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# LZ

## Instruction book

674892-GB-04/2002

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



# EC Declaration of Conformity

## Manufacturer,

HARDI INTERNATIONAL A/S  
Helgeshøj Allé  
DK 2630 Taastrup  
DENMARK

## Importer,

declare that the following product;

.....  
.....

Adhere extra shipping package labels to inside cover.

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

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

Taastrup 19.04.2002

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Lars Bentsen  
Product Development Manager  
HARDI INTERNATIONAL A/S

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



As the instruction book covers all LZ models, please pay attention to the paragraphs dealing with precisely your model. This book is to be read in conjunction with the "Spray Technique" book.

## 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.
-  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.
-  If any portion of this instruction book remains unclear after reading it, contact your HARDI dealer for further explanation before using the equipment.
-  Keep children away from the equipment.



## Description

The HARDI LZ models are designed for the application of crop protection chemicals and liquid fertilizers.

They consist of a pump, frame with 800, 1000 or 1200 litre tanks, Self-Cleaning Filter, EC operating unit, LHZ 12, 15, 16, 18, 20, 21 or 24 metre fully hydraulic operated spray boom and transmission shaft.

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

The tank, made of impact-proof and chemical resistant polyethylene, has a purposeful design with no sharp corners, for easy cleaning.

The EC operating unit consists of: on/off valve, pressure control valve with built-in HARDI-MATIC, pressure gauge and distribution valves with pressure equalization.

HARDI-MATIC ensures a constant volume per ha of the liquid at varying speed in the same gear. The number of revolutions on the P.T.O. must be kept between 300-600 r/min.

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 to tank.

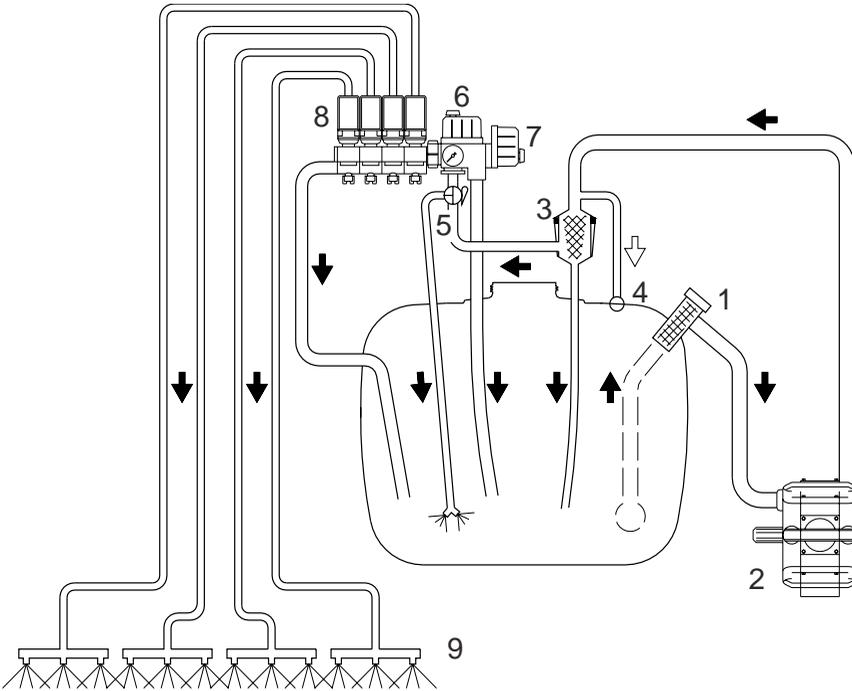
The LHZ spray boom is fully hydraulic folded and operated. Individual folding of right and left outer sections enable alternative boom widths. Individual boom tilt function for right and left side adapts boom height to slopping terrain. Slanting control for trapeze suspension compensates for driving 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 and pump is to indicate model, year of production with serial number and country of origin. Boom centre frame, and inner/outer sections also have identification plates indicating boom type and part no. of steel parts. If ordering spare parts, inform your dealer of these so the right model and version are described.

# Function diagram

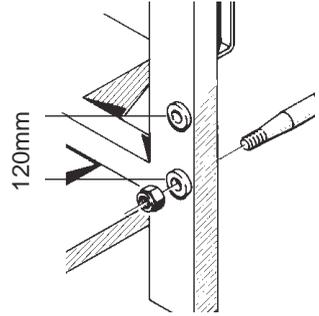
1. Suction filter
2. Pump
3. Self-Cleaning Filter
4. Safety valve
5. Pressure agitator
6. On/off valve with pressure gauge
7. Pressure control valve with HARDI-MATIC
8. Distribution valve with pressure equalization.
9. Sprayer boom.





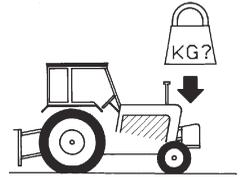
## Connecting the sprayer

The sprayer is designed for three point suspension and is equipped with 28 mm pivots (cat. II). Pivots can be relocated to suit the tractor.



**WARNING:** Note the weight of the sprayer. Generally it is recommended to:

1. Add ballast to front of tractor.
2. Travel at slower speeds when driving with a full tank. (The tractor braking effect will be reduced.)
4. Be careful when filling / lifting the sprayer for the first time.



## Hydraulics

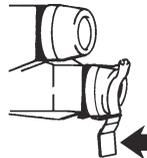
Hydraulic connection requires one double acting outlet for the D.A.H. system. A single outlet and return can also be used. The hydraulic hoses are marked with an arrow to indicate direction of oil flow.

The D.A.H. system requires an oil flow between 10 to 90 litres per minute and a min. pressure of 130 bar. The system has a built-in flow regulator that maintains constant speed on hydraulic movements.

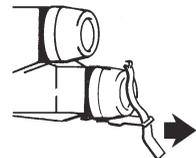
Before operating the hydraulics, the clip at the distribution valve (situated at front of tank) should be set for OPEN or CLOSED CENTRE tractor hydraulics.

Most tractors have OPEN CENTRE hydraulics and the valve must be open for continuous oil circulation. For CLOSED CENTRE hydraulics (e.g. JOHN DEERE) the clip must hold the valve closed so oil only circulates when hydraulic movements are required.

Setting of distribution valve.



CLOSED CENTRE



OPEN CENTRE

## Control boxes and power supply

Power requirement is 12 V DC. Note polarity!  
For EC: Brown pos. (+), Blue neg. (-).  
For D.A.H.: White pos. (+), Black neg. (-).

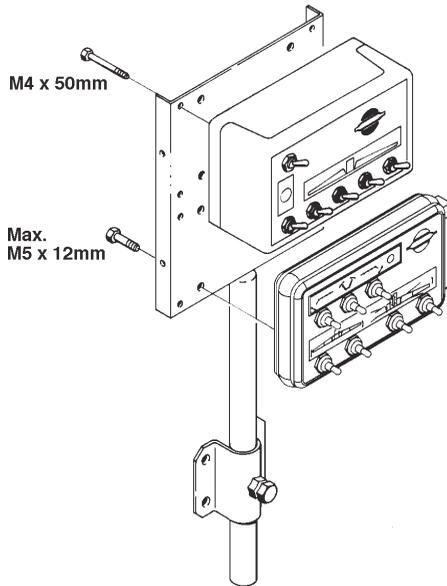


The control boxes for EC-operating unit and for D.A.H. are fitted in the tractor cabin at a convenient place. See section on Assembly for initial mounting.

The wires must have a cross-sectional area of at least 4.0 mm<sup>2</sup> to ensure sufficient power supply.

For the EC-operating unit the tractor circuit should have a 8 Amp fuse and for the D.A.H. a 16 Amp fuse.

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

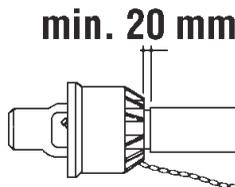
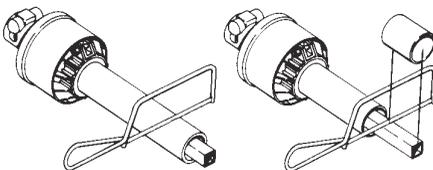


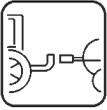
## Rear lights (if fitted)

Connect plug for rear lights to the tractors 7-poled socket and check that rear lights, stop lights and turning indicators function.

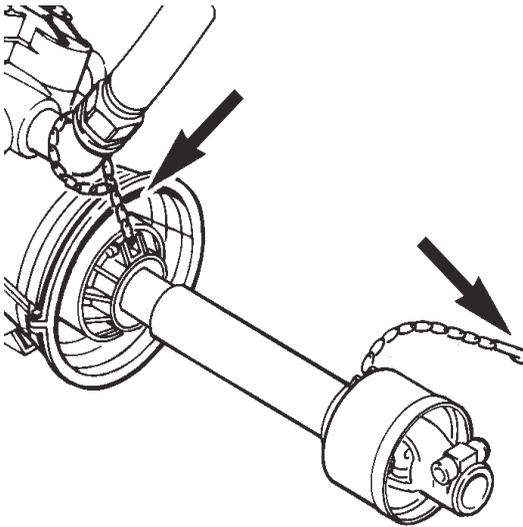
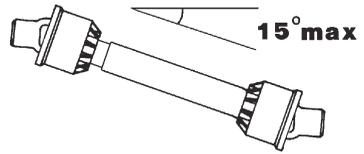
## Transmission shaft

When connecting the sprayer to the tractor the length of the transmission shaft should be checked and if necessary shortened. There should be at least 20 mm free play between the male and female parts when the shaft is horizontal.





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



It is important for the personal safety of the operator that the transmission shaft is intact.

The protection guards must cover the whole shaft. This includes the universal cross covers at each end of the shaft. The chains are connected so that the protection guards do not rotate with the shaft.



### 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 of the boom

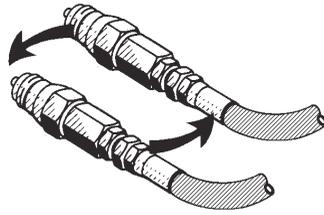
**WARNING:** BEFORE UNFOLDING THE BOOM IT IS IMPORTANT THAT THE SPRAYER IS CONNECTED TO THE TRACTOR TO PREVENT OVERBALANCING.



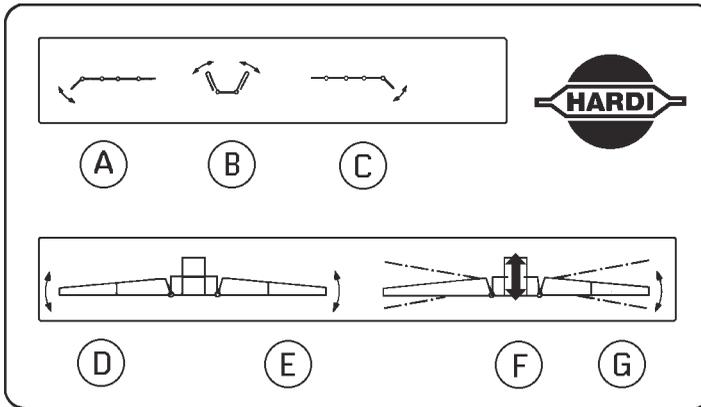
BE CAUTIOUS WITH INITIAL USE OF THE HYDRAULIC SYSTEM; IF THERE IS AIR IN THE SYSTEM THIS MAY CAUSE VIOLENT MOVEMENTS OF THE BOOM. THEREFORE TAKE CARE THAT NO PERSONS OR OBJECTS ARE HURT OR DAMAGED IN THE PROCESS OF TESTING.

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 is as follows.**



- A. Unfolding/folding of left outer section
- B. Unfolding/folding of inner section
- C. Unfolding/folding of right outer section
- D. Boom tilt for left side
- E. Boom tilt for right side
- F. Raising and lowering of boom
- G. Slanting of boom

### Unfolding of boom

ENSURE THAT THE BOOMS ARE CLEAR FROM THE TRANSPORT BRACKETS BEFORE UNFOLDING.

1. Push switch **F** upward to lift the boom clear of the rear transport brackets.
2. Push switch **D** and **E** upward to ensure boom sections are clear of the front transport brackets.





3. Push switch **B** upward to unfold the inner sections.
4. Push switch **A** and **C** upward to unfold outer sections.
5. Push switch **D** and **E** downward to lower right and left sections.
6. Push switch **F** downward to lower the boom to correct height above crop or ground level.



### CAUTION

The 3 upper functions, in the red rectangle with STOP sign, must only be operated when sprayer is stationary. Failure to do so will damage the boom.

### Folding of boom

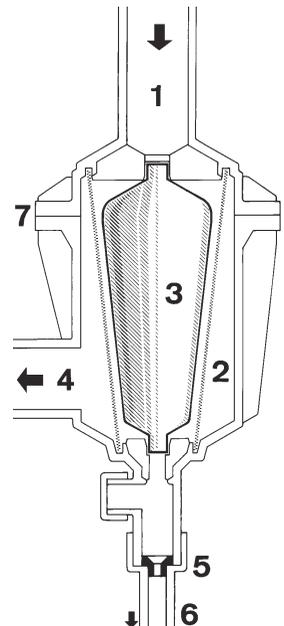
1. Raise boom **F** to upper position.
2. Check the slanting function is midway **G**.
3. Fold outer sections, **A** and **C**.
4. Raise right and left sections **D** and **E**.
5. Fold inner sections **B**.
6. Lower boom **F** until boom rests on rear transport brackets.
7. Lower right and left boom sections until they rest the front transport brackets **D** and **E**.



### Self-Cleaning Filter

Function diagram

1. From pump
2. To safety valve (operating pressure is 15 bar)
3. Double filter screen
4. Guide cone
5. To operating unit
6. Replaceable restrictor
7. Return to tank
8. Nut



### Choice of restrictor

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

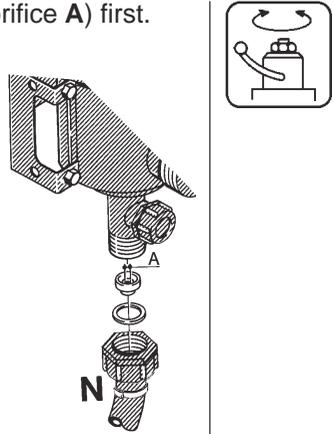
4 restrictors are supplied. Use the green one (largest orifice **A**) first.

The hose **N** is unscrewed at the Self-Cleaning Filter, the restrictor is put in the hose and the hose is mounted again.

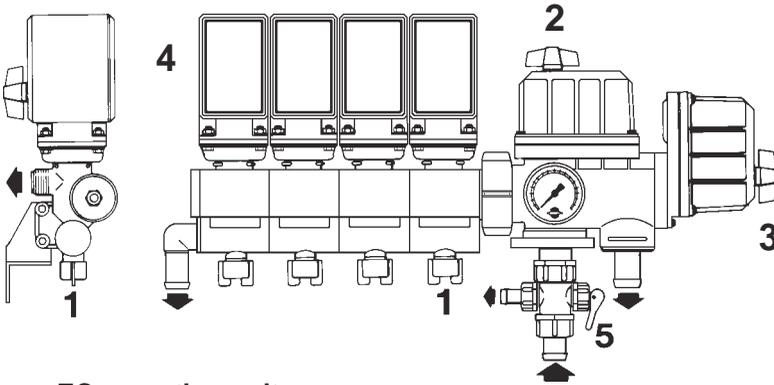
If the required working pressure cannot be obtained, the restrictor is too large. Choose a smaller restrictor. Start with the black one, then the white and finally the red one.

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. Check the O-rings before reassembling the filter and replace if damaged.



