

673768-GB-95/2

HARDI INTERNATIONAL A/S reserve the right to make changes in design or to add new features without any obligation in relation to implements purchased before or after such changes.

EC Declaration of Conformity

Manufacturer,
HARDI INTERNATIONAL A/S
Helgeshøj Allé
DK 2630 Taastrup
DENMARK

Importer,

declare that the following product;

. . . . . .

. . . . . .

Adhere extra shipping package labels to inside cover.

A. was manufactured in conformity with the provisions in the COUNCIL DIRECTIVE of 14 June 1989 on mutual approximation of the laws of the Member States on the safety of machines (89/392/EEC as amended by directives 91/368/EEC and 93/368/EEC) with special reference to Annex 1 of the Directive on essential safety and health requirements in relation to the construction and manufacture of machines.

B. was manufactured in conformity with the standards current at that time that implements a harmonised standard in accordance with Article 5 (2) and other relevant standards.

Taastrup 13.11.2002

Lars Bentsen
Development Product Manager
HARDI INTERNATIONAL A/S

Operator safety

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

Note the following recommended precautions and safe operating practices.

⚠ 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.

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

⚠ Pressure test with clean water prior to filling with chemicals.

⚠ Wear protective clothing.

⚠ Rinse and wash equipment after use and before servicing.

⚠ Depressurize equipment after use and before servicing.

⚠ Never service or repair the equipment whilst it is operating.

⚠ Disconnect electrical power before servicing.

⚠ Always replace all safety devices or shields immediately after 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.

⚠ Do not eat, drink or smoke whilst spraying or working with contaminated equipment.

⚠ Wash and change clothes after spraying.

⚠ Wash tools if they have become contaminated.

⚠ In case of poisoning, seek doctor or ambulance. Remember to identify chemicals used.

⚠ 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.

⚠ Do not use the step unless the sprayer is connected to the tractor or the sprayer is correctly placed on a hard, flat surface.

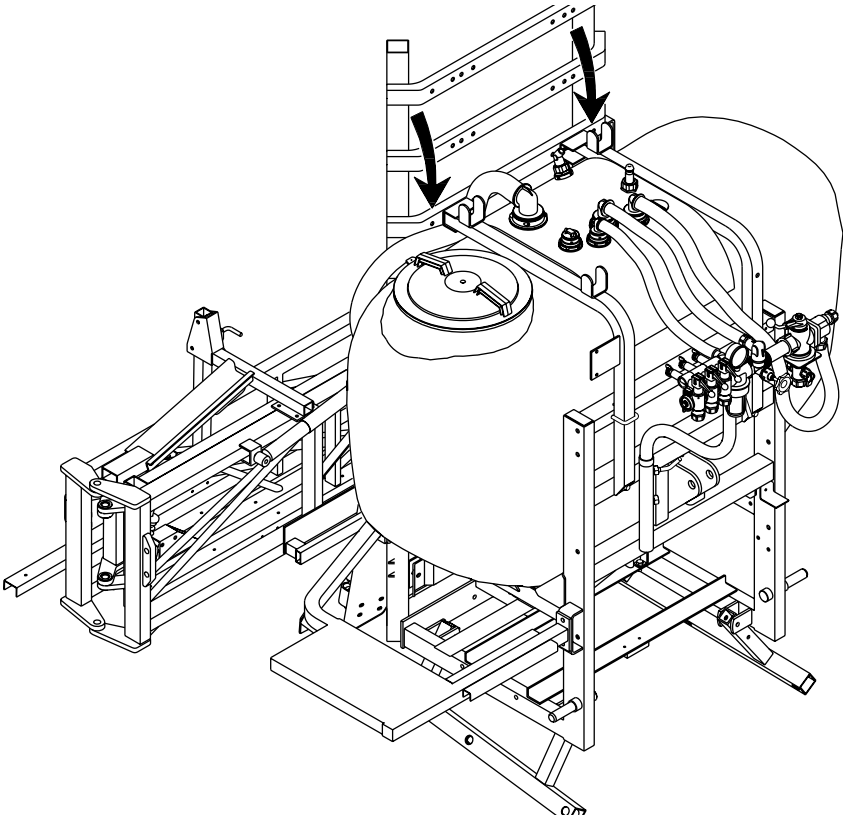
⚠ If any portion of this instruction book remains unclear after reading it, contact your HARDI dealer for further explanation before using the equipment.

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

As the instruction book covers all MASTER models with hydraulic HFA/HFY booms, please pay attention to the paragraphs dealing with precisely your model. This book is to be read in conjunction with the “Spray Technique” book.

Lifting points

When loading or unloading the sprayer from a truck or lorry with a crane, use the lifting points as shown.



Description

The HARDI MASTER (MA-HFA and MA-HFY) sprayers are for the application of crop protection chemicals and liquid fertilizers. They consist of a pump, MA type frame with tank of 600, 800, 1000 or 1200 litre capacity, BK operating unit, transmission shaft and HFA or HFY type boom. Options include remote controlled operating units, Rinsing tank and Self-Cleaning Filter.

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

The tank, made of impact-proof 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 in front of the tank. The filling hole and a foot board is placed at the right-hand side of the sprayer. This ensures an easy access for the filling of sprays, cleaning of the tank, etc.

The BK operating unit consists of; pressure agitator valve, safety valve, main ON/OFF valve, pressure filter with pressure gauge, distribution valves with pressure equalization and HARDI-MATIC pressure control valve.

The BK/EC and EC (Electric Control) operating unit consists of; pressure agitator valve, main ON/OFF valve, pressure control valve with HARDI-MATIC, pressure gauge, distribution valves with pressure equalization and control box.

HARDI-MATIC ensures a constant volume per hectare of the liquid (l/ha) at varying speed in the same gear when the number of P.T.O. revolutions are between 300-600 r/min.

The left hand side of the sprayer is equipped with the basic connections for the HARDI MANIFOLD SYSTEM. It is wise to utilize the MANIFOLD SYSTEM in combination with a number of optional extras as this makes the operation of the sprayer more safe and simple.

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

The manually folded MA-HFA models are equipped with a 10, 12, 12.5 or 15 metre spray boom. The raising/lowering function is done via the tractor hydraulics.

The hydraulic folded MA-HFY models are equipped with a 12, 12.5 or 15 metre spray boom. The raising/lowering and folding/unfolding functions are done via the tractor hydraulics.
The frame and boom are connected by a pendulum suspension which reduces the swing of the boom when driving on uneven ground. The outer sections incorporate a double-action breakaway.

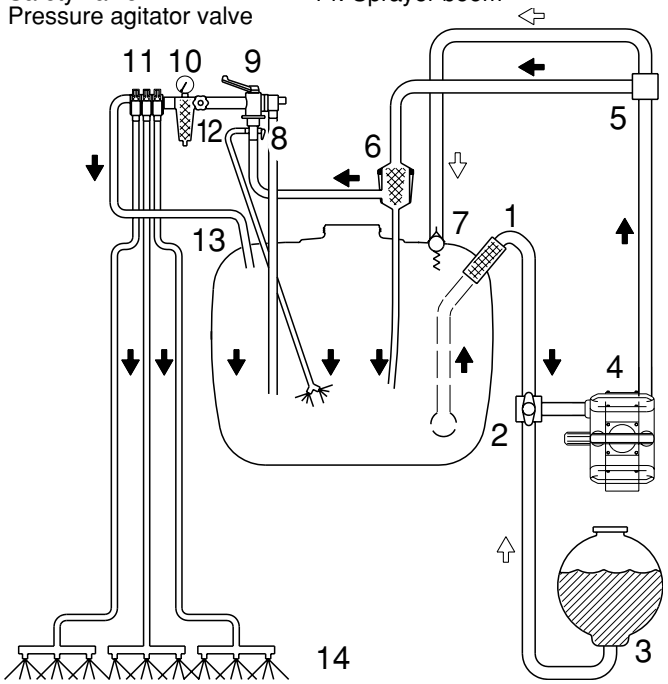
Identification plates

An identification plate fitted on the frame and pump is to indicate model, serial number and country of origin. Boom centre frame, and inner/outer sections also have identification plates indicating boom type and part no. of steel parts. If ordering spare parts, inform your dealer of these so the right model and version are described.

Function diagram

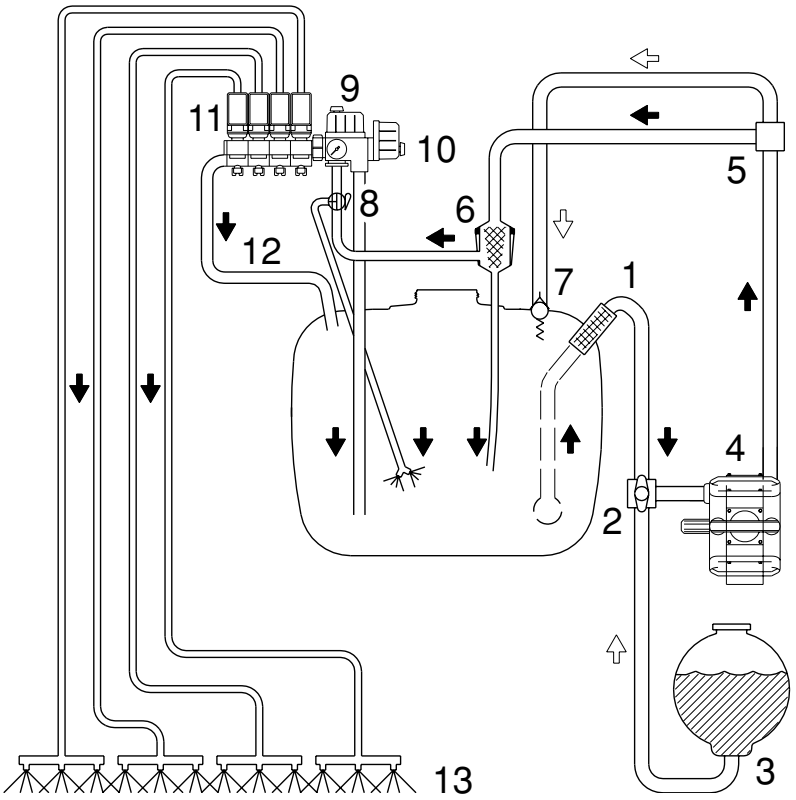
BK operating unit

1. Suction filter
2. Suction manifold
3. Rinsing tank (if fitted)
4. Pump
5. Pressure manifold
6. Self-Cleaning Filter
7. Safety valve
8. Pressure agitator valve
9. Main ON/OFF valve
10. Pressure filter with pressure gauge
11. Distribution valves with pressure equalization
12. Pressure control valve with HARDI-MATIC
13. Return to tank
14. Sprayer boom



EC operating unit

1. Suction filter
2. Suction manifold
3. Rinsing tank (if fitted)
4. Pump
5. Pressure manifold
6. Self-Cleaning Filter
7. Safety valve
8. Pressure agitator valve
9. Main ON/OFF valve with pressure gauge
10. Pressure control valve with HARDI-MATIC
11. Distribution valves with pressure equalization
12. Return to tank
13. Sprayer boom

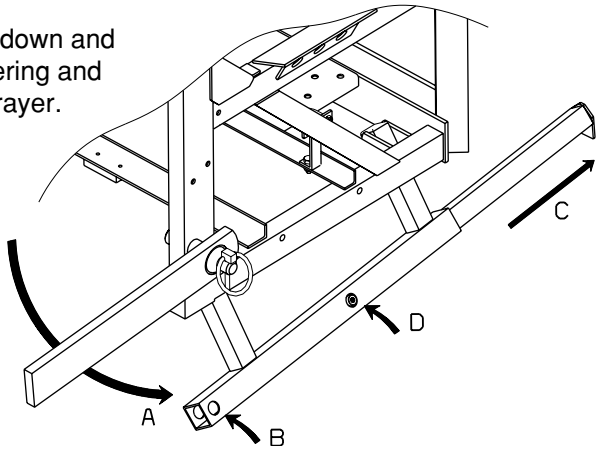


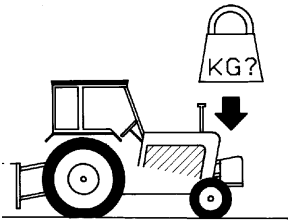
Connecting the sprayer

The sprayer is designed for three point suspension and is equipped with 28 mm pivots (cat. II). Use pins with a diametre of at least 10 mm when connecting the sprayer. The frame has retractable support legs that can be folded up to minimize crop damage.

They must be folded down and extended before lowering and disconnecting the sprayer.
Proceed as follows:

1. Swing support legs **A** down.
2. Push the black button **B** in.
3. Extend the legs **C** until the black button clicks out in location hole **D**.





WARNING: Note the weight of the sprayer.
General recommendations are as follows:
Add ballast to front of tractor.

