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LB / TB

Instruction book

674087-GB-96/2



EC Declaration of Conformity

Manufacturer,

ILEMO-HARDI S.A.
Pol. Ind. El Segre
E 25080 Lérida
SPAIN

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.

Lérida 1.2.96

Enric Capdevila
Managing Director
ILEMO-HARDI S.A.

Operator safety



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

Note the following recommended precautions and safe operating practices.



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



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



Pressure test with clean water prior to filling with chemicals.



Wear protective clothing.



Rinse and wash equipment after use and before servicing.



Depressurize equipment after use and before servicing.



Never service or repair the equipment whilst it is operating.



Disconnect electrical power before servicing.



Always replace all safety devices or shields immediately after servicing.



If an arc welder is used on the equipment or anything connected to the equipment, disconnect power leads before welding. Remove all inflammable or explosive material from the area.



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



Wash and change clothes after spraying.



Wash tools if they have become contaminated.



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



Keep children away from the equipment.



Do not attempt to enter the tank.



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

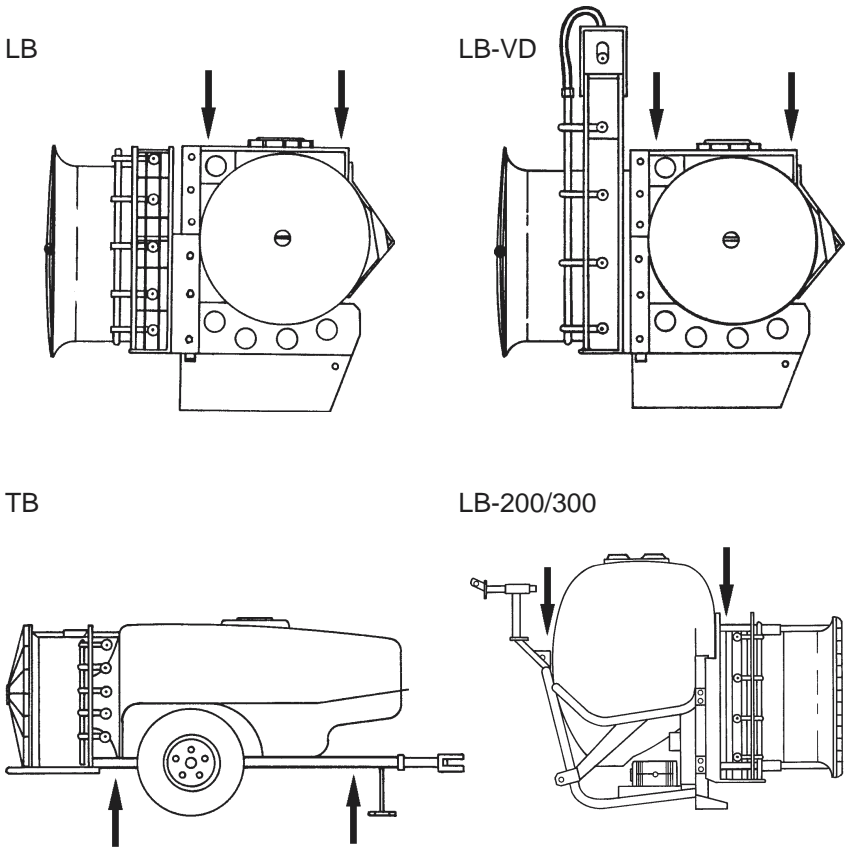


We congratulate you for choosing a HARDI plant protection product. The reliability and efficiency of this product depend on your care. The first step is to carefully **read and pay attention** to this instruction book. It contains essential information for the efficient use and long life of this quality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

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

Lifting points

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



Description

The HARDI LB lift mounted and TB trailed mistblowers are designed for small to medium orchards. They feature piston or diaphragm pumps, easy to use operating units and axial blower units.

The power is transferred from the tractor via the transmission shaft to the pump and blower unit.

The pumps are of a robust design for agricultural usage. The simple mechanical design allows for easy maintenance.

The operating unit consists of pressure regulator, main on/off valve, pressure gauge and distribution valves.

The tank design is compact and has no sharp edges for easy cleaning.

A suction filter incorporating a shut-off valve and coupling for a filling device is located at the bottom of the tank. The LB-255 (LB-50) models have a suction filter inside the tank. Hydraulic agitation in the tank maintain a homogeneous mixture of the spray liquid.

The axial blower units have adjustable fan blades. The angle can easily be varied to suit various orchard tasks and match tractor power output. A set of colour-coded ceramic nozzles are located in the blower slot. Each nozzle assembly can be turned off so that only the nozzles pointing towards the foliage are utilized.

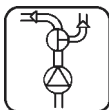
The LB models incorporate the F550 (22") and F650 (26") fans which can be disengaged for calibration, agitation whilst under transport or usage of spray guns.

The TB models have the larger F750 (30") and F820 (32") fans which include a patented centrifugal clutch. The clutch ensures a smooth engagement and disengagement of the fan. This minimizes stress on the sprayer and tractor. The units are fitted with a gearbox which permits disengagement of the fan for calibration, agitation whilst under transport or usage of spray guns. Furthermore, the TB models have adjustable track width and drawbar position.

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. If ordering spare parts, inform your dealer of these so the right model and version are described.

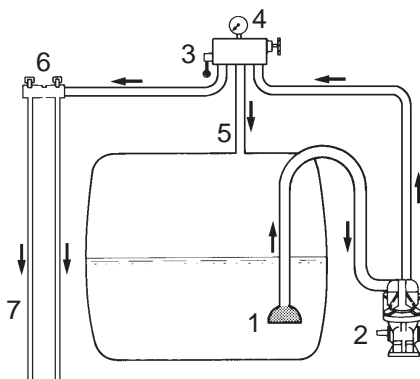




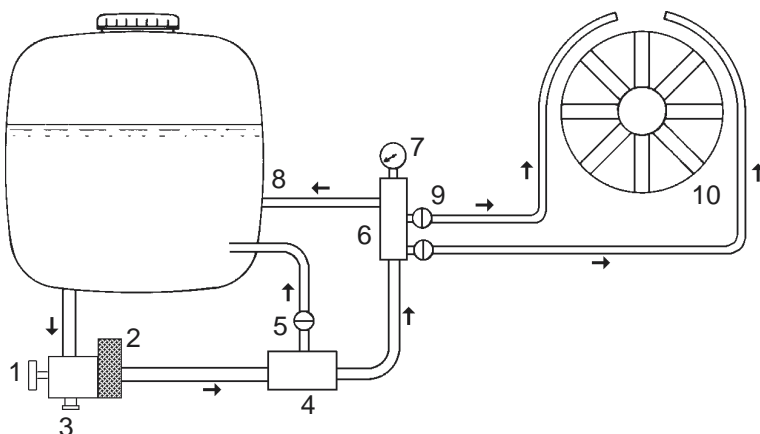
Function diagram

LB-255 (LB-50)

1. Suction filter
2. Pump
3. Operating unit
4. Pressure gauge
5. Pressure regulation bypass
6. Distribution valves
7. To blower unit



LB



1. 3-way valve
2. Suction filter
3. Coupling for filling device
4. Pump
5. Pressure agitation valve
6. Operating unit
7. Pressure gauge
8. Pressure regulation bypass
9. Distribution valves
10. Blower unit

Connecting the sprayer

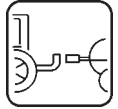
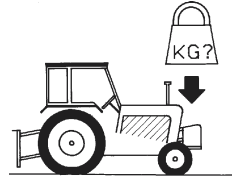
LB

The lift mounted sprayers have category I and II pivots LB-255 (LB-50) has only cat. 1 pivots. Two attachment points are possible.

