CROPLANDS

Cropliner

Parts & Operator's Manual

Part No. HT-POM000009 - Rev 4

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Welcome to Croplands

Congratulations on your astute purchase of this Croplands Sprayer!

This high quality, Australasian made sprayer is backed by local service and a highly reputable company with years of experience and dedication to the rural industries of Australasia.

We are committed to research and development of new and better spraying technology. We also welcome user comments on our product and service.

Our objective is simply to be the most excellent supplier of chemical application equipment in Australasia. Your communication will benefit both of us.

We recommend you read this manual thoroughly so that you are well versed with the proper operation and maintenance of your sprayer.

Properly used this sprayer will give you years of efficient, reliable operation.

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Description & Specification

2000 litre Cropliner.

New 1000, 1500 and 2000 litre poly-tank Cropliner are more than just a better airblast sprayers - a business investment that can provide a powerful insurance for protecting your best crops.

Precision made, high performance fans give large volume, medium speed air for better distribution and more effective spray coverage than low volume, high speed air technology.

Stainless steel or galvanised fan housings, and on the 820/920 fans, a choice of stainless steel air straightening vanes give greater strength and more power efficient air output for superior accuracy.

Maximum efficiency with durable brass non-drip, roll-over nozzles. You have total control of spray rates and spray direction to maximise spray penetration and coverage whilst minimising wastage.

Cropliner Specifications

Tanks Impact resistant polyethylene tanks with UV stabilised white finish. Calibrated sight gauge, flip-open filling lid with large basket strainer, separate chemical pre-mixer & 1¼" drain valve.

Models available:
- 2000 litre main tank with separate 130 litre flushing tank.
- 1500 litre main tank with separate 130 litre flushing tank.
- 1000 litre main tank with separate 100 litre flushing tank.

Separate 15 litre fresh water tank for safety & hygiene on all models.

Fan Options
- **820/920mm SV fan:** Stainless steel shroud and straightening vanes. 9 nozzles per side, 2 speed oil-bath gearbox, adjustable pitch blades.
- **820mm standard fan:** Galvanised shroud, 7 nozzles per side, single speed gearbox with neutral, adjustable pitch blades.
- **820mm Linear Tower:** Galvanised tower, 7 nozzles per side, 2-speed gearbox, adjustable pitch blades.
- **620mm fan:** Galvanised shroud, 6 nozzles per side, single speed gearbox with neutral, adjustable pitch blades.

Nozzles
Brass swing-over nozzle bodies, automatic shut-off type. All units supplied with one set of ceramic nozzle tips. Spray rate capability: 35 litres/ha to 4000+ litres/ha (depending on model).

Pump
A & R oil-backed diaphragm type with chemical resistant diaphragms, and corrosion resistant cast anodised body.

Drive
Heavy duty PTO driveshaft with covers and quick-release pins.

Agitation
2000 litre: Twin Supa-flo agitators.
1500 & 1000 litre: Single, angle-adjustable Supa-flo agitator.

Filtration
Lid strainer, large suction filter, nozzle filters.

Chassis
Hot-dipped galvanised, full-length with jockey wheel, adjustable drawbar, adjustable axle height and width, 6 stud heavy duty wheel hubs, bumper bar, step and wheel-scraper.

Controls
Remote mounting Bymatic 50 controller with individual L/R shut-off, simultaneous shut-off, full bypass, pressure adjustment and glycerine-filled gauge.

Wheels
Steel rims, 10.0/75 x 15.3 tubeless tyres.

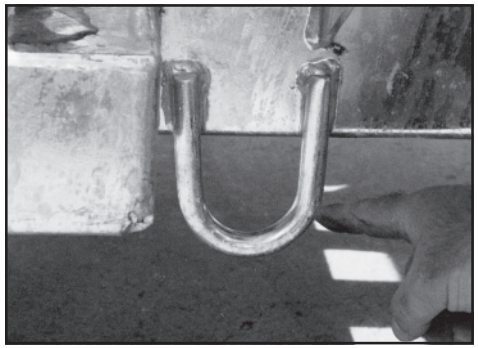
Power Required
920mm SV fan: min. 37kW (50hp) at PTO.
820mm SV fan: min. 34kW (45hp) at PTO.
820mm std fan: min. 30kW (40hp) at PTO.
620mm fan: min. 22kW (30hp) at PTO.

Dimensions (mm)
2000 litre – 3700 L x 1450 W x 1550 H.
1500 litre – 3500 L x 1400 W x 1450 H.
1000 litre – 3000 L x 1300 W x 1450 H.
Linear Tower models - add 600mm to H.

Options
- Constant velocity, wide angle PTO shaft.
- Two brass pressure filters.
- Multi-rib tyres - 11.00 x 16.
- Electric L/R Braglia shut-off valves with switch box.
- Electric L/R Braglia shut-offs with pressure control & dump valve.
- MT3405 fully automatic controller with
- Braglia valves.
- Cable control, L/R.
- Flowtrak spray monitor.
- Single sided Volute (920mm fans only).
- Double nozzle blocks.
- Chemical suction probe.
- Self-steering drawbar.
- TX ceramic nozzles

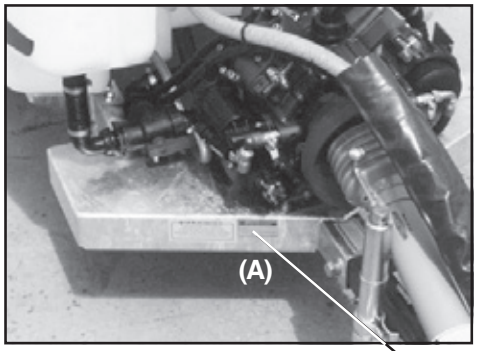
Machine specifications are subject to change without prior notification.

Shipping Information & Product Identification

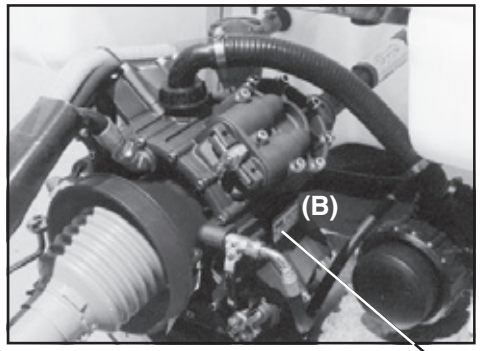


Use tie-down points provided when transporting.

1500 litre Cropliner with linear tower option.



Cropliner Serial Number



AR Pump Serial Number

Shipping Information

The following shipping information is provided but variations can occur without prior notification.

Dry Weight (approx)
2000 litre 640 kg
1500 litre 580 kg
1000 litre 550 kg

Dimensions (m)
W x L x H
2000 litre – 3.7 x 1.45 x 1.55*

1500 litre – 3.5 x 1.4 x 1.45*

1000 litre – 3.0 x 1.3 x 1.45*
**Add 600mm H for linear tower models.*

Maximum Towing Speed:
Do not exceed 30 kph when towing on roads.

Product Identification

Always use the serial number of the Cropliner when requesting service information or when ordering parts.

Early or later models (identification made by serial number) may use different parts, or it may be necessary to use a different procedure for specific service operations.

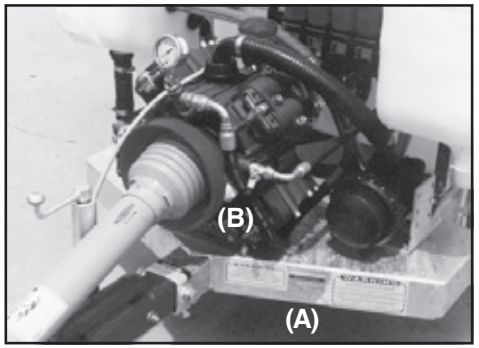
Cropliner Serial Number Plate

The Cropliner Serial Number Plate is located on the main frame at the front of the frame near the drawbar **(A)**. This plate shows name of manufacturer, serial number, date of manufacture, tare weight and maximum towing (transport) speed.

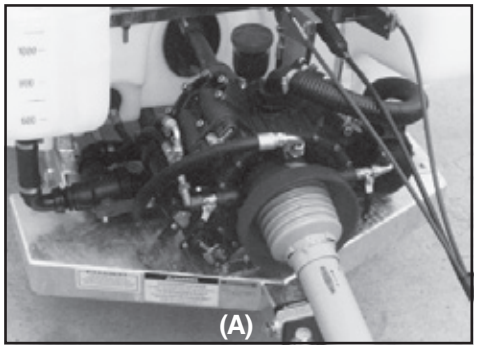
Pump Serial Number Plate

The Pump Serial Number Plate is located on the pump **(B)**. This plate shows name of manufacturer, serial number, type of pump, year of manufacture, maximum flow rate and maximum working pressure of the pump.

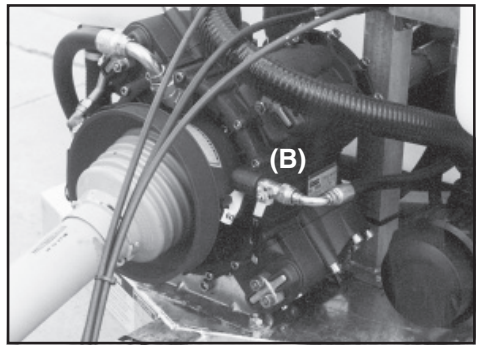
Cropliner with electric controls.



Cropliner with cable controls.



Cropliner with cable controls.



Pre-Delivery Check List

The Croplands dealer must thoroughly check & pass (✔) the following items to ensure the unit is in good order and operating correctly before delivery:

1 Operator's Manual Supplied	(✔)
- Cropliner.	
- MT3405 (if applicable).	
- Flowtrack (if applicable).	
2 Trailer	
- Undamaged.	
- Hitch adjustment bolt tight.	
- Wheel stand: check and lubricate.	
- Wheel hubs:	
- Greased.	
- Bearings adjusted.	
- Split pin and dust caps in place.	
- Wheel nuts tight.	
- Tyre pressure 350kPa (50psi).	
- Main axle adjustment bolts tight.	
- Rear bumper bar in place.	
3 Tank	
- Undamaged.	
- Check mounting bolts are in place.	
- Check all outlets sealed:	
- Suction line.	
- Drain outlet.	
- By-pass line.	
- Mixing basket line.	
- Agitators.	
- Check tank lid opens and seals shut correctly.	
- Chemical mixing basket in place.	

	(✔)
4 Power Drive	
a) PTO to tractor:	
- Check quick release pins operate easily and lock into place.	
- Check universal joints work correctly.	
- Adjust PTO length to suit tractor.	
- Grease telescopic sliding shaft.	
- Grease universal joints.	
- Check safety shields are in place.	
- Grease safety shields.	
b) Pump to Fan PTO:	
- Check universal joint bolts are locked into place.	
- Check universal joints work correctly.	
- Grease universal joints.	
5 Pump	
- Check mountings.	
- Check oil level.	
- Check tightness of pump head bolts.	
- Check correct air dome pressure: (10-20% of operating pressure).	
- Check operation.	

6 Suction Lines	(✔)
- Undamaged.	
- Hose unobstructed, no kinking, no restrictions.	
- All joints sealed (no air leaks).	
- Suction filter clean, screen complete with O-Rings in place.	
- Tighten all hose clamps.	
7 Pressure Lines	
- Undamaged.	
- Hose unobstructed, no kinks, no restrictions.	
- All joints sealed (no leakages) - check all joints from pump to filter to controller and ventilator nozzles.	
8 Nozzles	
- Undamaged.	
- Nozzles not worn.	
- Nozzles clean & not blocked.	
- Non-drip diaphragms working.	
9 Agitation	
- Check that tank agitation works.	
- Check there are no leakages from joints.	
- Tighten all hose clamps.	

10 Controller	(✔)
- Check installation is correct.	
- Fully check operation of controller & control valves.	
11 Valves	
- Check all manual valves open and close easily and do not leak.	
12 Fan Gearbox	
- Checkoil level.	
- Check gear lever operates	
13 Fan Assembly	
- Undamaged.	
- Bolts tight.	
- Fan guard fitted securely.	
- Fan guard clear of debris.	
14 Fan Housing	
- Undamaged.	
- Bolts tight.	
- Fan guard fitted securely.	
- Nozzles fitted correctly.	
- Nozzles adjusted to suit application.	
15 Decals	
- Check all decals are on the machine.	
- Ensure all safety and warning decals are in place.	

Warranty Policy

Warranty Policy

Croplands Equipment Pty Ltd (trading as Croplands) warrants to its authorised Dealer, who in turn, warrants to the original purchaser (Owner) that each new Croplands' sprayer, part or accessory will be free from proven defects in material and workmanship for twelve (12) months after delivery to the first Owner according to the conditions outlined.

This warranty does not cover damages resulting from abuse, accidents, alterations, normal wear or failure to maintain or use the Croplands product with due care.

During the warranty period, the authorised Croplands Dealer shall repair or replace, at Croplands option, without charge for parts and labour any part of the Croplands product which fails because of defects in material or workmanship. The Owner must provide the authorised Dealer with prompt written notice of the defect (within 14 days of its occurrence), and allow reasonable time for replacement or repair.

Croplands (at its option) may request failed parts to be returned to the factory. Any travel time of a service technician and/or transportation of the Croplands product to the authorised servicing Dealer for warranty work are the responsibility of the Owner.

This warranty is in lieu of all other warranties (except those of title), expressed or implied, and there are no warranties of merchantability or fitness for a particular purpose.

In no event shall the authorised selling Dealer or Croplands be liable for downtime expenses, loss of chemicals, loss of machine use or other incidental, consequential or special damages.

Conditions of Warranty

1. The warranty is not transferable.
2. The Warranty Registration Form must be returned to Croplands by the Owner

   Operator within 14 days of taking delivery of the unit.

   Only when warranty registration is completed and returned, can Croplands fulfill all warranty obligations.
3. **Components and conditions <u>not covered</u> by warranty are:**

Abuse — Failure resulting from neglect, such as improper operation, lack of required maintenance or continued use of a sprayer after the discovery of a defect which results in greater damage to the unit.

Environmental Conditions and Application — Deteriorated or failed components such as: diaphragms, O-rings, hoses, seals, electrical wiring and connections damaged by corrosive chemicals, dirt and sand, excessive heat or moisture. Owners should ensure the type and strength of chemicals used in the sprayer are compatible with the design of the unit. Warranty determination for these types of failures will be made by Fernz Croplands only after inspection of failed components. In most instances these will incur inspection charges and cost of replacement parts.

Normal Wear — Normal wear and consumable items such as: oils and lubricants, diaphragms, filter elements, flow meters, clutches, fan belts, drive belts, pivot pins, paint, light bulbs and nozzles are considered to be normal wear items and are not warranted.

Maintenance — Component failure caused by not performing scheduled maintenance service such as: oils, grease, failure to clean tanks, pumps, filters, spray lines, nozzles or any other blocked components. Not tightening or replacing loose or missing bolts, nuts, fittings, shields and covers.

Damage — Damages or machine failure caused by carelessness or accidental damage, improper operation, inappropriate transportation or storage of the sprayer or attachment.

Power Source — Failures due to faulty or inadequate electrical sources of power. Owners who use their own 12 volt power source must make sure that it is suitable for operating the spraying equipment.

Alterations — Any unauthorised alteration, modification, attachments or unauthorised repairs to the Croplands sprayer or attachments. Written approval must be obtained from Croplands for any such items to maintain warranty.

Removal & Installation — The time taken to remove and re-install a warranted part or component into other brands of sprayers will not be covered by Croplands warranty. Only parts and labour directly attributable to the repair of the Croplands unit is covered.

Clean-up Time — Croplands does not pay for cleaning the sprayer, parts, accessories or work area before or after the warranty repair. Clean-up time is affected primarily by the application or conditions in which the sprayer is operated and maintained. Since clean-up time can be so variable, cleaning time should be considered a customer expense.

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Transportation Costs — Warranty does not cover transportation or insurance costs for sprayers or other equipment needing repair or replacement of warranted components. Nor does it cover any freight or insurance costs in obtaining new parts or returning old parts to Croplands for inspection purposes.

Travel Time — Travel time required for warranty repairs is the responsibility of the Owner.

Diagnostic Time — Warranty does not cover time required to diagnose a warranty problem. Diagnostic time is affected greatly by the training and expertise of the technician employed to do the job. With proper training of service personnel, diagnostic time should be at a minimum.

Croplands expects that Dealers will assign a well trained and proficient technician to handle any warranty repairs. Since Croplands is not in control of either of these responsibilities, we elect not to cover diagnostic time.

Non-Genuine Parts — Use of parts other than Croplands parts for repair of warranted parts will automatically negate any warranty. Warranted components must be replaced with genuine Croplands repair parts.

Unauthorised Repairs — Repairs by an unauthorised agent will automatically forfeit any warranty. Warranty repairs must be carried out by an authorised Croplands Dealer only.

Safety Instructions

Safety is the Operator's Responsibility

The Cropliner features precision made, high performance fans which give large volume, medium speed air for better distribution and more effective spray coverage.

Stainless steel or galvanised fan housings, a choice of stainless steel air straightening vanes give greater strength and more power efficient air output for superior accuracy.

The Cropliner is capable of spraying a wide range of pesticides and fungicides and the operator must be aware of the hazards associated with the Cropliner's operation

The dealer explains the capabilities, application and restrictions of the Cropliner.

The dealer demonstrates the safe operation of the Cropliner according to Croplands instructions materials; which are also available to operator.

The dealer can also identify unsafe modifications or use of unapproved attachments.

The following publications provide information on the safe use and maintenance of the Cropliner and attachments:

- The Operator's Manual delivered with the Cropliner gives operating information as well as routine maintenance and service procedures. It is a part of the Cropliner and must stay with the machine when it is sold.

  Replacement Operator's Manuals can be ordered from your Croplands dealer.

- The Cropliner has machine signs (decals) which instruct on the safe operation and care. The signs and their locations are shown in the Operator's Manual.

  Replacement signs are available from your Croplands dealer.

Safe Operation Needs a Qualified Operator

A Qualified Operator Must Do the Following:

1 Understand the Written Instructions, Rules & Regulations

- The written instructions from Croplands are included in the Cropliner Operation & Maintenance Manual and on machine decals.

- Check the rules and regulations at your location. The rules may include any Federal and State safety requirements for the chemical applicator.

2 Have Training with Actual Operation

- Operator training must consist of a demonstration & verbal instruction. This training is given by your dealer before the Cropliner is delivered.

- The new operator must start in an area without bystanders and use all the controls until they can operate the Cropliner safely under all conditions of the work area.

3 Know The Work Conditions

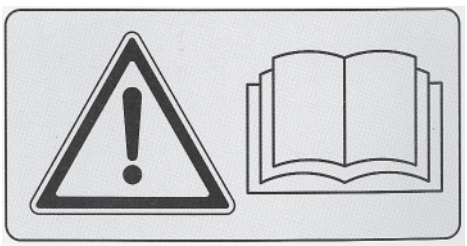
- The operator must know any prohibited uses or work areas. They need to know about excessive slopes and rough terrain.

- Wear protective clothing as recommended by the chemical manufacturer. Always wear safety goggles when maintaining or servicing Cropliner.

- For an operator to be qualified, they must not use drugs or alcoholic drinks which impair alertness or coordination while working.

  An operator who is taking prescription drugs must get medical advice to determine if they can safely operate a machine.

Safety Instructions




Rules for Safe Cropliner Operation

• Always read your sprayer operator's manual thoroughly before operating. Accidents occur every year because of careless use of farm chemicals and farm machinery. You can avoid these hazards by observing these safety instructions.

• Dispose of all chemical containers as per instructions on label. Failure to do so could result in contaminating the environment with chemicals.

• Inspect hose and hose connections daily. Always wear rubber gloves when tightening connections. Damaged, loose or worn hoses could result in operator being exposed to toxic chemicals which could result in serious illness or faulty sprayer operation.

• Always use the proper application rate. To assure proper application rate calibrate sprayer frequently. The wrong application rate of a pesticide concentration that is too high may expose the operator and the environment to danger.

• Follow the chemical manufacturer's precautions before cleaning the sprayer. Exposure to chemicals could result in serious illness or death.

• Always wear gloves and wash the machine before doing any disassembly repair work. Chemical residues on the machine parts could contaminate operator or service personnel causing serious illness.

• Always relieve system pressure before doing any work on the machine. Failure to do so could cause operator to be exposed to high pressure spray of chemical resulting in serious injury or machine damage.

• Always be sure all guards are properly installed on machine before operating. Failure to do so could result in entanglement in moving parts resulting in serious injury to operator.

• Always keep PTO guard in place when sprayer is operating. Failure to do this might result in entanglement.

• Always wear relatively tight and belted clothing to avoid entanglement in moving parts. Failure to do so could result in serious injury.

• Always stay out from under the sprayer unless it is resting on the ground or supported on solid blocks. Hydraulics or jacks could fail letting the sprayer fall. This could result in pinning or crushing of personnel.

• Check the entire sprayer, prior to each use, for any loose bolts or mechanical connections. These precautions can prevent injury to personnel and damage to equipment.

• Only inflate tyres to rated pressures. Over inflating causes tyres to burst resulting in serious injury.

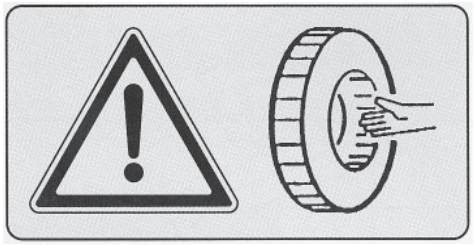
• Use only genuine Fernz Croplands parts for any necessary replacement. Special alloy steels are used in many parts which are important to the equipment design. Home made parts may look the same but might be dangerous in operation.

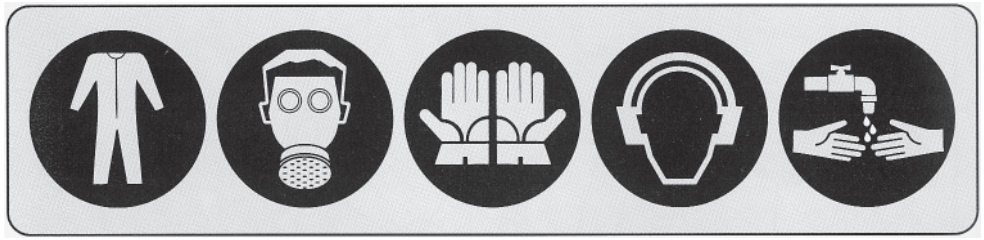
• Do not ride on machine when in motion. This is an unsafe practice and can lead to serious injury should the rider fall from the machine.

• Always replace warning decals when damaged and make certain operator understands proper safety practices.

• Always stand well clear of sprayer when operating. The sprayer is capable of spraying chemicals 20-30 metres from the boom which may be hazardous to humans.

Safety Instructions





• Do not disconnect any hoses nozzles or filters while sprayer is operating. Disconnecting components while under pressure will result in uncontrolled spray discharge which may be hazardous to humans.

• Be sure to disconnect the battery before attempting welding repairs.

• Always clean the Cropliner and disconnect the battery before doing any welding repairs. Cover rubber hoses, and all other flammable parts. Keep a fire extinguisher near the Cropliner when welding. Have good ventilation when grinding or welding painted parts. Wear dust mask when grinding painted parts. Toxic dust or gas can be produced.

Rules for Safe Use of Chemicals

• Always read the label before using chemicals. Follow instructions from chemical manufacturer on how to select, use and handle each chemical. Note protection information each time before opening the container.

• Always observe all warnings on chemical products. Failure to do so could result in operator or others being exposed to toxic chemicals which could result in serious illness. Remember chemical manufacturers go to much research and expense to develop labels for your protection.

• Be sure you recognise the categories of toxicity and their key words.

• Verbal warnings must be given if written warnings cannot be understood by workers.

• Do not spill chemicals on skin or clothing. If chemicals are spilled, remove contaminated clothing immediately and wash skin (and clothing) thoroughly with soap and water.

Wash hands and face with soap and water and change clothing after spraying. Wash clothing each day before reuse.

• The spray tank and system should be emptied of chemical mixture and flushed with clean water before servicing the spray system or spraying components. Clean the Cropliner of all chemical residue before servicing.

• Avoid inhaling chemicals. When directed on the label, wear protective clothing, face shield or goggles.

• Never smoke while spraying or handling chemicals.

• Cover food and water containers when spraying around livestock or pet areas.

• If symptoms of illness occurs during or shortly after spraying, call a physician or go to a hospital immediately.

• Follow label directions and advice to keep residues on edible portions of plants within the limits permitted by law.

• Keep chemicals out of the reach of children, pets and unauthorized personnel. Store them outside of the home, away from food and feed and lock them in a secure area.

• Keep bystanders away from spray drift.

• Always store chemicals in original containers and keep them tightly closed. Never keep them in anything but the original containers.

Connect the Cropliner to the Tractor

Assembly Instructions

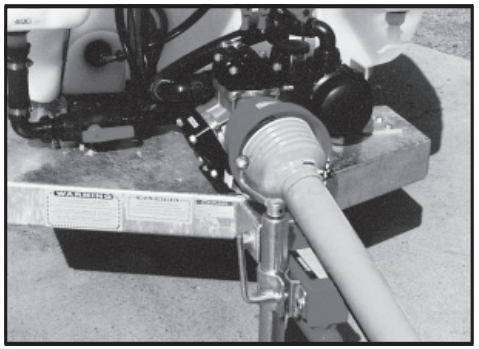
The Cropliner is supplied fully assembled with only two components requiring some assembly after shipping from the factory:

1 The tractor-to-Cropliner PTO shaft.

2 Fit the Controller to the Tractor:

- Bymatic 50 Controller (if ordered).
- Cable Controls (if ordered).
- Electric Controller (if ordered).
- MT3405 Controller (if ordered).
- Flowtrak Monitor (if ordered).

3 Axle Adjustment may be altered to suit your terrain and wheel tracks.



Connect the PTO shaft to the Cropliner.

1 Tractor-to-Cropliner PTO Shaft

The PTO shaft has been fitted and fully tested at the factory but has been disconnected and packed for transit.

Follow the instructions below to fit the PTO shaft onto the Cropliner after transit:

1 Remove the PTO shaft which is strapped to the Cropliner frame.

2 Check the PTO shaft has not been damaged in transit.

3 Grease the universal joins and telescoping shafts.

4 Fit the PTO to the Cropliner ensuring the locking pin is correctly located.

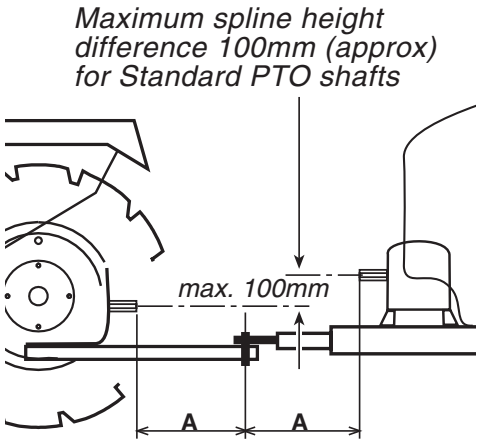
Connect the Cropliner to the tractor.

Connect the Hitch & PTO Shaft

The Cropliner must be connected to a suitable tractor, making sure the drawbar and PTO shaft are fitted according to the instructions that follow:

1 Align drawbars of tractor and Cropliner, insert and lock drawbar pin in position ensuring the drawbar pin cannot come out while transporting or operating. Lift up and/or remove the hitch jack for sprayer operation.

2 Check the Cropliner is level fore and aft. The sprayer should be slightly lower at the front. If not make the necessary adjustments to tractor and/or sprayer drawbars and axle to achieve level position (see page 12-13).



Drawbar pivot midway with standard PTO shafts

3 Next fit the Cropliner PTO shaft to the tractor:

a) Remove the PTO shaft which is strapped to the Cropliner frame.

b) Grease the universal joints telescoping shafts and safety cover.

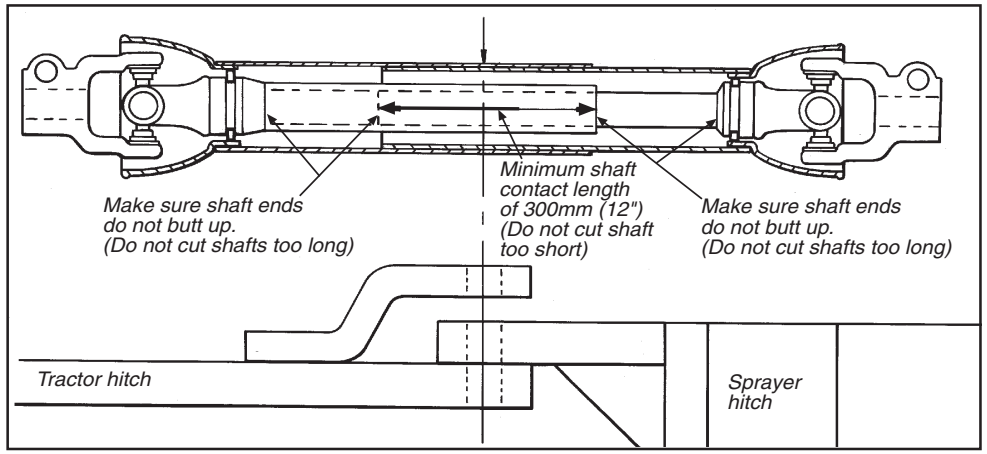
c) Fit the PTO to the Cropliner (as per the instructions that follow) ensuring the locking pins are correctly located.

Correctly Position the Hitch & PTO Shaft

1 When travelling straight ahead, the point at which the sprayer drawbar pin is joined to the tractor should be halfway between the universal joints of a Standard PTO shaft, as illustrated.

The tractor is then able to make maximum turns with minimal bending of the universals.

Connect the Cropliner to the Tractor



On Standard PTO shafts, the drawbar pin connecting the tractor & Cropliner should be centred between the two universal joints of the PTO shaft. For wide angle (constant velocity) shafts, see alternative settings on page 14.

Important: Do not allow more than 10% difference in the two halves of drawbar length. If more than 10% difference occurs, a wide angle shaft must be used.

A constant velocity (wide angle) joint should always be positioned over the shortest half (ideally over the pivot point itself).

2 When the tractor is towing the sprayer straight ahead, the two telescopic sections of the power take-off shaft are at maximum extension.

When turning or crossing an inversion, the telescopic shaft sections close up.

Important: Ensure that the drive shaft is the correct length to avoid any "butt up" damage to the pump.

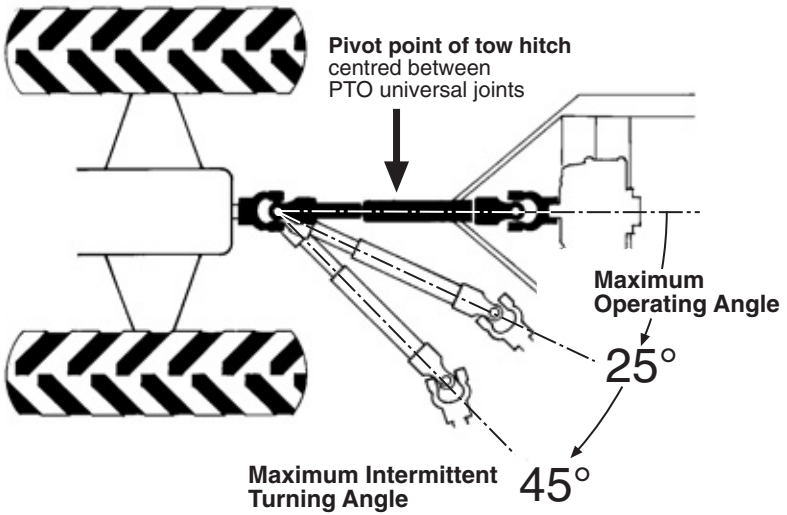
3 If the Cropliner is hitched too closely, remove excess PTO shaft to avoid the "butt up" damage. The PTO shaft can be cut to length by measuring the amount to be removed and cutting this amount from both halves of the shaft and the safety shields.

4 When operating the drive shaft, be sure that all safety guards are in place.

5 Incorrect hitching of PTO shaft will result in excessive pump vibration.

Note: Pump **warranty is not valid** for damage caused by incorrect PTO shaft mounting.

Standard PTO



Maximum Disengage Angle 90°

Heed the Operating Limits of the PTO Shaft Used

The standard Cropliner is fitted with a STANDARD PTO shaft.

An optional WIDE ANGLE (Constant Velocity) PTO shaft is available.

These shafts perform very differently when turning the tractor and sprayer at the end of rows. They must be set-up and operated within the limits outlined above.

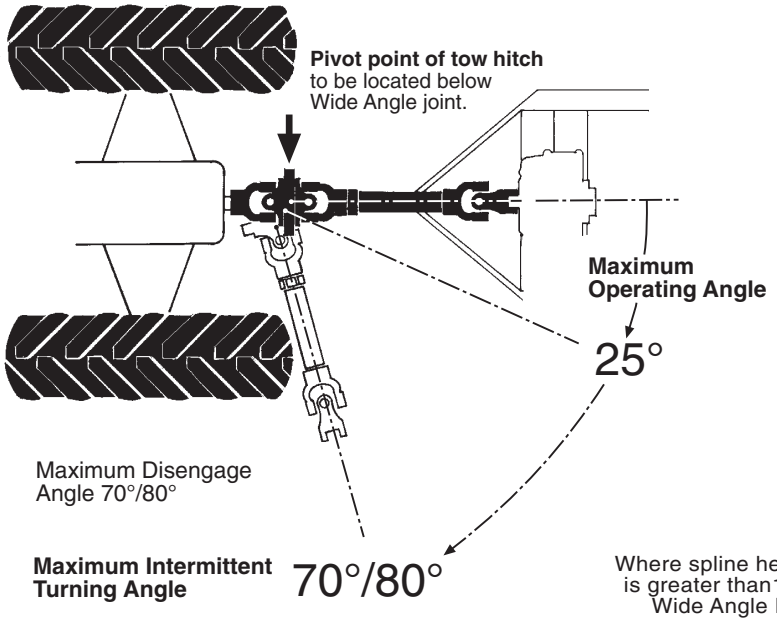
Standard PTO

The Standard PTO shaft is only recommended where The maximum intermittent turning angles do not exceed 45° turning angle of the PTO.

Also on Standard PTO shafts, the height difference between the tractor PTO spline and the PTO spline of Cropliner should not be more than 100mm. This ensures PTO joint angles are approx equal and do not exceed limits. If greater than 100mm, a wide angle (constant velocity) PTO should be used.

Connect the Cropliner to the Tractor

Optional Wide Angle (Constant Velocity) PTO

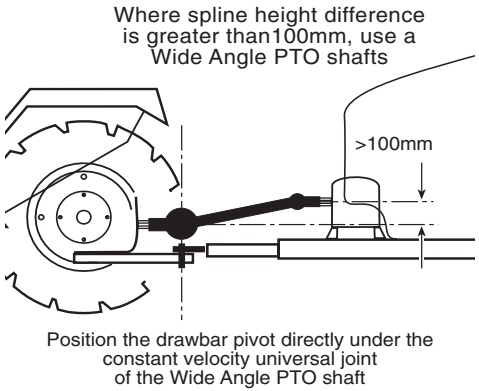


Optional Wide Angle PTO

The wide angle (constant velocity) PTO must be used where tight turning requires greater than 45° turning angle of the PTO.

Where height variance between the tractor output spline and Cropliner input shaft is greater than 100mm, a wide angle (constant velocity) PTO must be used.

Warning! Always operate the PTO fitted to your Cropliner within the specified limits. Follow the information on pages 12 - 15.



Failure to operate the PTO as instructed can result in serious damage to the pump, PTO and any components connected to the drive train of the tractor and Cropliner. **Incorrect operating will void warranty claims.**

Bymatic 50 controller.

2 Fit the Controller to the Tractor

Follow the appropriate instructions to fit the controller to the tractor.

Bymatic 50 Controller (if ordered)

When ordered, the Bymatic 50 controller has been fitted and fully tested at the factory and packed for transit.

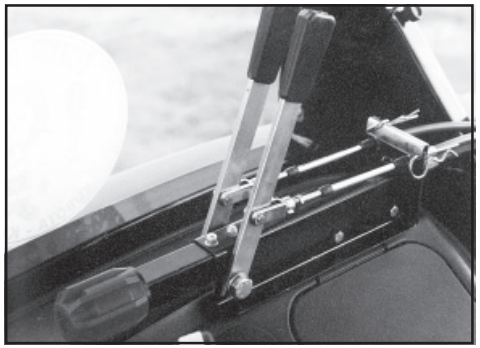
Follow the instructions below to assemble the unit after transit:

1 Unpack the Bymatic 50 controller from the Cropliner.

2 Uncoil the hose & controller and fit the controller onto the tractor in a convenient and safe location for the operator.

3 Follow instructions to test, calibrate and operate the controller.

Connect the Cropliner to the Tractor



Cable controls in tractor cab.

Cable Controls
(if ordered)

When ordered, the cable controls have been fitted and fully tested at the factory and packed for transit.

Follow the instructions below to assemble the unit after transit:

1 Unpack the cable controls from the Cropliner.

2 Uncoil the cable controls and fit them into the tractor in a convenient and safe location for the operator.

3 Follow instructions to test, calibrate and operate the controls.

Electric controller.

Electric Controller
(if ordered)

When ordered, the electric controller has been fitted and fully tested at the factory but has been disconnected and packed for transit.

Follow the instructions below to fit the unit after transit:

1 Unpack the electric controller from the Cropliner.

2 Connnect the electric controller couplings together, and fit the controller console onto the tractor in a convenient and safe location for the operator.

3 Follow the electric controller instructions to connect the unit power connections to the tractor battery.

4 Follow instructions to test, calibrate and operate the controller.

MT3405 automatic controller.

MT3405 Controller
(if ordered)

When ordered, the MT3405 controller has been fitted and fully tested at the factory but has been disconnected and packed for transit.

Follow the instructions below to fit the unit after transit:

1 Unpack the MT3405 controller from the Cropliner.

2 Connnect the MT3405 controller couplings together, and fit the controller console onto the tractor in a convenient and safe location for the operator.

3 Locate the MT3405 operators manual and follow the instructions to connect the unit power connections to the tractor battery.

4 Follow the instructions in the MT3405 operators manual to test, calibrate and operate the controller.

Flowtrak monitor.

Flowtrak Monitor
(if ordered)

When ordered, the Flowtrak monitor has been fitted and fully tested at the factory but has been disconnected and packed for transit.

