

MEGA-LPY
MEGA-LPZ

Instruction book
674701-GB-98/12

Pictorial symbols



Description



Function



Connection



Warning



Operating



Service/Adjustment



Liquid flow



Pressure



Cleaning



Lubrication



Winter storage



Operational problems



Technical specifications



EC Declaration of Conformity

Illustrations, technical information and data in this book are to the best of our belief correct at the time of printing. As it is HARDI INTERNATIONAL A/S policy permanently to improve our products, we reserve the right to make changes in design, features, accessories, specifications and maintenance instructions at any time and without notice.

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

As this instruction book covers all models, features or equipment, which are available in certain countries only can be shown. Please pay attention to paragraphs dealing with precisely your model.

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EC Declaration of Conformity

Manufacturer,
HARDI INTERNATIONAL A/S
Helgeshøj Allé 38
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 current standards implementing harmonised standards in accordance with Article 5 (2) and other relevant standards.

Taastrup, November 1998

Erik Holst
Managing Director
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, immediately seek medical advice. 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.
- 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 upon your care. The first step is to carefully read and pay attention to this instruction book. It contains essential information for the efficient use and long life of this quality product.

As this instruction book covers all MEGA models with LPY or LPZ 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.



Description

Frame

The frame is strong and compact. It has a strong chemical and weather resistant electrostatic lacquer coat. Screws, nuts etc., have been DELTAMAGNI treated to be resistant to corrosion.

Tank

UV-resistant Polyethylene in a purposeful design with no sharp corners for easy agitation, emptying and cleaning. Nominal contents 800, 1000 or 1200 l.

Pump

Diaphragm pump with 6 diaphragms, model 363 or 463, depending on boom width, with easily accessible valves and diaphragms.

Manifold system

All functions of the sprayer circuits are operated via the centrally situated MANIFOLD valves with colorcoded plates and pictorial symbols for easy operation.

Operating unit

The operating unit is constructed of modules and consists of main ON/OFF valve, pressure gauge, pressure regulation with built-in HARDI-MATIC and distribution valves with pressure equalization. HARDI-MATIC ensures a constant volume per hectare of the liquid (l/ha) at varying forward speed within the same gear when the number of P.T.O. revolutions are between 300-600 r/min. The operating unit is fully electrically controlled (EC) via a remote control box.

Filters

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. Also suction filter and nozzle filters are standard. In-line pressure filters can be fitted as option.

Boom

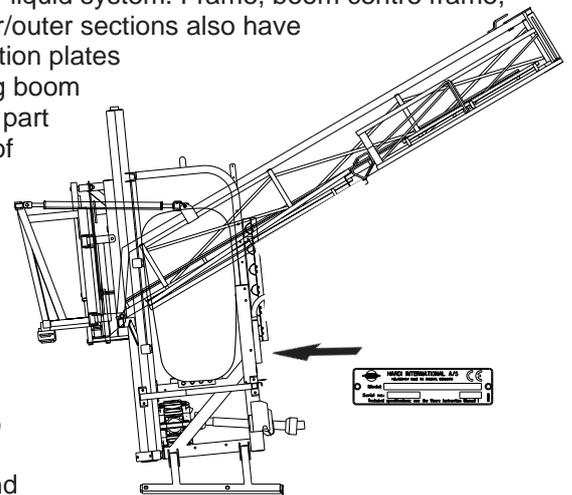
The LPY spray boom is equipped with 4 hydraulic rams. The raising/lowering and folding/unfolding functions are performed via the tractor hydraulics. The frame and boom are connected by a pendulum suspension which

reduces the swing of the boom when driving on uneven ground. The outer sections incorporate spring loaded breakaway.

The LPZ spray boom is fully hydraulic folded and operated. Individual folding of outer sections enable alternative boom widths. Individual boom tilt function for right and left side adapts boom height to slopping terrain. Slanting control compensates for driving on hillsides. All functions are controlled by Direct Acting Hydraulic system (D.A.H.). The outer sections incorporate spring loaded breakaway.

Identification plates

An identification plate fitted on the frame indicates producer name, model, own weight, max. weight, max. pressure of the hydraulic system, and max. pressure of the spray liquid system. Frame, boom centre frame, and inner/outer sections also have identification plates indicating boom type and part number of spare parts. If ordering spare parts, inform your dealer of these, so the right model and version are described.



Write the information of your sprayer here:

		HARDI INTERNATIONAL A/S			
		HELGESHOJ ALLE 38. DK2630, DENMARK			
Model:	<input type="text"/>				
Serial no.:	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Technical specifications: see the Users Instruction Manual !					

T279-0002

		HARDI INTERNATIONAL A/S		TAASTRUP DENMARK	
Typ.	463/10		rpm,max. 700		
No.					
rpm	l/min.	bar	kW		
540	263	0	1.7		
540	243	10	5.4		
		max. 15			

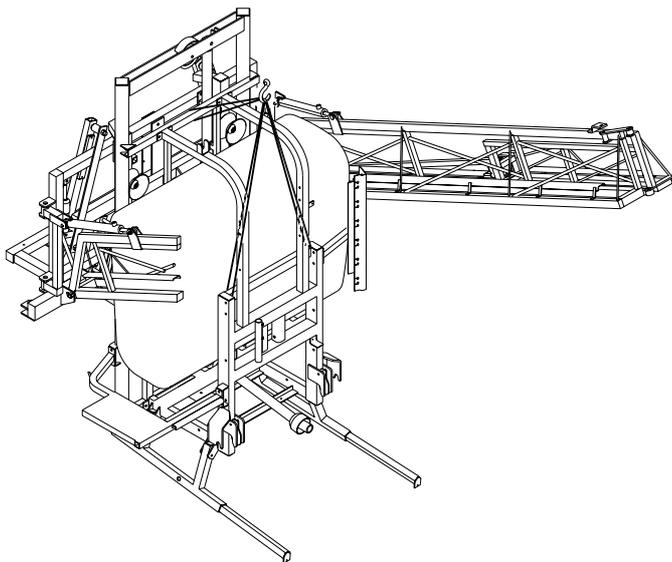
T279-0001

Sprayer use

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

Lifting points

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



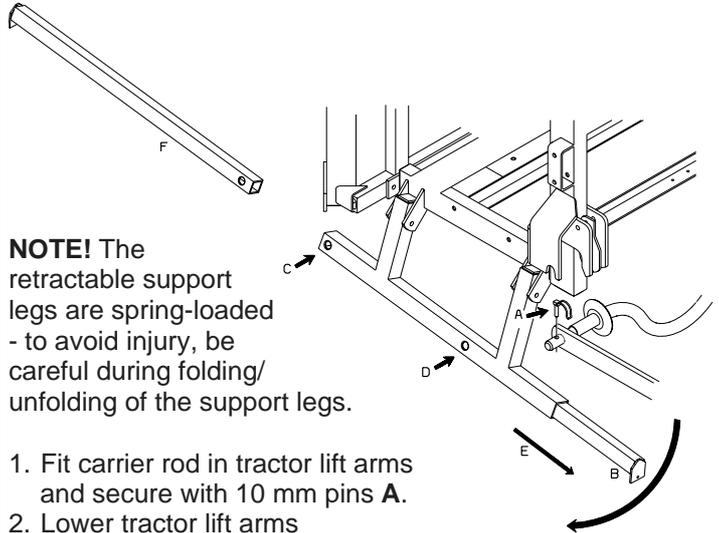
Before putting the sprayer into operation

Although the sprayer has been applied with a strong and protective surface treatment on steel parts, bolts etc. in the factories, it is recommended to apply a film of anti-corrosion oil (e.g. CASTROL RUSTILLO or SHELL ENSIS FLUID) on all metal parts in order to avoid chemicals and fertilisers discolouring 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 shiny for many years.

This treatment should be carried out every time the protection film is washed off.

Connecting the sprayer

The sprayer is designed for three point suspension and is equipped with semi automatic hitch for the tractor lift arms (28 mm pivots, cat. II). The frame has retractable support legs that can be folded up to minimize crop damage.



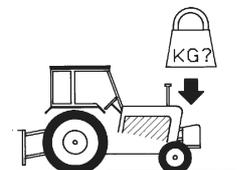
NOTE! The retractable support legs are spring-loaded - to avoid injury, be careful during folding/unfolding of the support legs.

1. Fit carrier rod in tractor lift arms and secure with 10 mm pins A.
2. Lower tractor lift arms
3. Reverse tractor till carrier rod is under the sprayer hitch.
4. Lift the lift arms carefully till the locking devices "clicks" and the carrier rod is locked to the sprayer frame.
5. Fit the top bar, secure with pins.
6. Lift the sprayer, retract the support legs, and fold them up.
7. Position the tractor lift so the boom can be lowered to 45-50 cm in lowest position, and adjust top bar until the gantry is perpendicular to the ground.



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 that the operating unit and the tractor do not touch.
- Travel at slower speeds when driving with a full tank. (The tractor braking effect will be reduced.)



Disconnecting the sprayer.

The retractable support legs must be folded down and extended before lowering and disconnecting the sprayer. Proceed as follows:

1. Swing support legs down.
2. Push the black button C in.

3. Extend the legs **B** until the black button clicks out in location hole **D**.

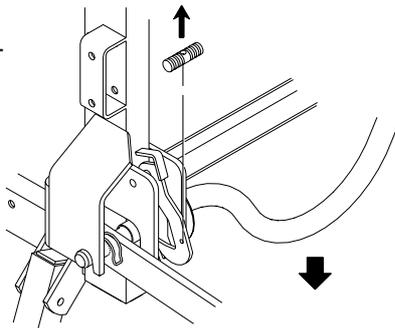


WARNING! Note correct location of support leg extensions!

When the boom is folded in **transport position** the support leg extensions must be placed and extended at the **front** of the sprayer **B**.

When the boom is unfolded in **working position** the support leg extensions must be placed and extended at the **back** of the sprayer **F**.

4. Lower the sprayer
5. Disconnect top bar, stop engine and disconnect PTO-shaft, hydraulics and electric cables.
6. Pull the string to disengage the semi automatic hitch locking devices and lower the lift arms fully.



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 facilitate spline alignment, 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 CV-joints 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 are intact.

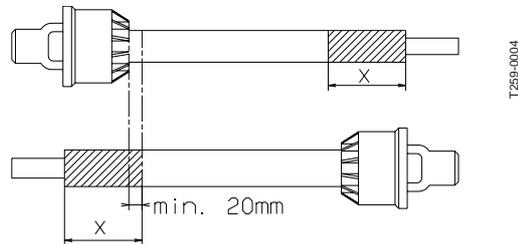
Always STOP ENGINE and remove the ignition key

before carrying out maintenance or repairs to the transmission shaft or implement.

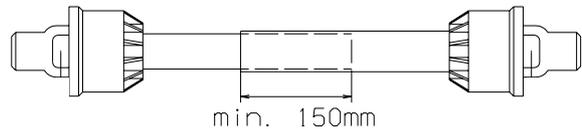
Installation of transmission shaft

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

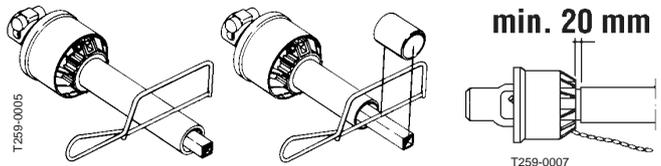
1. Attach sprayer to tractor and set sprayer height in the position with shortest distance between the tractor and sprayer pump P.T.O. shafts.
2. Stop engine and remove ignition key.
3. If transmission shaft must be shortened, the shaft is pulled apart. Fit the two shaft parts at tractor and sprayer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



NOTE! The shaft must always have an overlap of minimum 155 mm (6.1 in).



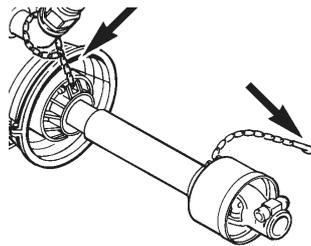
4. The two parts are shortened equally. Use a saw, and file the profiles afterwards to remove burrs.



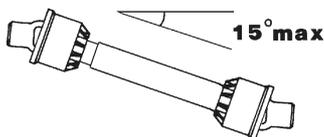
5. Grease the profiles and assemble male and female parts again.
6. Fit the shaft to tractor P.T.O. and sprayer pump shaft.

NOTE! 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°.



9. Only 1302 pump: 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 ME-LPY

Connection requirements for MEGA-LPY 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).

Ensure the snap couplers are clean before connection!

NOTE! The hydraulic system requires a minimum oil pressure of 130 bar, max. oil pressure of 210 bar and an oil capacity of approx. 5 litres. After having operated the boom and the system has been filled with oil, check tractor's hydraulic oil level and top up if necessary.

Hydraulics ME-LPZ

Direct Acting Hydraulic system

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

The D.A.H. system requires an oil flow between 10 and 90 l/min (19.8 Imp. gal/min.) and a min. pressure of 130 bar (1886 p.s.i.) The system has a built-in flow regulator that maintains constant speed on hydraulic movements.

Before operating the hydraulics, the clip at the distribution valve should be set for OPEN CENTRE or CLOSED CENTRE tractor hydraulics, depending on tractor model.

- ① Unlocked = Open centre hydraulics (Constant Flow)
- ② Locked = Closed centre (Constant Pressure and Load-Sensing hydraulics)



T120-0024

If you are in doubt about which type of hydraulic system your tractor is equipped with, ask your tractor dealer.

Control boxes and power supply

Power requirement is 12V DC.

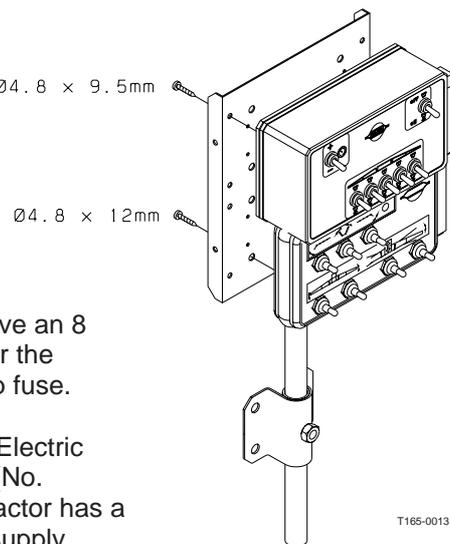
Note Polarity!

For EC: Brown pos. (+), Blue neg. (-).

For D.A.H.: White pos. (+), Black neg. (-).

The control boxes for EC-operating unit and D.A.H. are fitted in the tractor cabin at a convenient place. Tapping screws can be used for mounting.

The wires must have a cross sectional area of at least $\varnothing 4.8 \times 9.5\text{mm}$ to ensure sufficient power supply. For the EC-operating unit the tractor circuit should have an 8 Amp fuse and for the D.A.H. a 16 Amp fuse.



T165-0013

Use the HARDI Electric distribution box (No. 817925) if the tractor has a doubtful power supply.

Rear lights (if fitted)

Connect plug for rear lights to the tractor's 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.

Roadworthiness

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.

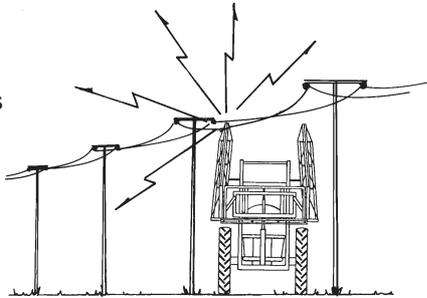
Operating instructions

Operating the LPY and LPZ booms



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

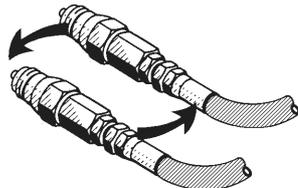
DANGER! When folding and unfolding the boom, be sure that no persons or objects are in the operating area of the boom and that the boom cannot touch any electrical conductors.



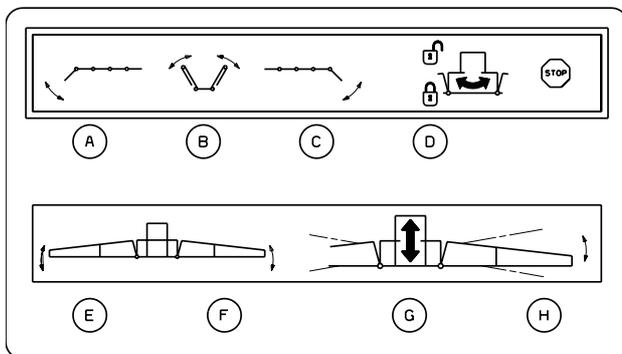
T029-0010

LPZ boom

First set the tractor's hydraulic remote control lever in position for correct direction of oil flow. If the boom starts to rise either switch the hydraulic hoses around or set the control lever in the opposite position.



Boom manoeuvring:



- A. Unfolding/folding of the left outer section
- B. Unfolding/folding of the inner section
- C. Unfolding/folding of the right outer section
- D. Pendulum locking device
- E. Boom Tilt, left side
- F. Boom Tilt, right side
- G. Boom lift, up/down
- H. Slanting control, pendulum

Unfolding the LPZ boom

1. Push boom lift switch **G** upwards to lift the boom clear of the transport brackets.

NOTE! Ensure that the booms are clear of the transport brackets, before unfolding is proceeded.

2. Lift the right and left boom parts by activating the boom tilt function, switch **E** and **F**
3. Push switch **B** to unfold the inner sections completely
4. Push switch **A** and **C** to unfold outer sections completely
5. Push switch **G** downwards to lower the boom to approximately 50 cm above crop- or ground level.
6. Unlock the pendulum suspension by pushing switch **D** upwards.

IMPORTANT! The 4 upper functions (in the red rectangle with STOP sign) must only be operated when the sprayer is stationary. Failure to do so will damage the boom!

Folding the LPZ boom

1. Raise boom lift **G** to upper position.
2. Check that slanting control is in levelled to middle position - if not correct by activating switch **H**.
3. Lock pendulum locking device by pushing switch **D** downwards.
4. Fold outer sections, **A** and **C**.
5. Lift up right and left hand side boom by activating right and left boom tilt, **E** and **F**.
6. Fold inner sections by activating switch **B**.
7. Lower boom lift, **G**, until boom touches the transport brackets.
8. Lower right and left boom side, until they rest in the transport brackets, by activating boom tilt **E** and **F**.

Alternative boom widths (LPZ only)

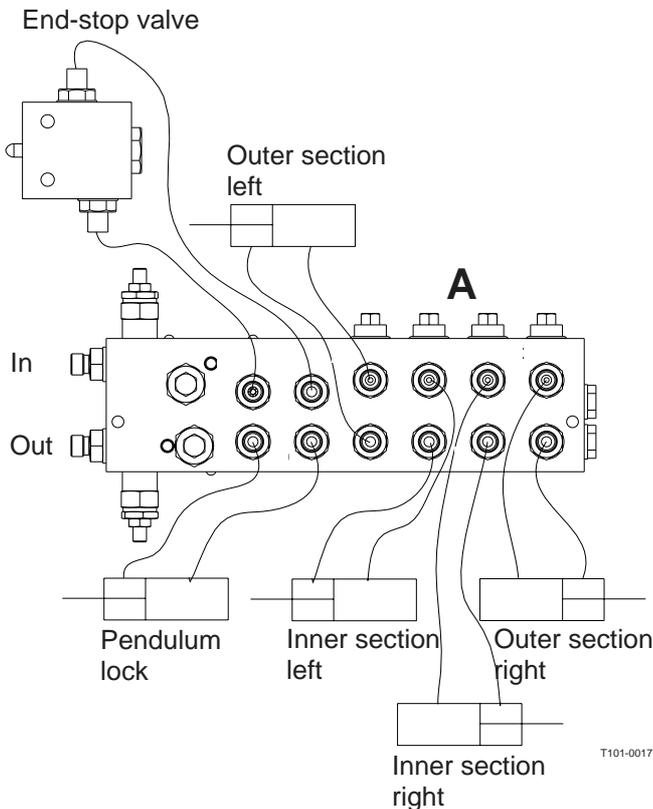
Alternative boom widths can be obtained by folding outer section(s). The pendulum must always be locked if driving with only one outer section in folded position.