WARNING: Note the weight of the sprayer.
See section on Technical specifications.

Generally it is recommended to:

1. Mount the sprayer as close as possible to the tractor.
2. Add ballast to front of tractor.
3. Increase tyre pressure (see tractor instruction book).
4. Travel at slower speeds when driving with a full tank.
(The tractor will have decreased braking efficiency.)
5. Be careful when filling/lifting the sprayer the first time.



TB

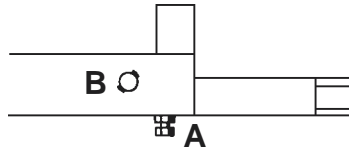
WARNING: The following adjustments must only be carried out when the sprayer is secured to prevent falling or rolling.

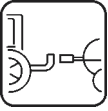
Drawbar

The forked drawbar designed for attachment to the cross boom mounted in the tractor linkage.

The drawbar length can be regulated by loosening the counter nut and bolt

A under the drawbar and removing the pin **B**. After the drawbar is connected, the jack is placed in the holders above the drawbar.





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 cross journals at each end of the shaft. Do not use without protection guard.

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

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

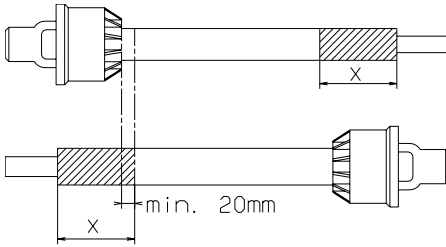
Make sure that protection guards around tractor P.T.O. and implement shaft is intact.

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

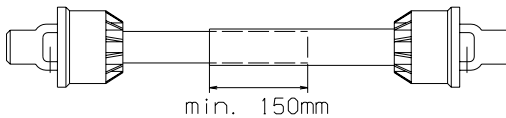
Installation of transmission shaft

Initial installation of the shaft is done as follows:

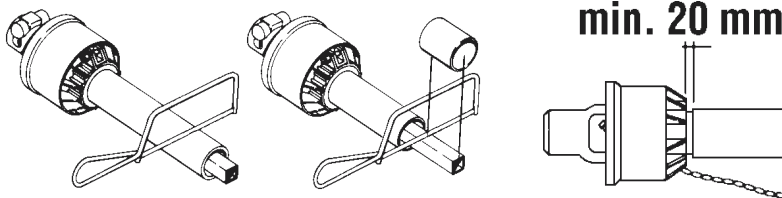
1. Attach sprayer to tractor and set sprayer in the position with **shortest** distance between the tractor and sprayer pump P.T.O. shafts.
2. Stop engine and remove ignition key.
3. If transmission shaft must be shortened, the shaft is pulled apart. Fit the two shaft parts at tractor and sprayer pump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



NOTE: The telescoping profiles must overlap at least by $\frac{1}{3}$ of their length while in use.



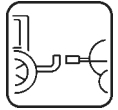
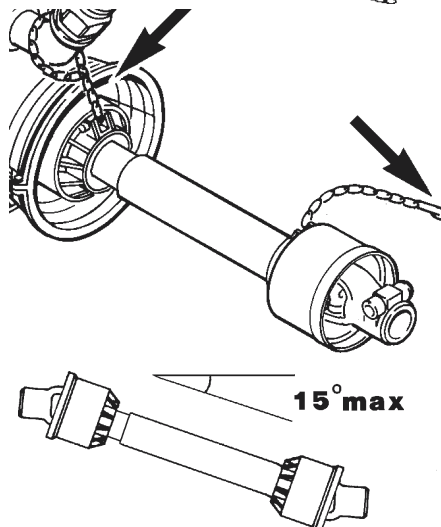
4. The two parts are shortened equally. Use a saw, and file the profiles afterwards to remove burrs.
5. Grease the profiles, and assemble male and female parts again.

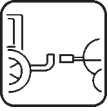


6. Fit the shaft to tractor and sprayer pump.
NOTE: Female part towards tractor.

Fit the chains to prevent the protection guards to rotate with the shaft.

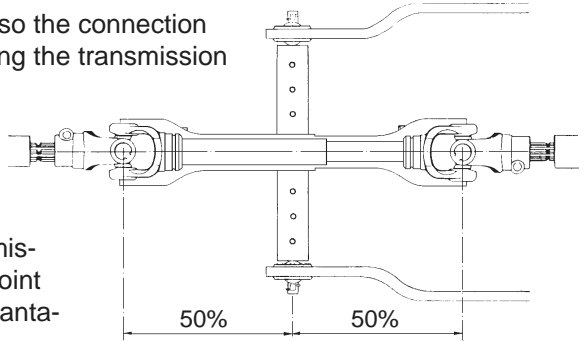
7. To ensure long life of the transmission shaft, try to avoid working angles greater than 15° .





For TB models

- adjust the drawbar so the connection point is midway along the transmission shaft.
- disengage P.T.O. if turning at angles greater than 35°.
- use an articulated drawbar and transmission shaft with CV joint for narrow rowed plantations.



Rear lights (if fitted)

Connect plug for rear lights to tractors 7-poled socket, loosen the lights assembly knob, extend assembly and tighten the knob. Check that rear lights, stop lights and turning indicators function properly.

NOTE: Remember to retract lights assembly when not needed.



Roadworthiness

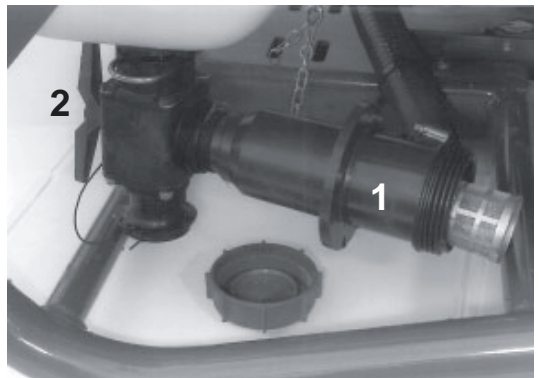
When driving on public roads and other areas where the highway code applies, or areas where there are special rules and regulations for marking and lights on implements, you should observe these and equip implements accordingly.

Before starting

Check that suction filter 1 is clean.

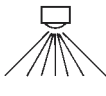

Check that arrow on the 3-way valve 2 is set correctly.