Follow the instructions below to fit the unit after transit:

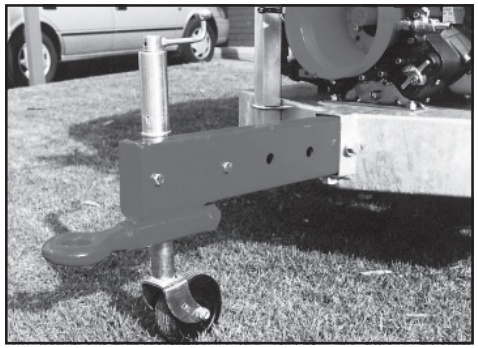
1 Unpack the Flowtrak monitor from the Cropliner.

2 Connnect the Flowtrak monitor couplings together, and fit the monitor console onto the tractor in a convenient and safe location for the operator.

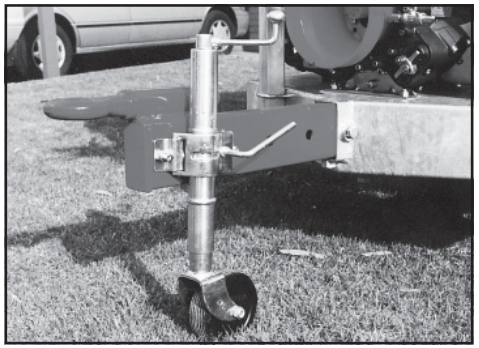
3 Follow the Flowtrak monitor instructions to connect the unit power connections to the tractor battery.

4 Follow instructions to test, calibrate and operate the monitor.

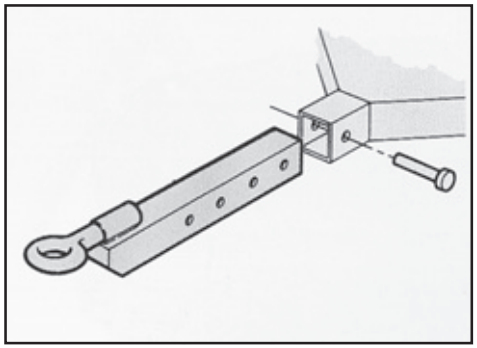
Connect the Cropliner to the Tractor



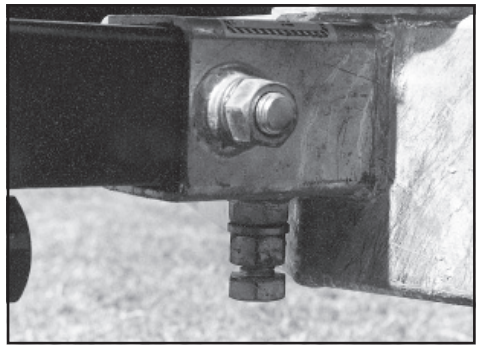
Hitch fitted in the lower position.



Hitch fitted in the upper position.



Select the hole position to set hitch length.



Retighten the bolts and locking nuts that hold the hitch.

Hitch Adjustment

The Cropliner hitch height and length can be adjusted to match your tractor drawbar.

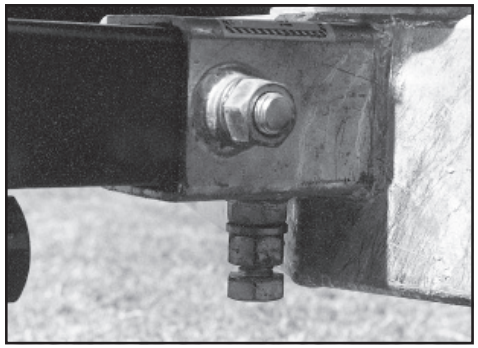
1 Height Adjustment

To adjust the height of the Cropliner hitch:

a) Make sure the Cropliner cannot roll and support the front of the frame and remove the hitch jack.

b) Loosen the locking nut and bolt under the Cropliner hitch.

Loosen the bolts and locking nuts that hold the hitch.



c) Remove the nut and then the bolt that goes through the hitch.

d) Slide the hitch out of the Cropliner frame, turn it the other way up and then slide it back into the frame.

e) Replace the bolt through the hitch and then the locking nut.

f) Retighten bolt and the locking nut under the Cropliner hitch.

g) Refit the hitch jack.

Note: When connected to your tractor drawbar, the Cropliner should be level or slope slightly downwards at the front.

2 Length Adjustment

To adjust the length of the Cropliner hitch:

a) Make sure the Cropliner cannot roll and support the front of the frame and remove the hitch jack.

b) Loosen the locking nut and bolt under the Cropliner hitch.

c) Remove the nut and then the bolt that goes through the hitch.

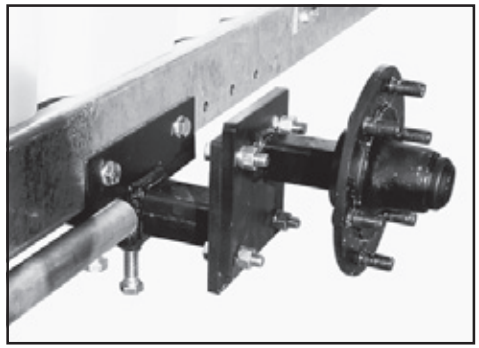
d) Slide the hitch in out of the Quantum Mist frame to the length required.

e) Replace the bolt through the hitch and then the locking nut.

f) Retighten bolt and the locking nut under the Cropliner hitch.

Note: When connected to your tractor drawbar, the drawbar pin connecting the tractor and Quantum Mist should be centred between the two universal joints of the PTO shaft (see illustration on page 13),except where a constant velocity drive shaft is being used.

Where a constant velocity drive shaft is used, the towing pivot point should be as close as possible to the constant velocity joint of the driveshaft.



Adjust the axle width in or out to suit your needs.

Axle Adjustment

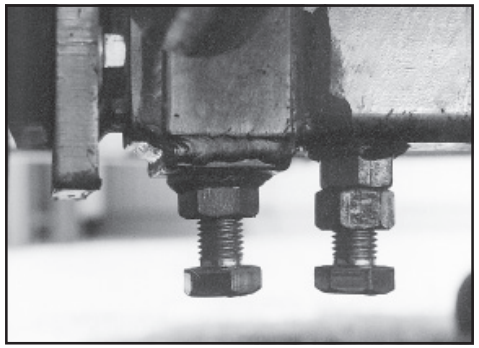
The axle height, fore and aft position and width of the Cropliner can be adjusted to suit your terrain & wheel tracks.

1 Axle Width Adjustment

The axle width adjustment is made to wheel track requirements.

To adjust axle width:

a) Make sure the Cropliner cannot roll and jack one wheel off the ground.



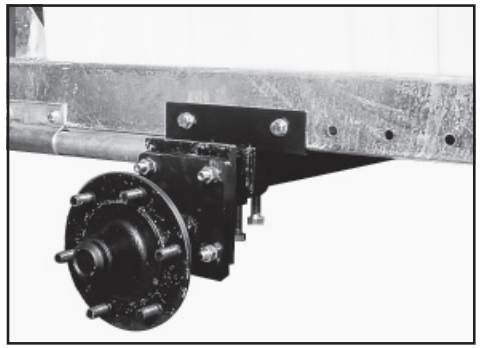
Retighten the bolts and locking nuts that hold the axle.

b) Loosen the locking nuts and bolts on the underside of the axle.

c) Adjust the axle in or out to suit your needs.

d) Retighten the bolts and locking nuts on the underside of the axle.

e) Repeat the process for the second wheel.

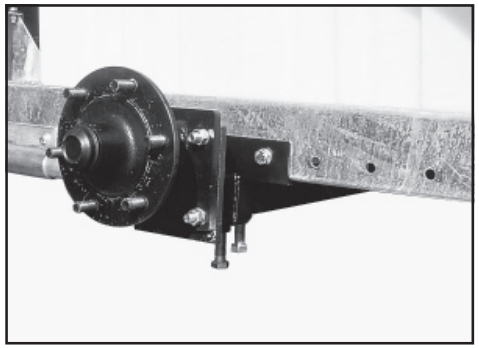


Hub assembly positioned for maximum clearance.

2 Axle Height

a) To maximise Cropliner clearance, jack one wheel off the ground, remove the wheel, remove the hub bolts and fit the hub assemblies as shown above.

Repeat the process for the other wheel.



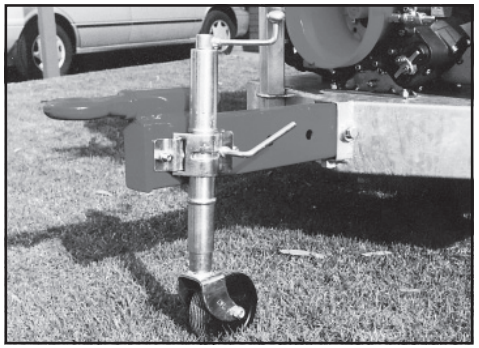
Hub assembly in lowered position.

b) To minimise Cropliner clearance, jack the wheel off the ground, remove the wheel, remove the hub bolts and fit the hub assemblies as shown below.

Repeat the process for the other wheel.

Connect the Cropliner to the Tractor

Connect the Cropliner to the tractor.



Attach & adjust hitch jack before removing drawbar pin.

Hitching Cropliner to the Tractor

1 Align drawbars of tractor and Quantum Mist, insert and lock drawbar pin in position ensuring the drawbar pin cannot come out while transporting or operating. Lift up and/or remove the hitch jack for sprayer operation.

2 Check the Cropliner is level fore and aft. The sprayer should be slightly lower at the front. If not make the necessary adjustments to tractor and/ or sprayer drawbars and axle to achieve level position.

3 Connect the Cropliner PTO shaft to the tractor following the instructions below on "Correct Positioning of the Hitch & PTO Shaft".

4 Connect the Cropliner controlle to the tractor following the instructions given for the controller supplied.

5 Connect the Cropliner hydraulic hoses to the tractor (see page 14).

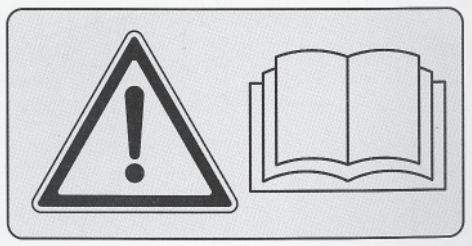
Unhitching Cropliner from the Tractor

1 Locate sprayer on level ground and chock wheels so that sprayer does not roll when drawbar pin is removed.

2 Disconnect PTO shaft, hydraulic hoses and sprayer controller from the tractor.

3 Attach and adjust the hitch jack and then remove the drawbar pin.

Check Cropliner Operation



Read the Operators' Manual before operating machine.

Pre-Operation Checklist

1 Before attempting to use this machine, Read Operator's Manual thoroughly.

2 Read and follow instructions on chemical manufacturers labels.

3 Always wear applicable protective clothing.

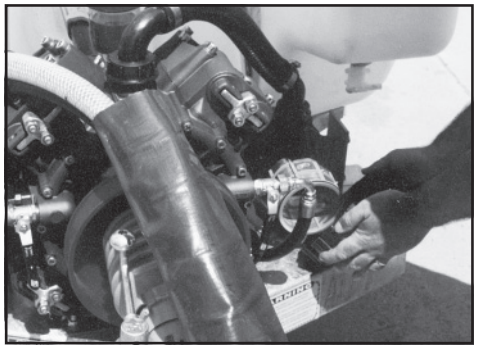
4 Check that all maintenance procedures have been followed.

5 Check all plumbing and fittings to ensure they are tight, not damaged or leaking.

6 Check PTO shaft is correctly set up.

7 Grease the PTO shaft if necessary.

8 Check pump oil level.



Check the suction filter is clean.

9 Check air pressure in the pump air chamber is 210-280 kPa (30-40 psi), . As a general guideline it should be 10% - 20% of operating pressure

10 Check the suction filter is clean.

Important: Whilst all precautions are taken during assembly, it is possible to get filings in the tank and lines.

These will accumulate in the suction filter when first used.**Therefore clean the filter out after initial use**, and discs if necessary.

Check pump oil level.

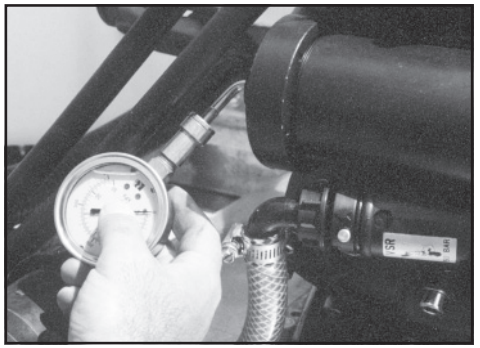
For filling, use the main lid with the basket filter in place.

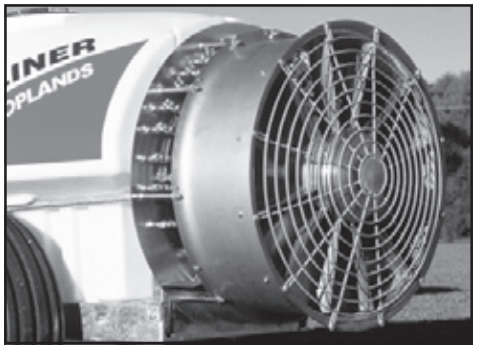
Check Sprayer Operation

Fully check the operation of the Cropliner by :

- Choosing the fan pitch setting.
- Selecting the gear of the fan gearbox.
- Checking the full operation of the sprayer with the controller fitted.

Check the pump air chamber pressure.





Two speed 920 fan with air straightening vanes.

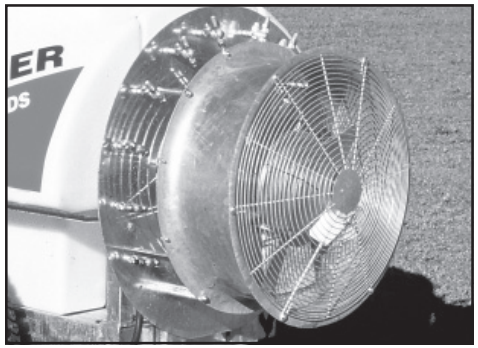
Fan Pitch Setting

Cropliner fans incorporate variable pitch blades which can adjusted to suit various application requirements.

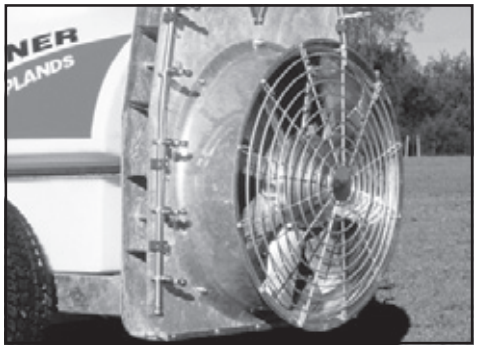
The selected pitch settings of the blades on a fan determine fan performance or air output (see page 20).

Each blade can be set at 25, 35 or 45 degrees.

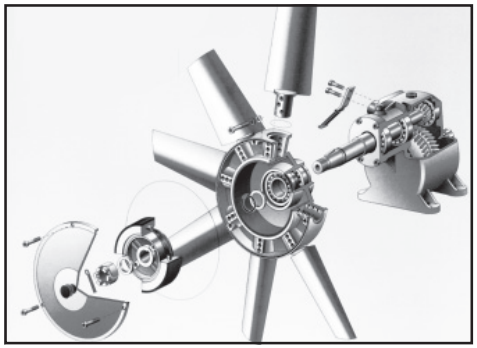
Check Cropliner Operation



Single speed 620 fan.



Two speed 820 fan with linear tower.



Fan with variable pitch blades, clutch & gearbox.

Fan Output & Power Specifications				Standard Fan		Straightening Vanes	
Fan Dia. mm	**Nozzles**	**Gear**	**Blade Pitch**	**Air Output M3/Sec**	**Power required KW (HP)**	**Air Output M3/Sec**	**Power required KW (HP)**
620	12	Single Speed	25° 35° 45°	4.5 5.6 7.0	19 (25) 22 (30) 26 (35)		
820	14	Single Speed	25° 35° 45°	8.4 10.3 11.1	34 (45) 37 (50) 41 (55)		
820 Linear	14	1st	25° 35° 45°		34 (45) 35 (47) 37 (49)		
		2nd	25° 35° 45°	8.4 10.98 11.2	38 (51) 40 (53) 41 (55)		
820SV	18	1st	25° 35° 45°				41 (55) 43 (57) 44 (59)
		2nd	25° 35° 45°			10.5 12.7 14.7	46 (61) 47 (63) 49 (65)

To adjust the blade pitch setting follow the these instructions:

1 Remove fan safety grill.

2 Remove fan clutch cover.

3 Individually for each fan blade:
a) Remove the fan pitch holding bolt.
b) Select new fan pitch setting.
c) Replace the fan pitch holding bolt.

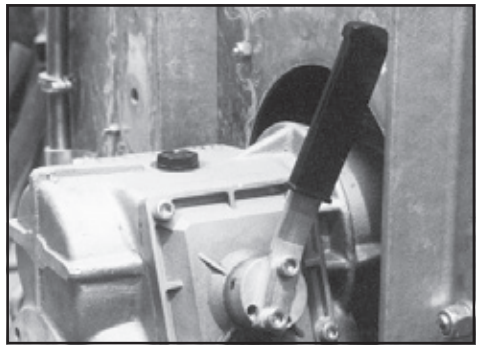
Important: The fan is a balanced assembly. Therefore ensure the fan blades are always placed in the same hub position,and the same pitch setting is use throughout.

4 Replace fan clutch cover.

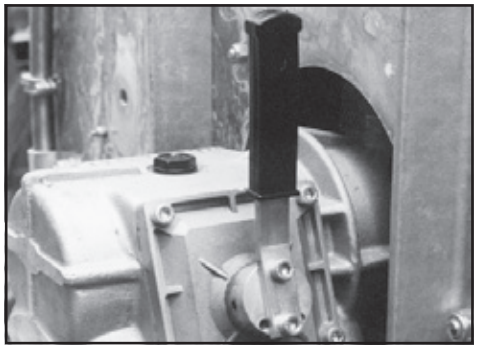
5 Replace fan safety grill.

Fan Output & Power Specifications				Standard Fan		Straightening Vanes	
Fan Dia. mm	**Nozzles**	**Gear**	**Blade Pitch**	**Air Output M3/Sec**	**Power required KW (HP)**	**Air Output M3/Sec**	**Power required KW (HP)**
920SV	20	1st	25° 35° 45°				49 (65) 51 (69) 55 (73)
		2nd	25° 35° 45°			14.0 16.9 19.2	57 (77) 60 (81) 63 (85)

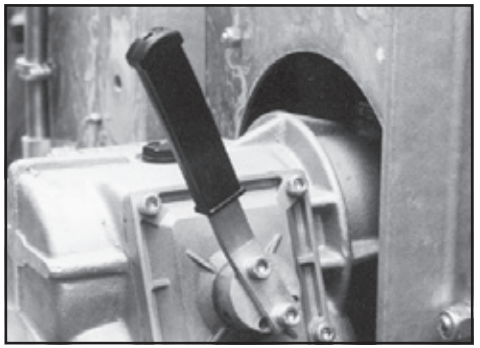
Check Cropliner Operation



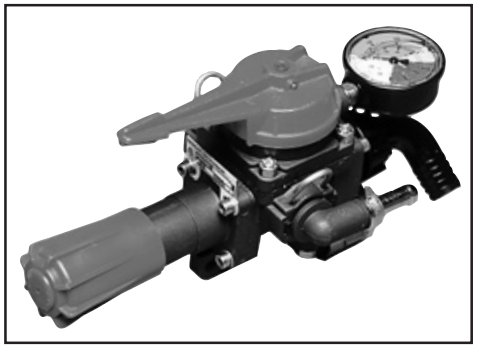
HIGH gear selected on 2 speed, 820 & 920 fans.



NEUTRAL selected on 2 speed, 820 & 920 fans.



LOW gear selected on 2 speed, 820 & 920 fans.



Bymatic 50 controller.

Fan Gear Selection

Fan gearboxes allow high and low gear selection and neutral position.

Select and engage the position required for the spray application.

Refer to the fan output chart on page 20 for information regarding gear selection and air outputs.

Check Sprayer & Controller Operation

Check the full operation of the sprayer according to the controller supplied.

Separate operating instructions follow for each controller:

Bymatic 50 Controller

The Cropliner is fitted standard with a Bymatic 50 controller.

To operate the Cropliner fitted with the Bymatic 50 controller:

1 Connect Cropliner to tractor - connecting hitch, PTO, hydraulic hoses and controller.

2 Fill appropriate quantity of clean water into spray tank.

Important: Do not have pesticides in the spray tank when checking sprayer.

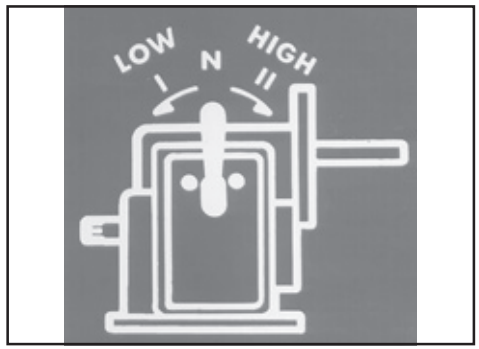
4 Check the agitator valve[s] (located on pump) is/are open.

5 Check the suction valve (located at the front of the tank) is open.

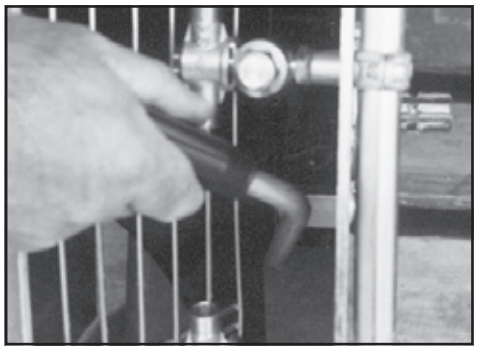
6 Check the fan gearbox is engaged.

7 Place sprayer controls in start up position by placing the Bymatic 50 contol lever in “By Pass” position.

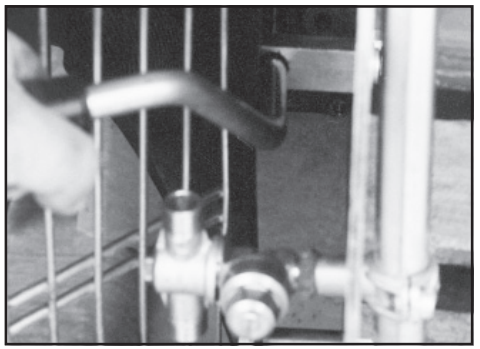
Decal showing gear selection for 820 & 920 fans.



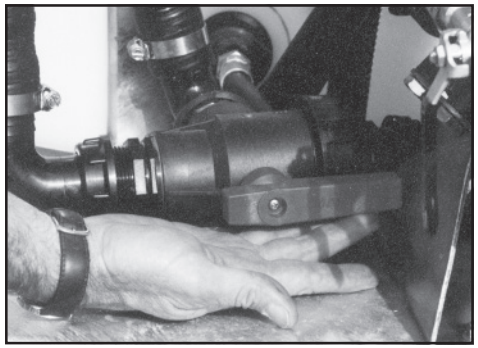
Fan DISENGAGED on 620 fan.



Fan ENGAGED on 620 fan.



Check Cropliner Operation

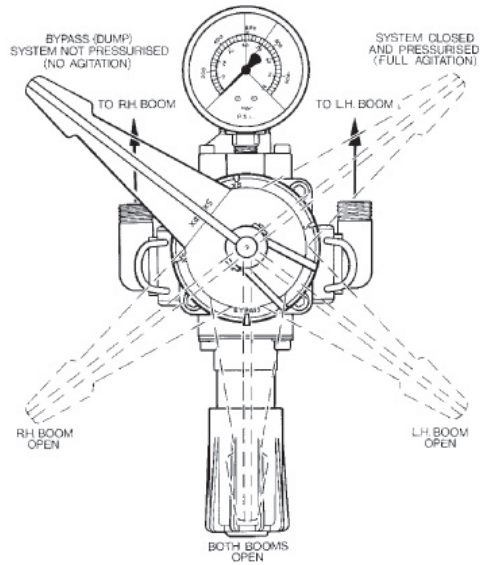


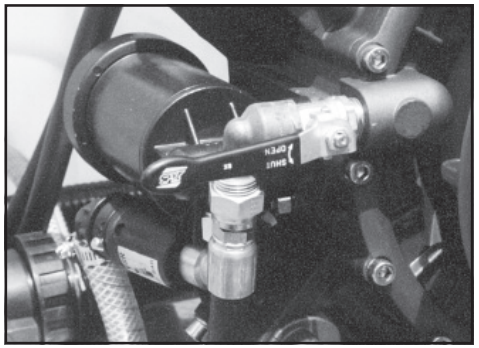
The pump suction valve OPEN to the main spray tank.

8 Engage PTO and bring pump speed up to 540 RPM.

All pumped liquid is now being passed through the controller back into the tank. The system is not pressurised and tank agitators are not working.

Illustration of Bymatic 50 controller functions.





Agitator valve (located on pump) in OPEN position.

9 Pressurise the system and operate the tank agitators by placing the Bymatic 50 contol lever in “C” (closed) position.

10 Adjust pressure to desired operating pressure by adjusting the pressure control knob of the controller.

11 Check the agitator valve (located on pump) is open and adjust the agitator operating pressure. Check that the agitator(s) is/are working.

12 Turn spray booms ON and OFF to check that they are operational:

- To operate both booms - place the lever in forward “Sx - Dx” position.
- To operate LH boom only - place the lever in left “Sx” position.
- To operate RH boom only - place the lever in right “Dx” position.
- To turn booms off - place the lever back into “C” (closed) position.

13 While water is being pumped through both booms check for any leakages or blockages throughout the sprayer.

Check the tank agitator(s) & adjust angle if necessary.

Check hoses, connections, valves, filters, boom fittings etc. Also check nozzles are operating correctly and that roll-overs are aligned and work correctly. Rectify any problems.

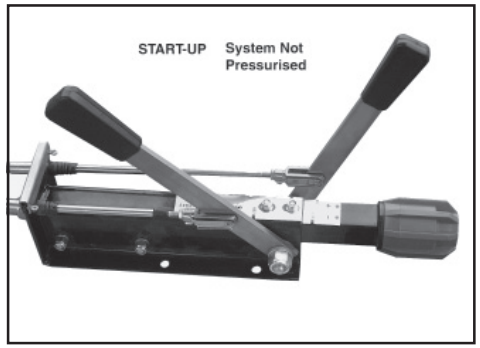
Always ensure the sprayer controls are turned off and PTO disengaged when making any repairs or adjustments. Making adjustments while sprayer is operating can lead to serious injury.

14 With both booms operating check operating pressure and make the appropriate adjustment.

15 Switch booms ON and OFF several times and check that non-drip diaphragms are working.

16 On completion of checking the sprayer turn boom controls OFF by putting the Bymatic 50 contol lever in “By Pass” position.

17 Disengage PTO after controls are turned off.



Controls in Start-up mode - LH lever fully forward (C) & RH lever fully rearward (Off).

Cable Controls (if fitted)

When fitted, this cable control gives in-cab lever control of left and right booms, pressure adjustment, and pressure dump.

To operate the Cropliner fitted with the cable control:

1 Connect Cropliner to tractor - connecting hitch, PTO, hydraulic hoses and controller.

2 Fill appropriate quantity of clean water into spray tank.

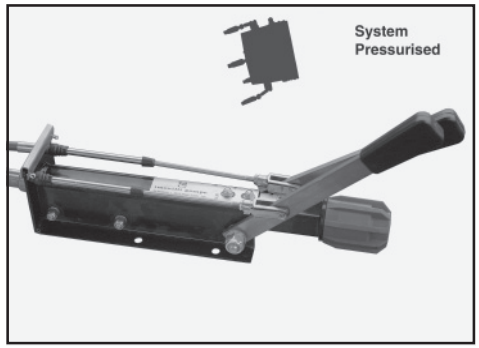
Important: Do not have pesticides in the spray tank when checking sprayer.

4 Check the agitator valve[s] (located on pump) is/are open.

5 Check the suction valve (located at the front of the tank) is open.

6 Check the fan gearbox is engaged.

Check Cropliner Operation



System pressurised, but both Booms Off - LH lever forward (C) & RH lever forward (On).

7 Place sprayer controls in Start-up mode by placing the RH lever in the fully rearward position (Off), and the LH lever in the most forward position (C).

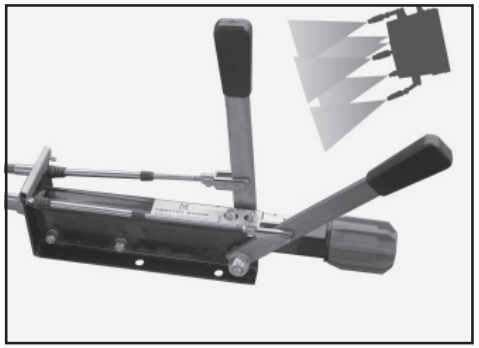
8 Engage PTO and bring pump speed up to 540 RPM.

All pumped liquid is now being passed through the controller back into the tank. The system is not pressurised and tank agitators are not working.

9 Pressurise the system and operate the tank agitators by placing the RH lever fully forward positon (On).

10 Adjust pressure to desired operating pressure by adjusting the pressure control knob of the controller.

11 Check the agitator valve (located on pump) is open and adjust the agitator operating pressure. Check that the agitator(s) is/are working.



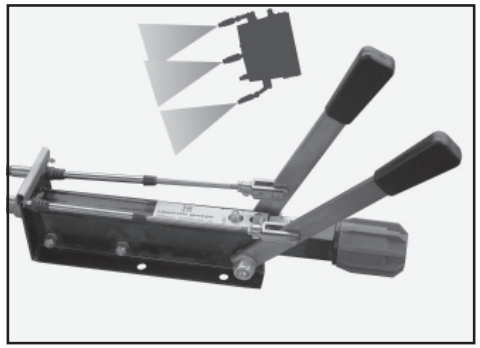
Both Booms On- LH lever part rearward (1 + 2) & RH lever forward (On).

12 Turn spray booms ON and OFF to check that they are operational:

- To operate both booms - move the LH lever to the centre position (1 + 2).
- To operate LH boom only - move the LH lever to the part forward position (2).
- To operate RH boom only - move the LH lever to the fully rear position (1).
- To turn booms off - move the LH lever to the full forward position (C).

13 While water is being pumped through both booms check for any leakages or blockages throughout the sprayer. Check hoses, connections, valves, filters, boom fittings etc. Also check nozzles are operating correctly and that roll-overs are aligned and work correctly. Rectify any problems.

Always ensure the sprayer controls are turned off and PTO disengaged when making any repairs or adjustments. Making adjustments while sprayer is operating can lead to serious injury.



Left hand Boom On only - LH lever part forward (2) & RH lever forward (On).

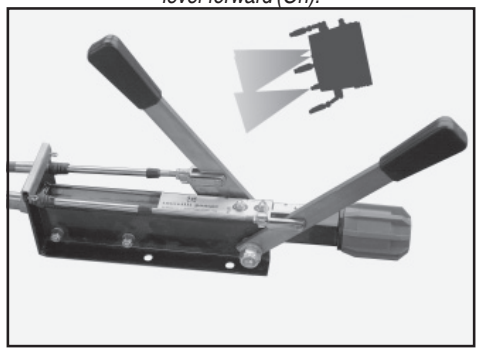
14 With both booms operating check operating pressure and make the appropriate adjustment.

15 Switch booms ON and OFF several times and check that non-drip diaphragms are working.

16 On completion of checking the sprayer turn boom controls OFF by placing the LH leaver fully forward (C), and the RH lever fully rearward (Off).

17 Disengage PTO after controls are turned off.

RH Boom On only- LH lever fully rearward (1) & RH lever forward (On).



Electric controller.

Electric Controller
(if fitted)

When fitted, this electric controller gives in-cab switch control of left and right booms, pressure adjustment, and pressure dump.

To operate the unit:

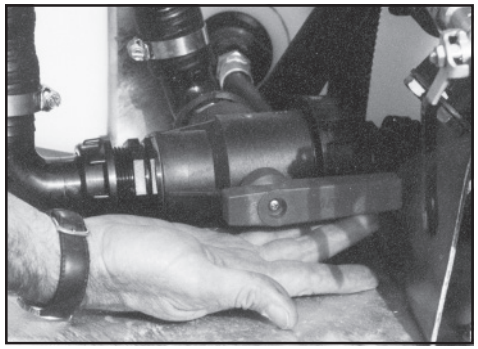
1 Connect Cropliner to tractor (see instructions pages 12-18) connecting the hitch, PTO & controller.

2 Fit nozzles to the Cropliner heads.

3 Fill appropriate quantity of clean water into spray tank. Always fill the tank through the main lid with the basket filter in place.

Important: Do not have pesticides in the spray tank when checking the sprayer.

Check Cropliner Operation



The pump suction valve OPEN to the main spray tank.

3 Check the pump suction valve (located at the front of the sprayer) is open for sourcing liquid from the main tank.

4 Check the fan gearbox is engaged.

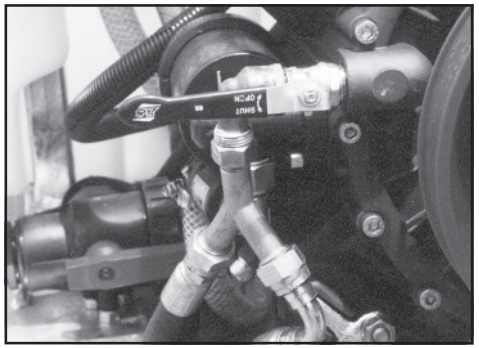
5 Place sprayer controls in start up position by placing the master switch in OFF position.

6 Engage PTO and bring the PTO speed up to 540 RPM.

All pumped liquid is now being passed through the dump valve back into the tank. The system is not pressurised and tank agitators are not working.

7 Pressurise the system and operate the tank agitator by placing the master switch in ON position and boom switches OFF

8 Adjust pressure to desired operating pressure by first closing the electrical regulating valve (servo), and then adjusting the manual pressure relief valve to maximum working pressure.



Air agitator valve in ON position (2000 litre model).

9 Check the agitator valve (located on pump) is open and adjust the agitator operating pressure.

10 Check the tank agitator is working.

The angle of the agitator is adjustable for maximising tank mixing action. Adjust if necessary.

11 Turn spray booms ON and OFF to check that they are operational:

- To operate both booms - place the left and right boom switches into ON position.
- To operate the LH boom only - place the LH boom switch ON (whilst leaving the RH switch OFF).
- To operate the RH boom only - place the RH boom switch ON (whilst leaving the LH switch OFF).
- To turn both booms off - place both boom switches in OFF position.

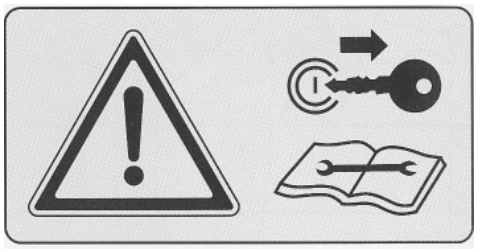
Check the tank agitator & adjust angle if necessary.

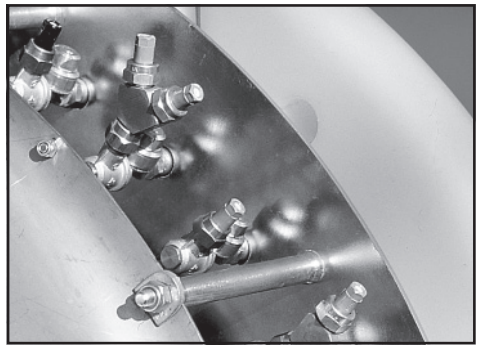
12 While water is being pumped through both booms check for any leakages or blockages throughout the sprayer.

Check all hoses,connections, valves, filters, boom fittings etc. Check the nozzles are operating correctly.

Rectify any problems.

13 With both booms operating check operating pressure and make appropriate adjustment.





Check nozzles & non-drip diaphragms are working.

14 Switch booms ON and OFF several times and check that the non-drip diaphragms are working.

15 On completion of checking the sprayer turn controls off by placing the master switch and boom switches in OFF position.

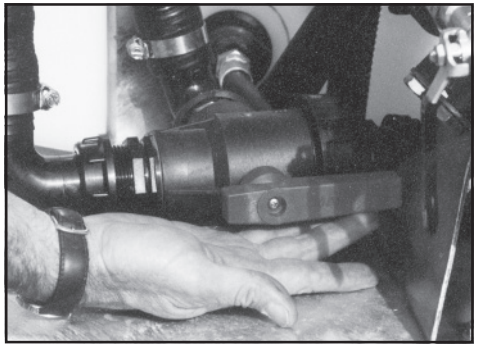
16 Disengage PTO after the electric controls are turned off.

Warning! Always ensure the sprayer controls are turned off and PTO disengaged when making any repairs or adjustments.

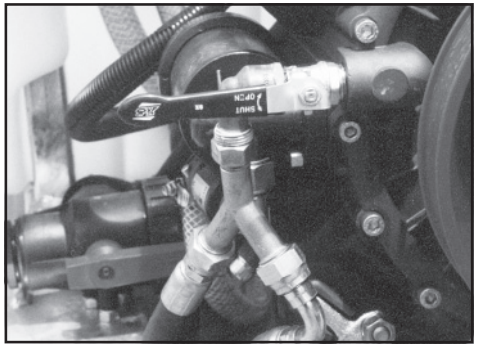
Making adjustments while sprayer is operating can lead to serious injury.

Check Cropliner Operation

MT3405 Controller



Pump suction valve OPEN to the main tank.



Air agitator valve in ON position (2000 litre model).

MT3405 Controller
(if fitted)

When fitted, this automatic controller takes control of all aspects of spray application rates.

Set the rates you want and the controller ensures constant application rate - irrespective of undulating terrain, engine speed, ground speed and variations in nozzle wear.

To operate the unit:

1 Connect Cropliner to tractor (see instructions pages 12-18) connecting the hitch, PTO and controller.

2 Fill appropriate quantity of clean water into spray tank. Always fill the tank through the main lid with the basket filter in place.

Important: Do not have pesticides in the spray tank when checking the sprayer.