## Adjustment of the controls

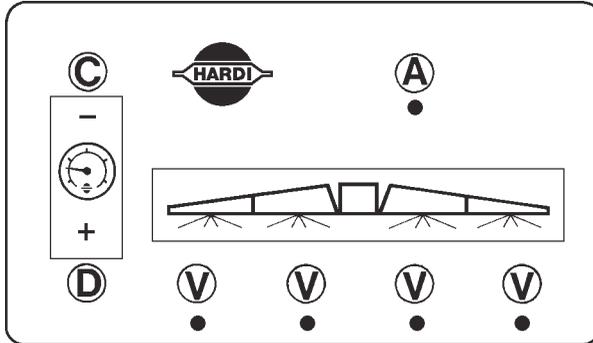


### EC operating unit

1. Adjust screw for pressure equalization
2. On/off valve
3. Pressure control valve
4. Distribution valve
5. Pressure agitation valve



## EC remote control box



- A. Operating switch for on-off valve
- V. Operating switch for distribution valves
- C. Pressure regulation switch (to lower)
- D. Pressure regulation switch (to raise)

1. Choose the correct nozzle size by turning the TRIPLET nozzle bodies to the suitable nozzle for the spray purpose. Make sure that all nozzles are the same type and capacity. See "Spray Technique" book.
2. Open or close lever **5** depending on whether pressure agitation is required. (Remember pressure agitation takes 5% to 10% of pump output).
3. On-off switch **A** is activated against green.
4. All distribution valves switches **V** are activated against green.
5. Pressure regulation switch **C** is activated until emergency handle **3**, stops rotating (minimum pressure).
6. Put the tractor in neutral and adjust the P.T.O. and thereby the number of revolutions of the pump corresponding to the intended travelling speed.  
Remember the number of revolutions on the P.T.O. must be kept between 300-600 r/min.
7. Pressure regulation switch **D** is activated till the recommended pressure is shown on the pressure gauge.

### ADJUSTMENT OF PRESSURE EQUALIZATION:

8. Close the first distribution valve switch **V**.
9. Turn the adjusting screw **1** until the pressure gauge again shows the same pressure.

10. Adjust the other sections of the distribution valve in the same way.

NOTE: HEREAFTER ADJUSTMENT OF PRESSURE EQUALIZATION WILL ONLY BE NEEDED IF YOU CHANGE TO NOZZLES WITH OTHER CAPACITIES.



11. Operating the control unit while driving:

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 anti-drip valves ensure instantaneous closing of all nozzles.

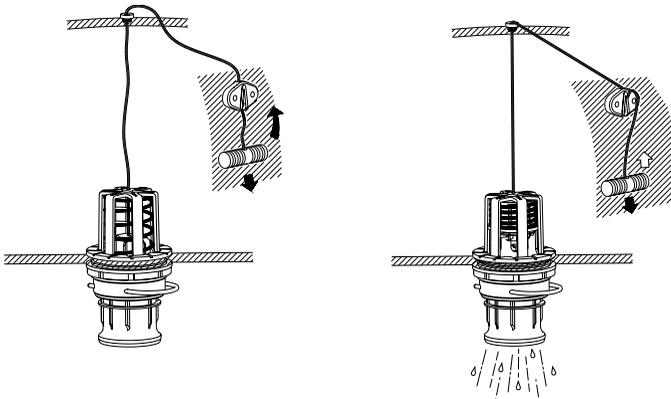
In order to close one or more sections of the boom, switch the relevant distribution valve **V** to off position. The pressure equalization ensures that the pressure does not rise in the sections which are to remain open.

In case of power failure it is still possible to activate all functions of the operating unit. See section "Emergency operation of the sprayer".

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

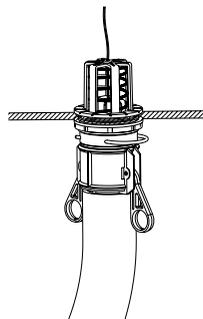
### Operation of the tank drain valve

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 downwards and the valve will close automatically.





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



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



## Maintenance

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



## Cleaning the sprayer

### Guidelines

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

Be familiar with local legislation regarding disposal of pesticides washings, mandatory decontamination methods, etc. Contact the appropriate body, eg. Dept of Agriculture.

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

Cleaning starts with the calibration, as a well calibrated sprayer will ensure the minimal amount of remaining spray liquid. It is good practice to clean the sprayer immediately after use thereby rendering the sprayer safe and ready for the next pesticide application. This also prolongs the life of the components.

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



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

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

## **Cleaning**

1. Dilute remaining spray liquid in the tank with at least 10 parts water and spray the liquid out in the field you have just sprayed.

NOTE: It is advisable to increase the forward speed (double if possible) and reduce the pressure.

For 4110 nozzles: 1.5 bar minimum

For 1553 nozzles: 3.0 bar minimum

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 cap for suction filter. Replace filters when the sprayer is completely clean.

5. With the pump running, rinse the inside of the tank. Remember the tank roof. Rinse and operate all components and any equipment that has been in contact with the chemical.

Before opening the distribution valves and spraying the liquid out, decide whether this should be done in the field again or on the soakaway.

6. After spraying the liquid out, stop the pump and fill at least 1/5 of the tank with clean water. Note that some chemicals require the tank to be completely filled. Add appropriate detergent and/or deactivating agent, eg. Washing soda or Triple ammonia.



NOTE: If a cleaning procedure is given on the chemical label, follow it closely.

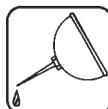
7. Start the pump and operate all controls enabling the liquid to come in contact with all the components. Leave the distribution valves until last. Some detergents and deactivating agents work best if left in the tank for a short period. Check the label.

The Self-Cleaning Filter can be flushed by removing the bypass hose from the bottom of the filter. Stop the pump and remove the hose. Start the pump for a few seconds to flush filter. Be careful not to loose the restrictor nozzle.

8. Drain the tank and let pump run dry. Rinse inside of tank, again letting the pump run dry.

9. Stop the pump. If the pesticides used have a tendency to block nozzles and filters, remove and clean them now. Check also for sediment on the pressure side of the safety valve for the Self-Cleaning Filter.

10. Replace all the filters and nozzles and store the sprayer. If, from previous experiences, it is noted that the solvents in the pesticide are particularly aggressive, store the sprayer with the tank lid open.



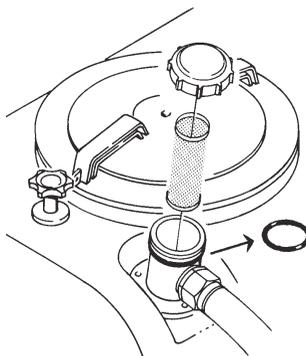
NOTE: If the sprayer is cleaned with a high pressure cleaner we recommend lubrication of the entire machine.

### **Filters**

Clean filters ensure;

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

The main filter protecting sprayer components is the suction filter at the top of the tank. Check it regularly. Ensure the O-ring on filter housing is in good condition and lubricated.



## Lubrication

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

**NOTE:** If the sprayer is cleaned with a high pressure cleaner or corrosive products have been sprayed out, we recommend lubrication of all sections.

**POS.** Position of the sprayer



Oil



Grease



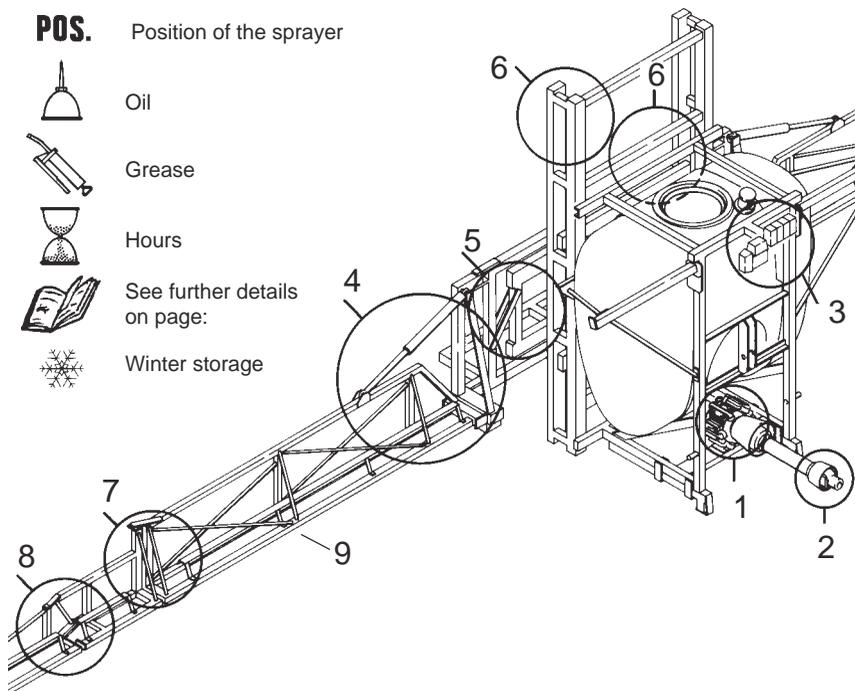
Hours

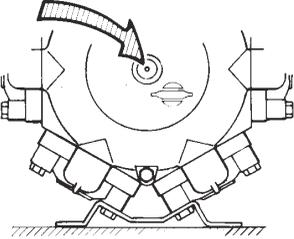
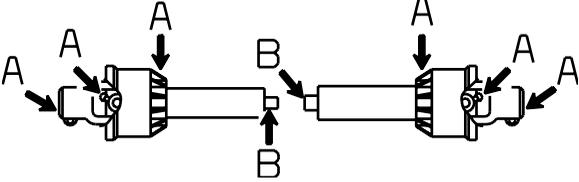
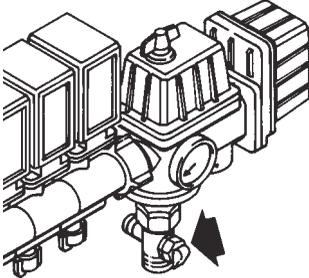
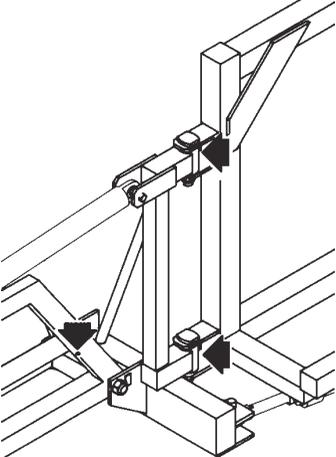


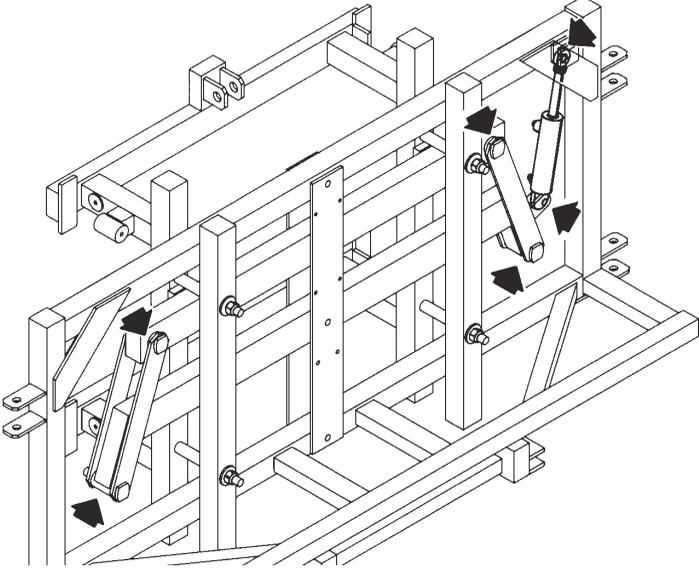
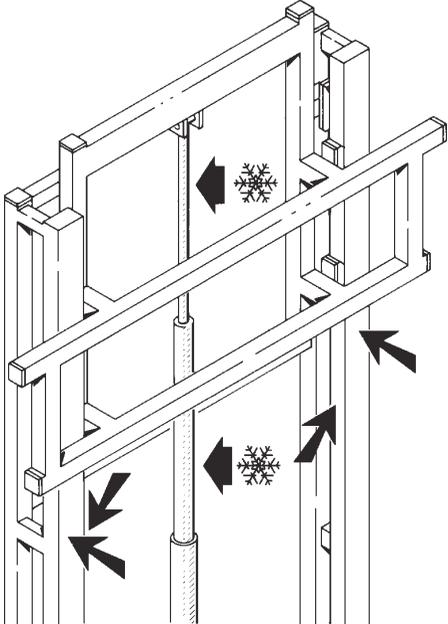
See further details on page:

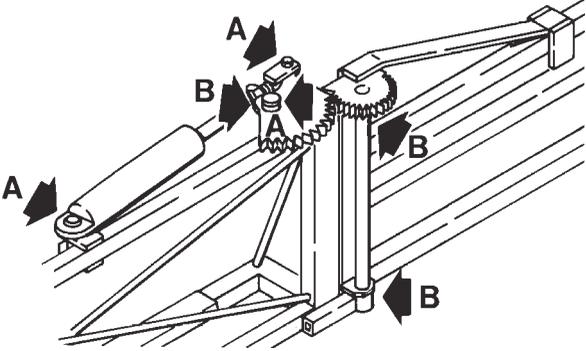
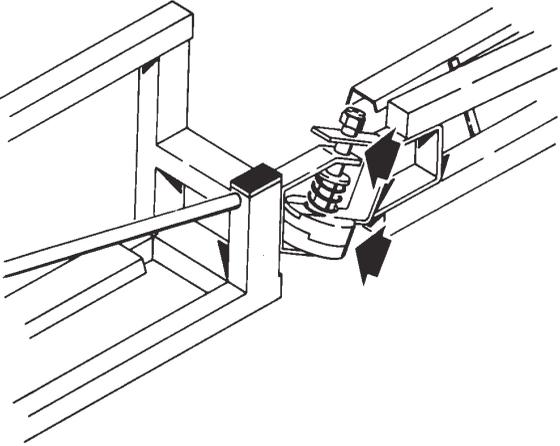
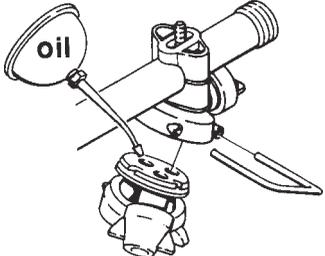


Winter storage



POS.					
1		x	40		26
2A B		x x	12 40		7 8
3	x		20		7 11 12 27 33
4	x		40		22 23

POS.					
5		x	40		21
6		x	40		

POS.					
7 A B	x	x	40 40		23
8	x		20		
9	x		40		

## Re-adjustment of the Boom

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

**NOTE:** Tractor and sprayer must be on level ground.  
Sprayer must be lubricated. (see section "Lubrication").

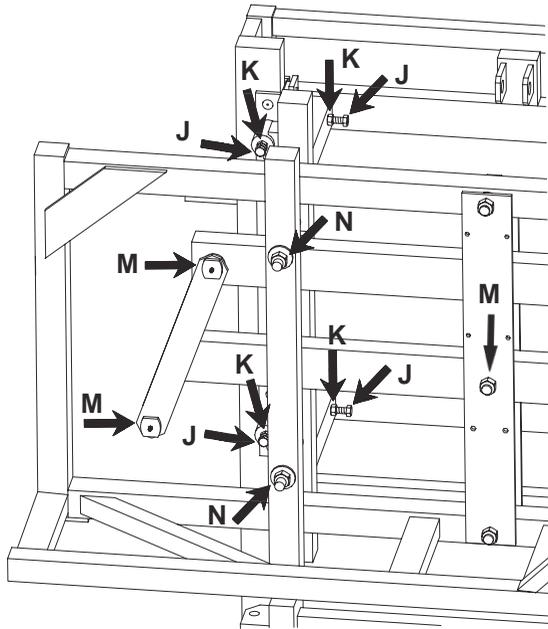
### WARNING

**NOBODY MUST STAND UNDER THE BOOM WHILST ADJUSTMENT IS TAKING PLACE.**

### Boom lift

The boom lift should be adjusted so the boom can freely move up and down when the lift ram is actuated.

1. Unfold the boom.
2. Loosen counter nuts **K** and adjust the screws **J** so the glide pads are just touching at all points in both directions. Tighten counter nuts.



### Trapeze suspension

For the trapeze to function it must not be overtight. If it is too loose the boom will yawn (forward and back movement). This results in a poor spray distribution.

1. With the boom unfolded, check the tension on nuts **M**. They must not be overtight.
2. The trapeze function is adjusted by tightening or loosening the 4 nuts **N**.

Minor adjustment in the field may be necessary.