Check that the pressure agitation valve is turned on. (If the valve is fitted it is located near the pump). It only needs to be turned off if the products used have a tendency to create foam or if there is difficulty in completely emptying the spray tank.



For diaphragm pump

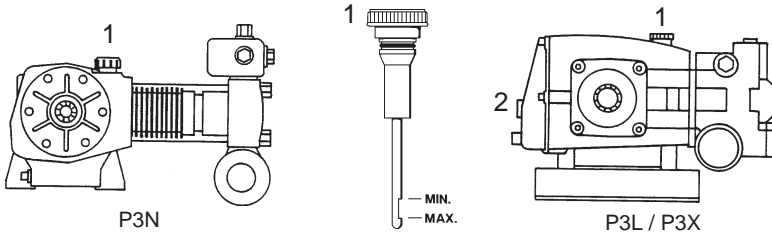
The air pressure in the pulsation damper is factory preset at 2 bar (30 psi) to cover spray working pressures between 3 (45 psi) and 25 bar (350 psi). When using spray pressures outside this range, the air pressure should be adjusted as shown in the diagram. The diagram is also embossed on the damper.

	
bar	bar
1.5 - 3	0 - 1
3 - 15	1 - 3
15-25	3 - 4

For piston pumps

Check oil level of pump. Level must be between minimum and maximum mark on dipstick **1**. P3L and P3X pumps also have an external oil level indicator **2**.

Piston pumps need to be run in. To prolong the life of the pump; Do not operate the pump at maximum pressure for the first 40 hours.



Pump	0 - 40 h	40 h +
P3L	35 bar/500 psi	60 bar/870 psi
P3X	40 bar/580 psi	55 bar/800 psi
P3N	45 bar/650 psi	60 bar/870 psi

WARNING: Do not operate pump over 540 r/min. Do not run pump dry for more than 60 seconds.





Adjustment of controls

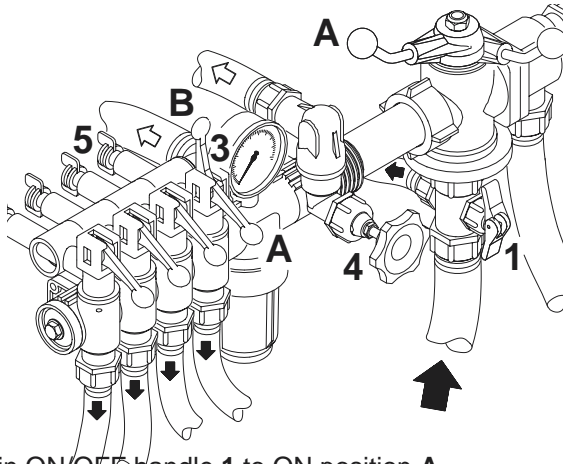
Please see section dealing with your operating unit. Initial adjustment and calibration is done with clean water.

See also “Mistblowing Technique” book.

NOTE: To ensure long bearing life, the tractor P.T.O. must not exceed 540 r/min.



M70/2 operating unit



1. Turn main ON/OFF handle **1** to ON position **A**.
2. Set hand levers on the distribution valve **2** to ON position **A**.
3. Put the tractor in neutral and set the P.T.O. revolutions to 540 r/min. (If maximum blower output is not necessary the revolutions may be set at less than 540 P.T.O. r/min).
4. From a given forward speed in a gear and the nozzles chosen, the desired pressure on the pressure gauge is set by means of the pressure adjustment handle **3**.

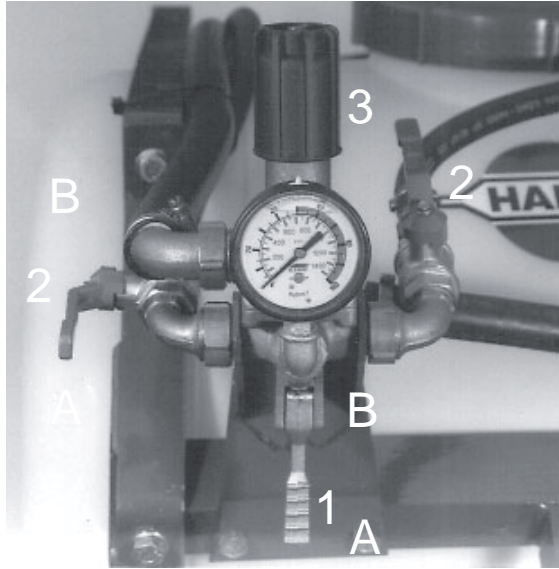
NOTE: Maximum pressure is 25 bar (350 psi). Do not operate over 25 bar (350 psi).

Operating the unit whilst spraying

To stop the liquid flow on both sides of the blower, turn the handle **1** to OFF position **B**. This takes the pressure off the pump. The liquid will then return to the tank via the return system. If you want to spray on one side only, set handle **2** to OFF position **B** on the side you want to close off. Note that the pressure will rise and readjustment will be necessary.

M/2 operating unit

1. Push handle **1** to ON position **B**.
2. The two handles **2** are set at ON position **A**.
3. Put the tractor in neutral and set the P.T.O. revolutions to 540 r/min. (If maximum blower output is not necessary the revolutions may be set at less than 540 P.T.O. r/min).
4. From a given forward speed in a gear and the nozzles chosen, the desired pressure on the pressure gauge is set by means of the pressure adjustment handle **3**.



NOTE: For P3L pump, maximum pressure is 60 bar (870 psi).
For P3X pump, maximum pressure is 55 bar (800 psi).
For P3N pump, maximum pressure is 60 bar (870 psi).
Do not operate over the maximum pressure.

Operating the unit whilst spraying

To stop the liquid flow on both sides of the blower, set handles **2** to OFF position **B** or set handle **1** to OFF position **A**. If you only want to spray on one side only, turn handle **2** to OFF position **B** on the side you want to close off. Note that the pressure will rise and readjustment will be necessary.

LB-255 (LB-50) tank drain

A drain plug is located at the bottom of the tank. Check drain cap is fitted before filling tank.

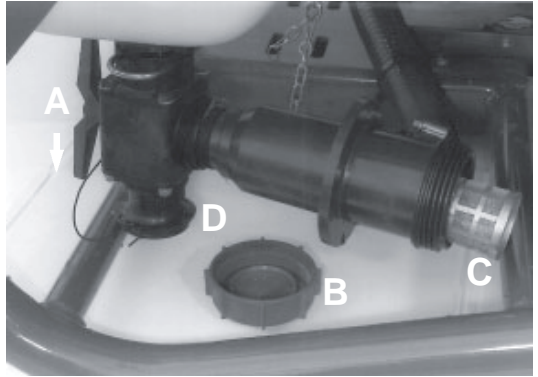




LB tank drain

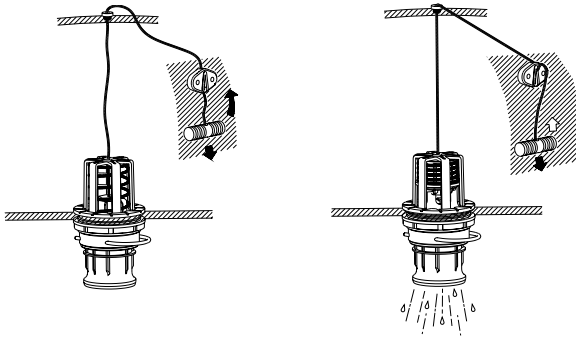
The tank can be drained via the suction filter assembly.