3 Check the pump suction valve (located at the front of the sprayer) is open for sourcing liquid from the main tank.

4 Check the fan gearbox is engaged.

5 Follow instruction in the MT3405 Controller Instruction Manual - to calibrate and operate the controller.

6 Place sprayer controls in start up position by placing the master switch in OFF position.

7 Engage PTO and bring the PTO speed up to 540 RPM.

All pumped liquid is now being passed through the dump valve back into the tank. The system is not pressurised and tank agitators are not working.

8 Pressurise the system and operate the tank agitator.

9 Adjust pressure to desired operating pressure by first closing the electrical regulating valve (servo), and then adjusting the manual pressure relief valve to maximum working pressure.

10 Check the agitator valve(s) (located on pump) is/are open and adjust the agitator operating pressure.

11 Check the tank agitator(s) is/are working.

The angle of each agitator is adjustable for maximising tank mixing action. Adjust if necessary.

12 Engage the tractor hydraulics to operate the Cropliner pump and fan.

13 Turn spray booms ON and OFF to check that they are operating.

14 While water is being pumped through both booms check for any leakages or blockages throughout the sprayer. Check all hoses,connections, valves, filters, boom fittings etc. Check the nozzles are operating correctly.

Rectify any problems.

15 With both booms operating check operating pressure and make appropriate adjustment.

16 Switch booms ON and OFF several times and check that the non-drip diaphragms are working.

17 On completion of checking the sprayer turn controls off by placing the master switch and boom switches in OFF position.

18 Disengage PTO after the MT3405 controls are turned off.

Operating the Cropliner

Open the lid & fill main tank using the basket filter.

Filling the Sprayer

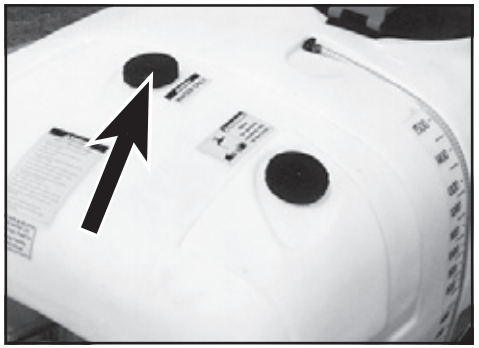
The Cropliner features three tanks for easy operation, cleaning and safety.

1 Main Tank

When filling the main tank, open the spray tank lid and fill the tank with the basket filter in place.

Use fresh water (preferably rainwater), free of suspended organic matter or clay. Some chemicals are deactivated when they contact these materials.

Ensure sufficient water quantity to allow correct product blending.



Remove the lid shown to fill the flushing tank.

2 Flushing Tank

Use fresh water (preferably rainwater) in the flushing tank. Uncrew the lid (shown above) and fill before spraying.

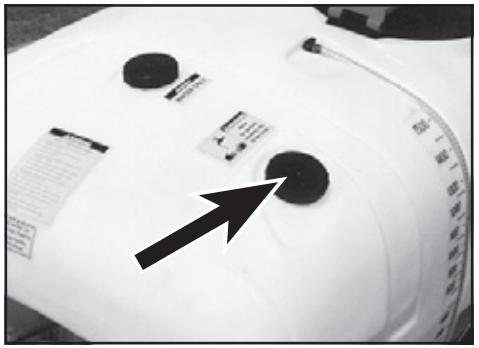
Replace the lid after filling.

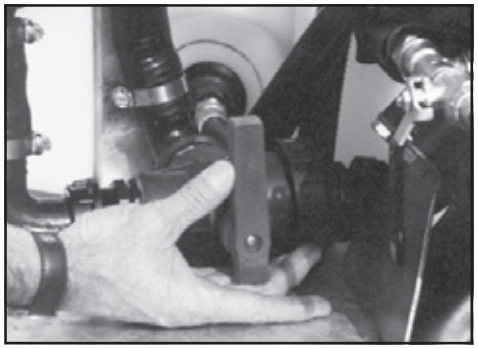
3 Fresh Water Tank

Use only rainwater in the flushing tank. Uncrew the lid shown below) and fill before spraying.

Replace the lid after filling.

Remove the lid shown to fill the fresh water tank.





CLOSE the pump suction valve before filter cleaning.

Filters

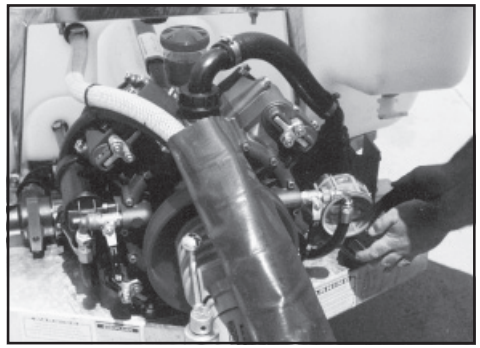
Filters will ensure that no solids enter the system to block or damage pump or nozzles.

1 Always ensure the basket filter is in place when filling the main tank.

2 All filters should be cleaned regularly or after each spraying period.

If the filter screen is damaged, replace with a new screen.

Unscrew & remove the fresh water tank lid.



Thoroughly clean the suction filter and reassemble.

Cleaning the Suction Filter

The suction filter should be cleaned regularly or after each spray tank has been emptied.

To clean the filter:

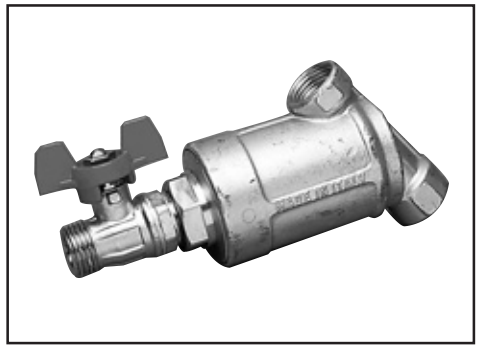
1 Completely stop all sprayer functions.

2 Place the pump suction valve in the close position to shut off liquid from the main tank.

3 Remove the outer filter screw and bowl, and then remove the filter and thoroughly clean it before reassembling the filter.

Note: Be careful not to damage or deform the mesh or O-ring while leaning and refitting the suction filter.

Operating the Cropliner



Regularly clean the pressure filter (if fitted).

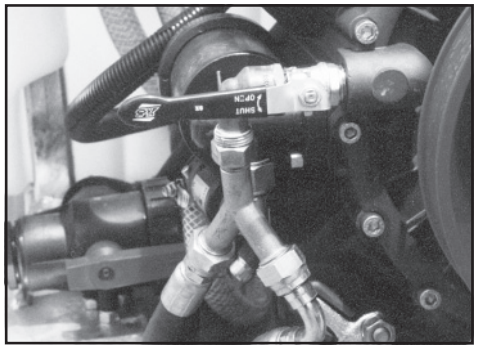
Cleaning the Pressure Filter

The pressure filter (when fitted) should be cleaned regularly to avoid nozzle blockages.

To clean the pressure filter:

1 With the sprayer operating OPEN the valve at the bottom of the filter for and short period and CLOSE the valve..

2 Cleaning the filter should especially be done when flushing the sprayer with fresh water.



Air agitator valve in ON position (2000 litre model).

Agitation

When chemical is added to the tank, the pump and agitator(s) must be operating at all times to ensure chemical does not settle in the tank.

Check to see that tank agitation is correctly adjusted

If agitation causes too much foaming in the tank, partly close the agitator tap to reduce foaming.

If chemical settles, through pump break down or another reason, start up the sprayer after the fault has been rectified and let the mixture in the tank agitate for a length of time to ensure thorough mixing of the chemical.

Note: Two agitators are fitted standard to 2000 litre tank models.

Accuately calculate the amount of chemical required.

Calculate Water & Chemical Quantities

Before spraying it is necessary to calculate the exact quantities of water and chemical needed to spray the required area of orchard or vines.

a) For chemical rates expressed in litres or kg per hectare (land area), use the formula:

Chemicals required (litres)
=
Tank Volume (l) x Recommended Chemical Rate (l/ha) ÷ Spray Application Rate (l/ha)

eg.

1500 x 5 ÷ 400

= 18.75 litres.

b) For volume of mixture required to spray the selected area, use the following formula:

Tank Volume Required (litres)
=
Area (ha) x Spray Application Rate (l/ha)

eg.

18.75 x 400

= 1500 litres

Area Covered (ha)
=
Tank Volume (litres) ÷ Spray Application Rate (l/ha)

eg.

1500 ÷ 400

= 3.75 hectares

c) For chemical rates expressed in litres or kg per 100 litres of water (water volume), use the formula:

Chemicals Required (litres)
=
Tank Volume (litres) x Recommended Chemical Rate (l/100 litres) ÷100

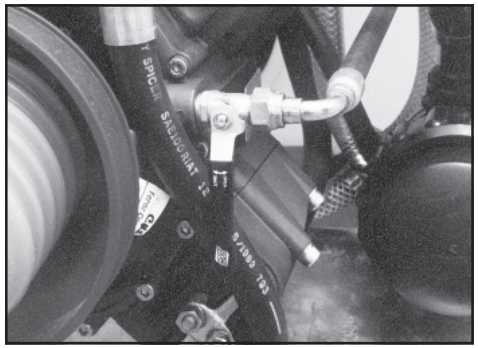
eg.

1500 x 3.0 ÷100

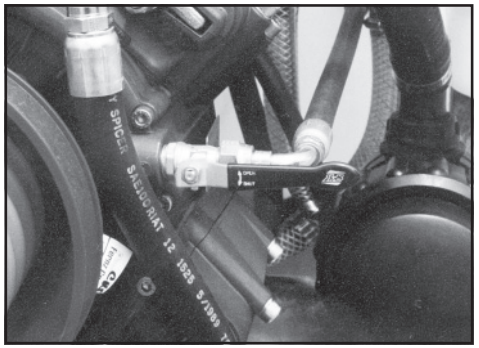
= 45 litres.

IMPORTANT: Be sure to mix only enough spray mixture to cover the area required. Avoid wastage and problems of needless chemical disposal.

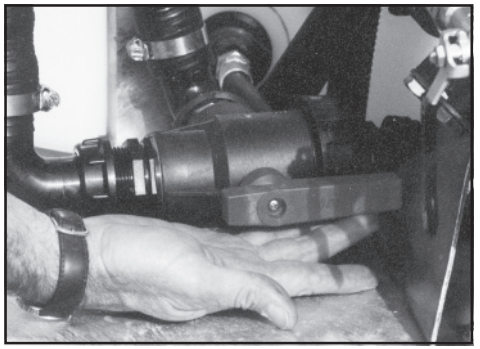
Operating the Cropliner



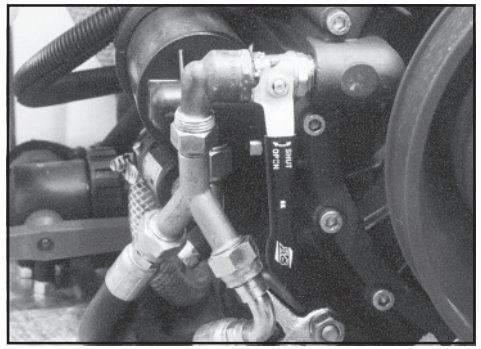
Mixing basket valve Closed.



Mixing basket valve OPEN.



Pump suction valve OPEN to the main spray tank.



Agitator valve CLOSED.

Mixing Basket

A separate chemical mixing basket is provided in the main tank to allow the operator to add and mix chemicals to the main tank while it is filling. This will save down time in spraying operations.

To operate the mixing basket:

1 Fll the main tank with the appropriate amount of water.

The mixing basket assists adding chemicals to the tank.

2 Measure the chemical required for the tank mix and place the chemical (liquid, powder or granules into the mixing basket & close the mixer lid

3 Check the pump suction valve (located at the front of the sprayer) is open for sourcing liquid from the main tank.

Note: Always follow chemical label safety instructions.

When handling chemicals always wear protective clothing ie. gloves, face mask, spray suit.

Should chemical come in contact with skin immediately rinse off with water.

4 Open agitator valve(s).

5. Open the mixing basket valve.

6 Place sprayer controls in start up position by placing the master switch in OFF position.

7 Engage PTO and bring the PTO speed up to 540 RPM.

8 Pressurise the system and operate the tank agitator by placing the master switch in ON position with boom switches OFF.

9 Allow the chemical to mix into the tank and close the mixing basket valve.

10 Keep the PTO engage and the agitator(s) operating while chemical is in the tank.

Operating the Cropliner

Proceed to Spray

Once the chemical mixture is in the tank, proceed to spray:

1 Adjust the pressure to correct operating pressure by adjusting pressure (up or down) according to the instructions of the controller fitted.

2 Turn spray booms ON and OFF as required to spray according to the instructions of the controller fitted.

Operating Pointers

While spraying, continually observe that:

1 Engine and PTO speed are correct.

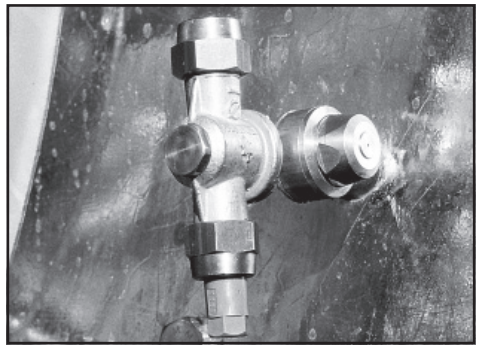
2 Correct operating pressure is being maintained.

3 Ground speed is correct and constant.

4 Cropliner spray heads are operating correctly and aimed toward the targeted foliage.

5 Ground speed is correct. Avoid going slower than the selected speed where possible because over application will occur.

Conversely, avoid going faster than the selected speed because under application will occur.



Swing-over nozzle on OFF position.

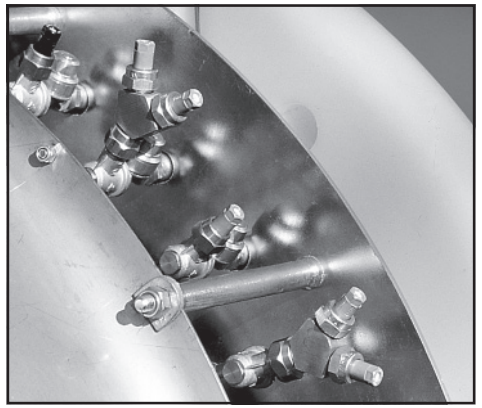
Swing-Over Nozzles

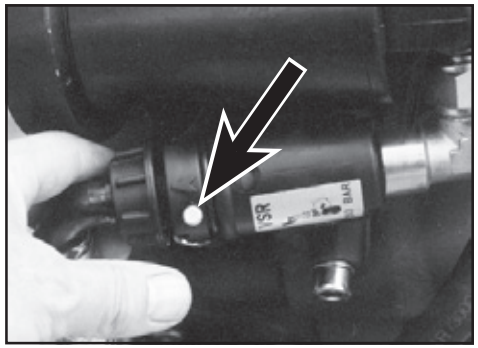
Fit and adjust swing-over nozzles according to your calibration and spraying requirements.

The non-drip swing-over nozzles have three positional settings when ON.

Note: The non-drip valve must be pointing in the direction of liquid flow.

Optional double nozzles used on alternate outlets.





Press the reset button of the pump safety valve.

Pump Safety Valve

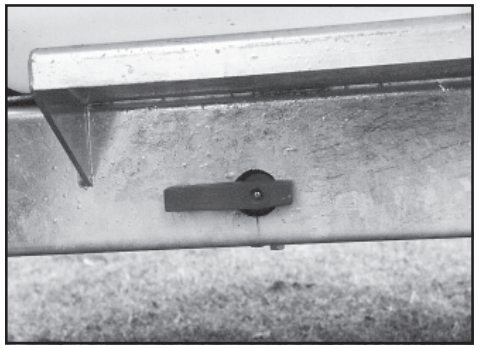
The A & R diaphragm pumps are fitted with a safety valve to protect against over pressurising the pump.

If the safety valve is actuated due to high pressure, the safety valve must be reset before the pump will operate.

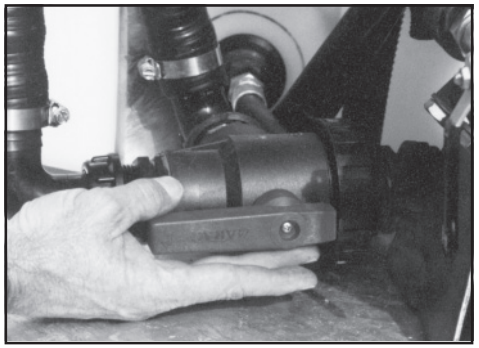
If for some reason you cannot acheive pressure with the pump, press the reset button of the pump safety valve (located on the side of the pump). Then try operating the pump again.

Note: When resetting the button, make sure there is no air in the system>

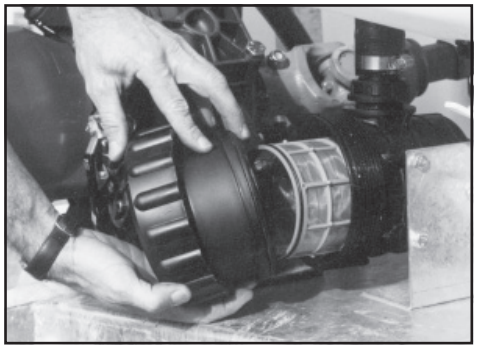
Operating the Cropliner



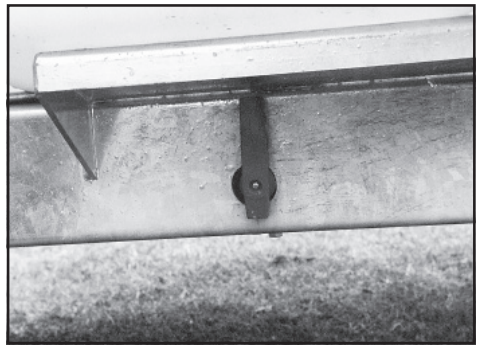
Tank drain valve OPEN.



The pump suction valve OPEN to the flushing tank.



Remove & clean the filter element & components.



Tank drain valve CLOSED.

Flushing the Cropliner

The Cropliner is equipped with a flushing tank for cleaning the sprayer when changing chemicals, and at the end of the day.

To flush the Cropliner:

1 Ensure the site for flushing and cleaning the Cropliner meets with environmental and statutory regulations.

2 Open tank drain valve (valve located at the base of the tank) to drain remaining spray mixture from the tank.

Note: Ensure the drained mixture is disposed of as required by law. Read chemical instructions.

3 Open the pump suction valve to the flushing tank.

4 Open the mixing basket valve.

5 Check the agitator valve is open.

6 Place sprayer controls in start up position according to the instructions of the controller fitted (see page ??).

7 Engage PTO and bring the PTO speed up to 540 RPM.

All pumped liquid is now being passed through the dump valve back into the tank. The system is not pressurised and tank agitators are not working.

8 Pressurise the system and operate the tank agitator.

9 Adjust pressure to desired operating pressure by adjusting pressure up or down.

10 Engage the hydraulics to drive the fan heads.

11 Turn the spray booms ON.

Fresh water now flushes through the suction line, suction filter, pump, agitator(s), pressure lines, nozzles and mixing basket.

All water comes into the tank from the flushing tank. Water remaining in the tank drains out of the tank through the drain outlet.

12 On completion of flushing, shot down all contols and disengage the PTO and hydraulic fan drive.

13 Remove and clean the suction filter & screen, and reassemble

14 Adjust all valves back to operating (non-flushing) mode.

a) Close mixing basket valve.

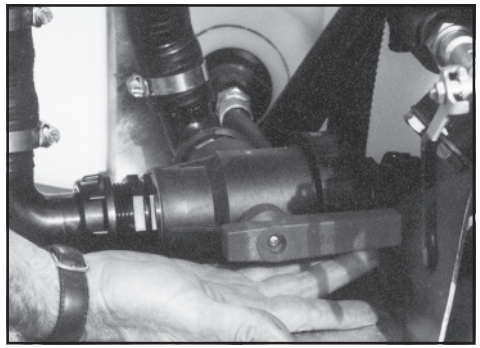
b) Close tank drain valve.

c) Open pump suction valve to the main tank.

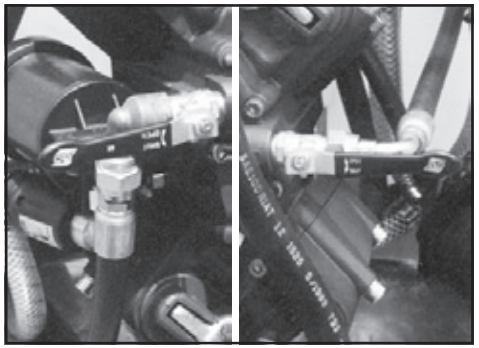
d) Open the agitator valve.

15 Wash/hose down the outside of the sprayer.

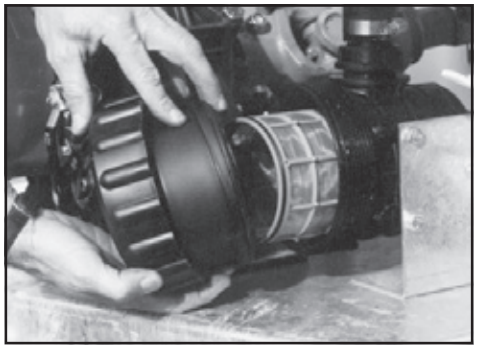
Operating the Cropliner



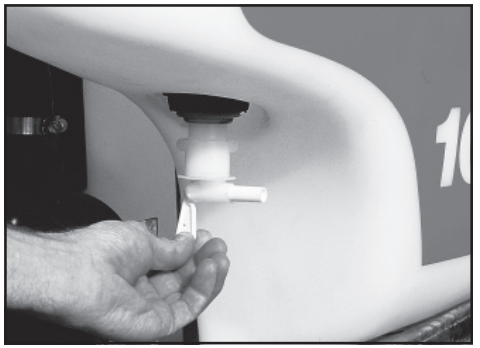
Pump suction valve OPEN to the flushing tank.



Agitator & mixing basket valves OPEN .



Remove & clean suction filter screen and reassemble.



Fresh water tap for personal safety.

Using Tank and Equipment Cleaners

If a cleaning agent is required (refer to chemical label), first completely flush the Cropliner with water as outlined in Steps 1 - 15 on page 25, then:

1 Fill the spray tank with fresh water.

2 Add cleaning agent into the mixer basket (use according to instructions).

3 Open the pump suction valve to the main tank.

4 Open mixing basket valve.

5 Open the agitator valve.

6 Place sprayer controls in start up position according to the instructions of the controller fitted (see page ??).

7 Engage PTO and bring the PTO speed up to 540 RPM.

All pumped liquid is now being passed through the dump valve back into the tank. The system is not pressurised and tank agitators are not working.

8 Pressurise the system and operate the tank agitator.

9 Adjust pressure to desired operating pressure by adjusting pressure up or down using the toggle switch on the electric sprayer controller.

10 Turn the spray booms ON to put cleaner through the spray lines and nozzles.

11 If you require the cleaning agent to soak or stand for a period, turn the spray booms OFF and completely shut down the sprayer for a period.

12 When soaking is completed, start the machine following steps to flush the tank and spray lines (see page 27).

9 Stop flushing by switching booms off, turning controls off, disengaging the PTO and hydraualic fan drive.

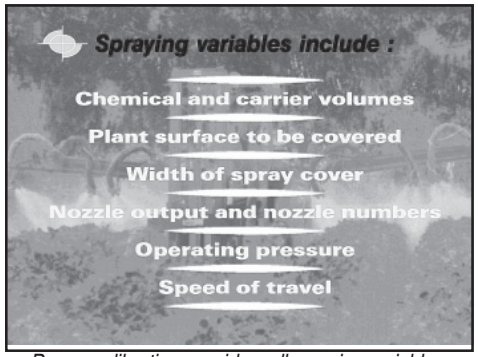
10 Open spray tank drain valve and allow cleaning mixture to drain from the tank.

11 Completely flush the sprayer with fresh water as outlined on page 27.

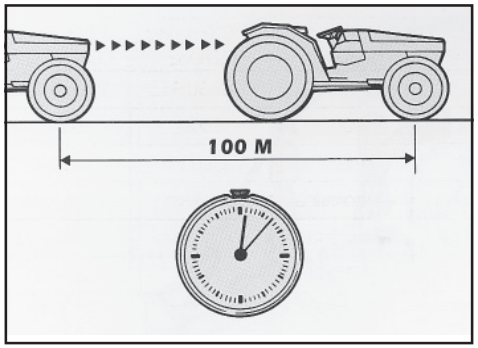
Fresh Water Tank

The Cropliner incorporates a fresh water tank for personal safety when operating the unit in the field.

Calibrating the Cropliner



Proper calibration considers all spraying variables.



Determine actual speed of travel.

Proper calibration of your sprayer is essential for good pest control. You should always strive for the most efficient calibration and use of spray chemicals for effective pest and disease control.

Integrated pest control with correct chemical application rates and minimum enviromental contamination are very important for discerning local and export markets.

Calibrate your sprayer using these eleven steps:

1 Check the Sprayer is in Good Working Order
2 Determine Actual Speed of Travel
3 Determine Spraying Volume Required
4 Determine Sprayer Configuration
5 Determine Spray Output for Each Side of Sprayer
6 Select & Design Nozzle Layout
7 Fit & Test Selected Nozzles
8 Calculate Actual Application Rate
9 If Tested Rate is Unsatisfactory
10 Field Check Actual Coverage
11 Record Calibration on the Work Sheet.

Step 1
Check the Sprayer is in Good Working Order

Tank, pump, plumbing, filters, boom and nozzles should be clean, free of leakages and functioning properly.

Follow the manufacturer's pre-operation checklist, maintenance and operating instructions.

Step 2
Determine Actual Speed of Travel

It is essential to use actual speed of travel when calibrating application rates.

a) Half fill the sprayer tank with water and mark out a test strip of 100 metres (simulating spraying conditions).

b) Set the sprayer operating and record the time taken to travel 100 metres at your required spraying speed.

c) Calculate the actual speed of travel using the formula:

km/hr
=
Distance (m) x 3.6 ÷Time (sec)

eg. 100 x 3.6 ÷60
= 6.0 km/hr

An alternative formula is:

km/hr =
Metres travelled in 1 minute

Step 3
Determine Spraying Volume Required

It is essential to determine the **liquid volume per hectare** required to effectively spray a crop without overspraying or underspraying.

The term "litres per hectare" must be related to foliage and not just to land area.

The amount of liquid needed to effectively spray any given crop will vary greatly with:

- The type of crop,
- Row spacing,
- Width of canopy,
- Height of canopy.
- Stage of growth,
- Density of foliage,
- Type of leaf surface,
- Type of fruit (single or bunched)
- Type of sprayer used.

Note: Use your own experience or a registered rate calibration consultant to determine effective volume in litres per hectare.

Calibrating the Cropliner

Step 4
Determine Sprayer Configuration

Once the volume of required spray volume per hectare is established, the next step in calibrating your sprayer is to determine:

- The **number of row(s)** to be sprayed in one pass, and
- The **total number of nozzles** to be used on each side of the sprayer.

Both these factors can vary with the type of sprayer used and other factors mentioned under step 3 (see page 29).

Example 1
A Cropliner to spray apples - spraying both sides, each with 8 nozzles (total nozzles 16) to spray one row per pass.

Step 5
Determine Spray Output for Each Side of Sprayer

Knowing actual travel speed, application rate required, number of rows to be sprayed in one pass and total number of nozzles to be used, we can determine the spray output from each side of the sprayer in litres per minute.

Use the following formula:

Litres/min/side
=
Spray Volume (l/ha) x Speed (km/hr) ÷ 1200 x Row Spacing (m) x Number of Rows in One Pass

Example 1
960 x 6 ÷ 1200 x 4 x 1
=
19.2 litres/min/side

Step 6 Select & Design Nozzle Layout

a) Select the number of nozzles to be used on one side of the sprayer (in the effective air stream) for the planned crop.

Depending on size and shape of crop/ trees it may be necessary to turn some outer nozzles off.

Example 1
Use 8 nozzles and shut 2 off.

b) Divide the nozzles used into:
- 1/3 (outer upper and lower areas)
- 2/3 (bulk 1/2 - 2/3 of the tree)

& calculate the litres per minute required for each nozzle

Example 1
19.2 litres/min/side required within:

- **The Outer Tree Area (1/3rd)**
19.2 ÷ 3 (1/3rd) = 6.4 litres
allocated to three nozzle
positions 2, 3 & 9
(1/3 to outer areas)

6.4 ÷ 3 nozzles
=
2.13 litres/min/nozzle (average).

- **The Bulk of Tree Area (2/3rd)**
6.4 x 2 (2/3rd) = 12.8 litres
allocated to five nozzle
positions 4, 5, 6, 7 & 8
(2/3 to bulk of the tree)

12.8 ÷ 5 nozzles
=
2.56 litres/min/nozzle (average).
.

c) Now select appropriate nozzles using:

- Calibration work sheet on page 39, It is suggested that a photocopy of the blank worksheet be used for each calibration, and keep them for future reference.

- Nozzle charts on pages 36 - 38. Find and allocate the operating pressure and nozzle or disc/swirl plate (core) combinations which fulfill the required discharge rate for the nozzle layout and droplet size required.

Calibration Example shown next page.

Calibrating the Cropliner

Actual Travel Speed **Calibration of Example**

100m x 3.6 ÷ 60 (sec) = 6.0 km/hr

Row spacing = 4 metres

Volume of spray/ha = 960 litres/ha

Spray Output per Side

Spray Volume (l/ha) x Speed (km/hr) ÷ 1200

x Row Spacing (m) x Number of Rows/ Pass

960 x 6 ÷ 1200 x 4 x 1

= 19.2 litres/minute/side

1/3 Spray Volume = 6.4 litres/minute

Average/nozzle = 2.13 litres/nozzle/minute

2/3 Spray Volume = 12.8 litres/minute

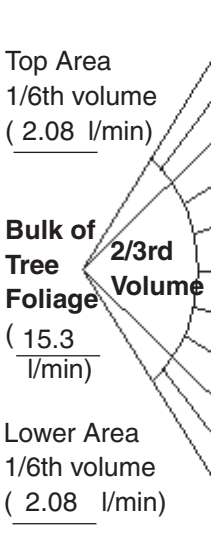
Average/nozzle = 2.56 litres/nozzle/minute

Pump Pressure = 1380 kPa

**Read these from your spray nozzle discharge charts for selected pump pressure.*

DISCLAIMER:
Because of the many variable factors involved Fernz Croplands cannot be held responsible for any down grading or loss of crop resulting from the use of any information in this manual. This is issued as a guide only and subject to acceptance of this disclaimer.

Nozzle Diagram



Nozzle	*Discharge	*Disc No	*Core No	*Spray Angle
1				
2	2.08	D2	56	17
3	2.65	D3	46	22
4	2.35	D4	25	82
5	2.65	D3	46	22
6	2.65	D3	46	22
7	2.35	D4	25	82
8	2.65	D3	46	22
9	2.08	D2	56	17
10				
Total	19.46 per side			

Step 7
Fit & Test Selected Nozzles

Now, the most important calibration is to test for the **actual litres per hectare** acheived through your sprayer.

Use the following method to fit and test the selected nozzles:

a) Fit selected nozzles one side of the sprayer.

b) Fill your spray tank to overflowing & set the specified pump pressure and operate the sprayer for a short period to make sure all lines are full and nozzles fitted are working properly (no blockages,leaks etc).

c) Stop the sprayer and top up the tank with water to overflowing again.

d) Operate the sprayer in the stationary position at the required pressure for approximately one minute.

Measure how much water is required to refill the tank.

e) Measure how much water is required to refill the tank to the brim.

Now, divide the volume measured by the time taken (minutes).

Output/min/side (l/min)
=
Output (litres) ÷ Time (minutes)

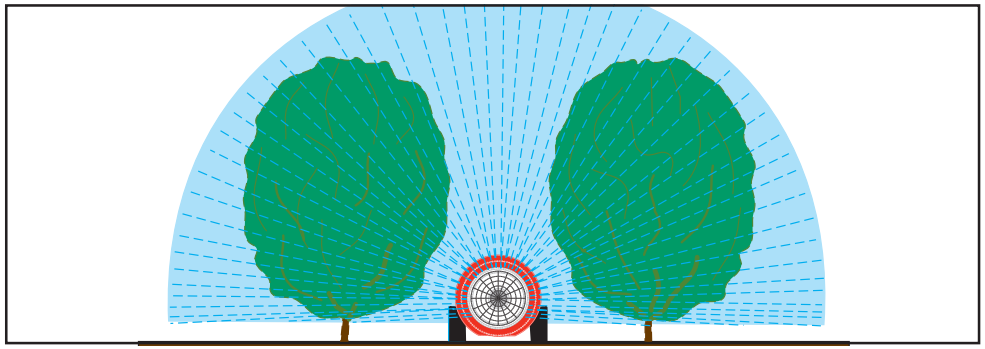
Example 1
24.2 litres ÷ 1.25 minutes

= 19.36 litres/min.

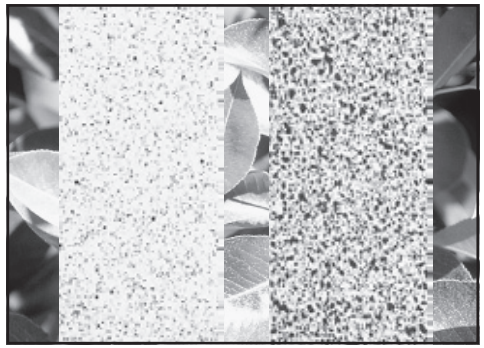
Multiply by 2 = Output for both sides

Example 1
19.36 x 2
= 38.72 litres/min.

Calibrating the Cropliner



Calculate the application rate tested. Then, if necesary, make adjustments, retest and recalculate.



Samples of 50 litre/ha and 750 litre/ha application.

Step 8
Calculate the Actual Application Rate

Actual application rate is the objective of setting up and calibrating your sprayer.

To calculate actual application rate (litres per hectare), use the following formula:

Application Rate (l/ha)
=
Total Sprayer Output (l/min) x 600 ÷ Speed (Km/hr) ÷ Row Spacing (m) ÷ Number Rows in One Pass

Example 1
38.72 (l/min) x 600 ÷ 6 km/hr ÷ 4m (row spacing) ÷ 1 (rows/pass)
=
968 litres/ha.

Note: Always use Actual Speed of Travel for speed in the above formula.

Step 9
If the Tested Rate is Unsatisfactory

If your tested application rate does not meet your requirements, your options are:

a) Adjust pump pressure to increase or decrease the rate of application as required.

b) Adjust the speed of travel decrease or increase application rate.

c) Select a different nozzle size to decrease or increase application rate.

Repeat the necessary testing procedure and application rate calculation (steps 6 & 7) if adjustment or nozzle changes are made.

Continue adjustment and testing until the require application rate is acheived.

Step 10
Field Check Coverage

Operate your sprayer in the required orchard or vineyard to check the actual spray coverage acheive on foliage.

This is important because it is the only real measure you have of actual coverage and effective penetration of your sprayer.

Coverage checks can be done using:

- A fluorescent dye system - often available through chemical and spray equipment suppliers.
- Water or oil sensitive papers available through chemical and spray equipment suppliers.

  Ensure cards are strategically placed on both upper and lower surfaces.

It is recommended to test the unit using water only as a test run, and again when applying your chemical mixture.

Step 11
Record each Calibration on a Work Sheet

Calibration work sheets are provided on pages 40-43.

It is suggested that a photocopy of the blank worksheet be used for each calibration, and keep them for future reference.

Disc & Core Chart

The core & disc sizes listed are the most commonly used in airblast spraying. For Hollow Cone Spray Patterns use cores 23, 25, 45 & 46. For Full Cone Spray Patterns use cores 33, 35 & 56.

Spray Outputs per nozzle in litres per minute, and Spray Angle at disc orifice - at 5 different pressures.													
Disc	Core	700 kPa (100 psi)	1040 kPa (150 psi)	1380 kPa (200 psi)	2070 kPa (300 psi)	2760 kPa (400 psi)	Disc	Core	700 kPa (100 psi)	1040 kPa (150 psi)	1380 kPa (200 psi)	2070 kPa (300 psi)	2760 kPa (400 psi)
D1	23	0.41	0.47	0.53	0.62	0.70	**D2**	23	0.61	0.72	0.80	0.95	1.06
		60°	63°	64°	65°	65°			71°	72°	72°	72°	72°
	25	0.59	0.70	0.80	0.97	1.10		25	0.95	1.10	1.29	1.55	1.74
		46°	49°	50°	51°	51°			60°	61°	61°	61°	60°
	33	0.83	0.99	1.14	1.40	1.59		33	1.40	1.71	1.97	2.39	2.73
		36°	37°	38°	37°	37°			55°	55°	55°	52°	48°
	35	0.83	0.99	1.10	1.33	1.52		35	1.40	1.71	1.93	2.27	2.58
		27°	27°	27°	27°	26°			47°	45°	44°	40°	38°
	45	0.72	0.85	0.97	1.17	1.33		45	1.21	1.44	1.67	2.01	2.31
		36°	39°	40°	40°	40°			57°	58°	58°	58°	57°
	46	0.87	1.06	1.21	1.48	1.71		46	1.59	1.90	2.16	2.58	2.96
		16°	17°	17°	17°	16°			21°	20°	19°	18°	18°
	56	0.87	1.06	1.21	1.48	1.71		56	1.48	1.78	2.08	2.54	2.92
		16°	17°	17°	17°	16°			18°	18°	17°	16°	16°
D1.5	23	0.49	0.59	0.66	0.80	0.90	**D3**	23	0.68	0.80	0.91	1.06	1.21
		64°	66°	67°	67°	67°			76°	77°	77°	77°	77°
	25	0.78	0.93	1.06	1.25	1.44		25	1.10	1.33	1.52	1.82	2.08
		51°	54°	55°	55°	55°			68°	69°	69°	69°	68°
	33	1.14	1.36	1.55	1.90	2.16		33	1.71	2.08	2.39	2.88	3.34
		45°	46°	46°	45°	43°			57°	57°	57°	56°	54°
	35	1.10	1.29	1.48	1.74	1.97		35	1.71	2.08	2.35	2.80	3.22
		30°	30°	30°	30°	29°			52°	48°	45°	42°	40°
	45	0.95	1.17	1.33	1.63	1.86		45	1.36	1.67	1.93	2.35	2.69
		46°	48°	49°	50°	50°			61°	62°	62°	62°	61°
	46	1.25	1.55	1.74	2.12	2.43		46	1.93	2.31	2.65	3.26	3.75
		18°	18°	18°	18°	17°			24°	23°	22°	21°	21°
	56	1.25	1.55	1.78	2.16	2.46		56	2.01	2.46	2.84	3.49	4.06
		16°	16°	16°	16°	15°			24°	24°	23°	22°	22°

Refer to charts on page 92 - 96 for more detailed infomation on hollow cone disc & cores.