NOTE! Use caution if driving with locked pendulum, and only do so on level ground. Reduce the period of driving with locked pendulum to a minimum of time, as this setting reduces the life span of the boom.

LPY boom

Speed regulation of the hydraulic boom movements

Adjustable restrictors for the regulation of boom folding and unfolding speed, are located on the hydraulic distribution block (fitted at the boom centre frame). It is important to adjust the valves to ensure that the boom operates smoothly.



1. Adjust the 4 screws **A**. They are screwed the whole way in clockwise, and then 1 turn back. The system is now basically adjusted.
2. Unfold and fold the boom several times in order to heat the oil and remove air from the system.
3. Adjust the screws **A** until the individual rams run with the speed wanted (clockwise = less speed).

 **WARNING!** Test of the hydraulic system should be done very cautiously. There may be air in the system, which may cause violent movements of the boom. Therefore, take care that no persons or objects are hurt or damaged in the process of testing.

 **WARNING!** 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.

Unfolding/folding the LPY boom

Unfolding and folding of the LPY boom is carried out by means of the tractor remote control valves.

IMPORTANT! Always stop the tractor completely when folding or unfolding the boom. Failure to do so may cause serious damages to the boom.

To unfold the boom proceed as follows:

1. Lift the boom clear of the transport brackets
2. Unfold the boom wings completely
3. Lower the boom lift to correct working height (approx. 50 cm (20 in) above ground or crop).

IMPORTANT! Control that the pendulum lock works correctly: Inspect the pendulum chains; they must be loose when the boom is fully unfolded.

To fold the boom proceed as follows:

1. Lift the boom.
2. Fold the boom completely.
3. Lower the boom until it rests in the transport brackets.

IMPORTANT! Control that the pendulum lock works correctly: Inspect the pendulum chains, they must be tight when the boom is in folded position.



WARNING! When driving on public roads the tractor hydraulic remote control levers should be locked to avoid unintended unfolding of the boom.

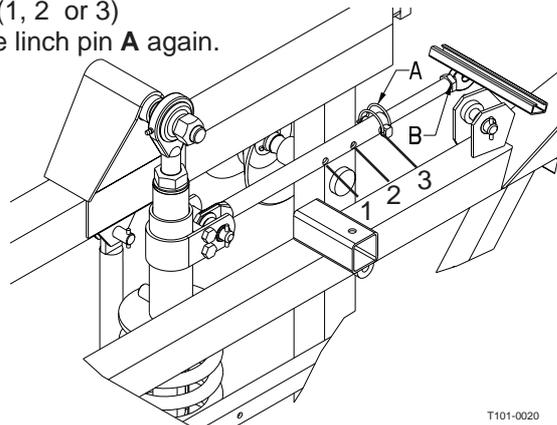
Slanting the boom

When driving on slopes, the boom can be slanted in order to match the local topography.

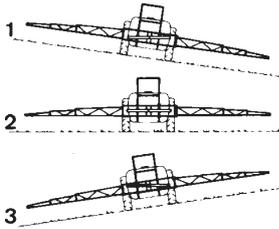
At delivery the boom is locked in pos. **2** (neutral) which is used when driving on horizontal grounds.

The slanting angle is adjusted as follows and with the boom unfolded:

1. Remove the linch pin **A**
2. Reset the position of the cylinder according to the holes (1, 2 or 3)
3. Secure linch pin **A** again.



T101-0020



NOTE! Always reset position to neutral (pos 2) before folding the boom.

Minor adjustments of the boom in order to adjust it vertically can be done by adjusting the position of nut **B**.

Hydraulic Slanting Control (if fitted)

The Hydraulic Slanting Control enables slanting of the entire boom hydraulically. This is advantageous when spraying along hillsides.

NOTE! Reset position to neutral (midway) before folding the boom.

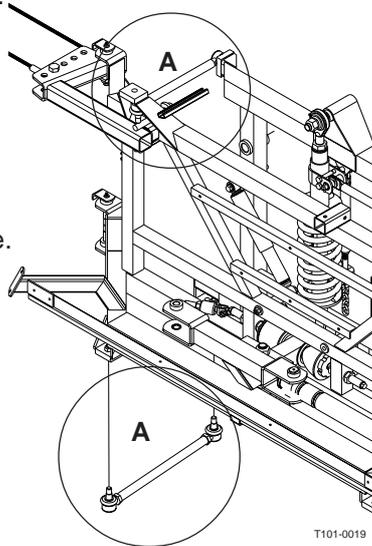
Adjustments of LPY and LPZ booms

Adjusting the pendulum device

The purpose of this adjustment is to align the 4 steering arms (**A**) to level position.

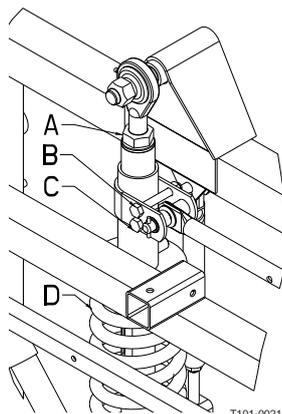
Adjustment of the pendulum device needs to be carried out before putting the sprayer into operation for the first time. Subsequent adjustment will be required very seldom.

Perform adjustments with the boom unfolded.



1. Loosen the big nut **A**
2. Loosen the nuts **B** and **C**
3. Grasp around the spring **D** and rotate the whole spring arrangement to regulate the length of it.

• *Clockwise rotation:* The spring arrangement becomes longer and the steering arms are moved downwards.



• *Anticlockwise rotation:* The spring arrangement becomes shorter and the steering arms are moved upwards

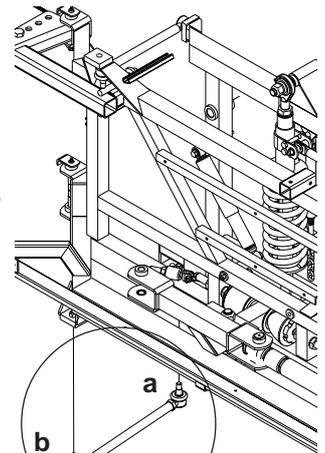
Inspect the alignment to make sure the 4 steering arms are level. When correct position is obtained:

1. Tighten the nut **A**
2. Tighten the nuts **B** and **C**

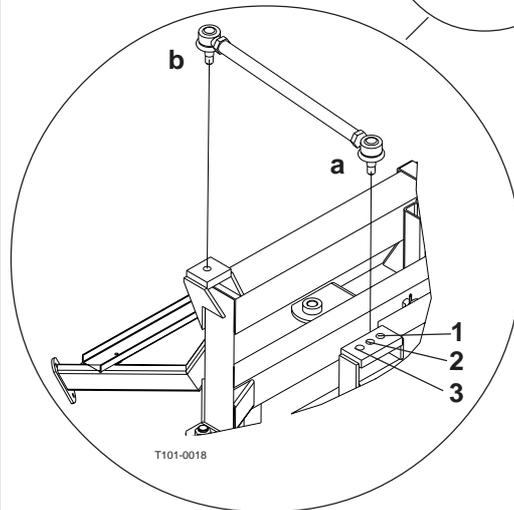
Adjusting the pendulum effect

The pendulum effect can be adjusted to match the local topography. For this purpose, the 2 bottom steering arms can be locked in 3 different positions.

Always use the same position for both bottom steering arms, and perform adjustments with the boom unfolded.



UPSIDE DOWN



POSITION 1: The boom is always kept horizontal. Use position 1 when spraying flat country.

POSITION 2: The boom follows the movements of the tractor to some extent. Use position 2 when spraying hilly land.

POSITION 3: The boom follows the movements of the tractor to a high extent. Use position 3 when spraying very hilly land.

Pendulum damping

The boom centre section is fitted with 2 shock absorbers to damp the boom movements. No adjusting is required.

Adjustment of pendulum chains

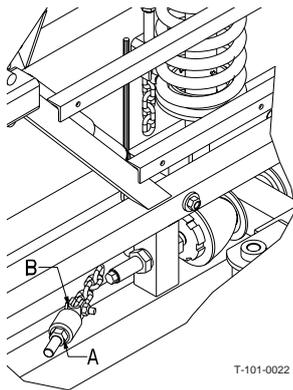
The function of the chains is to make sure that the boom centre section acts correctly during transportation.

Inspect the folded boom; the centre section must be level. If not, the pendulum chains need adjustment.

The length of the chains can be individually adjusted by the nut **A**.

1. Retain fork nut **B** by a spanner while adjusting the position of nut **A**.

- Clockwise rotation: The chain becomes shorter.
- Anticlockwise rotation: The chain becomes longer.



T-101-0022

Adjustment of limit stop valve

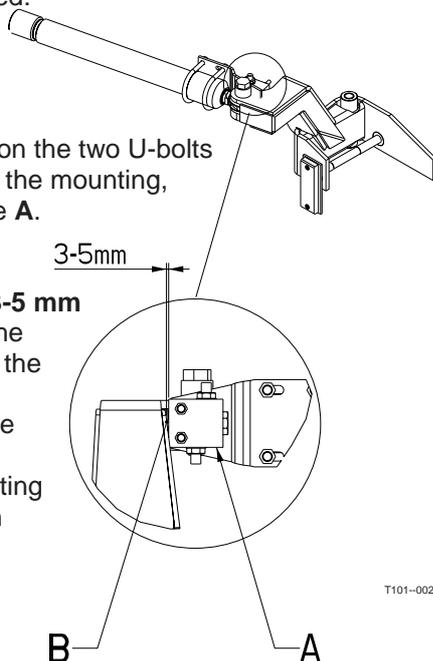
The limit stop valve ensures the activation of the cylinders, which slacken the chains when the boom is unfolded.

Inspect the unfolded boom. The nipple on the black limit-stop-valve must have contact with the red profile, and there must be a distance of **3-5 mm** space between the end-surface of the black valve and the end-surface on the profile. If the dimension between the two check-points deviates, the setting of the mounting holding the valve must be altered:

1. Loosen the nuts on the two U-bolts
2. Reset position of the mounting, holding the valve **A**.

Correct setting: **3-5 mm** space between the end-surface **B** of the valve and the end-surface of the profile.

3. Fasten the mounting again to maintain new position of valve **A**.



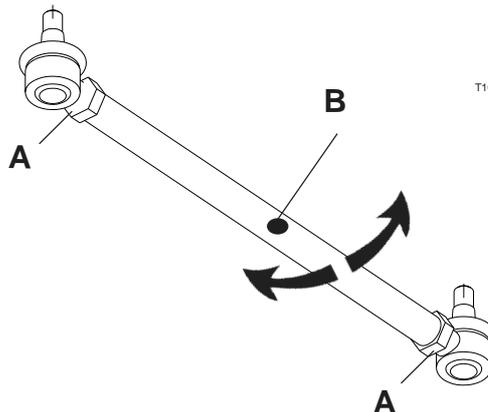
T101-0027

Parallel setting of centre section and MEGA lift

The centre section of the boom and the frame of the MEGA lift must be parallel positioned. If necessary, the length of the 4 steering arms can be adjusted to obtain parallel setting.

Adjustment of each steering arm is performed as follows:

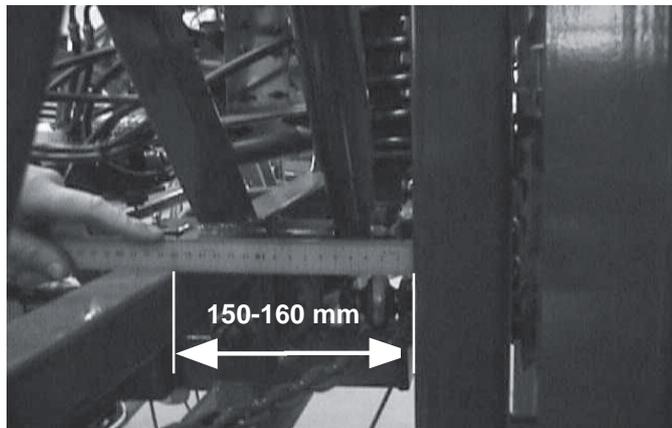
1. Loosen nuts **A**.
2. Place a suitable tool (e.g. a screwdriver) in the hole **B** in the turn buckle, and use the tool to rotate the turn buckle.



T101-0035

- *Clockwise rotation:* The turnbuckle becomes shorter and the distance between centre section and lift decreases.
- *Anticlockwise rotation:* The turnbuckle becomes longer and the distance between centre section and lift increases.

NOTE! The distance must be uniform on both upper and lower frame part, and the distance should be in the span **150-160 mm**. Measure the distances to control the uniformity!



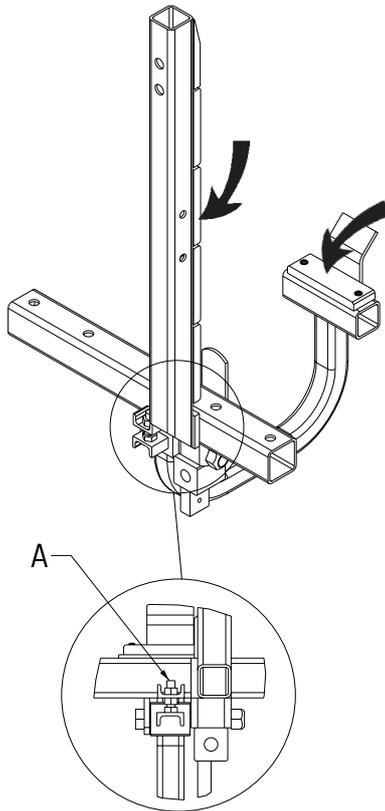
T064-0026

3. When correct setting has been obtained, tighten nuts **A** on the turnbuckle again.

Transport

Transport brackets

When the boom is in folded position: Inspect that the boom wings rest in the transport brackets. Each boom wing must be supported in both sides by the pads (marked with pointers). If not, the height of the transport bracket has to be adjusted. This is done by correcting the position of set screw **A**.



T101-0032

Independent setting of transport position

The transport position of the boom can be set independently. A combination of adjustments form each position.

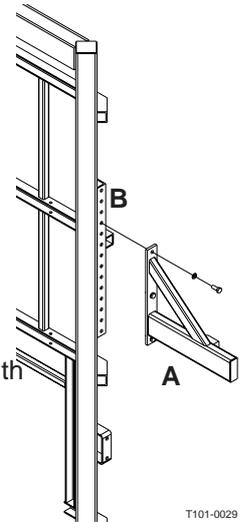
The charts later in this part shows the dimensions of the sprayer in the different positions. When choosing a position, each adjustment must match the settings shown in the chart. Failure to do so may cause serious damages to the sprayer!

NOTE! The position must be identical on both sides of the sprayer.

The sprayer is adjusted as follows and with the boom unfolded:

1. Mounting fitted to the MEGA frame

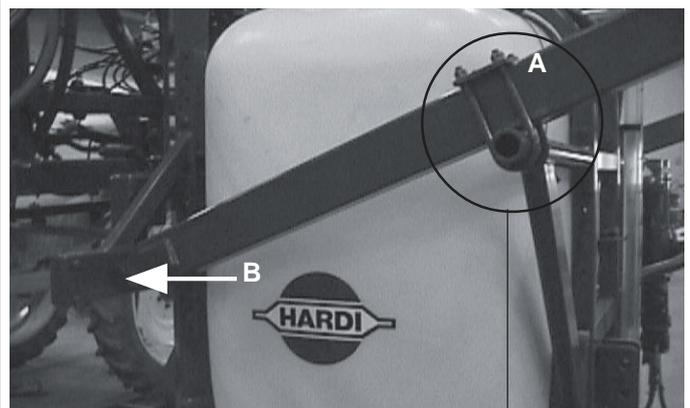
1. Loosen and remove the 3 bolts, which hold the mounting **A** to the frame.
2. Now place mounting **A** in correct position according to the punctuation **B**. Please refer to chart for correct setting. The number given in the chart, shows which hole in punctuation **B** (counted from above) that is to be assembled with the top-hole of mounting **A**.
3. Reassemble.



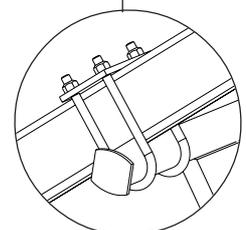
T101-0029

2. Position of the transport bracket

1. Loosen the 2 U-bolts and remove the mounting **A** from its present position.
2. Loosen and remove the big bolt **B**, positioned at the end of the bracket mounting.
3. Place the bracket mounting on the correct side of the horizontal tube section - either above or below. Please refer to chart for correct setting.
4. Reassemble in reverse order

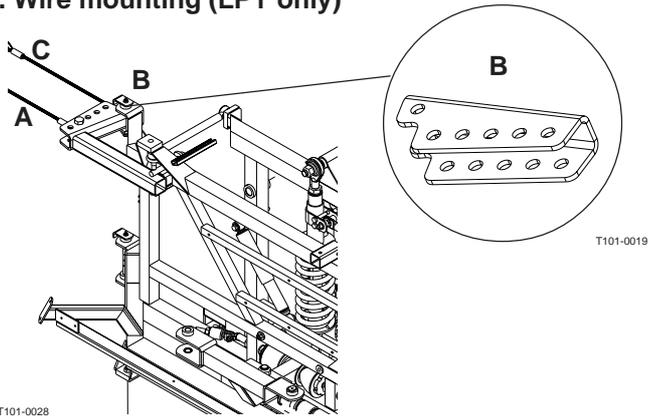


T064-0036



T101-0037

3. Wire mounting (LPY only)



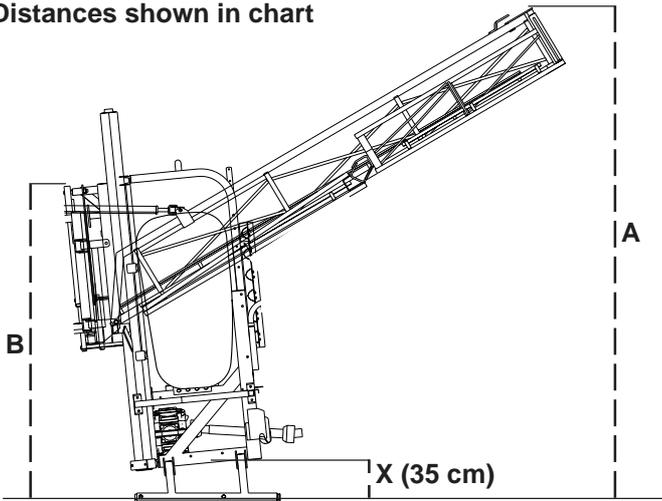
1. Loosen the nut and remove the bolt, which holds the wire **A** to the mounting **B**.
2. Place the wire **A** in correct position (please refer to chart) and reassemble.

IMPORTANT! Only replace position of the wire **A**. Do not loosen or replace wire **C** during this adjustment!



Notes:

Distances shown in chart



- A:** Distance from the top of the boom wing to ground level.
- B:** Distance from the top of the pendulum to ground level.
- X:** The transport positions are determined on the basis of a vertical clearance from frame to ground of **35 cm** (at a nozzle-height of **50 cm**).