1. Turn handle **A** so arrow points towards the quick coupler **D**.
2. Remove the filter cap **B** and filter **C**.
3. Turn handle **A** towards tank suction hose to drain.



TB tank drain valve

Pull the red handle on the top 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.



Engaging and disengaging the fan

Spraying with guns or agitation under transport only needs the operation of the pump and it is therefore practical to disengage the fan.

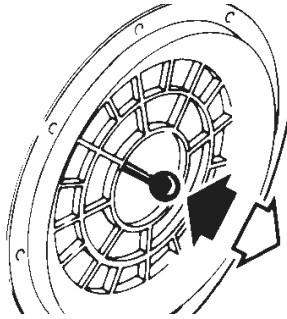


IMPORTANT: P.T.O. must be disengaged and both pump and fan must be stationary when engaging/disengaging the fan.

LB

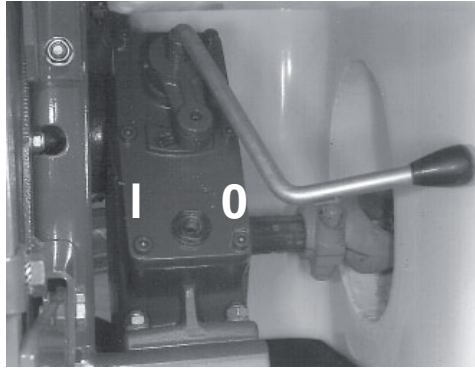
The handle for engaging/disengaging the fan is in the middle of the air intake on the blower unit.

Push handle IN to engage fan.
Pull handle OUT to disengage fan.



TB

The gear box located at the rear of the tank. The handle is set at position **O** to disengage the fan and position **I** to engage the fan.



Blower adjustment

The angle of the fan blades can be varied from among four settings marked as 1, 2, 3 and 4.

The air volume/air speed can be increased by increasing the angle of the blades. The power consumption of the fan can be reduced by decreasing the angle of the blades. This permits the sprayer to be matched to the spray task and to the tractor.

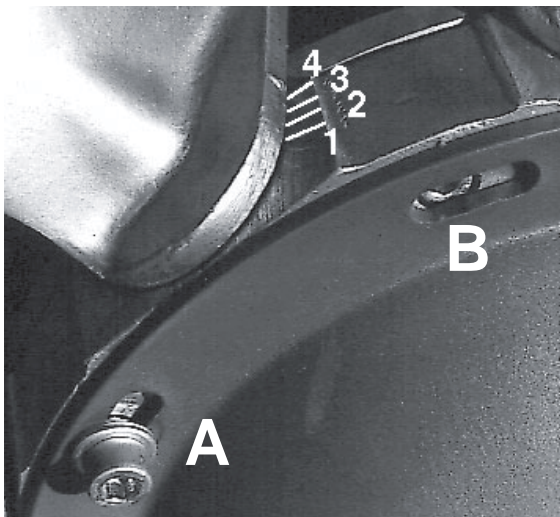
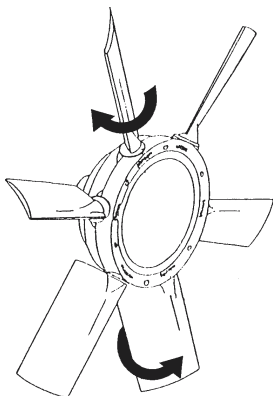
See section on Technical specifications for power consumption.

Fan adjustment

Disconnect the transmission shaft from the tractor P.T.O. before adjustment.

1. Remove the large guard at rear of blower.
2. Loosen the Allen screws **A** holding the red cover. Remember to only loosen.
3. Loosen the Allen screws **B** in the slots. It may be necessary to hold the nut at the back of the fan.





4. Using both hands on opposite blades, turn blades to desired position (from 1 to 4). All blades should turn together.
5. Check all blades are at same position. Tighten Allen screws **A** and **B** and replace guard.

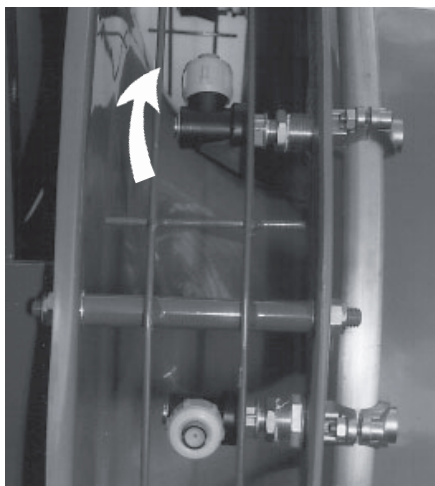
Nozzle ON/OFF

Individual nozzles can be turned off if the target is not in the spray direction of the nozzle.

To turn nozzle off, rotate 90°.

LB-VD adjustment

For models with the Vertical Deflector (VD), it may be necessary to adjust the top part of the deflector. Adjust so the spray mist is directed into the foliage.



TB

The TB models are equipped with adjustable nozzles. To turn a nozzle off, screw the nozzle cap until the flow is completely cut off.

Calibration - see “Mistblowing Technique” book.

Air volume and air speed - see section on Technical specifications.

Maintenance

In order to derive full benefit from the sprayer for many years to come, these few but simple points should be noted.

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 orchard you have just sprayed.
NOTE: It is advisable to increase the forward speed (double if possible) and reduce the pressure.
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 suction filter and clean. Be careful not to damage the mesh. Reassemble the filter housing without the filter. Replace filter 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 orchard 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.
8. Drain the tank and let pump run dry. Rinse inside of tank, again letting the pump run dry. Remember that piston pumps must not run dry for more than a minute.
9. Stop the pump. If the pesticides used have a tendency to block nozzles and filters, remove and clean them now.
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, plunger cups/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. Check it daily when spraying. For models with 3-way valve at suction filter, ensure the O-ring on filter housing is in good condition and lubricated. See section on Operating instructions-Before starting.

In Line Filters (if fitted)

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

Adjustment of V-belts

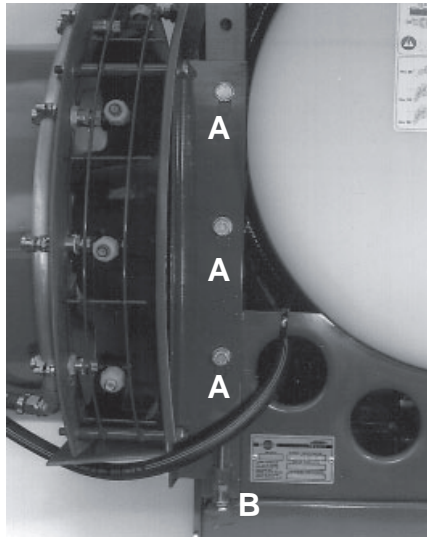
Correct belt tension is important for efficient power transfer. Under tensioned belts will slip and overheat reducing belt life whilst over tensioned belts will reduce belt and bearing life.