- Increase tyre pressure (see tractor instruction book).
- Be careful when filling/lifting the sprayer for the first time.
- Ensure the operating unit and tractor do not touch.
- Travel at slower speeds when driving with a full tank. (The tractor braking effect will be reduced.)

Transmission shaft

Operator safety

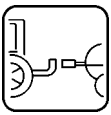
To avoid accidents and personal injuries, note the following recommended precautions and safe operation practices.

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 facillitate spline alignement, when engine is stopped.

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

WARNING: ROTATING TRANSMISSION SHAFTS WITHOUT PROTECTION GUARDS ARE FATAL.

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



Do not touch or stand on the transmission shaft when it is rotating - safety distance: 1.5 meter.

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

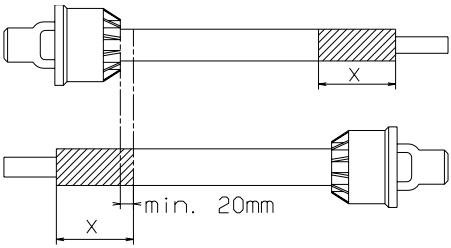
Make sure that protection guards around tractor P.T.O. and implement shaft is intact.

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

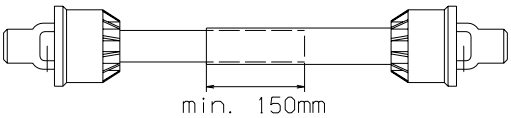
Installation of transmission shaft

Initial installation of the shaft is done as follows:

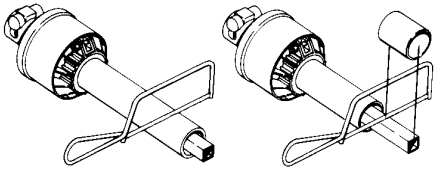
1. Attach sprayer to tractor and set sprayer in the position with **shortest** distance between the tractor and sprayer pump P.T.O. shafts.
2. Stop engine and remove ignition key.
3. If transmission shaft must be shortened, the shaft is pulled apart. Fit the two shaft parts at tractor and sprayer pump and measure how much it is necesary to shorten the shaft. Mark the protection guards.

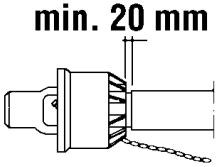


NOTE: The shaft must always have a minimum overlap 150 mm.

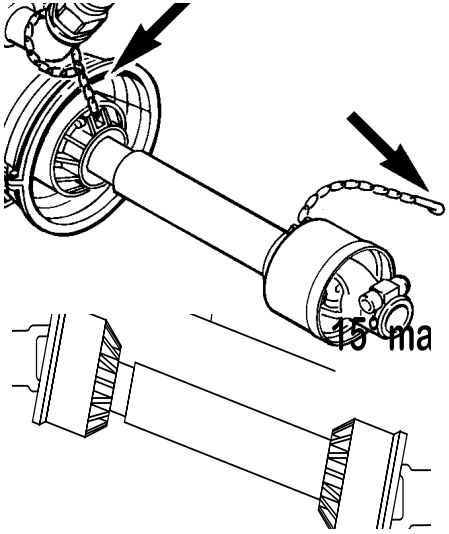


4. The two parts are shortened equally. Use a saw, and file the profiles afterwards to remove burrs.
5. Grease the profiles, and assemble male and female parts again.





6. Fit the shaft to tractor and sprayer pump. **NOTE:** Female part towards tractor. Fit the chains to prevent the protection guards to rotate with the shaft.
7. To ensure long life of the transmission shaft, try to avoid working angles greater than 15°.
8. Transmission shafts with cone must be fitted by tightening the Allen screw to a torque of 40 Nm. Check again after 2 minutes use.

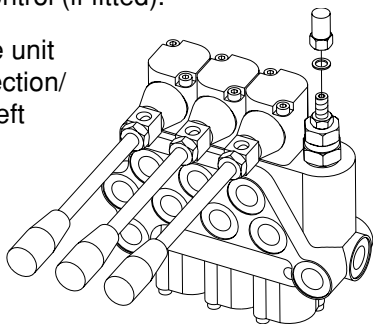


Hydraulics

Connection requirements for MA-HFA are;
- single outlet to raise or lower the boom,
- double outlet for Hydraulic Slanting Control (if fitted).

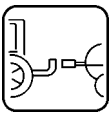
Connection requirements for MA-HFY are;
- single outlet to raise or lower the boom,
- double outlet to fold or unfold the boom,
- double outlet for Hydraulic Slanting Control (if fitted).

The MA-HFY models have a spool valve unit which controls three functions; centre section/ transport bracket, right boom wing and left boom wing. The spool valve is to be located nearby the operator.

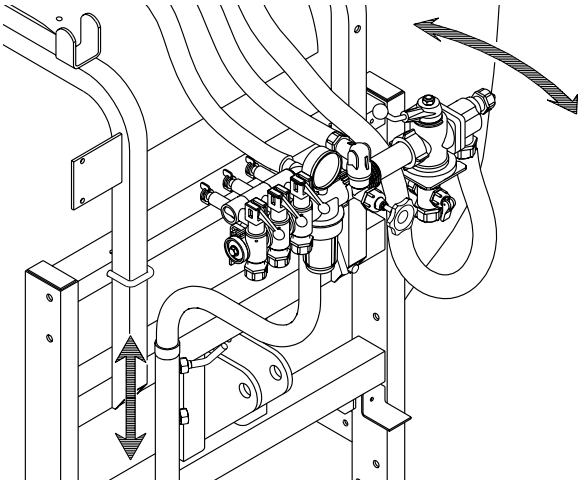


Ensure the snap couplers are clean before connection.

NOTE: The hydraulic system requires a minimum oil pressure of 130 bar, max. pressure 160 bar and an oil capacity of approx. 3 litres. After having operated the boom and the system has been filled with oil, check tractor hydraulic oil level and top up if necessary.

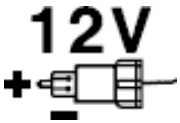


BK operating unit
The position of the operating unit can be adjusted forward or backward and up or down. Position it so it can be operated from the tractor without risk of damage to the sprayer or tractor.



BK/EC and EC operating unit control box
The control box is fitted at a convenient place in the tractor cabin. The control box has 4 screw holes in the back cover. Mount it on a flat surface.

Power requirement is 12 V DC.
Note polarity. Brown pos. (+), Blue neg. (-).



Rear lights (if fitted)

Connect plug for rear lights to the tractors 7-poled socket and check that rear lights, stop lights and direction indicators work properly before driving anywhere.

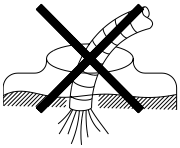
The wiring is in ISO accordance. See section on Technical specifications.

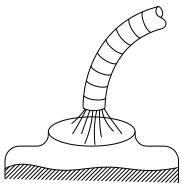
Roadworthyness

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

Operating instructions

Filling the main tank





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

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

Filling the Rinsing tank (if fitted)

Remove the tank lid and fill with clean water and replace lid.

Operating the boom

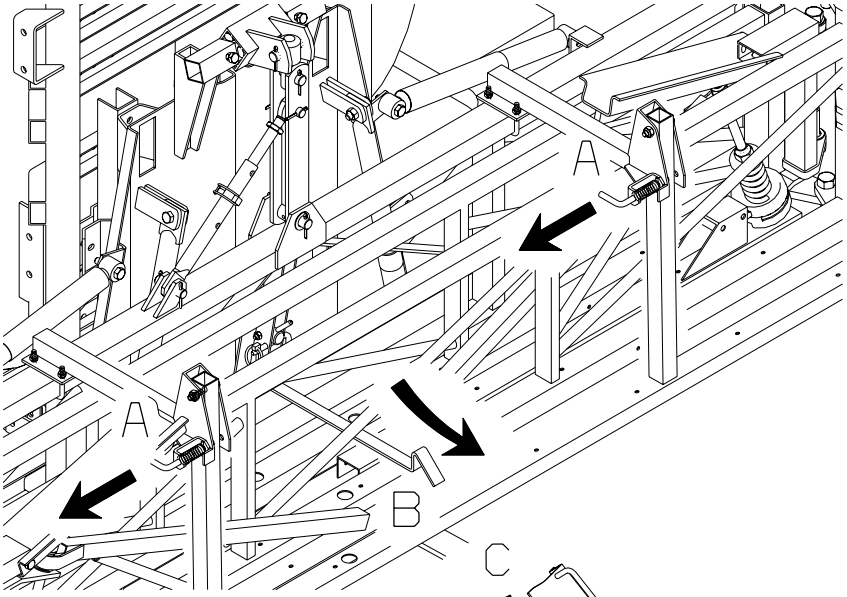
WARNING: Before unfolding the boom it is important to connect the tractor to prevent overbalancing of the sprayer.

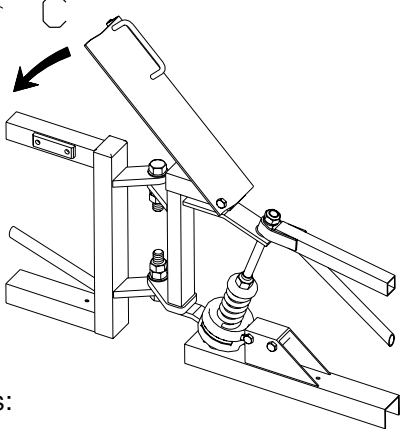
WARNING: Testing of the hydraulic system should be done very cautiously. There may be air in the system and this may cause violent movements of the boom. Therefore take care that no persons or objects are hurt or damaged in the process of testing.

Unfolding and folding the HFA

The manual HFA boom is operated as follows:

1. Release the spring-loaded lock pins **A**, and fold up the transport bracket/centre boom.
2. Push down stop bracket **B**, and unfold boom wings; right-hand side first. Make sure the locking devices lock the inner sections.
3. Unfold outer section and lock with the locking device **C**.
4. Reverse the procedure to fold the boom.





Unfolding and folding the HFY
The boom is manoeuvered by setting the control lever of the tractor for circulation and the folding functions are activated by the control levers at the spool valve unit.
WARNING: Only do so when the tractor is not moving. Failure to do so will cause damage to the boom.

The HFY boom is operated as follows:
1. Fold the centre boom up.
2. Unfold the right-hand side boom first and then the left-hand side.
3. Fold the centre boom down.
4. Reverse the procedure to fold the boom.

Operating the pendulum
The primary function of the pendulum suspension is to protect the boom against vibrations and shocks and to keep it in a uniform height above the target.
The boom must be lubricated and properly adjusted, if it is going to operate satisfactorily.

If the boom will not stay horizontal on level ground, the counter weight is fitted to balance the boom.

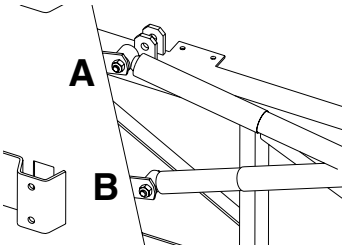
There are different settings for the pendulum suspension according to different field conditions.

Combination	Upper rod	Lower pin	Conditions
1. HFA	locked	locked	Boom is totally locked. Used at transport and fold/unfolding. If using this setting for spraying, drive carefully if the ground is uneven in order to avoid boom damage.
2. HFA/HFY	open	locked	Boom is pivoting in the centre of gravity. Boom is following the tractor and inclination of the ground and compensation for uneven ground is maintained. Used on inclinations with uneven tramlines or ground conditions.
3. HFA/HFY	locked	open	Boom is suspended in a single pendulum. Used on flat terrain with e.g. level difference in tramlines. Boom will stay horizontal although the tractor is inclining.
4. HFA	open	open	Boom is suspended in a double pendulum. Used in hilly terrain.

Pendulum damping

The boom centre section is fitted with two shock absorbers to damp the boom movements. There are 3 damping graduations:

No dampers fitted = no damping
Dampers in pos. **A** = light damping
Dampers in pos. **B** = maximum damping



The boom damping is set according to:
- ground conditions
- driving speed
- boom self-leveling abilities.

No exact settings can be recommended but optimal settings have to be experienced by the operator during spraying.

Hydraulic Slanting Control (if fitted).
The Hydraulic Slanting Control enables slanting of the entire boom hydraulically. This control can be used, when the boom is set in combinations **1** or **3** only - use of slanting control in combination **2** or **4** is not possible. Further the slanting control can be necessary by using single side folding of boom.