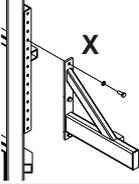
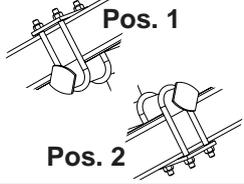
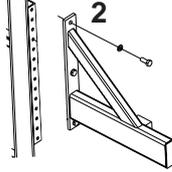
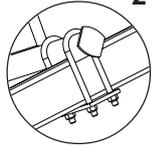
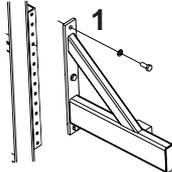
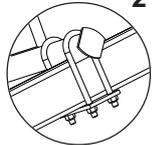
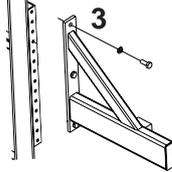
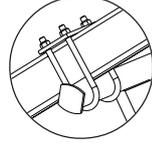
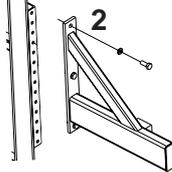
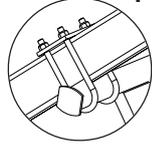
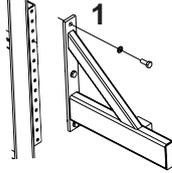
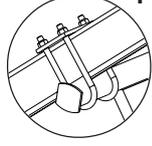
Transport positions, LPY booms

		Distance A (cm)		Distance B (cm)			
		15-18 m boom	20-24 m boom	-			
POS 1	1200l	320	345	-			
	800/1000l	335	365	-			
POS 2	1200l	305	330	-			
	800/1000l	320	350	-			
POS 3	1200l	290	310	-			
	800/1000l	300	325	-			
POS 4	1200l	275	290	-			
	800/1000l	285	300	-			
POS 5	1200l	375	-	-			
	800/1000l	395	-	-			
POS 6	1200l	360	400	-			
	800/1000l	380	-	-			
POS 7	1200l	350	385	-			
	800/1000l	370	-	-			

Choose a setting. Follow the exact adjustments for this setting!

T101-0038
T101-0028
T101-0036
T101-0037

Transport positions, LPZ booms

		Distance A (cm)		Distance B (cm)		
		15-18 m boom	20-24 m boom	-		
POS 1	1200l	260	265	265		
	800/1000l	265	275	265		
POS 2	1200l	240	245	270		
	800/1000l	240	245	270		
POS 3	1200l	335	365	-		
	800/1000l	350	390	-		
POS 4	1200l	320	345	-		
	800/1000l	330	360	-		
POS 5	1200l	305	325	-		
	800/1000l	310	335	-		

Choose a setting. Follow the exact adjustments for this setting!

T101-0038
T101-0036
T101-0037

Operating instructions

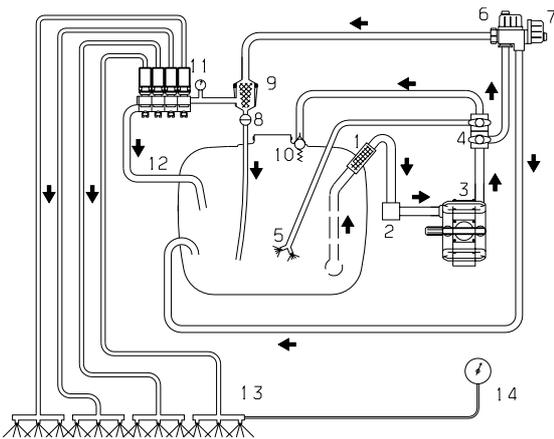
MANIFOLD SYSTEM

The MANIFOLD SYSTEM is located at the left side of the sprayer and permits operation of all HARDI optional extras from one position. The modular system facilitates the addition of up to three optional extras on the suction side and five 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

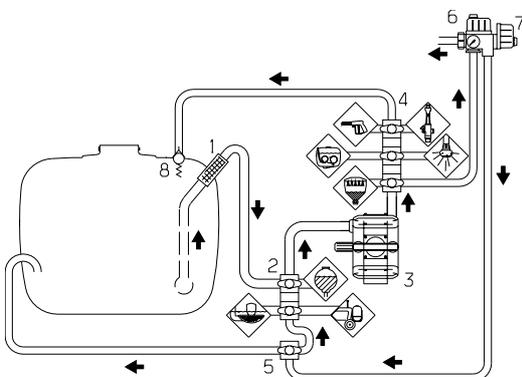
- | | |
|----------------------|---------------------------------------|
| 1. Suction filter | 9. Self-cleaning filter |
| 2. Suction manifold | 10. Safety valve |
| 3. Pump | 11. Distribution valves |
| 4. Pressure manifold | 12. Return from Pressure Equalisation |
| 5. Pressure agitator | 13. Sprayer boom |
| 6. On/Off | 14. Pressure gauge |
| 7. HARDI MATIC | |
| 8. Ball valve | |

EC



T050-0010

EC with optional equipment



T055-0019

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

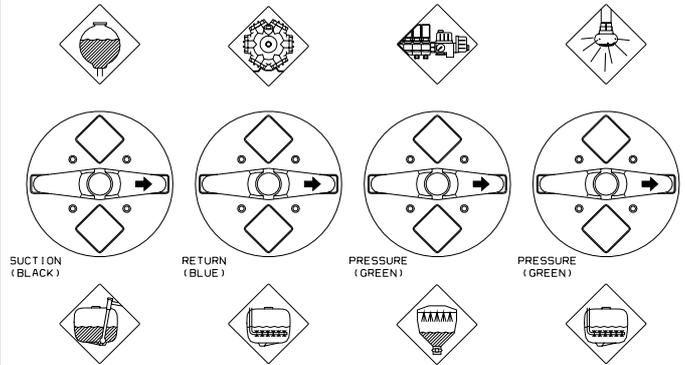
Use of MANIFOLD valve system

The following pictograms and colours are used for the visualizing the function of the MANIFOLD valves:

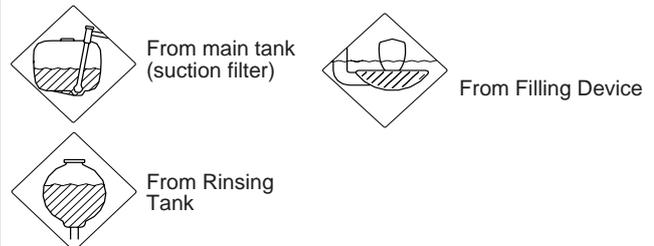
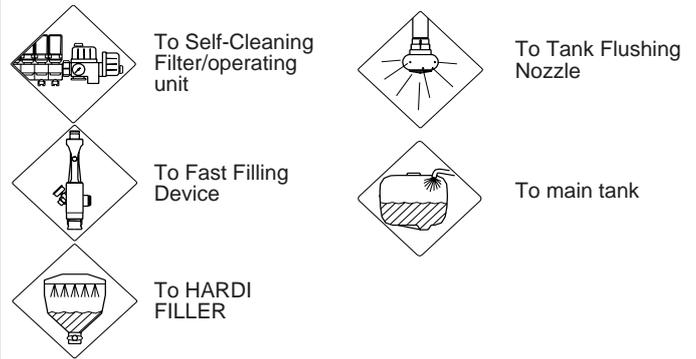
Green disc = Pressure valve

Black disc = Suction valve

Blue disc = Return valve

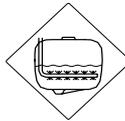


T020-0002

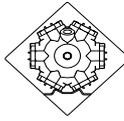




Blue disc = Return valve



Agitation
(spraying position)



Pump suction line
(to facilitate emptying
the tank completely)

To operate the spraying functions:

- Turn the handle on a green pressure valve towards the function desired
- Turn the handle on a black suction valve towards the desired function
- Turn the handle on the blue return valve towards the desired direction of return flow
- Close all remaining valves by setting the handle(s) on “O”

IMPORTANT! Please note, that the valves and functions and the number of valves, may vary from machine to machine depending on optional equipment fitted. Only the functions to be used must be open - always close remaining valves.

Electric operated MANIFOLD valves (if fitted)

One or more MANIFOLD valves can be electrically operated via a control box in the tractor cab. These can only be operated manually when the power to the valve motor is disconnected first.

Filling of main tank

Water can be filled into the main tank in following ways:

1. Filled through tank lid.
2. Filled by diaphragm pump through a suction side fitted filling device (optional extra) using normal pump capacity directly to the tank.
3. Filled by diaphragm pump through a pressure side fitted injector/venturi type Fast Filling Device (optional extra) using up to 3 times normal pump capacity.
4. Combination of 2 and 3.

The tank should normally be filled 1/3 with water, before adding the chemicals - always read instruction on chemical container!

Filling through tank lid

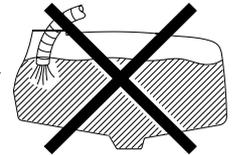
Remove tank lid and fill water through strainer to prevent rust or other particles to enter the tank.

An overhead tank can be used in order to obtain high filling capacity.

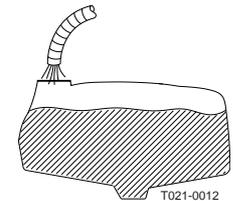
It is recommended to use as clean water as possible for spraying purposes.



WARNING! DO NOT LET FILLING HOSE ETC. ENTER THE TANK. KEEP IT OUTSIDE THE TANK, POINTING TOWARDS THE FILLING HOLE.



IF THE HOSE IS LEAD TO THE BOTTOM OF THE TANK, AND THE WATER PUMP AT THE WATER SUPPLY PLANT STOPS, CHEMICALS CAN BE SIPHONED BACK AND CONTAMINATE THE WATER SUPPLY LINES.

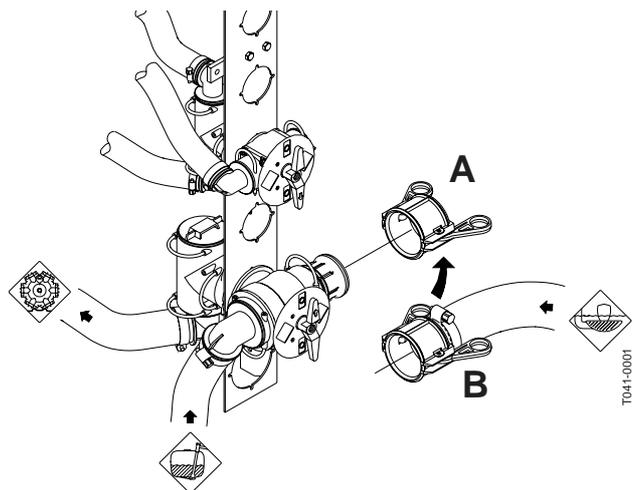


Suction Filling Device (if fitted)

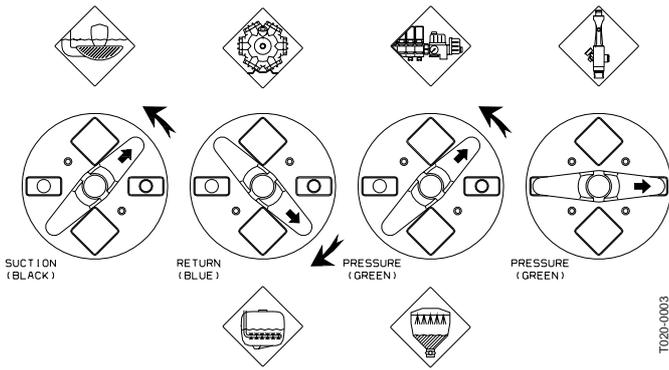


WARNING! Avoid contamination or personal injury. Do not open suction valve towards Suction Filling Device unless pump is running and filling hose is connected. If this valve is opened without pump running, liquid will stream out of the MANIFOLD.

The Suction Filling Device is operated as follows:



1. Remove cover **A**, and connect suction hose **B** to Suction Manifold.
2. Engage diaphragm pump and set P.T.O. revolutions at 540 r/min. Turn handle on Suction Manifold towards Filling Device.



3. The tank is now filled with water. Keep an eye on liquid level indicator.
4. Turn handle on Suction Manifold away from Filling Device to discontinue filling process. Then disengage pump.
5. Disconnect suction tube **B** and replace cover.

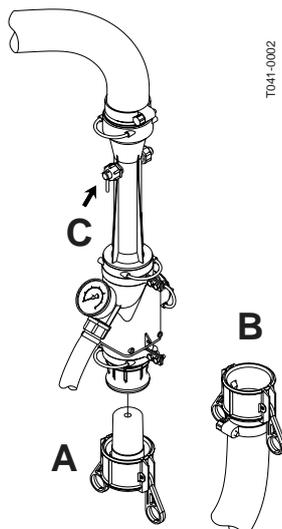
NOTE! Observe local legislation regarding use of Filling Device. In some areas it is prohibited to fill from open water reservoirs (lakes, rivers etc.). It is recommended only to fill from closed reservoirs (mobile water tanks etc.) to avoid contamination.

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

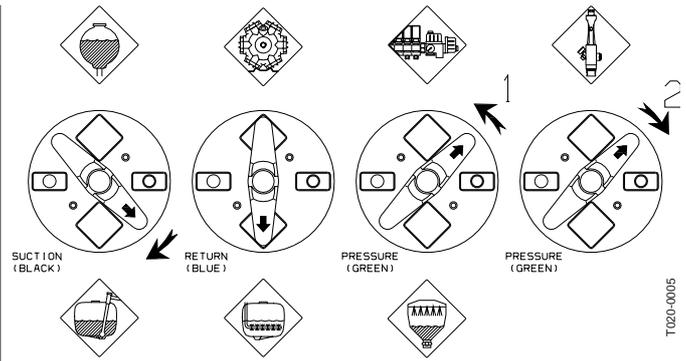
Fast Filling Device (if fitted)

The Fast Filling Device is operated as follows:

1. Ensure spray liquid tank contains at least 50 litres of water.
2. Remove cover **(A)** and connect suction hose **(B)**.
3. Turn handle on Pressure Manifold towards Fast Filler. With the P.T.O. at 540 r/min, the pressure gauge should indicate about 10 bar.
4. If water is not seen in transfer tube, prime by turning valve **(C)**.
5. Keep eye on liquid level indicator.
6. Turn handle on Pressure Manifold away from Fast Filler to discontinue filling process.

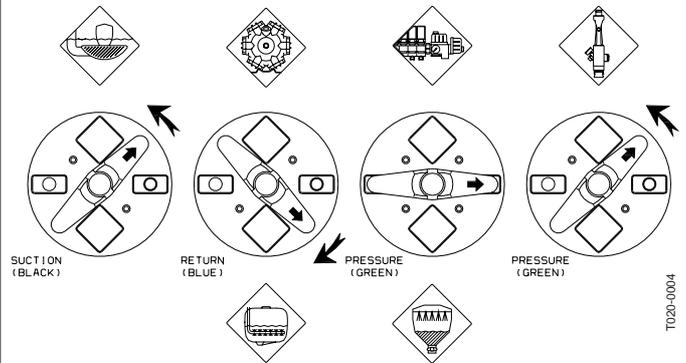


NOTE: Turn handle towards EC-operating unit **before** turning away from Fast Filler in order to avoid peak pressure blowing the safety valve!



7. Disconnect suction tube **(B)** and replace cover.

The Filling Device and the Fast Filling Device can be used simultaneously - this gives even bigger filling capacity.



WARNING! Do not leave the sprayer whilst refilling the tank, and keep an eye on the level gauge in order **NOT** to overfill the tank!

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

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

Filling of rinsing tank (if fitted)

The rinsing tank(s) are situated under the main tank. Only fill with clean water. Depending on the capacity of the main tank, the sprayer is to be equipped with one or two rinsing tanks:

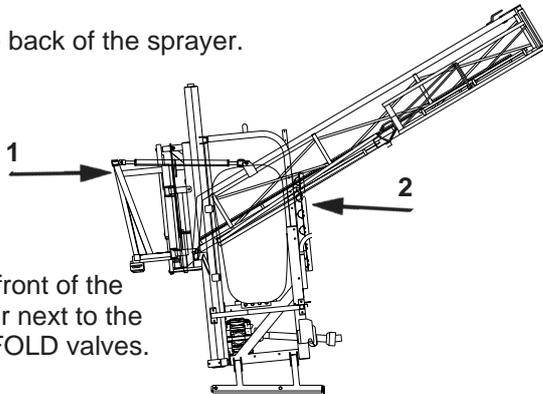
Capacities are:

Model	Rinsing tanks recommended	Total rinsing tank capacity in litre
800 l	1	80
1000 l	2	160
1200 l	2	160

Filling of clean water tank (if fitted)

The clean water tank has a capacity of 15 l (3.3 Imp. gal). The water from this tank is for hand washing, cleaning of clogged nozzles etc. Only fill this tank with clean water from the well. The clean water tank can be fitted via a mounting in two different places:

1. On the back of the sprayer.

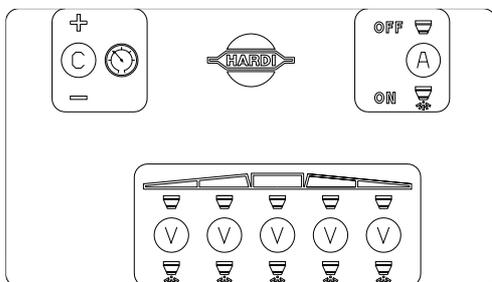
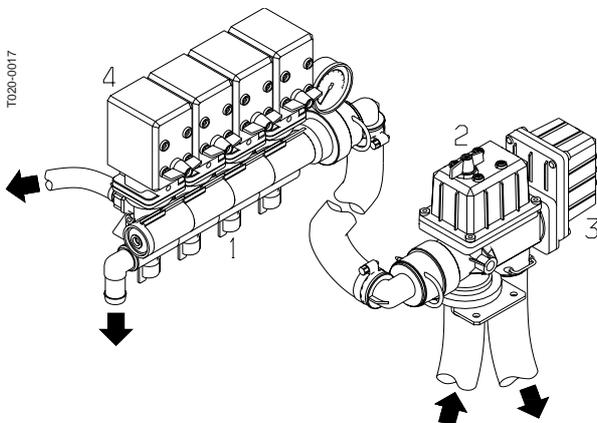


2. In the front of the sprayer next to the MANIFOLD valves.



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

Adjustments of EC operating unit



Before spraying, the EC 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. On-off switch **A** is activated against green.
3. All distribution valve switches **V** are activated against green.
4. Pressure regulation switch **C** is activated until emergency handle **3** 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 travelling speed. Remember the number of revolutions on the P.T.O. must be kept between 300-600 rpm.
6. Pressure regulation switch **C** is activated until the required pressure is shown on the pressure gauge.

ADJUSTMENT OF PRESSURE EQUALISATION

1. Close the first distribution valve switch **V**.
2. Turn the adjusting screw **1** until the pressure gauge again shows the same pressure.
3. Adjust the other sections of the distribution valve in the same way.

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

1. YOU CHANGE TO NOZZLES WITH OTHER CAPACITIES
2. THE NOZZLE OUTPUT INCREASES AS THE NOZZLES WEAR

OPERATING THE CONTROL UNIT WHILE SPRAYING

In order to close the entire boom, switch ON/OFF **A** 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 **V** to off position. The pressure equalisation ensures that the pressure does not rise in the sections which are to remain open.

When the sprayer is put aside, the control box and the multi plug must be protected against moisture and dirt.

A plastic bag may be used to protect the multi plug.

Remote pressure gauge (if fitted)

The remote pressure gauge measures the working pressure in the boom tubes as close to the nozzles as possible. This pressure reading will always be slightly lower than the reading at the operating unit pressure gauge.

The outputs stated in the nozzle charts are always based on the pressure measured at the nozzle.

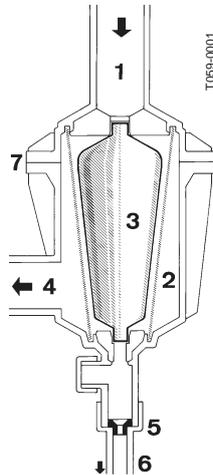
Always adjust pressure when calibrating and spraying according to readings at the Remote pressure gauge.

Filters

All filters should always be used, and their function checked regularly. The mesh size of the filter in use should always be smaller than the flow average of the nozzles used. Therefore, pay attention to the correct combination of filters, mesh size.