Check the V-belts regularly within the first 24 working hours as they need to be run in. Tighten if necessary. Thereafter check every 40 hours.

A visual check can be done by running the transmission for a few minutes and then noting the “bow” of the V-belts on the slack side. A faint “bow” should be noted.

For LB-255 (LB-50)

The blower drive V-belts are tensioned by raising or lowering the blower unit. Loosen at **A** on the blower suspension and set the belt tension by the adjusting bolts **B**.

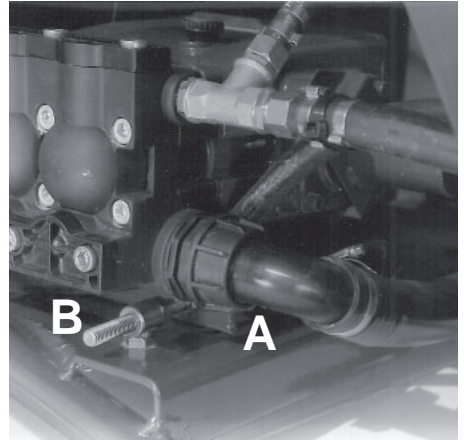




For LB

The pump drive V-belts are adjusted by loosening the bolts **A** at the base of the pump, loosening counter nut and adjusting bolt **B** at the foot of the pump.

Adjust tension so that at midway between pulleys, a force of 1 kg (2.2 lb) should deflect the V-belt 2 to 3 mm (3/32" to 1/8"). Do not over-tighten the V-belts.



NOTE: Tighten all counter nuts and replace guards after adjustment.

Tank contents indicator (if fitted)

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.



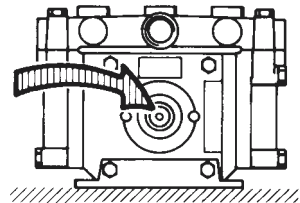
Lubrication

Recommended lubrication is shown as follows. Use ball bearing grease (lithium grease No. 2).

NOTE: If the sprayer is cleaned with a high pressure cleaner or it has been used to spray fertilizer, we recommend lubrication of the entire machine.

Diaphragm pump

Grease every 40th working hour.

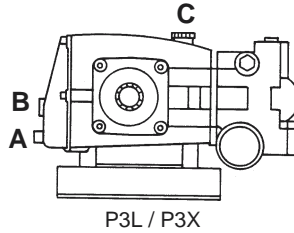
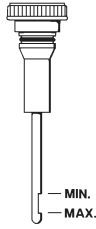
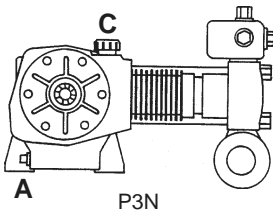


Piston pump

Check oil daily when spraying. Level must be visible between the minimum and maximum mark of the indicator.

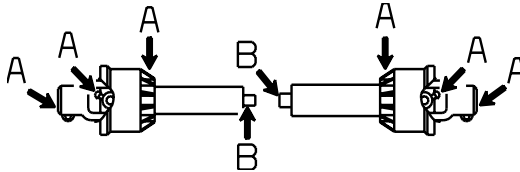
The pump is filled with oil from the factory. Change the oil after the first 50 hours of work. Thereafter as described in following table or once a year.

A = Drain plug **B** = Level indicator **C** = Filling hole



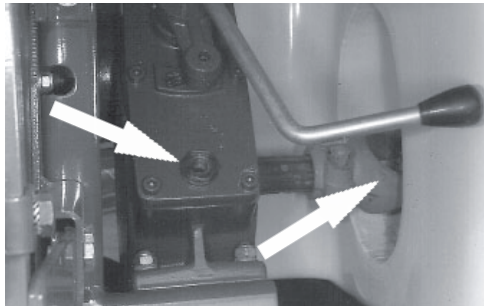
Transmission shaft

Lubricate the cross journals and bearings with ball bearing grease **A** every 8th working hour and tubes and pins **B** every 20th working hour.



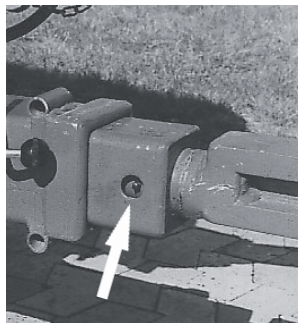
TB transmission shaft

This includes the power transmission shaft and bearings connecting the pump and the blower unit.



TB gear box

The gear box is filled with oil from the factory. Regularly check oil level. The oil level must come to the indicator glass.



TB drawbar and wheels

The swivel of the drawbar and axles should be greased at least once a year.



	Oil cap. litre	Oil type SAE	Initial change hours	There after hours
Pump P3L	1.5	20/40 HD	50	150
Pump P3X	1.5	20/40 HD	50	150
Pump P3N	2.5	20/40 HD	50	150
TB gear box	1.3	20/40 HD	50	150

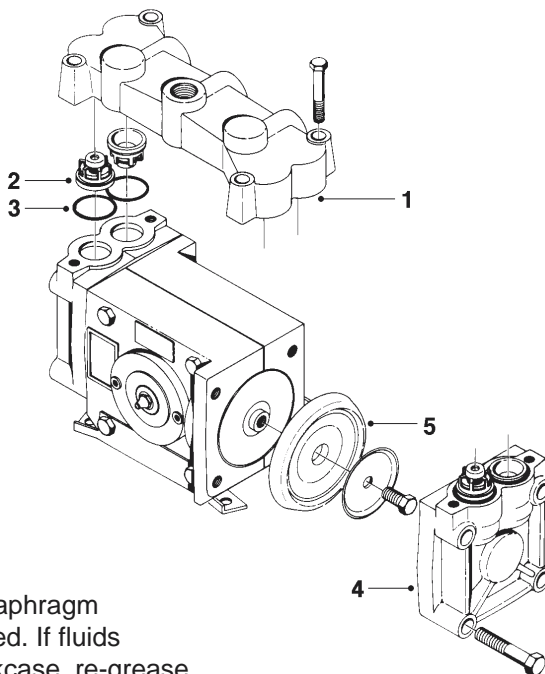
Changing of valves and diaphragms / plunger cups

Diaphragm pump

Valves

Remove valve cover **(1)**. Before changing the valves **(2)** note the orientation of the valves so that they are replaced correctly.

It is recommended to use new gaskets **(3)** when changing or checking the valves.