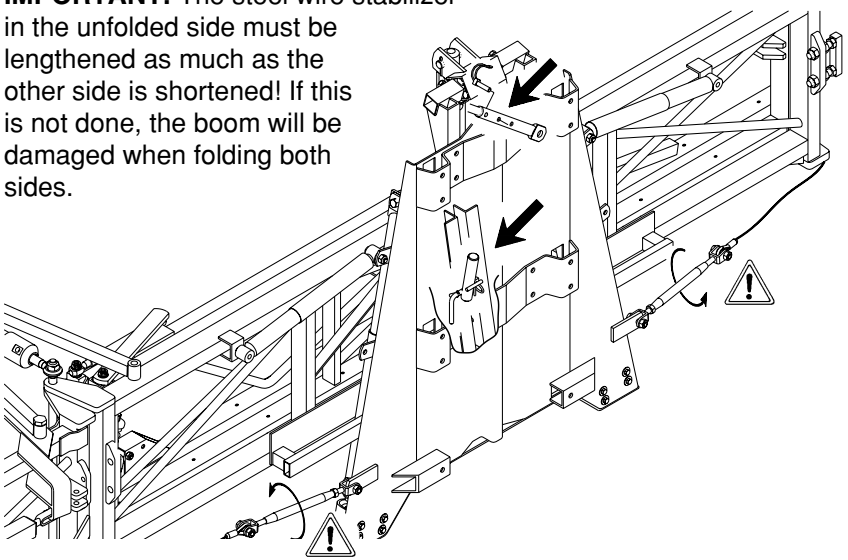
Single side folding (MA-HFY with Hydraulic Slanting Control)
If necessary, the boom can spray with only one side unfolded. To do this, either right-hand side or left-hand side is folded in and the boom is set level again by means of the Hydraulic Slanting Control.

NOTE: The boom pendulum suspension is now blocked and will not compensate for uneven ground conditions. Drive carefully in order to avoid boom damage.

Single side folding (MA-HFY without Hydraulic Slanting Control)
The MA-HFY can spray with single side fold without having the Hydraulic Slanting Control installed.
NOTE: It is only possible to spray with either right-hand side or left-hand side.

To keep the boom in horizontal, the desired boom wing is unfolded and the steel wire stabilizer at the folded side is adjusted (shortened).

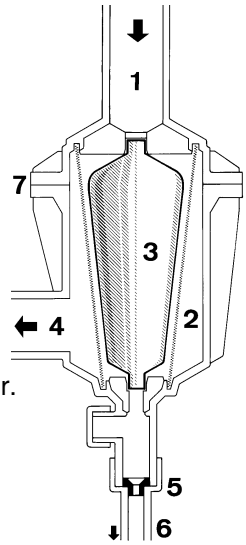
IMPORTANT: The steel wire stabilizer in the unfolded side must be lengthened as much as the other side is shortened! If this is not done, the boom will be damaged when folding both sides.



When spraying with both sides again, the steel wires has to be re-adjusted. The adjustment is correct when both wires are tight with both boom wings folded and the boom is level to the tank frame (see section on Adjustment).

IMPORTANT: Do NOT lock the upper rod and lower pin instead of using the wires or Hydraulic Slanting Control by single side fold! This will damage the boom centre section.

Self-Cleaning Filter



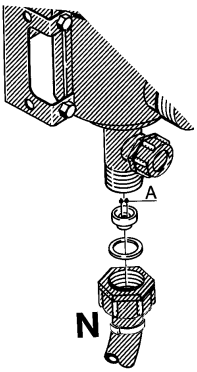
Function diagram

1. From pump
2. Filter screen
3. Guide cone
4. To operating unit
5. 3, 4, 5 or 6 mm restrictor
6. Return to tank
7. Ring nut

Choice of restrictor

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

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



Hose **N** is unscrewed from the filter. Be careful not to loose the seal. The restrictor is placed in the hose and the hose is mounted again.

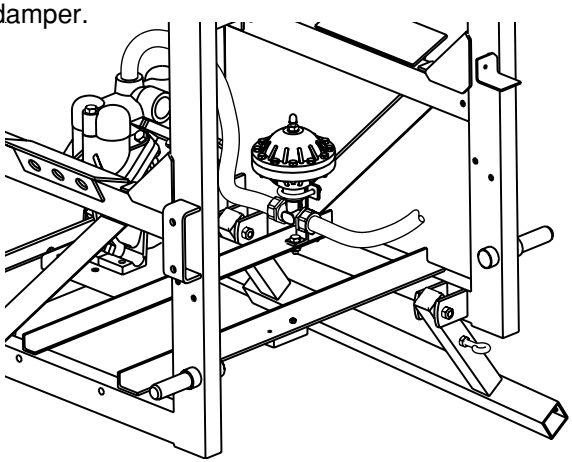
If the required working pressure cannot be obtained, the restrictor is too large. Choose a smaller restrictor. Start with a black one, then a white and finally a red one.

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

Standard filter size is 80 mesh. Filters of 50 and 100 mesh are available. To remove filter mesh undo the large ring nut. Check condition and placement of O-rings before reassembly.

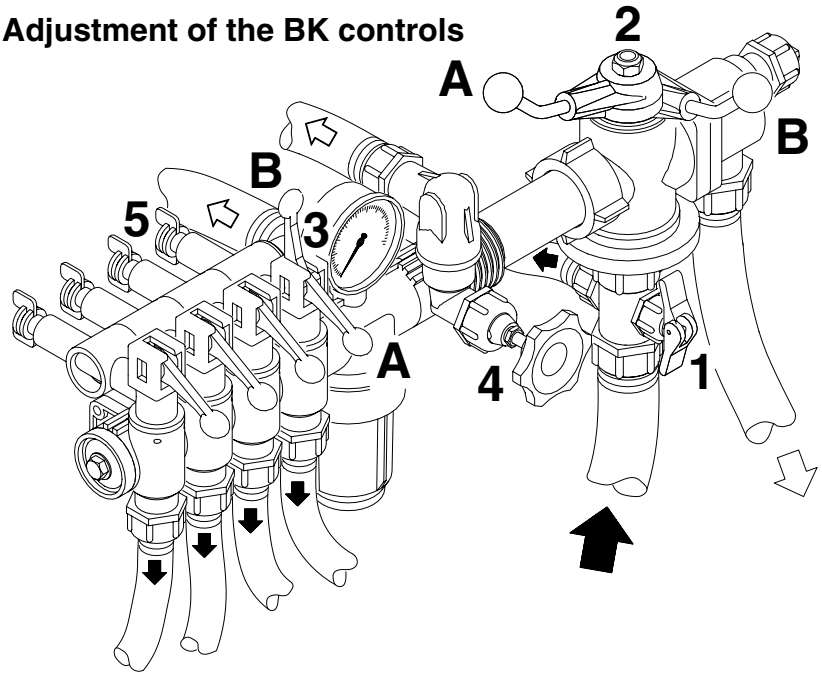
Pulsation damper (if fitted)

The air pressure in the pulsation damper is factory preset at 2 bar to cover spray working pressures between 3 and 15 bar. When using spray pressures outside this range, the air pressure should be adjusted as shown in the diagram. The diagram is also embossed on the damper.



bar	bar
1.5 - 3	0 - 1
3 - 15	1 - 3

Adjustment of the BK controls



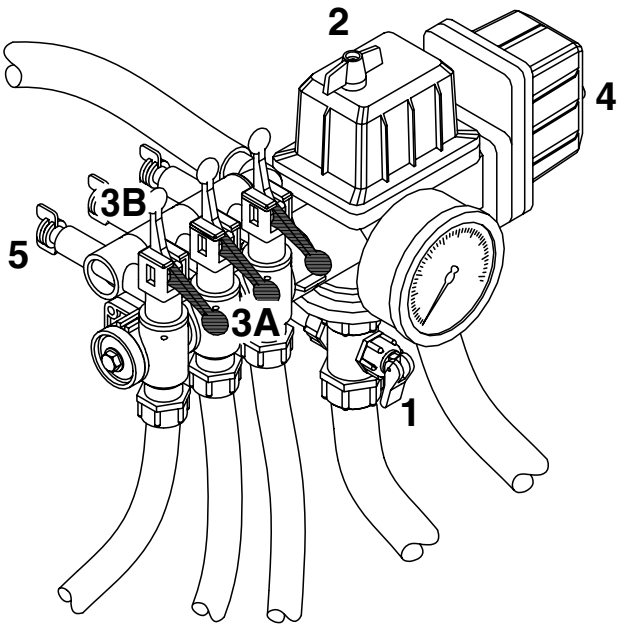
1. Choose the correct nozzle. TRIPLET nozzle turrets are turned to the suitable nozzle for the spray purpose. Make sure that all nozzles are the same type and capacity. See “Spray Technique” book.
2. Open or close lever **1** depending on whether pressure agitation is required. (Remember pressure agitation takes 5% to 10% of pump output).
3. Turn main ON/OFF handle **2** to ON position **A**.
4. Set all hand levers **3** on the distribution valve to ON position **A**.
5. Turn the HARDI-MATIC valve **4** anti-clockwise to its extreme position.
6. Put the tractor in neutral and adjust the P.T.O. thereby the number of revolutions of the pump corresponding to the intended travelling speed.
   NOTE: The P.T.O. revolutions must be kept between 300-600 r/min.
7. Adjust the HARDI-MATIC valve **4** so that the pressure gauge indicates the recommended pressure.

ADJUSTMENT OF PRESSURE EQUALIZATION:

8. Place the first lever **3** on the distribution valve in OFF position **B**.
9. Turn the adjusting screw **5** until the pressure gauge again shows the same pressure.
10. Adjust the other sections of the distribution valve in the same way. Hereafter adjustment of pressure equalization will only be needed if you change to nozzles of other capacities.

11. Operating the control unit while driving:
    To stop the liquid flow to the boom turn the ON/OFF handle **2** to OFF position **B**. This returns the pump output to the tank through the return system. The diaphragm anti-drip valves ensure instantaneous closing of all nozzles.
    To stop the liquid flow to one or more boom sections, turn lever **3** of the distribution valve to OFF position **B** for the section to be closed. The pressure equalization ensures that the pressure does not rise in the sections which are to remain open.

Adjustment of the BK/EC controls

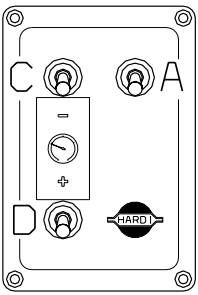


BK/EC operating unit

1. Pressure agitation valve
2. Main ON/OFF valve
3. Distribution valve
4. Pressure control valve
5. Adjustment screw for pressure equalization

BK/EC Remote control box

A. Operating switch for main ON/OFF valve
C. Pressure control switch (to lower)
D. Pressure control switch (to raise)



1. Choose the correct nozzle. TRIPLET nozzle turrets are turned to the suitable nozzle for the spray purpose. Make sure that all nozzles are the same type and capacity. See “Spray Technique” book.
2. Open or close lever **1** depending on whether pressure agitation is required. (Remember pressure agitation takes 5% to 10% of pump output).

3. Main ON/OFF switch **A** is set to ON.
4. Set all hand levers **3** on the distribution valve to ON position **A**.
5. Pressure control switch **C** is activated until emergency handle **4**, stops rotating (minimum pressure).
6. Put the tractor in neutral and adjust the P.T.O. thereby the number of revolutions of the pump corresponding to the intended travelling speed.
   NOTE: The P.T.O. revolutions must be kept between 300-600 r/min.
7. Pressure control switch **D** is activated till the recommended pressure is shown on the pressure gauge.

ADJUSTMENT OF PRESSURE EQUALIZATION:

8. Place the first lever **3** on the distribution valve in OFF position **B**.
9. Turn the adjusting screw **5** until the pressure gauge again shows the same pressure.
10. Adjust the other sections of the distribution valve in the same way. Hereafter adjustment of pressure equalization will only be needed if you change to nozzles of other capacities.

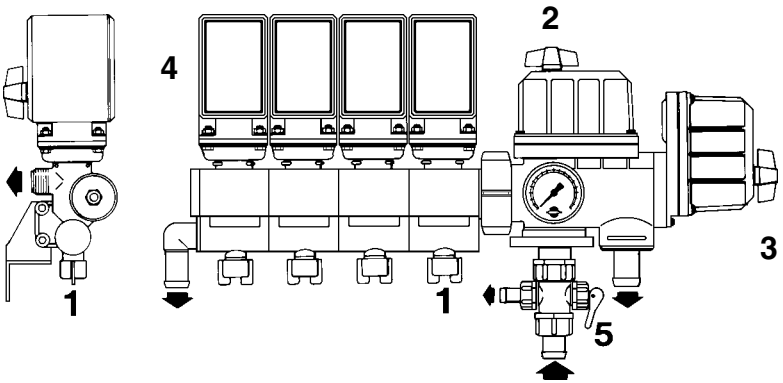
11. Operating the control unit while driving:
    To stop the liquid flow to the boom switch ON/OFF **A** to OFF position. This returns the pump output to the tank through the return system. The diaphragm anti-drip valves ensure instantaneous closing of all nozzles.
    To stop the liquid flow to one or more boom sections, turn lever **3** of the distribution valve to OFF position **B** for the section to be closed. The pressure equalization ensures that the pressure does not rise in the sections which are to remain open.