### Transport position

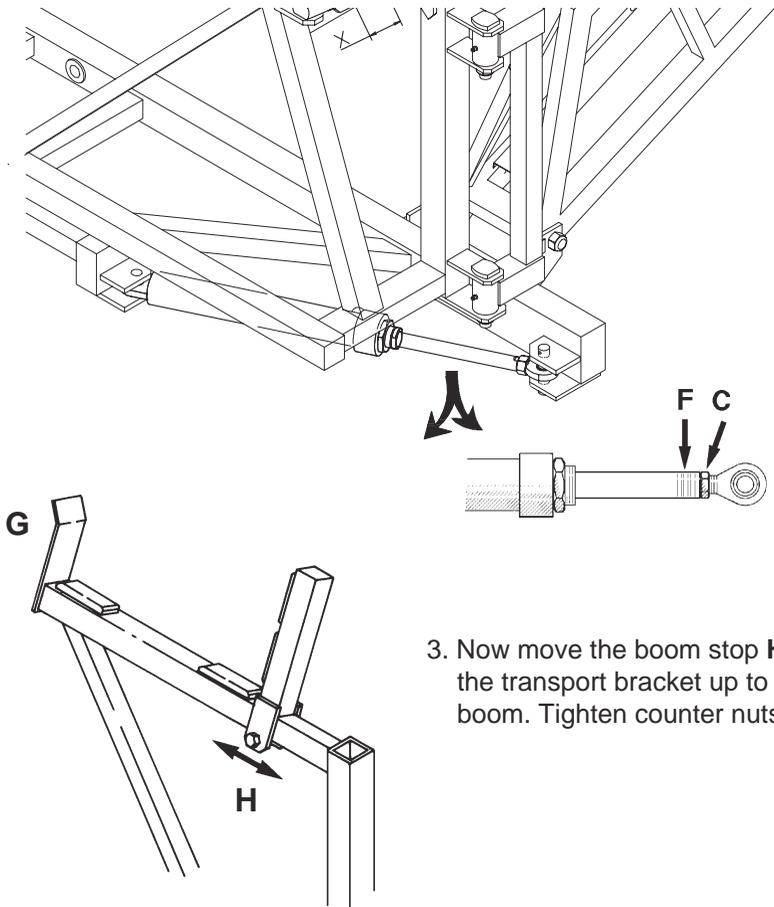
The boom and transport brackets are to be adjusted so that boom movement is prevented when in transport.

1. Fold the outer sections and then the inner sections until the folding rams are at minimum length and carefully place the boom in the transport brackets.



**NOTE:** The following is best done without pressure in the hydraulic rams.

2. Loosen counter nut **C** and adjust the length of the rod **F** until the boom rests against **G** at the transport bracket.

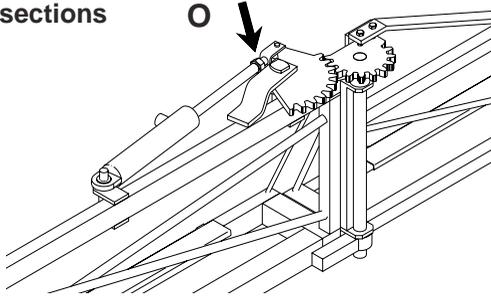


3. Now move the boom stop **H** on the transport bracket up to the boom. Tighten counter nuts.

## Linear adjustment of outer sections

**NOTE:** The following is best done without pressure in the hydraulic rams.

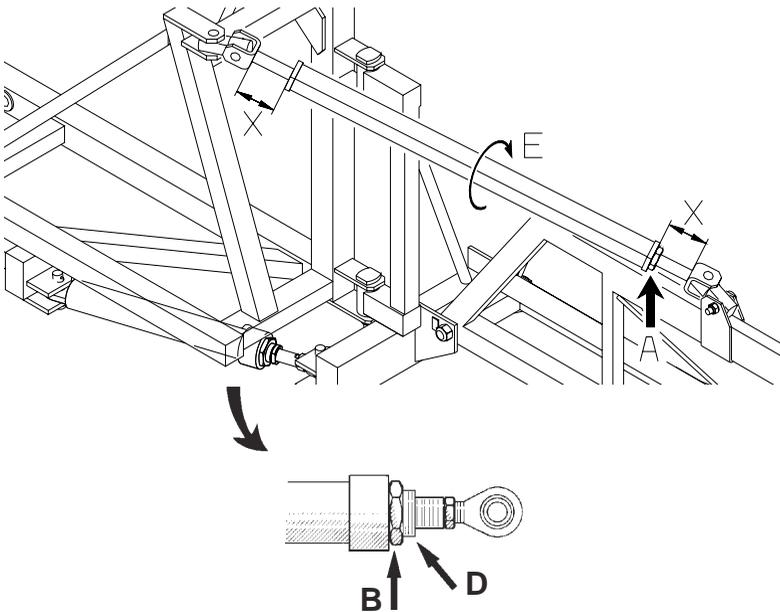
1. Unfold the boom.
2. Loosen counter nut **O** and adjust the length of the rod until the outer and inner sections are parallel. Tighten counter nut.



## Linear adjustment of inner sections (12 to 21 m)

**NOTE:** The following is best done without pressure in the hydraulic rams.

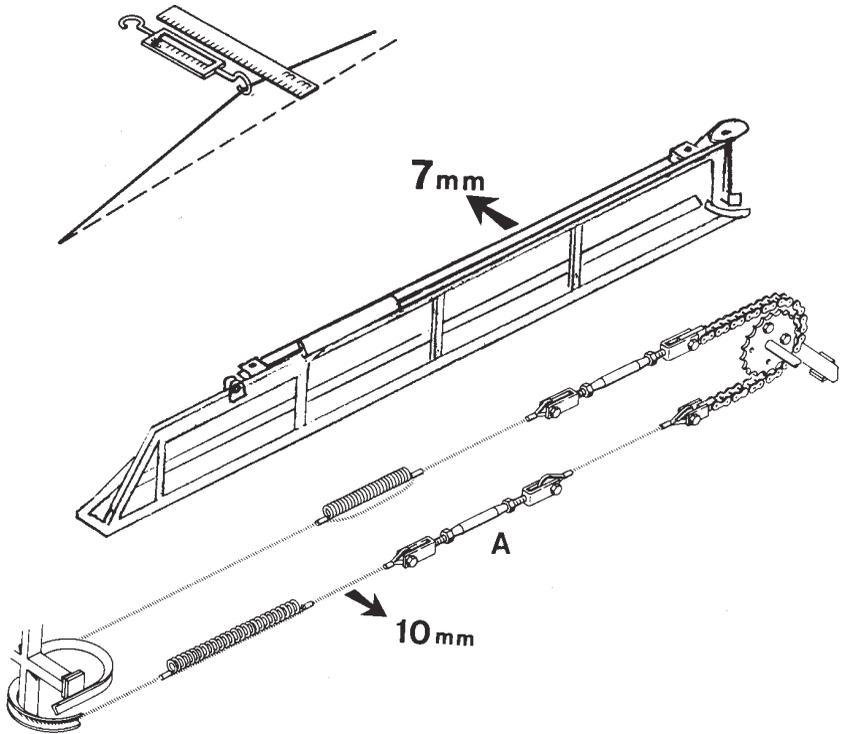
1. Unfold the boom.
2. Loosen counter nut **B**. Adjust the threaded bushing **D** until the boom is at right angle to the tank frame. Tighten counter nut.



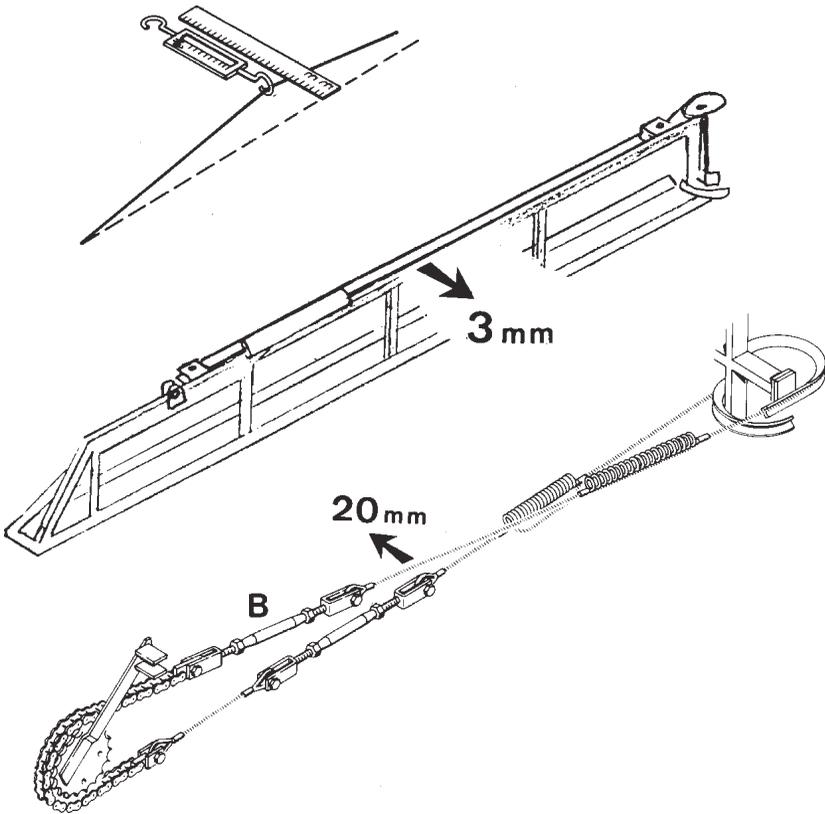


## Adjustment of inner and intermediate sections (24 m)

1. Unfold the boom.
2. Check that the ram rod is fully withdrawn. Adjust rigging screw if not so.
3. Midway on the wire of the inner section, check the tension. A 10 kg force the wire should move a maximum of **3 mm**. Adjust rigging screw if necessary.
4. Midway on the wire of the intermediate section, check the tension. A 10 kg force the wire should move a maximum of **10 mm**. Adjust rigging screw if necessary.
5. Fold the boom.



6. Midway on the wire of the inner section, check the tension. A 10 kg force the wire should move a maximum of **3 mm**. Adjust rigging screw if necessary.
7. Midway on the wire of the intermediate section, check the tension. A 10 kg force the wire should move a maximum of **20 mm**. Adjust rigging screw if necessary.



**REMEMBER TO TIGHTEN ALL COUNTER NUTS AFTER ADJUSTMENT.**





## Changing of valves and diaphragms

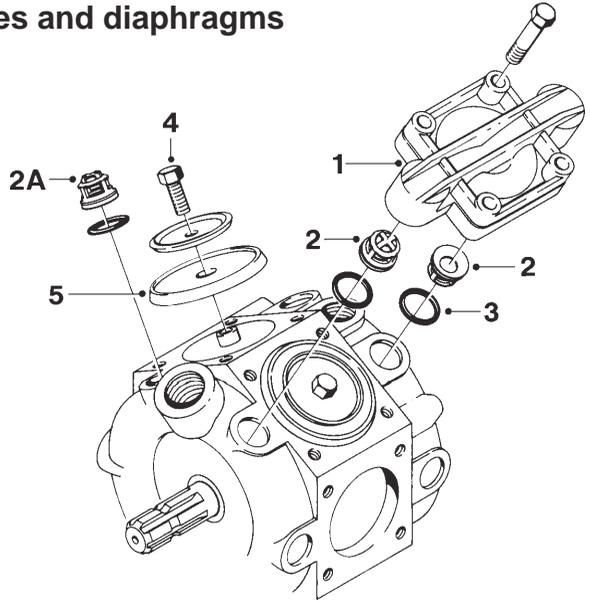
### Valves

Remove valve cover

1. Before changing the valves **2** note the orientation of the valves so that they are replaced correctly.

**Important:** Note valve with white flap **2A** is placed in the valve opening shown.

It is recommended to use new O-rings **3** when changing or checking the valves.



### Diaphragms

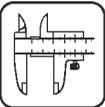
Remove the diaphragm bolt **4** after having dismantled the valve cover as indicated above.

The diaphragm **5** may then be changed. If fluids have reached the crankcase, re-grease the pump thoroughly.

Reassemble with the following torque settings:

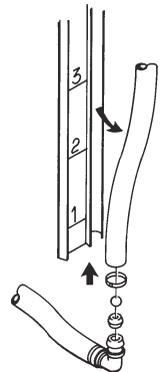
Pump Model	Valve cover Nm	Diaphragm bolt Nm
361	70	60

1 Nm = 0.74 ft-lb



### Level indicator

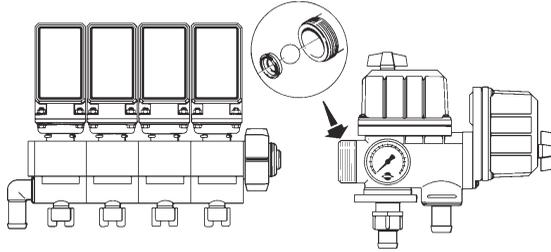
Depending on products used, it can become difficult to see the red sphere inside the level indicator tube. Note that the tube can be replaced when necessary.



## Changing of ball seat in operating unit

If problems with on/off valve occurs (e.g. dripping nozzles when on/off valve is closed), the ball and ball seat should be checked.

Remove the 2 bolts fixing the on/off pressure valve unit to the bracket, unscrew the union nut **A** and pull the on/off-pressure 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.

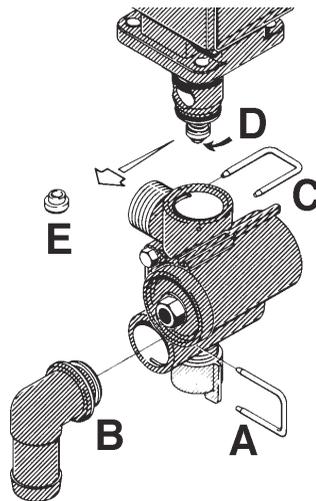
## Check of valve cone in distribution valves

Periodically check the distribution valves for proper sealing.

Run the sprayer with clean water and open on/off and all distribution valves.

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

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

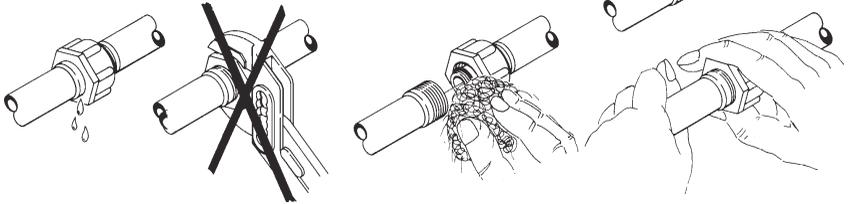




### Nozzle tubes and fittings

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

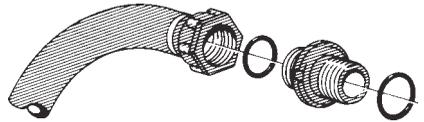


Therefore, in case of leaks: **DO NOT** overtighten. Disassemble, check condition and position of O-ring or gasket, clean lubricate and reassemble.

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

The O-ring to be lubricated **ALL THE WAY ROUND** before fitting on to the nozzle tube.

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



### Off-season storage

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

### Hoses

Check that none of the hoses are caught or have sharp bends.

A leaky hose can give an annoying delay in the middle of the spraying job. Therefore check all the hoses and change if there is any doubt about the durability.

### Paint

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

## Tank

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

## Operating unit

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

## Transmission shaft

Check that the transmission shaft fulfills its security purpose, e.g. that shields and protective tubes are intact.

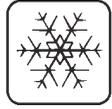
## Anti-freeze precaution

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

## Operational problems

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

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





**Therefore ALWAYS check:**

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

<b>Fault</b>	<b>Probable cause</b>	<b>Control / remedy</b>	
<b>Liquid system</b> No spray from boom when turned on.	Air leak on suction.	Check if red suction lid/O-ring are sealing. <hr/> Check suction tube and fittings. <hr/> 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. <hr/> Check yellow suction pipe is not obstructed or placed too near the tank bottom.	
	Lack of pressure.	Incorrect assembly.	Agitation nozzles not fitted. <hr/> Restrictor nozzle in Self-Cleaning Filter not fitted. <hr/> Safety valve spring for Self-Cleaning Filter not tight. <hr/> 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. <hr/> If using powders, make sure agitation is on.