Diaphragms

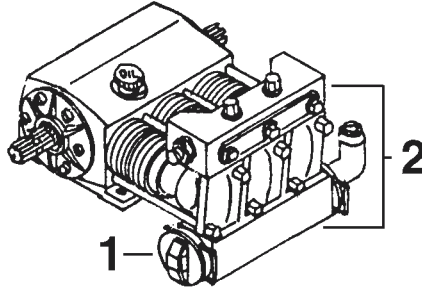
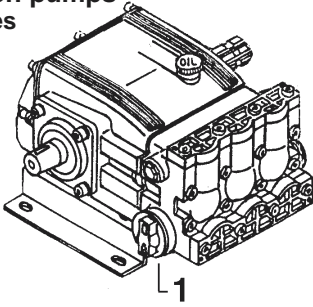
Remove the diaphragm cover **(4)** after having dismantled the valve cover. The diaphragm **(5)** may then be changed. If fluids have reached the crankcase, re-grease the pump thoroughly. Check also the drain hole at the bottom of the pump is not blocked.

Reassemble pump with the following torque settings.

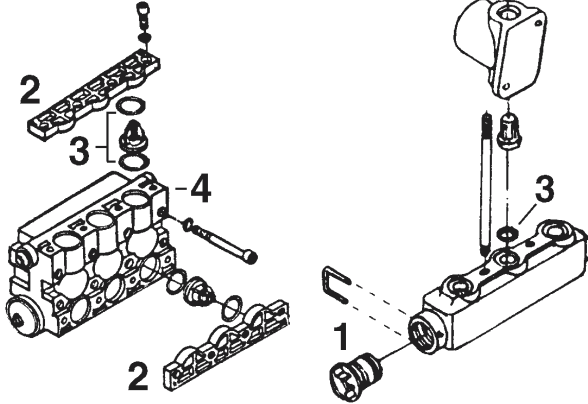
Pump Model	Valve cover Nm	Diaphragm cover Nm	Diaphragm bolt Nm
321	50	80	60

1 Nm = 0.74 ft-lb

Piston pumps Valves



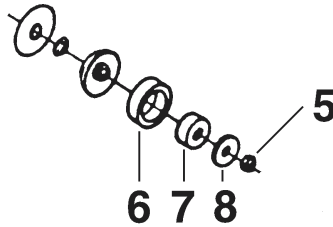
1. Remove suction cover 1 so that the liquid is drained from the pump.
2. Remove valve chamber 2. Note orientation of the valves. It is recommended to use new O-rings 3 when checking or changing the valves.



NOTE: For valves with ball seat, the valve seat can be rotated.

Plunger cups

1. The valve chamber must be removed first (P3N only).
2. Remove cylinder head 4.
3. Use spanner to loosen nut 5.
4. Cylinder can now be removed so the cups 6 can be removed.
5. At reassembly, grease cups and inside of cylinder.
6. Assemble cup 6, rubber expander 7, washer 8 and self-locking nut 5.
7. Tighten nut (30 Nm). Do **NOT** over tighten. If it is too tight, the cups will wear rapidly. If it is too loose, liquid will leak from the drain port of the cylinder.
8. Finish the assembly and run the pump for 1/2 hour. If liquid leaks from the drain ports, it is necessary to tighten nut 5. Only tighten 1/4 of a turn. This may also be necessary if the cups have dried out after off-season storage.





Off-season storage

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

Anti-freeze precautions

If the sprayer is not stored in a frost- proof place you should take the following precautions: Put at least 10 litres (3 US gallons) of 33% anti-freeze mixture in the tank and let the pump run a few minutes so that the entire system including spray lines 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, plunger cups and gaskets from drying out.

Hoses

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

A leaky hose causes annoying delays in the middle of spraying. Check all the hoses and replace if there is any doubt of their durability.

Paint

Some chemicals are very corrosive. It is therefore advisable to remove rust, if any, and touch up the paint.

Operating unit

Ensure the pressure regulating valve is relieved or released. This relieves the pressure on the spring and operating problems are avoided when starting up.

Tank

Ensure that all chemical residues are removed from the tank and rest of the sprayer.

Transmission shaft

It is important that the push pins are clean and well lubricated, to ensure safe function.

Every 40 hours:

Inspection of protection guards, function and condition. Replace possible damaged parts.

Every 1000 hours:

Check condition of protection guards and replace nylon bearings.

Check general condition of cross journals and push-pin/quick release - replace if necessary.

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, reducing pump efficiency.
- Poorly reassembled pumps, especially valve covers will allow the pump to suck air resulting in reduced or no capacity.
- Worn plunger cups will reduce the pump capacity. It will be necessary to replace them when working pressure cannot be reached or liquid leaks from the cylinder ports.
- Reduced working pressure may also be due to insufficient spring strength or a worn valve cone on the pressure control unit.
- Loose or partially loose V-belts may result in lower revolutions per minute on the blower and overheating of the V-belts.
- Electrical components that are contaminated with dirt result in poor connections.

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. Electrical components are maintained clean.

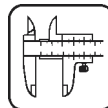


Trouble shooting

Fault	Possible cause	Control / remedy
No liquid flow from pump	Suction obstructed.	Check filters. Suction cut-off open.
	Air leak on suction.	Missing O-rings. Defect hoses.
	Valves obstructed or worn.	Replace.
No pressure	Worn control unit.	Check spring strength.
	Valves obstructed or worn. Worn plungers.	Replace.
	Valves obstructed or worn.	Replace.
Fluctuating pressure	Air leak on suction.	Missing O-rings. Defect hoses.
	Suction obstructed.	Check filters.
	Worn bearings. Valves worn.	Replace.
Pump noisy	Air leak on suction.	Missing O-rings. Defect hoses.
	Cylinder seals defect. Piston seals worn.	Replace.
Water in oil	High air humidity.	Change oil twice as often.
	Worn plungers. Cylinder barrel worn.	Replace.
Liquid leaks at cylinder seals	Piston seals worn	Replace

Technical specifications

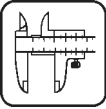
Pump power consumption and capacity



321/7.0	r/min									
	300		400		500		540			
bar	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	kW
0	24	0.22	33	0.29	44	0.37	51	0.45		
5	22	0.37	30	0.52	37	0.67	40	0.75		
10	21	0.60	29	0.82	36	1.04	39	1.12		
15	21	0.75	29	1.04	36	1.23	38	1.41		
20	20	0.89	28	1.23	35	1.57	37	1.72		
25	20	1.12	27	1.49	35	1.86	37	2.01		
Rotation per min.	r/min	Capacity				l/min	Suction height			0,0 m
Power consumption	kW	Max. pressure				15 bar	Weight			24,2 kg

P3L-36	r/min									
	350		400		500		540			
bar	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	kW
0	24	0.01	27	0.01	34	0.01	36	0.01		
10	24	0.40	27	0.47	34	0.58	36	0.63		
20	24	0.81	27	0.96	34	1.18	36	1.25		
30	24	1.25	27	1.40	34	1.76	36	1.84		
40	24	1.62	27	1.84	34	2.28	36	2.50		
50	24	1.99	27	2.28	34	2.87	36	3.09		
60	24	2.43	27	2.79	34	2.46	36	3.75		
Rotation per min.	r/min	Capacity				l/min	Suction height			0,0 m
Power consumption	kW	Max. pressure				60 bar	Weight			18,6 kg