In case of power failure it is possible to activate the functions of the operating unit. To operate manually, disconnect the multiplug first.

When the sprayer is put aside, the control box and the multiplug must be protected against moisture and dirt. A plastic bag may be used to protect the multiplug.

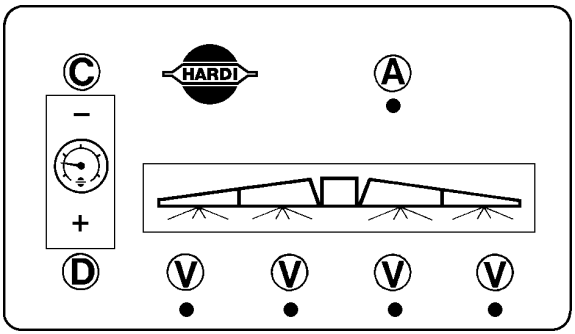
Adjustment of the EC controls

EC operating unit



1. Adjustment screw for pressure equalization
2. Main ON/OFF valve
3. Pressure control valve
4. Distribution valve
5. Pressure agitation valve

EC Remote control box



A. Operating switch for main ON/OFF valve
V. Operating switch for distribution valves
C. Pressure control switch (to lower)
D. Pressure control switch (to raise)

1. Choose the correct nozzle. TRIPLET nozzle turrets are turned to the suitable nozzle for the spray purpose. Make sure that all nozzles are the same type and capacity. See “Spray Technique” book.

2. Open or close lever **5** depending on whether pressure agitation is required. (Remember pressure agitation takes 5% to 10% of pump output).
3. Main ON/OFF switch **A** is set towards green.
4. All distribution valves switches **V** are set towards green.
5. Pressure control switch **C** is activated until emergency handle **3**, stops rotating (minimum pressure).
6. Put the tractor in neutral and adjust the P.T.O. and thereby the number of revolutions of the pump corresponding to the intended travelling speed.
   NOTE: The P.T.O. revolutions must be kept between 300-600 r/min.
7. Pressure control switch **D** is activated till the recommended pressure is shown on the pressure gauge.

ADJUSTMENT OF PRESSURE EQUALIZATION:

8. Close the first distribution valve switch **V**.
9. Turn the adjusting screw **1** until the pressure gauge again shows the same pressure.
10. Adjust the other sections of the distribution valve in the same way. Hereafter adjustment of pressure equalization will only be needed if you change to nozzles of other capacities.

11. Operating the control unit while driving:
    To stop the liquid flow to the boom switch ON/OFF **A** to OFF position. This returns the pump output to the tank through the return system. The diaphragm anti-drip valves ensure instantaneous closing of all nozzles.
    To stop the liquid flow to one or more boom sections, switch the relevant distribution valve **V** to OFF position. The pressure equalization ensures that the pressure does not rise in the sections which are to remain open.

In case of power failure it is possible to activate all functions of the operating unit. To operate manually, disconnect the multiplug first.

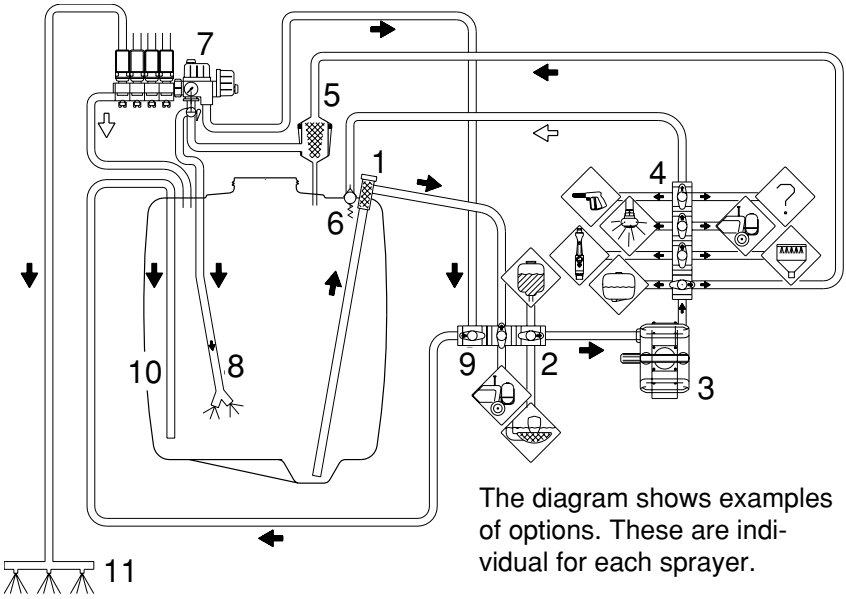
When the sprayer is put aside, the control box and the multiplug must be protected against moisture and dirt. A plastic bag may be used to protect the multiplug.

Adjustment of MANIFOLD SYSTEM (if fitted)

The MANIFOLD SYSTEM is located at the left side of the sprayer and permits operation of all HARDI optional extras from this one position. The modular system facilitates the addition of up to three optional extras on the suction side and seven extras on the pressure side. Furthermore the suction manifold can be fitted with a return valve which ensures better draining of the sprayer before cleaning.

Function diagram

1. Suction filter
2. Suction manifold BLACK with 2 valves
3. Pump
4. Pressure manifold GREEN with 4 valves
5. Self-Cleaning Filter
6. Safety valve
7. Operating unit
8. Pressure agitator
9. Return valve BLUE
10. Return to tank
11. Sprayer boom

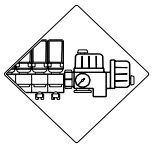


The diagram shows examples of options. These are individual for each sprayer.

Symbols

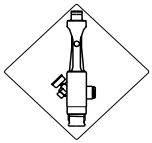
The pressure, suction and return valves are distinguished by coloured identification discs on the 3-way valves. Symbols corresponding to the optional extras are located on the discs for easy identification and operation.

Green disc = Pressure valve

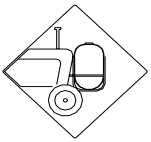


To Self-Cleaning Filter/operating unit

To Hose reel/spray gun



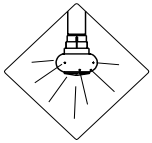
To Fast Filler



To Front Tank

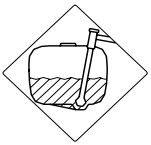
To HARDI FILLER

To main tank

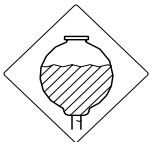


To Tank Flushing Nozzle

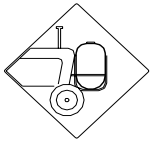
Black = Suction valve



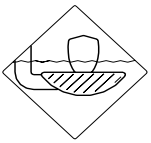
From main tank (suction filter)



From Rinsing Tank

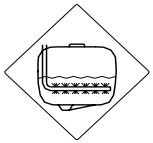


From Front Tank (suction filter)

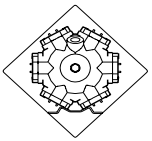


From Filling Device

Blue = Return valve



Return from operating unit



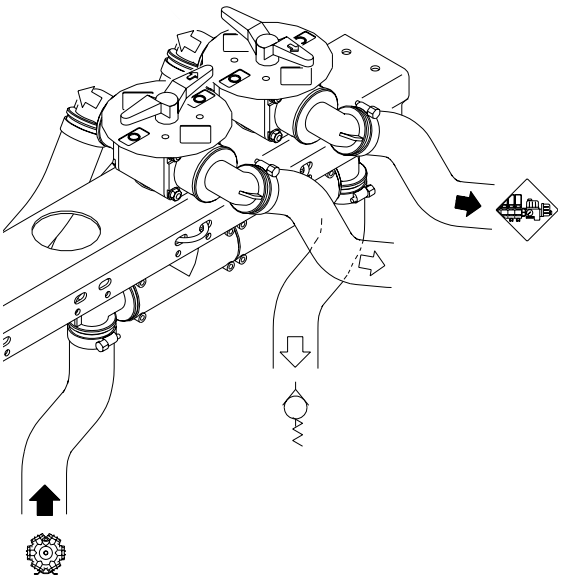
Pump

Operating instructions

The green pressure valves and the black suction valves have 4 positions. Two positions are for options. The other two are marked “O” indicating the valve is closed. The blue return valve only has 2 positions. The arrow on the handle indicates which position is selected.

Green pressure valves

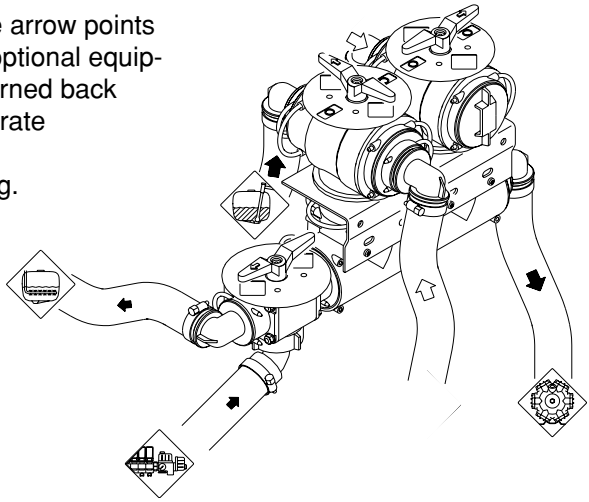
To select the optional equipment, the handle is turned so the arrow and thereby liquid is directed to the optional extra instead of the Self-Cleaning Filter/ operating unit. When spraying is to resume, turn the handle so the Self-Cleaning Filter/ operating unit is selected.



If 2 or more valves are fitted, the arrow must point towards the optional extra you select. Remaining handles are turned to “**O**” (closed). When spraying is to resume, select the Self-Cleaning Filter/operating unit. The other handles are turned to “**O**”.

If all the green pressure valves are closed the safety valve will open inside the tank.

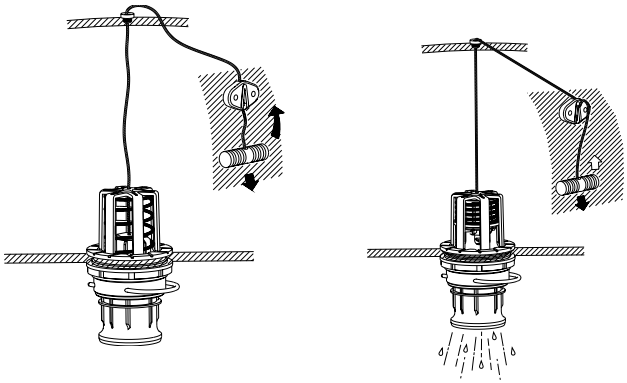
Black suction valves
Turn the handle so the arrow points towards the selected optional equipment. The handle is turned back when you want to aspirate from the main tank.
If 2 valves are fitted, eg. Front Tank and Rinsing Tank, select optional extra and turn the other valve to “O” (closed). To resume aspiration from the main tank, the arrow must point towards the main tank. Remaining valve must be closed.



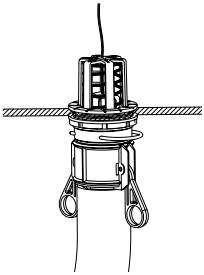
Blue return valve
Normally the liquid is directed to the tank return. When the tank is nearly empty, the handle is turned so the liquid is directed to the suction side of the pump instead of the tank return.

Operation of the tank drain valve

Pull the red handle on the side of the tank to open the drain valve. The valve is spring-loaded, but can be kept open by pulling the string out and upwards in the V-shaped slit. To release, pull the string downward and the valve will close automatically.



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



Spray Technique - see separate book.
Optional Extras - see separate books.

Maintenance

In order to derive full benefit from the sprayer for many years the following few but important rules should be kept:

Cleaning the sprayer

Guidelines

Read the whole label of the chemical. 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 body, eg. Dept of Agriculture.

Pesticide washings can usually be sprayed out on a soakaway. This is an area of ground that is not used for cropping. You must avoid seepage or run-off of residues into streams, water courses, ditches, wells, springs, etc. The washings from the cleaning area must not enter sewers. Drainage must lead to a soakaway.

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 thereby rendering the sprayer safe and ready for the next pesticide application. This also prolongs the life of the components.

It is sometimes necessary to leave spray liquid in the tank for short periods, eg. overnight, or until the weather becomes suitable for spraying again. Unauthorized persons and animals 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.

Remember: Clean sprayers are safe sprayers.
Clean sprayers are ready for action.
Clean sprayers can not be damaged by pesticides and their solvents.