Self-cleaning filter
Operating diagram

1. From pump
2. Double filter screen
3. Guide cone
4. To operating unit
5. Replaceable restrictor
6. Return to tank
7. Screw-joint

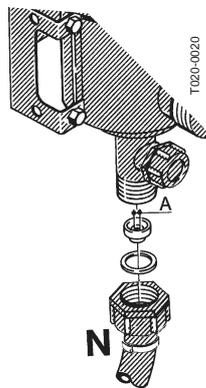


Choice of correct restrictor

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 orifice) first.

The hose **N** is demounted at the self-cleaning filter, the restrictor is put 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. Sizes of 50 and 100 mesh are available and can be changed by opening the filter top, and replace the strainer. Check the O-rings before reassembling the filter and replace if damaged.

Filling of chemicals.

Chemicals can be filled in the tank in 2 ways:

1. Through tank lid.
2. By means of HARDI FILLER chemical filling device.

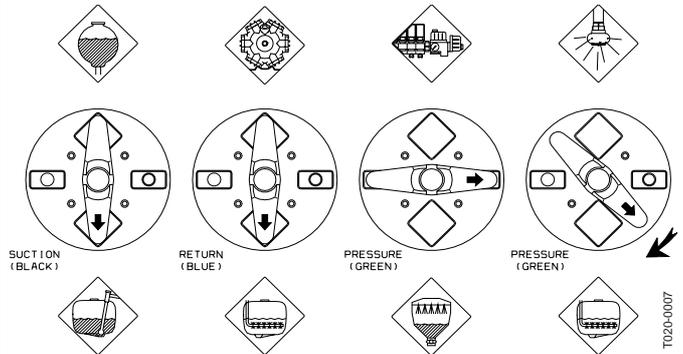
Filling through tank lid

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

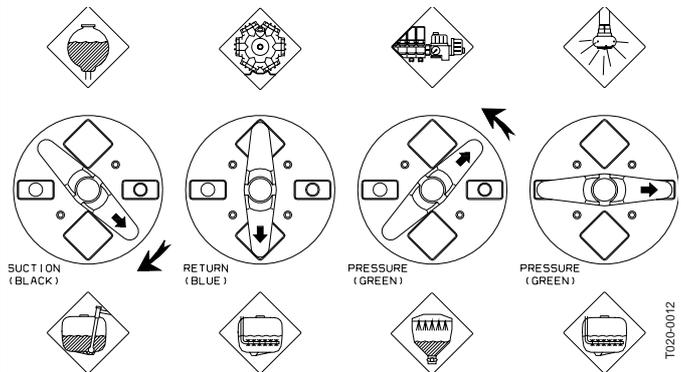


WARNING! Be careful not to slip or splash chemicals when carrying chemicals up to the tank lid!

1. Make sure the EC on/off valve is switched off.
2. Set the MANIFOLD valves to correct position. Black valve "Suction from main tank", green valve towards "Agitation" and Blue valve towards "Agitation".



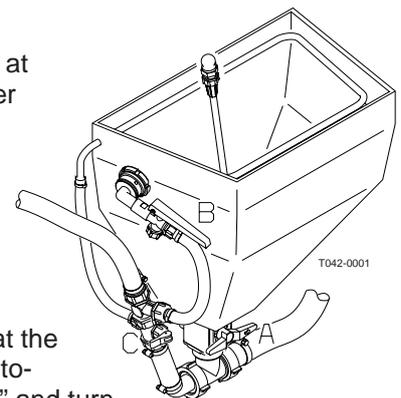
3. Engage the pump and set P.T.O. revs. to 540 r.p.m.
4. Add the chemicals through the main tank hole.
5. When the spray liquid is well mixed, turn handle on the Pressure Manifold towards "Spraying" position. Keep P.T.O. engaged so the spray liquid is continuously agitated until it has been sprayed on the crop.



Filling by HARDI FILLER chemical inductor

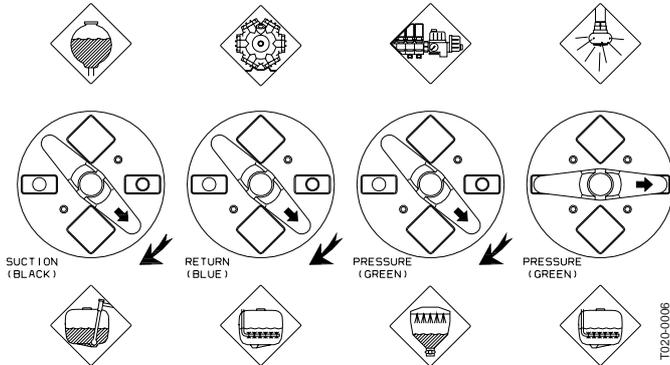
Liquid chemicals:

1. Fill the main tank at least 1/3 with water (unless something else is stated on the chemical container label). See section "Filling of water".
2. Turn the handle at the Suction Manifold towards "Main tank" and turn



blue return valve towards “Agitation”. Close remaining valves.

- Turn the handle at the Pressure Manifold towards “HARDI FILLER”. Close remaining valves. Check that bottom valve **A** at the FILLER is closed.



- Engage the pump and set P.T.O. speed at 540 r.p.m.
- Open FILLER lid.
- Measure the correct quantity of chemical and fill it into the hopper.

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

- Open the bottom valve **A** and the chemical is transferred to the main tank.
- If the chemical container is empty it can be rinsed by the container rinsing device (if fitted). Place the container over the multi-hole nozzle and press the lever **B**.

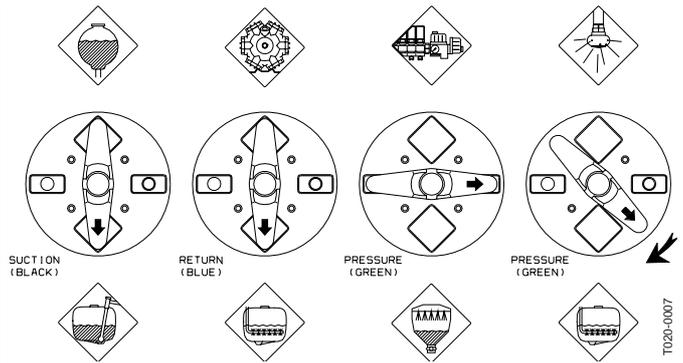
 **WARNING!** Do not press lever **B** unless the multi-hole nozzle is covered by a container to avoid spray liquid hitting the operator.

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

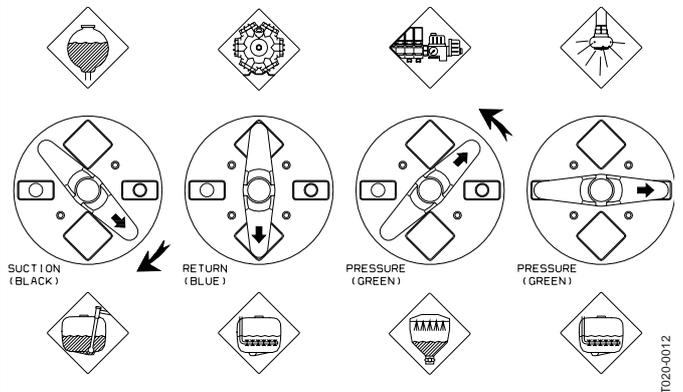
- Engage the hopper rinsing device by opening valve **C**.
- Close valve **C** again when the hopper is rinsed.

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

- Close valve **A** and the FILLER lid again.
- Turn handle at the Pressure Manifold towards “Intensive Agitation” and close remaining valves.

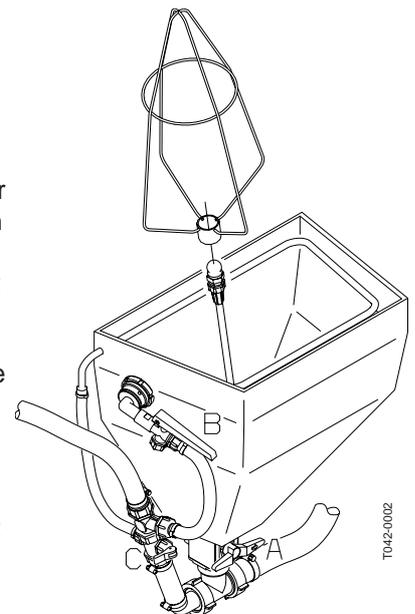


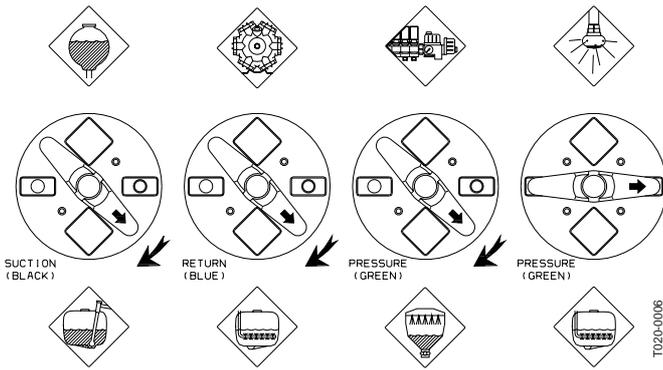
- When the spray liquid is well mixed, turn handle on the Pressure Manifold towards “Spraying” position. Keep P.T.O. engaged so the spray liquid is continuously agitated until it has been sprayed on the crop.



Powder chemicals:

- Fill the main tank at least 1/2 with water (unless something else is stated on the chemical container label). See section “Filling of water”.
- Turn the handle at the Suction Manifold towards “Main tank” and turn blue return valve towards “Agitation”. Close remaining valves.
- Turn the handle at the Pressure Manifold towards “HARDI FILLER”. Close remaining valves.





T020-0006

4. Engage the pump and increase P.T.O. speed to 540 r.p.m.
5. Open the bottom valve **A** at the FILLER. Open FILLER lid.
6. Engage the hopper rinsing device by opening valve **C**.
7. Measure the correct quantity of chemical and sprinkle it into the hopper as fast as the rinsing device can flush it down.
8. If the chemical container is empty it can be rinsed by the container rinsing device (if fitted). Fit the bag bracket and place the powder bag over the multi-hole nozzle and press the lever **B**.



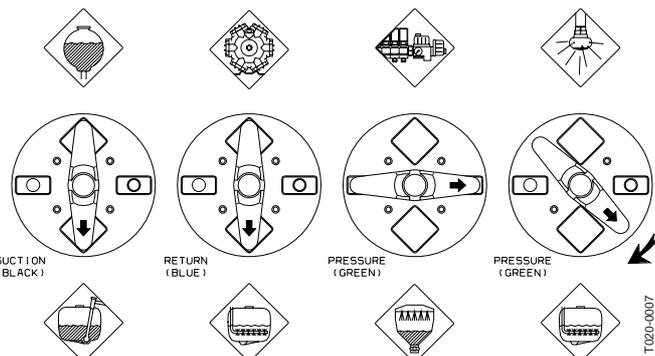
WARNING! Do not press lever **B** unless the multi-hole nozzle is covered by a container to avoid spray liquid hitting the operator.

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

9. Close valve **C** again when the hopper is rinsed.

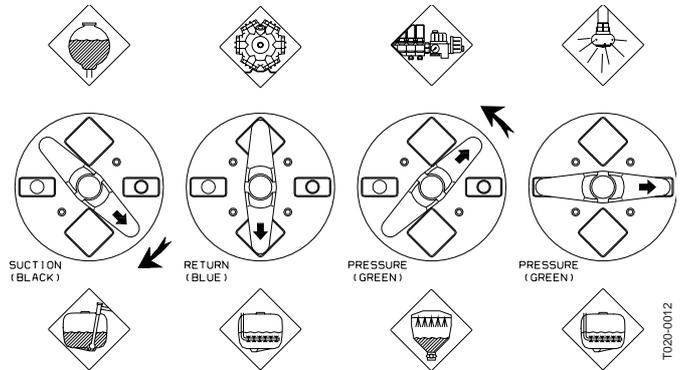
IMPORTANT! The hopper rinsing device is using spray liquid to rinse the hopper for concentrated chemical. The FILLER must always be cleaned together with the rest of the sprayer when the spray job is done.

10. Close valve **A** and the FILLER lid again.
11. Turn handle at the Pressure Manifold towards "Intensive Agitation" and close remaining valves to mix the spray liquid.



T020-0007

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

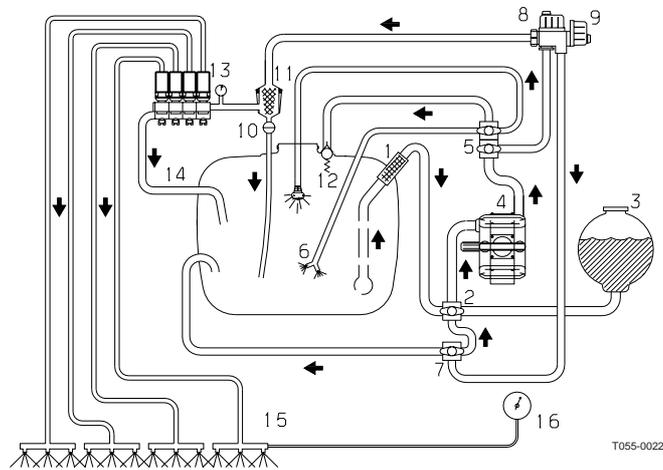


T020-0012

Use of rinsing tank and rinsing nozzles (if fitted)

The rinsing tank can be used for two different purposes.

- A.** In-field diluting of remaining spray liquid residues in the spraying circuit for spraying the liquid in the field, before cleaning the sprayer.



T055-0022

1. Empty the sprayer as much as possible. Turn the blue valve **6** towards pump and spray till air comes out of all nozzles.
2. Remove the tank filter basket.
3. Turn suction valve **2** towards rinsing tank.
4. Turn pressure valves **5** towards rinsing nozzle (if fitted).
5. Engage and set the pump at appr. 300 r.p.m.
6. When rinsing water corresponding to appr. 10 times the spray liquid residue (see paragraph "Technical Residue") is used, turn back suction valve towards suction from main tank and operate all valves, so all

hoses and components are rinsed.

7. Turn pressure valve **5** back to EC operating unit and spray liquid in the field you have just sprayed.
8. Repeat point 3-7 until the rinsing tank is empty.

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

1. Turn suction valve **2** towards rinsing tank.
2. Turn blue return valve **6** (if fitted) towards pump suction line.
3. Engage the pump and spray water from rinsing tank in the field until all nozzle tubes/nozzles are flushed with clean water.
4. Disengage pump again.

WARNING! 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!



Technical Residue

Inevitably a quantity of spray liquid remains in the system and cannot be sprayed properly on the crop, as the pump takes in air when the tank is about to be empty.

This Technical Residue is defined as the remaining liquid qty. in the system as the first clear pressure drop on the pressure gauge is read.

	Residue, litre					
	With Blue Return Valve			Without Blue Return Valve		
	800	1000	1200	800	1000	1200
Dilutable Residue*	-	-	-	-	-	-
Total Residue**	-	-	-	-	-	-

1 litre= 0.264 US Gal. 1 litre = 0.220 Imp Gal.

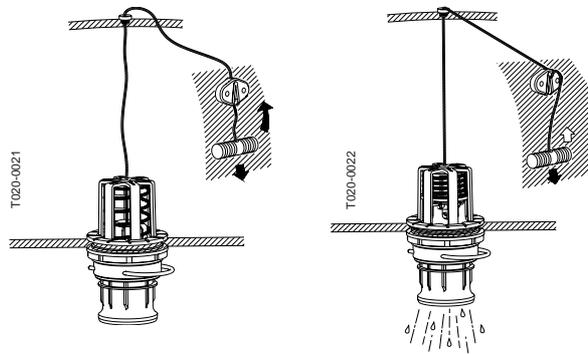
*) Residue in main tank, possible to dilute with water from rinsing tank

**) Total residue in tank and spraying circuit on standard sprayer. Variations due to different ground inclinations etc.

The dilutable residue must be diluted 10 times with clean water and sprayed to the crop just sprayed, before cleaning the sprayer - See paragraph "Cleaning".

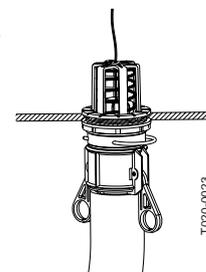
Operation of the tank drain valve

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.



Rinsing tank drain valve

To avoid algae developing in the rinsing tank always drain the rinsing tank when the sprayer is not in use for a long period.

Spray Technique - see separate book.

Safety precautions



Always be careful when working with crop protection chemicals!

Personal protection

Dependant on which type of chemical used, the following protective clothing/equipment should be used:

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

This equipment should be worn to avoid contact with the chemicals!

- Protective clothing/equipment should be used when preparing the spray liquid, during the spraying work and when cleaning the sprayer. Also follow the recommendations on the chemical label.
- It is always advisable to have clean water available, especially when filling the sprayer with the chemical.
- Always clean the sprayer carefully and immediately after use.
- Do not mix different chemicals in the tank.
- Always clean the sprayer before changing to another chemical.

Liquid fertilisers

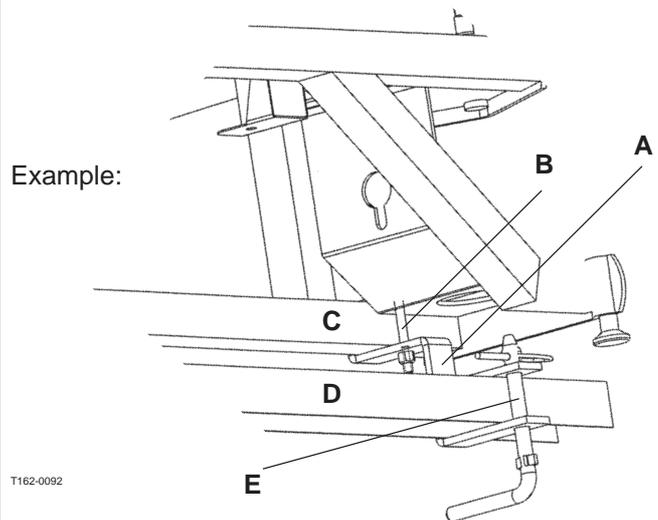
For the application of liquid fertiliser, a set of fertiliser equipment is available for the MEGA-LPY/LPZ as optional extra.

The fertiliser equipment is easily mounted to the spray boom.

One frame, containing a distribution tube, is fitted to each boom section. Each frame is mounted by two fittings.

Each fitting **A** is mounted by a bolt **B** to the spray boom **C**.

Each frame **D** can then fastened to the fittings **A** by a dowel **E**, which is secured by a linchpin.



T162-0092

IMPORTANT! Each fitting must be mounted to the spray boom right between two triplets. Failure to do so may disturb the spray pattern during the application of pesticides.

All tubes on the fertiliser frames will now have to be mutually connected by means of a special tube section at each boom fold.

The drippe hoses can then be screwed on to the non-drip-valves on the tubes along the frames.

For further information, please refer to instructions accompanying the fertiliser equipment.



Maintenance

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

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



Cleaning the sprayer 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.

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 an approved 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 and 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, e.g. overnight, or until the weather becomes suitable for spraying again. Unauthorised persons and animals must not have access to the sprayer under these circumstances.

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 cannot be damaged by pesticides and their solvents.

Cleaning

1. Dilute remaining spray liquid in the tank with at least 10 parts of water and spray the liquid out in the field you have just sprayed - See paragraph "Use of rinsing tank and rinsing nozzles". **NOTE:** It is advis-

able to increase the forward speed (double if possible) and reduce the pressure. For S4110 nozzles, pressure may be reduced to 1.5 bar (20 psi).

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 $\frac{1}{5}$ 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.
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 by-pass 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 lose 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 lubrication of the entire machine is recommended.