Pressure dropping.	Nozzles worn.	Check flow rate and replace nozzles if it exceeds 10%.
	Tank is airtight.	Check vent is clear.
	Sucking air towards end of tank load.	Excessive agitation, turn off. Returns inside tank need relocation.
Pressure increasing	Pressure filters beginning to clog.	Clean all filters.
	Agitation nozzles clogged.	Check by turning agitation off/on.
Formation of foam.	Air is being sucked into system.	Check tightness / gaskets / O-rings of all fittings on suction side.
	Excessive liquid agitation.	Turn agitation off. Reduce pump r/min.  Check safety valve for Self-Cleaning Filter is tight.
		Ensure returns inside tank are present.  Use foam damping additive.
Liquid leaks from bottom of pump.	Damaged diaphragm.	Replace. See Changing of valves and diaphragms.
<b>Operating unit</b> EC operating unit not functioning .	Blown fuse(s).	Check mechanical function of microswitches. Use cleaning/ lubricating agent if the switch does not operate freely.  Check motor. 450-500 milli-Amperes max. Change motor, if over.
		Wrong polarity.
	Valves not closing properly.	Check valve seals for obstructions.  Check microswitch plate position. Loosen screws holding plate a 1/2 turn.
		No power.

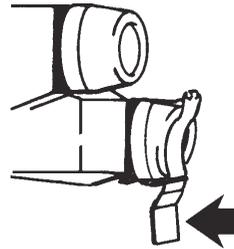




<b>Fault</b>	<b>Probable cause</b>	<b>Control / remedy</b>
<b>Hydraulic system</b> Hydraulic movements of boom are fast/slow/erratic.	Air in system.	Loosen ram connections and activate hydraulics until oil flow has no air in it (not whitish).
	Insufficient hydraulic pressure.	Check output pressure of tractor hydraulics. Minimum for sprayer is 130 bar.
	Insufficient amount of oil in tractor reservoir.	Check and top up if needed.
Particular ram not functioning.	Restrictor blocked.	Place boom in transport bracket. Dismantle and clean

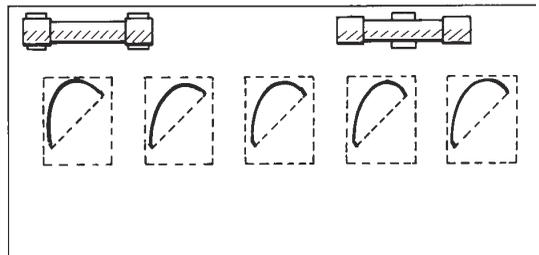
### **Emergency operation of the sprayer** **The boom**

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



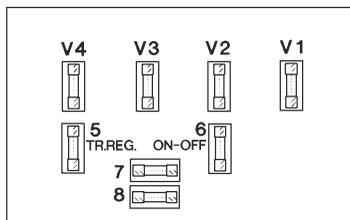
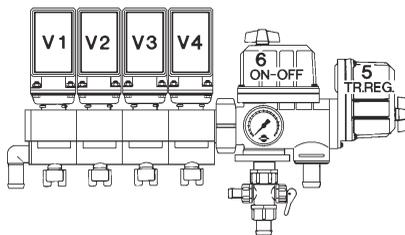
Fuse type T 10 A 250 V  
HARDI ref. no. 261272

## EC operating unit

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

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

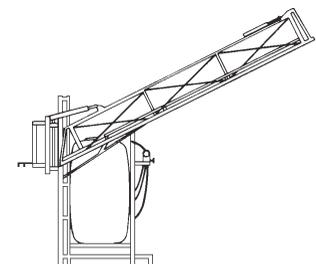
Fuse type            T 500 mA  
 HARDI ref. no.    261125



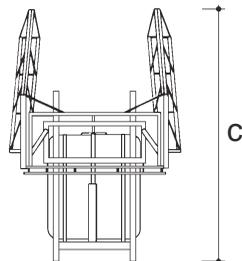
## Technical specifications

### Measure and weight

Tank size l	Spraying width m	Measure a × b × c cm	Weight kg
	12	310 × 255 × 300	753
	15	410 × 255 × 330	782
	16	410 × 255 × 330	797
800	18	430 × 255 × 350	867
	20	450 × 255 × 370	891
	21	450 × 255 × 370	917
	24	420 × 255 × 345	1010
	12	310 × 255 × 300	783
	15	410 × 255 × 330	812
	16	410 × 255 × 330	827
1000	18	430 × 255 × 350	897
	20	450 × 255 × 370	921
	21	450 × 255 × 370	947
	24	420 × 255 × 345	1040
	12	310 × 255 × 300	833
	15	410 × 255 × 330	862
	16	410 × 255 × 330	877
1200	18	430 × 255 × 350	947
	20	450 × 255 × 370	971
	21	450 × 255 × 370	997
	24	420 × 255 × 345	1090

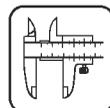


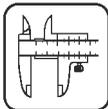
a



b

c



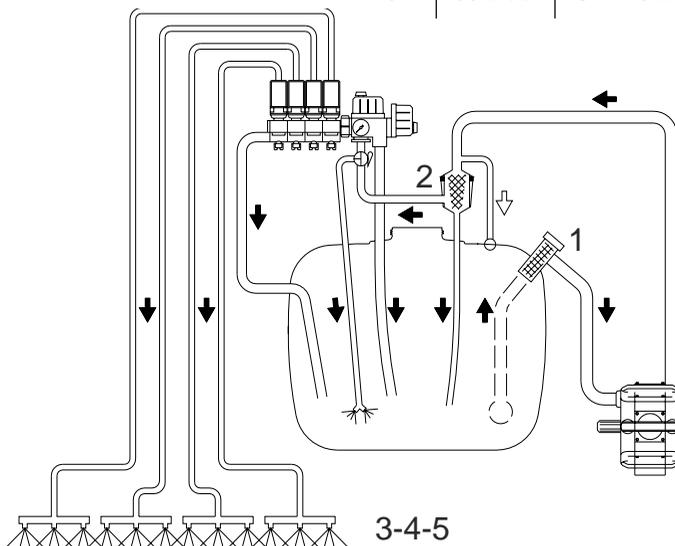


## Power consumption and capacity

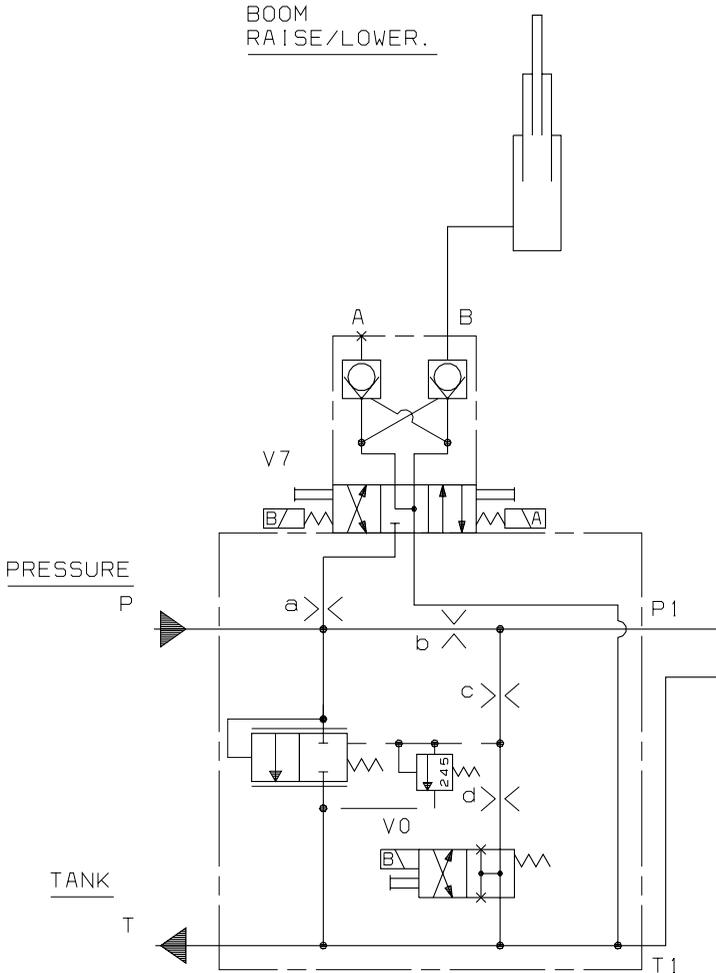
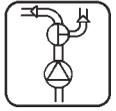
361/9,5	r/min									
	300		400		500		540		600	
bar	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	kW
0	95	0,92	127	1,33	158	1,56	171	1,69	189	1,85
5	92	1,49	123	1,93	151	2,38	165	2,63	183	2,98
10	91	2,22	120	2,89	148	3,69	163	4,02	180	4,74
15	89	3,03	119	3,92	148	4,90	160	5,40	177	6,15
Rotation per min.	r/min	Capacity				l/min	Suction height			0,0 m
Power consumption	kW	Max. pressure			15bar	Weight			54,0 kg	

## Filters and nozzles

Pos.	Mesh/ colour	Description
1.	30	suction filter
2.	80	Self-Cleaning Filter
3.	50 blue	S 4110-14 orange
4.	50 blue	S 4110-16 red
5.	50 blue	S 4110-20 green

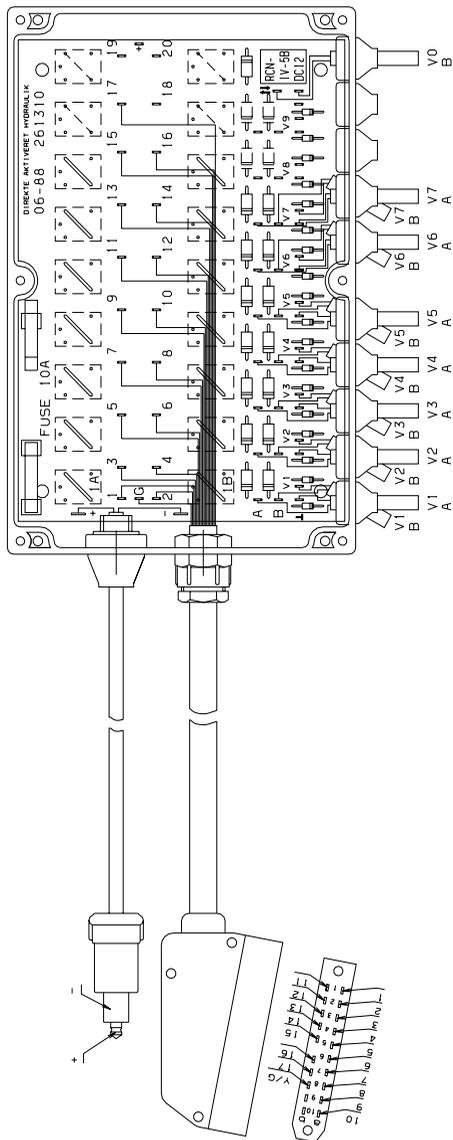


**Electric and hydraulic diagram**  
**Boom raise/lower**

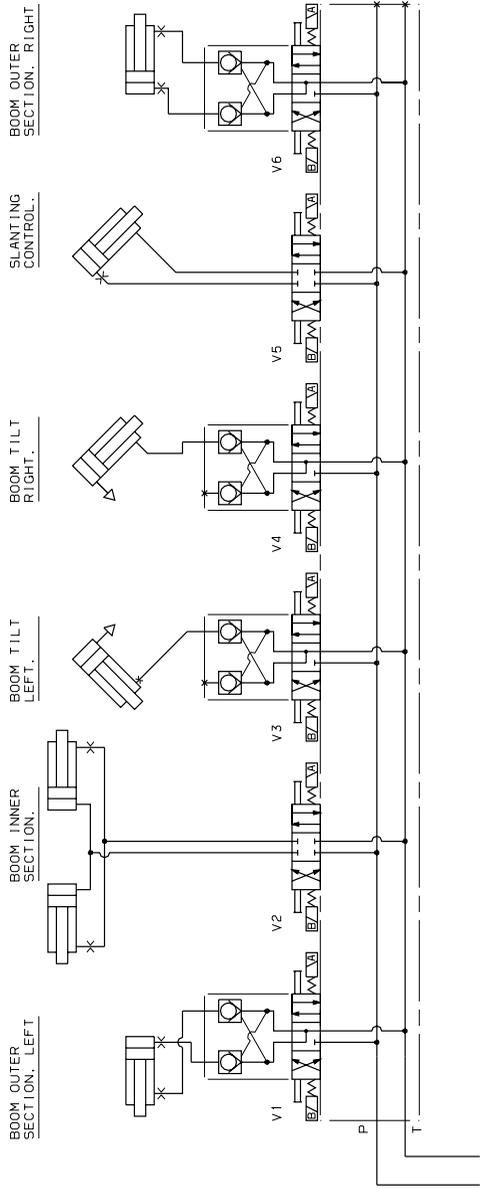




# Electric and hydraulic diagram Distribution box



# Electric and hydraulic diagram hydraulic system





## Pictorial symbols



EC Declaration of Conformity



Description



Function



Connection



Warning



Operation



Service/adjustment



Liquid flow



Pressure



Cleaning



Lubrication



Winter / off-season storage



Operational problems



Technical specifications

# Assembly

## Preassembly information

The sprayer is supplied ex-works in shipping packages (SP). Number of SP's per sprayer varies depending on model. As this covers all LZ models, please note the fittings covering exactly your model.

### NOTE:

Removal of the plastic bag covering the tank is easiest done before assembly.

Some components are shipped within the tank. Check inside.

## Packaging information

Materials used for packaging are environmentally compatible. They can be safely deposited or they can be burnt in an incinerator.

## Recycling

Cardboard: Can recycle up to 99% and therefore should be put into the waste collection system.

Polystyrene foam: Can be recycled. Fluorocarbons (CFC) not used in foam production.

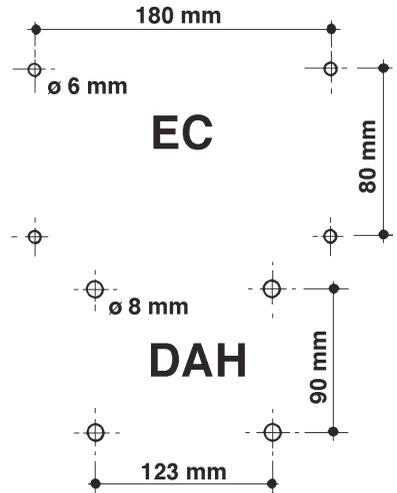
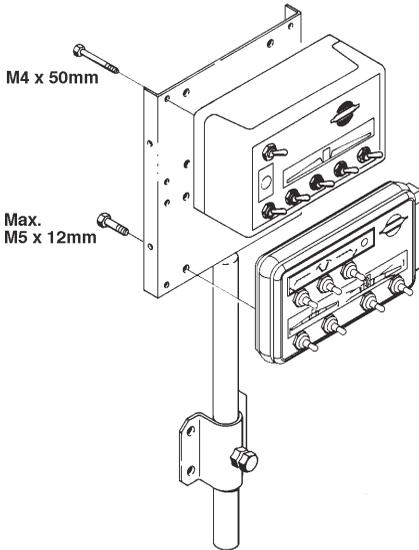
Polyethylene: Can be recycled.

## Materials

Tank	HDPE
Pressure hose	PVC
Suction hose	PVC

When the equipment has completed its working life, it must be thoroughly cleaned. The tank, hose and synthetic fittings can be incinerated. The metallic parts can be scrapped.





1. Mount the boxes on the holder delivered or a suitable bracket for the purpose.

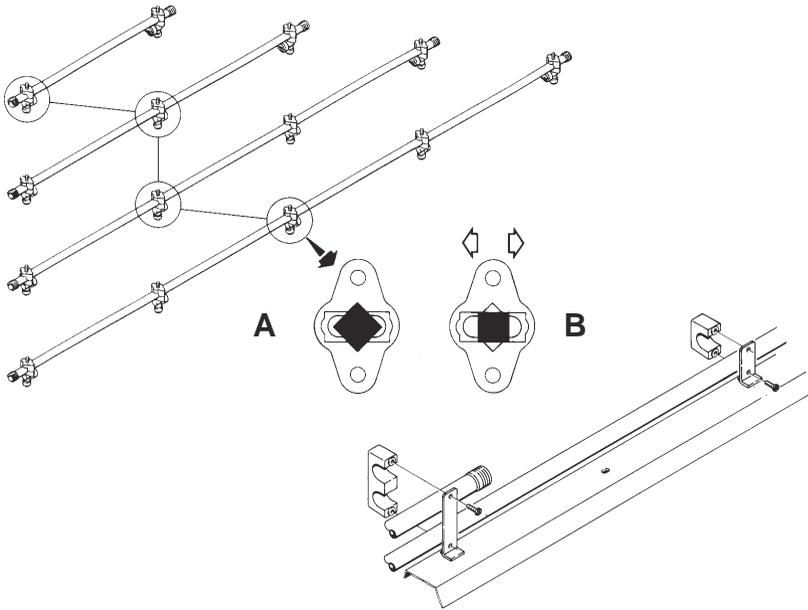


**WARNING:** The screws for mounting the D.A.H. control box must not be too long (max. 12 mm) as they may cause a short circuit!