Disc & Core Chart

The core & disc sizes listed are the most commonly used in airblast spraying. For Hollow Cone Spray Patterns use cores 23, 25, 45 & 46. For Full Cone Spray Patterns use cores 33, 35 & 56.

Spray Outputs per nozzle in litres per minute, and Spray Angle at disc orifice - at 5 different pressures.

Disc	Core	700 kPa (100 psi)	1040 kPa (150 psi)	1380 kPa (200 psi)	2070 kPa (300 psi)	2760 kPa (400 psi)
D4	23	0.87	1.06	1.21	1.44	1.67
		88°	88°	88°	88°	88°
	25	1.71	2.05	2.35	2.84	3.26
		81°	82°	82°	82°	81°
	33	2.27	2.77	3.15	3.87	4.43
		62°	63°	63°	63°	58°
	35	2.99	3.52	4.17	4.93	5.69
		70°	68°	63°	60°	54°
	45	2.12	2.58	2.96	3.60	4.21
		73°	73°	73°	72°	72°
	46	3.34	4.06	4.66	5.76	6.67
		33°	32°	32°	31°	31°
	56	3.30	4.02	4.66	5.72	6.59
		30°	30°	29°	28°	28°
D5	23	1.06	1.29	1.44	1.74	2.01
		95°	96°	96°	95°	95°
	25	2.05	2.46	2.84	3.41	3.94
		85°	85°	84°	84°	84°
	33	Not recommended				
	35	3.79	4.55	5.31	6.44	7.20
		71°	69°	65°	65°	59°
	45	2.69	3.26	3.75	4.62	5.31
		76°	76°	76°	75°	75°
	46	4.74	5.69	6.56	8.07	9.36
		42°	41°	41°	40°	40°
	56	4.55	5.57	6.41	7.88	9.10
		35°	35°	34°	33°	33°

Disc	Core	700 kPa (100 psi)	1040 kPa (150 psi)	1380 kPa (200 psi)	2070 kPa (300 psi)	2760 kPa (400 psi)
D6	23	1.21	1.49	1.71	2.05	2.35
		99°	100°	100°	99°	99°
	25	2.65	3.22	3.68	4.51	5.19
		89°	89°	89°	88°	88°
	33	Not recommended				
	35	Not recommended				
	45	3.52	4.36	5.04	6.22	7.20
		81°	80°	80°	79°	79°
	46	6.56	8.19	9.48	11.60	13.34
		50°	49°	48°	47°	47°
	56	6.59	8.07	9.32	11.45	13.19
		41°	40°	39°	38°	38°
D7	23	Not recommended				
	25	3.07	3.71	4.47	5.19	6.03
		93°	92°	92°	91°	91°
	33	Not recommended				
	35	Not recommended				
	45	4.21	5.12	5.95	7.35	8.53
		87°	86°	86°	85°	85°
	46	8.41	10.35	11.94	14.99	16.75
		56°	55°	54°	53°	53°
	56	9.10	11.14	12.89	15.77	18.23
		54°	53°	52°	51°	51°

Refer to charts on page 92 - 96 for more detailed infomation on hollow cone disc & cores.

Spraying Systems TX Ceramic Nozzles

TIP	BAR	LITRES PER MINUTE	CUMULATIVE VOLUME PERCENTAGE OF MICRONS *											
			0-50 µm	0-100µm	50-100 µm	50-150 µm	100-150 µm	100-200 µm	100-300 µm	150-200 µm	300-400 µm		V.M.D. µm	SPRAY ANGLE
YELLOW	4	.22	7	44	37	80	40	54	56	13			107	74º
NO 3	8	.30	9	54	45	87	41	45	46	4			95	80º
	20	.45	10	80	70	90	20	20	20				87	83º
GREEN	4	.30	4	38	34	73	40	60	62	19			115	75º
NO 4	8	.41	7	48	41	85	44	45	52	7			101	80º
	20	.62	9	62	53	91	38	38	38				92	81º
RED	4	.45	2	28	26	60	34	66	72	27			132	75º
NO 6	8	.62	4	36	32	76	44	63	64	19			117	80º
	20	.93	6	44	38	94	58	58	58				106	80º
GREY	4	.60	2	20	20	43	28	58	77	32			150	75º
N0 8	8	.84	2	26	24	66	36	66	74	28			132	80º
	20	1.30	4	30	26	96	70	70	70				120	80º
BLACK	4	.75	2	16	14	40	26	66	83	30			164	76º
N0 10	8	1.00	2	23	21	52	31	65	77	34			145	80º
	20	1.60	3	24	21	76	67	74	74	7			132	79º
BROWN	4	.90	1	11	10	33	23	49	84	24	6		180	76º
NO 12	8	1.30	1	18	17	41	24	60	84	36			159	80º
	20	2.00	2	21	19	54	35	35	35	44			145	78º
ORANGE	4	1.40	1	10	9	25	18	40	82	22	8		203	77º
N0 18	8	1.90	1	10	9	33	25	53	86	28	4		180	80º
	20	3.00	2	12	10	34	26	90	90	62			164	77º
LIGHT BLUE	4	2.00	1	5	4	19	15	31	71	16	16		233	78º
N0 26	8	2.80	1	7	6	24	18	41	83	23	10		206	80º
	20	4.40	2	9	7	24	18	51	40	33			187	76º

Information gathered from Spraying Systems DATA SHEET NO 12135-168M 12135 169M 12135-170M April 14, 1993.

**There are1000 µm (microns) in 1mm.*

Calibration Work Sheet

Step 1 Check the Sprayer is in Good Working Order

Step 2
Determine Actual Speed of Travel
Measure and mark a straight path of 100 metres (or more) of travelling conditions similar to the orchard or vineyard you are going to spray.

Half fill the spray tank & record the time (in seconds) to travel the measured distance.

Make sure that the tractor is traveling at spraying speed when you pass the start and finish marks and ensure the the fan and pump are at operational speed.

If you have a hectare meter or automatic controller you need to check the speed calibration of the contoller**.**

Tractor model	
Gear	
Range	
Dual power	
Engine RPM	
Speed in Km/hr	

Kilometres per Hour
=
Distance traveled (m) x 3.6

Step 3
Determine Spraying Volume Required
It is essential to determine the liquid volume per hectare required to effectively spray a crop without overspraying or underspraying.

Note: Use your own experience or a registered rate calibration consultant to determine effective volume in litres per hectare.

Step 4
Determine Sprayer Configuration

- **Number of row(s)** to be sprayed in one pass .....
- **Total number of nozzles** to be used .....

Step 5
Determine Spray Output for Each Side of Sprayer

Litres/Minute/Side
=
Spray Volume (l/ha) x Speed (km/hr) ÷ 1200 x Row Spacing (m) x Number of Rows in One Pass

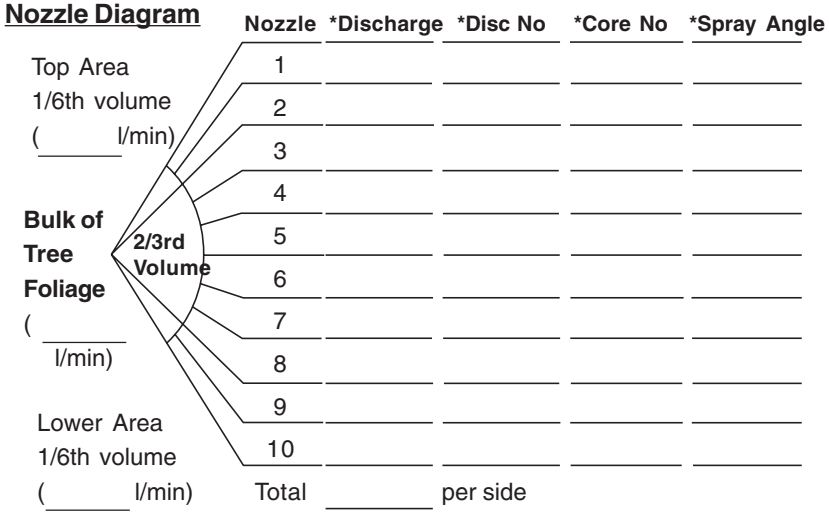
eg.
..... x ..... ÷ 1200 ÷ ..... x .....

= ..... litres/minute/side.

Step 6
Select & Design Nozzle Layout

1/3 Spray Volume = ... litres/minute
Average/nozzle = ... litres/nozzle/minute
2/3 Spray Volume = ... litres/minute
Average/nozzle = ... litres/nozzle/minute
Pump Pressure = ... kPa

Nozzle Diagram



**Read these from your spray nozzle discharge charts for your pump pressure.*

DISCLAIMER: Because of the many variable factors involved Fernz Croplands cannot be held responsible for any down grading or loss of crop resulting from the use of any information in this manual. This is issued as a guide only and subject to acceptance of this disclaimer.

Step 7
Fit & Test Selected Nozzles
The most important calibration is to test for actual litres per hectare.

Fill your spray tank to overflowing and run the sprayer for one minute at the above operating settings and record:

Output/min/side (l/min)
=
Output (litres) ÷ Time (minutes)

..... ÷ ..... = ... litres/min/side

x 2 = ... Total Output (l/min).

Step 8
Calculate the Actual Application Rate
To calculate actual application rate (litres per hectare), use the following formula:

Application Rate (l/ha)
=
Total Sprayer Output (l/min) x 600 ÷ Speed (Km/hr) ÷ Row Spacing (m) ÷ Number Rows in One Pass

..... x 600 ÷ ..... ÷ ..... ÷ .....

= ..... litres/ha.

Note: *If your sprayer has a flow meter fitted, you should calibrate it regularly. The calibration setting on the tag is a factory setting only and needs to be regularly checked - taking into consideration changes in density and or viscosity of the product to be sprayed.*

Lubrication & Maintenance

Greasing & Service Procedures

Daily

1 Clean suction line filter with each tank load.

2 Clean nozzles regularly.

3 Check tyre pressure (250kPa), and tighten wheel nuts regularly.

4 Check tank bolts regularly.

5 Check all bolts and nuts, especially the wheels and pump mounting bolts.

6 Grease tractor to sprayer PTO universal joints every 8 hours.

Grease lightly until grease becomes firm in seals. Over greasing will break seals and allow dust and moisture to penetrate - increasing wear.

7 Grease PTO inner tubes every 8 hours.

To lubricate the inner tube, slide PTO shaft apart, clean the telescopic tubes, grease and reassemble.

Important: Ensure the sliding inner tubes of the PTO are greased every 8 hours (working around the clock equals 3 time/day), especially when doing a lot of tight turning

8 Grease the PTO covers every 20 hours.

9 Check pump air chamber pressure (100-175kPa), on a regular basis.

10 To ensure trouble free spraying, flush the sprayer with fresh water thoroughly each day, and before changing chemicals.

Dispose of tank wash according to chemical manufacturers instructions.

Every 200 Hours

1 Lubricate quick release lock pins on PTO shaft.

2 Re-pack wheel bearings with grease.

3 Grease the universal joint of the PTO through-shaft once per year.

Pump Operation and Maintenance

Annovi & Reverberi (A&R) pumps are of the piston-diaphragm type. All parts in contact with the spray liquid, which are subject to corrosion, are protected, making them ideal for spraying (herbicides, insecticides, fungicides, fertilisers, etc.), disinfection and washing.

Daily Before Starting the Pump

1 Check that oil is visible in sight glass (half way up) and top up if necessary with good clean motor oil 20W/30 or 20W/40.

2 Clean all sprayer filters. Blocked or semi blocked filters place extra stress on diaphragms.

3 Start with zero pressure and the pump will self prime immediately and clear air locks in suction line.

Lubrication & Maintenance

Important: Running a diaphragm pump faster than specified will not improve performance but will damage and wear out moving parts.

Warranty will be made void by speeds in excess of those indicated on the pump name plate.

Daily after Use

1 Flush pump with clean water.

2 Drain filters and clean. A high percentage of pump failures are due to blocked filters.

Every 250 Hours

1 Check surge chamber pressure and adjust as follows:

- Air pressure 210-280 kPa (30-40 psi) [Should be 10% - 20% of operating pressure].

Vibration of the delivery hose usually indicates that the air pressure in the surge chamber is incorrect.

The main cause of surge chamber diaphragm fracture is low pressure in this chamber.

Surge chamber pressure can be checked with an ordinary tyre gauge.

The above pressure range is a guide to the correct pressure however if difficulties re encountered adjust this pressure till an even flow is obtained from the pump. The pressure is best increased with a bicycle pump.

2 Change oil and refill with 20W/30 oil.

Attention should be made to removing trapped air behind the diaphragms by rocking from side to side as instructed.

It is also a good practise to run the pump for 10 minutes without pressure and top up with oil before working the pump.

3 When changing the pump oil, check diaphragms, replacing them if they are showing signs of wear.

This is normally a pre-season maintenance procedure which can be done quickly and easily as no special tools are required.

You can avoid unnecesaary down time in spraying seasons by carrying out the proper maintenance.

4 Also check inlet and outlet valves and replace if worn. Worn valves not only reduce the output of the pump, but also may reduce the life of the diaphragm.

Lubrication & Maintenance

Excessive Diaphragm Failure

If you have excessive diaphragm failure check the following points which will cause failure of diaphragms due to added stress or chemical attack.

1 **Most Important** - Pump not being flushed out daily with clean water after use

.

2 Oil level too low allowing air between piston and diaphragm.

3 Air leaks in suction line.

4 Restricted suction line.

5 Restriction through suction filter.

6 Not cleaning suction filter regularly.

7 Worn suction and discharge valves.

8 Bypass line too small to carry full capacity of pump.

9 In cold climates - frozen suction/ discharge lines or water remaining in the pump after flushing.

10 Incorrect air setting or no air in air chamber.

11 Agitator excessively restricting bypass from pump.

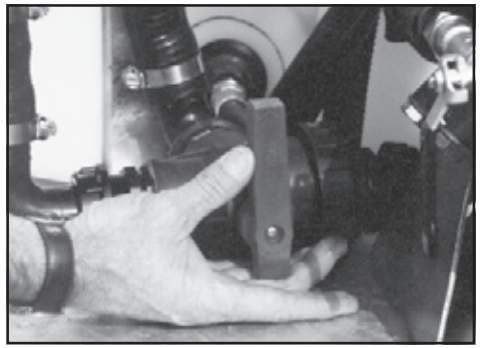
12 Diaphragm material construction incorrect for chemical or solution being pumped.

13 Chemicals containing toluene or other aggressive solvents may require viton diaphragms - particularly if the pump is not properly flushed after use.

Pre-Season Servicing

For thorough pre-season servicing - check all aspects of the Cropliner and its operating components as outlined in the pre-delivery check list on page 7.

Lubrication & Maintenance



The pump suction valve CLOSED to the main tank.

Filter Maintenance

Clean filters ensure that no solids enter the spraying system to block or damage pump or nozzles.

All filters should be cleaned regularly or after each spraying period.

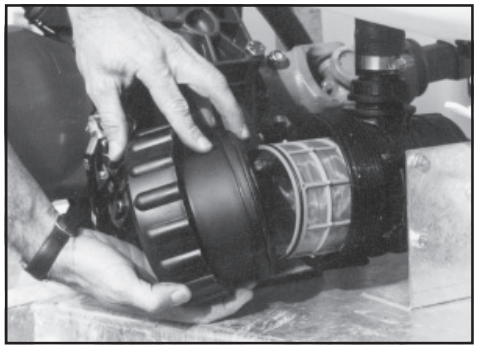
Suction Filter

The suction filter should be cleaned regularly or after each spray tank has been emptied.

To clean the filter:

1 Completely stop all sprayer functions.

2 Place the pump suction valve in the close position to shut off liquid from the main tank.

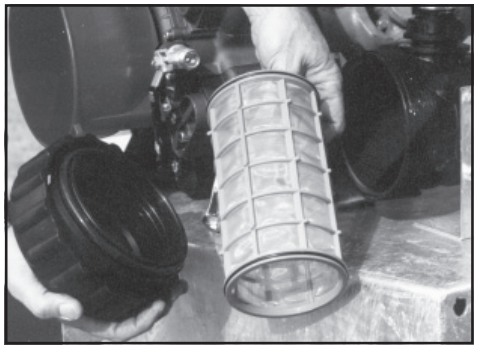


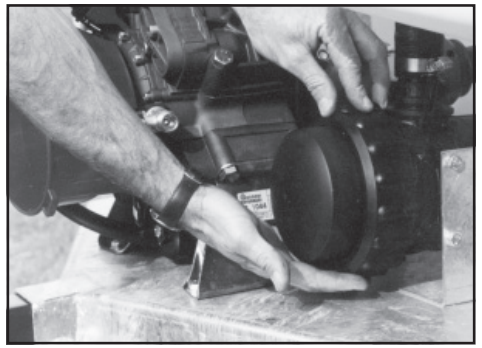
Remove the outer filter screw and bowl.

3 Remove the outer filter screw and bowl.

4 Remove the filter screen & thoroughly clean it and other components before reassembling the filter.

Remove & clean the filter element & components.





Reassemble and tighten the outer filter screw.

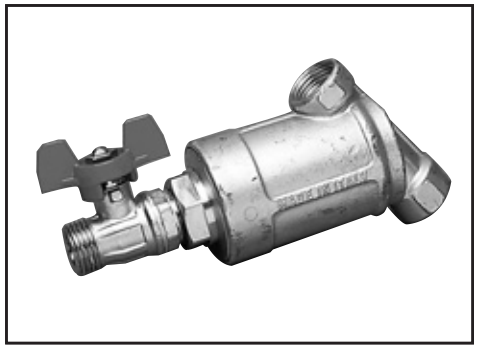
5 Carefully reassemble the filter and tighten the outer filter screw to seal the O-ring.

6 Check the filter is sealed correctly by opening the pump suction valve to access liquid from the main tank.

If leaking, further tighten the outer screw until sealed. If this does not stop the leaking, check the alignment of the O-ring and/or the condition of the O-ring. Replace if necessary.

Note: Be careful not to damage or deform the mesh or O-ring while leaning and refitting the suction filter.

If the filter screen or O-ring is damaged, replace the part.



Regularly clean the pressure filter (if fitted).

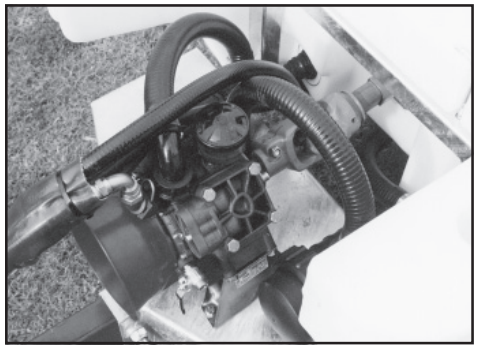
Pressure Filter

The pressure filter (when fitted) should be cleaned regularly to avoid nozzle blockages.

To clean the pressure filter:

1 With the sprayer operating OPEN the valve at the bottom of the filter for and short period and CLOSE the valve..

2 Cleaning the filter should especially be done when flushing the sprayer with fresh water.



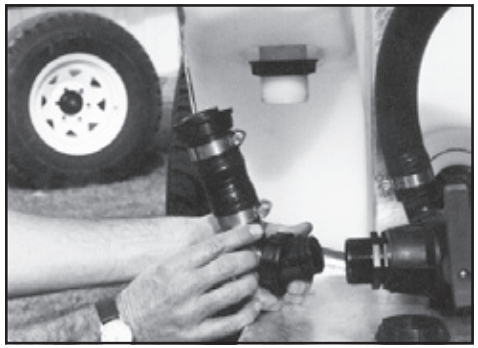
Fresh water tanks removed for open acces.

Removal of Fresh Water Tanks

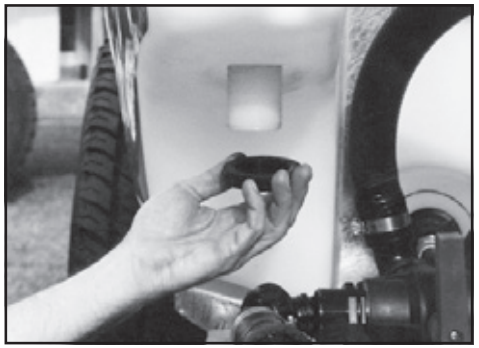
The fresh water tanks at the front of the sprayer can be quickly and easily removed to gain open access for servicing the pump and PTO shaft.

To remove the fresh water tanks for servicing follow the steps outlined:

1 Unscrew the hose fitting flanges and & remove the hose elbow from flushing tank outlet.



Unscrew & remove the hose from flushing tank outlet.

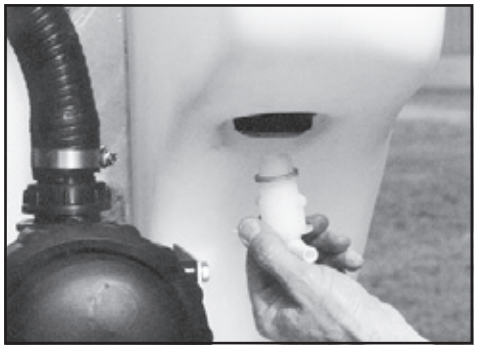


Remove flange from flushing tank outlet.

2 Uncrew and remove the flange from flushing tank outlet.

3 Remove the centre flange from the fresh water tanks located above the PTO shaft.

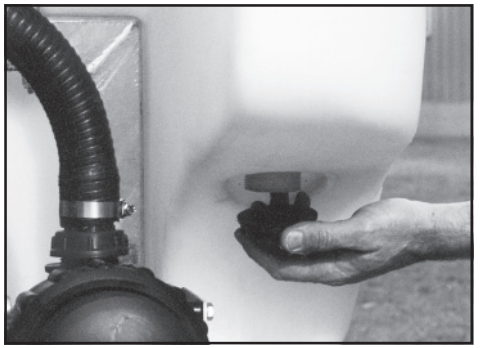
Remove the centre flange from the fresh water tanks.



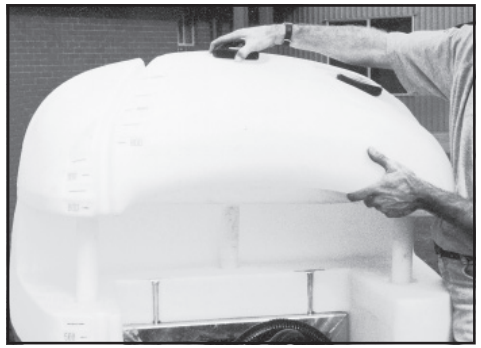
Remove the tap from fresh water tank outlet.

4 Uncrew and remove the tap from fresh water tank outlet.

5 Uncrew and remove the flange from fresh water tank outlet.



Remove flange from fresh water tank outlet.

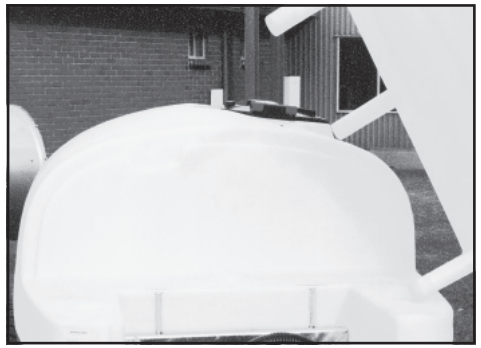


Raise the fresh water tanks to clear outlets.

6 Raise the fresh water tanks to clear the tank outlets.

7 Completely remove the fresh water tanks for open access to the pump and PTO shaft.

Follow the procedure in reverse to refit the tanks after servicing.



Completely remove the fresh water tanks.

Lubrication & Maintenance

Front clamps of the main tank.

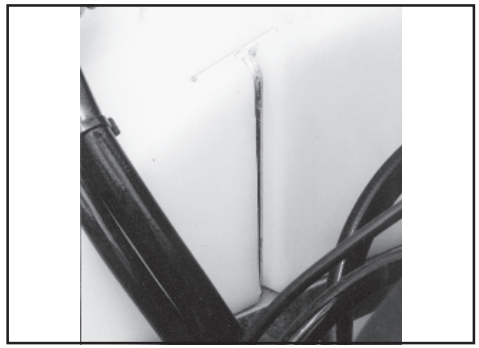
Tank Clamps

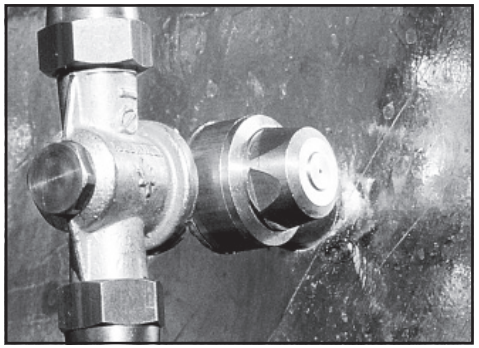
The tank clamps located at the front and rear of the main tank should be kept tight so that the tank is not free to slide on the chassis.

Tank clamps should be check two or three times a day when the sprayer is new and the tank and chassis are bedding-in.

Thereafter the tank clamps should be checked regularly.

Rear clamps of the main tank.





Remove & clean non-drip diaphragms regularly.

Non-Drip Diaphragms

Non-drip diaphragms should be cleaned regularly to prevent dripping from nozzles.

To clean the non-drip diaphragms:

1 Completely stop all sprayer functions.

2 Uncrew and remove the diaphragm cap.

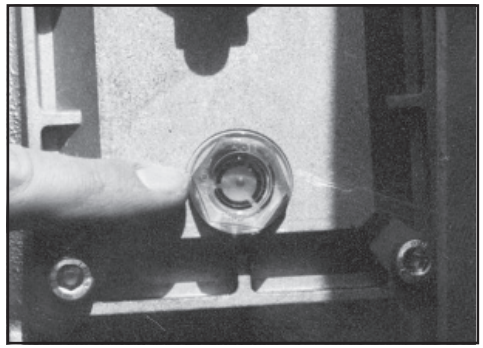
3 Remove and clean any sediment off the diaphragm membrane.

Replace the diaphragm membrane if damaged.

4 Check the valve seat and maintain using fine wet and dry sand paper.

5 Replace the diaphragm.

6 Refit the diaphragm cap and tighten.



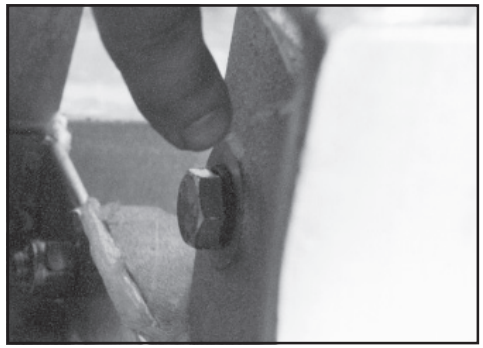
Check gearbox oil level regularly.

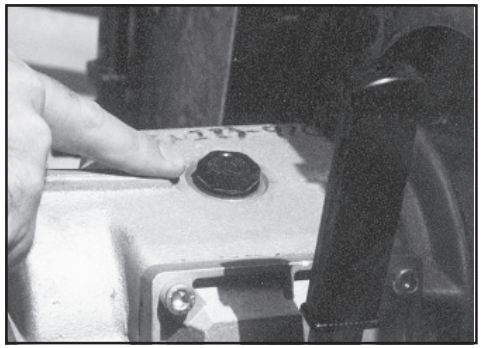
Fan Gearbox

The oil level of the fan gearbox should be checked regularly. Top up oil level if necessary.

Drain gearbox oil every 200 hours, and refill with SAE 140 oil.

Gearbox oil drain plug.





Gearbox oil filler port.

Trouble Shooting Pump Problems

PROBLEM	PROBABLE CAUSE	REMEDY
A Pump does not draw or deliver liquid. Pressure gauge fluctuates badly.	1 One or more valves are not seating properly. 2 The pump is sucking in air through suction line. 3 Air has not been entirely evacuated from the pump. 4 Blocked suction filter. 5 Damaged or worn suction valves.	1 Clean valve seating. 2 Examine the suction hose and ensure it is firmly secured. 3 Rotate the pump with outlet hose and taps open. 4 Clean suction filter. 5 Replace suction valves.
B Liquid flow is irregular (Also check items under A)	1 The air in the air chamber of the pump is incorrectly set. 2 Diaphragm split. 3 Damaged or worn valves. 4 Foreign matter holding valves open.	1 Check pressure in air chamber of pump. Set at 210-280Kpa (30-40 psi). 2 Replace diaphragm. 3 Replace valves. 4 Clean valves.
C Pump delivers insufficient pressure	1 Regulating valve: • Sticking open • Not set for pressure. • Damage or worn seat or spring. 2 Cylinder diaphragm ruptured. 3 Pump valves blocked, worn or damaged. 4 Spray nozzles worn, missing or exceed pump capacity.	1 Fix the regulator: • Unstick the valves. • Set the pressure. • Replace the spring. 2 Replace diaphragms. 3 Unblock valves and or replace. 4 Replace spray nozzles with appropriate size.
D Output drops & pump is noisy.	1 Oil level is too low.	1 Top up with oil to correct level (1/2 way up the sump sight glass).

Trouble Shooting Pump Problems

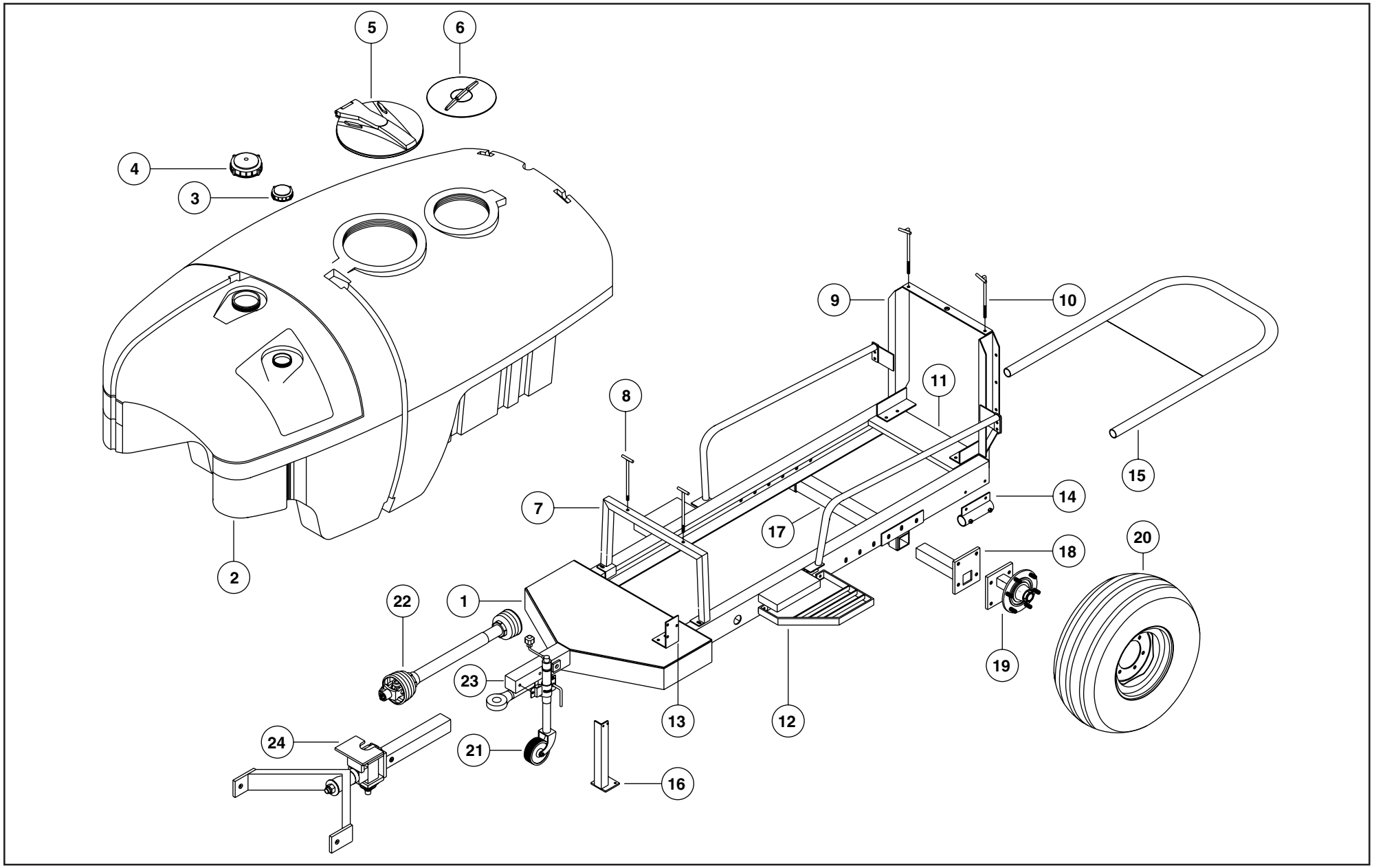
PROBLEM	PROBABLE CAUSE	REMEDY
E Oil being discharged through delivery line or discoloured oil in sight glass of pump.	1 One or more diaphragms split or ruptured.	1 Immediately drain oil from pump and flush to remove all spray residues from sump. Remove pump heads & fit new diaphragms. Fill to correct level with motor oil 20W/30.
	SUCTION SIDE OF PUMP	
F Suction hose vibration.	1 Air getting into suction.	1 Seal all joints securely with tape or stag. Firm up clamps.
G Pump valves hammering.	1 Suction tap partly turned off. 2 Suction strainer(s) blocked.	1 Turn tap fully on. 2 Clean filters.
H No water flow on suction hose.	1 Obstruction in tank or suction line.	1 Clean foreign material from tank & suction line.
	DISCHARGE SIDE OF PUMP	
I Pressure gauge pointer swings violently.	1 Pressure control valve spindle doesn't move easily.	1 Lubricate with light oil or C.R.C.
J AR control valve leaking from spindle.	1 Split diaphragm or O-rings.	1 Remove 4 body set screws, replace diaphragm and O-rings.
K Pressure gauge showing correct working pressure no pressure at nozzle.	1 Burst discharge line. 2 Blocked discharge filter where fitted. 3 O-ring(s) jamming flow in discharge line. 4 Ants, wasps build nests in discharge line or nozzles.	1 Replace discharge line. 2 Clean discharge filter. 3 Clean discharge line of foreign materials. 4 Clean nozzles of foreign materials with tooth brush

Trouble Shooting General Sprayer Problems

PROBLEM	PROBABLE CAUSE	REMEDY
1 No spray when turned on.	1 Filter on the inlet side of the pump blocked. 2 Faulty pump.	1 Dismantle, clean & re-assemble. 2 Change pump.
2 Sprays for short time only.	1 Air inlet to tank blocked. 2 Filter on suction side of pump blocking or blocked.	1 Clean air vent. 2 Dismantle, clean & re-assemble the filter. If filter problem persists, clean out the tank & start again.
3 Spray is uneven around the boom.	1 Some nozzle filters or tips are blocked. 2 Nozzle tips worn. 3 Different pressure along the boom.	1 Remove, clean & check. Check output & for streaks. 2 Check nozzle output, replace worn nozzles. 3 Remove a nozzle in each boom section & check that flow rate is the same. If different, check for blockages.
4 Pressure going up - output going down.	1 Nozzle filters blocking.	1 Dismantle, clean & refit. Check pressure returns to normal. Check all filters and spray mixture.
5 Pressure falling.	1 Filter on suction side blocked. 2 Nozzle tips worn. 3 Pressure gauge faulty. 4 Pump worn.	1 Dismantle & clean the filter. 2 Check nozzle output, replace worn nozzles. 3 Check with new pressure gauge. 4 Repair or replace the pump.
6 Spray pattern narrow.	1 Pressure too low. 2 Pressure too low & spluttering.	1 Check that the correct nozzles are being used. 2 Check that the tank is not empty. If not, there is an air leak between the pump & tank or in the pump. Check plumbing & repair.
7 Foam in the tank.	1 Too much agitation.	1 Check that the return line is at the bottom of the tank. Partly close agitation and valve
8 Spray pattern streaky.	1 Nozzle partly blocked.	1 Remove & clean. If it continues, the nozzle is damaged. Replace with same size tip, check flow rate of replacement nozzle.