Cleaning

1. Dilute remaining spray liquid in the tank with at least 10 parts water and spray the liquid out in the field you have just sprayed.
   NOTE: It is advisable to increase the forward speed (double if possible) and reduce the pressure. For S4110 nozzles, pressure may be reduced to 1.5 bar.
2. Select and use the appropriate protective clothing. Select detergent suitable for cleaning and suitable deactivating agents if necessary.
3. Rinse and clean sprayer and tractor externally. Use detergent if necessary.
4. Remove tank and suction filters and clean. Be careful not to damage the mesh. Replace suction filter top. Replace filters when the sprayer is completely clean.
5. With the pump running, rinse the inside of the tank. Remember the tank roof. Rinse and operate all components and any equipment that has been in contact with the chemical.
   Before opening the distribution valves and spraying the liquid out, decide whether this should be done in the field again or on the soakaway.
6. After spraying the liquid out, stop the pump and fill at least 1/5 of the tank with clean water. Note that some chemicals require the tank to be completely filled. Add appropriate detergent and/or deactivating agent, eg. Washing soda or Triple ammonia.
   NOTE: If a cleaning procedure is given on the chemical label, follow it closely.

7. Start the pump and operate all controls enabling the liquid to come in contact with all the components. Leave the distribution valves until last. Some detergents and deactivating agents work best if left in the tank for a short period. Check the label.
   The Self-Cleaning Filter can be flushed by removing the bypass hose from the bottom of the filter. Stop the pump and remove the hose. Start the pump for a few seconds to flush filter. Be careful not to loose the restrictor nozzle.

8. Drain the tank and let pump run dry. Rinse inside of tank, again letting the pump run dry.
9. Stop the pump. If the pesticides used have a tendency to block nozzles and filters, remove and clean them now. Check also for sediment on the pressure side of the safety valve for the Self-Cleaning Filter.
10. Replace all the filters and nozzles and store the sprayer. If, from previous experiences, it is noted that the solvents in the pesticide are particularly aggressive, store the sprayer with the tank lid open. **NOTE:** If the sprayer is cleaned with a high pressure cleaner we recommend lubrication of the entire machine.

Filters

Clean filters ensure :

- Sprayer components such as valves, diaphragms and operating unit are not hindered or damaged during operation.
- Nozzle blockages do not occur whilst spraying.
- Long life of pump. A blocked suction filter will result in pump cavitation.

Suction filter

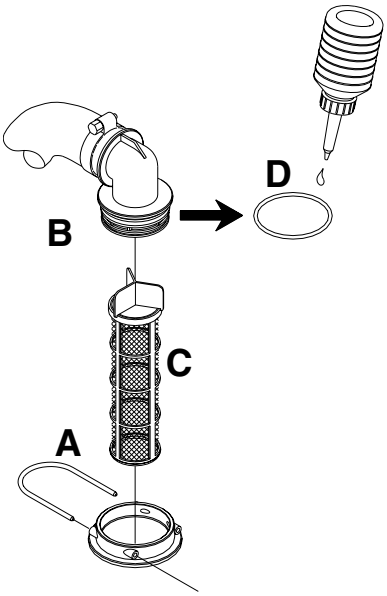
The main filter protecting sprayer components is the suction filter at the top of the tank. Check it regularly.

To service the suction filter:

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

To reassemble:

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



BK Pressure filter / In Line Filters (if fitted)

The BK operating unit has a built in pressure filter. Unscrew the filter bowl to inspect and clean the filter.

The boom may be equipped with In Line Filters. Unscrew the filter bowl to inspect and clean the filter.

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

Lubrication

Recommended lubrication is shown in following tables. Use ball bearing grease (lithium grease No. 2).

NOTE: If the sprayer is cleaned with a high pressure cleaner or fertilizer has been used, we recommend lubrication of all sections.

POS. Position on sprayer

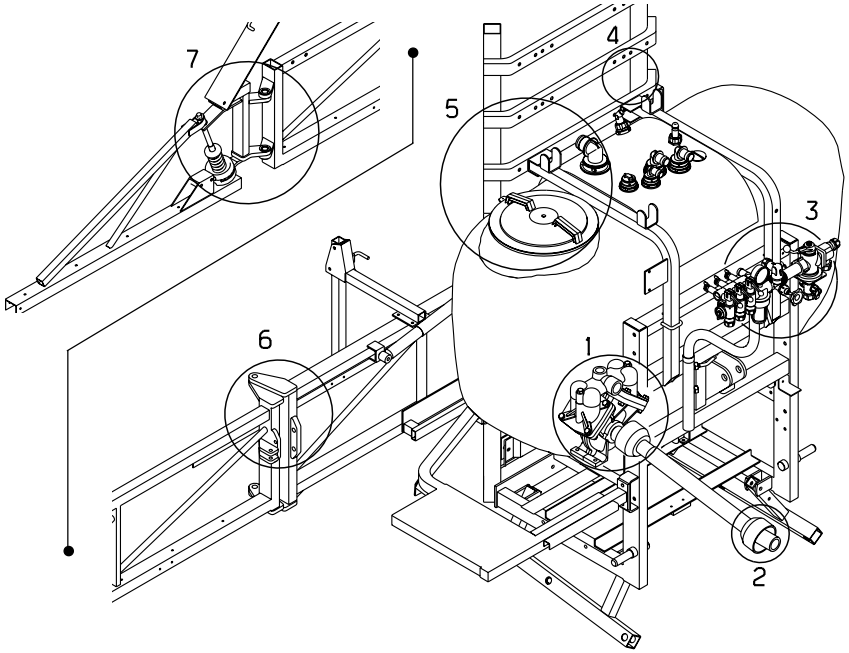
Oil

Grease

Operation hours

Page to find more information

Winter protection or off-season storage



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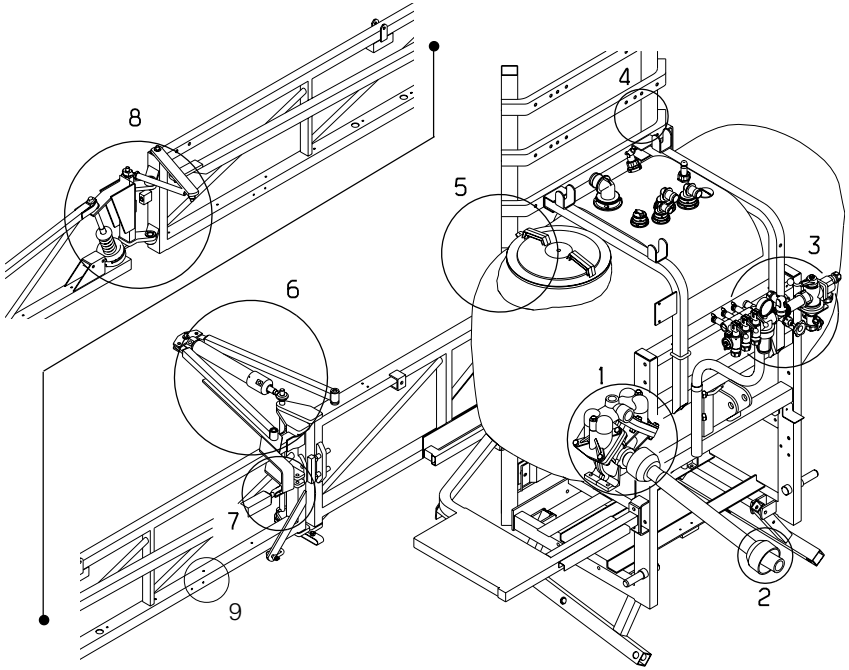

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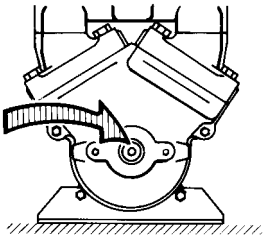
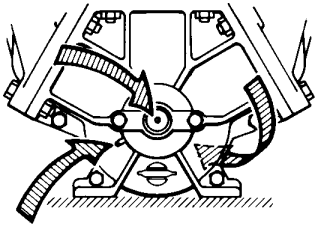
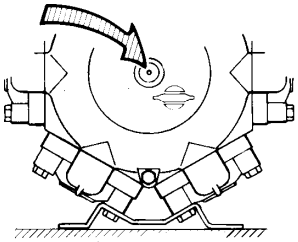
					38
1		X	40	 	39 45
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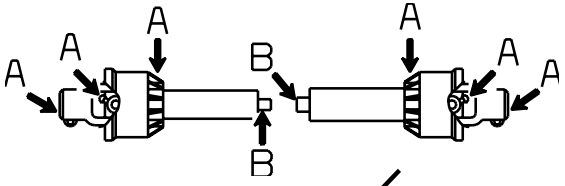
2					9
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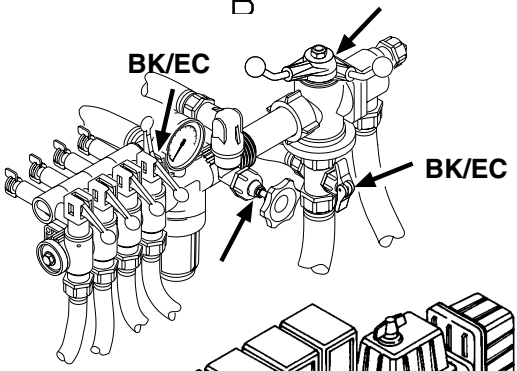
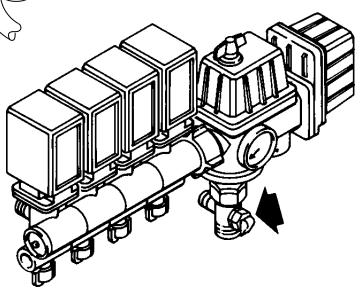
					6 7 11 17
3	X		20		18 19 40 45 49

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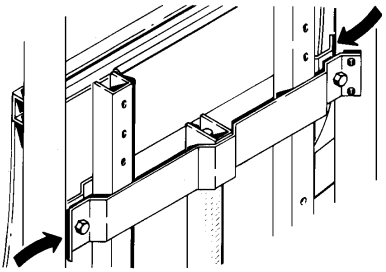
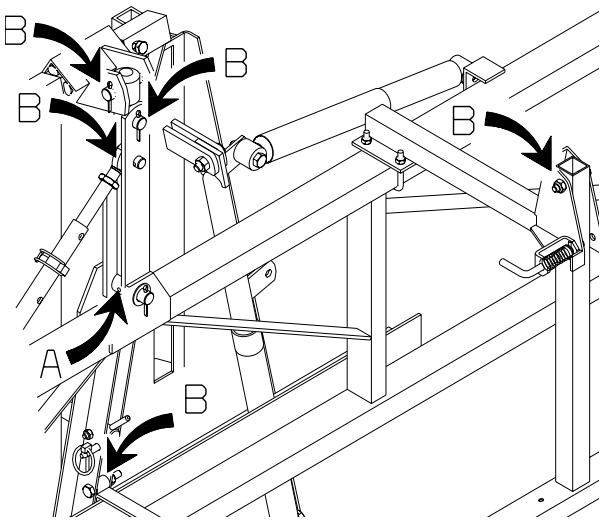
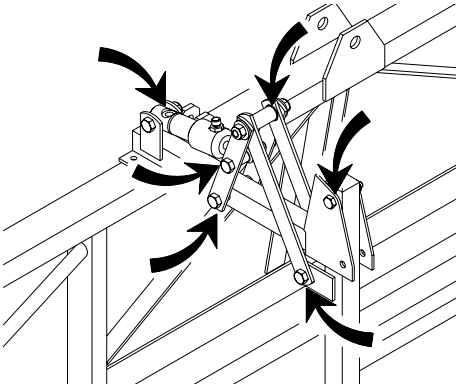
4		X	40	**HFA/HFY** 	
5 A B	X	X	40 40	**HFA/HFY** 	12 13 14 15 16 36 42 43
5		X	40	**HFY** 	