2. Mount the boom wings. A crane or forklift will be needed. It will help to fully extend the tilt rams so the boom wings do not have to be raised as much.



**WARNING:** Remember to secure the sprayer from over-balancing.

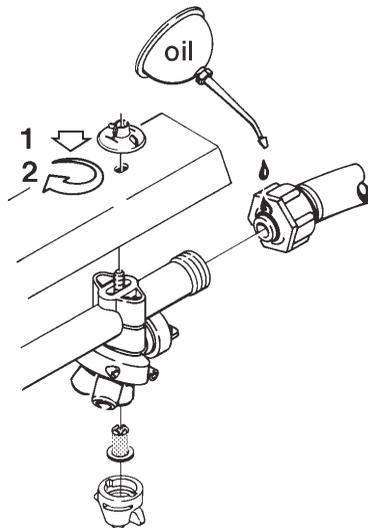


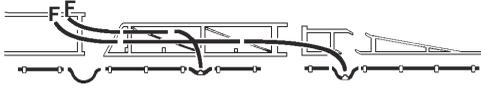
3. Nozzle tubes are supplied with one lock nozzle saddle per tube **A**.  
The rest can slide lengthwise **B** allowing for extension and contraction.

4. Tubes and hoses are connected.  
Fit tubes using synthetic nut.  
Press down **1**, turn **2**.  
**Do not over-tighten.**

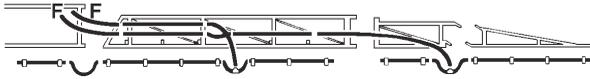
Fit filter and COLOR TIPS.

Lubricate O-rings with non-mineral  
oil to aid assembly.

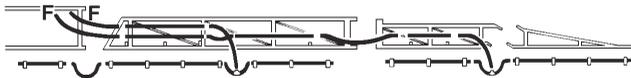




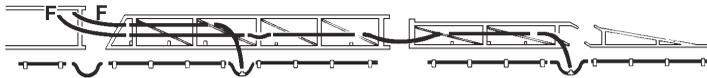
12 m LHZ



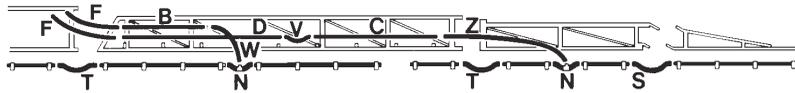
15 m LHZ



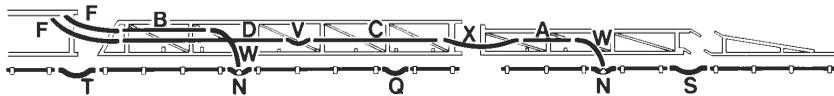
16 m LHZ



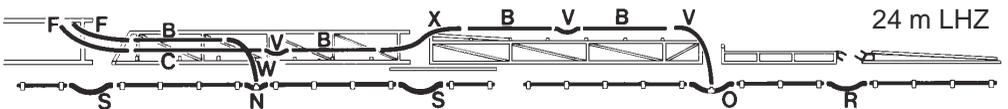
18 m LHZ



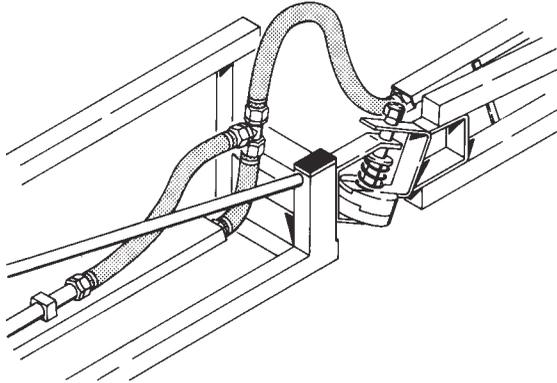
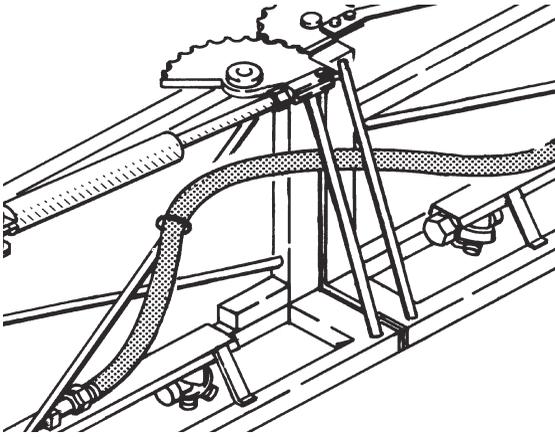
20 m LHZ