Parts
Assembly Drawings
&
Parts Listings

1500 Litre Chassis Assembly

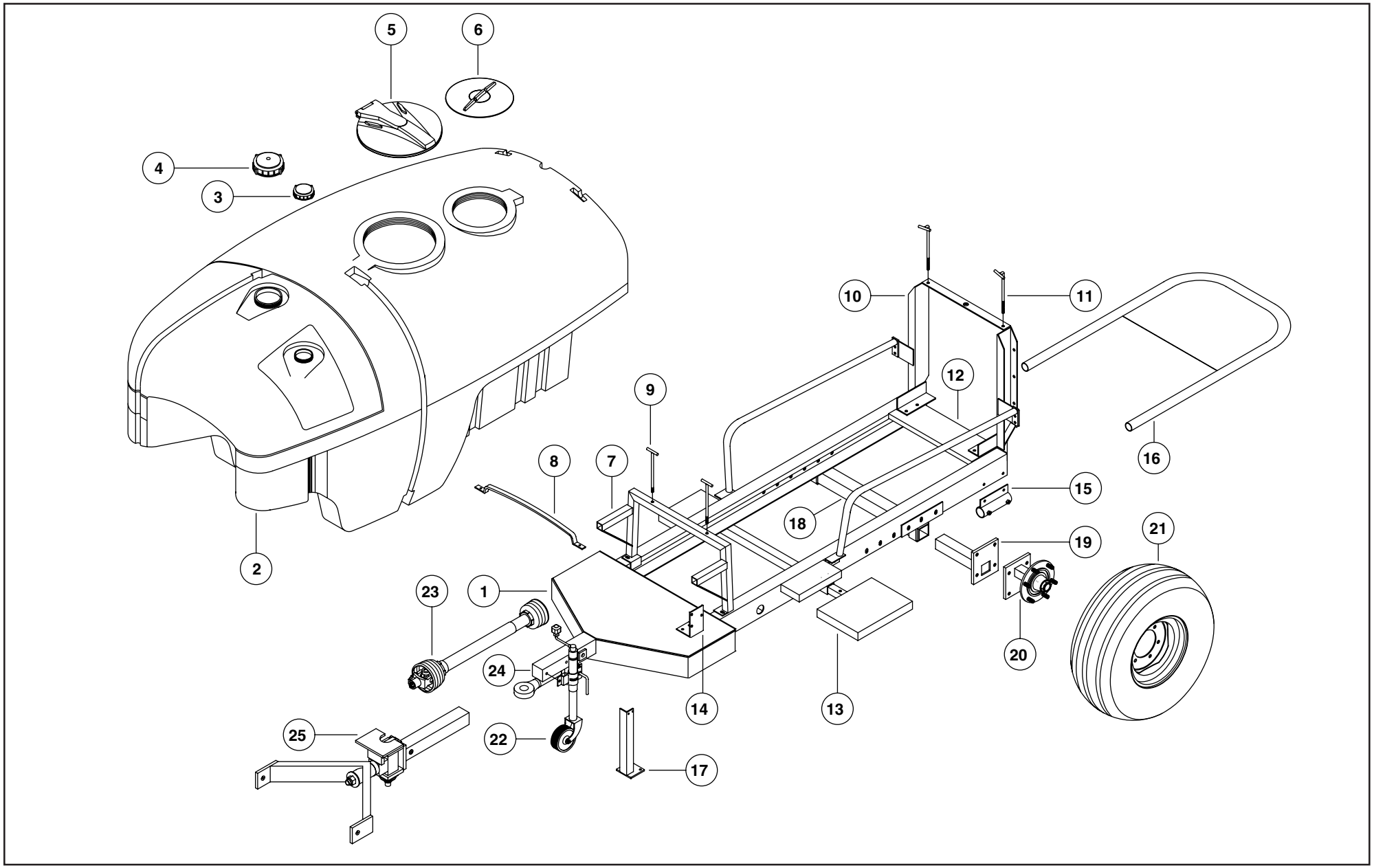


1500 Litre Chassis Assembly Parts List

Pos	Part No	Description	Qty
1	HP1500AB	CHASSIS	1
2	P1500AB	TANK	1
3	A354030	LID, 4 INCH	1
4	A354010	LID, 6 INCH	1
5	A356060	HINGED LID	1
6	A352040	LID, MEDIUM	1
7	HP-311	TANK SUPPORT, FRONT	1
8	HP-314	TIE DOWN ROD	2
9	HP-284A	FAN & TANK BRACKET	1
10	HP-315L	TIE DOWN ROD,L.H.	1
	HP-315R	TIE DOWN ROD,R.H.	1
11	HP-304L	SIDE RAIL, L.H.	1
	HP-304R	SIDE RAIL, R.H.	1
12	HP-402	STEP	1
13	HP-405	FILTER BRACKET	1
14	HP-406	BUMPER BRACKET	2
15	HP-407	BUMPER	1
16	HP-228	CONTROL BRACKET	1
17	HP-309	AXLE HOUSING	1
18	HP-408L	ADJUSTABLE AXLE BLOCK, L.H.	1
	HP-409R	ADJUSTABLE AXLE BLOCK, R.H.	1
19	HP-198	HUB ASSEMBLY (complete)	2
	HP-199	AXLE/HUB 6 STUD 50SQ 200PCD	2
20	HP-200	TYRE AND RIM	2
21	MUJOCKEY	JOCKEY WHEEL	1
22	SH5AG	DRIVE SHAFT	1
23	HP-400	DRAW BAR	1
24	HP-024	SWIVEL DRAW BAR	1

Pos	Part No	Description	Qty

2000 Litre Chassis Assembly

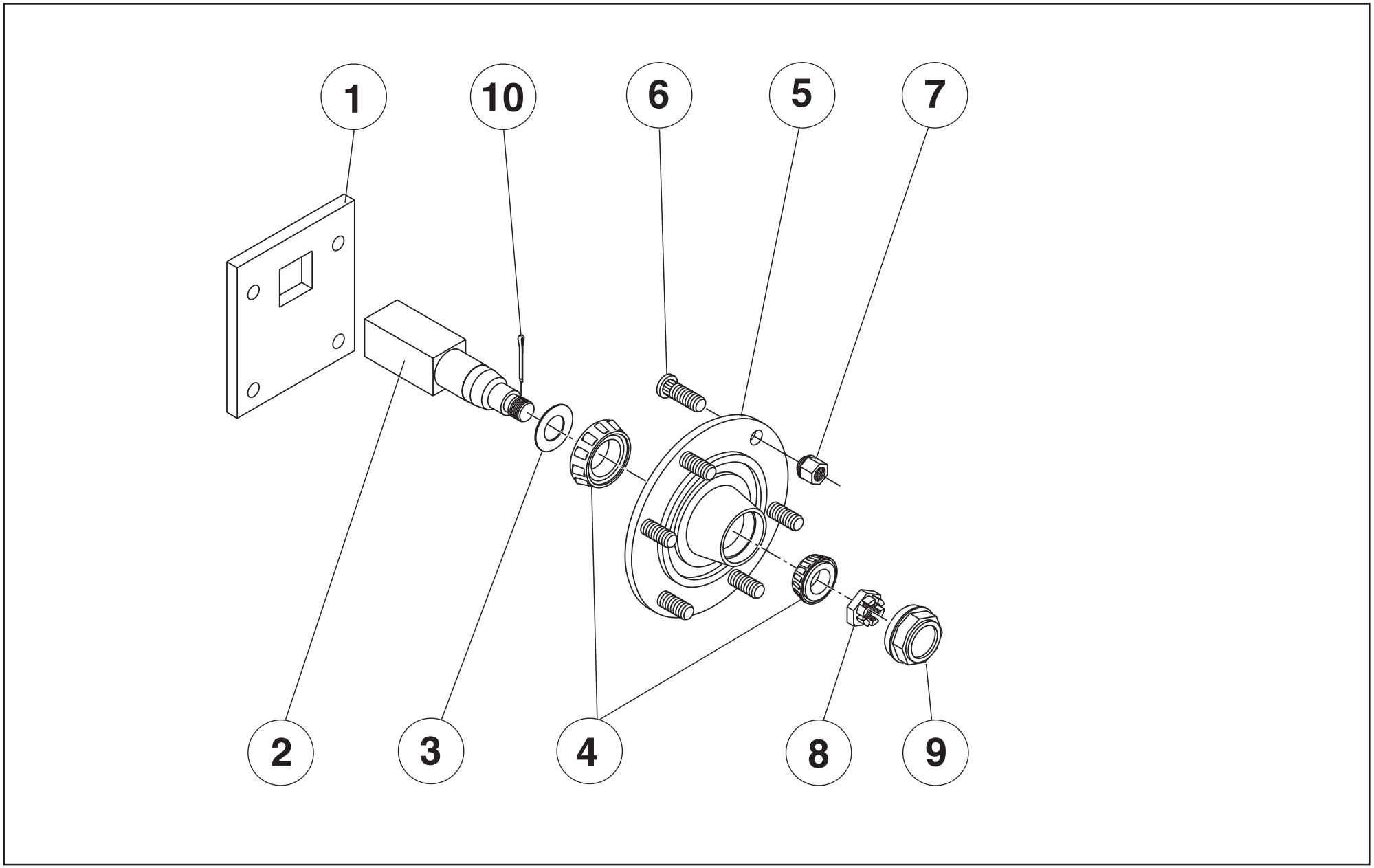


2000 Litre Chassis Assembly Parts List

Pos	Part No	Description	Qty
1	HP2000AB	CHASSIS	1
2	P2000AAB-RAW	TANK	1
3	A354030	LID, 4 INCH	1
4	A354010	LID, 6 INCH	1
5	A356060	HINGED LID	1
6	A352040	LID, MEDIUM	1
7	HP-411	TANK SUPPORT, FRONT	1
8	HP-413	SPREADER BAR	1
9	HP-414	TIE DOWN ROD	2
10	HP-284	FAN & TANK BRACKET	1
11	HP-415L	TIE DOWN ROD,L.H.	1
	HP-415R	TIE DOWN ROD,R.H.	1
12	HP-404L	SIDE RAIL, L.H.	1
	HP-404R	SIDE RAIL, R.H.	1
13	HP-402A	STEP, RETRACTABLE	1
14	HP-405	FILTER BRACKET	1
15	HP-406	BUMPER BRACKET	2
16	HP-407	BUMPER	1
17	HP-228	CONTROL BRACKET	1
18	HP-409	AXLE HOUSING	1
19	HP-408L	ADJUSTABLE AXLE BLOCK L.H.	1
	HP-408R	ADJUSTABLE AXLE BLOCK R.H.	1
20	HP-198	HUB ASSEMBLY (complete)	2
	HP-199	AXLE/HUB 6 STUD 50SQ 200PCD	2
21	HP-200	TYRE AND RIM	2
22	MUJOCKEY	JOCKEY WHEEL	1
23	SH5AG	DRIVE SHAFT	1
24	HP-400	DRAW BAR	1
25	HP-024	SWIVEL DRAW BAR	1

Pos	Part No	Description	Qty

Hub Assembly

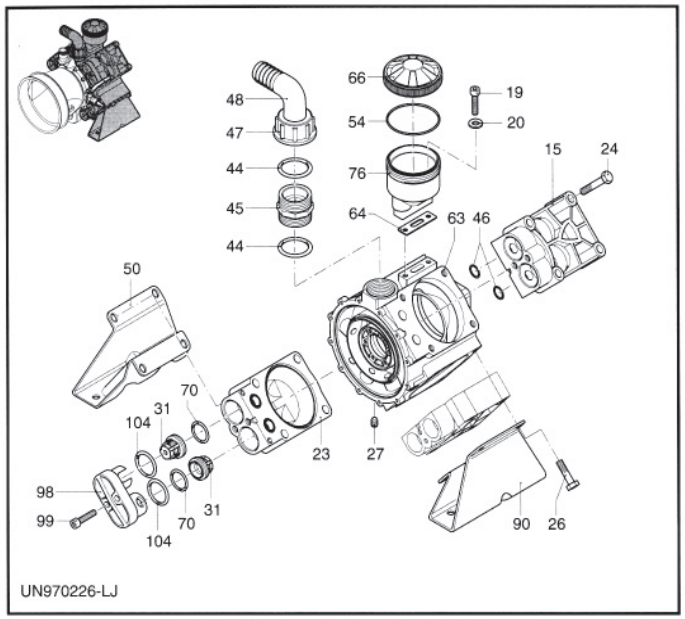


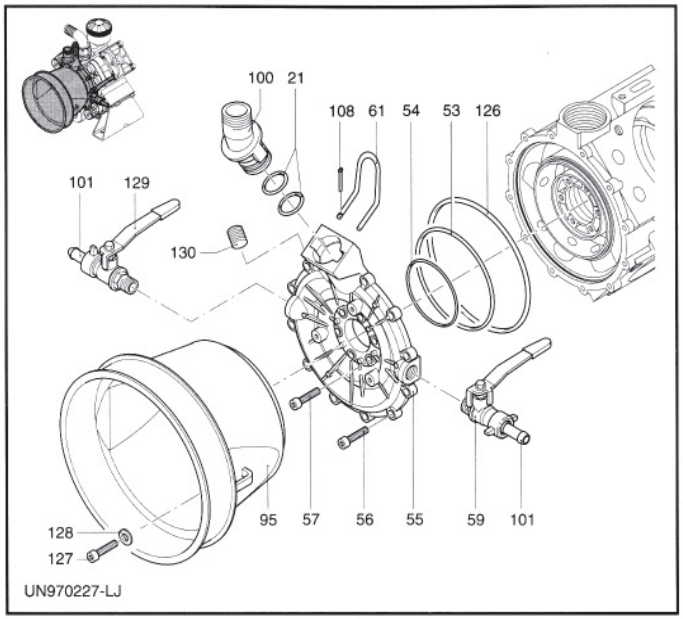
Hub Assembly Parts List

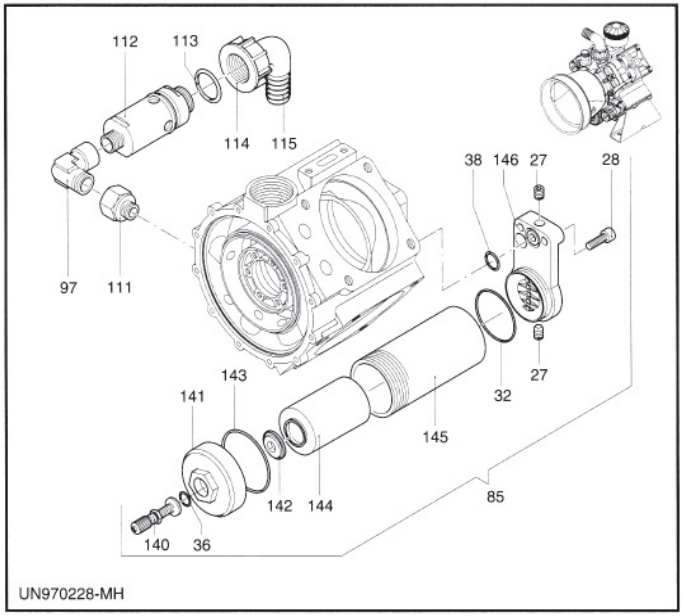
Pos	Part No	Description	Qty
1	HP-201	PLATE	2
2		SPLIT PIN	2
3	HP-199SEAL	SEAL	2
4	HP-199BEARING	BEARING KIT	2
	30209 SPZ RUSSIA	BEARING	
	30206A	BEARING	
5		HUB	2
6		STUD	12
7		NUT	12
8		CASTLE NUT	2
9	HP-199CAP	CAP	2
10		SPLIT PIN	2

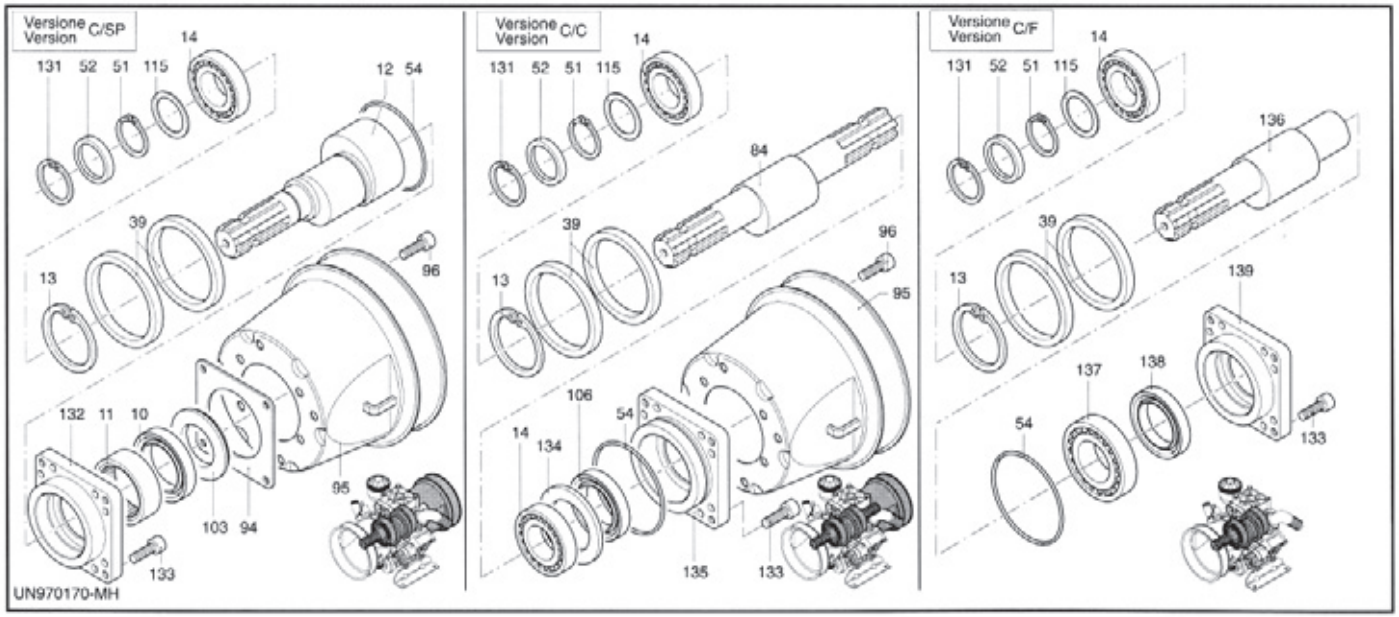
Pos	Part No	Description	Qty

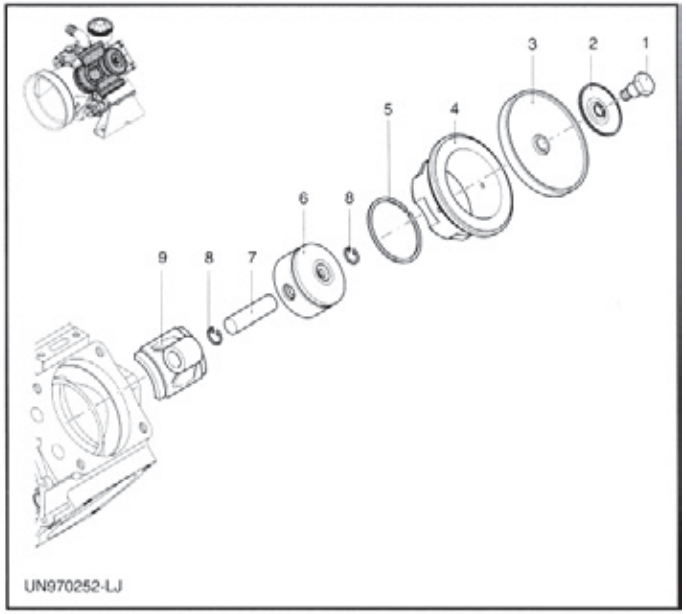
AR1064 Pump Assembly









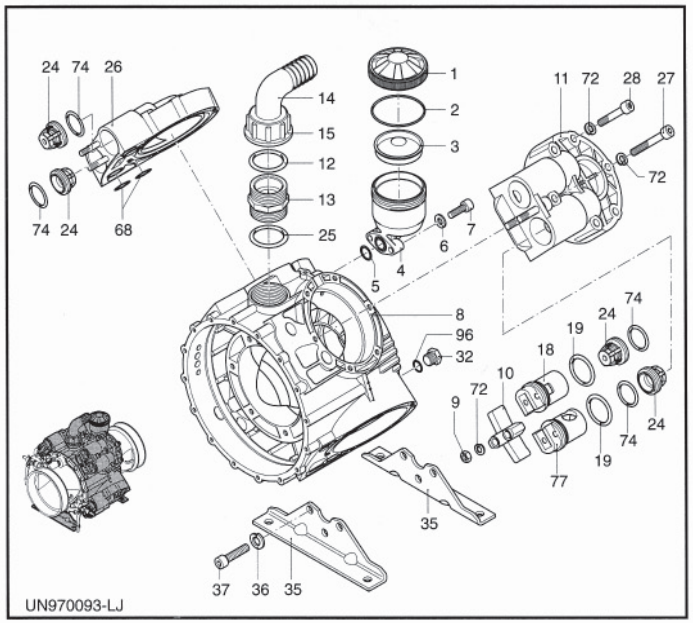


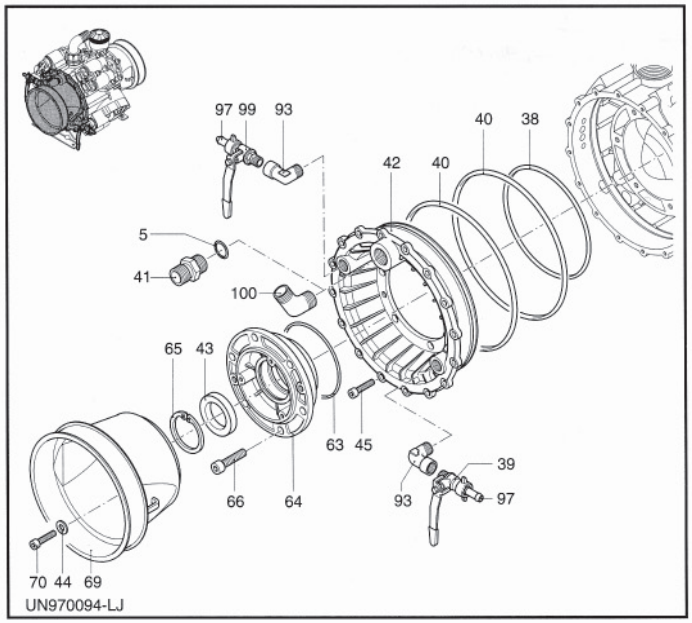
AR1064 Pump Assembly Parts List

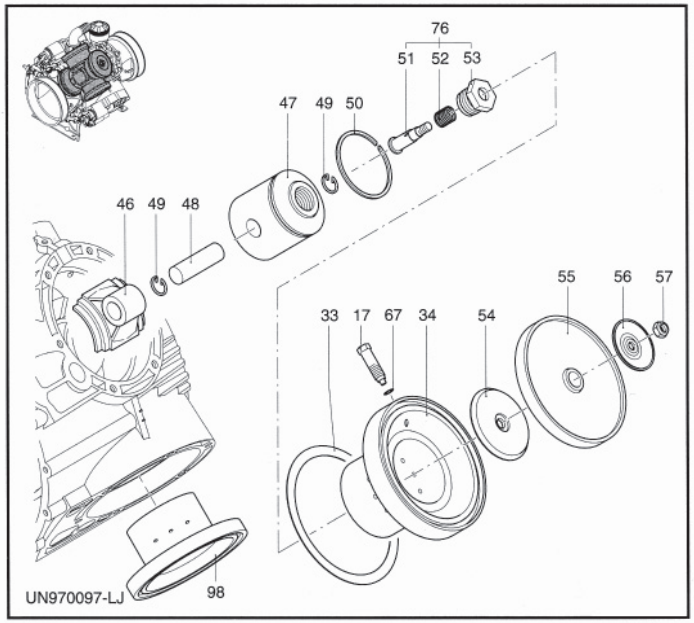
Pos	Part No	Description	Qty
1	AR580360	Diaphragm pin	4
2	AR1040180	Plate	4
3	AR1040080	Diaphragm	4
	AR1040081	Diaphragm	4
	AR1040086	Diaphragm	4
4	AR1500080	Sleeve	4
5	AR650190	Piston ring	4
6	AR1040120	Piston	4
7	AR1040070	Piston pin	4
8	AR1040270	Pin ring	8
9	AR1800050	Connecting rod	4
10	AR1400150	Seal ring	1
11	AR650200	Roller hearing	1
12	AR1800200	“CM” shaft	1
13	AR161050	Circlip	1
14	AR1800170	Bearing	2
15	AR1040551	Right head	2
19	AR680350	Bolt	2
20	AR380241	Washer	2
21	AR390180	O-Ring	2
23	AR1040552	Left head	2
24	AR1480040	Bolt	8
26	AR750060	Bolt	8
27	AR1040470	Dowel	3
28	AR320360	Bolt	2
31	AR1409050	Complete valve	8
32	AR540360	O-Ring	1
36	AR650542	Gasket	1
38	AR640070	O-Ring	1
39	AR1040340	Con rod ring	2
44	AR250310	O-Ring	2
45	AR540530	Threaded adapter	1
46	AR770571	O-Ring	8
47	AR540540	Ring nut	1
48	AR540550	Elbow	1
50	AR1040590	Left base	1
51	AR1040570	Circlip	1
52	AR1040050	Seal ring	1
53	AR1800160	O-Ring	1
54	AR1040060	O-Ring	3
55	AR1800150	Manifold	1
56	AR1040370	Bolt	12
57	AR780060	Bolt	6
59	AR130491	Right valve	1
61	AR1040690	Fork	1
63	AR1820040	Pomp body	1
64	AR750040	Gasket	1
66	AR1800060	Black oil tank cam	1

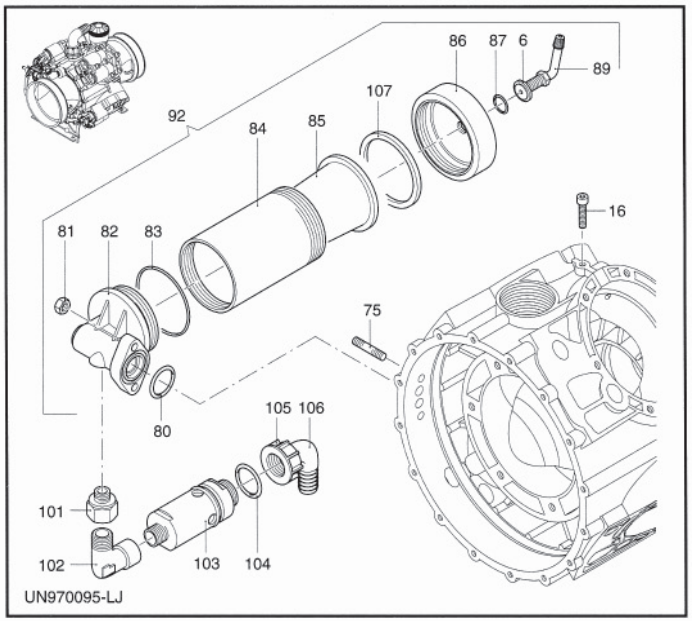
Pos	Part No	Description	Qty
70	AR620030	O-Ring	8
76	AR750030	Oil tank	1
84	AR1800180	“C/C” shaft	1
85	AR1536	Complete air chamber	1
90	AR1040580	Right base	1
94	AR1400140	Flange	1
95	AR1500350	Cardan protection	2
	1500470	Cardan protection	2
96	AR820670	Bolt	4
97	AR881560	Elbow	1
98	AR1300190	Valve cap	4
99	AR620610	Bolt	8
100	AR1040760	Coupling	1
101	AR110131	Fitting112”(G)+hose 10mm	2
103	AR1400110	“CW’ flange spigot	1
104	AR540361	O-Ring	8
106	AR160740	Seal ring “C/C”	1
108	AR1040950	Split pin	1
111	AR881461	Adapter	1
112	AR1609002	Safety valve	1
113	AR880831	O-Ring	1
114	AR550450	Ring nut	1
115	AR550460	Elbow	1
124	AR1040850	Ring	1
126	AR1400120	O-Ring	1
127	AR1343510	Bolt	3
128	AR881710	Washer	3
129	AR130492	Left valve	1
130	AR1800240	Dowel	1
131	AR1460490	Circlip	1
132	AR1800210	Flange “CJSP” version	1
133	AR180030	Bolt	8
134	AR1800230	Spacer	1
135	AR1800220	Flange “UC” vesion	1
136	AR1800190	“C/F” shaft	1
137	AR230320	Bearing	1
138	AR200150	Seal ring “CP’	1
139	AR1800120	Flange “c/F” version	1
140	AR180020	Air valve	1
141	AR1800270	Air chamber cover	1
142	AR1800310	Plate	1
143	AR650560	O-Ring	1
144	AR1800300	Semi air chamber	1
145	AR1800280	Air chamber tube	1
146	AR1800290	Air chamber connector	1

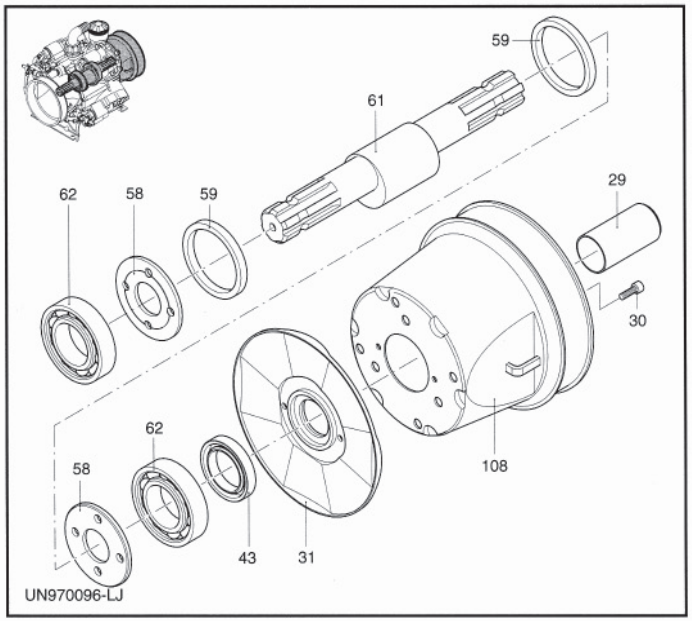
AR1254 Pump Assembly









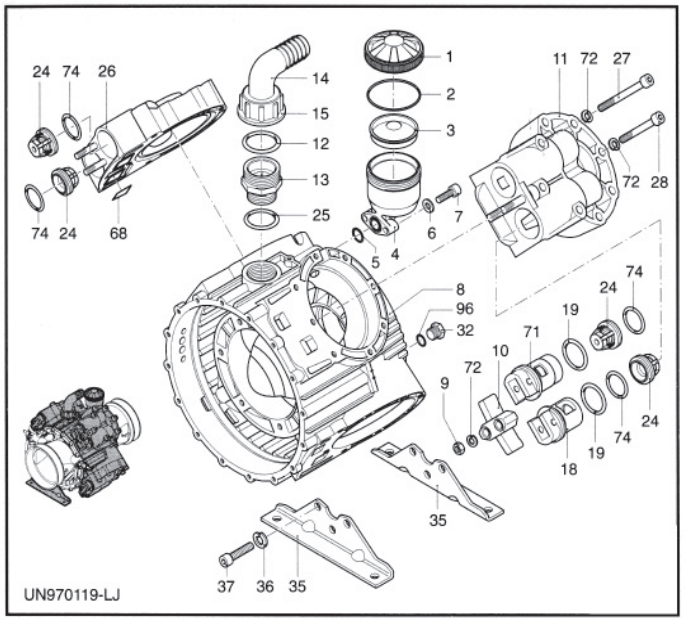


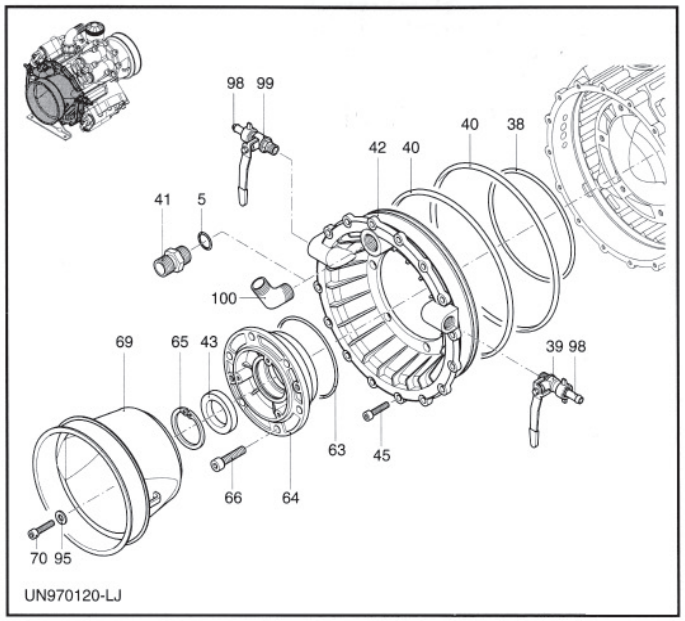
AR1254 Pump Assembly Parts List

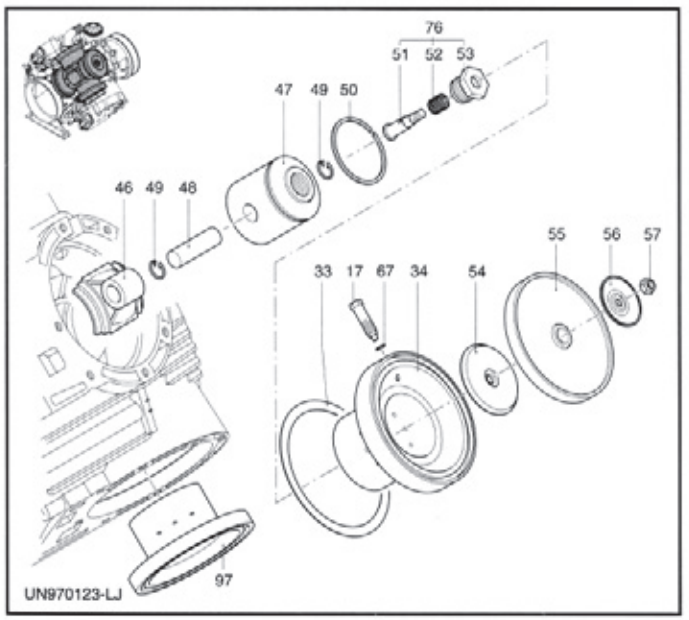
Pos	Part No	Description	Qty
1	750050	Red oil tank cap	1
2	1040060	O-Ring	1
3	680040	Oil breather	1
4	680030	Oil tank	1
5	390180	O-Ring	2
6	380241	Washer	3
7	680350	Bolt	2
8	900010	Pump body	1
9	180150	Nut	8
10	850271	Valve clamp	4
11	900103	Right head	2
12	250310	O-Ring	1
13	391920	Threaded adapter	1
14	540550	Elbow	1
15	540540	Ring nut	1
16	850370	Bolt	1
17	850190	Dowel	2
18	900180	Valve Cap	4
19	230060	O-Ring	8
24	909050	Complete valve	8
25	540360	O-Ring	1
26	900104	Left head	2
27	620870	Bolt	12
28	700020	Bolt	12
29	850920	Cardan protection	1
30	850930	Bolt	3
31	850910	Flange	1
32	880530	Plug	1
33	900220	Gasket	4
34	900112	Sleeve	2
35	900201	Base	2
36	250142	Washer	6
37	850330	Bolt	6
38	850300	O-Ring	1
39	130491	Right valve	1
40	900040	O-Ring	2
41	850740	Threaded adapter	1
42	900150	Manifold	1
43	160740	Seal ring	2
44	390311	Washer	3
45	320360	Bolt	16
46	900140	Connecting rod	4
47	850121	Piston	4
48	160700	Piston pm	4
49	160691	Pin ring	8
50	850240	Piston ring	4
51	850220	Diaphragm pin	4
52	850090	Spring	4

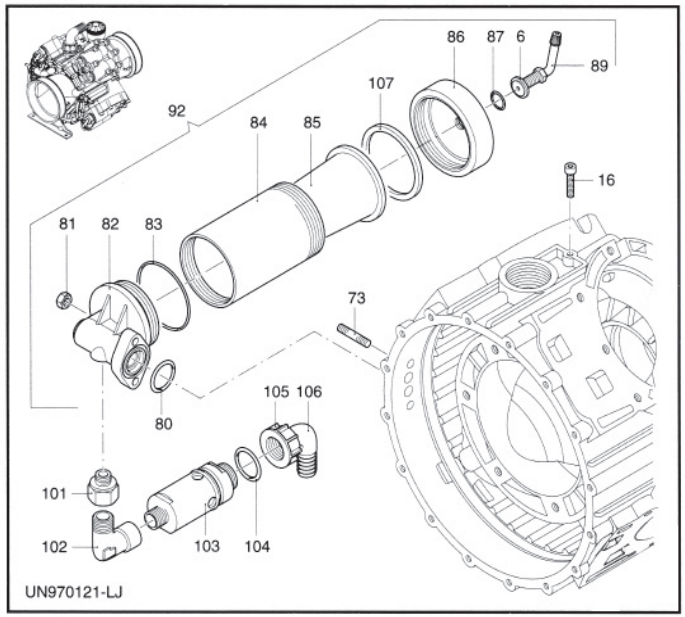
Pos	Part No	Description	Qty
53	850230	Bushing	4
54	650090	Plate	4
55	900080	Diaphragm	4
55	900081	Diaphragm	4
55	900085	Diaphragm	4
56	650390	Plate	4
57	160311	Nut	4
58	680160	Spacer plate	2
59	680130	Con rod ring	2
61	850170	Shaft	1
62	230350	Bearing	2
63	850290	O-Ring	1
64	900020	Support	1
65	200390	Circlip	1
66	540310	Bolt	6
67	851280	Washer	2
68	550350	O-Ring	8
69	1500470	Cardan protection	1
70	850250	Bolt	3
72	200231	Washer	32
74	320030	O-Ring	8
75	851250	Stud	2
76	859080	Complete bushing	4
77	900160	Valve cap	4
80	390290	O-Ring	1
81	380240	Nut	2
82	851210	Lower support	1
83	851270	O-Ring	1
84	851220	Air chamber tube	1
85	851230	Semi air chamber	1
86	851240	Air chamber cover	1
87	650542	Gasket	1
89	380440	Air valve	1
92	1526	Complete air chamber	1
93	900210	Elbow	2
96	740290	O-Ring	1
97	110130	Fitting ½" (G) & Hose 13mm	2
98	900110	Sleeve	2
99	130492	Left valve	1
100	851650	Elbow	1
101	881461	Adapter	1
102	881560	Elbow	1
103	1609002	Security valve	1
104	880831	O-Ring	1
105	550450	Ring nut	1
106	550460	Elbow	1
107	851610	Washer	1
108	900250	Cardan protection	1