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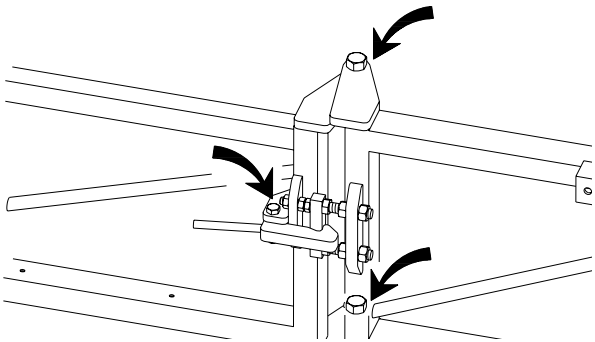
				HFA 	
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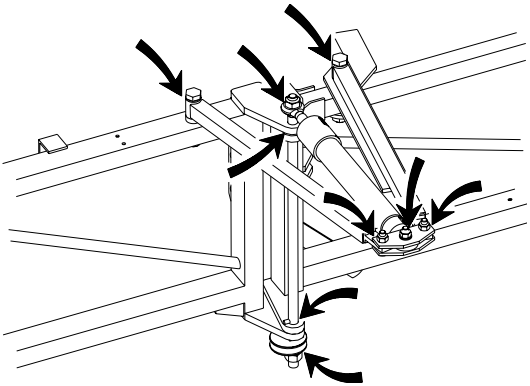
				HFY 	
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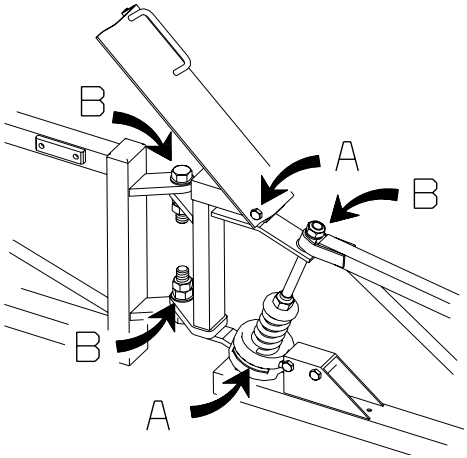
				HFA 	
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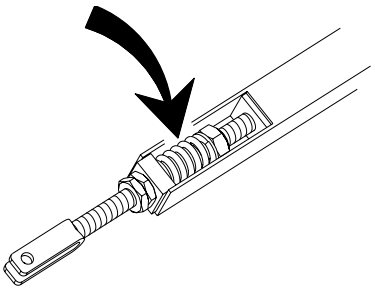
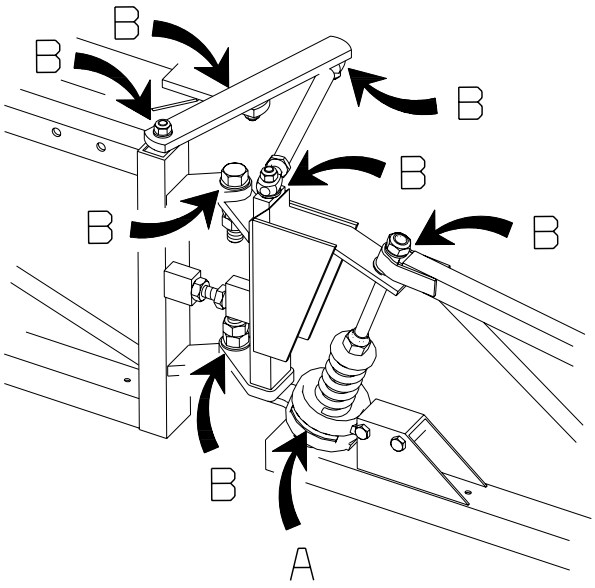
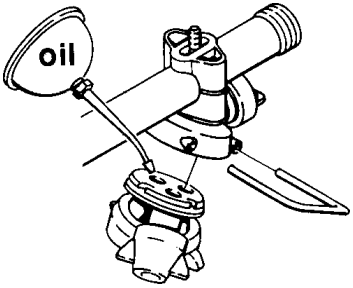
POS.					
7		X	40	HFY 	36 37
8 A B	 X	 X	 40 40	HFY 	 36 37 38
9	X		❄		45

Re-adjustment of the boom

After having used the sprayer for some days the boom should be adjusted according to the following instructions:

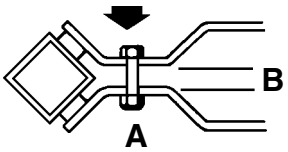
NOTE: Tractor and sprayer must be on level ground.
Sprayer must be lubricated. See section on Lubrication.

Adjustment of hydraulic rams is done without pressure in the hydraulic system. Carry out adjustments in the following order.

WARNING: NOBODY MUST BE UNDER THE BOOM WHILST ADJUSTMENT IS CARRIED OUT.

Boom lift

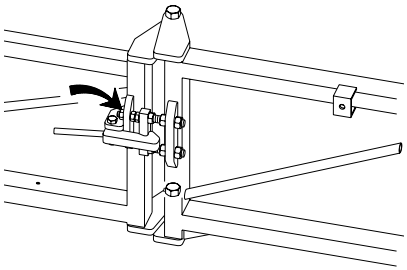
The boom lift should be adjusted so the boom can freely move up and down when the lift cylinder is operated. Adjust both sides. Adjust **A** so gap **B** is equal at all 4 points.



Adjustment of MA-HFA

The inner sections is adjusted to be linear to the centre section as follows:

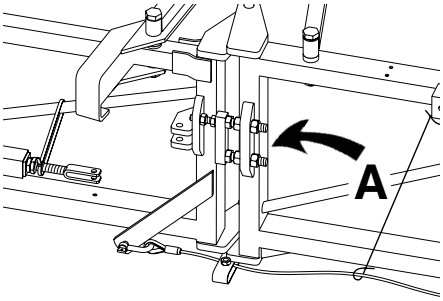
1. Unfold the boom.
2. Adjust the stop until the boom wings are linear to the centre section. Tighten the counter nuts again.

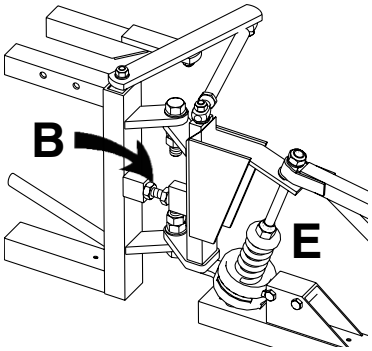


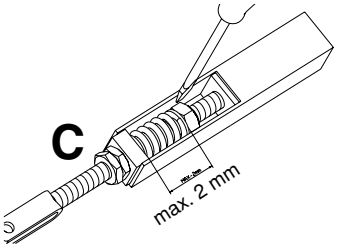
Adjustment of MA-HFY

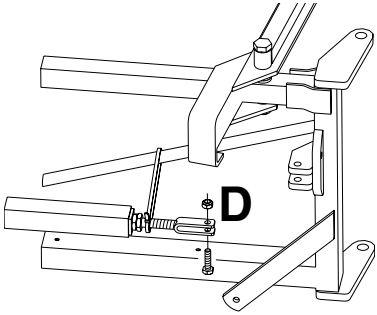
Adjustment of the HFY boom is as follows:

1. Unfold the boom and adjust the stop **A** until the inner section and centre section are aligned.
2. Adjust stop bolt **B** until outer section and inner section are aligned. Tighten counter nut.
3. Adjust nut **C** until boom profile is bending slightly backwards. Tighten counter nut.
4. Fold boom carefully and check spring tension. The spring must be 1-2 mm from being fully compressed.
5. If necessary to adjust the spring compression, unfold boom a little and remove the bolt **D**. Block the inner nut by means of a screw-driver and turn the fork to lengthen or shorten the rod.







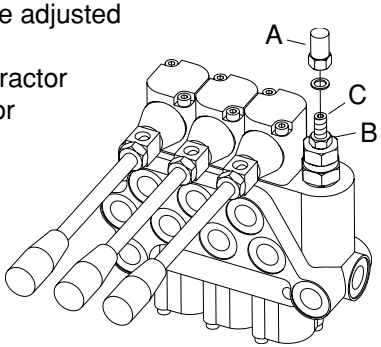


6. Fit the activating rod again, fold the boom, and check the spring compression again. If necessary, carry out point 5 again.
7. When the boom is folded, the stabilizing steel wires are adjusted to be tight. The wires are correctly adjusted when the lower lock pin can be locked and unlocked.

Adjustment of inlet oil pressure

The maximum inlet oil pressure can be adjusted at the spool valve unit as follows:

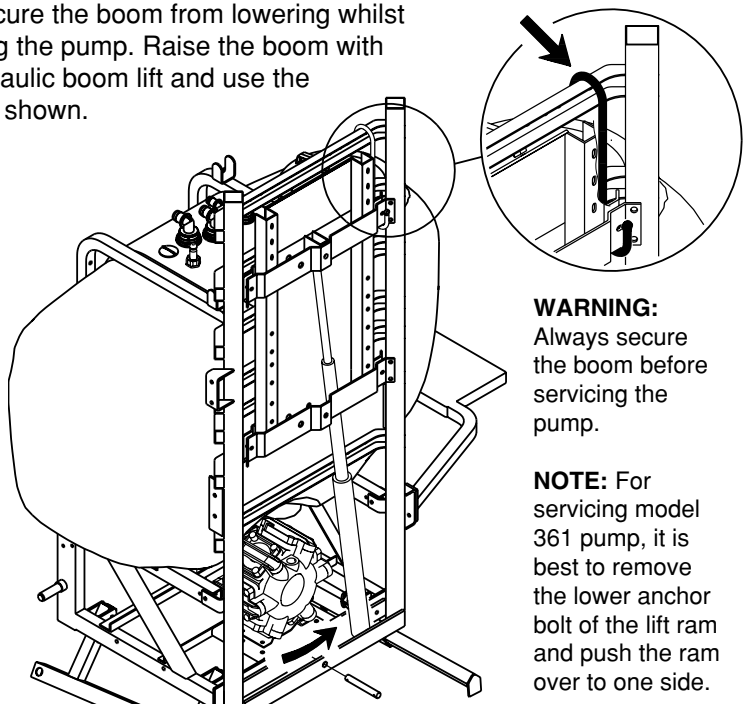
1. Fit a pressure gauge between the tractor pressure outlet and snap-coupler for spool valve inlet.
2. Remove cap **A**, loosen counter nut **B**, and when applying pressure to a full extended or retracted hydraulic ram for folding, the Allen screw **C** is adjusted to a max. pressure of 125-130 bar (1810-1885 p.s.i.)



Adjustment of breakaway
The breakaway reduces boom damage in case the boom hits an obstacle. The breakaway claw clutch must always be kept well greased (see section on Lubrication). If the claw clutch is too tight or loose, adjust screw **E.**

Changing of valves and diaphragms

Access to the pump is best from the rear of the sprayer. A "**S**" shaped hook supplied with the sprayer is used to mechanically secure the boom from lowering whilst servicing the pump. Raise the boom with the hydraulic boom lift and use the hook as shown.



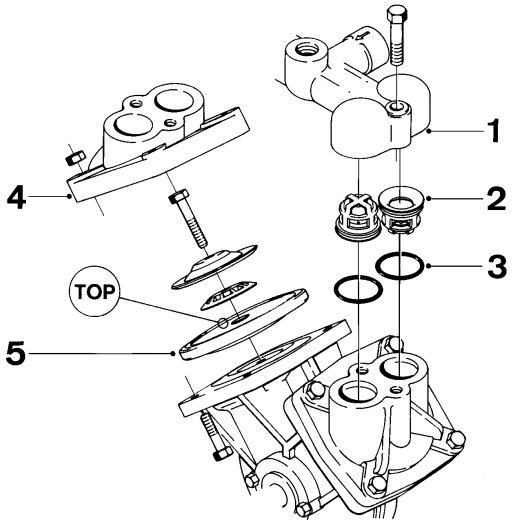
WARNING:
Always secure the boom before servicing the pump.

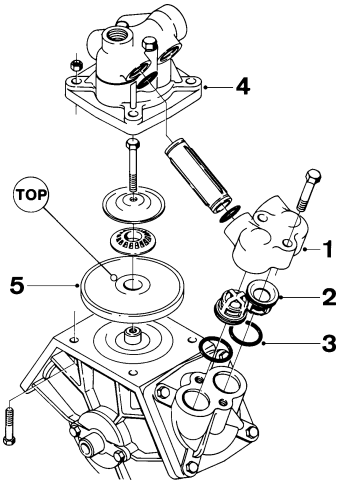
NOTE: For servicing model 361 pump, it is best to remove the lower anchor bolt of the lift ram and push the ram over to one side.

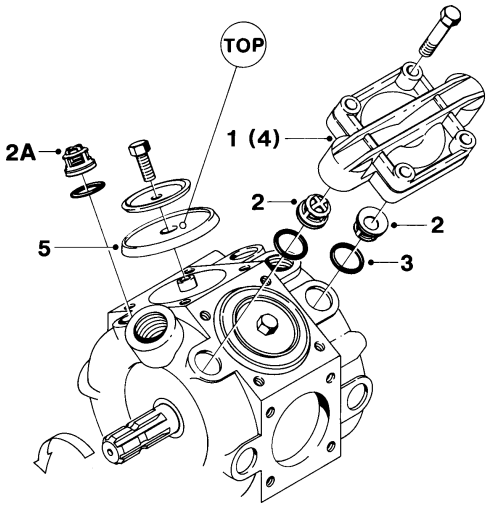
Valves
Remove valve cover **1**. Before changing the valves **2** note their orientation so they are replaced correctly.