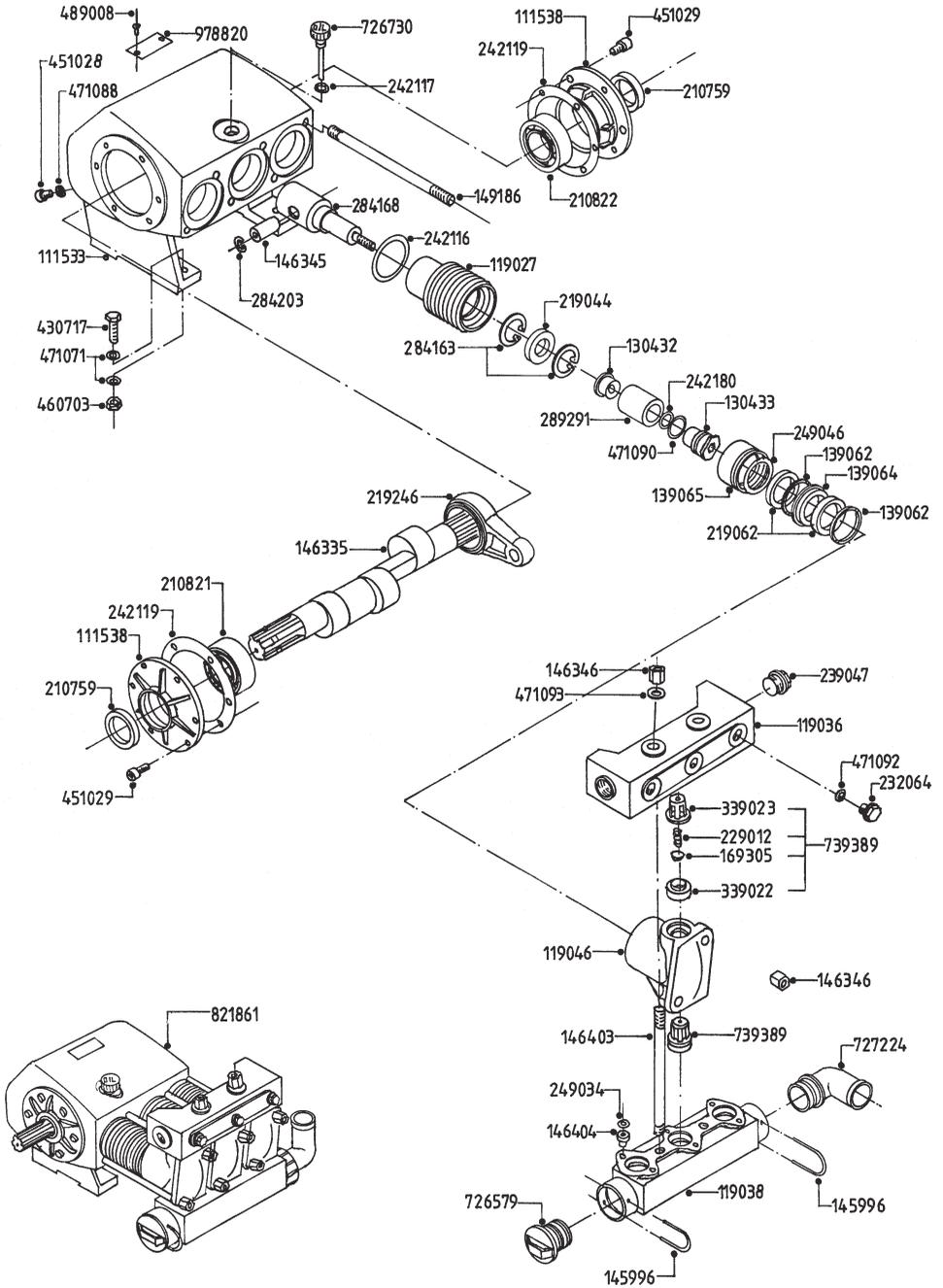
21 m LHZ

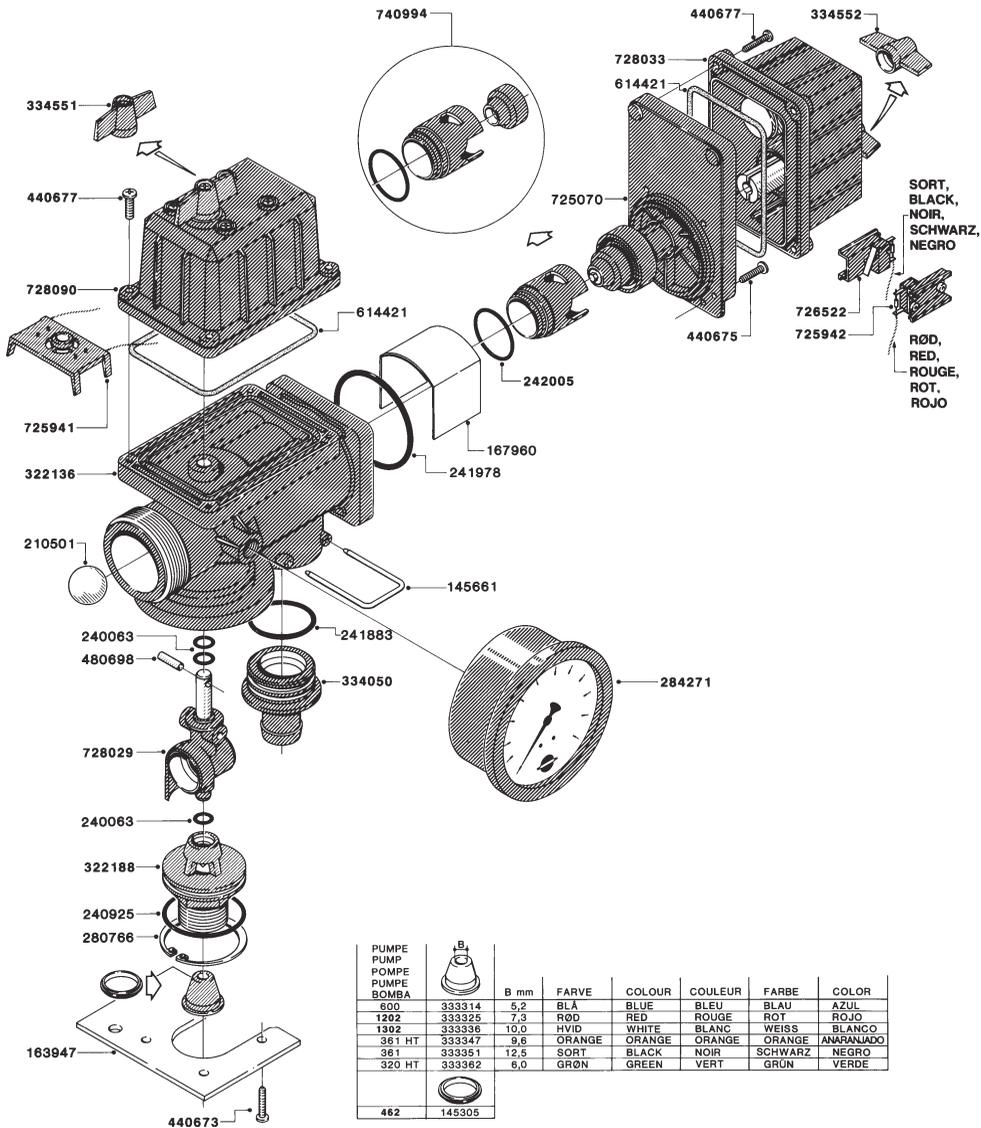


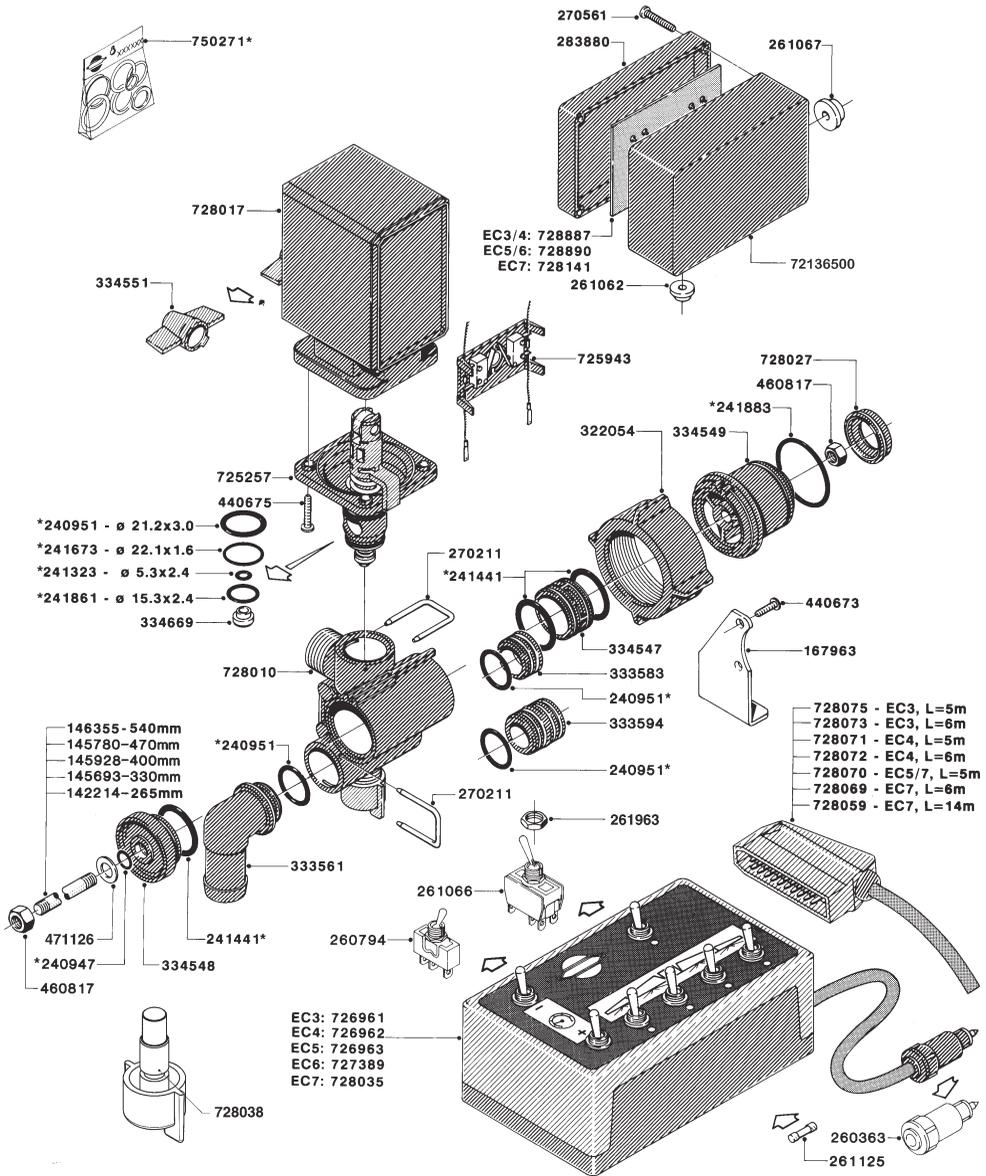
24 m LHZ

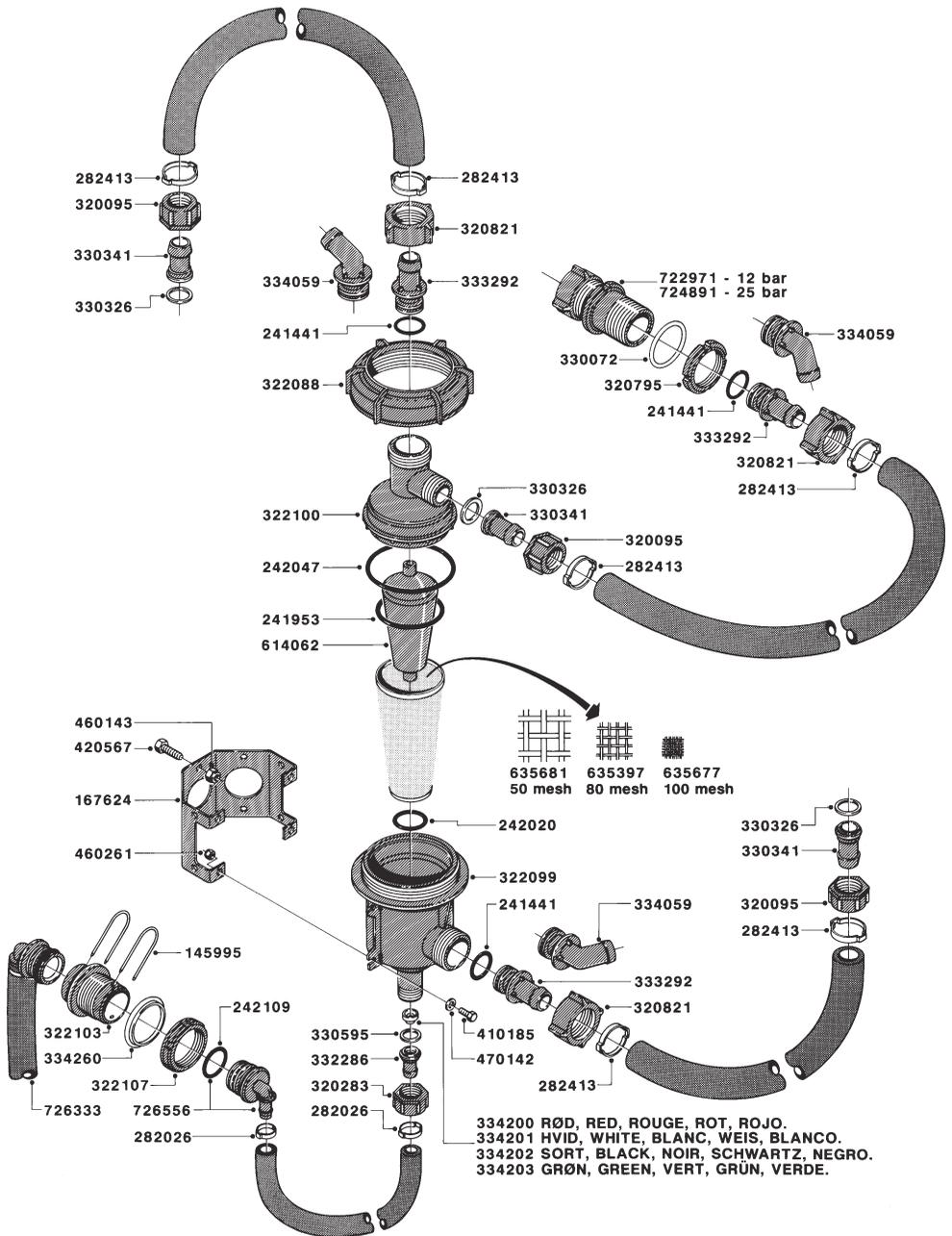


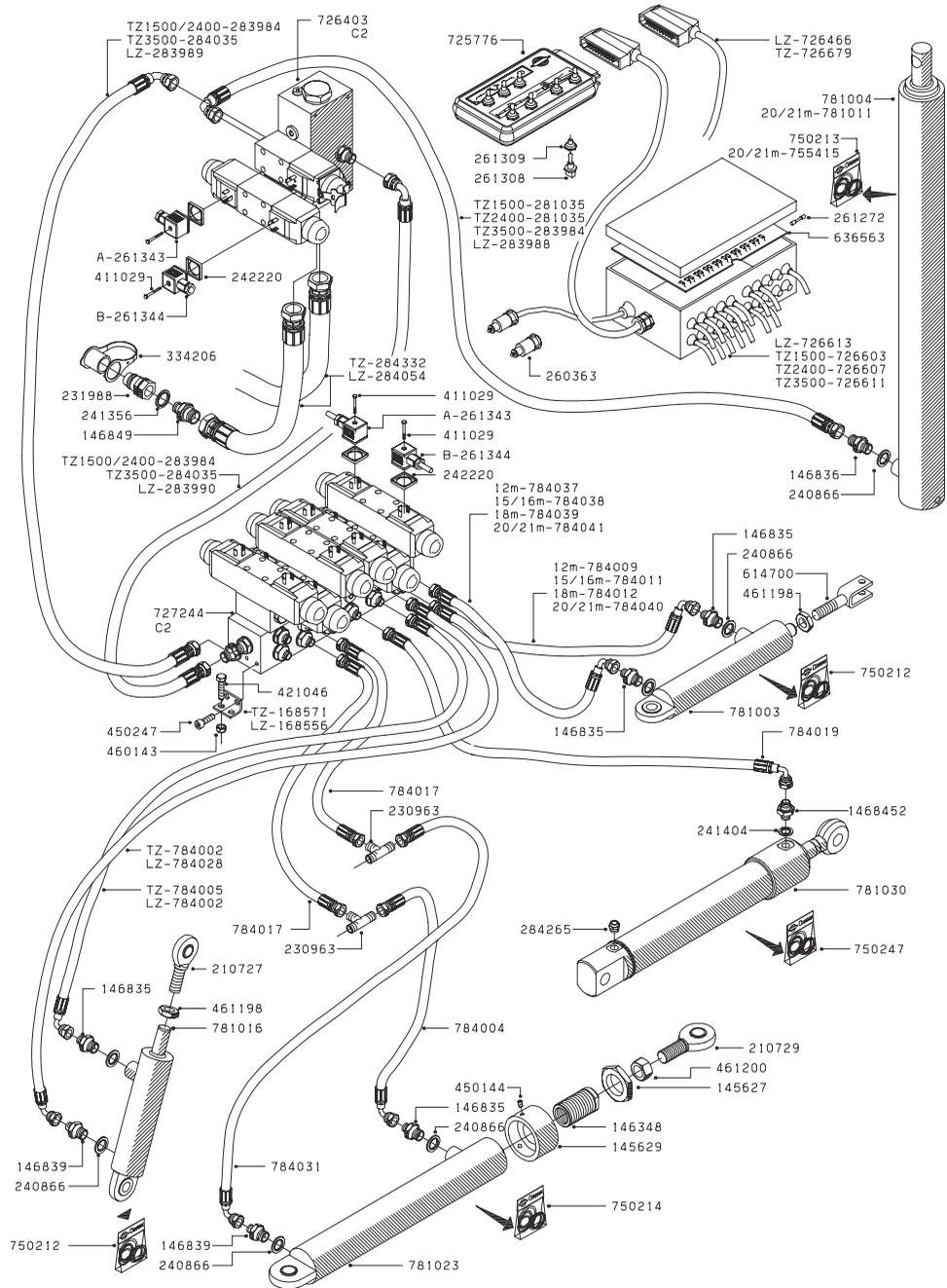
5. Secure feed and connecting hoses with plastic straps (approx. every 30 cm). Check that the hoses do not catch or pinch during **folding and unfolding**.