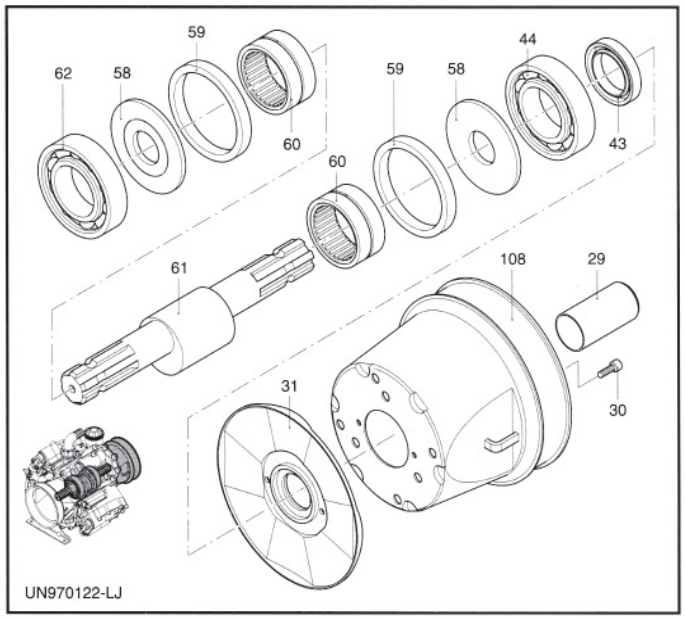
AR1554 Pump Assembly









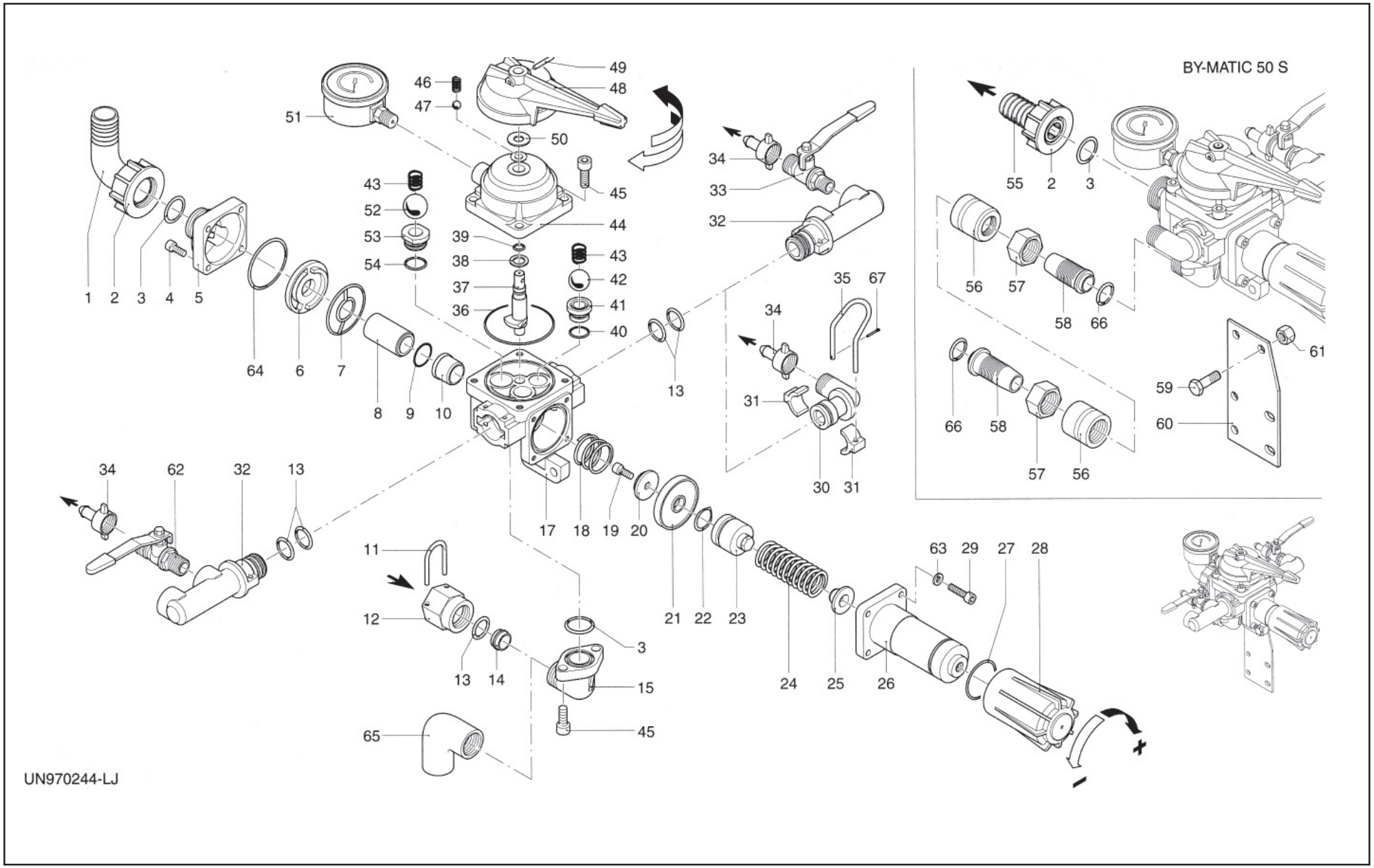


AR1554 Pump Assembly Parts List

Pos	Part No	Description	Qty
1	ar750050	Oil filler cap	1
2	ar580230	O-Ring 69.52x2.62	1
3	ar680040	Oil retaining diaphragm	1
4	ar680030	Oil filler sight glass	1
5	ar390180	O-Ring 18.72x2.62mm	2
6	ar380241	Washer 8.5x15x1.5mm	3
7	ar680350	Bolt M8x35	2
8	ar850010	Pump body	1
9	ar851300	Nut M10	8
10	ar850271	Valve clamp	4
11	ar850103	RH head	2
12	ar250310	O-Ring 36.14x2.62mm	1
13	ar391920	Nipple 1 1/4”M x 1 3/4”M	
14	ar540550	Elbow 40mm	1
15	ar540540	Fly nut	1
16	ar850370	Bolt M8x16	1
17	ar850190	Stud M10x40	2
18	ar850161	Valve cover	4
19	ar230060	O-Ring 34.52x3.53mm	8
24	ar909050	Valve complete	8
25	ar540360	O-Ring 44.12x2.62mm	1
26	ar900104	LH head	2
27	ar850260	Bolt M10x90	12
28	ar620870	Bolt M10x70	20
29	ar850920	Protector	1
30	ar850930	Bolt M6x12	3
31	ar850910	Flange	1
32	ar130171	Plug 3/4”	1
33	ar8502280	Seal	4
34	ar850112	Cylinder liner 66mm	2
35	ar850200	Pump mounting bracket	2
36	ar250142	Spring washer 12.5mm	6
37	ar850330	Bolt M12x30	6
38	ar850300	O-Ring 171x3.53mm	1
39	ar160141	RH valve	1
	ar160142	LH valve	1
40	ar850310	O-Ring 247.02x5.33mm	2
41	ar850740	Nipple 3/4”M-3/4”M	1
42	ar900150	Inlet & pressure manifold	1
43	ar230380	Oil seal 35x62x10mm	2
44	ar230350	Bearing 35x80x21mm 6307	1
45	ar320360	Bolt M8x22	16
46	ar850140	Conrod	4
47	ar850120	Piston 66mm	4
48	ar650071	Gudgeon pin 18x55mm	4
49	ar160691	Gudgeon pin circlip 18mm	8
50	ar260231	Piston Ring 66x3mm	4
51	ar850220	Diaphragm stud	4
52	ar850090	Spring	4
53	ar850230	Retaining bush	4
54	ar650090	Diaphragm base plate	4

Pos	Part No	Description	Qty
55	ar850080	Diaphragm - Rubber	4
	ar850085	Diaphragm - Desmopan	4
56	ar650390	Diaphragm return plate	4
57	ar160311	Nut M8	45
58	ar540040	Spacer ring	2
59	ar850130	Conrod ring	2
60	ar850320	Bearing NK 60/35	2
61	ar850170	Eccentric shaft C/C	1
62	ar160750	Bearing 35x100x25mm 6407	1
63	ar850290	O-Ring 117.07x3.53mm	1
64	ar900020	Retaining plate	1
65	ar200390	Circlip 62mm	1
66	ar540310	Bolt M10x40	6
67	ar851280	Washer 5.2mm	2
68	ar850030	Valve seal	8
69	ar540660	Protector (optional)	1
70	ar850250	Bolt M8x12	3
71	ar850181	Valve cover	4
72	ar200231	Spring washer 10.5mm	40
73	ar851250	Stud M8x40	2
74	ar680070	O-Ring 31.5x4.25mm	8
75	ar851250	Stud M8x40	2
76	ar859060	Diaphragm return assembly complete	4
77	ar900160	Valve cover	4
80	ar390290	O-Ring 29x3mm	1
81	ar380240	Nut M8	2
82	ar851210	Air chamber base	1
83	ar851270	O-Ring 65.09x3.53mm	1
84	ar851220	Air chamber	1
85	ar851230	Air diaphragm rubber	1
86	ar851240	Air chamber cap	1
87	ar650542	Seal	1
89	ar380440	Air valve	1
90	ar269050	Safety valve	1
91	ar851260	Safety valve flange	1
92	ar1526	Air chamber complete	1
95	ar390311	Washer 8.5x17x1.5mm	3
96	ar740290	O-Ring 14x1.78mm	1
97	ar850110	Cylinder liner 60mm	2
98	ar110130	Nut & hose tail	1
99	ar130492	Left valve	1
100	ar851650	Elbow	1
101	ar881461	Adapter	1
102	ar881560	Elbow	1
103	ar1609002	Safety valve	1
104	ar880831	O-Ring -viton	1
105	ar550450	Ring nut	1
106	ar550460	Elbow	1
107	ar851610	Washer	1
108	ar900250	Cardan Protection	1

Bymatic 50 Controller Assembly

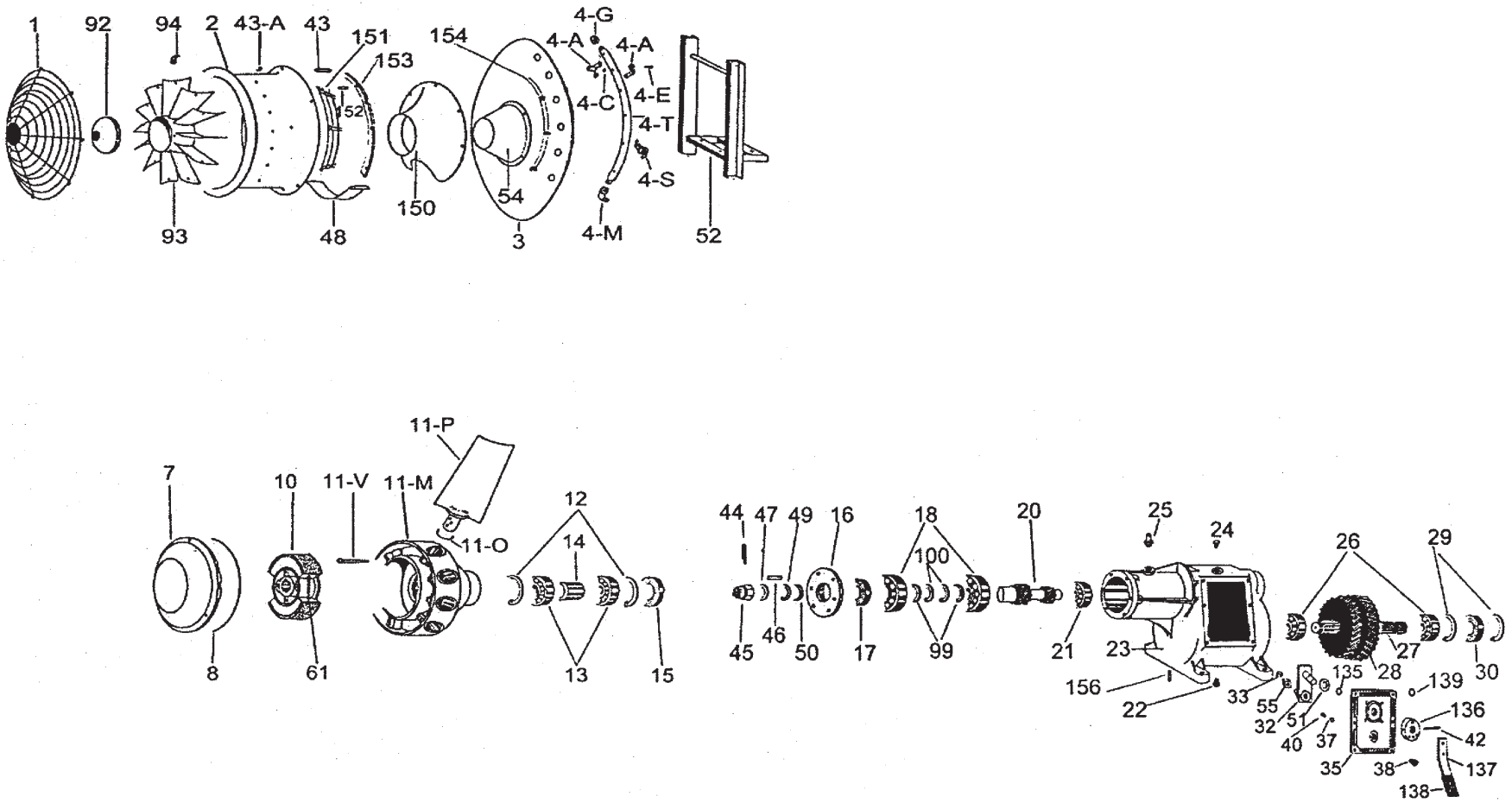


Bymatic 50 Controller Assembly Parts List

Pos	Part No	Description	Qty
1	AR550370	Elbow 25mm	1
2	AR550242	Fly nut 1”	1
3	AR550350	O-Ring 23.81x2.62mm	2
4	AR780060	Bolt M6x25	4
5	AR1150030	Bypass flange 1”	1
6	AR1150020	Seperating disc	1
7	AR1150040	Seal desmopan	1
8	AR1150050	Transfer tube	1
9	AR770590	O-Ring 21.95x1.78mm	1
10	AR1150060	Valve seat	1
11	AR850760	Retaining clip	1
12	AR850750	Outlet port adaptor	1
13	AR390180	O-Ring 18.72x2.62mm	5
14	AR850490	Olive joiner	1
15	AR850710	Outlet port	1
17	AR1150010	Main body	1
18	AR320420	Spring	1
19	AR680700	Bolt M6x20	1
20	AR1150070	Valve	1
21	AR1150131	Diaphragm - Rubber	1
	AR1150130	Diaphragm - Desmopan	1
22	AR660160	O-Ring 24.99x3.53mm	1
23	AR1150180	Piston	1
24	AR1150190	Pressure regulation spring	1
25	AR1150200	Main spring pressure block	1
26	AR1150170	Pressure adjustment housing	1
27	AR820490	O-Ring 34.65x1.78mm	1
28	AR1150210	Pressure adjustment knob	1
29	AR1040370	Bolt M6x22	4
30	AR1150140	Outlet manifold 1/2”M	2
31	AR1150150	Outlet clamp	4
32	AR1150160	2 outlet manifold	2
33	AR160142	LH valve	2
34	AR110130	Nut & hose tail 1/2”	4
35	AR1040690	Retaining clamp	2
36	AR1150250	O-Ring 65x2mm	1
37	AR1150120	Selecta shaft	1

Pos	Part No	Description	Qty
38	AR850720	Washer	1
39	AR390340	O-Ring 7.3x2.4mm	1
40	AR740290	O-Ring 14x1.78mm	2
41	AR850650	Pressure port seat	2
42	AR850660	Stainless steel ball 13/16”	2
43	AR850680	Spring	3
44	AR1150081	Top body cover	1
45	AR320360	Bolt M8x22	6
46	AR850830	Spring	1
47	AR621160	Stainless steel ball 5/16”	1
48	AR1150110	Roll pin 4x28mm	1
49	AR480520	Contol lever	1
50	AR391460	Washer	1
51	AR550545	Pressure gauge 63mm 0-80 bar	1
52	AR1150100	Stainless steel ball 15/16”	1
53	AR1150091	Bypass seat	1
54	AR880270	O-Ring 17.17x1.78mm	1
55	AR550210	Bypass hose tail 21mm	1
56	AR850770	Hose ferrule	2
57	AR850790	Nut 3/4”	2
58	AR850780	Hose barb 19x32mm	2
59	AR1880370	Bolt M8x25	2
60	AR850690	Mounting bracket	1
61	AR390270	Nut M8	2
62	AR160141	RH valve	2
63	AR550331	Washer 6.5x12.5x1.5mm	4
64	AR1150280	O-Ring 50.52x1.78mm	1
65	AR1150690	Elbow	1
66	AR960160	O-Ring 17.86 x2.62mm	2
67	AR1040950	Split Pin	2

920SV Fan Assembly

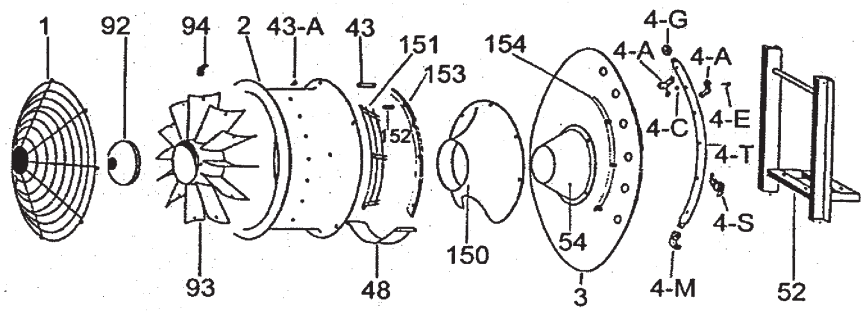


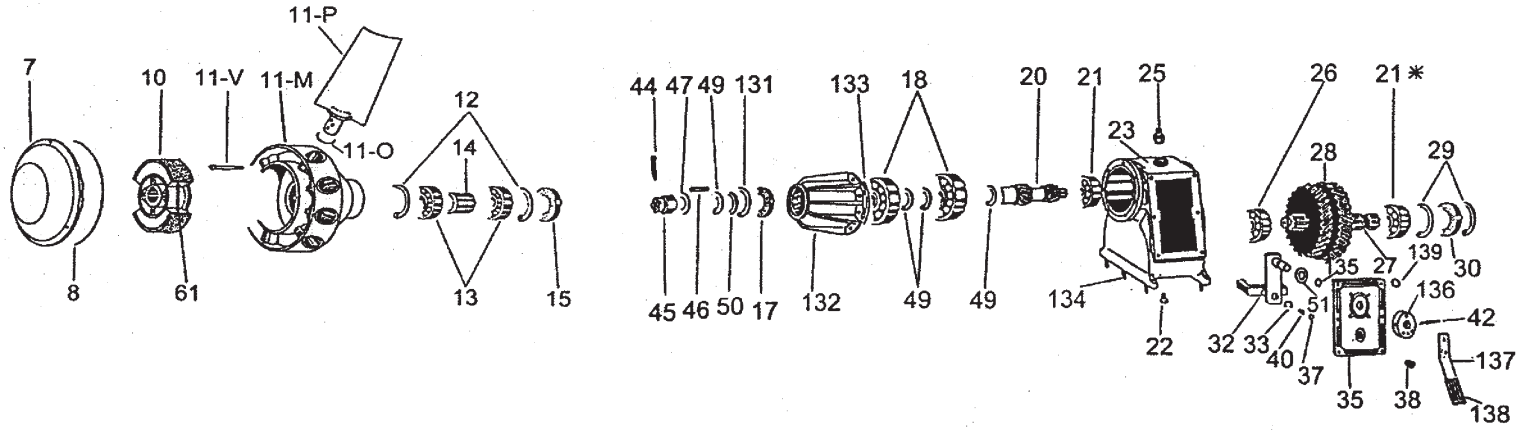
920SV Assembly Parts List

Pos	Part No	Description	Qty
1	FIRET0010	D.920 fan guard	
2	FICNV0022	D.920 ungalv. fan housing	
2	FICNV0023	D.920 galv fan housing	
3	FIPIA0014	Ungalvanised backplate	
3	FIPIA0015	Galvanised backplate	
4	FITUB0043	SS complete manifold 10 clamps	
4A	FIMOR0001	¼ F. gas clamp	
4C	FIOR00014	3030 Viton 'O' ring	
4E	FITCC0004	6x12 Bolt	
4G	FITAP0001	½ F. Gas cap	
4M	FICUR0001	½-1/2 Gas elbow	
4S	FISTA0001	Galvanised stirrups	
4T	FIENI4-920SV	SS Pipe 10 holes	
43	FIDIS0007	H.150 shaped spacer	
43A	FIRON0021	Shaped ring	
48	FIDVT0017	H.150 ungalv. deflector for turbo	
48	FIDVT0016	H.150 galv. Deflector for turbo	
52	FICAV0006	Ungalvanised frame	
52	FICAV0007	Galvanised frame	
54	FICON0003	Plastic cone	
92	FICAL0001	Strightening vanes cover	
93	FIRAD0007	Ungalv. straightening vanes	
93	FIRAD0008	Galvanised straightening vanes	
150	FICON0007	H.175 cut PST cone	
151	FIRET0025	RT./18 safety guard	
152	FIDIS0023	H.50 spacer	
153	FIANE0014	MD/01 ring for D.920	
154	FIRET0021	RT./16 safety guard	
	FIVEN0026	**D.920 complete fan 25,35,45***	
7	FIFUS0052	Fan cover	
8	FIOR00010	Fan 'O' ring	
11M	FIMOZ0001	Fan hub	
11P	FIFUS0040	D.920 fan blade	
11-0	FIOR00005	3137 'O' ring	
11V	FITCC0016	8x55 Bolt	
12	FISEG0014	1 80 Circlip	
13	FICUS0011	6208 2RS bearing	
14	FIDIS0014	D.40 spacer	
15	FIPAR0009	45x80x10 Seal	
10	FIENI10-920	Complete Clutch	
61	FI40000290	Spring for clutch	

Pos	Part No	Description	Qty
	FIMOLV2G001	**Complete Gearbox V2G 'A'**	
	FIMOLV2G002	**Complete Gearbox V2G 'B'**	
16	FIFUS0058	Round cover	
17	FIPAR0007	45x65x10 Seal	
18	FICUS0021	6309 Bearing	
20	FIPGN0003	High speed shaft T10-12	
20	FIPGN0004	Low speed shaft T11-13	
21	FICUS0022	6407 Bearing	
22	FITER0011	12x16 Bolt	
23	FIFUS0021	Gearbox casing	
24	FITAP0002	Oil loading cap	
25	FISFI0002	Oil breather	
26	FICUS0016	6307 Bearing	
27	FIPER0004	Splining pivot	
28	FICOR0021	Low speed gear T41-43 'A'	
28	FICOR0022	High speed gear T42-44 'B'	
29	FISEG0014	I 80 circlip	
30	FIPAR0004	35x80x12 Seal	
32	FILEV0011	Secondary lever	
33	FISEG0001	E 10 Circlip	
35	FIFUS0054	Rectangular cover	
37	FISFE0002	Sphere	
38	FI60000850	½ Oil level	
40	FIMLL0004	Spring	
42	FISPI0005	6x45 Plug	
44	FICOP0002	5x40 Pin	
45	FIDAD0008	24MB nut	
46	FICHI0001	10x8x40 Small key	
47	FIRON0005	24x44x4 Washer	
49	FISEG0005	E 40 circlip	
50	FIDIS0022	48x40x5/2 Ring	
51	FIRON0002	18x30x3 Washer	
55	FICUB0001	Tempered cube	
99	FIDIS0020	45x55x2 Ring	
100	FISEG0007	E 45 Circlip	
135	FIOR00002	2056 'O' ring	
136	FIPOR0002	Lever holder	
137	FILEV0001	Lever	
138	FIMAN0002	Handgrip	
139	FIOR00001	OR 117 for lever	
156	FIPRI00010	12x25 Stud	

820SV Fan Assembly



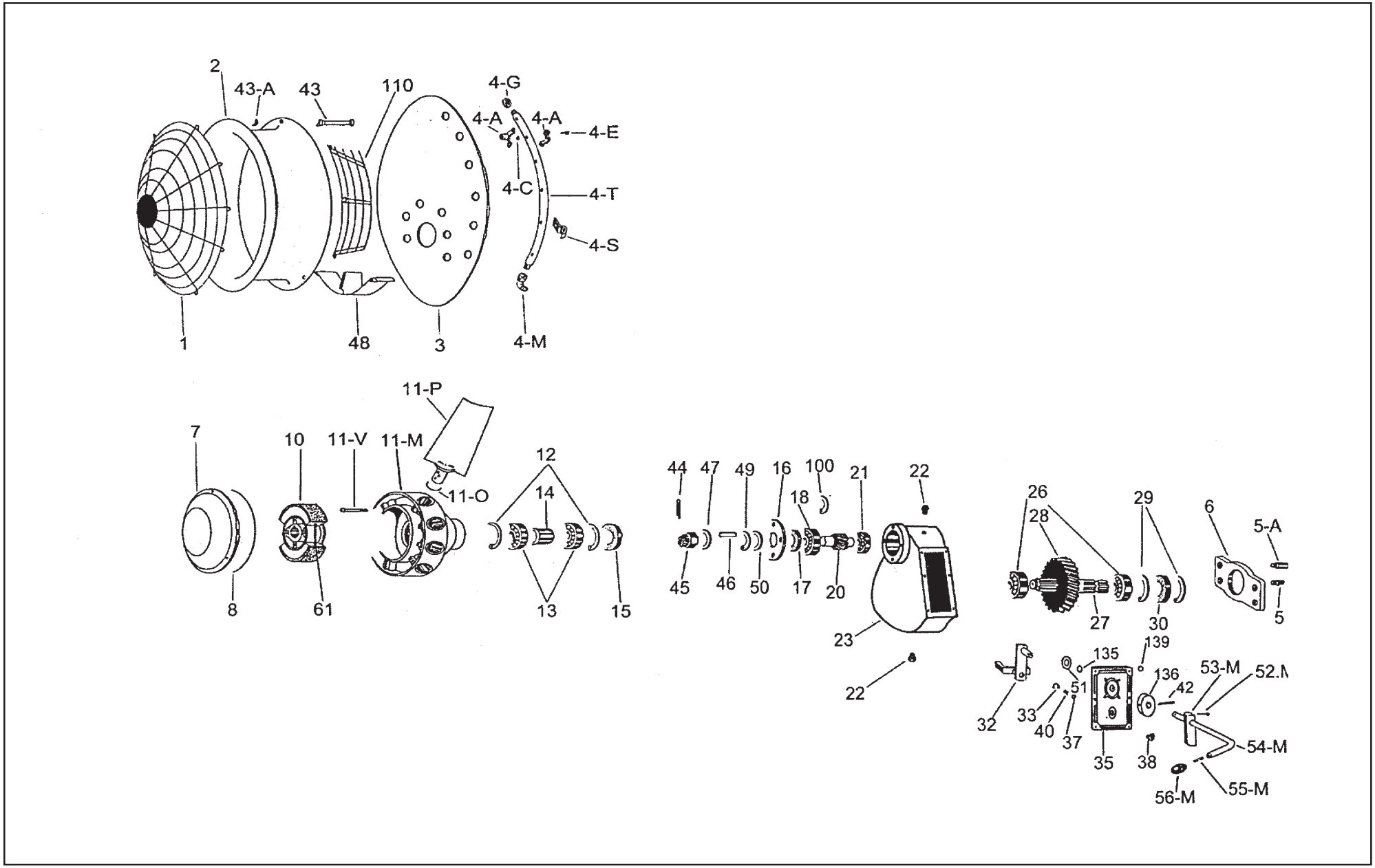


820SV Assembly Parts List

Pos	Part No	Description	Qty
1	FIRET0010	D.820 fan guard	
2	FICNV0017	D.820 ungalv. fan housing	
2	FICNV0018	D.820 galv fan housing	
3	FIPIA0012	Ungalvanised backplate	
3	FIPIA0013	Galvanised backplate	
4	FITUB0042	SS complete manifold 7 clamps	
4A	FIMOR0001	¼ F. gas clamp	
4C	FIOR00014	3030 Viton 'O' ring	
4E	FITCC0004	6x12 Bolt	
4G	FITAP0001	½ F. Gas cap	
4M	FICUR0001	½-½ Gas elbow	
4S	FISTA0001	Galvanised stirrups	
4T	FIENI4-920SV	SS Pipe at 7 holes	
43	FIDIS0007	H.150 shaped spacer	
43A	FIRON0021	Shaped ring	
48	FIDVT0017	Ungalvanised deflector	
48	FIDVT0016	Galvanised deflector	
52	FI CAV0004	Ungalvanised frame	
52	FICAV0005	Galvanised frame	
150	FICON0007	PST cutted cone H.175	
54	FICON0003	Plastic cone	
92	FICAL0001	Straightening vanes cover	
93	FIRAD0005	Ungalv. straightening vanes	
93	FIRAD0006	Galvanised straightening vanes	
94	FISQU0001	Stirrups for straightening vanes	
151	FIRET00022	RT./17 820 safety guard	
154	FIRET00021	RT./16 820 safety guard	
152	FIDIS00023	H.50 spacer	
153	FIANE0008	MD/01 ring for 820 turbo	
	FIVEN0022	**D.820 complete fan 25,35,45* complete fan**	
7	FIFUS0052	Fan cover	
8	FIOR00010	Fan 'O' ring	
11M	FIMOZ0001	Fan hub	
11P	FIFUS0039	D.820 fan blade	
11*	FIOR00005	3137 'O' ring	
11V	FITCC0016	8x55 Bolt	
12	FISEG0014	I 80 Circlip	
13	FICUS0011	6208 2RS bearing	
14	FIDIS0014	D.40 spacer	
15	FIPAR0009	45x80x10 Seal	
10	FIENI10-920	Complete Clutch	

Pos	Part No	Description	Qty
61	FI40000290	Spring for clutch	
	FIMOLCM9042	**Complete Gearbox CM9PG'A'**	
	FIMOLCM9043	**Complete Gearbox CM9PG 'B'**	
17	FIPAR0007	45x65x10 Seal	
18	FICUS0013	6209 Bearing	
20	FIPGN0015	High speed shaft T10-12	
20	FIPGN0016	Low speed shaft T11-13	
21	FICUS0016	6307 Bearing	
22	FITER0011	12x16 Bolt	
23	FIFUS0023	Gearbox casing	
24	FITAP0002	Oil loading cap	
25	FISFI0002	Oil breather	
26	FICUS0009	6207 Bearing	
27	FIPER0009	Splining pivot 400/33	
28	FICOR0023	Low speed gear T41-43 'A'	
28	FICOR0024	High speed gear T42-44 'B'	
29	FISEG0013	I 80 circlip	
30	FIPAR0002	35x72x10 Seal	
32	FILEV0012	Accessory lever	
33	FISEG0003	E 18 Circlip	
35	FIFUS0053	Rectangular cover	
37	FISFE0001	Sphere	
38	FI60000850	½ Oil level	
40	FIMLL0002	Spring	
42	FISPI0005	6x45 Plug	
44	FICOP0002	5x40 Pin	
45	FIDAD0008	24MB nut	
46	FICHI0001	10x8x40 Small key	
47	FIRON0005	24x44x4 Washer	
49	FISEG0007	E 45 circlip	
51	FIRON0002	18x30x3 Washer	
131	FISEG00012	I 65 Circlip	
132	FIFUS00026	CM9 extension	
133	FIOR00004	OR 2400	
134	FIPRI0003	10x25 Stud	
135	FIOR00002	2056 'O' ring	
136	FIPOR0002	Lever holder	
137	FILEV0001	Lever	
138	FIMAN0002	Handgrip	
139	FIOR00001	OR 117 for lever	

820 Std Fan Assembly

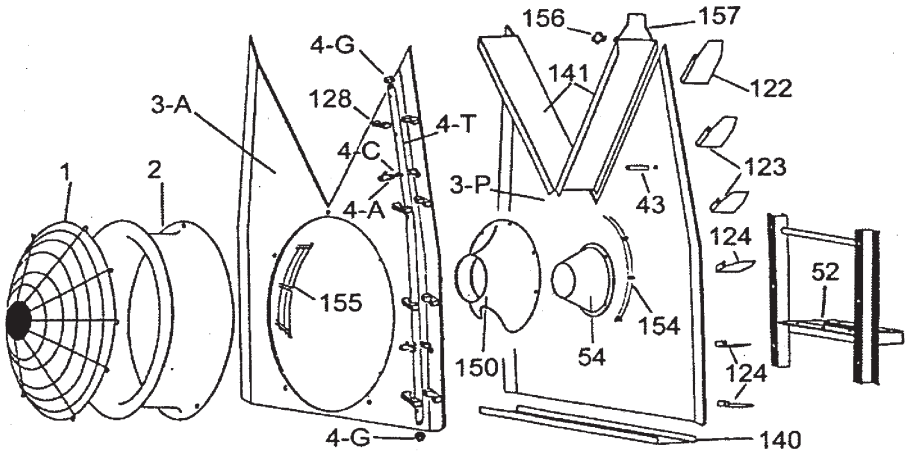


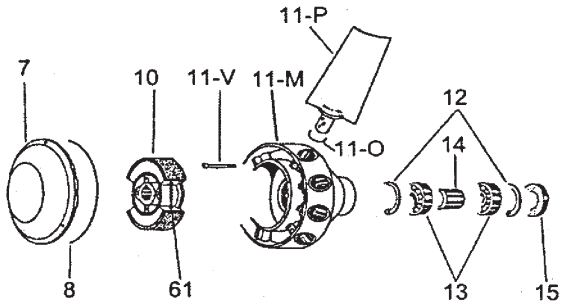
820 Std Assembly Parts List

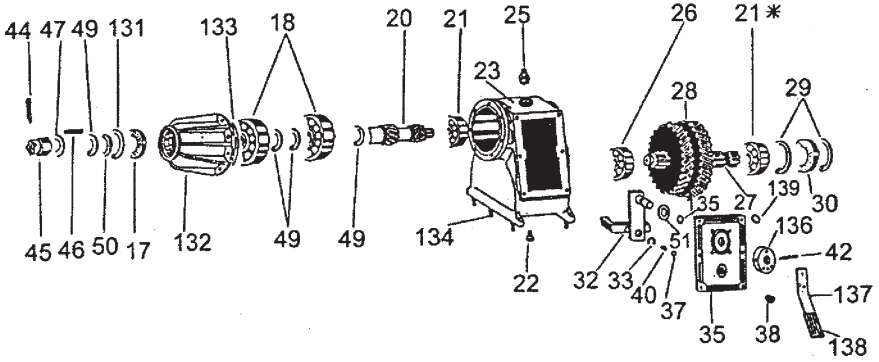
Pos	Part No	Description	Qty
1	FIRET0008	D.820 fan guard	
2	FICNV0015	D.820 ungalv. fan housing	
2	FICNV0016	D.820 galv fan housing	
3	FIPIA0012	Ungalvanised backplate	
3	FIPIA0013	Galvanised backplate	
4	FITUB0042	SS complete manifold 10 clamps	
4A	FIMOR0001	¼ F. gas clamp	
4C	FIOR00014	3030 Viton 'O' ring	
4E	FITCC0004	6x12 Bolt	
4G	FITAP0001	½ F. Gas cap	
4M	FICUR0001	½-1/2 Gas elbow	
4S	FISTA0001	Galvanised stirrups	
4T	FITUB0003	SS Pipe 10 holes	
43	FIDIS0007	H.150 shaped spacer	
43A	FIRON0021	Shaped ring	
48	FIDVT0007	Ungalv. deflector for turbo	
48	FIDVT0008	Galv. Deflector for turbo	
110	FIRET0016	D.820 Safety guard	
	FIVEN0026	**D.820 complete fan 25,35,45***	
7	FIFUS0052	Fan cover	
8	FIOR00010	Fan 'O' ring	
11M	FIMOZ0003	Fan hub	
11P	FIFUS0039	D.820 fan blade	
11-0	FIOR00005	3137 'O' ring	
11V	FITCC0016	8x55 Bolt	
12	FISEG0014	1 80 Circlip	
13	FICUS0018	6207 2RS bearing	
14	FIDIS0015	D.35 spacer	
15	FIPAR0009	45x80x10 Seal	
10	FIFRI0003	Complete Clutch	
61	FIMLL0003	Spring for clutch	

Pos	Part No	Description	Qty
	FIMOLV10063	**One Speed Heavy Gearbox**	
5	FIPRI0005	12x22 stud	
5A	FIPRI0007	12x53 stud	
6	FIFUS0008	Flange	
16	FIFUS0059	Round cover	
17	FIPAR00096	45x62x7 Seal	
18	FICUS0021	62208 Bearing	
20	FIPGN0009	400/26 shaft	
21	FICUS0003	30305 Bearing	
22	FITER0011	12x16 Bolt	
23	FIFUS0001	Gearbox casing	
26	FICUS0009	6207 Bearing	
27	FIPER0003	Splining pivot	
28	FICOR0020	400/28 V1P gear	
29	FISEG0013	I 72 circlip	
30	FIPAR0002	35x72x10 Seal	
32	FIFOR0008	Accessory lever V1/V1P	
33	FISEG0003	E 18 Circlip	
35	FIFUS0120	Rectangular cover/1997	
37	FISFE0001	Sphere 19/32	
38	FILIV0001	½ Oil level	
40	FIMLL0002	Spring	
42	FISPI0005	6x45 Plug	
44	FICOP0002	5x40 Pin	
45	FIDAD0008	24MB nut	
46	FICHI0003	8x7x40 Small key	
47	FIRON0005	24x44x4 Washer	
49	FISEG0004	E 35 circlip	
50	FIDIS0021	42x35x5/2 Ring	
51	FIRON0002	18x30x3 Washer	
52M	FITER0021	8x16 bolt	
53M	FISUP0003	Lever support	
54M	FILEV0006	Lever	
55M	FIPRI0002	8x16 stud	
56M	FIMAN0001	Handgrip	
135	FIOR00002	2056 'O' ring	
136	FIPOR0004	Lever holder	
139	FIOR00001	OR 117 for lever	
100	FISEG0005	E 40 circlip	