Cleaning and maintenance of filters

Clean filters ensure:

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

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



Lubrication

Recommended lubrication is shown in following tables. Following lubricants are to be used:

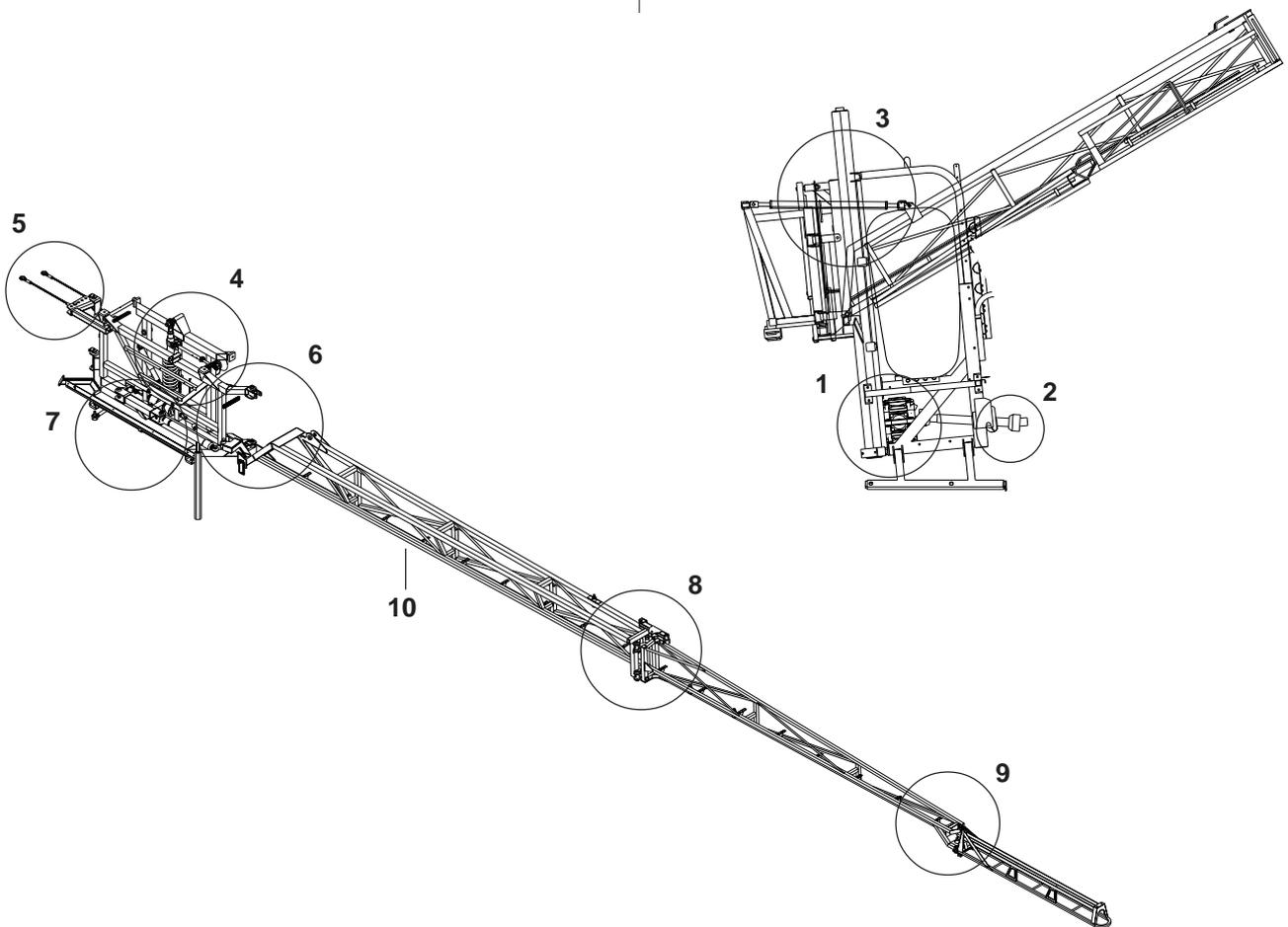
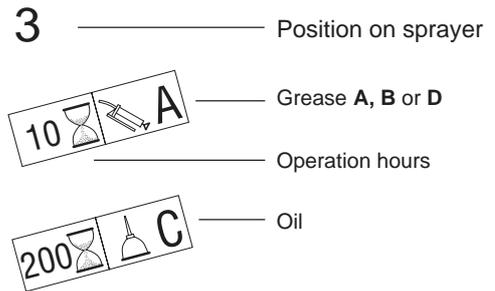
Lubricating point		Lubricant
Ball bearings	 A	Universal Lithium grease, NLGI No. 2 SHELL RETINAX EP2 CASTROL LMX GREASE
Slide bearings	 B	Lithium grease with Molybdenumdisulphide or graphite SHELL RETINAX HDM2 CASTROL MOLYMAX
Oil lub. points	 C	TOTAL Transmission TM SAE 80W/90 Castrol EPX 80/W90 Shell Spirax 80W/90 Mobil Mobilube 80W/90
Yaw dampers	 D	Use a synthetic type of grease, e.g. silicone grease. Never use a compound containing kerosine or mineral oil.

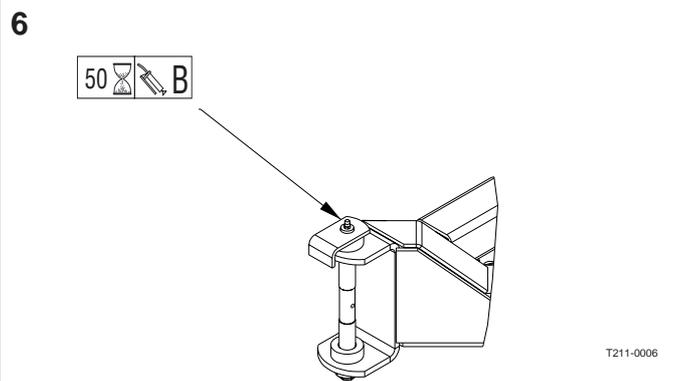
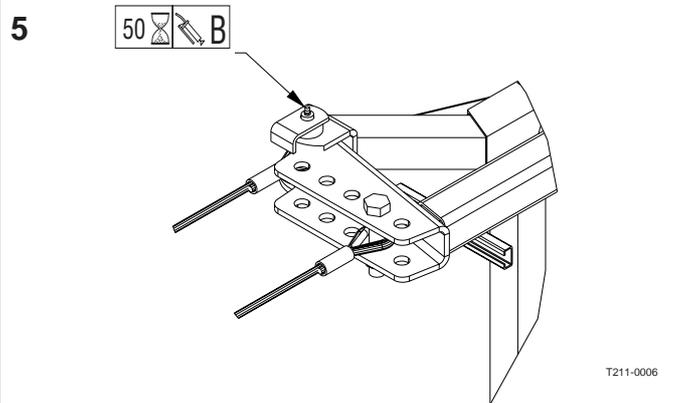
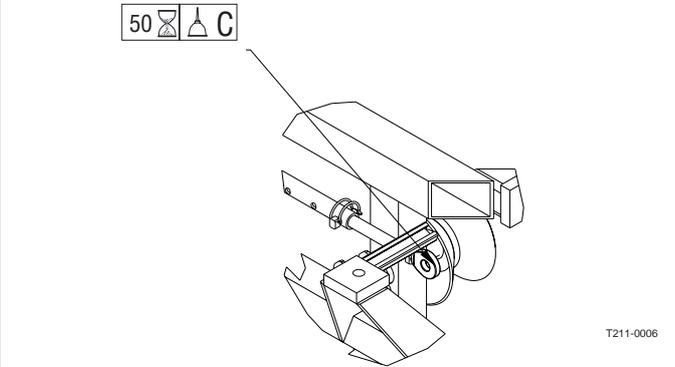
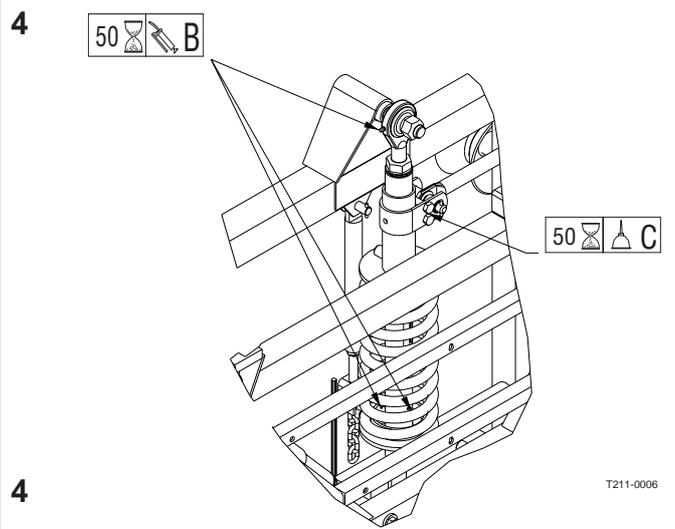
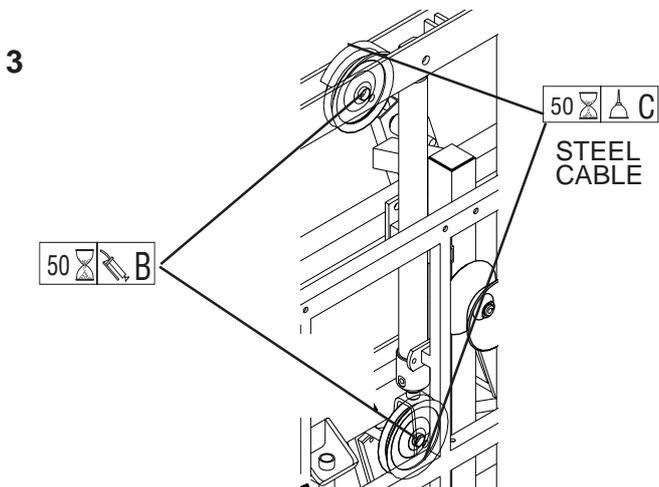
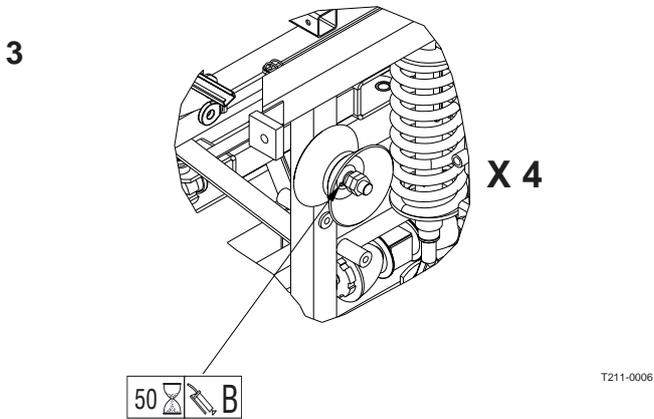
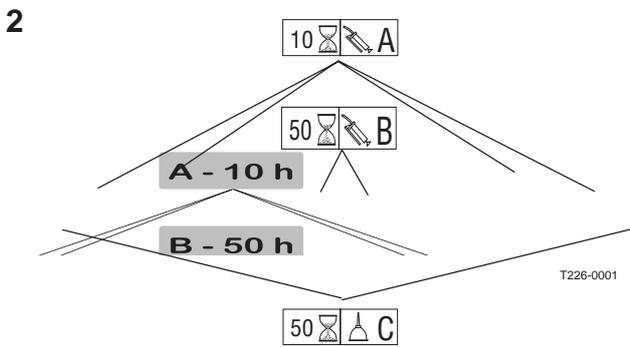
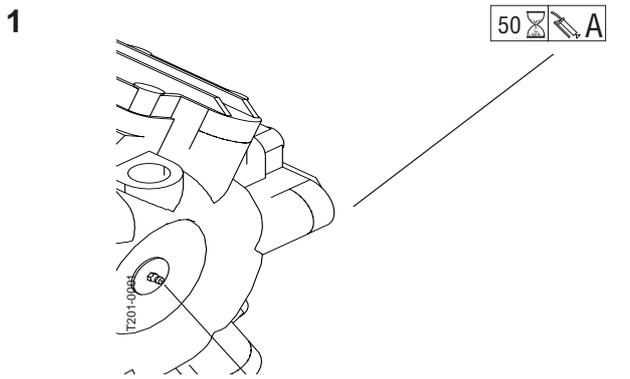
Always store lubricants clean, dry and cool - preferably at a constant temperature - to avoid contamination from dirt and condensed water.

Keep oil filling jugs, hoppers and grease guns clean, and clean the lubricating points thoroughly before lubricating.

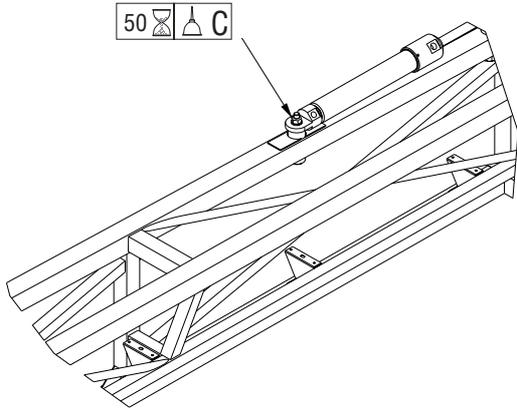
Avoid skin contact with oil products for longer periods.

NOTE! If the sprayer is cleaned with a high pressure cleaner or fertiliser has been used, lubrication of all sections is recommended.



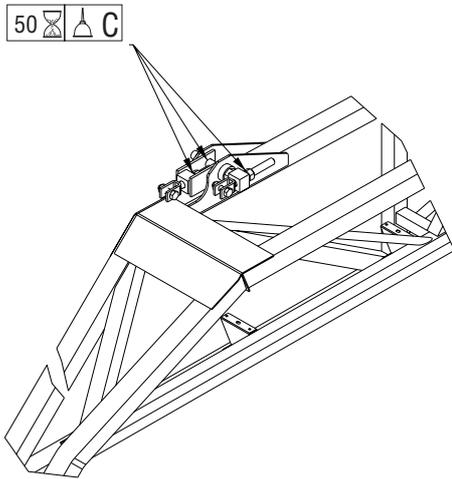


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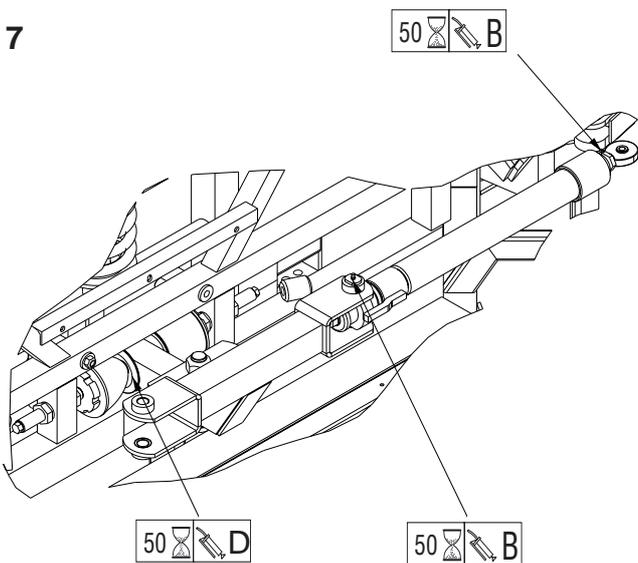
T211-0007

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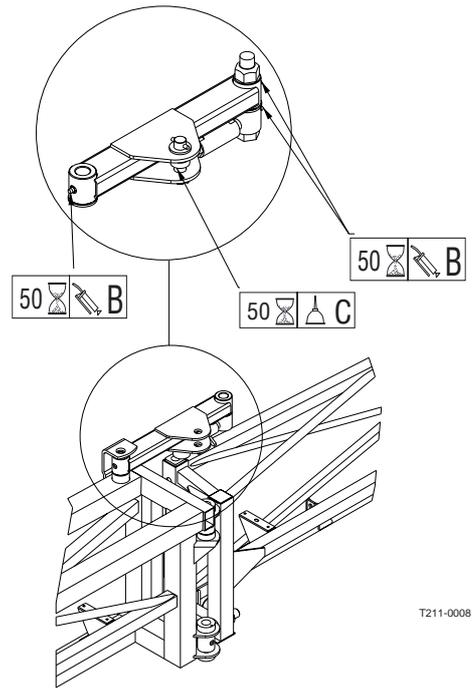
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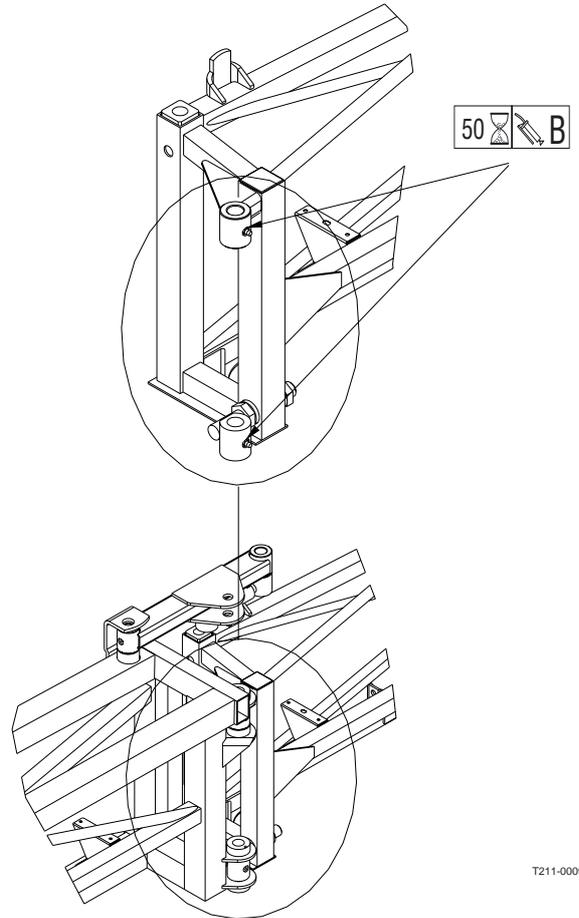
T211-0006

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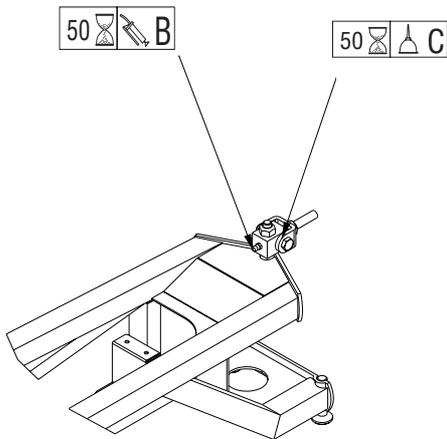
T211-0008

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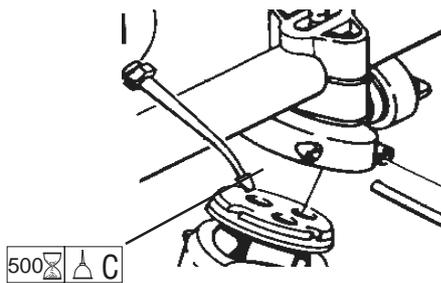
T211-0009

9



T211-0009

10



T219-0003

Service and Maintenance

10 hours service

1. Suction filter, clean
2. Self-cleaning filter, check and clean gauze if necessary
3. In-line filters, clean
4. Nozzle filters, clean
5. Spraying circuit, check for leaks

50 hours service

Do all previous mentioned +

1. Transmission shaft, check condition of protection guards

250 hours service

Do all previous mentioned +

1. Readjustment of the boom
 - a. Horizontal
 - b. Vertical

1000 hours service or yearly, whichever comes first

1. Change of bearings - centre and inner section

Occasional maintenance

1. Boom lift steel cable
2. Change of wear bushes in boom lift wheels
3. Change of bushes in the lift wagon wheels
4. Adjustment of lift wagon wheels
5. Pump valves and diaphragms renewal
6. Ball seat check/renewal, EC on/off valve
7. Cone check/renewal, EC distribution valve
8. Replacement of transmission shaft protection guard
9. Replacement of transmission shaft cross journals
10. Nozzle tubes and fittings
11. Level indicator adjustment
12. Cord renewal, level indicator
13. Seal renewal, drain valve
14. Adjustment of breakaway device
15. Yaw dampers
16. Rubber dampers

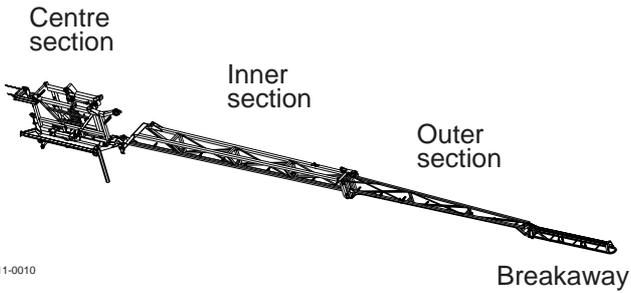


ALWAYS CHECK THAT ALL LOCK NUTS ARE TIGHT AFTER ADJUSTMENT!