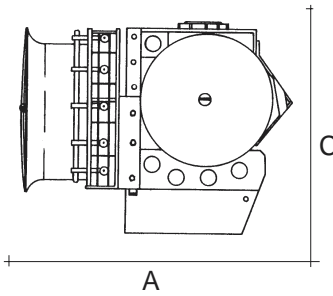
P3X-70	r/min									
	350		400		500		540			
bar	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	kW
0	45	0.01	52	0.01	65	0.01	70	0.01		
10	45	0.79	52	0.90	65	1.13	70	1.22		
20	45	1.56	52	1.78	65	2.22	70	2.40		
30	45	2.33	52	2.67	65	3.34	70	3.60		
40	45	3.11	52	3.56	65	4.45	70	4.80		
50	45	3.89	52	4.45	65	5.56	70	6.01		
55	45	4.28	52	4.90	65	6.12	70	6.61		
Rotation per min.	r/min	Capacity				l/min	Suction height			0,0 m
Power consumption	kW	Max. pressure				55 bar	Weight			21,0 kg



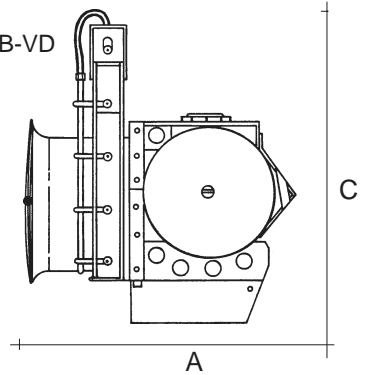
P3N-102	r/min									
	300		400		500		540			
bar	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	kW
0	57	0.01	75	0.01	94	0.01	102	0.02		
10	57	0.98	75	1.31	94	1.64	102	1.78		
20	57	1.99	75	2.57	94	3.16	102	3.53		
30	57	2.87	75	3.90	94	4.85	102	5.22		
40	57	3.90	75	5.22	94	6.47	102	7.06		
50	57	4.84	75	6.47	94	8.16	102	8.82		
60	57	5.88	75	7.87	94	9.78	102	10.59		
Rotation per min.	r/min	Capacity				l/min	Suction height		0,0 m	
Power consumption	kW	Max. pressure				60 bar	Weight		57,5 kg	

Measure and weight

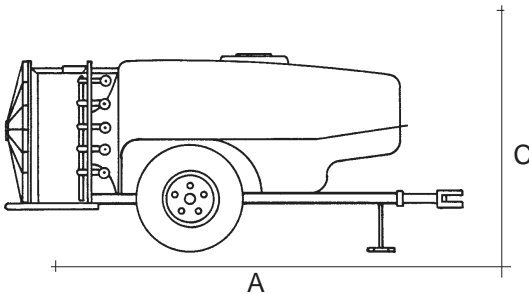
LB



LB-VD



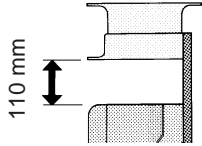
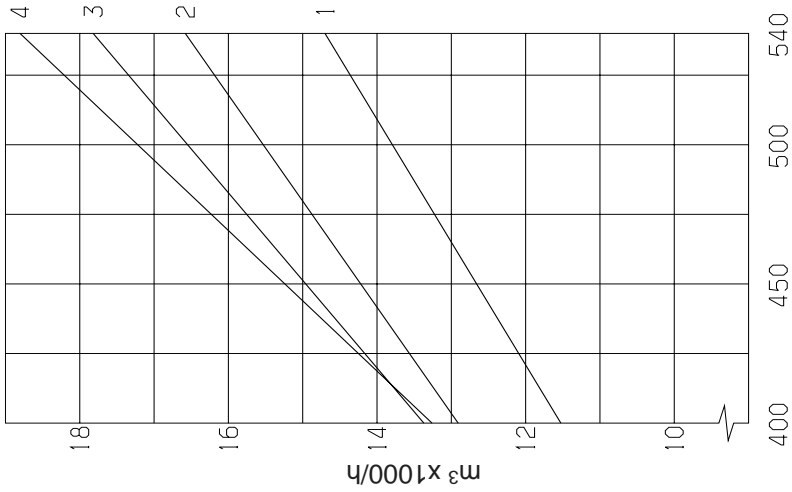
TB