820 Linear Tower Fan Assembly





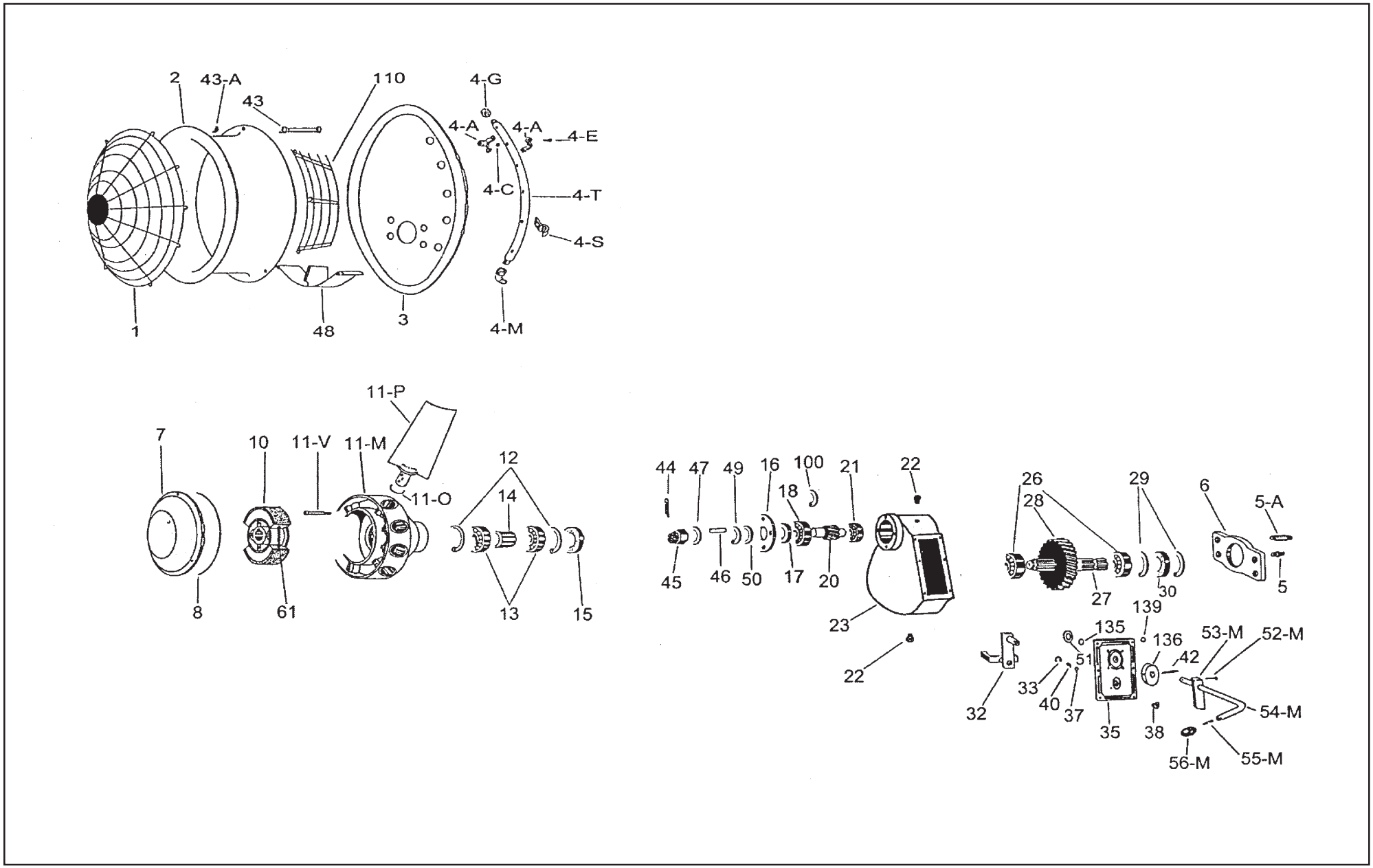


820 Linear Tower Assembly Parts List

Pos	Part No	Description	Qty
1	FIRET0008	D.820 fan guard	
2	FICNV0015	D.820 ungalv. fan housing H.250	
2	FICNV0016	D.820 galv fan housing H.250	
2	FICNV0017	D.820 ungalv. fan housing H.320	
3A	FIPIA0026	Galvanised backplate 20/10	
3P	FIPIA0038	Galvanised backplate 40/10	
4	FITUB0031DX	SS complete manifold right	
4	FITUB0031SX	SS complete manifold left	
4A	FIMOR0001	¼ F. gas clamp	
4C	FIOR00014	3030 Viton 'O' ring	
4E	FITCC0004	6x12 Bolt	
4G	FITAP0001	½ F. Gas cap	
4T	FITUB00004 DX	SS Pipe at 7 holes right L 1400	
4T	FITUB00004 SX	SS Pipe at 7 holes left L 1400	
43	FIDIS0010	3/8 spacer	
52	FICAV0004	Ungalvanised frame	
52	FICAV0005	Galvanised frame	
54	FICON0003	Plastic cone	
155	FIRET00022	RT/17 820 safety guard	
154	FIRET00021	RT/16 820 safety guard	
122	FIBAN0018	SS deflector BN/14	
123	FIBAN0017	SS deflector BN/13	
124	FIBAN0016	SS deflector BN/12	
128	FICOL0001	D.22 clamp	
144	FIBAN0020	SS deflector BN/18	
141	FIBAN0019	SS deflector BN/19	
157	FIBAN00036	SS deflector BN/28	
156	FIMAN0003	Handgrip 1015/F	
	FIVEN0022	**D.820 complete fan 25,35,45***	
7	FIFUS0052	Fan cover	
8	FIOR00010	Fan 'O' ring	
11M	FIMOZ0001	Fan hub	
11P	FIFUS0039	D.820 fan blade	
11-0	FIOR00005	3137 'O' ring	
11V	FITCC0016	8x55 Bolt	
12	FISEG0014	I 80 Circlip	
13	FICUS0011	6208 2RS bearing	
14	FIDIS0014	D.40 spacer	
15	FIPAR0009	45x80x10 Seal	
10	FIFRI0004	Complete Clutch	
61	FIMLL0003	Spring for clutch	

Pos	Part No	Description	Qty
	FIMOLCM9042	**Complete Gearbox CM9PG 'A'**	
	FIMOLCM9043	**Complete Gearbox CM9PG 'B'**	
17	FIPAR0007	45x65x10 Seal	
18	FICUS0013	6209 Bearing	
20	FIPGN0015	High speed shaft T10-12	
20	FIPGN0016	Low speed shaft T11-13	
21	FICUS0016	6307 Bearing	
22	FITER0011	12x16 Bolt	
23	FIFUS0023	Gearbox casing	
25	FISFI0002	Oil breather	
26	FICUS0009	6207 Bearing	
27	FIPER0009	Splining pivot 400/33	
28	FICOR0023	Low speed gear T41-43 'A'	
28	FICOR0024	High speed gear T42-44 'B'	
29	FISEG0013	I 72 circlip	
30	FIPAR0002	35x72x10 Seal	
32	FILEV0012	Secondary lever	
33	FISEG0003	E 18 Circlip	
35	FIFUS0053	Rectangular cover	
37	FISFE0001	Sphere	
38	FILIV0001	½ Oil level	
40	FIMLL0002	Spring	
42	FISPI0005	6x45 Plug	
44	FICOP0002	5x40 Pin	
45	FIDAD0008	24MB nut	
46	FICHI0001	10x8x40 Small key	
47	FIRON0005	24x44x4 Washer	
49	FISEG0007	E 45 circlip	
51	FIRON0002	18x30x3 Washer	
131	FISEG00012	I 65 Circlip	
132	FIFUS00026	CM9 extension	
133	FIOR00004	OR 2400	
134	FIPRI0003	10x25 Stud	
135	FIOR00002	2056 'O' ring	
136	FIPOR0002	Lever holder	
137	FILEV0001	Lever	
138	FIMAN0002	Handgrip	
139	FIOR0001	OR 117 for lever	

620 Std Fan Assembly



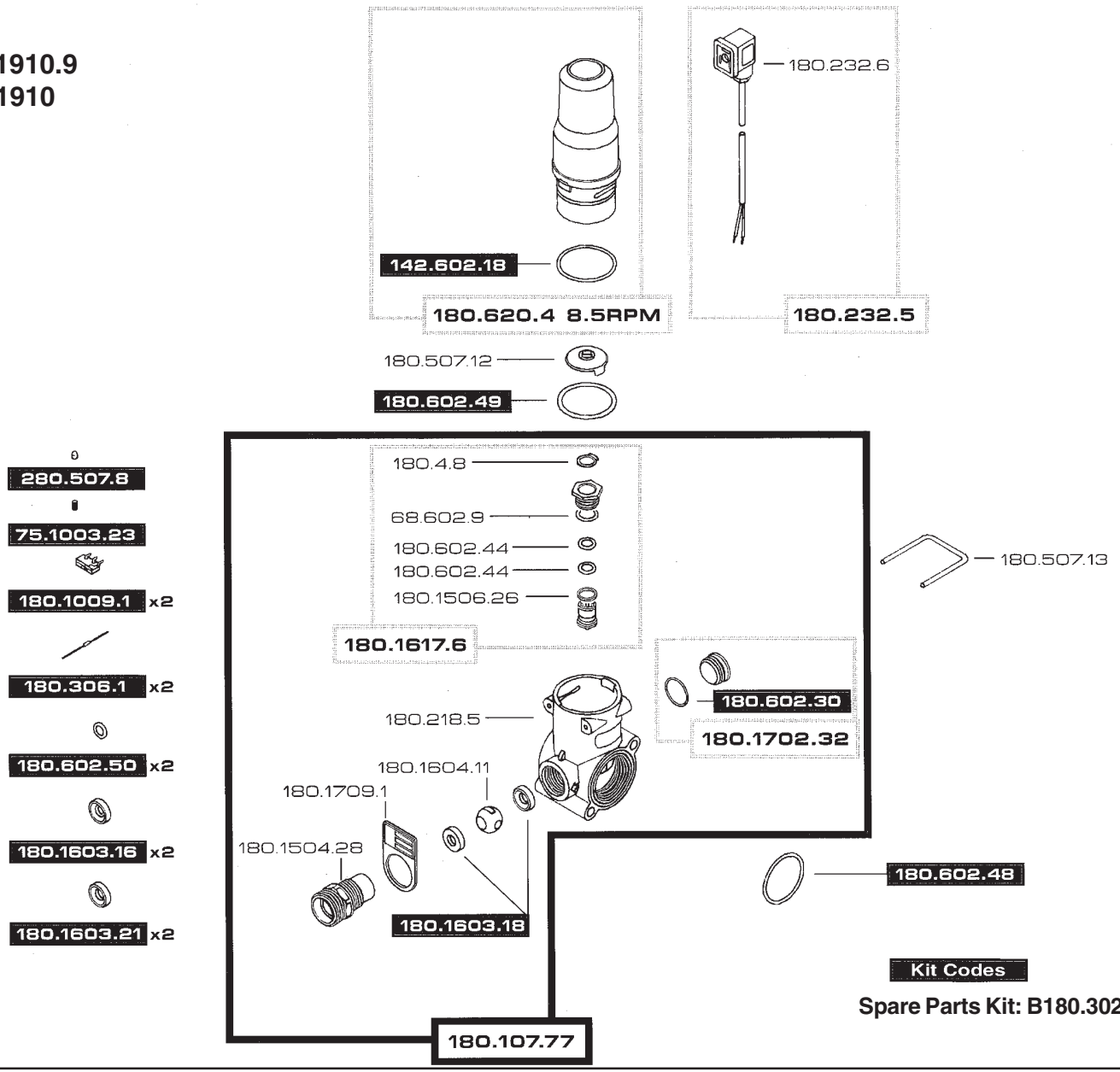
620 Std Assembly Parts List

Pos	Part No	Description	Qty
1	FIRET0003	D.620 fan guard	
2	FICNV0005	D.620 ungalv. fan housing	
2	FICNV0006	D.620 galv fan housing	
3	FIPIA0003	Ungalvanised backplate	
3	FIPIA0004	Galvanised backplate	
4	FITUB0040	SS complete manifold 10 clamps	
4A	FIMOR0001	¼ F. gas clamp	
4C	FIOR00014	3030 Viton 'O' ring	
4E	FITCC0004	6x12 Bolt	
4G	FITAP0001	½ F. Gas cap	
4M	FICUR0001	½-1/2 Gas elbow	
4S	FISTA0001	Galvanised stirrups	
4T	FITUB0001	SS Pipe at 5 holes	
43	FIDIS0010	H.120 3/8 spacer	
48	FIDVT0013	Ungalv. deflector for turbo	
48	FIDVT0014	Galv. Deflector for turbo	
110	FIRET0014	D.620 Safety guard	
	FIVEN00010	**D.620 complete fan 25,35,45***	
7	FIFUS0052	Fan cover	
8	FIOR00009	Fan 'O' ring	
11M	FIMOZ0002	Fan hub	
11P	FIFUS0037	D.620 fan blade	
11-0	FIOR00005	3137 'O' ring	
11V	FITCC0016	8x55 Bolt	
12	FISEG0011	1 62 Circlip	
13	FICUS0007	6007 2RS bearing	
14	FIDIS0015	D.35 spacer	
15	FIPAR0005	40x62x7 Seal	
10	FIFRI0002	Complete Clutch	
61	FIMLL0003	Spring for clutch	

Pos	Part No	Description	Qty
	FIMOLV10063	**One Speed Heavy Gearbox**	
5	FIPRI0005	12x22 stud	
5A	FIPRI0007	12x53 stud	
6	FIFUS0008	Flange	
16	FIFUS0016	Round cover	
17	FIPAR0005	40x62x7 Seal	
18	FICUS0001	30304 Bearing	
20	FIPGN0008	400/23 shaft	
21	FICUS0002	30304 Bearing	
22	FITER0011	12x16 Bolt	
23	FIFUS0022	Gearbox casing	
26	FICUS0009	6207 Bearing	
27	FIPER0003	Splining pivot	
28	FICOR0018	400/28 V1P gear	
29	FISEG0013	I 72 circlip	
30	FIPAR0002	35x72x10 Seal	
32	FIFOR0008	Accessory lever V1/V1P	
33	FISEG0003	E 18 Circlip	
35	FIFUS0119	Rectangular cover/1997	
37	FISFE0001	Sphere 19/32	
38	FILIV0001	½ Oil level	
40	FIMLL0002	Spring	
42	FISPI0005	6x45 Plug	
44	FICOP0002	5x40 Pin	
45	FIDAD0008	24MB nut	
46	FICHI0003	8x7x40 Small key	
47	FIRON0005	24x44x4 Washer	
49	FISEG0004	E 35 circlip	
50	FIDIS0021	42x35x5/2 Ring	
51	FIRON0002	18x30x3 Washer	
52M	FITER0021	8x16 bolt	
53M	FISUP0003	Lever support	
54M	FILEV0003	Lever	
55M	FIPRI0002	8x16 stud	
56M	FIMAN0001	Handgrip	
135	FIOR00002	2056 'O' ring	
136	FIPOR0004	Lever holder	
139	FIOR00001	OR 117 for lever	
100	FISEG0005	E 40 circlip	

Main On/Off (Dump) Valve

25 Bar - Part No B180.1910.9
40 Bar - Part No B180.1910

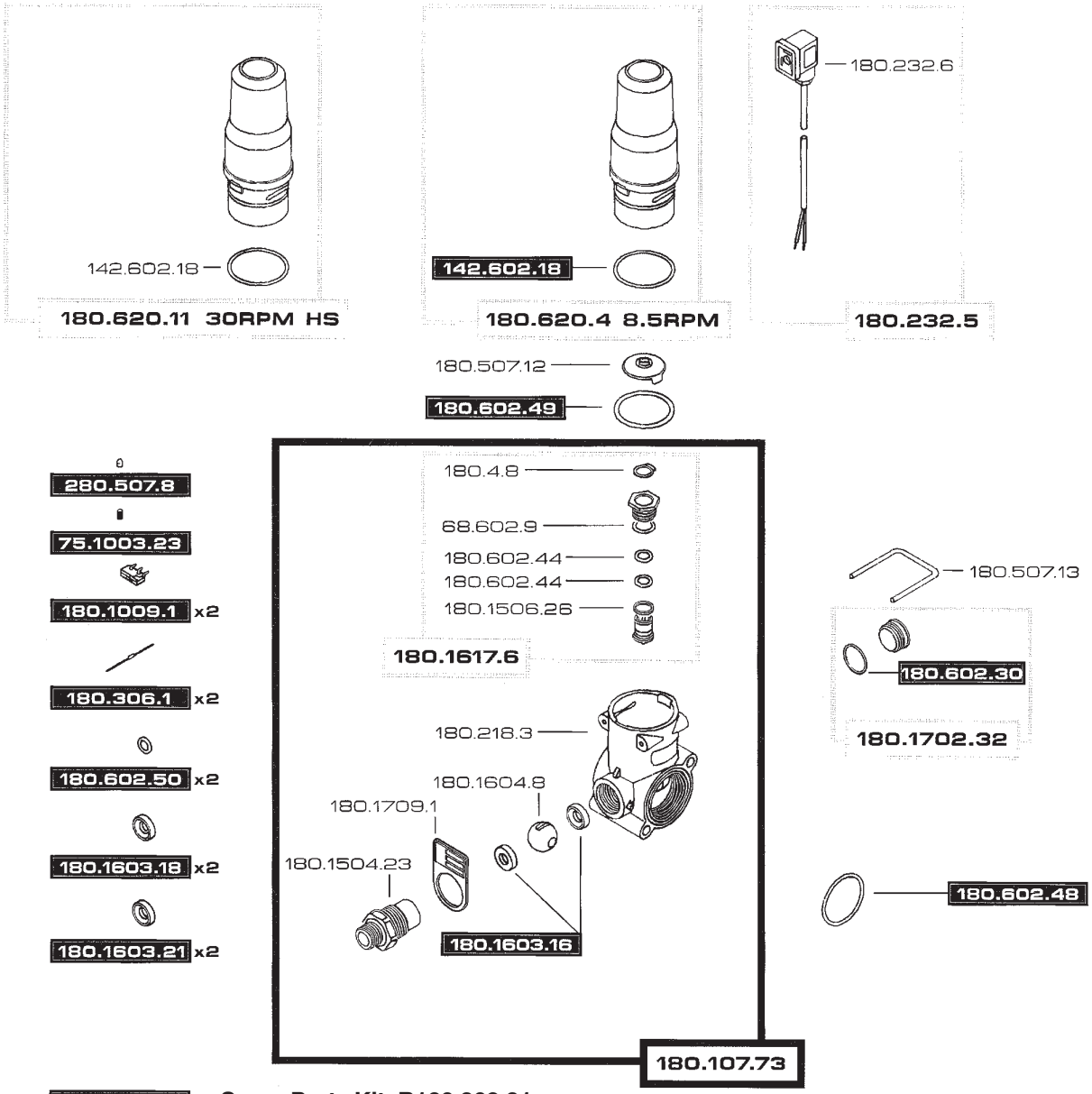


Kit Codes

Spare Parts Kit: B180.302.31

Boom On/Off Valve

25 Bar - Part No B180.1910.19
40 Bar - Part No B180.1910.6



Kit Codes **Spare Parts Kit: B180.302.31**

Pressure Regulating Valve

25 Bar - Part No B180.1910.10 (25 sec)

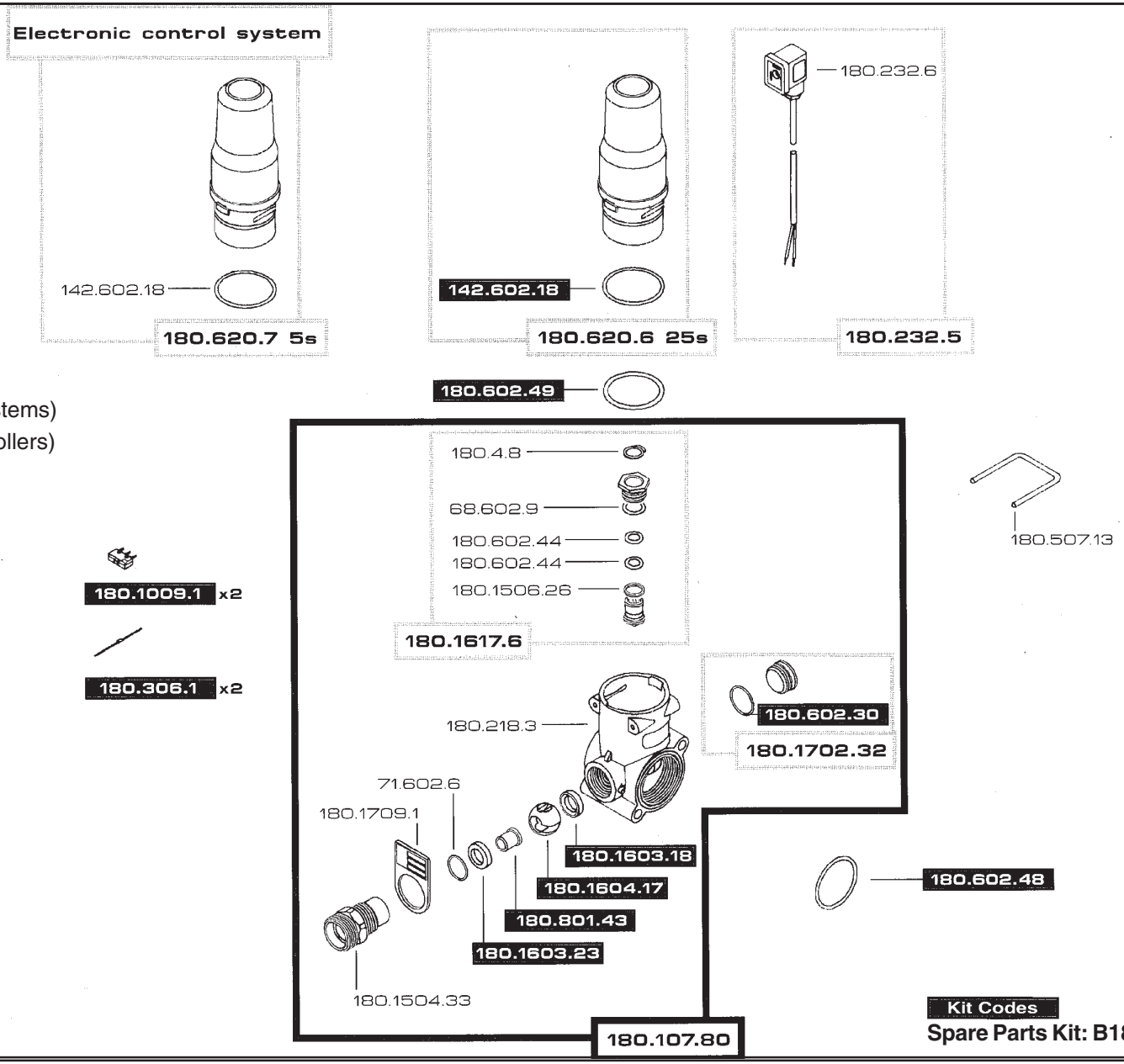
25 Bar - Part No B180.1910.13 (13 sec)

40 Bar - Part No B180.1910.15 (25 sec)

40 Bar - Part No B180.1910.14 (5 sec)

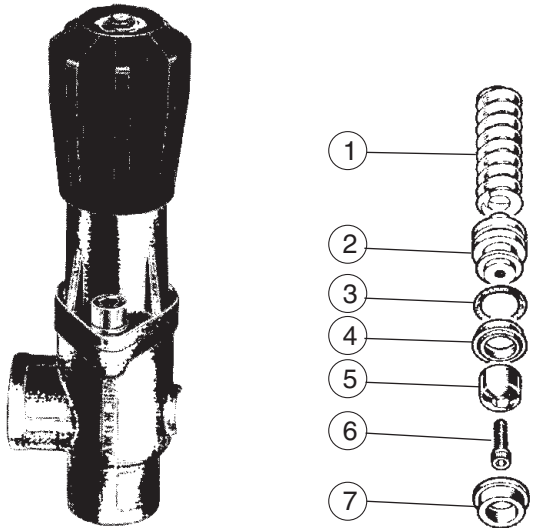
(25 seconds for basic electrical systems)

(5 seconds for automatic rate controllers)



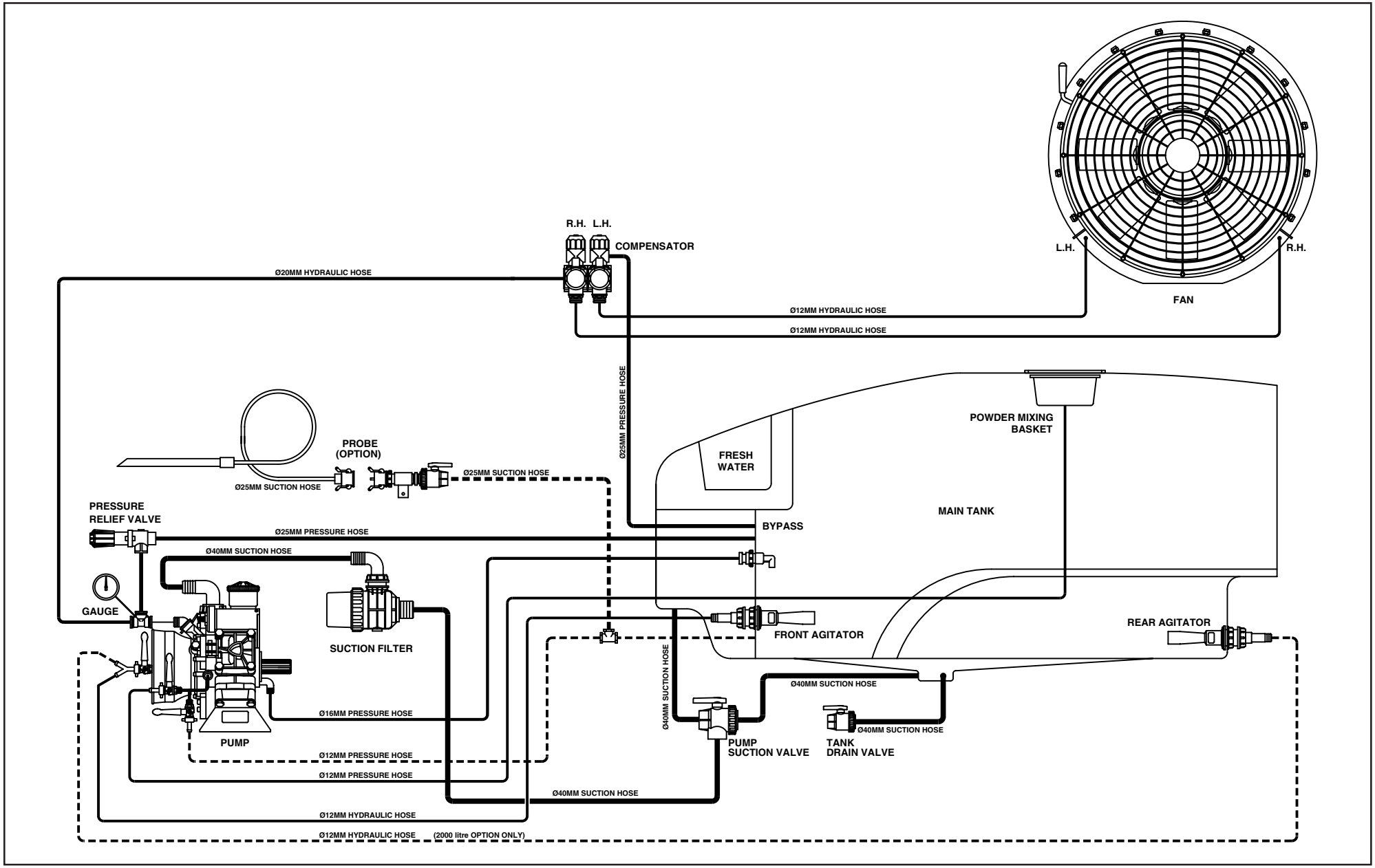
Pressure Relief Valve

Part No B410.1510.2

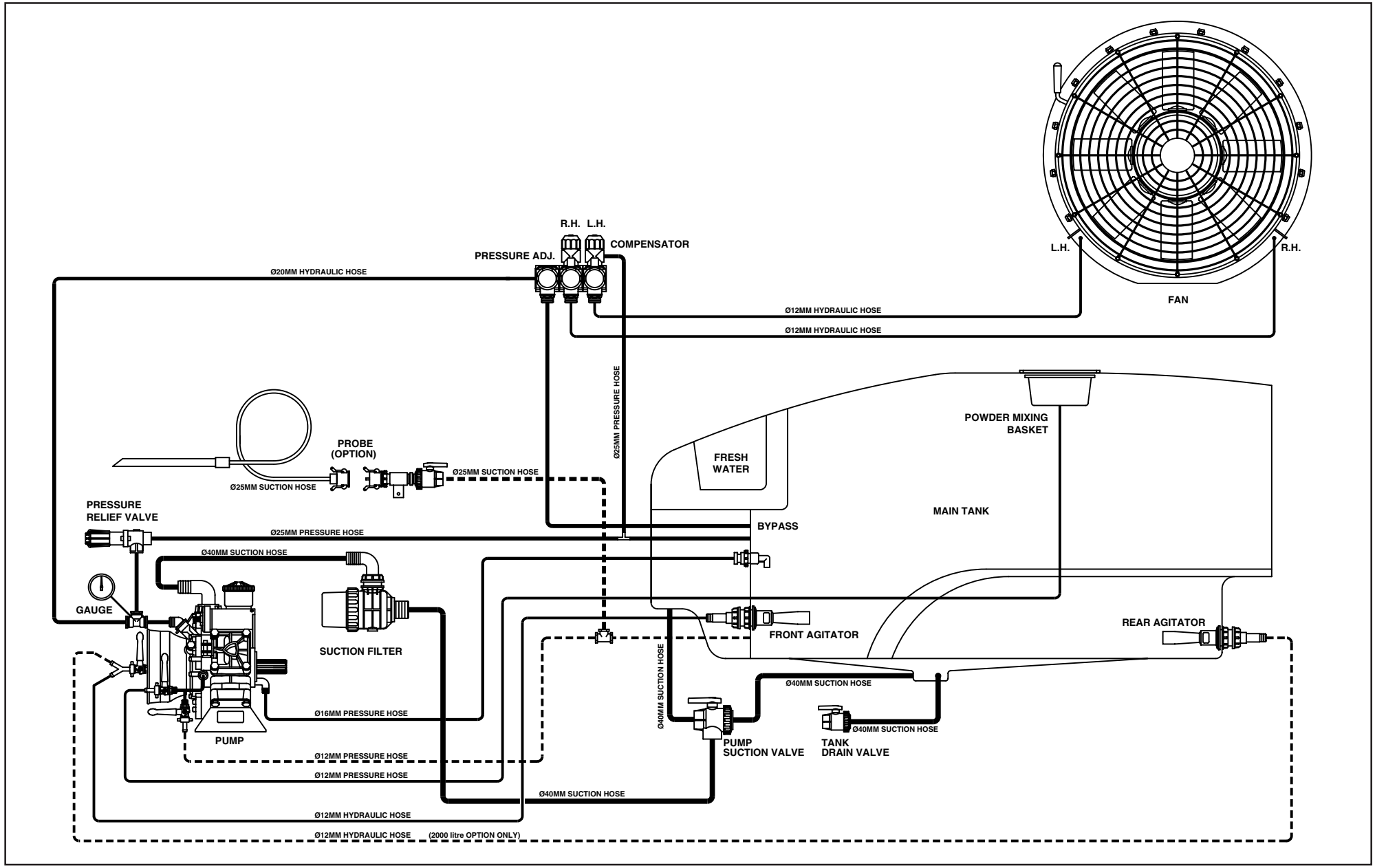


Parts List		
Pos	Part No	Qty
1	B170.1003.10	1
2	B170.1609.1	1
3	B170.602.25	1
4	B170.601.23	1
5	B170.202.7	1
6	B170.1902.17	1
7	B170.1603.1	1

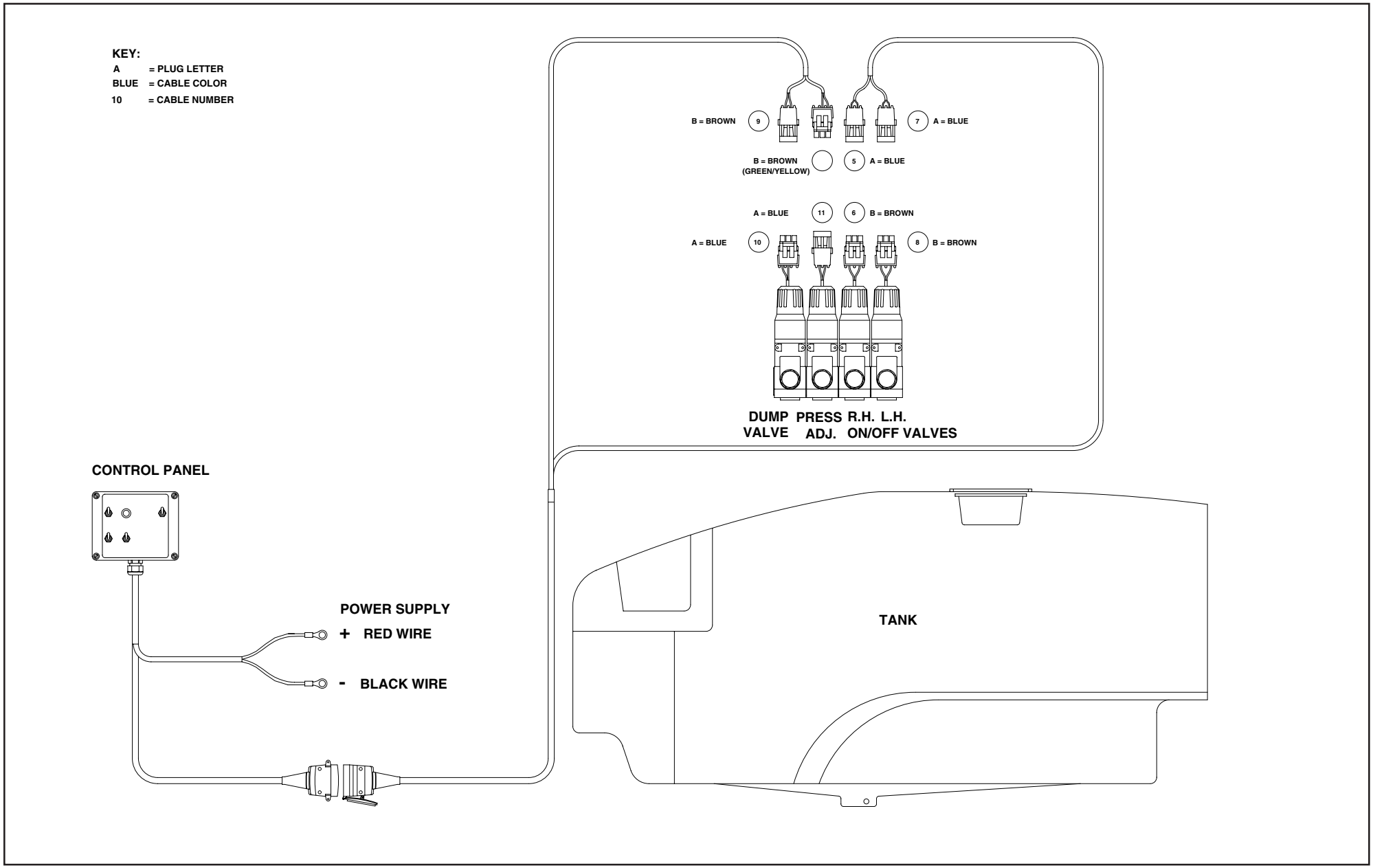
Plumbing Diagram - Electric Controller HT-IE4020



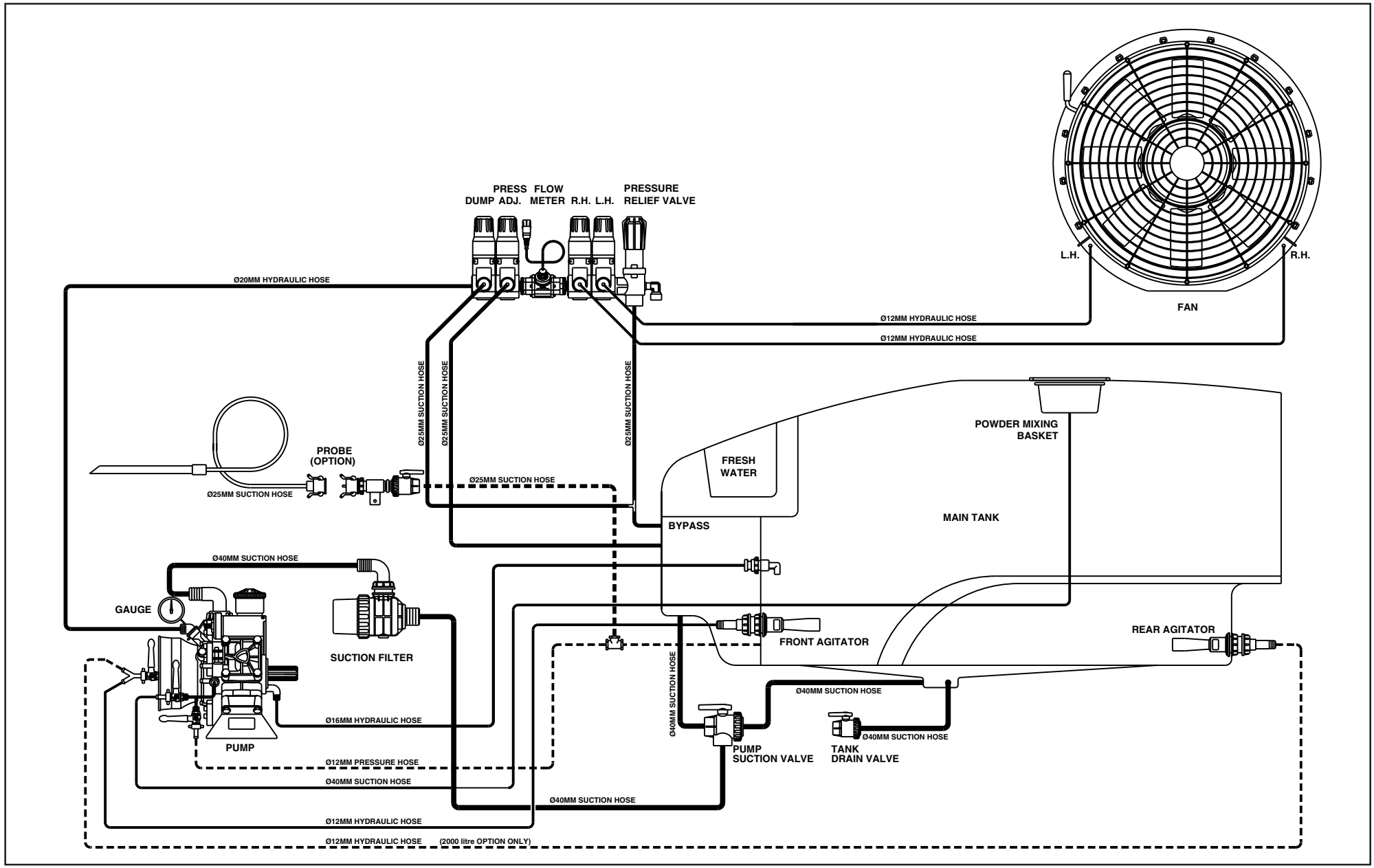
Plumbing Diagram - Electric Controller HT-IE4021