Terminology

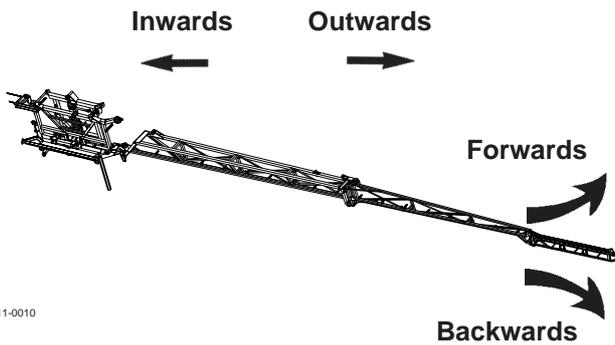
Boom sections

The text in the following part refers to adjustments performed in the folds between the different boom sections. An overview of the names of the sections is shown here:



T211-0010

These terms always refer to the following directions on the boom:



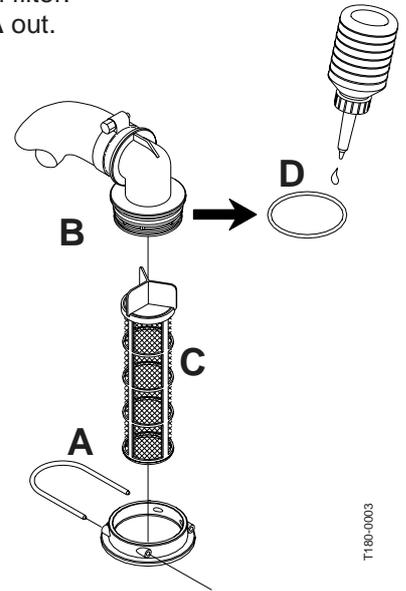
T211-0010

10 hours service

1. Suction filter

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.



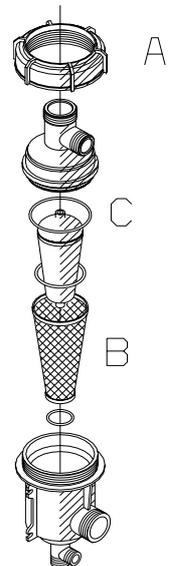
To reassemble:

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**.

T180-0003

2. Self-Cleaning Filter

1. Unscrew nut **A** and open filter.
2. Check filter gauze **B**, clean if necessary
3. Lubricate O-ring **C**
4. Assemble filter again.

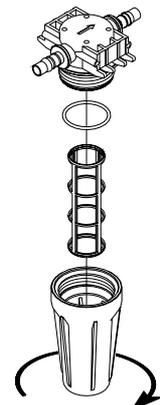


T180-0004

3. In-Line filter (if fitted)

If the boom is equipped with In-Line Filters unscrew the filter bowl to inspect and clean the filter.

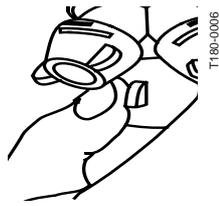
Alternative filters are available. See section on Technical specifications - Filters and nozzles.



T180-0005

4. Nozzle filters

Check and clean.



5. Spraying circuit

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

50 hours service

1. Transmission shaft

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

250 hours service

1. Readjustment of the boom

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

Before adjusting the boom, please go through this check list:

- The sprayer must be lubricated (Please see part about Lubrication)
- Tractor and sprayer must be placed on level ground
- The boom must be unfolded
- Set slanting angle at midway

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

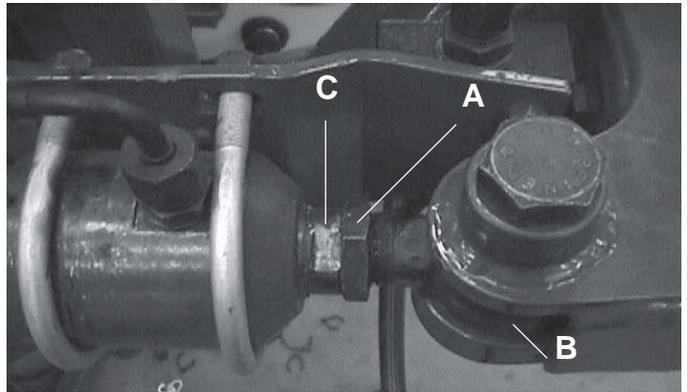
WARNING! NOBODY IS ALLOWED UNDER THE BOOM WHILST ADJUSTMENT IS CARRIED OUT.

In case of doubt about the expressions used in this section, please refer to the part "Terminology"

1a. Horizontal adjustment

Centre and inner section

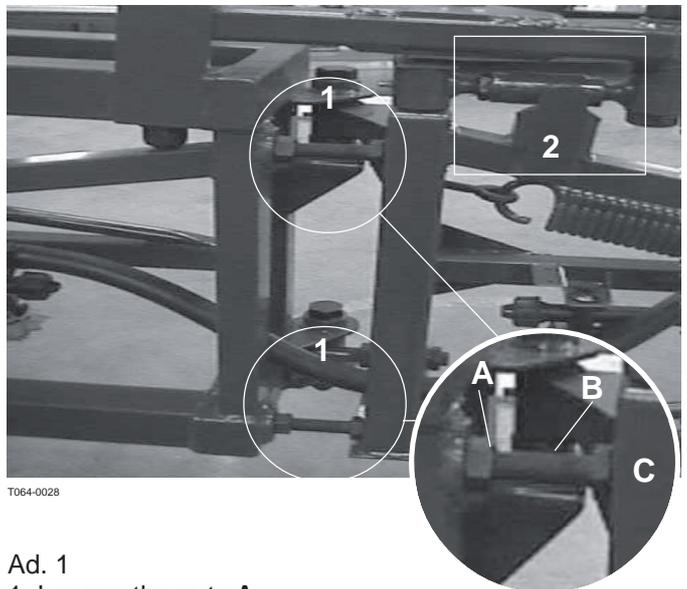
1. Loosen nut **A** on the eye bolt **B**.
2. Adjust the position of the rod end **C**.



- If the piston rod is screwed *outwards*, the boom will point *forwards*
- If the piston rod is screwed *inwards*, the boom will point *backwards*.

3. Tighten nut **A** against rod end **C** again.

Inner and outer section



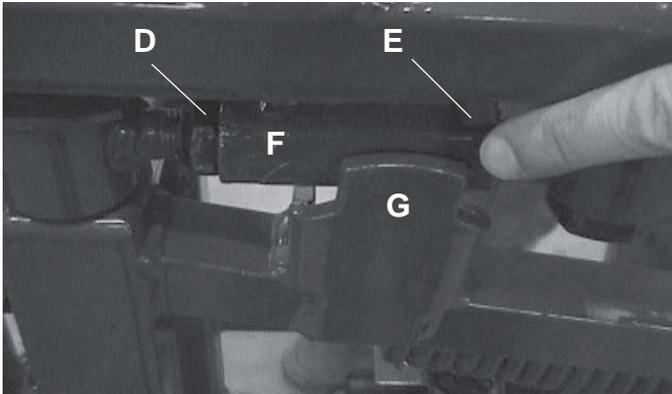
Ad. 1

1. Loosen the nuts **A**.
2. Screw the bolts **B** a bit inwards to create some space between the bolt-heads and the profile **C**.

Proceed with adjustment of the locking device (Ad 2).

Ad 2

3. Loosen the two nuts **D** and **E**.
4. Fold the boom section a little backwards.
5. Rotate the turn buckle **F** to align the boom section.



T064-0029

- *Clockwise rotation:* The boom will point forwards/backwards
- *Anticlockwise rotation:* The boom will point forwards/backwards

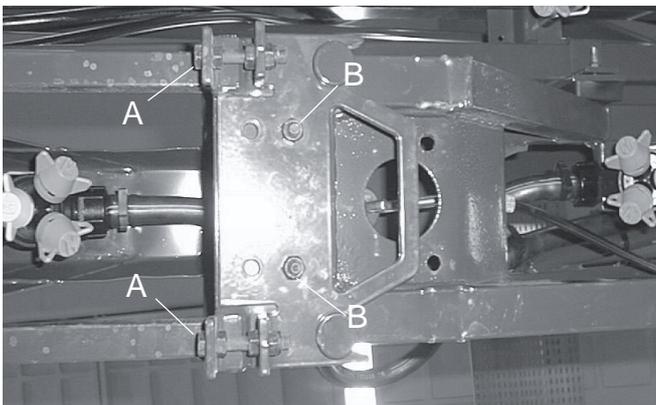
6. Unfold the section again, and inspect the alignment of the boom.

IMPORTANT! Control the position of the turn buckle **F**. This turn buckle must rest firmly against the mounting **G** (= no space between the two parts at all).

5. After alignment, tighten the nuts **D** and **E**.
6. Screw the bolts **B** outwards again till they have contact with the profile **C**, and thereby form a "stop" setting.
7. Tighten the nuts **A** again.

Outer section and breakaway section

1. Loosen the 3 nuts on both of the two horizontal bolts **A**.
2. Loosen the nuts on the two vertical bolts **B** and adjust the setting of these bolts in order to align the breakaway section.
3. Tighten the nuts on the bolts **B** again.
4. Tighten the nuts on the two horizontal bolts **A** again.



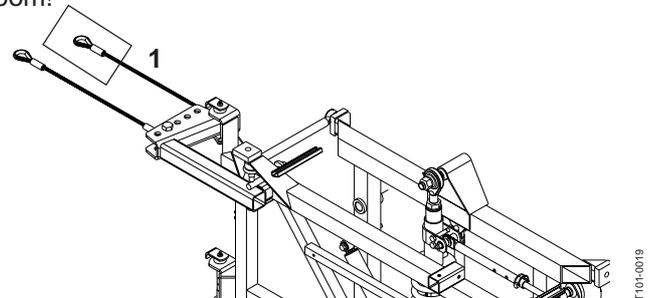
(Upside down)

T064-0030

1b. Vertical adjustment

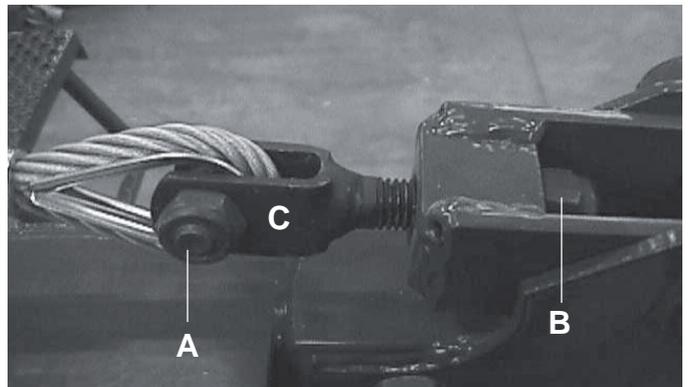
Centre and inner section (LPY only)

IMPORTANT! Support the boom before carrying out this adjustment. Failure to do so will cause a tip over of the boom!



T101-0019

1. Remove the bolt **A**, which holds the wire (1).
2. Hold on to the nut **B** with a spanner and rotate the fork bolt **C** in order to shorten or lengthen the wire.

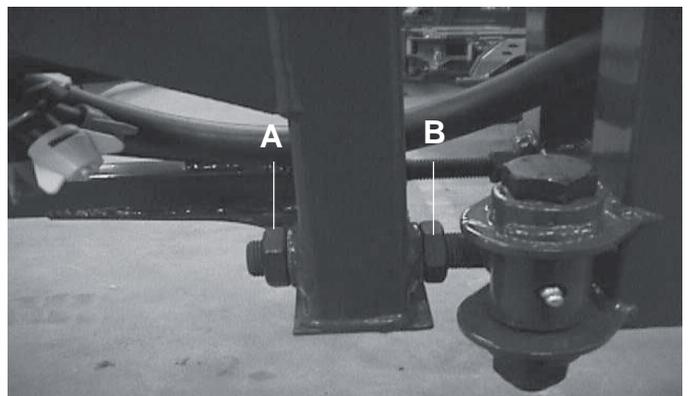


T064-0031

- If **C** is screwed *outwards*, the wire becomes longer and the boom will point *downwards*.
- If **C** is screwed *inwards*, the wire becomes shorter and the boom will point *upwards*.

3. Fit the wire by the bolt **A** again.

Inner and outer section



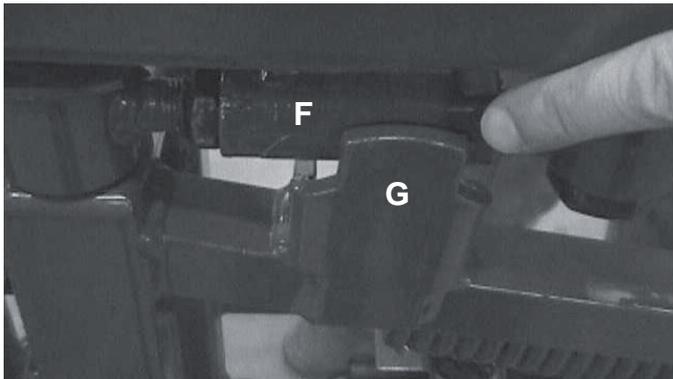
T064-0032

1. Adjust the position of the nuts **A** and **B** by loosening

and tightening them respectively, in order to align the boom sections.

- If the nuts are screwed *outwards* the boom will point *upwards*.
- If the nuts are screwed *inwards*, the boom will point *downwards*.

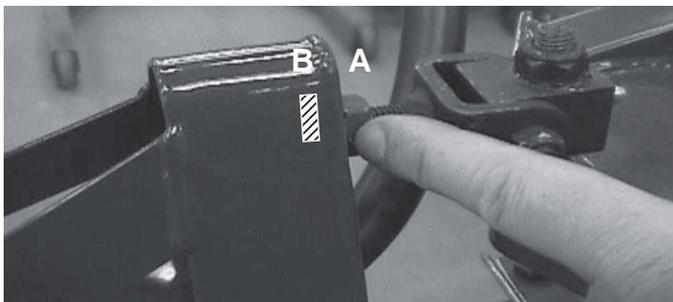
NOTE! If carrying out this adjustment, it may be necessary to readjust the locking device (F+G) to be sure it is set correctly. Please see the part “Horizontal adjustment of inner and outer section” for exact setting.



T064-0029

Outer section and breakaway section

1. Adjust the position of the nuts **A** and **B** by loosening and tightening them respectively.



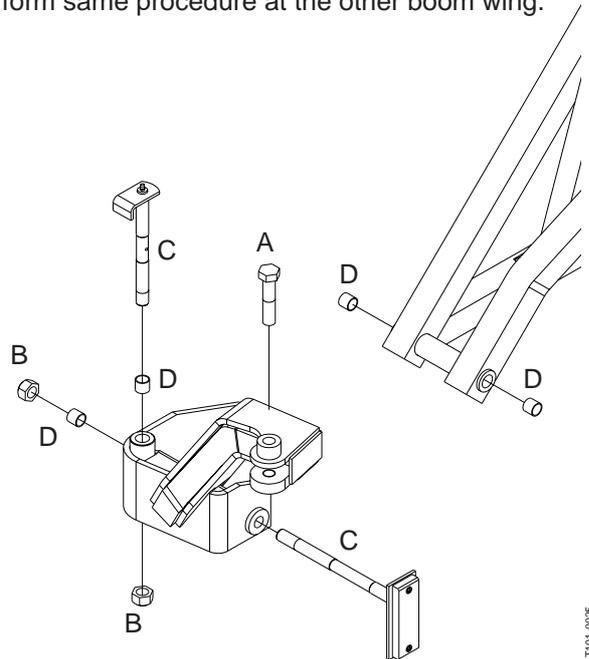
T064-0033

- If the nuts are screwed *outwards* the boom will point *downwards*.
- If the nuts are screwed *inwards*, the boom will point *upwards*.

1000 hours service or yearly, whichever comes first

1. Change of bearings - centre and inner section

1. Connect the sprayer to the tractor.
2. Fold out the boom.
3. Support the boom wing by e.g. some brackets in min. two places, to prevent boom tilt during adjustment.
4. Loosen and remove bolt **A** from the eye bolt on the cylinder.
5. Loosen and remove the nuts **B**, and remove the pins **C**.
6. Replace all bearings **D**.
7. Reassemble in reverse order.
8. Perform same procedure at the other boom wing.



T101-0025

Occasional maintenance

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

Boom lift steel cable

The boom lift steel cable holds the entire boom, and its proper condition is essential. The boom lift steel cable must be inspected for wear and damages with regular intervals.

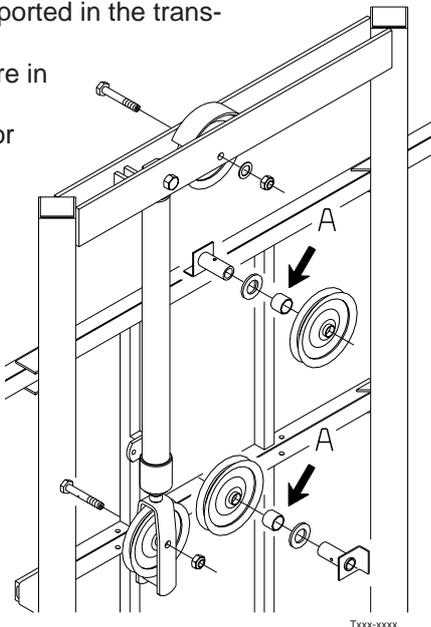
By first sign of wear, broken threads etc. the steel cable must be replaced instantly. The steel cable is lubricated with oil or grease - see lubrication chart.

The sprayer must be connected to the tractor when replacing the boom lift steel cable.

1. Fold boom in transport position, and lower it until it rests in the front and rear transport brackets.
2. Set hydraulic remote control valve in position "lower" so the cable can be removed.
3. Remove the cable.
4. Fit new cable, and secure with split pins. Grease cable - see lubrication chart.

Change of wear bushes in boom lift wheels.

1. Fold boom in transport position. Make sure the boom is supported in the transport brackets.
2. Remove pressure in boom lift ram by setting the tractor spool valve in position "lower".
3. Dismantle the wheel assembly and replace the two wear bushes **A** in both wheels.
4. Reassemble wheel-assembly.
5. Grease wheels through grease nipples.