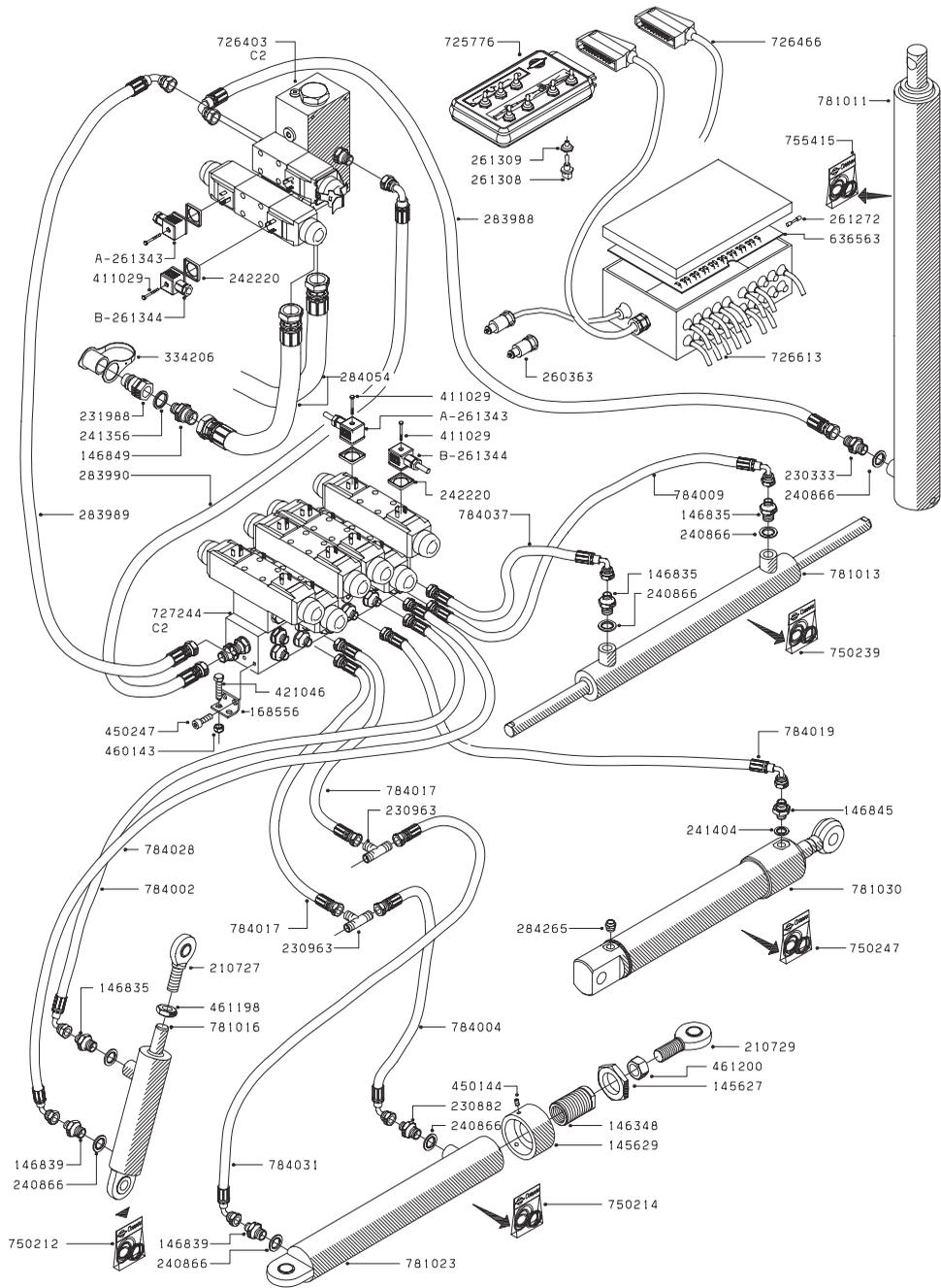




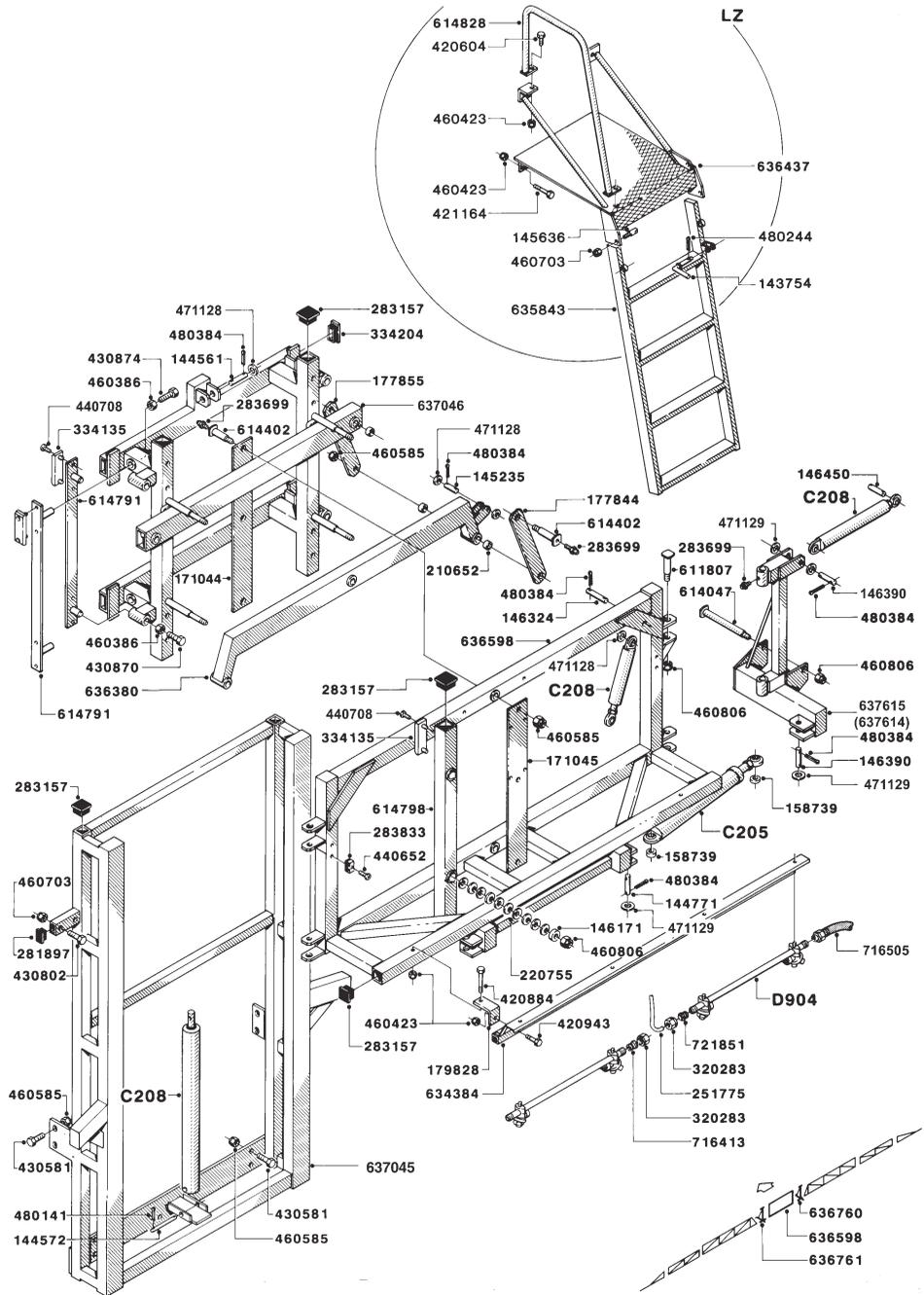


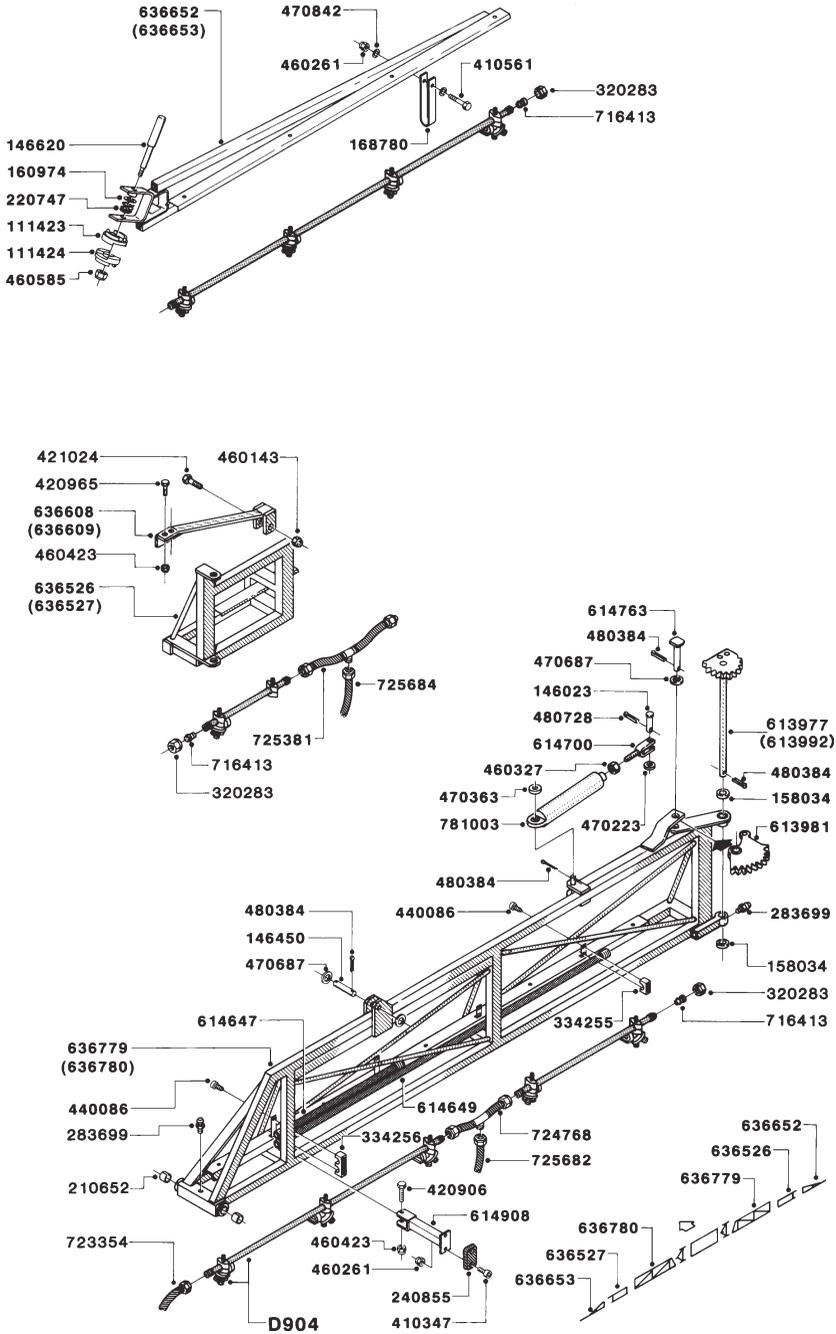


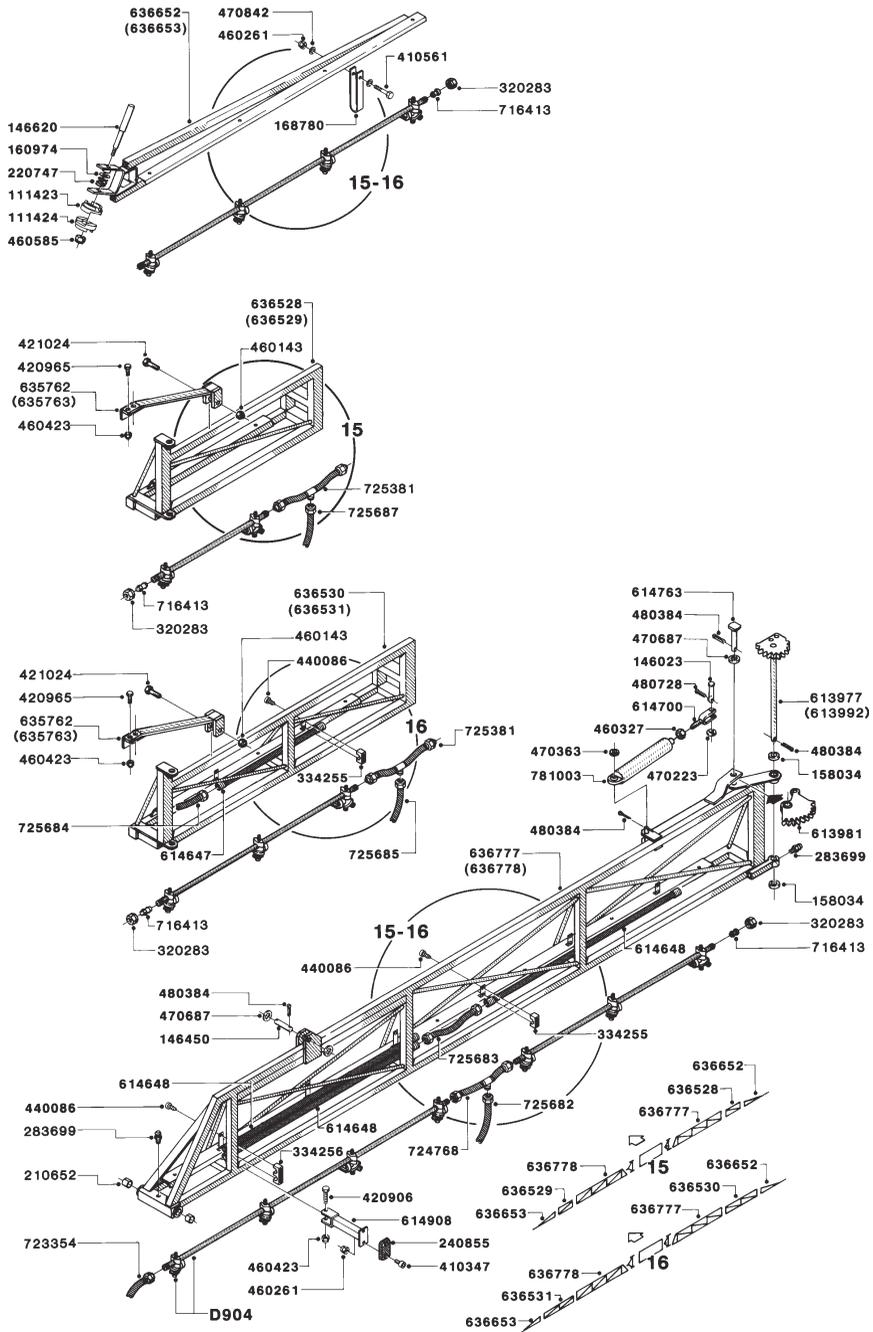


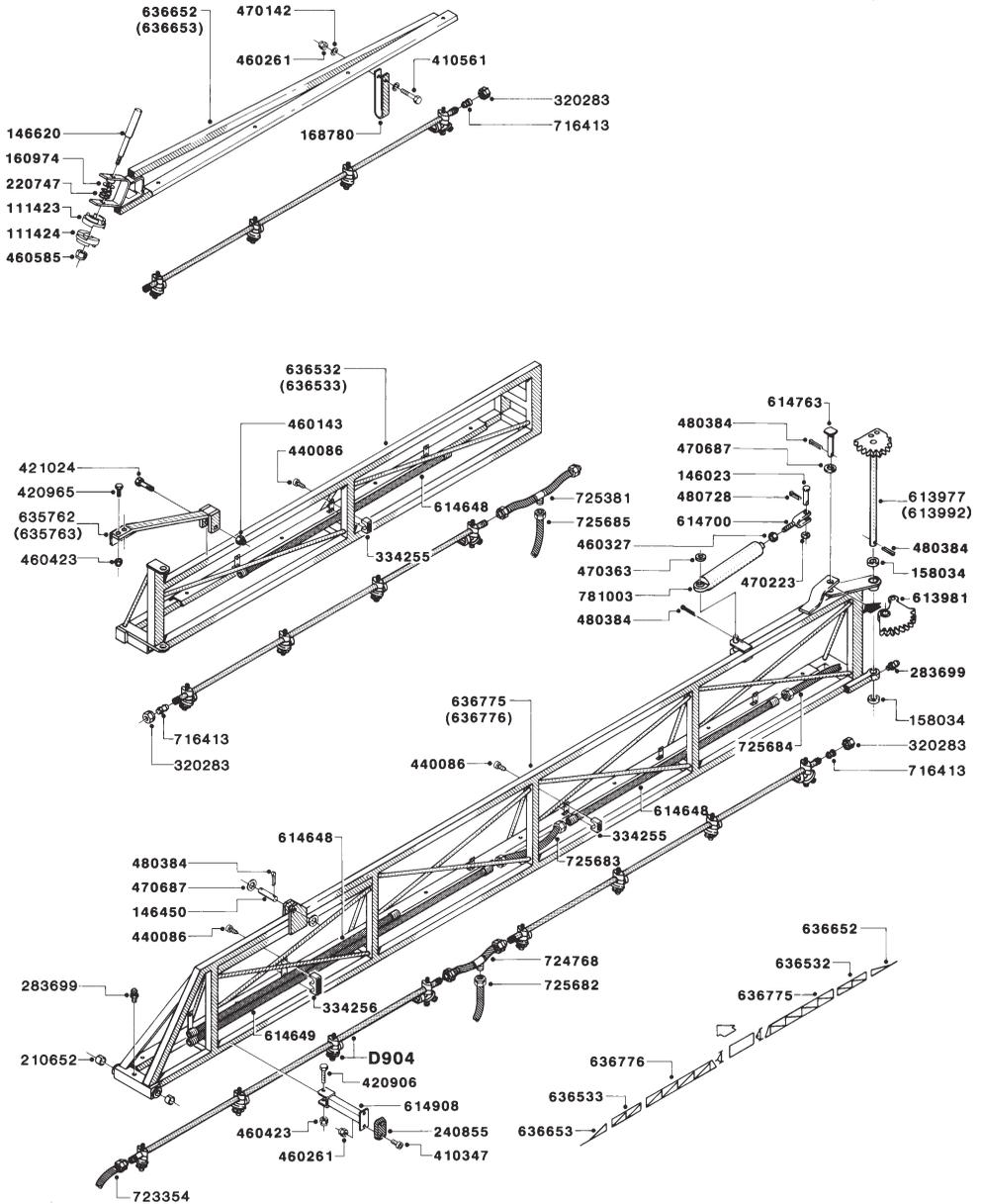


C209

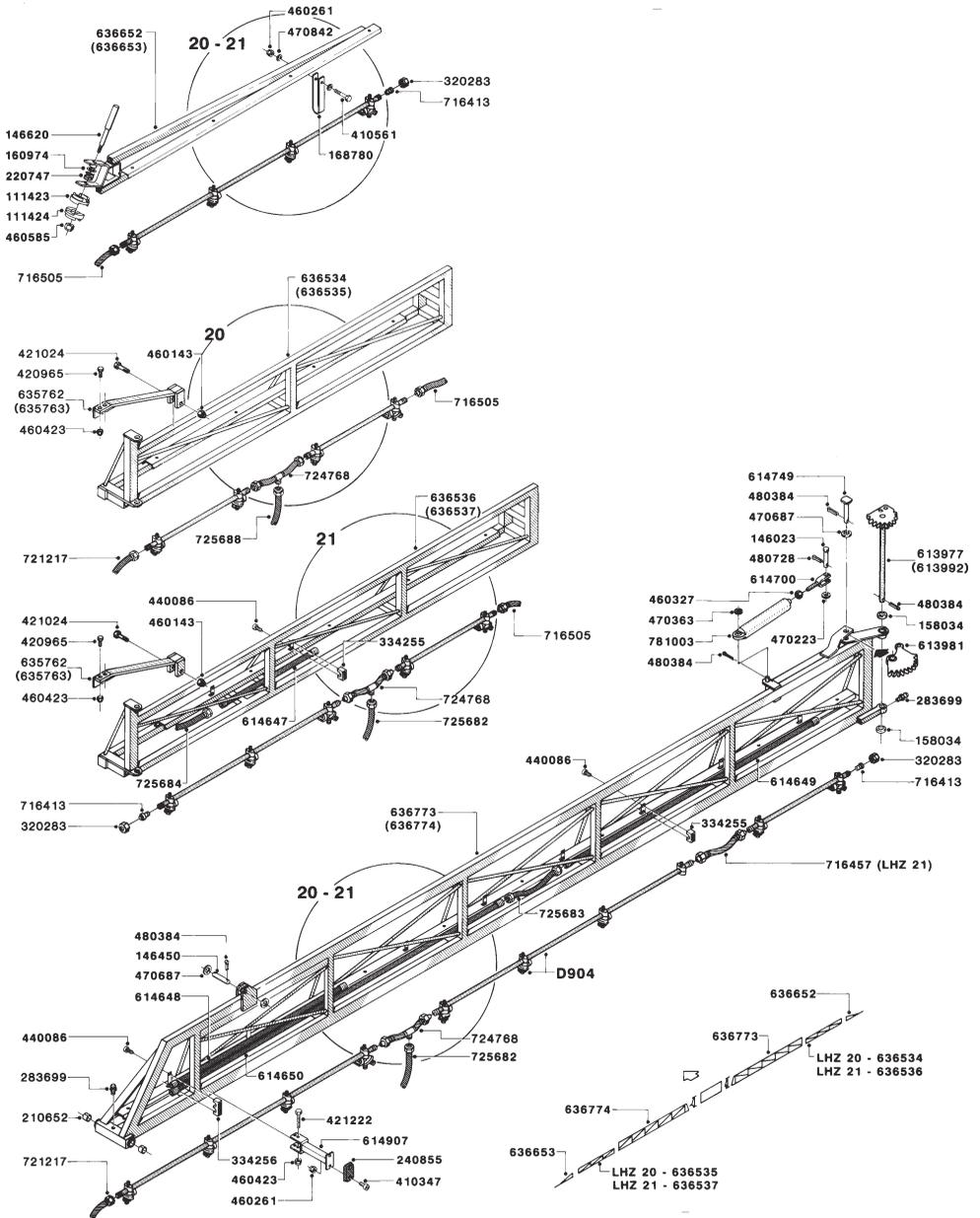


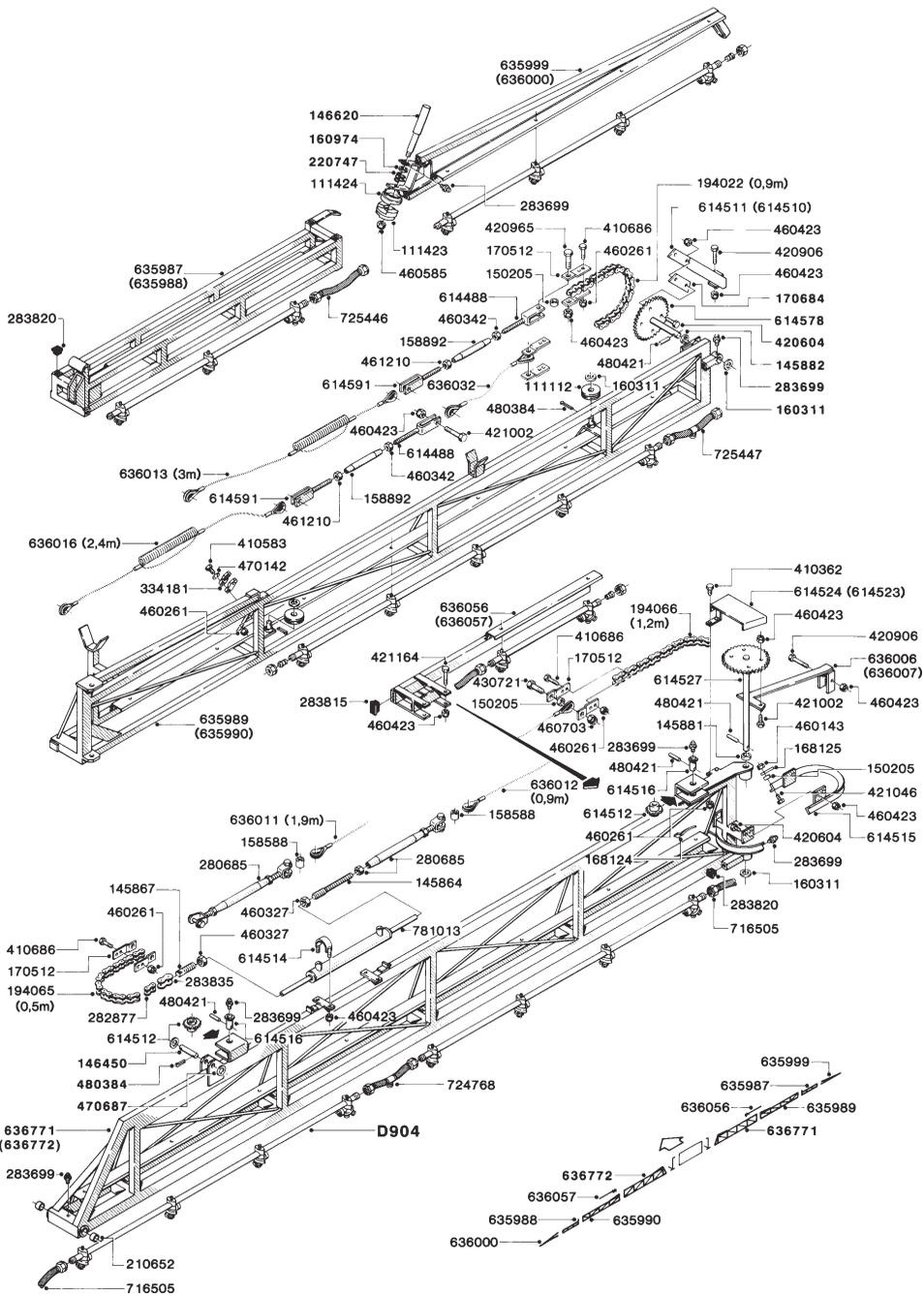




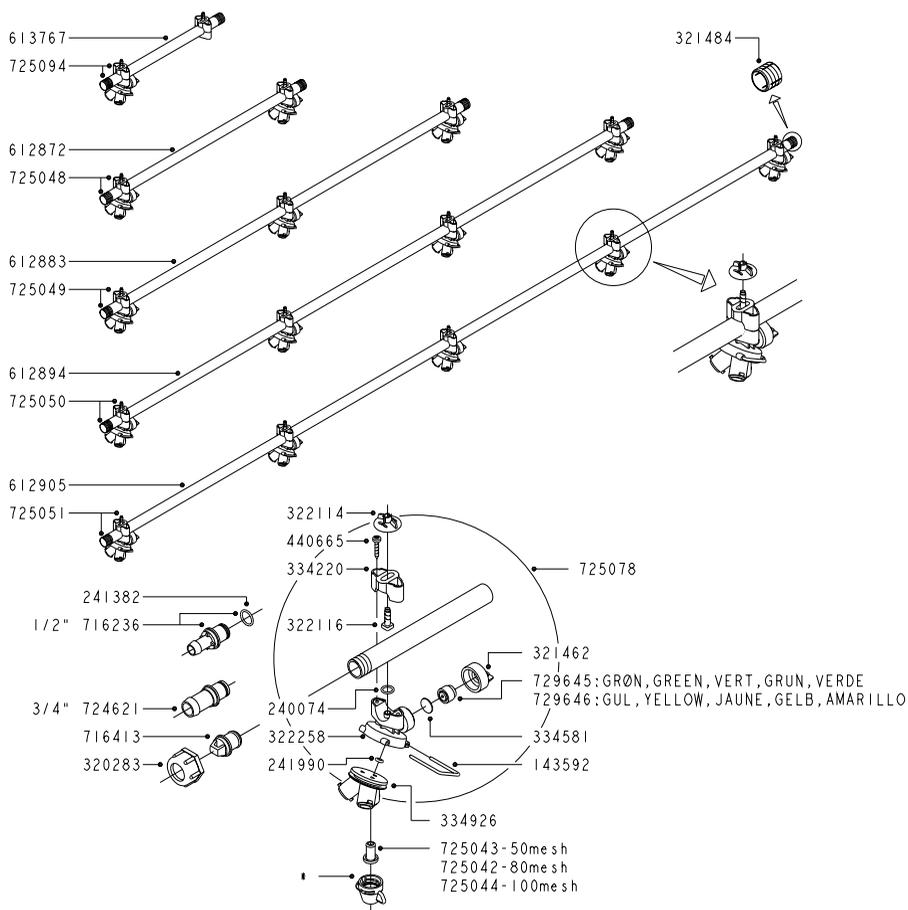


D302

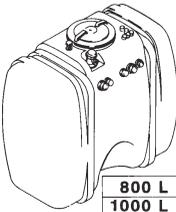




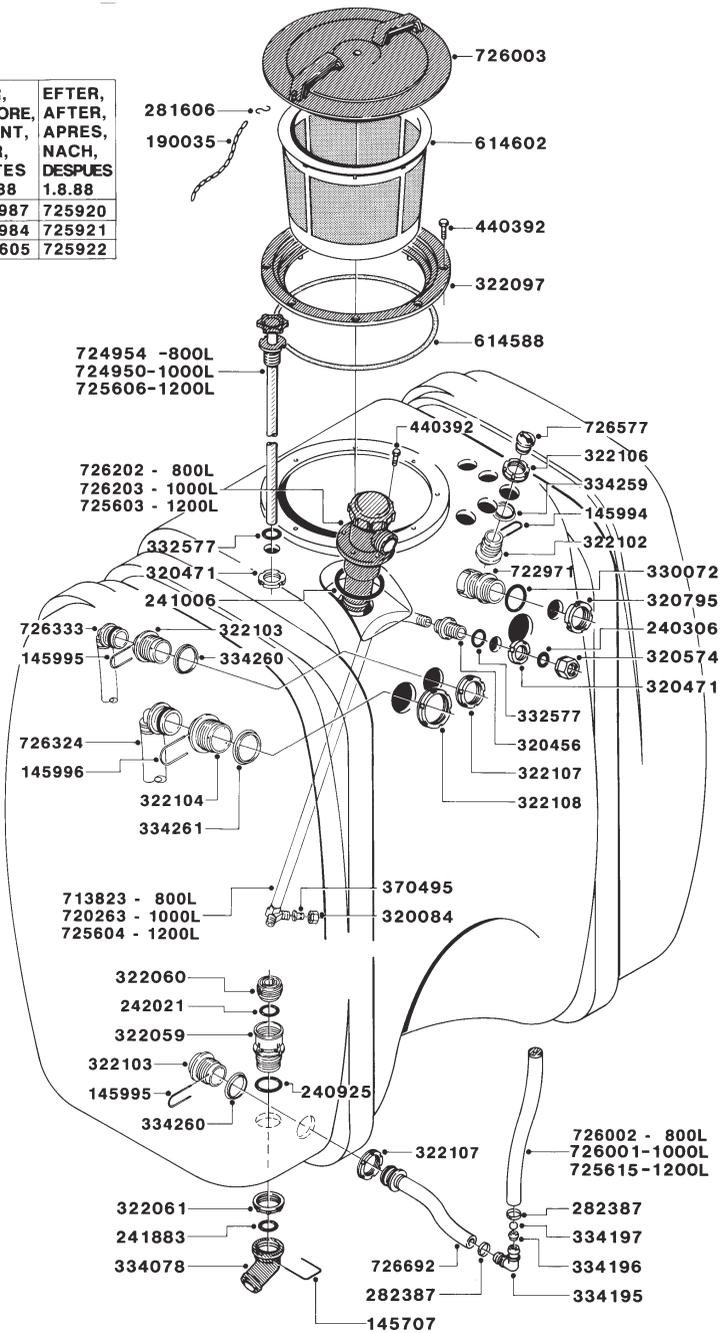
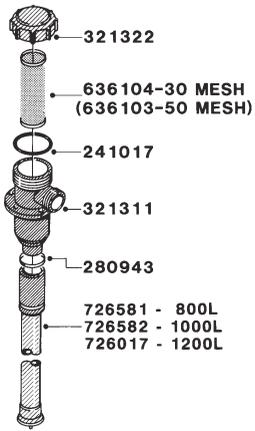
D304

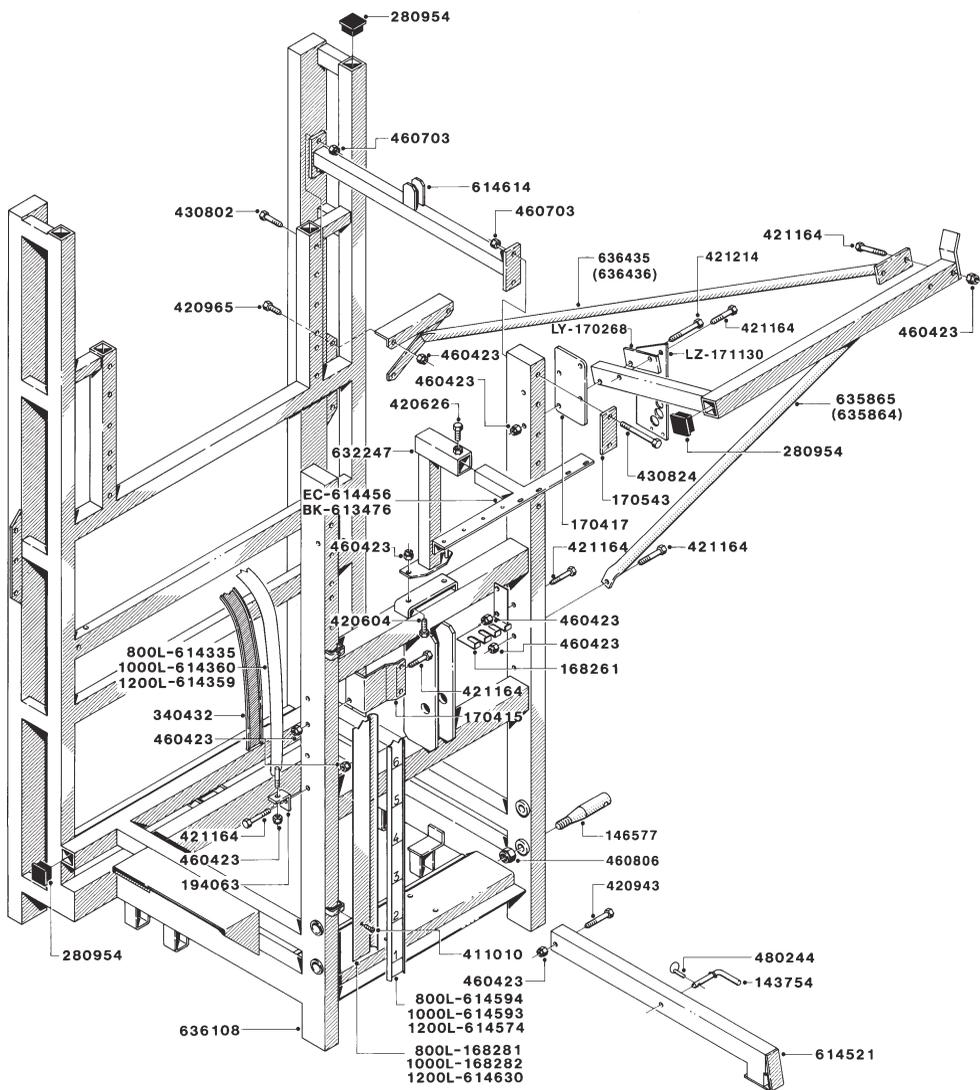


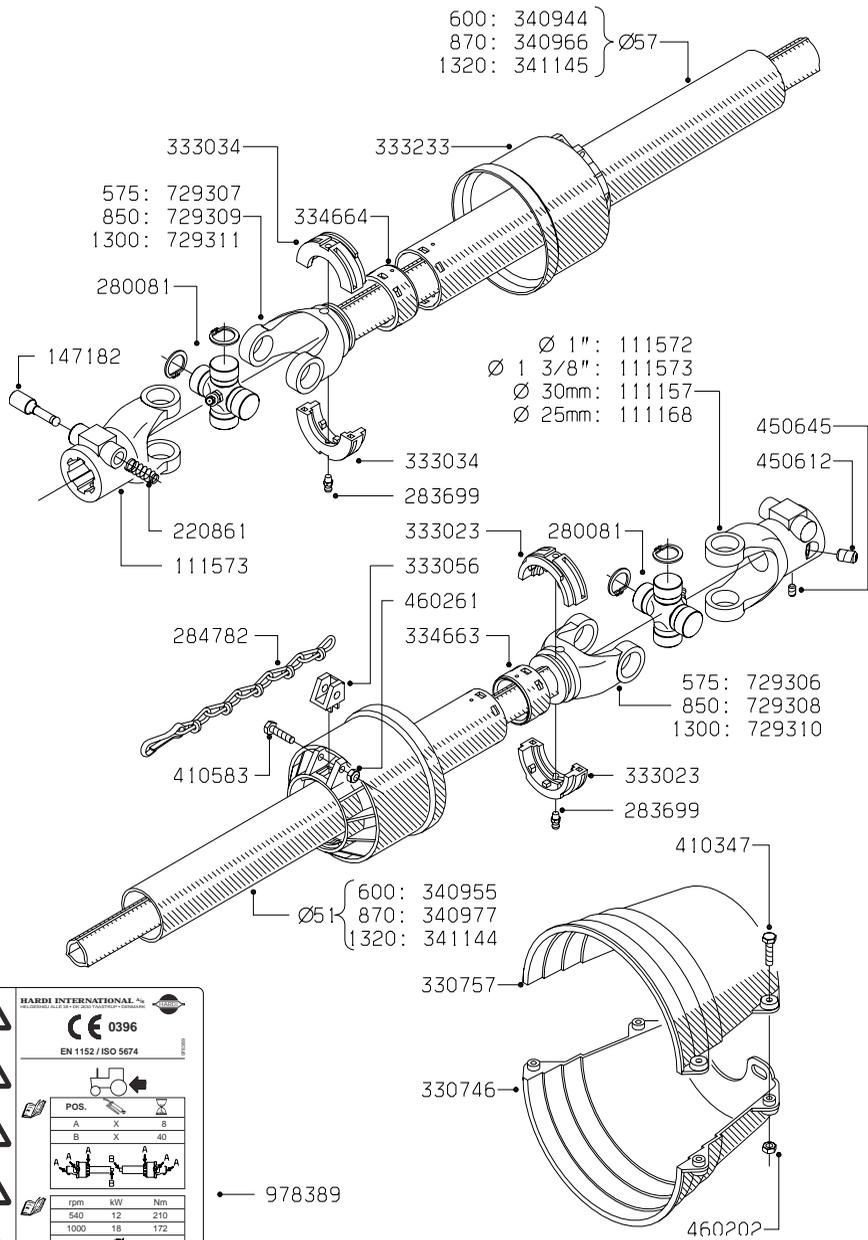
•		FARVE	COLOUR	COULEUR	FARBE	COLOR
371469	S4110-08	VIOLET	VIOLET	VIOLET	VIOLETT	VIOLETA
371470	S4110-10	BRUN	BROWN	BRUN	BRAUN	MARRON
371471	S4110-12	GUL	YELLOW	JAUNE	GELB	AMARILLO