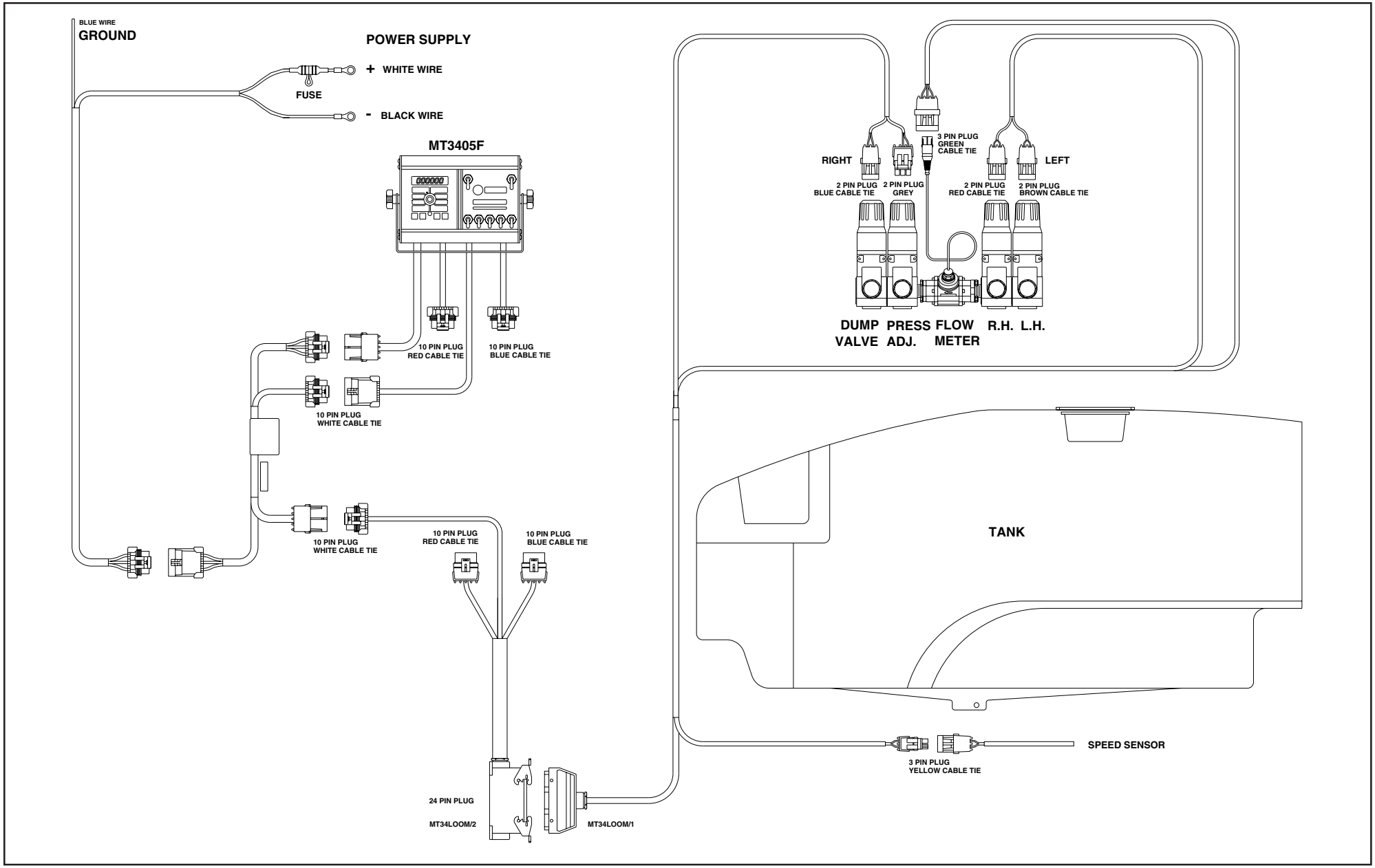
Electric Wiring Diagram - Electric Controller



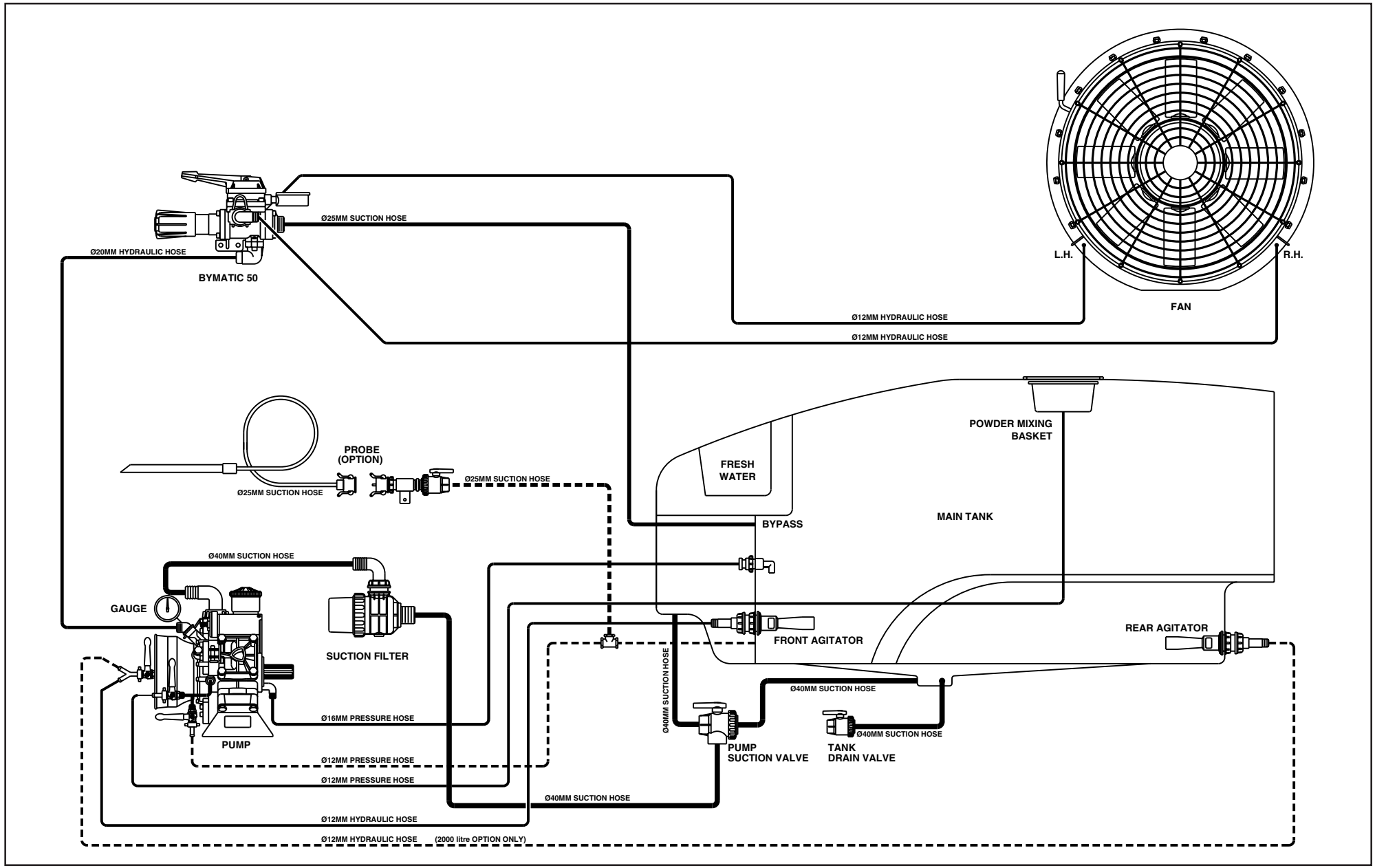
Plumbing Diagram - MT3405 Controller



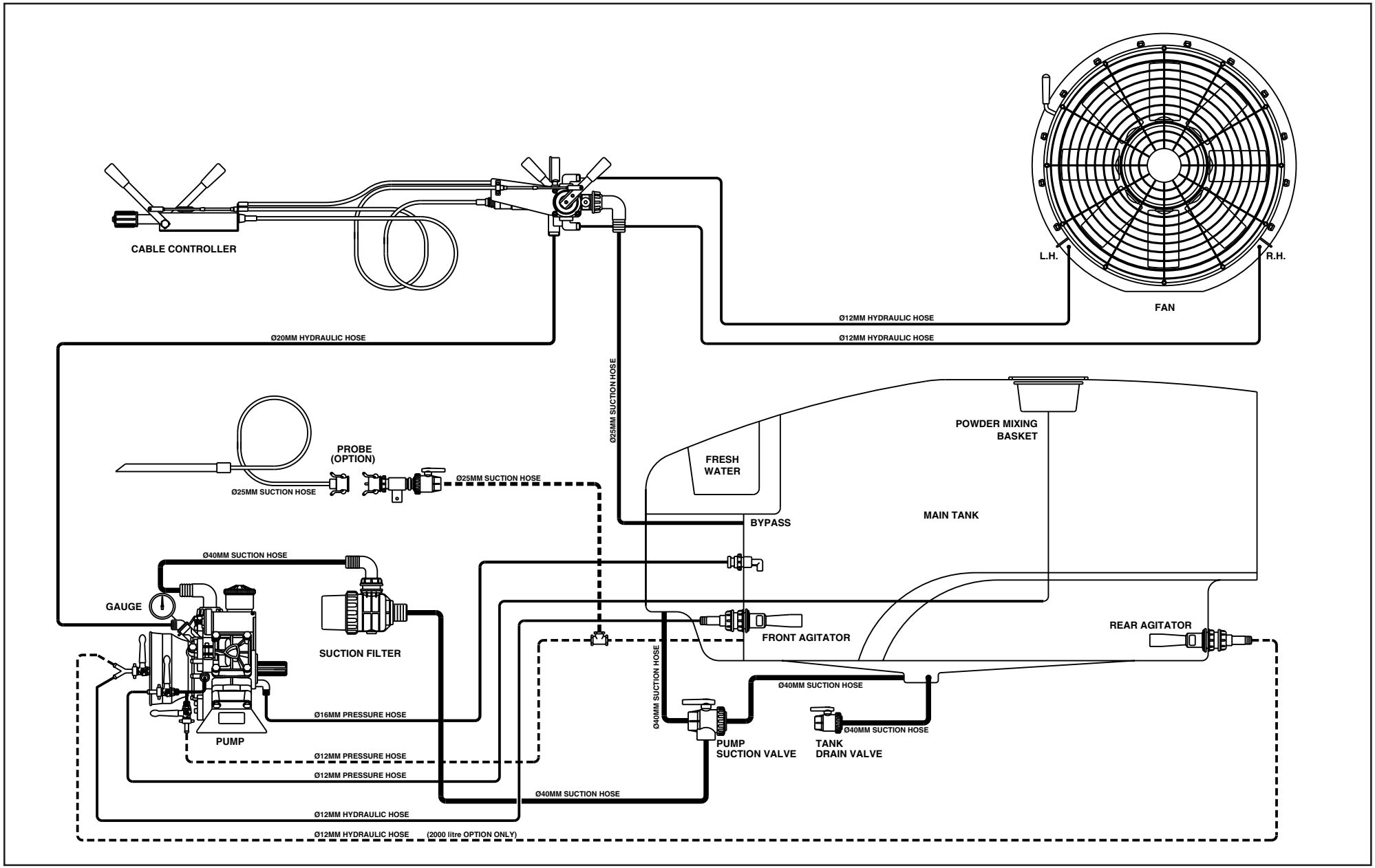
Electrical Wiring Diagram - MT3405 Controller



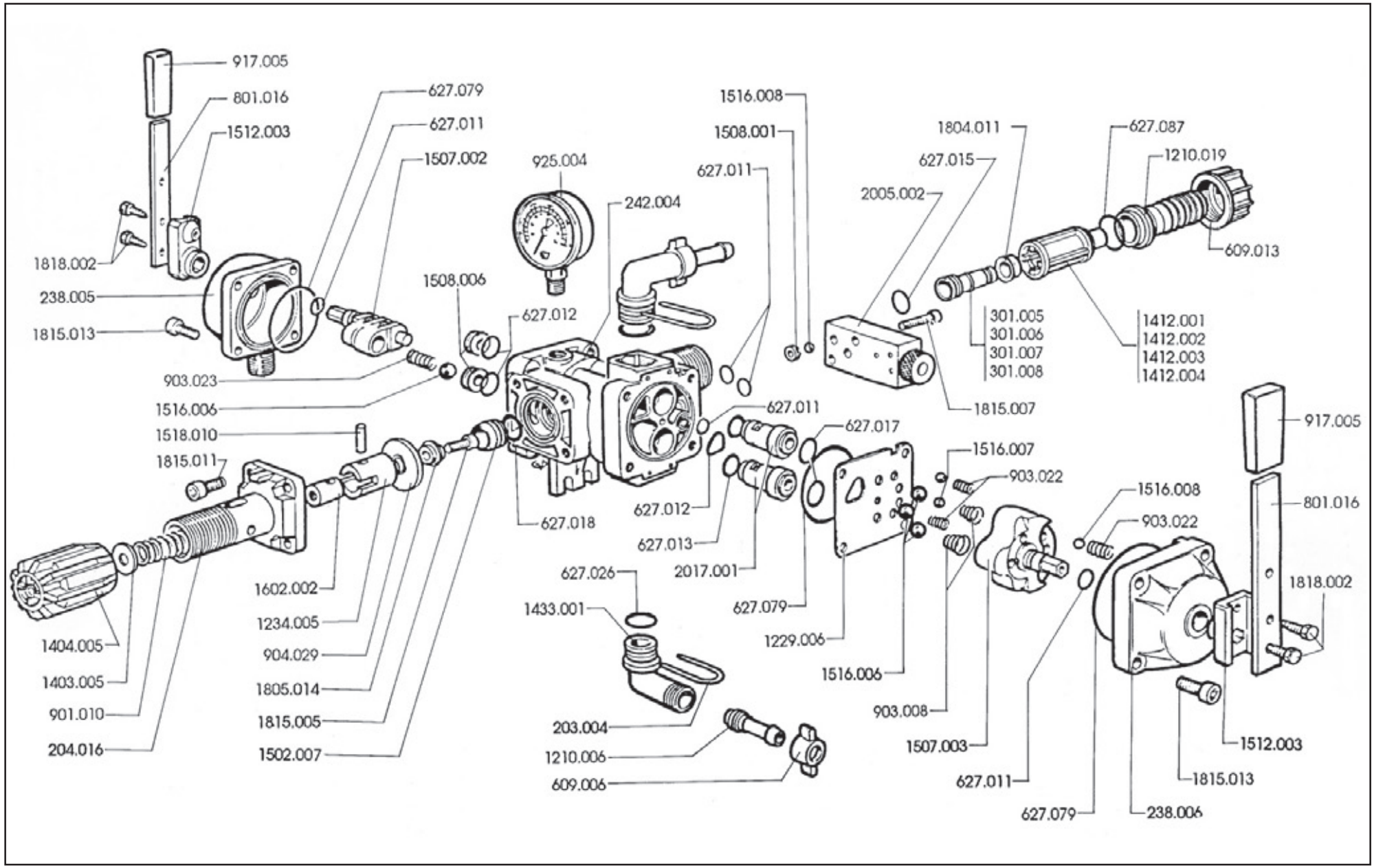
Plumbing Diagram - Bymatic 50 Controller



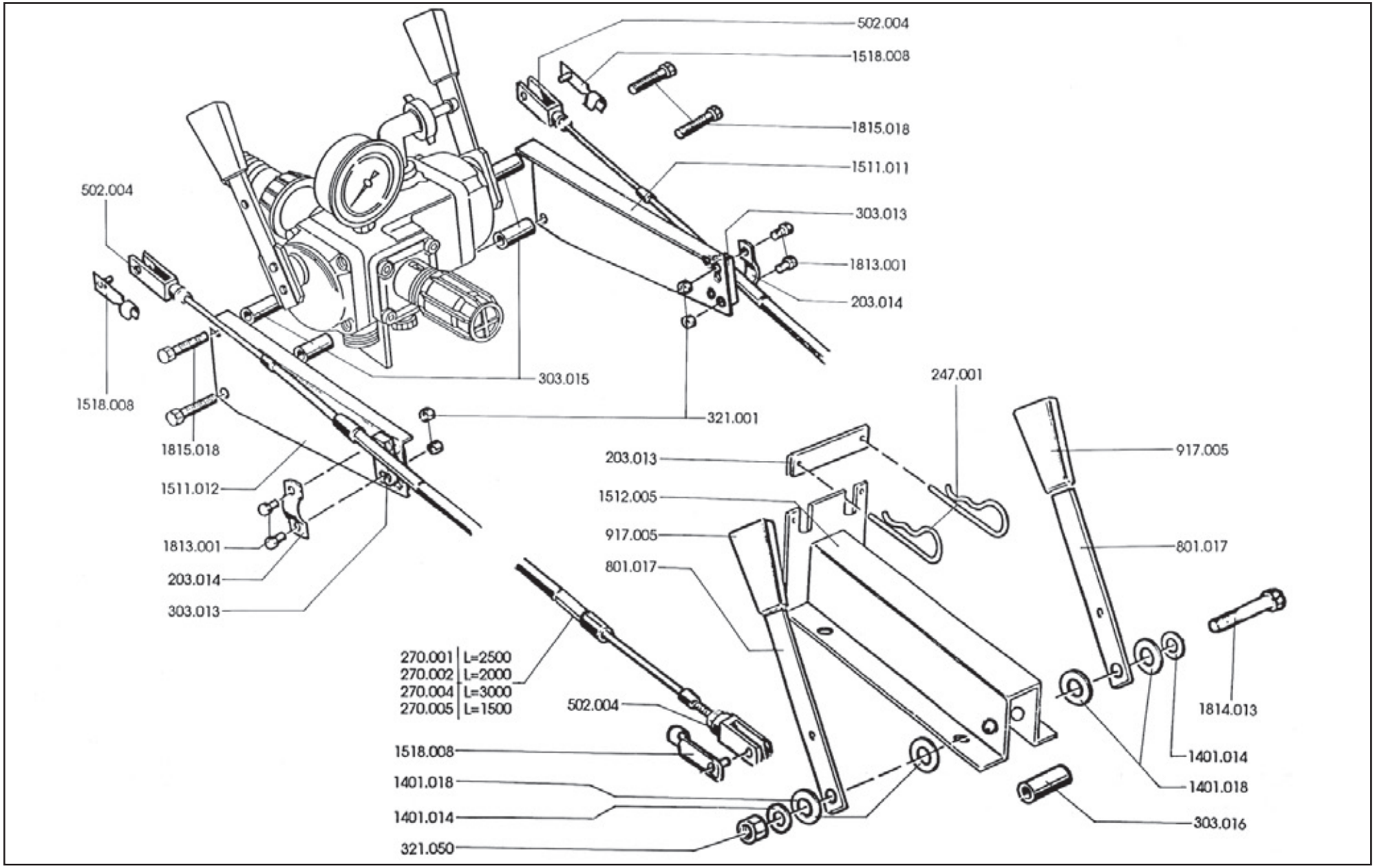
Plumbing Diagram - Cable Control



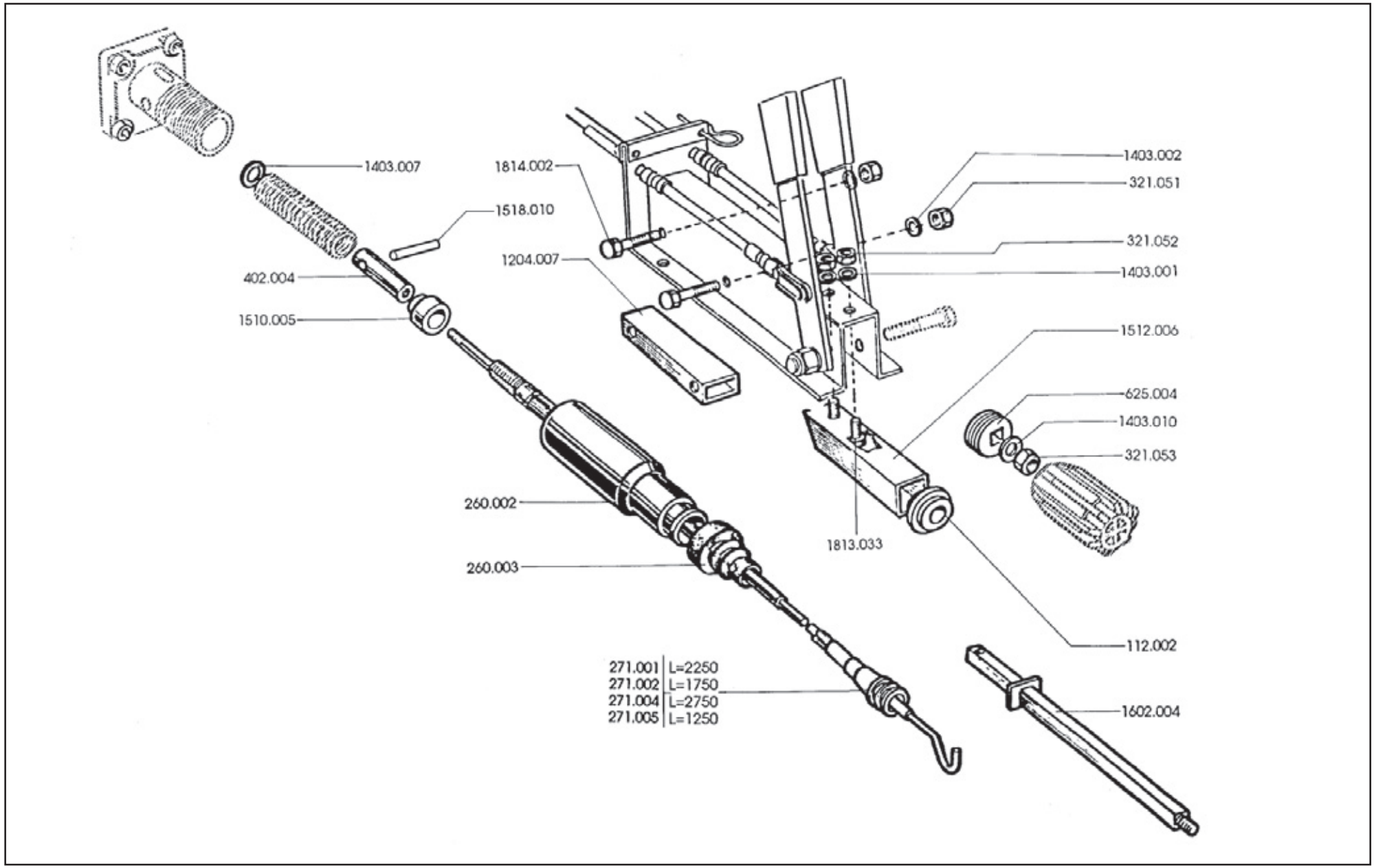
Cable Control Assembly & Parts 1



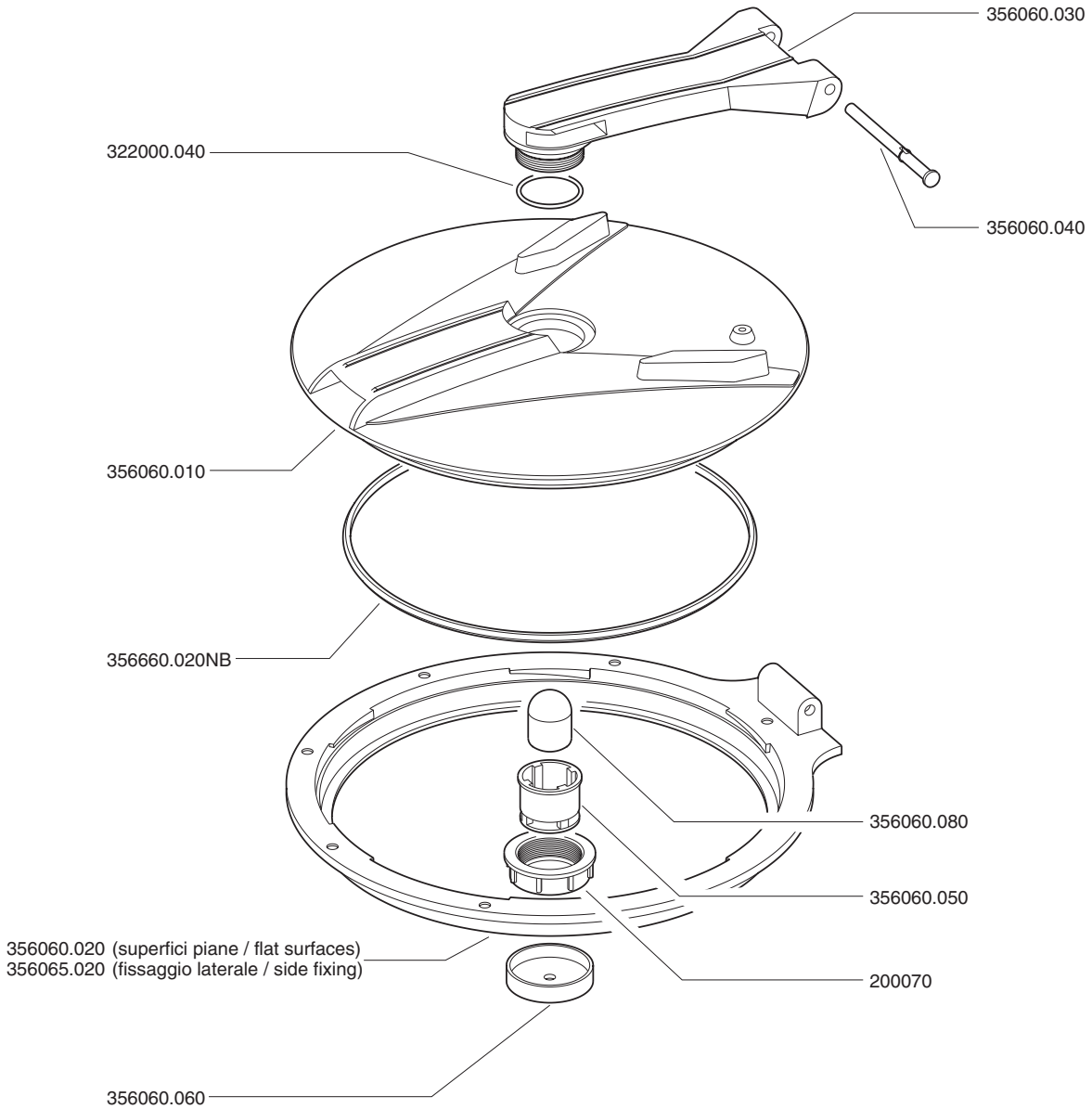
Cable Control Assembly & Parts 2



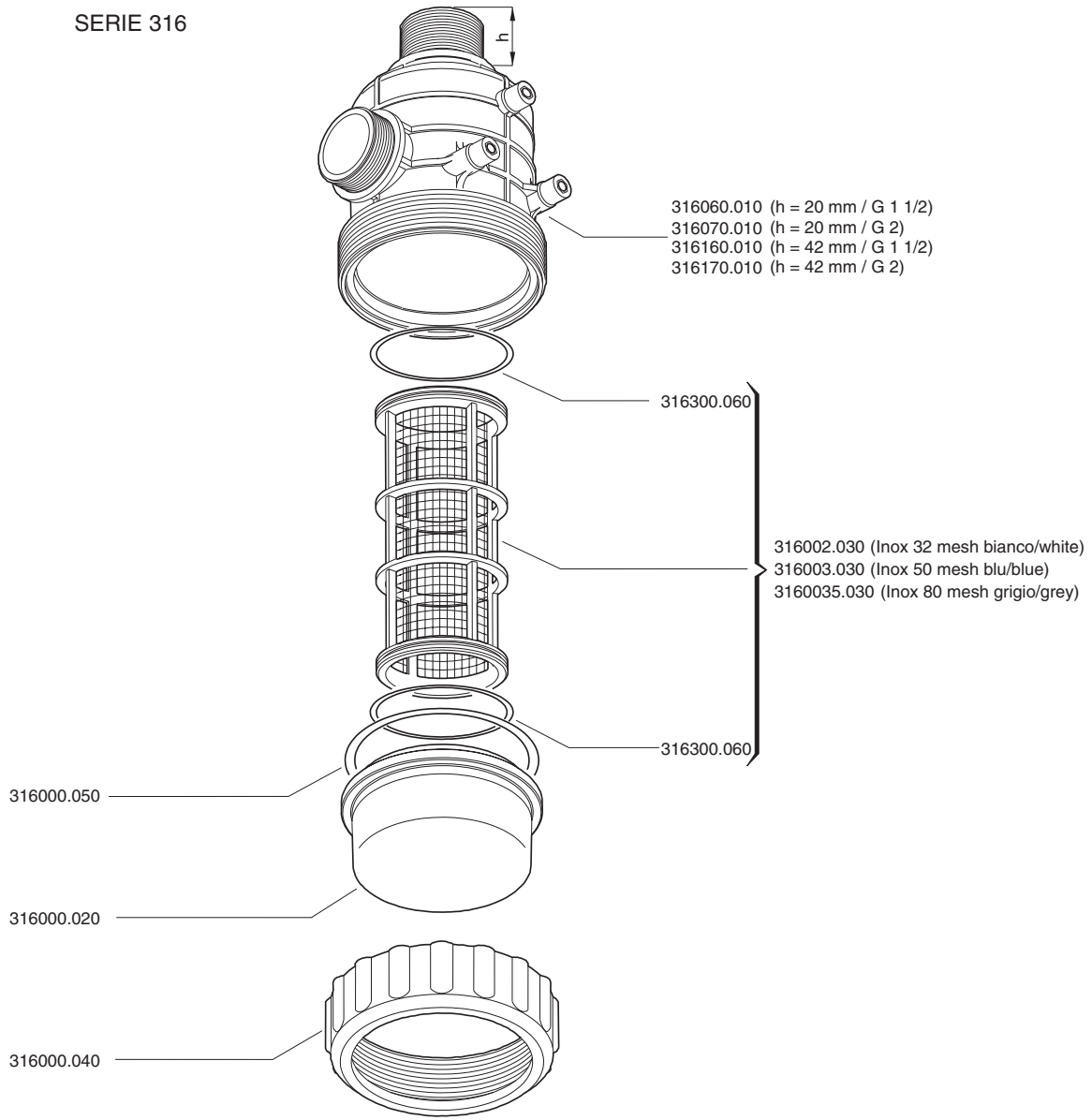
Cable Control Assembly & Parts 3



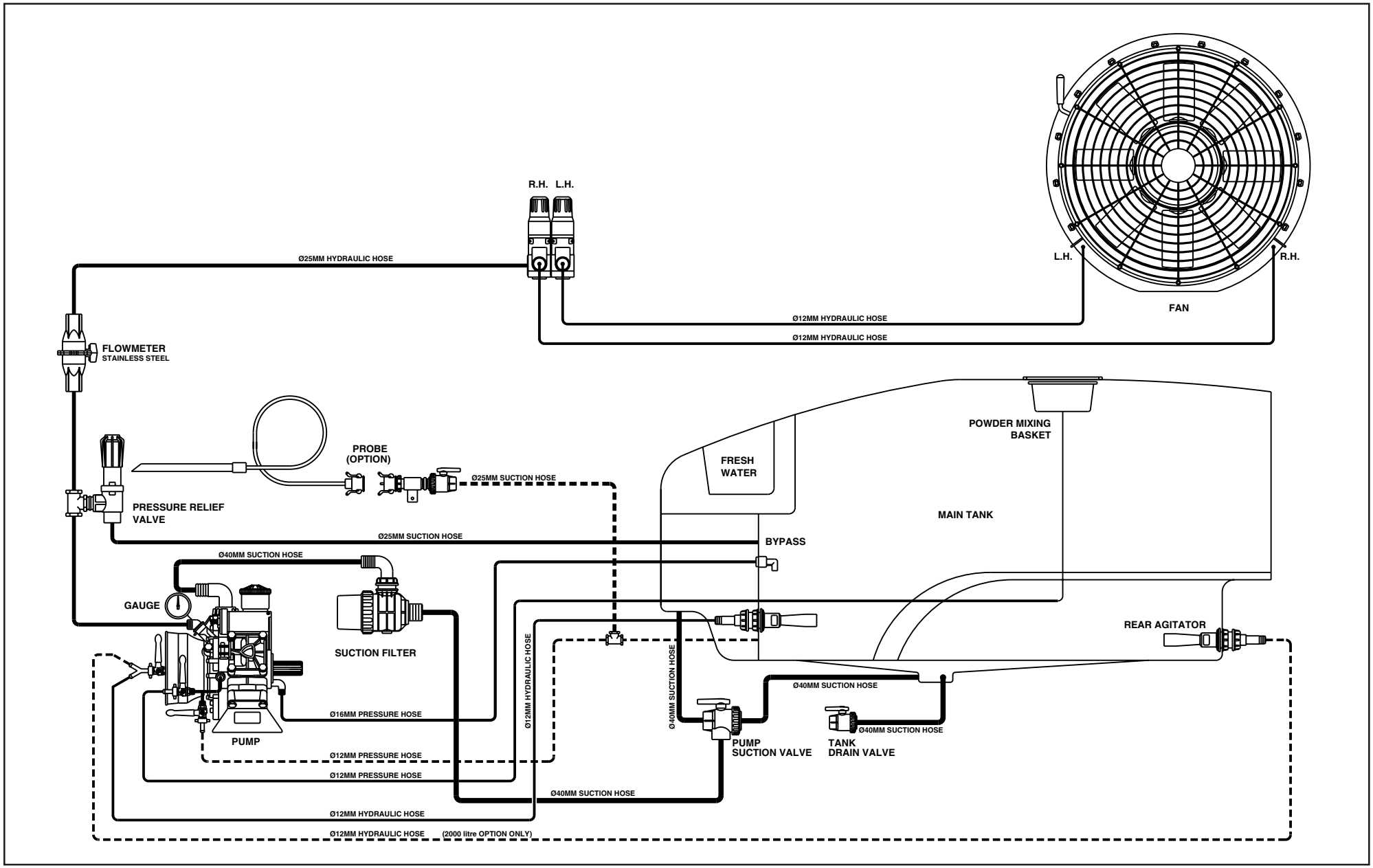
Tank Lid Assembly & Parts



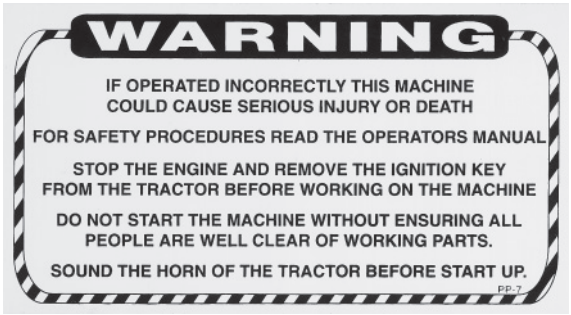
Suction Filter Assembly & Parts



Plumbing Diagram - Optional Flow Track



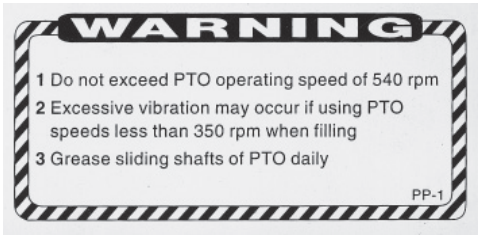
Decals


WARNING
IF OPERATED INCORRECTLY THIS MACHINE COULD CAUSE SERIOUS INJURY OR DEATH
FOR SAFETY PROCEDURES READ THE OPERATORS MANUAL
STOP THE ENGINE AND REMOVE THE IGNITION KEY FROM THE TRACTOR BEFORE WORKING ON THE MACHINE
DO NOT START THE MACHINE WITHOUT ENSURING ALL PEOPLE ARE WELL CLEAR OF WORKING PARTS.
SOUND THE HORN OF THE TRACTOR BEFORE START UP.
PP-7


WARNING
Water for operator washing only. Do Not Drink.
PP-9


WARNING
WATER ONLY
PP-15

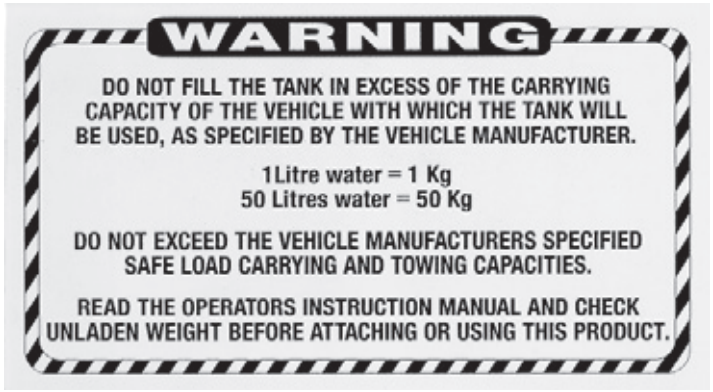

WARNING
NON-SWIVEL TYPE JOCKEY WHEELS OR STANDS MUST BE REMOVED OR IN THE HORIZONTAL POSITION WHEN TOWING.
PP-10


WARNING
1 Do not exceed PTO operating speed of 540 rpm
2 Excessive vibration may occur if using PTO speeds less than 350 rpm when filling
3 Grease sliding shafts of PTO daily
PP-1


WARNING
THIS MACHINE IS A SPECIAL PURPOSE MACHINE AND IS NOT DESIGNED FOR PROLONGED HIGHWAY USE AT SPEEDS EXCEEDING 30KPH
PP-3


WARNING
SAFETY INSTRUCTIONS
1 Read your operator's manual thoroughly before operating the sprayer
2 Inspect hoses, connections and nozzles daily
3 Clean filters regularly
4 Always follow correct maintenance schedules outlined in operator's manuals
5 Always read chemical manufacturers labels before use
6 Always observe all warnings on chemical products
7 Regularly check all bolts and nuts are tight
8 Always wear rubber gloves and wash sprayer down before doing any repair work
9 Do not ride on sprayer when moving
10 Keep clear of moving parts when sprayer is operating
11 Always keep guards in place when sprayer is operating
12 Be sure tank lid is closed before operating basket mixing facility
13 Stand well clear of sprayer when operating
14 Do not disconnect hoses, nozzles or filters while sprayer is operating
PP-6


WARNING
BEWARE OF MOVING PARTS! Keep hands well clear
PP-2


WARNING
DO NOT FILL THE TANK IN EXCESS OF THE CARRYING CAPACITY OF THE VEHICLE WITH WHICH THE TANK WILL BE USED, AS SPECIFIED BY THE VEHICLE MANUFACTURER.
1Litre water = 1 Kg
50 Litres water = 50 Kg
DO NOT EXCEED THE VEHICLE MANUFACTURERS SPECIFIED SAFE LOAD CARRYING AND TOWING CAPACITIES.
READ THE OPERATORS INSTRUCTION MANUAL AND CHECK UNLADEN WEIGHT BEFORE ATTACHING OR USING THIS PRODUCT.