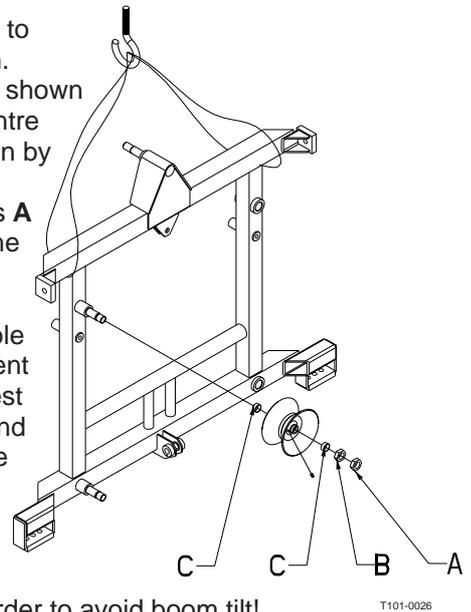
Change of bushes in lift wagon wheels

Periodically check the wear bushes in the boom lift wheels and replace them if worn.

NOTE! Replacement of bushes requires a crane or lift facilities.

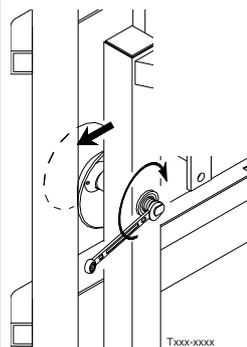
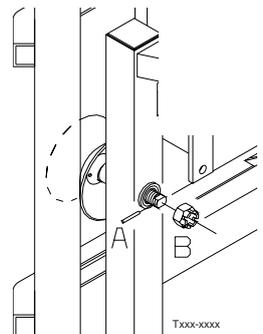
The sprayer must be connected to the tractor first.

1. Unfold the boom to working position.
2. Attach a rope as shown and keep the centre section in position by the crane.
3. Remove the nuts **A** and **B** on all of the four lift wagon wheels.
4. Remove the whole boom arrangement away from the rest of the sprayer, and at the same time make sure the shafts carefully slip out of the lift wagon wheels. Use caution in order to avoid boom tilt!
5. Replace worn bushes **C**.
6. Refit the wheels and reassemble in reverse order.
7. Lower boom and remove rope.
8. Grease through grease nipples.



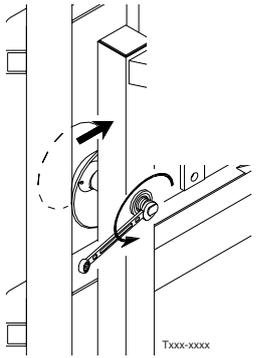
Adjustment of lift wagon wheels

1. Remove cotter pin **A** and loosen castellated nut **B**.

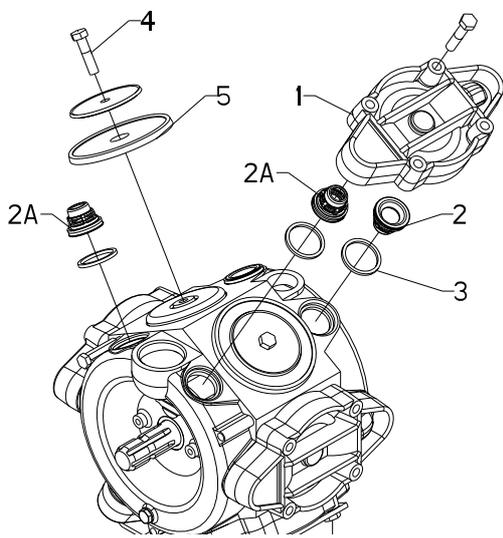


2. Turning the eccentric axle clockwise will decrease the gap between the wheel and the lift. Use a spanner.

3. Turning the eccentric axle counter clockwise will increase the gap between the wheel and the lift. Use a spanner.
4. Make sure that the contact surface between the eccentric axle and liftwagon is free of grease and paint.
5. After adjustment retighten castellated nut **B** and secure with new cotter pin. Torque wrench setting 200 Nm.



Pump valves and diaphragms renewal



Diaphragm pump overhaul kits (valves, seals, diaphragms etc.)

Pump model	HARDI part No.
363	750342
463	750343

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. 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

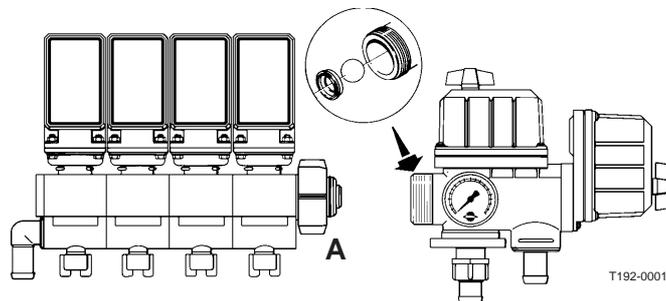
Remove the diaphragm cover **4**. The diaphragm **5** may then be changed. If fluids have reached the crankcase, re-grease the pump thoroughly. Check also the drain hole at the bottom of the pump is not blocked. Reassemble with the following torque setting:

Pump Model	Diaphragm cover Nm	Diaphragm bolt Nm
363	90	90
463	90	90

1 Nm = 0.74 lbft

j. Ball seat check/renewal, EC on/off valve

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.



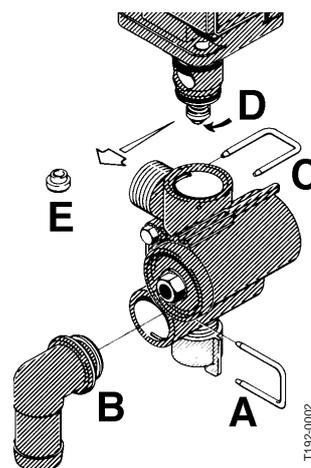
Check the ball for sharp edges and scratches, and check the ball seat for cracks and wear - replace if necessary.

Cone check/renewal, EC distribution valve

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.

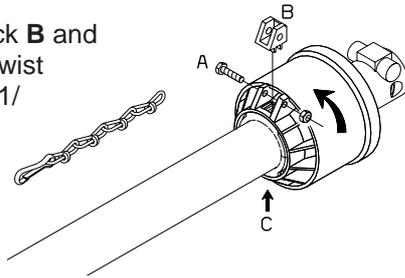
Cautiously remove the clip **A** and pull out the hose **B** for the pressure equalisation device. When the housing is drained, there should be no liquid flow through the pressure equalisation device. If there is any leakage, the valve cone **E** must be changed.

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 reverse order.

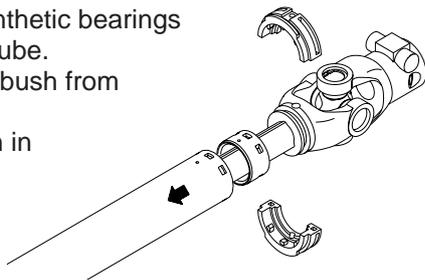


Replacement of transmission shaft protection guards

1. Remove bolt **A**, lock **B** and grease nipple **C**. Twist uni CV-joint cover 1/4 turn and pull it backwards.



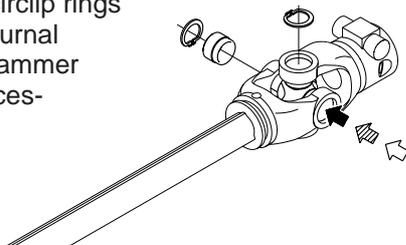
2. Remove the synthetic bearings and protection tube.
- 2a. Remove inner bush from protection tube.
3. Assemble again in reverse order, using new parts where necessary. Remember to fit chains again.
4. Grease bearings.



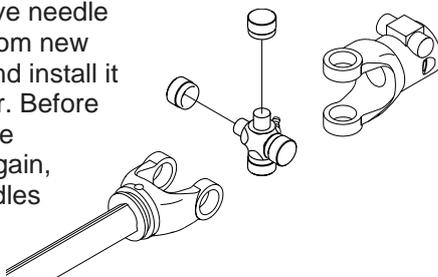
Only use genuine HARDI spare parts to service the transmission shaft.

Replacement of transmission shaft cross journals.

1. Remove protection guard as described previously.
2. Remove Seeger circlip rings
3. Press the cross journal sideways - use hammer and mandrel if necessary.
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.



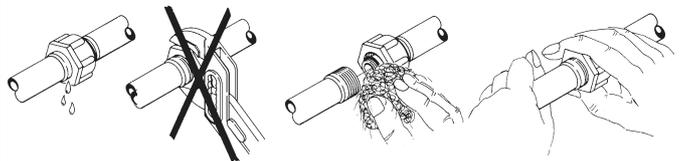
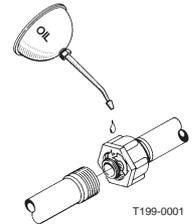
Nozzle tubes and fittings

Poor seals are usually caused by;

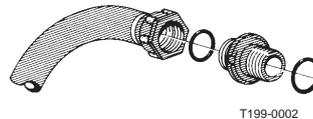
- missing O-rings or gaskets
- damaged or incorrectly seated O-rings
- dry or deformed O-rings or gaskets
- foreign bodies

Therefore, in case of leaks:

DO NOT overtighten. Disassemble, check condition and position of O-ring or gasket, clean, lubricate and reassemble. The O-ring must be lubricated **ALL THE WAY ROUND** before fitting on to the nozzle tube. Use non-mineral lubricant.



For **radial** connections only hand tighten them.

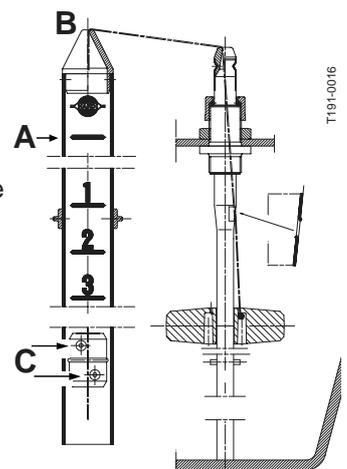


For **axial** connections, a little mechanical leverage may be used.

Level indicator adjustment

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.

Cord renewal, level indicator

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

1. Remove the tank drain valve (see paragraph "Main

tank drain valve”) and loosen the fitting holding the pole in position.

2. Pull the pole down through the drain valve hole till it is free in the top of the tank.
3. The pole can now be taken out of the tank through the filling hole.



DANGER! Do not attempt to enter the tank - the float pole can be removed from outside the tank!

Seal renewal, drain valve

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

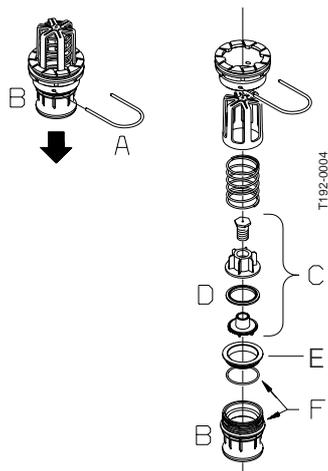


DANGER! Do not enter the inside of the tank - the parts can be changed from underneath the tank!



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

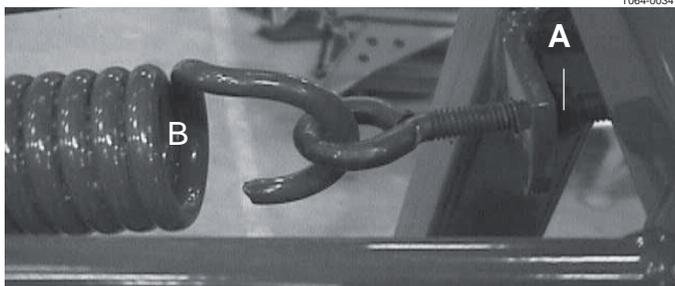
1. Make sure the tank is empty and clean.
2. The valve must be closed and the string loose.
3. Pull out the clip **A** and pull down connecting piece **B**. The entire valve assembly can now be pulled out.
4. Check cord and valve flap assembly **C** for wear, replace seal **D** and assemble again.
5.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



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

Adjustment of breakaway device

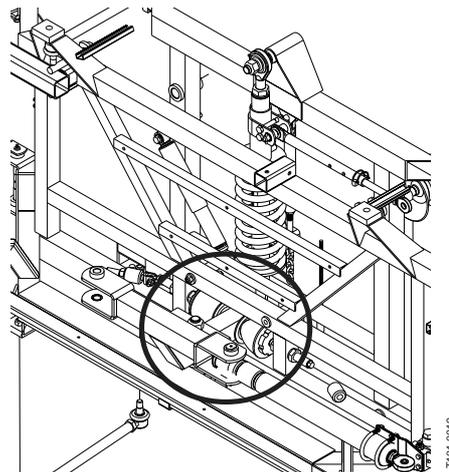
The breakaway device is adjusted by increasing or decreasing the amount of spring loading. Adjust the position of nut **A** on the eye bolt, which holds the spring **B**.



The amount of spring loading needed, can be observed when driving with the sprayer. If the breakaway sections “swing” too much for- and backwards, the spring loading must be increased.

Yaw dampers

To ensure optimal damping and stability of the boom, visual control of the yaw dampers is necessary at regular intervals.



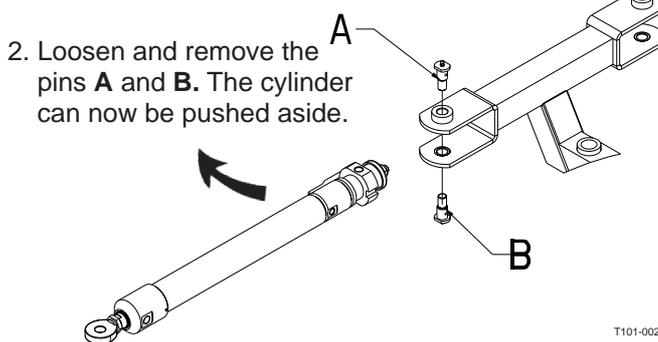
Inspect that the yaw dampers are:

1. Intact (If not, they must be renewed)
2. In a tight position (If not, they must be tightened)

Renewal of yaw dampers

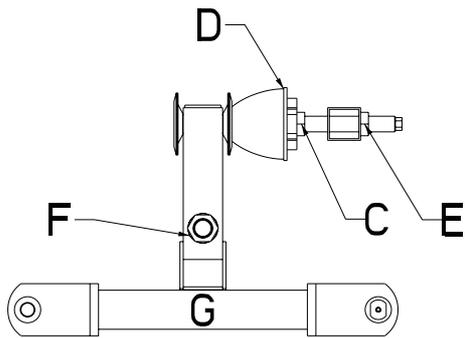
1. Unfold the boom

To get access to the yaw dampers, the position of the two cylinders on the centre section must be altered:



2. Loosen and remove the pins **A** and **B**. The cylinder can now be pushed aside.
3. Repeat this procedure at the opposite cylinder.
3. Screw counter nut **C** inwards and position it against the jag nut **D**.
4. Loosen and remove nut **E**.
5. Loosen and remove nut **F**, and remove the bolt - on which **F** was situated - from below.

Lift the whole profile part **G**, to give full access to the yaw dampers.



6. Remove the shaft containing the yaw damper.
7. Fasten the shaft in e.g. a jig.
8. Loosen and remove jag nut **D** and counter nut **C**.
9. Unscrew the yaw damper from the shaft and replace it with a new one. Grease the top of the new damper.
10. Place the jag nut **D** on the shaft again and fasten it against the new rubber damper. Also fit counter nut **C** on the shaft again.
11. Reassemble in reverse order. Remember to position the nut **C** against the profile now.
12. Carry out the same procedure at the opposite rubber damper.

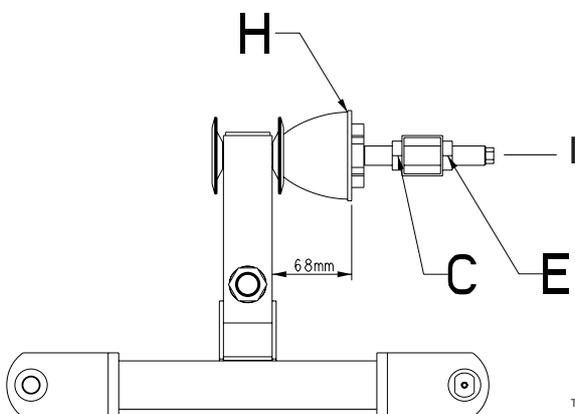
Subsequently, the yaw dampers must be equally tightened.

Tightening the yaw dampers

The two yaw dampers are tightened as follows:

1. Loosen nut **E**.
2. Retain nut **C** against the profile by a spanner while adjusting the bolt head **I** until the yaw damper is fastened.
3. Tighten nut **E** against the profile again.

IMPORTANT! The two yaw dampers must be equally tightened. Therefore, control that the distance between plate **H** and the profile is **68 mm** for both dampers.



Rubber dampers

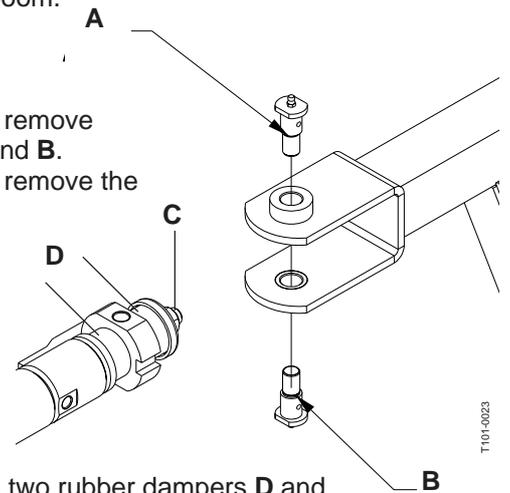
To ensure optimal damping and stability of the boom, visual control of the rubber dampers is necessary at regular intervals.

Inspect that the rubber dampers are:

1. Intact (If not, they must be renewed)
2. In a tight position (If not, they must be tightened)

Renewal of rubber dampers

1. Unfold the boom.



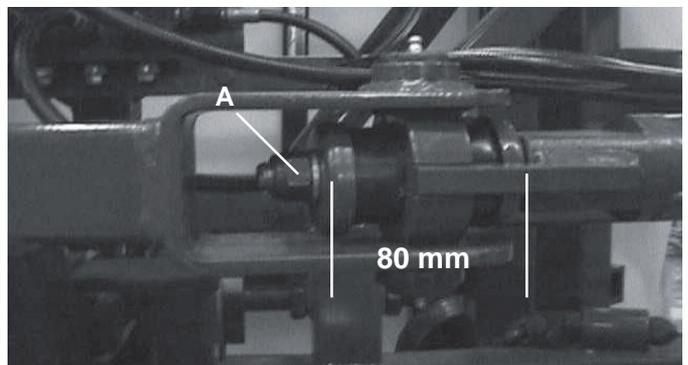
2. Loosen and remove the pins **A** and **B**.
3. Loosen and remove the nut **C**.
4. Remove the two rubber dampers **D** and replace them with two new ones.
5. Reassemble in reverse order.
6. Carry out the same procedure at the other cylinder.

Subsequently, the yaw dampers must be equally tightened.

Tightening the rubber dampers

The two rubber dampers are tightened as follows:

1. Adjust the position of nut **A** until the rubber dampers are fastened.



IMPORTANT! Each set of rubber dampers on both of the cylinders must be equally tightened. Therefore, control that the distance between the two plates, shown on the picture, is **80 mm** on both cylinders.



Off-season storage

When the spraying season is over, you should devote some extra time to the sprayer.

If chemical residues are left over in the sprayer for longer periods, it can reduce the life of the individual components.

To preserve the sprayer intact and protect the components, carry out following off-season storage program.