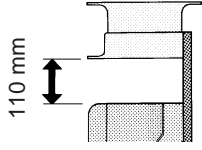
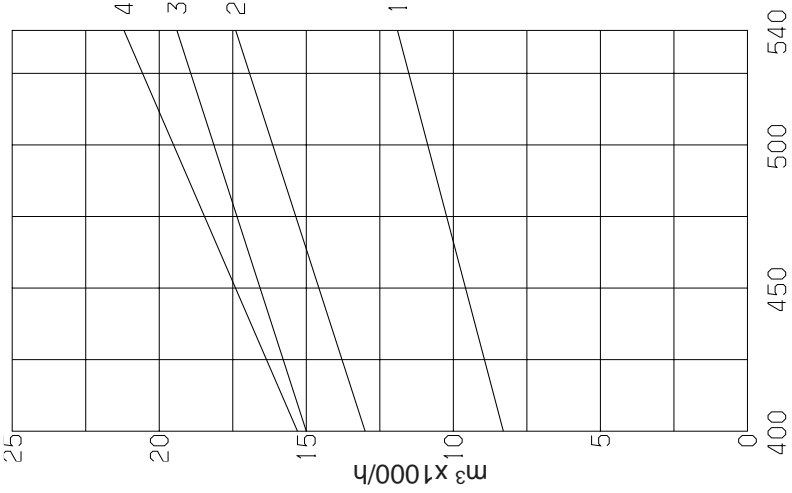
Model	Tank l	Blower Dia. mm	Air volume m ³ /h	Air speed average m/s	Pump model	Power consumption kW	Dimensions A x B x C min. cm	Weight kg	Track width min/max cm
Model	Tank US gal	Blower dia. inch	Air volume cfm	Air speed average MPH	Pump model	Power consumption HP	Dimensions A x B x C min. inch	Weight lb	Track width min/max inch
LB-255	200	550	19,000	24	P3L	8	138 x 80 x 105	130	-
LB-255	300	550	19,000	24	321	8	138 x 80 x 105	140	-
LB-355	200	550	19,000	24	P3X	9	145 x 80 x 130	155	-
LB-355	300	550	19,000	24	321	8	145 x 80 x 130	160	-
LB-465	400	650	21,200	25	P3X	10	145 x 80 x 150	165	-
LB-255	200	550-VD	19,000	24	P3L	8	138 x 80 x 115	135	-
LB-255	200	550-VD	19,000	24	321	8	138 x 80 x 115	145	-
LB-355	300	550-VD	19,000	24	P3X	8	145 x 80 x 130	160	-
LB-355	300	550-VD	19,000	24	321	8	145 x 80 x 130	170	-
LB-455	400	550-VD	19,000	24	P3X	8	145 x 80 x 150	160	-
LB-455	400	550-VD	19,000	24	321	8	145 x 80 x 150	165	-
LB-465	400	650	21,200	25	P3X	10	145 x 80 x 150	165	-
LB-465	400	650	21,200	25	321	9	145 x 80 x 150	170	-
LB-565	500	650	21,200	25	321	10	145 x 80 x 150	170	-
TB-1075	1000	750	33,000	28	P3X	15	2810 x 1320 x 1215	440	1080
TB-1075	1000	750	33,000	28	P3N	15	2810 x 1320 x 1200	450	1080
TB-1582	1500	820	49,000	32	P3N	25	3345 x 1340 x 1360	580	1200
TB-2082	2000	820	49,000	32	P3N	25	3625 x 1460 x 1360	625	1200
LB-255	53	22	11,210	54	P3L	11	55 x 32 x 42	287	-
LB-255	53	22	11,210	54	321	11	55 x 32 x 42	308	-
LB-355	80	22	11,210	54	P3X	12	57 x 32 x 52	342	-
LB-355	80	22	11,210	54	321	11	57 x 32 x 52	352	-
LB-465	105	26	12,500	56	P3X	14	57 x 32 x 59	364	-
LB-255	53	22-VD	11,210	54	P3L	11	55 x 32 x 45	298	-
LB-255	53	22-VD	11,210	54	321	11	55 x 32 x 45	320	-
LB-355	80	22-VD	11,210	54	P3X	12	57 x 32 x 52	353	-
LB-355	80	22-VD	11,210	54	321	11	57 x 32 x 52	375	-
LB-455	105	22-VD	11,210	54	P3X	12	57 x 32 x 59	353	-
LB-455	105	22-VD	11,210	54	321	11	57 x 32 x 59	364	-
LB-465	105	26	21,200	56	P3X	14	57 x 32 x 59	364	-
LB-465	105	26	21,200	56	321	12	57 x 32 x 59	375	-
LB-565	132	26	21,200	56	P3X	14	57 x 40 x 59	375	-
TB-1075	250	30	19,470	28	P3X	20	111 x 52 x 48	970	43
TB-1075	250	32	19,470	28	P3N	20	111 x 52 x 48	992	43
TB-1582	400	32	28,910	32	P3N	34	132 x 52 x 54	1279	47
TB-2082	500	32	28,910	32	P3N	34	143 x 53 x 54	1389	47

Air volume

F550 (LB) Gear ration 1:4:11



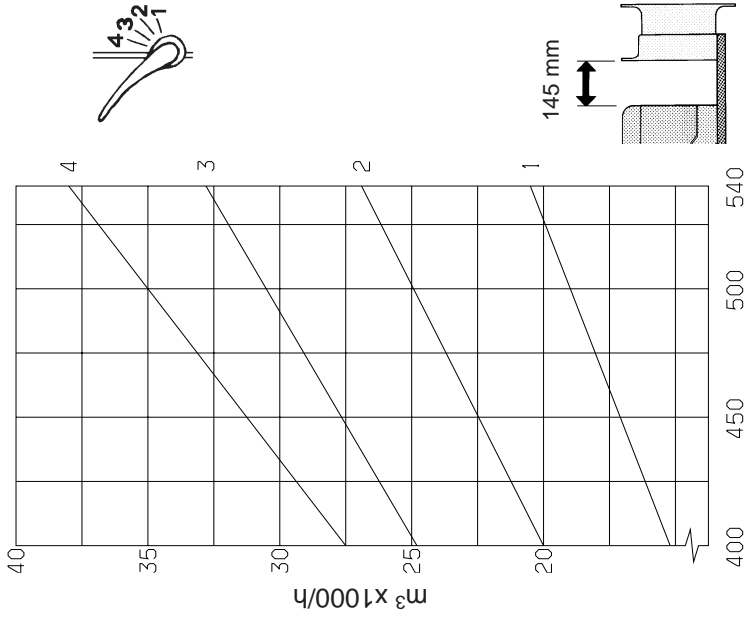
F650 (LB) Gear ration 1:4:11



P.T.O. r/min

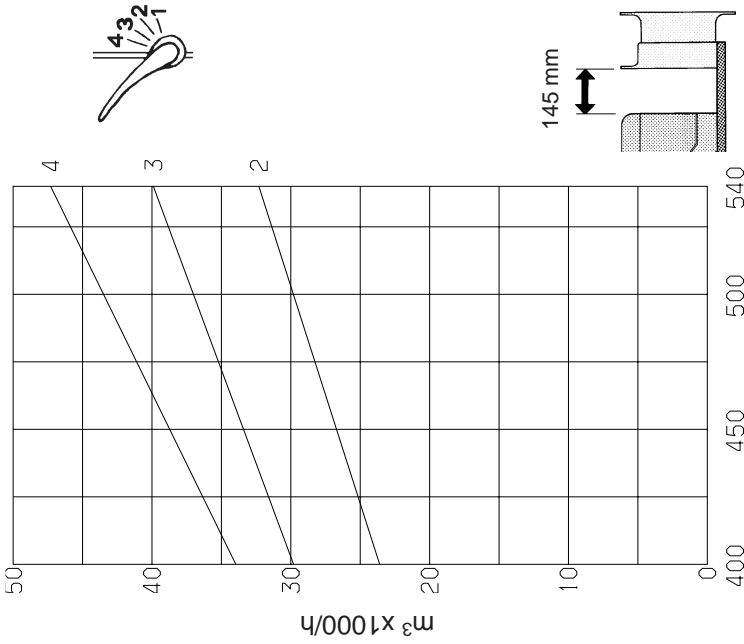
P.T.O. r/min

F-750 (TB) Gear ratio 1:4.00

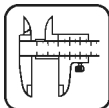


P.T.O. r/min

F-820 (TB) Gear ratio 1:4.00



P.T.O. r/min



Materials and recycling

Tank: HDPE or polyester
Hoses: PVC or rubber

Valves: mainly glass-filled PA.
Fittings: PA

Disposal of the equipment

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

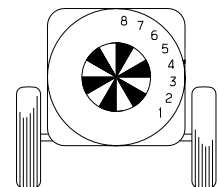
Nozzles

Standard nozzle combination

B = Brown O = Orange

Y = Yellow R = Red

LB-F550 (LB-F22)	LB-F650 (LB-F26)	TB-F750 & TB-F820 (TB-F30) & (TB-F32)
1 Y	1 O	1 Y
2 O	2 O	2 O
3 O	3 O	3 O
4 O	4 R	4 O
5 R	5 R	5 O
	6 R	6 R
		7 R



Pictorial symbols



Description



Service/adjustment



Winter storage



Function



Liquid flow



Operational problems



Connection



Pressure



Technical specifications



Warning



Cleaning



EU Declaration of Conformity



Operating



Lubrication