NOTE: One special valve with white flap 2A is used on model 361. It has to be placed in the valve opening shown.
It is recommended to use new gaskets **3** when changing or checking the valves.

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





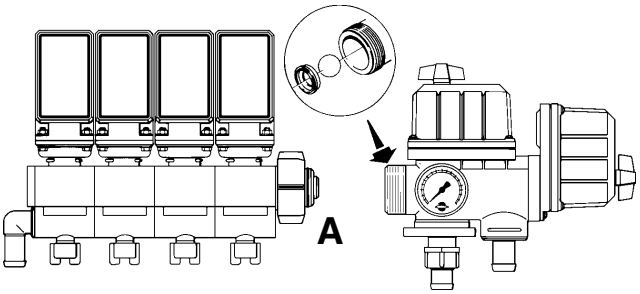


Pump Model	Valve cover Nm	Diaphragm cover Nm	Diaphragm bolt Nm
1202	70	70	60
1302	60	70	60
361	70		60

1 Nm = 0.74 ft-lb

Changing the ball seat in BK, BK/EC and EC

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

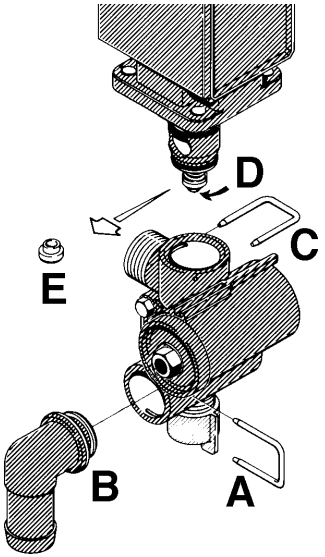


Remove the 2 bolts fixing the main ON/OFF-pressure valve unit to the bracket, unscrew the union nut **A** and pull the valve away from the distribution valves.

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

Checking the valve cone - EC only

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



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

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

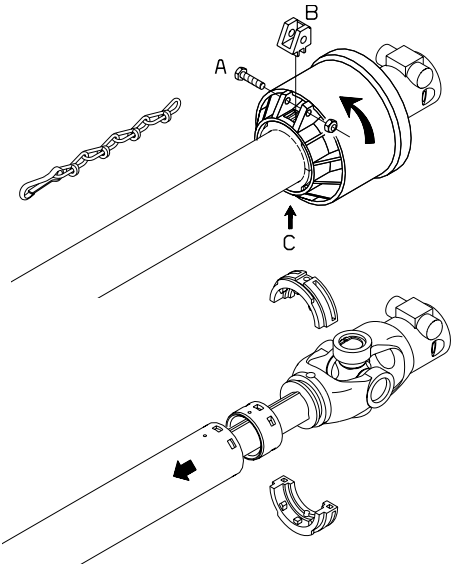
Replacement of transmission shaft protection guards

The replacement of defective protection guards is easy to do.

1. Remove bolt **A**, lock **B** and grease nipple **C.** Twist joint cover 1/4 turn and pull it backwards.
2. Remove the synthetic bearings and protection tube.

2a. Remove inner bush from protection tube.

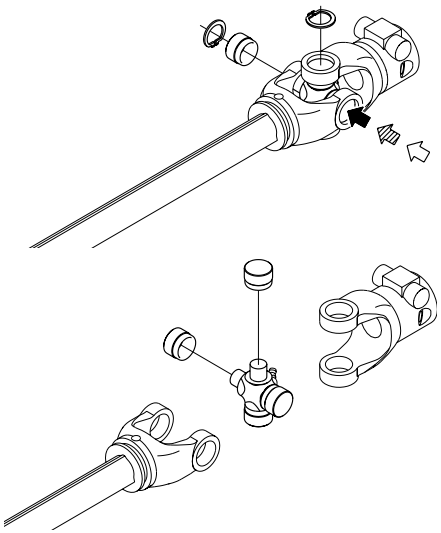
3. Assemble again in reverse order, using new parts where necesary. Remember to fit chains again.
4. Grease bearings.



Use only genuine HARDI spare parts to service the transmission shaft.

Replacement of transmission shaft cross journals.

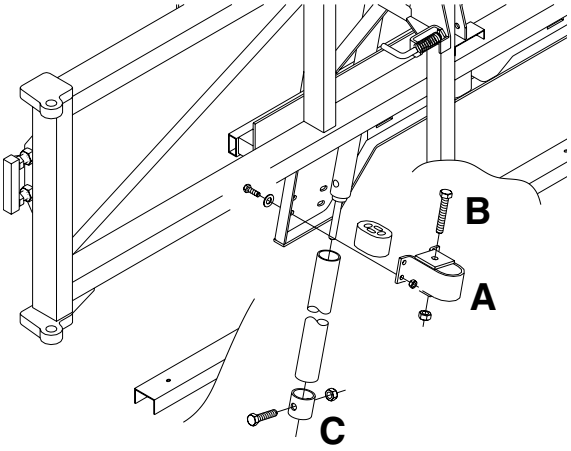
1. Remove protection guard as descriped previously.
2. Remove Seeger circlip rings
3. Press the cross journal sidewards - use hammer and mandrel if necesary.
4. Remove needle bearing cups and cross journal can now be removed.
5. Carefully remove needle bearing cups from new cross journal and install it in reverse order. Before fitting the needle bearing cups again, check that needles is placed correctly. Avoid dust and dirt in the new bearings.



Changing the rubber dampers and wear tubes on boom centre section

If the boom jaws excessively, the rubber dampers are to be checked, and replaced if necessary. Proceed as follows:

1. Remove bracket **A** and bolt **B**.
2. Replace worn dampers with new ones.
3. Fit brackets again - note orientation of bolts.



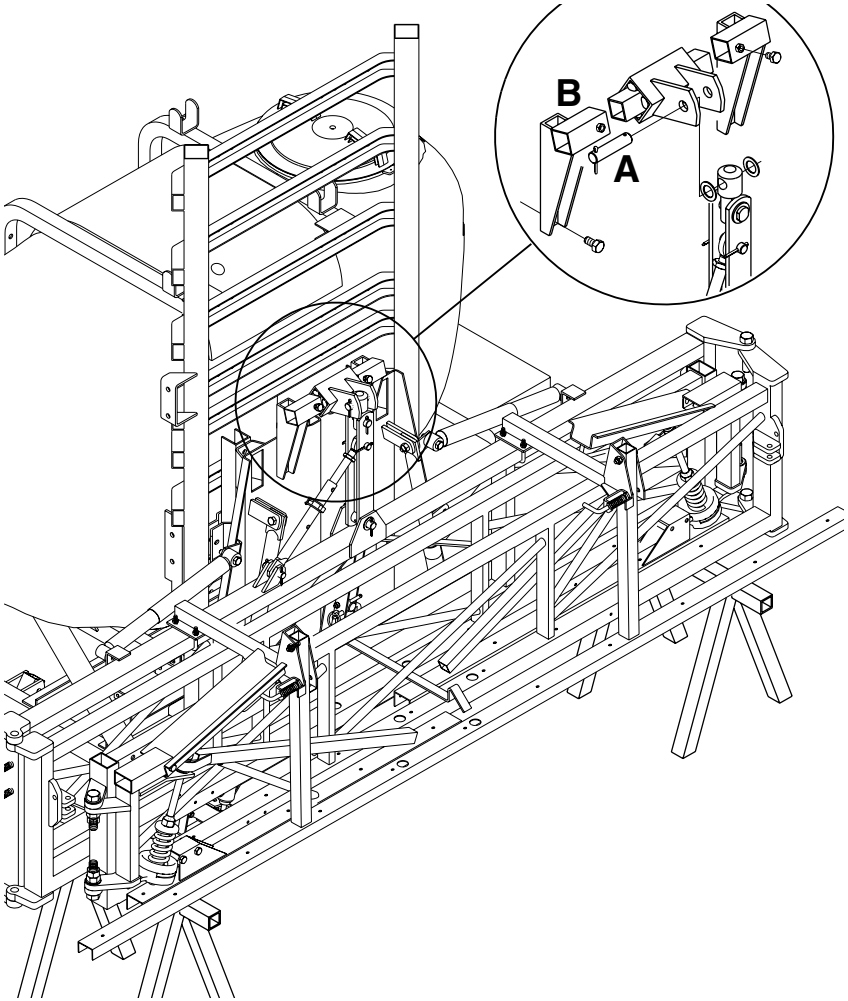
The synthetic wear tubes protecting the stabilizer rods should be changed before they are worn through. Proceed as follows:

1. Lift boom and remove bracket with rubber damper **A**.
2. Remove bolt **B** and bush **C.**
3. Remove the worn tubes and replace with new ones.
4. Fit bushes, bolts and brackets with rubber dampers again.

Changing the rubber suspension

When the rubber inserts in the rubber suspension becomes twisted and deformed and the suspension is hanging too low, the rubber suspension must be replaced. Proceed as follows:

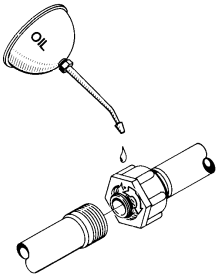
1. Lower and support the boom well on both sides.
2. Remove pin **A** and bracket **B**.
3. Replace the rubber suspension assembly with a new one.
4. Fit the bracket **B** again and centre the rubber suspension unit between the two brackets.
5. Fit the pin **A** again.



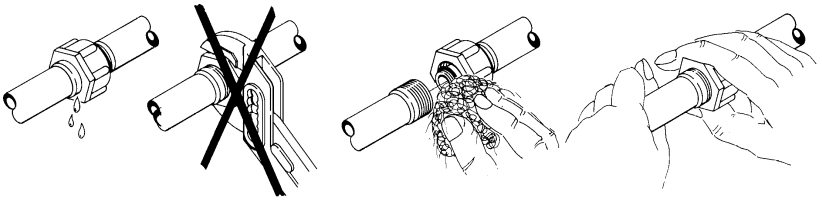
Nozzle tubes and fittings

Poor seals are usually caused by;

- missing O-rings or gaskets
- damaged or incorrectly seated O-rings
- dry or deformed O-rings or gaskets
- foreign bodies

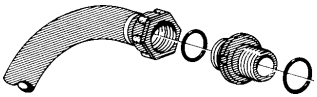


Therefore, in case of leaks: **DO NOT** over-tighten. Disassemble, check condition and position of O-ring or gasket, clean, lubricate and reassemble.



The O-ring is lubricated **ALL THE WAY ROUND** before fitting on to the nozzle tube. Use non-mineral lubricant.
For **radial** connections only hand tighten them.

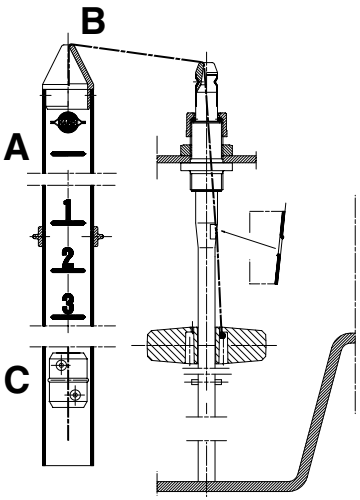
For **axial** connections, a little mechanical leverage may be used.



Level indicator

The level indicator should be checked regularly. When the tank is empty, the floater should rest on the stop pin on the rod and the O-ring at the indicator should be positioned at the top position line **A**.

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



Off-season storage

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

Hoses
Check that none of the hoses are caught or have sharp bends.
A leaky hose can give an annoying delay in the middle of the spraying job. Therefore check all the hoses and change if there is any doubt about the durability.

Paint
Some chemicals are very rough on paints. It is therefore well advised to remove rust, if any, and then touch up the paint.

Tank
Check that no chemical residues are left from the last spraying. Chemical residues must not be left in the tank for a long time. It will reduce the life of the tank. See section on Cleaning the sprayer.

BK/EC and EC operating unit
When the sprayer is put away the control box and the multiplug must be protected against moisture and dirt. Possibly use a plastic bag.

Transmission shaft
It is important that the push pins are clean and well lubricated, to ensure safe function.
Every 40 hours: Inspection of protection guards, function and condition. Replace possible damaged parts.
Every 1000 hours: Check condition of protection guards and replace nylon bearings.
Check general condition of cross journals and push-pin/quick release - replace if necesary.

Anti-freeze precaution
If the sprayer is not stored in a frost free place you should take the following precautions: Put at least 10 litres of 33% anti-freeze mixture in the tank and let the pump run a few minutes so that the entire system including spray hose are filled. The anti-freeze solution also hinders the O-rings and gaskets from drying out. Remove the glycerine filled pressure gauge and store it frost free in vertical position.