1. Clean the sprayer completely - inside and outside - as described under "Cleaning of the sprayer". Make sure that all valves, hoses and auxiliary equipment has been cleaned with detergent and flushed with clean water afterwards, so no chemical residues is left in the sprayer.
2. Renew possible damaged seals and repair possible leaks.
3. Empty the sprayer completely and let the pump work for a few minutes. Operate all valves and handles to drain as much water off the spraying circuit as possible. Let the pump run until air is coming out of all nozzles. Remember to drain the rinsing tank also.
4. Pour appr. 50 litre (11 Imp.gal) anti-freeze mixture consisting of 1/3 automotive anti-freeze and 2/3 water into the tank.
5. Engage the pump and operate all valves and functions on the MANIFOLD, operating unit, FILLER etc. allowing the anti-freeze mixture to be distributed around the entire circuit. Open the operating unit main on/off valve and distribution valves so the anti-freeze is sprayed through the nozzles as well. The anti-freeze will also prevent O-rings, seals, diaphragms etc. from drying out.
6. Lubricate all lubricating points according to the lubricating scheme regardless of intervals stated.
7. When the sprayer is dry remove rust from possible scratches or damages in the paint and touch up the paint.
8. Remove the glycerine-filled pressure gauges and store them frost free in vertical position.
9. Apply a thin layer of anti-corrosion oil (e.g. SHELL ENNIS FLUID, CASTROL RUSTILLO or similar) on all metal parts. Avoid oil on rubber parts and hoses.
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 the HARDI PILOT control box + display from the tractor, and store them dry and clean (in-house).
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. To protect against dust the sprayer can be covered

by a tarpaulin. Ensure ventilation to prevent condensation.

Preparation after off-season storage

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

1. Remove the cover
2. Wipe off the grease from hydraulic ram piston rods.
3. Fit the pressure gauges again. Seal with Teflon tape.
4. Connect the sprayer to the tractor including hydraulics and electric's.
5. Check all hydraulic and electric functions.
6. Empty the tank for remaining anti-freeze.
7. Rinse the entire liquid circuit on the sprayer with clean water.
8. Fill with clean water and check all functions.



Fault-finding

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.
- Hydraulic components that are contaminated with dirt result in rapid wear to the hydraulic system.

Therefore ALWAYS check:

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

Fault	Probable cause	Control / remedy
Liquid system No spray from boom when turned on.	Air leak on suction line.	Check if suction filter O-ring is sealing. Check suction tube and fittings. Check tightness of pump diaphragm and valve covers.
	Air in system.	Fill suction hose with water for initial prime.
	Suction/pressure filters clogged.	Clean filters. Check yellow suction pipe is not obstructed or placed too near the tank bottom.
Lack of pressure.	Incorrect assembly.	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 air tight.	Check vent is clear.
	Sucking air towards end of tank load.	Lower pump r.p.m.
Pressure increasing	Pressure filters beginning to clog.	Clean all filters.
Formation of foam.	Air is being sucked into system.	Check tightness / gaskets / O-rings of all fittings on suction side.
	Excessive liquid agitation.	Reduce pump r/min. Check safety valve for Self-Cleaning Filter is tight. Ensure returns inside tank are present. Use foam damping additive.
Liquid leaks from bottom of pump.	Damaged diaphragm.	Replace. See Changing of valves and diaphragms.

MEGA-LPY/LPZ

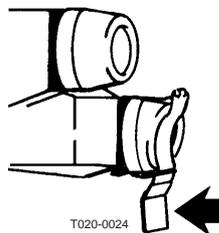
Fault	Probable cause	Control / remedy
EC Operating unit Operating unit not functioning	Blown fuse(s).	Check mechanical function of microswitches. Use cleaning/lubricating agent if the switch does not operate freely. Check motor. 450-500 milli-Amperes max. Change motor, if over.
	Wrong polarity.	Brown - pos. (+). Blue - neg. (-).
	Valves not closing properly.	Check valve seals for obstructions. Check microswitch plate position. Loosen screws holding plate a 1/2 turn.
	No power.	Wrong polarity. Check that brown is pos. (+), Blue is neg. (-). Check print plate for dry solders or loose connections. Check fuse holder are tight around fuse.
	D.A.H. Hydraulic system No boom movements when activated	Insufficient oil pressure
	Insufficient oil supply.	Oil flow must be min. 10 l/min. and max. 90 l/min. Check tractor hydraulic oil level.
	Blown fuse.	Check / replace fuse in junction box.
	Bad / corroded electrical connections	Check / clean connections, multi plugs etc.
	Insufficient power supply.	Voltage on activated solenoid valve must be more than 8 Volts. Use wires of at least 4 mm ² for power supply.
	Defect relay / diodes in junction box.	Check relays, diodes and soldering at PCB in junction box
	Clogged restrictors B or C in by-pass block.	Remove and clean restrictors B and C in by-pass block (See hydraulic diagram) Change hydraulic oil + filter
	Wrong polarity.	Check polarity. White pos. (+) Blue neg. (-).
Boom lift raises to max. pos. when tractor hydraulics are engaged	Wrong oil inlet to by-pass block.	Connect hydraulic snap couplers opposite in tractor outlets, or engage spool valve lever in opposite direction
	Back pressure in return line exceeds 20 bar	Connect the return line with free flow to hydraulic oil reservoir. Divide return line in two and lead return oil back to reservoir via two spool valves.
Oil heats up in Closed Centre systems	By-pass valve 0 does not close properly	Check / replace locking clip on by-pass valve 0 .
	Internal leaks in flow regulator	Replace flow regulator O-rings and back-up rings. Replace flow regulator.
Individual ram does not move	Clogged restrictor	Dismantle and clean restrictor

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 the sprayer

The boom

In case of power failure the boom can be operated manually by pressing the individual buttons on the solenoid valves. This is done by locking the by-pass valve, as is done when using tractors with closed centre hydraulics.

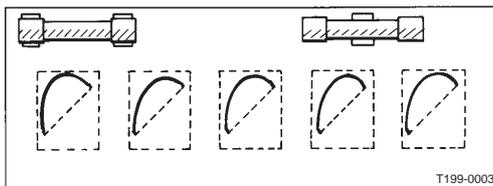


Remove the protection box of the solenoid valves at the boom. The boom can now be operated by pressing the individual buttons on the solenoid valves.

Remember to reset the system to Open Centre hydraulic, if the tractor has an Open Centre (Constant Flow) hydraulic system.

The problem may be due to a blown fuse. One spare fuse is located inside the junction box.

Fuse type:
T10 A 250 V
HARDI ref.
No. 261272

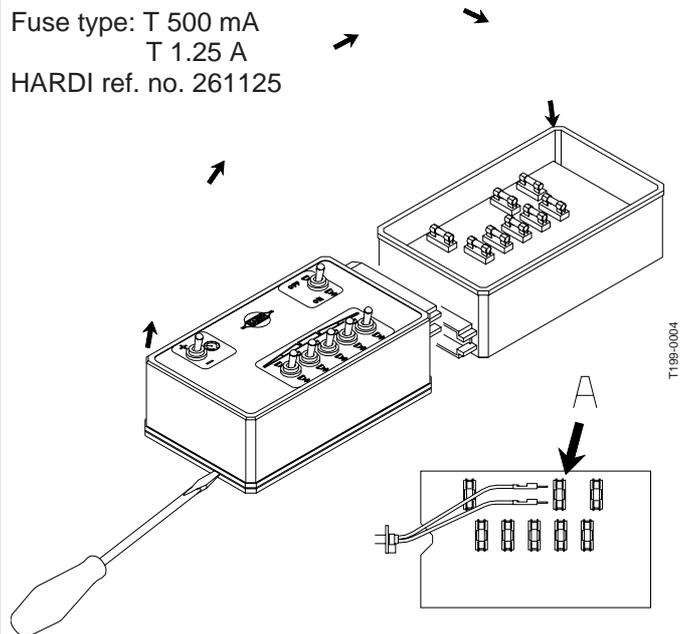


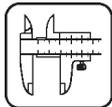
EC operating unit

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.

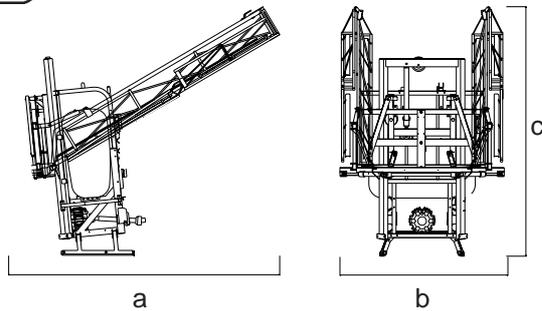
The problem may be due to a blown fuse. The fuses are placed in the control box and are marked according to functions. Fuses 7 and 8 are spare fuses.

Fuse type: T 500 mA
T 1.25 A
HARDI ref. no. 261125





Technical specifications Measure and weight



800 I MEGA-LPY/LPZ

Spraying width m	Pump model	Measure a x b x c cm	Weight kg
15	363	400 x 280 x C*	1086**
16	363	400 x 280 x C*	1091**
18	363	400 x 280 x C*	1102**
20	363	500 x 280 x C*	1129**
21	363	500 x 280 x C*	1140**
24	363/463	500 x 280 x C*	1174**

1000 I MEGA-LPY/LPZ

Spraying width m	Pump model	Measure a x b x c cm	Weight kg
15	363	400 x 280 x C*	1096**
16	363	400 x 280 x C*	1101**
18	363	400 x 280 x C*	1112**
20	363	500 x 280 x C*	1139**
21	363	500 x 280 x C*	1150**
24	363/463	500 x 280 x C*	1184**

1200 I MEGA-LPY/LPZ

Spraying width m	Pump model	Measure a x b x c cm	Weight kg
15	363	400 x 280 x C*	1122**
16	363	400 x 280 x C*	1127**
18	363	400 x 280 x C*	1138**
20	363	500 x 280 x C*	1165**
21	363	500 x 280 x C*	1176**
24	363/463	500 x 280 x C*	1210**

*) Transport height can vary from 2.7 m to 4.0 m depending on boom size, boom type and transport position. Please refer to chart in the part "Independent setting of transport position" for exact transport height.

**) If LPZ boom: Add 60 kg. to the figure shown.

Pump capacity

363/10.0 bar	Rotation per min					
	200	300	400	500	540	600
	Capacity l/min					
0	73	107	141	178	194	211
2	72	105	140	175	189	207
4	71	103	139	172	186	205
6	70	102	138	169	184	203
10	68	100	135	166	182	200
15	66	98	132	164	178	197
Max. pressure: 15bar		Weight: 52.5 kg		Suction height: 0.0 m		

463/10.0 bar	Rotation per min					
	200	300	400	500	540	600
	Capacity l/min					
0	109	156	207	257	276	305
2	103	152	202	252	270	299
4	101	149	198	246	265	295
6	99	146	195	242	263	289
10	94	142	192	236	256	282
15	91	136	184	230	248	276
Max. pressure: 15bar		Weight: 66.5 kg		Suction height: 0.0 m		

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

Operating temperature range: 2° to 40° C. (36°F to 104°F)

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

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

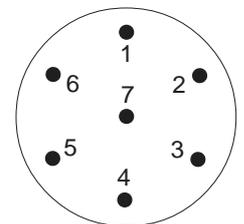
Max. pressure on the suction manifold: 7 bar (100 psi)

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 |

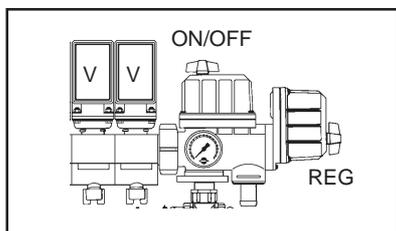
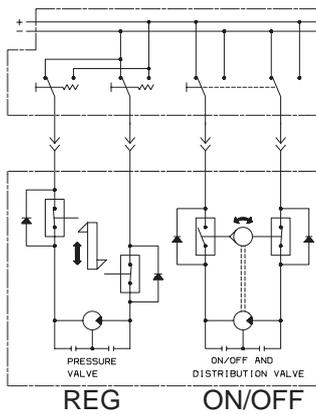


The wiring is in accordance with ISO 1724.

EC

The EC-operating unit fulfils the EU noise reduction standards.

EC



Number of distribution valves			
2/3/4 5/6 7			
Valve	Wire number or color 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
- Hoses: PVC
- Valves: mainly glass-filled PA.
- Fittings: PA

Disposal of the sprayer

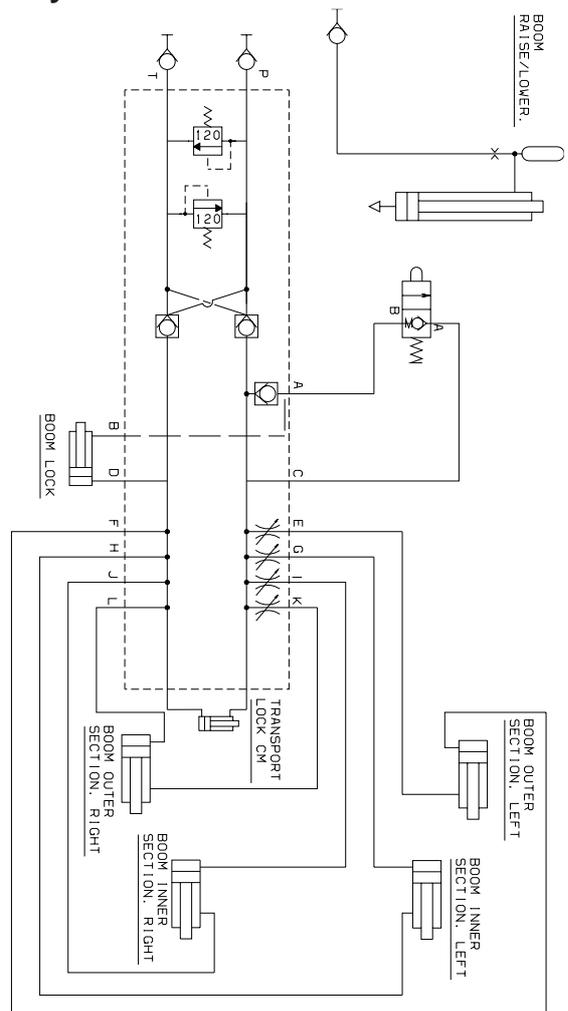
When the equipment has completed its working life, it must be thoroughly cleaned. The tank, hose and synthetic fittings can be incinerated at an authorised disposal plant. The metallic parts can be scrapped. Always follow local legislation regarding disposal.

Conversion factors, SI to Imperial units

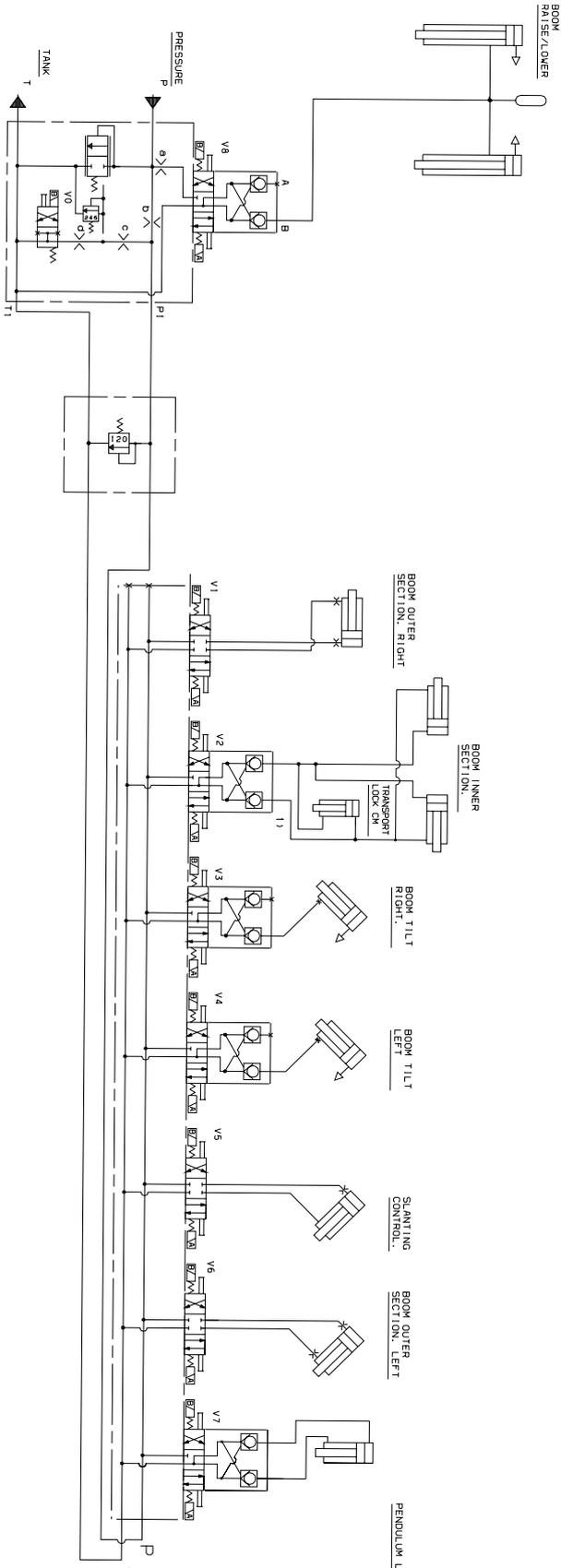
All units used in this manual are SI units. In some occasions Imperial units are used. Use following factors to convert SI units to Imperial units:

	SI unit	Imperial unit	Factor
Weight	kg	lb.	x 2.205
Surface area	ha	acres	x 2.471
Length	cm	in	x 0.394
	m	ft	x 3.281
	m	yd	x 1.094
velocity	km/h	mile/h	x 0.621
	km/h	m/s	x 0.277
Quantities/area	l/ha	gal (Imp.)/acre	x 0.089
Volume	ml	fl. oz (Imp.)	x 0.0352
	l	Imp. pt.	x 0.568
	l	gal (Imp.)	x 0.22
Pressure	bar	lb./in ² (p.s.i.)	x 14.504
Temperature	°C	°F	(°C x 1.8) + 32
Power	kW	hp	x 1.341
Torque	Nm	lbft	x 0.74

Boom hydraulic LPY

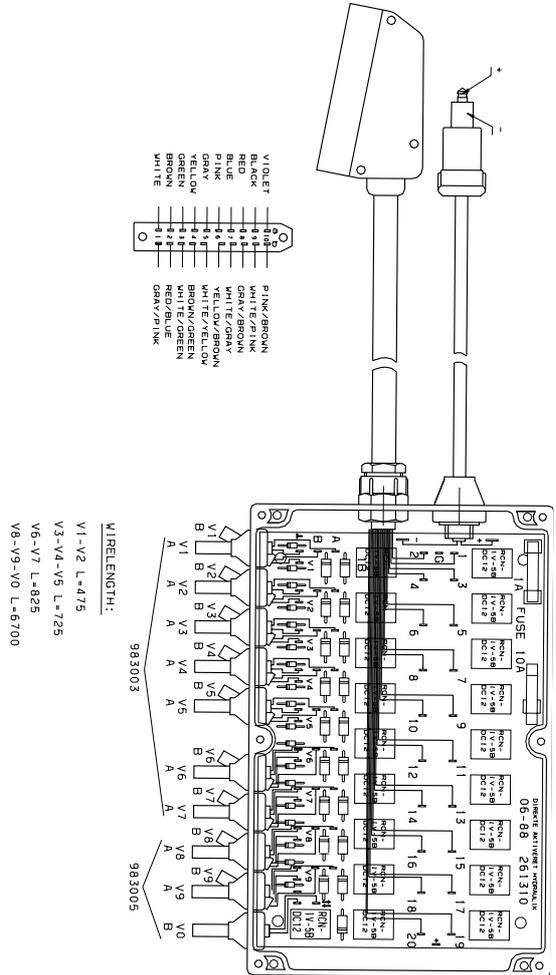


Boom hydraulic LPZ



651510

Electrical specs



ELECTRICAL SPEC.:
 SUPPLY VOLTAGE : 10-14 VOL.T.
 MAX. CURRENT : 10AMP.
 VOLTAGE ACROSS COILS: 8-13 VOL.T.

651510

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