371472	S4110-14	ORANGE	ORANGE	ORANGE	ORANGE	ANARANJADO
371473	S4110-16	RØD	RED	ROUGE	ROT	ROJO
371474	S4110-18	HVID	WHITE	BLANC	WEISS	BLANCO
371475	S4110-20	GRØN	GREEN	VERT	GRUN	VERDE
371476	S4110-24	TURKIS	TURQUOISE BLUE	BLEU TURQUOISE	TURKIS	AZUL TURQUI
371477	S4110-30	BLÅ	BLUE	BLEU	BLAU	AZUL
371478	S4110-36	GRÅ	GREY	GRIS	GRAU	GRIS
371479	S4110-44	ELFENBEN	IVORY	IVOIRE	ELFENBEIN	MARFIL



	FØR, BEFORE, AVANT, VOR, ANTES 1.8.88	EFTER, AFTER, APRES, NACH, DESPUES 1.8.88
800 L	725987	725920
1000 L	725984	725921
1200 L	725605	725922







**HARDI INTERNATIONAL S.p.A.**  
REPRESENTAZIONE ITALIANA DELLA SOCIETÀ INTERNAZIONALE ITALIANA

**CE 0396**  
EN 1152 / ISO 5674

**POS.**

A	X	8
B	X	40

**rpm kW Nm**

540	12	210
1000	18	172