Operational problems

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

- Minor leaks on the suction side of the pump will reduce the pump capacity or stop the suction completely.
- A clogged suction filter will hinder or prevent suction so that the pump does not operate satisfactorily.
- Clogged up pressure filters will result in increasing pressure at the pressure gauge but lower pressure at the nozzles.
- Foreign bodies stuck in the pump valves with the result that these cannot close tightly against the valve seat. This reduces pump efficiency.
- Poorly reassembled pumps, especially diaphragm covers will allow the pump to suck air resulting in reduced or no capacity.
- Electrical and hydraulic components that are contaminated will result in poor connections and rapid wear to the hydraulic system.

Therefore ALWAYS check:

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

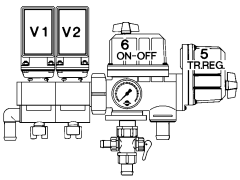
Fault	Probable cause	Control / remedy
Liquid system		
No spray from boom when turned on.	Air leak on suction.	Check if suction filter O-ring is sealing.
		Check suction tube and fittings.
		Check tightness of pump diaphragm and valve covers.
	Air in system.	Fill suction hose with water for initial prime.
	Suction/pressure filters clogged.	Clean filters.
		Check yellow suction pipe is not obstructed or placed too near the tank bottom.
Lack of pressure.	Incorrect assembly.	Agitation nozzles not fitted.
		Restrictor nozzle in Self-Cleaning Filter not fitted.
		Safety valve spring for Self-Cleaning Filter not tight.
		Too little distance between yellow suction pipe and tank bottom.
	Pump valves blocked or worn.	Check for obstructions and wear.
	Defect pressure gauge.	Check for dirt at inlet of gauge.
Pressure dropping.	Filters clogging.	Clean all filters. Fill with cleaner water.
		If using powders, make sure agitation is on.
	Nozzles worn.	Check flow rate and replace nozzles if it exceeds 10%.
	Tank is airtight.	Check vent is clear.
	Sucking air towards end of tank load.	Exessive agitation, turn off.
		Returns inside tank need relocation.

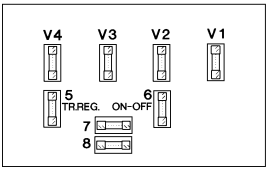
Fault	Probable cause	Control / remedy
Pressure increasing	Pressure filters beginging to clog.	Clean all filters.
	Agitation nozzles clogged.	Check by turning agitation off and on.
Formation of foam.	Air is being sucked into system.	Check tightness / gaskets / O-rings of all fittings on suction side.
	Excessive liquid agitation.	Turn agitation off. Reduce pump r/min.
		Check safety valve for Self-Cleaning Filter is tight.
		Ensure returns inside tank are present.
		Use foam damping addative.
Liquid leaks from bottom of pump.	Damaged diaphragm.	Replace. See Changing of valves and diaghragms.
Operating unit BK/EC and EC		
Operating unit not functioning	Blown fuse(s).	Check mechanical function of microswitches. Use cleaning/ lubricating agent if the switch does not operate freely.
		Check motor. 450-500 milli-Amperes max. Change motor, if over.
	Wrong polarity.	Brown - pos. (+). Blue - neg. (-).
	Valves not closing properly.	Check valve seals for obstructions.
		Check microswitch plate position. Loosen screws holding plate a ½ turn.
	No power.	Wrong polarity. Check that brown is pos. (+), Blue is neg. (-).
		Check print plate for dry solders or loose connections.
		Check fuse holder are tight around fuse.

Fault	Probable cause	Control / remedy
Hydraulic system		
Boom slow/eradic.	Air in system.	Loosen ram connection and activate hydraulics until oil flow has no air in it (not whitish).
	Regulation valve incorrectly set	Open or close until desired speed is achieved (clockwise = less speed). Remember oil must be at operating temperature.
	Insufficient hydraulic pressure.	Check output pressure of tractor hydraulics. Minimum for sprayer is 130 bar.
	Insufficient amount of oil in tractor reservoir.	Check and top up if needed.
Ram not functioning.	Restrictor or regulation valve blocked.	Secure boom with “S” hook. Dismantle and clean.

Emergency operation of BK/EC and EC

In case of power failure it is possible to operate all functions of the operating unit manually. First disconnect the multiplug from the control box. Now manually turn the emergency control knobs. The problem may be due to a blown fuse. The fuses are placed in the control box and are marked according to functions. Fuses 7 and 8 are spare fuses.
Fuse type T 500 mA HARDI ref. no. 261125



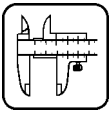


Technical specifications

Pump power consumption and capacity

1202/9.0	r/min 300		400		500		540		600	
bar	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	kW
0	56	0,91	72	1,28	93	1,52	99	1,63	112	1,79
5	40	1,11	53	1,36	66	1,60	71	1,71	79	1,86
10	38	1,38	52	1,74	64	1,79	69	1,87	77	2,07
15	37	1,60	50	1,97	62	2,32	67	2,48	75	2,76

Rotation per min.	r/min	Capacity		l/min	Suction height	0,0 m
Power consumption	kW	Max. pressure		15bar	Weight	24,0 kg



1302/9.0	r/min									
	300		400		500		540		600	
bar	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	kW
0	63	0,90	84	1,19	103	1,51	114	1,61	125	1,80
5	58	0,94	79	1,29	96	1,61	105	1,75	116	1,93
10	56	1,30	76	1,80	94	2,30	101	2,48	111	2,72
15	55	1,80	74	2,22	93	2,92	99	3,18	109	3,54
Rotation per min.		r/min	Capacity			l/min	Suction height			0,0 m
Power consumption		kW	Max. pressure			15bar	Weight			35,0 kg

361/9.5	r/min									
	300		400		500		540		600	
bar	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	kW
0	95	0,92	127	1,33	158	1,56	171	1,69	189	1,85
5	92	1,49	123	1,93	151	2,38	165	2,63	183	2,98
10	91	2,22	120	2,89	148	3,69	163	4,02	180	4,74
15	89	3,03	119	3,92	148	4,90	160	5,40	177	6,15
Rotation per min.		r/min	Capacity			l/min	Suction height			0,0 m
Power consumption		kW	Max. pressure			15bar	Weight			54,0 kg

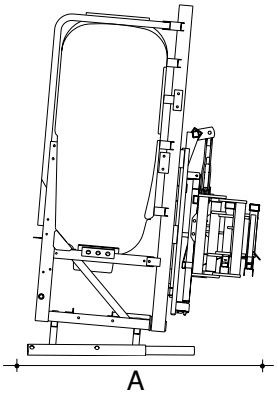
Measure and weight

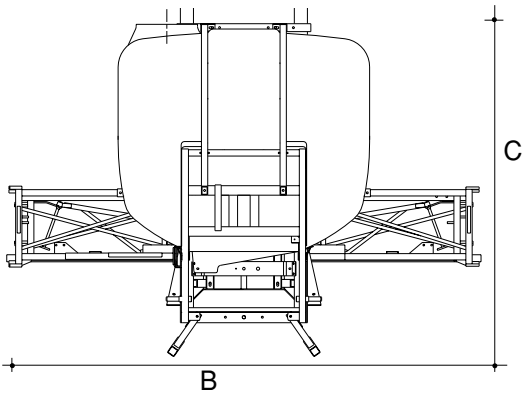
MASTER - HFA

Tank size l	Spray width m	Pump model	Pump capacity l/min	Measure l x w x h cm	weight kg.
600	10	1202	99	145 × 262 × 214	520
	12	1202	99	145 × 262 × 214	528
	12,5	1202	99	145 × 262 × 214	530
	12	1302	114	145 × 262 × 214	540
	12,5	1302	114	145 × 262 × 214	542
800	10	1302	114	154 × 262 × 214	538
	12	1302	114	145 × 262 × 214	546
	12,5	1302	114	145 × 262 × 214	548
	15	361	171	145 × 300 × 214	606
1000	12	1302	114	145 × 262 × 220	555
	12,5	1302	114	145 × 262 × 220	557
	12	361	171	145 × 262 × 220	574
	15	361	171	145 × 300 × 220	615
1200	12	361	171	160 × 262 × 220	591
	12,5	361	171	160 × 262 × 220	592
	15	361	171	160 × 300 × 220	632

MASTER - HFY

Tank size l	Spray width.m m	Pump model	Pump capacity l/min	Meausure l x w x h cm	weight kg.
600	12	1202	99	145 × 262 × 214	653
	12,5	1202	99	145 × 262 × 214	655
	12	1302	114	145 × 262 × 214	662
	12,5	1302	114	145 × 262 × 214	664
800	12	1302	114	145 × 262 × 214	668
	12,5	1302	114	145 × 262 × 214	670
	15	361	171	145 × 300 × 214	735
1000	12	1302	114	154 × 262 × 220	677
	12,5	1302	114	145 × 262 × 220	679
	12	361	171	145 × 262 × 220	692
	15	361	171	145 × 300 × 220	744
1200	12	361	171	160 × 262 × 220	710
	12,5	361	171	160 × 262 × 220	712
	15	361	171	160 × 300 × 220	761

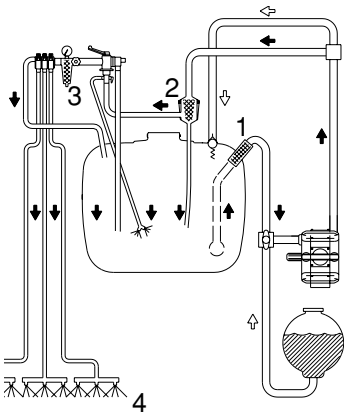

A



B

Filters and nozzles

Pos.	Mesh/ colour	Description/ nozzle
1	30 green	Suction filter
2	80 red	Self-Cleaning Filter (if fitted)
3	50 blue	Pressure filter
4	50 blue	Nozzle S4110-14
		Nozzle S4110-16
		Nozzle S4110-20

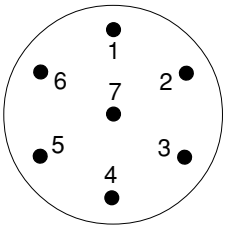


Temperature and pressure ranges

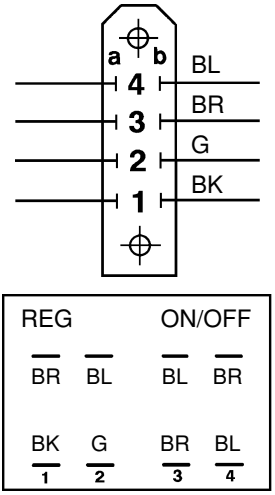
Operating temperature range:	2° to 40° C.
Operating pressure for safety valve:	15 bar
Max. pressure for spool valve:	130 bar
Max. pressure for the hydraulics:	160 bar

Electrical connections
Rear lights

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

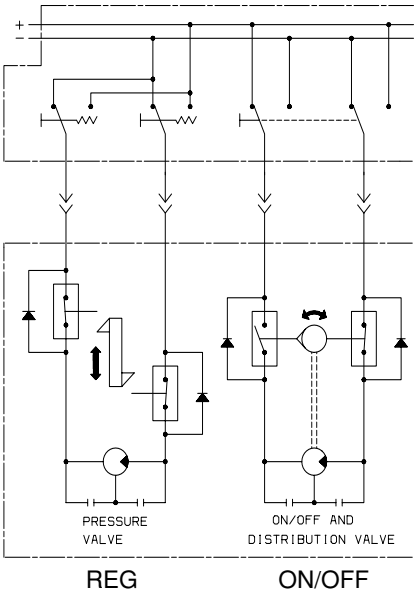


BK/EC

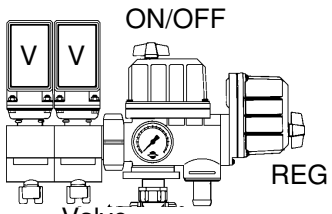


BL = Blue
BR = Brown
G = Gray
BK = Black

BK/EC and EC



EC



	Number of distribution valves		
	2 / 3 / 4	5 / 6	7
	Wire number or colour code		
V1	1-2	1-2	1-11
V2	3-4	3-4	2-12
V3	5-6	5-6	3-13
V4	7-8	7-8	4-14
V5		9-10	5-15
V6		11-12	6-16
V7			7-17
REG	9-10	13-14	9-10
ON/OFF	11-G/Y	15-G/Y	8-G/Y

G/Y = green/yellow

Materials and recycling

Tank: HDPE Valves: mainly glass-filled PA.
Hoses: PVC Fittings: PA

Disposal of the sprayer

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

Pictorial symbols

Description
Function
Connection
Warning
Operating
Service/adjustment
Liquid flow
Pressure
Cleaning
Lubrication
Winter storage
Operational problems
Technical specifications
EC Declaration of Conformity

Notes:

Notes:

Notes: