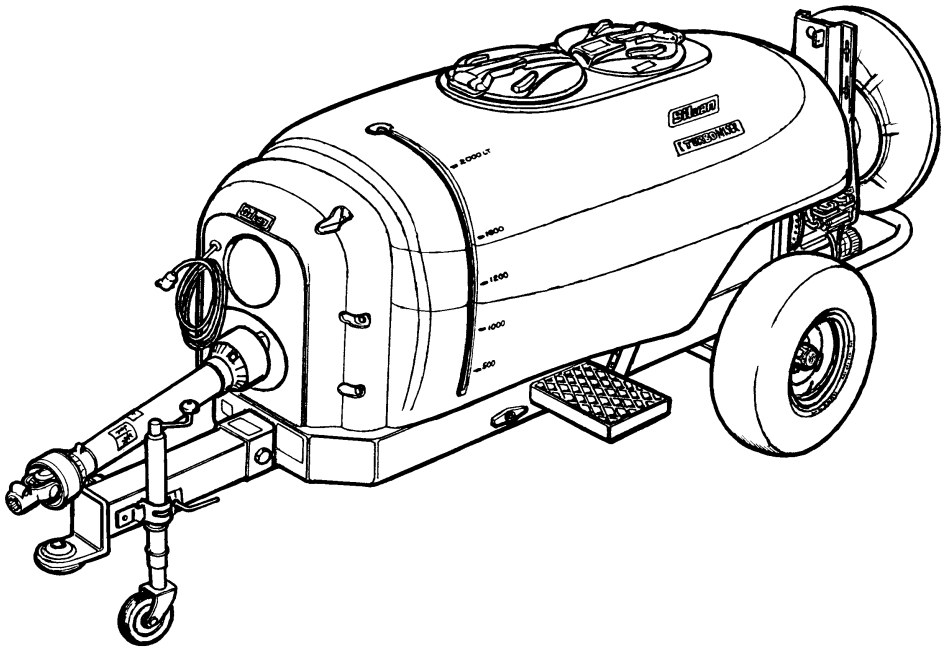
Instruction Manual

MANTURB-3 REV D 04/07/01

Turbomiser Trailed Sprayer

1500L
2000L



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Introduction

Silvan is an Australian owned company specialising in supply of crop protection equipment to primary producers. A leader in the design of agricultural sprayers, the company was established in 1962 and has grown to become the largest manufacturer and supplier of crop protection equipment in Australia.

Our operations are fully accredited to the international quality standard ASNZS ISO 9002-1994 and we are extremely proud of our reputation for quality products backed by quality service. Your investment in a Silvan sprayer is an investment in quality.

This manual covers the Turbomiser 1500 and 2000 Litre Trailed Sprayers and associated equipment, which has been designed and manufactured to provide a high standard of performance and safety, and incorporates many innovative features. To ensure continued efficient performance and safe operation of your boom, you need to read this manual thoroughly and fully familiarise yourself with all aspects of the boom's operation, maintenance and safety procedures.

Now that you are a proud Silvan owner, all our services and dealer support are available to you should you need them. We assure you of our best attention at all times.

Contents

Silvan

New Product Warranty

WARRANTY POLICY

Silvan Pumps & Sprayers (Aust.) Pty. Ltd. warrants to its authorised dealer, who in turn warrants to the original purchaser (owner) of each new Silvan product, that it will repair or replace, without charge for labour or parts, any defective or malfunctioning parts in accordance with the warranty limitations and adjustments schedule below.

PRODUCT - ALL
PRIVATE DOMESTIC - 12 MONTHS
PRIVATE AND COMMERCIAL AGRICULTURE - 12 MONTHS
AGRICULTURAL CONTRACTORS – 6 MONTHS
GOVERNMENT and MUNICIPAL DEPARTMENTS DEPTS- 6 MONTHS
ALL NON-AGRICULTURAL APPLICATIONS - 3 MONTHS
HIRE COMPANIES – 3 MONTHS

The warranty period will begin on the date the product is delivered to the first retail purchaser.

THIS WARRANTY COVERS:

- Claims resulting from defects in workmanship or material under normal use and service.

THIS WARRANTY DOES NOT COVER:

- Conditions resulting from misuse, negligence, alteration, accidental damage or failure to perform normal maintenance services;
- Any product which has been repaired by other than authorised Silvan Pumps & Sprayers (Aust.) Pty. Ltd. service outlet so as , in any way in the sole and absolute judgement of Silvan Pumps & Sprayers (Aust.) Pty. Ltd. to affect adversely its performance and reliability;
- The replacement of wear and tear items such as diaphragms, V-Belts and ground engaging components;
- Loss of time, inconvenience, loss of use of the product or other consequential damages.

The repair of defective products qualifying under this warranty will be performed by an authorised Silvan Pumps & Sprayers (Aust.) Pty. Ltd. Service outlet within a reasonable time following the delivery of the product, at the cost of the owner, to the service outlet's place of business. The product will be repaired or replaced, using new parts sold by Silvan Pumps & Sprayers (Aust.) Pty. Ltd.

The owner is responsible for the performance of regular maintenance services as specified in the Owners/Operator's Manual applicable to the product.

- **THIS WARRANTY IS THE ONLY WARRANTY APPLICABLE TO SILVAN PUMPS & SPRAYERS (AUST.) PTY. LTD. NEW PRODUCTS AND, TO THE MAXIMUM EXTENT PERMITTED BY LAW, IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**
- **SILVAN PUMPS & SPRAYERS (AUST.) PTY. LTD. DOES NOT AUTHORISE ANY PERSON TO CREATE FOR IT ANY OTHER OBLIGATION OR LIABILITY IN CONNECTION WITH THESE PRODUCTS.**
- **SILVAN PUMPS & SPRAYERS (AUST.) PTY. LTD. SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM A PRODUCT PERFORMING IN BREACH OF THIS WRITTEN WARRANTY.**

About Your Warranty

Silvan Pumps and Sprayers (Aust) Pty. Ltd. welcomes any warranty repair and apologises to you for any inconvenience caused. See the previous page for the statement of your legal warranty coverage. The following information will assist your understanding of warranty procedures.

Any authorised Silvan dealer service outlet can perform warranty repairs for you, however, we recommend that such repairs be carried out by the Dealer from whom you bought the machine.

Most warranty repairs are handled routinely, but sometimes requests cannot be accepted under warranty. Normal wear and tear is not covered by warranty nor does warranty apply if a product failure can be attributed to abuse or neglect.

Whilst Silvan will abide by its warranty policy under all genuine circumstances, we must emphasise that such can only apply when our equipment has been used in applications for which it was designed and manufactured and that a reasonable degree of care and common sense has been exercised by the operator.

To avoid misunderstandings which might occur between the customer and the service outlet, Items subject to normal wear and tear, such as bushes and similar items are not covered under warranty.

WARRANTY REPAIR SITE

The warranty provides for repairs to be carried out at the servicing dealer's normal place of business. An owner may elect to have repairs carried out at his own residence but, whilst Silvan will accept the actual repair cost of the failed component(s), the travelling costs will not be covered under warranty - see following.

ITEMS NOT COVERED BY WARRANTY

The warranty does not allow for the cost of the following items. These are the responsibility of the owner.

1) Labour to travel to and from a broken-down product or for any distance charges.
2) Labour premiums that might apply for any repairs that are made outside the dealer's normal business hours.
3) Transportation costs of the machine to and from the service outlet.
4) Freight costs to get parts to and from the service outlet.
5) Telephone and fax calls made by the owner in connection with the warranty repair.

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Specifications

General
The Silvan Turbomiser Trailed Sprayer is a low volume mister for application of agricultural chemicals to fruit, vegetable and vine crops. It uses high velocity airflow generated by a turbine fan to atomise and distribute the spray. A range of interchangeable heads are available to modify the spray pattern to suit various crops.

Tank
Polytuff impact resistant polyethylene with floating ball calibrated sight line.
Capacity 1500 or 2000 litres.
Two 455 mm diameter flip top lids
- basket strainer for liquids
- receptacle for chemicals.

Drain valve with 38 mm diameter outlet.

Agitation
Continuous by-pass fluid agitation plus belt driven propeller agitator in bottom of tank.

Pump
CD-32 centrifugal pump with toughened nylon body, stainless steel shaft and mechanical ceramic seal.
Maximum capacity 140 litre/min (31 gpm)
Maximum pressure 3.5 Bar (51 psi)

Fan
MV-50N or MV-55DS turbine type depending upon sprayer specification.

Fan Model	MV-50N	MV-55DS
Diameter (mm)	500	550
Speed (rpm)	4000	3700
Air speed (m/sec)	175	170
Capacity (m^3/hr)	7550	13000

Drive
BYPY 540 rpm PTO shaft with safety shields.
"SPZ" section vee belt to pump.
Poly-vee belt with over-run clutch to fan.
Flexible self tensioning belt to agitator

Controls
Cab mounted control box utilises tractor's 12 volt electrical system. Two "on/off" switches to control fluid flow to either side and toggle switch to regulate pressure.
Arag electrically operated valves.
10 bar pressure rating.
24 l/min flow rating.
0.6 sec shut off time.
100 mm dia. pressure gauge on front of sprayer.
Rotary distribution plate with 15 settings to calibrate fluid flow to each group of spray nozzles.

Nozzles
Low volume "air shear" type.

Chemical Filling System
Venturi induction system.
30 litre chemical receptacle.
Water jets for flushing residue into tank.

Filtration
Two stage with removable elements.
1)Tank lid strainer 30 mesh.
2)Suction line filter 50 mesh (white).

Interchangeable Spray Heads
4x4 double sided head
5x5 double sided head
Vineyard/Skip Row head
75 degree Orchard double sided head.
Hi Low Orchard double sided head.
Citrus double sided head.
Avocado single sided head.
Mango tower
Super Cannon and turntable

Frame and Hitch
Heavy duty galvanised steel construction.
Adjustable drawbar with jockey wheel.

Axle and Wheels
50 mm square axle with 50 mm drop and sliding track adjustment.
Track width to outside of tyres
Min. 1500 mm Max.1580 mm.
Galvanised steel wheels.
31x10.5x15 tubeless tyres.
Operating pressure 250 kpa (35 psi).

Optional Equipment
Glideflex suspension axle.
Constant velocity PTO shaft.
Extended drawbar.

Dimensions and Weights
With PTO drive but no spray head fitted, drawbar retracted and wheels in narrowest track.

Model	**Length**	**Width**	**Height**	**Mass** (kg) (All dimensions in mm) Empty	Tank Full
1500L	3410	1500	1530	600	2100
2000L	3860	1500	1530	630	2630

To calculate partly filled mass add to empty mass 1 kg/litre of fluid. e.g. 500 kg for 500 litre.

Tractor Power Requirement

Fan Model	PTO HP at 540 rpm
MV-50N	50 HP minimum.
MV-55DS	65 HP minimum

Maximum Towing Speed
Will vary depending upon tractor capabilities and terrain but should not exceed 30 kph under any circumstances.

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Safety Information

Before operating the sprayer read the following safety instructions.

Failure to comply with these warnings may result in serious injury or death.

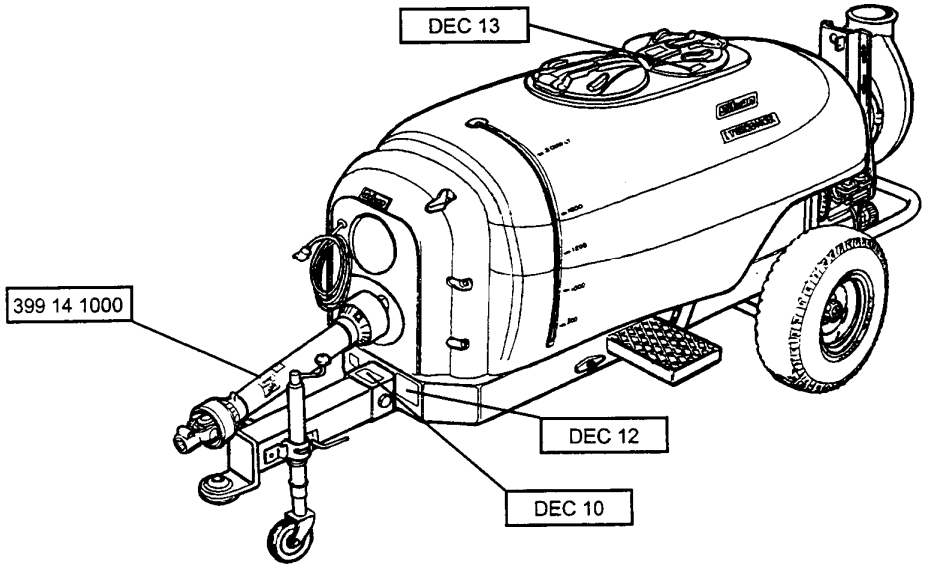
. Whilst the Silvan Turbomiser Trailed Sprayer has been designed and manufactured to incorporate all necessary safety features it is essential that any person who operates or works on the machine is aware of the safety precautions that should be exercised.

- ▲ This sprayer is designed and manufactured solely for the purpose of applying agricultural chemicals to crops. Under no circumstances should it be used for any other purpose.
- ▲ Before using the sprayer, carefully read and ensure you understand the contents of this manual and any other manual supplied with the sprayer.
- ▲ Before operating the sprayer, read all the safety warnings, which are carried on various parts of the machine. Refer to the next two pages for a location diagram and the wording of these warnings.
- ▲ Never allow an inadequately trained person to attach or operate the sprayer.
- ▲ Do not operate the sprayer whilst wearing loose clothing, unrestrained long hair, jewellery or anything which could become entangled in rotating components or limit your vision.
- ▲ Wear ear protection when operating the sprayer on a tractor which is not fitted with a sound proofed cabin.
- ▲ Ensure the towing capacity of the tractor is suitable for the loaded mass of the sprayer. Refer to the tractor operator's manual for safe working loads and relevant tractor safety instructions.
- ▲ Exercise extreme care when operating in hilly or uneven terrain to ensure proper stability. Refer also to the tractor manufacturer's operating and safety instructions.
- ▲ Do not allow any person to ride on the sprayer or tractor whilst it is in motion.
- ▲ Do not operate the sprayer at speeds greater than 540 PTO rpm.
- ▲ Do not operate the sprayer without all of the tractor and sprayer safety shields in place. Carefully check that PTO and driveline shields are correctly installed.
- ▲ Disconnect the PTO shaft at the tractor and ensure the sprayer is properly supported before performing any maintenance work. Do not support the sprayer by the jockey wheel when the tank is full or partly full of liquid.
- ▲ Do not adjust the drawbar or wheel track without the sprayer being properly supported. Do not support by the jockey wheel.
- ▲ **Before use of any chemicals** refer to the chemical manufacturer's label and safety instructions for safe handling procedures and correct method of use. Always use the recommended personal protective clothing and safety equipment.
- ▲ Always wear gloves when removing and cleaning filters.
- ▲ Dispose of empty chemical containers in accordance with the instructions supplied by the chemical manufacturer.
- ▲ Ensure that all operators and associated personnel are familiar with the legal regulations and codes of practice that apply to the safe use and storage of spray chemicals.
- ▲ **Do not enter the sprayer tank under any circumstances.** If service is required contact Silvan for correct maintenance procedures.
- ▲ Do not stand on the sprayer or rear bumper to adjust the spray heads.

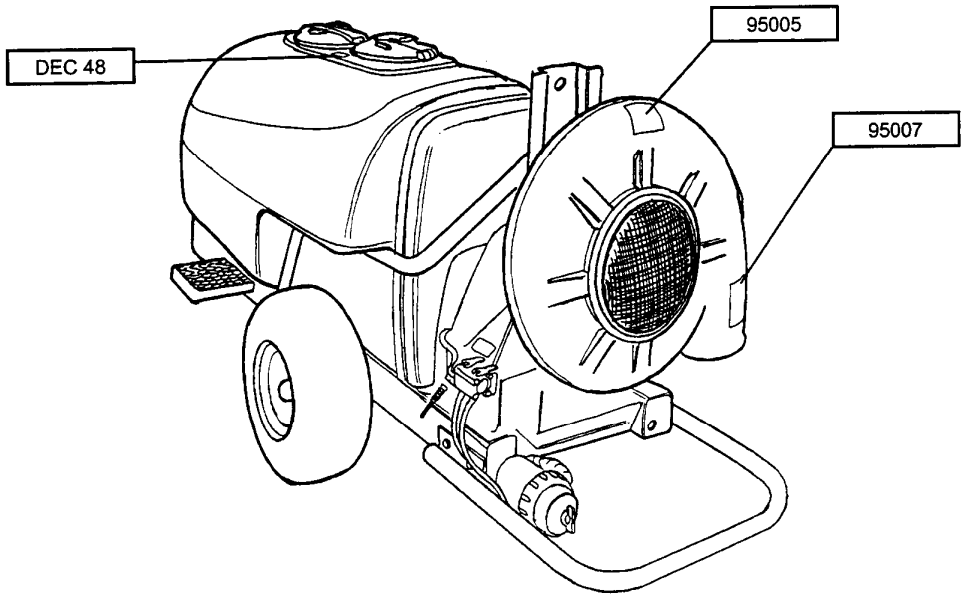
Safety Information

WARNING

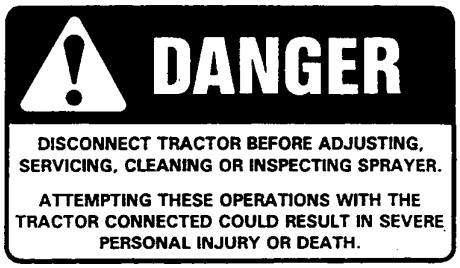
The location of the safety decals fitted to the Turbomiser Trailed Sprayer are shown in the diagrams below and their wording is shown on the page opposite.
It is important that all operators read and follow the information on all safety decals before operating the sprayer. Failure to comply with these warnings could result in serious injury or death.
Safety decals should be kept clean and legible at all times. If any decals are missing or unreadable, they should be replaced by ordering new decals from your Silvan dealer using the part numbers shown below.



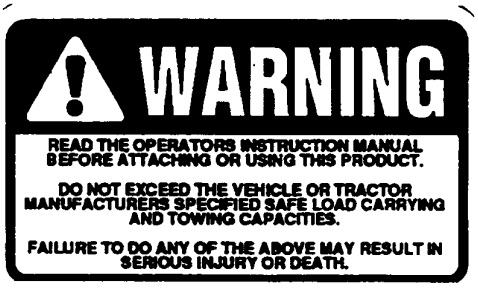
TURBOMISER 1500 & 2000 TRAILED SPRAYER
FRONT VIEW



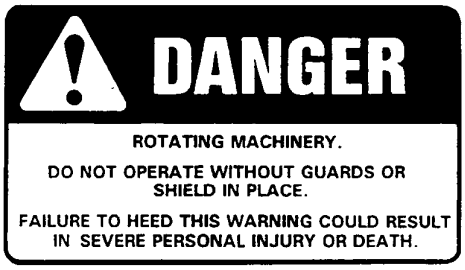
TURBOMISER 1500 & 2000 TRAILED SPRAYER
REAR VIEW



Part Number DEC 10

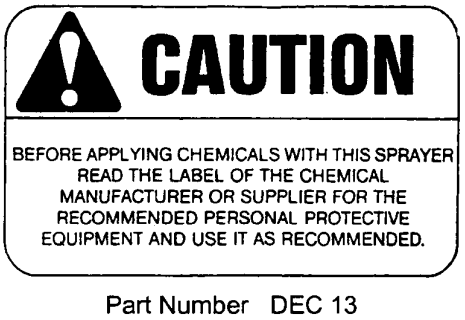


Part Number DEC 48

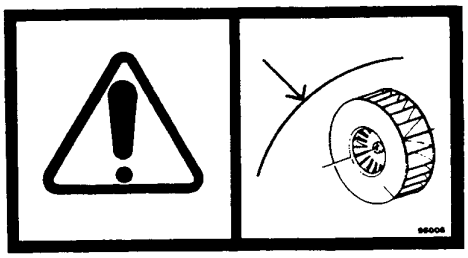


Part Number DEC 12

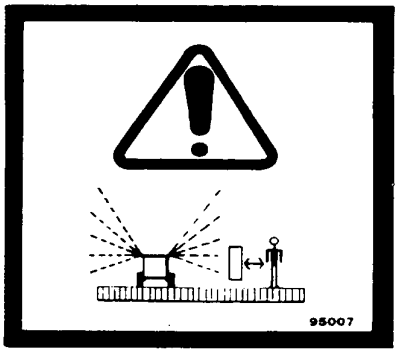
Part Number 399 14 1000



Part Number DEC 13



Part Number 95005
Keep clear of rotating fan



Part Number 95007
Keep away from sprayer during operation

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Installation

Attaching to the Tractor

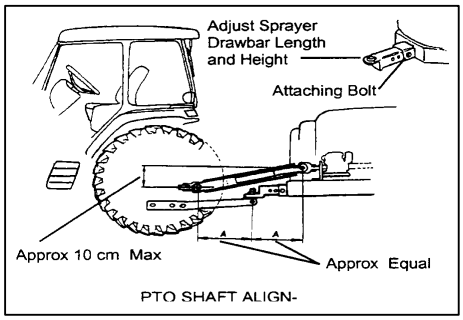
Attach the sprayer hitch to the tractor drawbar using the tractor hitch pin. Adjust the height of the tractor drawbar and/or the sprayer hitch to level the sprayer. The sprayer drawbar can be installed with the hitch ball in either the high or low position.

To alter the sprayer hitch height, remove the drawbar-attaching bolt and slide the drawbar out. Rotate the drawbar through 180^0 and reinstall it in the alternate position. Ensure that the drawbar-attaching bolt is securely retightened.

Clean and grease the splines on the tractor and sprayer PTO stub shafts and install the PTO shaft making sure that the spring-loaded locking pins engage in the grooves of both stub shafts. Ensure that the tractor's PTO shaft guard is attached to the tractor.

PTO Shaft Length

Note: Upon delivery of a new sprayer it is the selling dealer's responsibility to install and set the PTO shaft to the correct length. The following information is provided for reference.



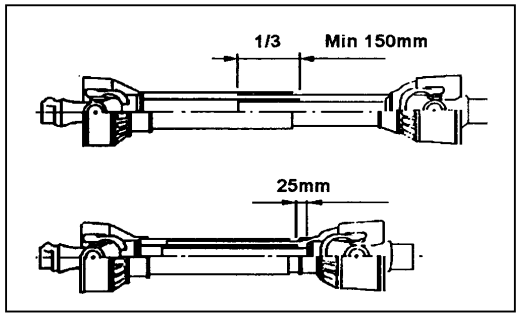
PTO SHAFT ALIGN-

The hitch point between the tractor and sprayer should be approximately midway between the two universal joints of the PTO shaft and the height difference between the joints should not be greater than about 10 cm. This will ensure the joint angles are approximately equal during turns and do not exceed the allowable limit.

The telescoping tubes of the shaft must overlap by at least 1/3 their length, but not less than 150 mm, in all possible operating positions and there must be approximately 25 mm telescopic movement remaining at the minimum operating length.

The length of the sprayer drawbar can be adjusted by removing its attaching bolt and sliding the drawbar in or out to one of the three positions where the bolt holes align. Reinstall the drawbar bolt and tighten securely.

The length of the tractor drawbar may also need to be adjusted.



If the PTO shaft must be shortened cut equal amounts from both male and female shafts and safety covers. Carefully remove all burrs then clean and relubricate before reassembling.

If after adjusting the sprayer and tractor drawbar, the joint angles exceed 35^0 during turns it may be necessary to fit a PTO shaft with constant velocity joints (see your Silvan dealer).

Cabin Electric Control Panel

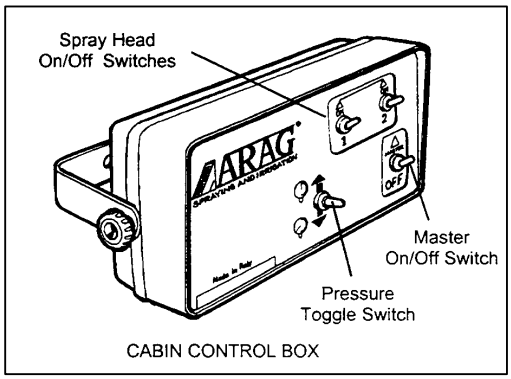
Install the electric control box in the cabin of the tractor using the bracket and hardware provided. Ensure that it is clearly visible and within easy reach of the driver. The master switch should be in the "Off" position whilst installing.

Connect the electrical cable provided directly to the battery. If the cable needs to be extended it is important to use wire of the same diameter.

The connections are:

Positive = Red Negative = Black

Run the control box wiring loom back to the sprayer through a convenient outlet in the tractor



CABIN CONTROL BOX

cabin ensuring that it does not rub on any sharp edges. Connect the control box loom to the sprayer loom at the quick release coupling and ensure that all wiring is clear of the PTO shaft and tractor wheels.

Spray Head Selection

A wide range of interchangeable spray heads can be fitted to the Turbomiser 2000 Trailed Sprayer to suit different crop types and each of these can be configured in a number of ways.

Some of the heads in the range are illustrated in the diagrams below. You should consult your Silvan dealer for advice and recommendations on the type of spray head which will be most suitable for your particular application. Your dealer will also be able to carry out the initial installation and adjustments.

Further information on the use and adjustment of each type of spray head is given in this manual in the section entitled Spray Head Operation and Adjustment.

Adjusting Wheel Track

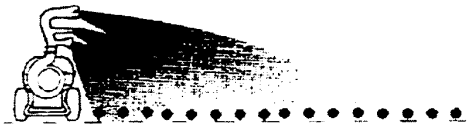
The wheel track may require adjusting to match the track of the tractor or to increase the stability of the sprayer. Use the maximum track on sloping terrain if possible.

> **WARNING** Do not attempt to adjust the track with the tank filled or partly filled with liquid or with out the sprayer being properly supported. Do not use the jockey wheel.

Lift the sprayer with a jack and support it with stands under the drawbar and each side of the frame behind the wheels.

Loosen the four axle U-bolts and the four set screws in the axle adjustment sleeve. Slide the axle shaft on each side to the required track and retighten the U-bolts and set screws securely.

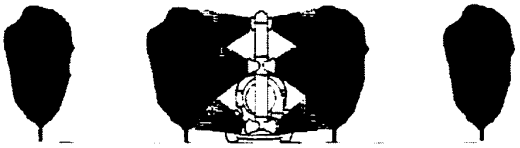
With standard tyres fitted the track may be set between 1500 and 1580 mm, measured over the outside of the tyres. Use an equal offset on each side and do not exceed the maximum track setting, as this will prevent proper engagement of the axle sections.



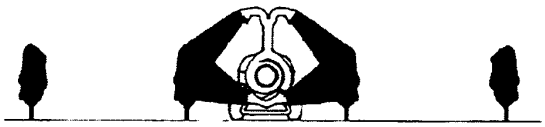
SUPER CANNON

75° ORCHARD HEAD

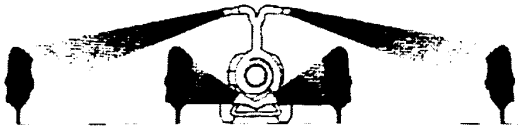
AVOCADO HEAD



CITRUS HEAD



VINEYARD HEAD



SKIP ROW HEAD

4 BY 4 HEAD

5 BY 5 HEAD

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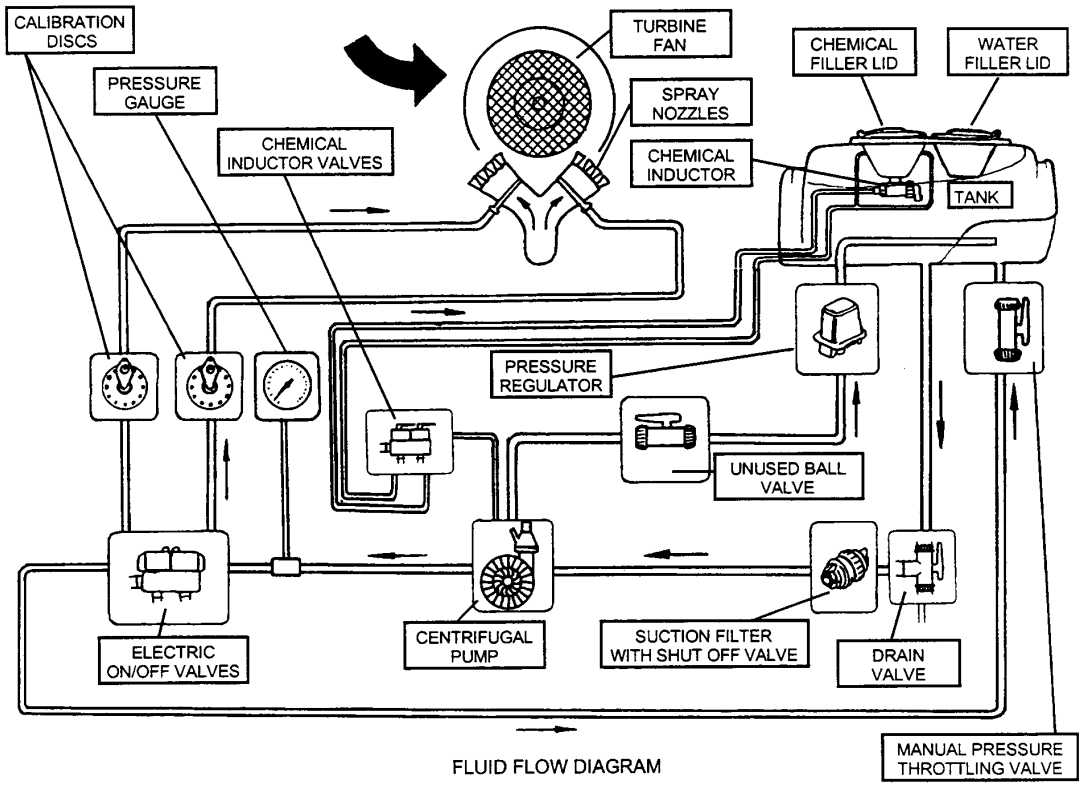
Operation



FLUID FLOW DIAGRAM

Description of Fluid Flow

The schematic diagram shows the fluid flow of a two head unit but the same system applies for other head arrangements.

The tank is filled with liquid through the rear lid which is fitted with a basket strainer to prevent entry of foreign material. The liquid level is shown by a calibrated sight gauge on the LH side. The tank can be drained through a ball valve under the LH side, in front of the step.

Chemicals are added to the receptacle of the inductor unit through the front tank lid. The rear inductor valve is opened to direct pressurised fluid to the inductor venturi, which creates a suction action to draw the chemicals into the tank. The front valve directs pressurised liquid to the top of the receptacle for flushing purposes.

The spraying solution is drawn from the bottom of the tank to the inlet side of the belt driven centrifugal pump. The suction filter ensures no foreign material enters the pump. A spring loaded shut off valve in the filter body can be closed to allow the element to be removed for cleaning while there is liquid in the tank.

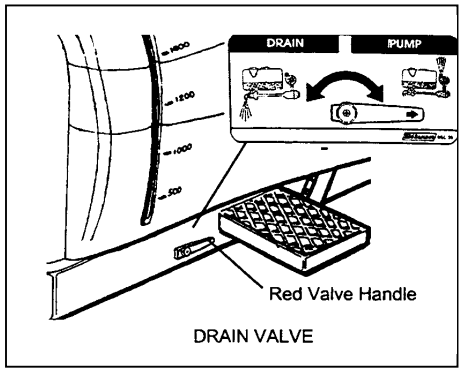
The manual pressure throttling valve is used when initially setting the spraying pressure. Pressure is then maintained at a constant setting by the electrical regulator in the by-pass line. Fluid from the by-pass line is returned to the bottom of the tank to agitate the solution. A belt driven propeller agitator is also fitted in the bottom of the tank. The unused ball valve in the by-pass line is only used when the optional KEE spray controller is fitted or when cleaning the suction filter if the tank is full. Otherwise it should be kept open at all times.

Output from the pump flows to the two electric on/off valves which are operated from the tractor cab to direct pressurised fluid to the nozzles on either, or both, sides of the sprayer.

The calibration plate in the discharge line to each group of spray nozzles can be rotated to select an opening which will give the required flow rate. The fluid discharge from the nozzles is mixed with air from the belt driven turbine fan to produce a fine mist. Individual taps on the spray nozzles can be opened or closed to vary the discharge pattern.

Starting the Sprayer

When starting the sprayer for the first time grease all lubrication points as described in the Maintenance section. Then conduct a trial using clean water only (no chemicals) to familiarise with the controls and to check that all systems are functioning correctly without leakage.

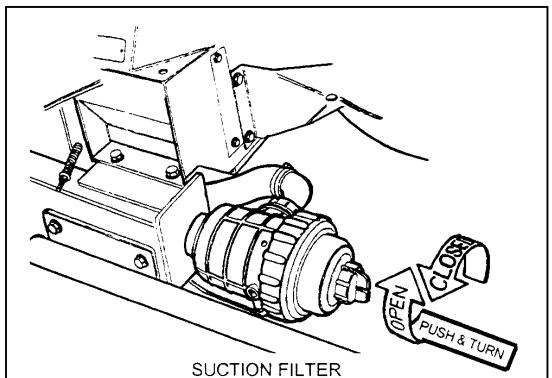


DRAIN VALVE

Before filling the tank check that the drain valve located in front of LH step is in the "pump"' position, ie. red handle facing rearward. Then fill the tank through the rear opening after checking that the basket strainer is in place and clean. Close and rotate the lid to secure it after filling.

Ensure the shut off valve in the suction filter is open. The valve is open when the yellow cap is fully screwed in. It automatically closes when the cap is screwed off which allows the filter cover to be unscrewed and the element to be removed for cleaning while there is fluid in the tank.

Set the calibration discs to the required position as described in the Calibration section. Turn the master switch "on" and the two spray head switches "off" (down position). Engage the PTO with the tractor running slowly and once the pump is primed gradually increase to 540 rpm.



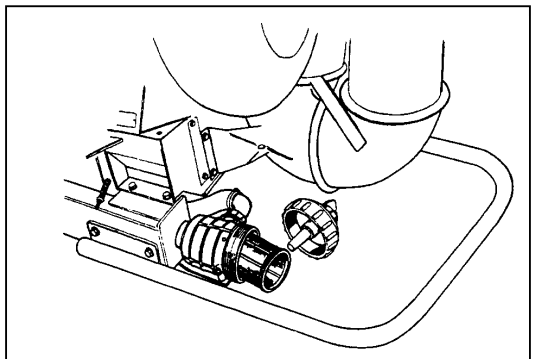
SUCTION FILTER
Showing Shut Off Valve Operation

Adjust the pressure as described below and whilst the two spray head switches are "on" check that all nozzles are operating.

Conduct a trial spraying run to verify that the sprayer is functioning correctly and is set up for your application. In particular, measure the output rate and check the spray head direction.

To shut the sprayer down turn the master switch "off', reduce engine speed and disengage the PTO drive at the tractor.

Chemicals can now be added as described on the following page.


SUCTION FILTER
Showing Element Being Removed For Cleaning

Pressure Adjustment

Spraying pressure is normally set between 1 and 3 Bar. For any chosen calibration disc position the application rate will increase as pressure is increased and decrease as pressure is decreased. The relationship between spraying pressure and application rate is shown in the Calibration section and the Disc Output Chart. Use this information to select the required disc setting and spraying pressure.

With the sprayer running at 540 rpm use the toggle switch on the control box to adjust the pressure to the maximum setting. Moving the switch up increases pressure and down decreases pressure. Holding the switch steady in either the up or down position will cause the regulator to cycle and the pressure will repeatedly increase then decrease, or vice versa. Maximum pressure is achieved by releasing the switch when the highest reading shows on the gauge at the front of the tank. This adjustment should be done with both spray head switches "off" and the throttling valve fully closed, ie. handle across the direction of flow.

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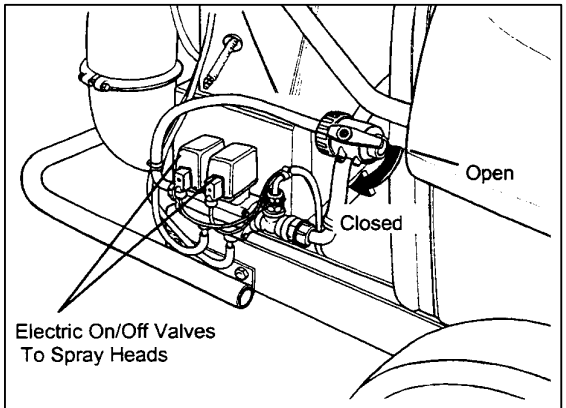
Operation



MANUAL PRESSURE THROTTLING VALVE

When the maximum pressure is set, turn the spray heads “on” and use the toggle switch on the control box to reduce the pressure to the required setting for spraying. To ensure that the electric regulator is not operating at the lower limit of its adjustment range, slowly open the manual throttling valve until the gauge reads approx. 0.5 Bar below the required spraying pressure. Then use the toggle switch to raise the pressure to the required setting. The electric regulator will then maintain this pressure while the sprayer is in operation.

Adding Chemicals

WARNING Before adding chemicals to the sprayer read and follow the chemical manufacturer’s instructions and wear the recommended protective clothing.

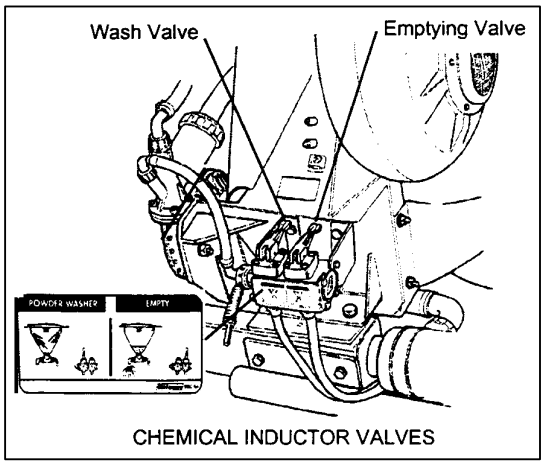
The inductor system enables either powdered or liquid chemicals to be safely and conveniently added to the sprayer in concentrated form and mixed within the tank. The chemical receptacle is located under the front lid of the tank and has a maximum capacity of 30 litres.

The inductor valves are located at LH rear of the sprayer and are open when the red levers are vertical and closed when they are horizontal.

The rear valve directs pressurised liquid to the venturi beneath the receptacle which creates a suction action to empty the chemicals into the main tank. The front valve directs pressurised water to the top of the receptacle to wash any chemical residue into the tank after filling.

From the chemical manufacturer’s instructions determine the quantity of chemical that needs to be added to the tank to achieve the correct strength of solution.

Fill the sprayer with about 500 litres of water through the rear tank opening and engage the PTO with the tractor running slowly until the pump is primed, then increase to 540 PTO rpm.



CHEMICAL INDUCTOR VALVES

Ensure that both spray outlet switches are off and that the spraying pressure has been set as previously described. Open the rear inductor valve to commence the venturi action. Then open the front lid of the tank, pour the chemicals into the receptacle and allow the suction to empty them into the tank. It is preferable, but not essential, to close the lid whilst the chemicals are emptying into the tank.

When the receptacle is empty, open the front inductor valve to wash any residue into the tank. Close both inductor valves and the tank lid and continue to run the sprayer to complete filling the tank with water through the front opening. During this time the by-pass flow and the mechanical agitator will thoroughly mix the solution.

Emptying the Sprayer

At the end of each day partly fill the tank with water and run this through the pump, spray heads and lines to purge them of chemicals.

Rinse the tank through the top opening and empty with the drain valve to remove powdered material. Never leave chemicals in the tank which could settle to the bottom and break into lumps that may block the suction filter.

Dispose of unused chemical mix, rinse water and containers as recommended by the chemical manufacturer or government authority.

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Disc Setting and Calibration

Calibration Setting and Checking

Chemical application rates and hence the calibration setting of your sprayer will vary greatly depending on the crop type, stage of crop development and the regional area. Information on application rates should be available from your chemical supplier.

Calibration is done by following the four simple steps below. The fourth step, measuring the actual application rate after calibration, is essential and must be carried out to ensure a known amount of spray is being applied per hectare.

STEP 1 ***Operating Factors***
First establish the following factors.

a) **Application rate (l/ha)** The litres of mixed chemical solution to be applied per hectare.

b) **Speed (km/hr)** The travel speed indicated by your tractor can be checked by timing the sprayer over a measured distance. The timing should be done in seconds over 100 metres with the PTO engaged and water in the tank to simulate real spraying conditions. In hilly terrain the sprayer should be timed driving up and down the hill and the two times averaged. The speed can be calculated according to the following formula.

$$\text{Speed (km/hr)} = \frac{360}{\text{Time in seconds for 100 m}}$$

c) **Row width (m)** The distance between rows measured in metres.

c) **No. of disc assemblies** The total number of yellow multi-disc assemblies fitted to the spray head.

d) **Spray pressure (Bar)** A spray pressure of between 1 and 3 Bar is usually selected. Lower spray pressures will allow you to use larger disc holes which reduces the chance of blocking and also allows more liquid to circulate for agitation.

STEP 2 ***Output per Disc Assembly***
Calculate the spray output required in litres per hour (l/hr) for one disc assembly using the following formula.

Output per disc assembly (l/hr) =

$$\frac{\text{Application rate(l/ha)} \times \text{Speed(km/hr)} \times \text{Row width(m)}}{10 \times \text{No. of disc assemblies}}$$

STEP 3 ***Disc Setting and Spraying Pressure***
a) From the Disc Output Chart on the next page select the disc setting and spraying pressure that most closely match the required output per disc which was calculated in Step 2.

b) Set the disc position by loosening both wing nuts on the disc assembly and rotating the disc until the required number appears in the recess. After setting the position retighten the wing nuts. Set all discs on the head to the same position.

Note: The calibration discs fitted to the Turbomiser 2000 are colour coded yellow. The holes in the discs have a square leading edge and a chamfered edge on the other side. Ensure the square edge faces upstream towards the in-coming fluid flow.

c) Set the spraying pressure to the figure chosen from the Disc Output Chart by adjusting the manual throttling valve and the electric pressure regulator as described in the section headed Pressure Adjustment.

STEP 4 ***Calibration Checking***
After setting the disc positions and spraying pressure, test the sprayer with water to confirm the disc output rate.

Fill the tank to the brim or a specific mark then run the sprayer at 540 PTO rpm for a measured time at operating pressure with all nozzles spraying. A run time of 2 minutes should be sufficient.

Measure the litres of water required to refill the sprayer to the brim or chosen mark, then use the following formula to calculate the output rate per disc assembly.
Verify that the result matches the required output rate that was calculated in step 2.

Output per disc assembly (l/hr)

$$= \frac{\text{Vol. to refill (litres)} \times 60}{\text{Time (min)} \times \text{No disc assemblies}}$$

For small variations, increase the spraying pressure to increase the output or reduce the pressure to reduce output.

An example of disc selection is shown on the next page and worksheets which you can use to record your calibration results are shown on page 15.

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Disc Setting and Calibration

DISC OUTPUT CHART For Yellow Colour Coded Disc			
Output Volume (Litres/Hour) per Disc Assembly			
DISC SETTING	**PRESSURE**		
	1 Bar (14.5 psi)	2 Bar (29 psi)	3 Bar (43.5 psi)
1	42	57	60
2	45	63	72
3	51	78	90
4	63	87	105
5	81	117	141
6	87	126	150
7	135	210	255
8	165	234	285
9	213	300	363
10	246	351	429
11	309	453	561
12	390	600	726
13	471	726	906
14	534	810	1026
15	588	882	1161

Calibration Example

This example applies to a unit fitted with a spray head which has four disc assemblies. The same procedure would be used for a head with a different number of discs by simply inserting the appropriate number in the calculation.

STEP 1

a) Required application rate = 300 l/ha
b) Chosen speed = 6 km/hr
c) Row width = 3 m
d) No. of disc assemblies = 4

STEP 2

Spray output needed per disc assembly (l/hr) =

$$\frac{\text{Application Rate(l/ha) x Speed (km/h) x Row width(m)}}{\text{10 x No. disc assemblies}}$$

$$= \frac{300 \times 6 \times 3}{10 \times 4} = 135 \text{ l/hr}$$

STEP 3

From the Disc Output Chart find the disc and pressure setting which gives the output closest to 135 litres/hour.

Position 7 at 1 Bar will give 135 l/hr.

STEP 4

Fill the tank with water to a mark. Run the sprayer at 540 PTO rpm and a little over 2 Bar spraying pressure with all nozzles operating.

Measure the run time and volume to refill to the mark, then calculate the output per disc.

Output per disc assembly (l/hr)

$$= \frac{\text{Vol. to refill (litres) x 60}}{\text{Time (min) x No disc assemblies}}$$

$$= \frac{18 \times 60}{2 \times 4} = 135 \text{ l/hr}$$

The above calculation assumes that the run time is 2 minutes and the refill volume is 18 litres which gives the correct result.

The run time and refill amount may be different in an actual test but the calculated output should be close to 135 l/hr if the calibration is correct.

Siluan

Disc Setting and Calibration

Calibration Worksheets

The two worksheets below can be used to record the results of calibration tests on your sprayer.

Machine Details

Sprayer Model: _____

Head Fitted: _____

No. Disc Assemblies: _____

Spraying Requirements

Application Rate: _____ litres/ha

Speed of Travel: _____ km/hr

Row Spacing: _____ metres

Required Output per Disc Assembly

Output per disc (l/hr) = Application Rate x Speed x Row Width / 10 x No disc assemblies

= x x / 10 x

= litres/hr

Settings Selected from Chart

Disc Position: _____

Pressure setting: _____ Bar

Verification Test

Date of Test: _____

Run Time: _____ minutes

Refill Volume: _____ litres

Calculated Output per disc assembly: _____ litres/hr

Output per disc (l/hr) = Vol. to refill (litres) x 60 / Time (min) x No disc assemblies

= x 60 / x = litres/hr

Machine Details

Sprayer Model: _____

Head Fitted: _____

No. Disc Assemblies: _____

Spraying Requirements

Application Rate: _____ litres/ha

Speed of Travel: _____ km/hr

Row Spacing: _____ metres

Required Output per Disc Assembly

Output per disc (l/hr) = Application Rate x Speed x Row Width / 10 x No disc assemblies

= x x / 10 x

= litres/hr

Settings Selected from Chart

Disc Position: _____

Pressure setting: _____ Bar

Verification Test

Date of Test: _____

Run Time: _____ minutes

Refill Volume: _____ litres

Calculated Output per disc assembly: _____ litres/hr

Output per disc (l/hr) = Vol. to refill (litres) x 60 / Time (min) x No disc assemblies

= x 60 / x = litres/hr

Spray Head Operation and Adjustment

Spray Head Configuration

A comprehensive range of interchangeable spray heads can be fitted to the Turbomiser 2000 to suit a wide variety of crops and differing methods of cultivation. For a listing of available head types refer to the Specifications section.

Each head can be configured in a variety of ways to optimise the spray pattern by using some, or all, of the following methods of adjustment:

1. The alignment of the spray diffusers can be adjusted to control the direction of discharge. On some heads they can also be relocated.
2. The liquid flow rate to each nozzle can be adjusted with an individual control tap; or turned off completely to avoid chemical wastage on areas not requiring coverage. On heads with fishtail diffusers, the control taps close off the fluid flow to sections of the spray bar within the fishtail.
3. The proportion of the air flow which passes through each outlet of the multiple trumpet diffusers, fitted to Vineyard, 4x4 and 5x5 heads, can be regulated by fitting a different size trumpet. The trumpets are a push fit in their sockets and the size is marked on the body of each trumpet. The standard sizes are 6/50, 8/50 and 10/50. The first number relates to the size of the trumpet (the higher the number the larger the trumpet) and the other numbers signify that the connection is 50 mm in diameter.
4. The air flow through any trumpet can be stopped by replacing it with one of the plug-in blanking caps supplied with the head. This will increase the air flow through the remaining unblanked trumpets.
5. In some situations multiple trumpet diffusers can be replaced by a single cannon to propel the discharge over a greater distance in a more concentrated pattern. The cannon is marked with its size and plugs into the same socket as the diffuser. The usual cannon size is 22.5/120, indicating a 120 mm connection.

Adjusting Sprayheads

At all times when working near the rear of the sprayer exercise extreme care and wear the appropriate protective clothing. Heads should only be adjusted with the sprayer stationary and the tractor PTO drive disengaged. Never stand on the machine to make adjustments.

After adjustment check the spray pattern in the crop for correct targeting before proceeding with the spray run.

Selecting the Travel Speed

Correct ground speed is an important factor in achieving good crop coverage whilst avoiding overspray and wastage of chemicals.

The most suitable speed can be established by making a trial run using water in the tank and having an assistant observe the penetration and crop coverage.

1. Firstly consider the terrain of the orchard or vineyard and choose a speed which will ensure safe operation.
2. Fill the tank with water and set the calibration discs to give a medium application rate (300 to 400 l/ha) to make the spray pattern and coverage easily visible to the observer.
3. Choose a speed that you believe is fairly suitable and begin a spraying run with the observer walking behind the machine to check the extent of crop penetration.
4. In vines and trellis fruit crops, the observer should expect to see the spray just “puffing” through the far side of the target if the travel speed is correct. In tree crops the observer should expect to see the spray penetrating about 3/4 of the way through the target.
5. If the penetration is greater than described, increase the ground speed and retest. If less than described then reduce the speed and retest. Adjust the speed in small increments until a satisfactory coverage is achieved and note the result for future reference.

Vines

Double Sided 4x4 and 5x5 Heads

These heads have multi trumpet diffusers and are normally used in overhead and traditional trellis systems.

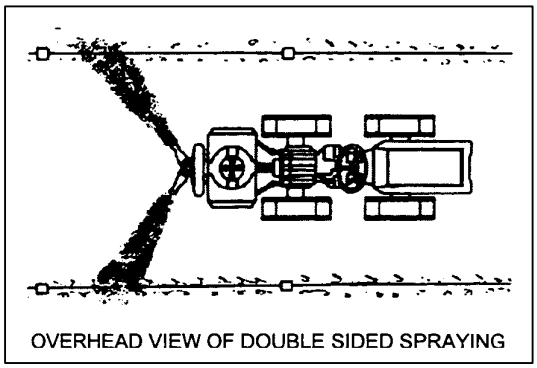
Set the diffusers at an angle from the rear of the sprayer and direct them vertically at the crop to obtain complete coverage and also to minimise overspray.

Turn off the fluid flow to any trumpets which are not directed at the crop. Blank these trumpets if it is necessary to increase the air flow to the other trumpets to gain proper crop coverage.

Observe the spray output from each trumpet and adjust the individual control taps to achieve a visually similar output pattern from all trumpets.

The diffusers should be at sufficient distance from the crop to produce some overlap of the spray discharge to avoid “stripping” in the cover.

Spray Head Operation and Adjustment



OVERHEAD VIEW OF DOUBLE SIDED SPRAYING

Vineyard/Skip Row Heads
The Vineyard head provides a converging spray from multi trumpet diffusers above and below the crop to give broad, even coverage in many vine canopy systems. It can also be used for skip row spraying by fitting cannons in the top diffusers.

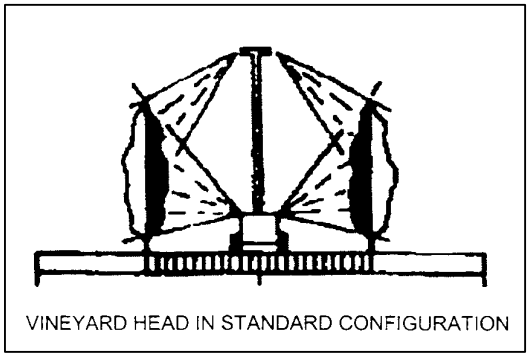
Standard Configuration
The diffusers should be angled back to assist in canopy penetration and to reduce "shingling", or the overlapping of leaves under spray action.

The vertical alignment of the upper and lower diffusers should be set to achieve a converging air flow but should not clash. The air streams should cross 40 to 50 cms from the centre of the vine body to ensure coverage of all shoots.

Using larger trumpets in the locations which are directed at critical points in the crop will ensure greater penetration of these areas.

Difficult to penetrate, or fruiting, zones may be targeted by using a cannon in the lower diffuser. In some circumstances, cannons may be used in both the upper and lower diffusers to direct large volumes of water and air at fruit lines.

New Plantings
For new plantings use the top cannons only and direct the spray onto the vines from above.



VINEYARD HEAD IN STANDARD CONFIGURATION

Skip Row Spraying
In skip row spraying the upper diffusers are fitted with cannons to propel the discharge across to the next row on either side, whilst the lower diffusers use multi trumpets to cover the rows adjacent to the sprayer.

This type of operation is particularly applicable to young vines, or those with up to 1/3 canopy, but can only be carried during suitable weather with the wind generally below 5 kph to avoid spray drift.

Set the top cannons at right angles to the line of travel, or angled back by up to 10 degrees, and adjust them vertically so that the spray stream covers the canopy in the skip row. Retest the alignment with the unit at operating speed.

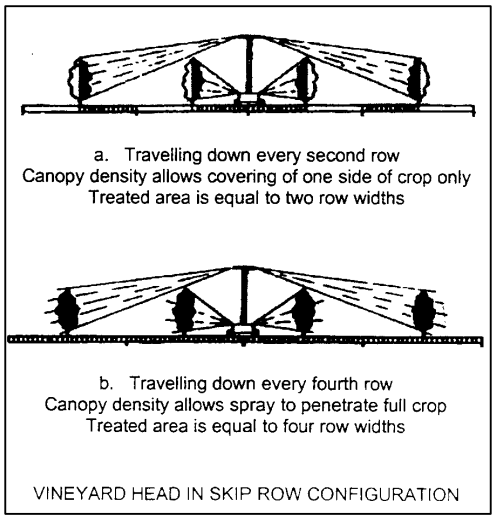
To minimise overspray, turn off the fluid flow to any trumpets on the lower diffusers which are not targeting the crop and if necessary replace the trumpet with a blanking plug.

Fitting 6/50 trumpets to the bottom diffusers will increase the air flow through the upper cannons and assist targeting of the skip row.

Depending upon the density of the canopy, skip row spraying can be done by travelling along:

a. Every second row (if density is sufficient to allow spray to cover only one side of crop)
or,
b. Every fourth row (where density is lighter and the spray can penetrate the full crop).

Refer to the diagrams below.



a. Travelling down every second row
Canopy density allows covering of one side of crop only
Treated area is equal to two row widths

b. Travelling down every fourth row
Canopy density allows spray to penetrate full crop
Treated area is equal to four row widths

VINEYARD HEAD IN SKIP ROW CONFIGURATION

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Spray Head Operation and Adjustment

Skip Row Calibration

Because skip row spraying covers more than one row for each pass of the sprayer, the "Treated Width" must be used in Step 2 of the calibration calculation rather than the "Row Width", refer to page 13.

The treated width is equal to either:

a. Two row widths, or
b. Four row widths

as shown in the diagrams on the previous page.

Tree and Orchard Crops

Trees and orchard crops can be sprayed with the 75^0 Orchard head, the Vineyard head, the Hi Low Orchard head or the Citrus head.

Double Sided 75^0 Orchard Head

This head uses two "fishtail" diffusers which should be angled slightly rearwards from the sprayer and directed vertically at the crop to ensure complete coverage and also to minimise overspray.

Turn off the fluid flow to any section of the fishtails which are not directed at the crop.

Observe the spray output from each diffuser and adjust the individual control taps to achieve a visually similar output pattern from both sides.

Vineyard Head

The Vineyard head is useful for spraying palmette and medium trees in protected situations, such as under netting.

It should be used with four trumpets in each of the upper and lower diffusers, which should be angled back to reduce shingling.

The air streams from the upper and lower diffusers should cross but not clash. Raising the upper diffusers by adding extra tower sections may assist coverage of tall crops.

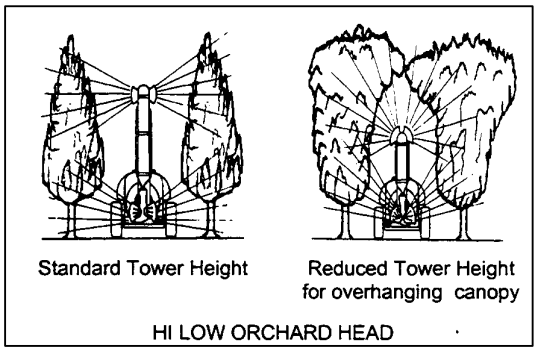
Hi Low Orchard Head and Citrus Head

These heads are fitted with fishtail diffusers with the upper units mounted on an air tower. The Citrus head also has diffusers at an intermediate height on the air tower. Both types are useful in bigger, denser trees. They are best suited to Turbomiser models fitted with the larger 55 mm fan, where the additional airflow increases spray penetration and enables a higher travel speed.

The diffusers should be adjusted vertically to give even coverage across the whole target.

After setting the air direction, the fluid flow should be regulated with the individual taps on the fluid lines to produce an even spray from each diffuser and across the whole head.

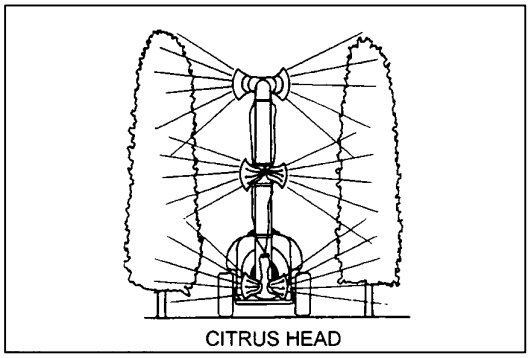
If tree crops overhang the row, it may be necessary to reduce the height of the Hi Low head by removing the upper air tower section.



HI LOW ORCHARD HEAD

The Citrus head should be used in taller crops, as its intermediate diffusers will ensure adequate coverage in the central area of the crop.

Lateral extensions and elbows may be fitted to the lower diffusers of either head to project spray up into the tree from beneath the skirt.


CITRUS HEAD

Tropical Fruit and Nut Crops

Avocado heads and Mango towers are commonly used in these crops.

Avocado Head

The Avocado head directs all the air flow to one side and for this reason it can be used where the horsepower required for larger spray heads is unavailable.

The diffuser has either four fixed canon sized outlets, or one fixed and three interchangeable

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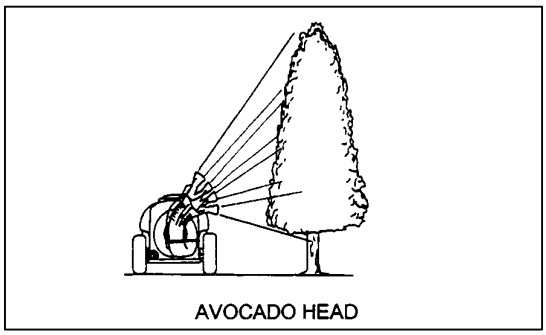
Spray Head Operation and Adjustment

canons. It should be directed so that all areas of foliage are covered and the individual fluid flow taps should be adjusted to provide an even coverage of the tree.



AVOCADO HEAD

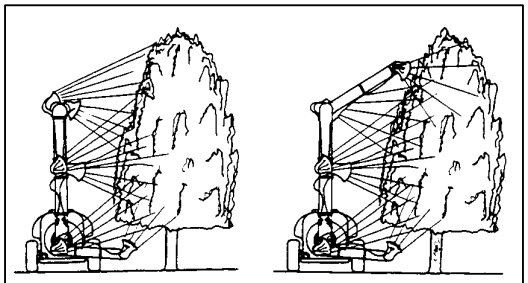
Mango Tower

This head is designed primarily for one sided spraying in tall, dense tree crops but it may be used for double sided spraying in less critical situations, such as foliar fertilising.

The Mango Tower uses fishtail diffusers mounted on an air tower and has one of the bottom diffusers offset to facilitate under-skirt spraying up into the centre of the tree. A similar offset arrangement can be made to one of the top diffusers to direct spray downwards through the tree, if the pruning permits.

The vertical alignment of the diffusers should be set so that the air flow achieves the optimum penetration and cover.

As in the case of all other heads, once the direction of the air flow has been adjusted the fluid flow should be regulated with the individual taps to provide even coverage.



With lower extension for under-skirt spraying

Using upper and lower extensions

MANGO TOWER

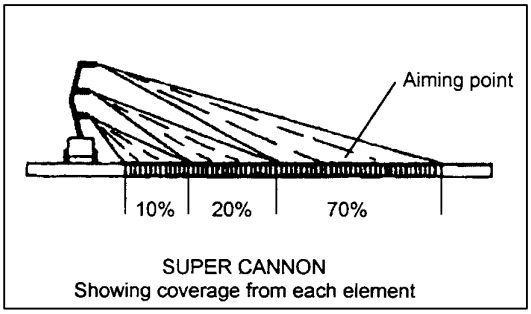
Vegetables

Super Cannon and Turntable

The Super Cannon enables efficient, high speed coverage of vegetable, row and field crops. It consists of a large top cannon to cover approximately 70% of the target furthermost from the sprayer, a smaller cannon covering about 20% of the spray area in the middle region and a fish tail diffuser to cover the remaining 10% of the area close to the sprayer, as shown below.

To achieve the necessary fluid flow the top cannon is supplied through two distributors and the lower cannon and bottom diffuser are supplied by one common distributor.

The head is adjusted so that the large cannon is aimed at a position just above the ground and a little under 70% of the distance from the sprayer to the edge of the treated width. The smaller cannon and the fishtail diffuser should then be adjusted to aim at their portions of the treated width so that a continuous coverage is achieved.



SUPER CANNON
Showing coverage from each element

The turntable should be rotated to angle the Super Cannon to the rear, making allowance for the effect of the sprayer's forward speed and any breeze.

When the correct combination of vertical adjustment and rearward angle is achieved, the coverage of the crop will become visibly more uniform and a downward, rolling effect in the spray stream will be observed through the crop right to the edge of the treated width.

Once the air direction has been set the fluid flow can be regulated. The flow to the bottom diffuser should be reduced at the tap until an even, fine spray pattern is achieved. This will direct more fluid to the small cannon which has a greater area to cover. The fluid taps on the top cannon should then be adjusted to provide an even output to the outside fluid streams with slightly more output from the centre fluid streams.

Optional Equipment

The Turbomiser 2000 Trailed Sprayer can be supplied with the following factory or dealer fitted optional equipment. Your Silvan dealer will be able to advise when they may be necessary.

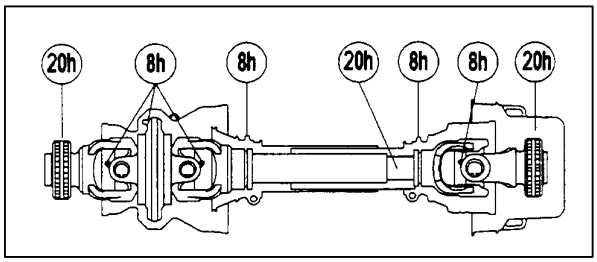
Wide Angle PTO Shaft

This shaft is fitted with a constant velocity joint which incorporates two universal joints, making it capable of operating at much greater angles than a standard PTO shaft.

A wide angle PTO shaft should always be used with the optional swivelling drawbar (see below).

When using the standard sprayer drawbar, a wide angle PTO shaft should only be needed if the tractor drawbar prevents correct alignment of the regular PTO shaft, refer Installation section.

When lubricating a wide angle PTO ensure that both the rear universals are greased, as shown in the diagram below. Lubrication intervals and all other greasing points are the same as a standard PTO shaft. Refer to the Lubrication and Maintenance section for further information on PTO lubrication.



Extended Drawbar

The extended drawbar is 30 cm longer than the standard drawbar and may be necessary when the sprayer is attached to a very large tractor to provide sufficient clearance between the sprayer and tractor tires when turning.

The extended drawbar may also be needed if a wide angle PTO is installed to provide clearance for the larger rear universal joint. This will depend upon the particular tractor used.

Glideflex Axle

The Glideflex axle is designed to reduce sprayer bounce on uneven terrain, particularly when the tank is empty, or nearly empty.

It features a cushioning unit at each end of the split axle which pivots in the centre to allow the wheels of the sprayer to ride up and down over bumps independently. As the tank is emptied and the weight of the sprayer reduces, the operation of the cushioning unit allows the extent of suspension travel to gradually increase which provides a softer ride.

Due to its special design, the wheel track cannot be adjusted on the Glideflex axle.

Spray Controller

In addition to the functions of the standard control box, the optional Spray Controller enables pre-programmed application rates to be selected and maintained whilst operating and it also monitors information which can be used to increase the efficiency of spraying.

Spraying can be stopped and started, pressure can be regulated and the discharge can be directed to either, or both, sides of the sprayer whilst operating. Any of the pre-programmed application rates can be selected whilst spraying and the controller will maintain the rate if ground speed varies by making pressure adjustments.

The controller monitors and provides a read out of ground speed, application rate, area covered, chemical volume used and remaining in the tank, as well as the rate of chemical use. The built in memory retains the information when the sprayer is switched off.

A comprehensive installation and operation manual is provided with the controller.

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Optional Equipment

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Trouble Shooting

Pump does not prime
- Insufficient liquid in tank to cover suction inlet
- Suction filter blocked.
- Suction filter stop valve closed.
- Suction filter bowl loose or missing O-ring.
- Suction line loose allowing pump to suck air.
- Pump drive belt loose and/or slipping.
- Pump impeller badly worn.

Pump does not reach correct pressure
- PTO not operating at full 540 rpm.
- Pump drive belt loose and/or slipping.
- Suction filter blocked.
- Suction filter stop valve partly closed
- Electric pressure regulator not correctly set.
- Manual throttling valve not correctly adjusted.
- Pressure gauge faulty or line blocked.
- Chemical inductor flushing tap left on.

Pump leaking liquid
- Mechanical seal worn or damaged.

Air speed or volume reduced
- Fan mesh blocked with leaves or debris.
- PTO not operating at full 540 PTO rpm.
- Fan drive belt loose and/or slipping.
- Head air outlets not matched to fan size.

Spray heads “fluttering”
- Air outlets incorrectly aligned.
- Air blanking caps fitted but liquid flow not turned off.
- Blocked or damaged fluid lines.
- Air leaking into fluid line between nozzle and calibration disc assembly.

Individual outlets not spraying
- Individual adjusting taps turned off.
- Manifold blocked.
- Hoses bent or crushed.
- Calibration disc holes blocked.

Flow delayed when spray heads turned on
- One way check valves, if fitted to the spray head, may be blocked or fitted in the wrong flow direction.

Poor tank agitation
- Chemical left in tank whilst not operating.
- By-pass agitator in bottom of tank blocked.
- Mechanical agitator belt loose and/or slipping

Electric valves or regulator not operating
- Wiring damaged or corroded.
- Connectors in loom quick coupler corroded.
- Low battery voltage.

Fan noisy and/or vibrating
- Bearings worn.
- Fan damaged or out of balance.
- Tractor PTO incorrectly installed

Over-run clutch noisy
- Clutch requires greasing.
- Clutch pawls worn.

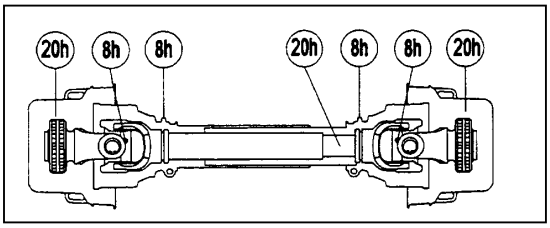
Drive shaft noisy
- PTO shaft not secured properly to shafts.
- Incorrect hitch point and PTO geometry.
- Universal joint crosses worn.

Silvan

Lubrication and Maintenance

Start Up Inspection
During the first few days of operation, before starting each day check that all hardware is tight and tighten all hose clamps. Inspect the unit for leaks while running .

PTO Shaft to Tractor
Grease the PTO shaft with multi-purpose grease at the time intervals shown below. This is the amount of lubrication recommended for normal operation. More frequent inspection and lubrication may be needed under very dusty conditions.



Every 20 hours slide the PTO shaft apart, clean the telescopic tubes with kerosene and apply multi-purpose grease to the sliding surfaces, then reassemble. This is most important in dusty conditions.

Internal PTO Shaft
Grease the single universal joint on the internal PTO shaft, which is connected to the fan drive at the rear of the sprayer, with multi-purpose grease every 50 hours.

The telescoping sections of this internal shaft do not require regular greasing as the shaft length is constant and the sections do not slide in operation. Check that the shaft is free to slide during the annual general inspection.

Other Greasing Points
Lubricate all other grease nipples on the sprayer in accordance with Lubrication Schedule shown on the next page.

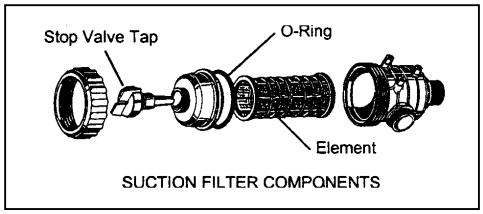
Pump
Add oil to the flip top cap on the pump shaft in accordance with the Lubrication Schedule.

Note. Fluid leaking from the pump housing indicates damaged seals which should be replaced immediately.

Filters
Clean all filters regularly. The best method is to wash them with a soft bristle brush. Check for any tears or holes and replace if damaged.

Check and if necessary clean the basket strainer under the tank lid before each fill.

Always clean the suction filter before each tank refill and at the end of the day. Close the stop valve by pushing the yellow tap in and turning it counterclockwise, then unscrew the filter cover to remove the element, refer diagram in Operation section. Ensure the O-ring is in good condition when refitting.



SUCTION FILTER COMPONENTS

Tank, Pump and Spray Lines
At the end of each day run clean water through the pump, spray heads and lines to purge them of chemicals. Rinse out the tank to remove any powdered material.

Never leave chemicals in the tank that may settle to the bottom, harden and break into lumps as this may block the suction filter.

Dispose of unused chemical, chemical mix, rinse water and chemical containers as recommended by the chemical manufacturer or the relevant government authority.

Caution Do not use a high pressure washer to clean around fan bearings or electrical valves.

Wheel Hubs
Remove the wheel hubs annually and check that the bearings are in good condition and adequately greased. Repack with multi-purpose grease as required.

Adjust the wheel bearings by tightening the axle nut, then backing it off by approximately 1/6 turn before installing the cotter pin. Check that the hubs are free to rotate without any end-play.

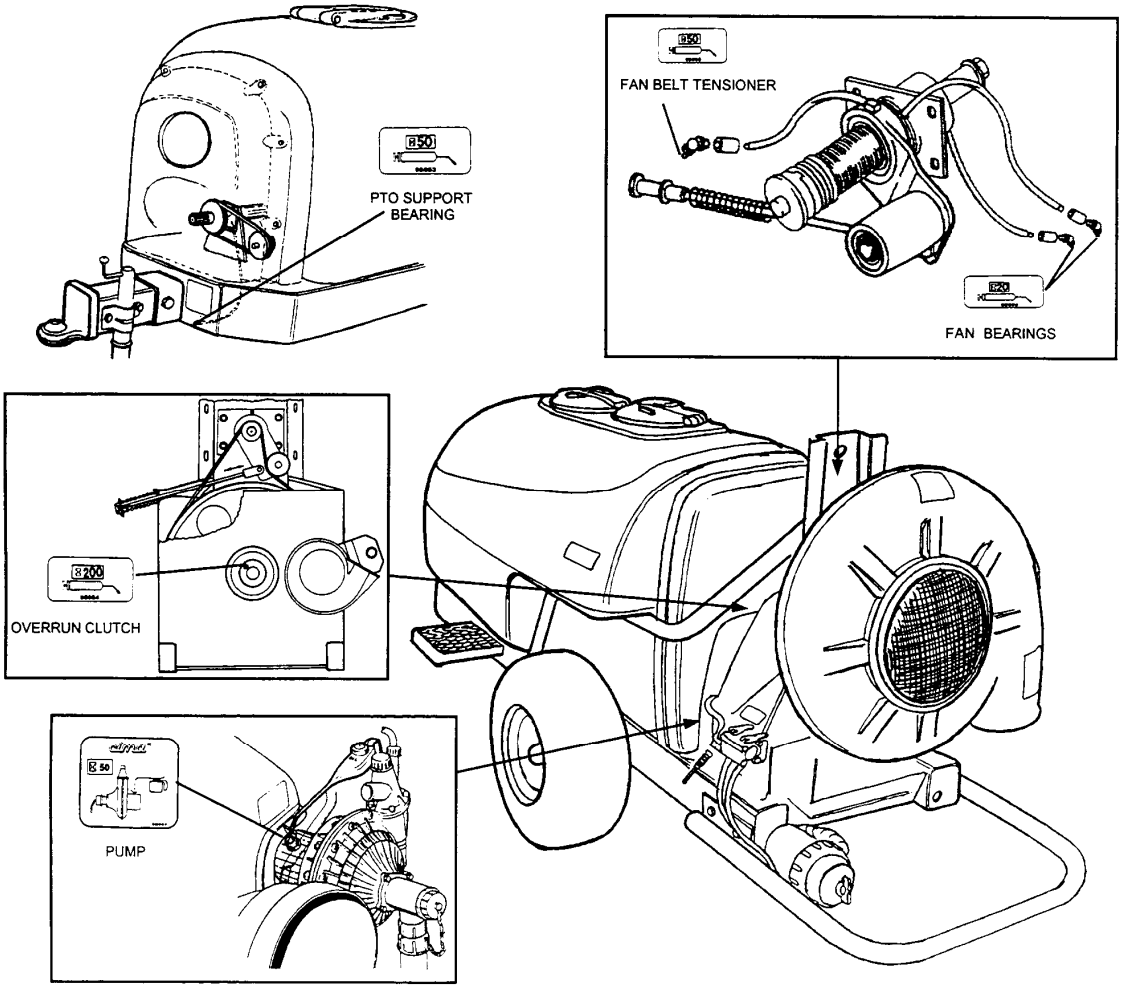
Tyres
Inspect the tyres regularly and inflate to 250 kpa (35 psi) if necessary.

Annual Inspection (or 350 hours)
At the end of each season or every 350 hours inspect the sprayer for any signs of damage, corrosion or leakage. Replace any parts that are affected by chemical contamination. Check that all bolts are securely tightened and that all hose connections are tight.

Siluan

Lubrication and Maintenance

LUBRICATION SCHEDULE			
LOCATION	LUBRICANT TYPE	QUANTITY	PERIOD
Fan bearings 2 nipples	SKF - LGMT2 Shell Stamina U2	10 gm each	20 hr
Fan belt tensioner	Multi-purpose grease	10 gm	50 hr
PTO support bearing	Multi-purpose grease	5 gm	50 hr
Over-run clutch	Multi-purpose grease	15 gm	200 hr
Pump	Multi-purpose oil 20W/40	2 ml	50 hr
IT IS IMPORTANT TO USE SPECIFIED GREASE IN FAN BEARINGS ONE PUMP OF A GREASE GUN IS APPROXIMATELY 1 GM			



Silvan

Lubrication and Maintenance

Adjustment of Drive Belts

Check the tension on the belts driving the fan, pump and agitator regularly and if necessary adjust as described below.

Fan Drive Belt

As the poly-vee fan belt transmits considerable power, correct tension needs to be maintained to avoid loss of air flow due to belt slippage. Tension is applied by means of an adjustable, spring loaded link connected to the arm of an idler pulley running on the back of the belt. The spring loading maintains constant tension and minimises the need for frequent adjustments.

The tension link is accessible from the RH side of the sprayer between the rear of the tank and the fan. To adjust, loosen the locknut and turn the inner nut so that the length of the spring is between the 9 and 12 cm as shown in the diagram. Retighten the locknut.

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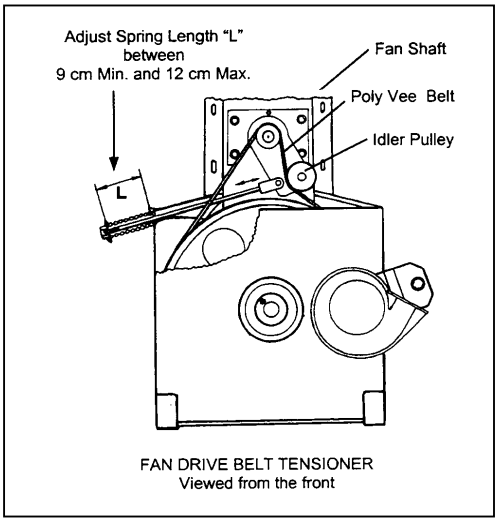
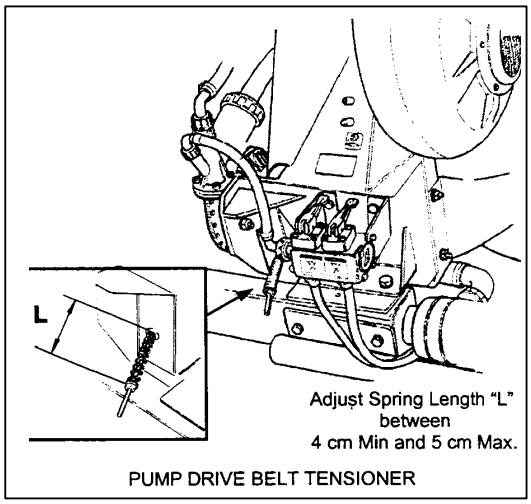


FAN DRIVE BELT TENSIONER
Viewed from the front

Pump Drive Belt

An "SPZ" section vee belt from the fan shaft drives the centrifugal pump which is mounted on a pivoting bracket. Tension is applied by means of an adjustable, spring loaded link connected to the pump bracket. It is essential that the spring is kept adjusted to the correct length to avoid low fluid pressure due to belt slippage.

The spring is accessible at the LH rear corner of the sprayer. To adjust, turn the nut so that the length of the spring is between 4 and 5 cm as shown in the diagram.



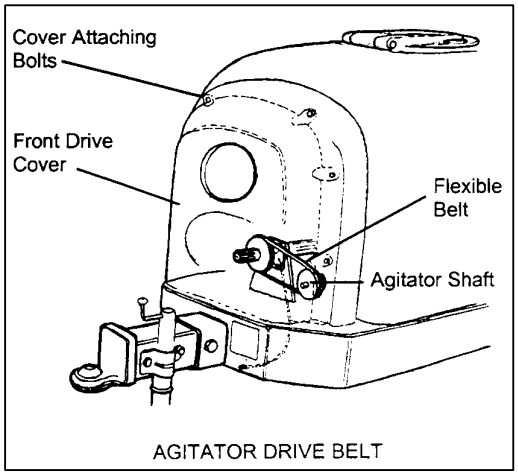
PUMP DRIVE BELT TENSIONER

Agitator Drive Belt

The propeller agitator is driven directly from the PTO shaft at the front of the tank by a flexible tubular belt which is self tensioning. To check whether the agitator is driving correctly observe it through the rear opening on top of the tank, when empty. If it is not operating correctly it probably indicates that the belt has stretched and requires shortening.

To access the belt for adjustment, disconnect the PTO shaft from the sprayer, remove the front cover attaching bolts and remove the cover.

Remove the belt and cut it at either side of the join, adjacent to the ends of the connector piece. Shorten the belt to an overall length of 630 mm, remove the connector from the cut out section and use it to rejoin the shortened belt. Reinstall the cover and PTO shaft after adjustment.



AGITATOR DRIVE BELT

PRE DELIVERY, INSTALLATION AND WARRANTY REGISTRATION FORM GENERAL

IMPORTANT: This form is to be completed and returned to Silvan within 10 working days of installation. Failure to do so may result in a limited warranty period.

PRODUCT DETAILS

Model Description : .....

Silvan Serial No: .....

Pump Model & Serial No: .....

Original Equipment Manufacture's Serial No .....

Optional Equipment:

- ☐ Hose Reel
- ☐ KEE Controller
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

Machines intended use ☐ Private & Commercial Agriculture ☐ Agricultural Contractor & Government Department ☐ Non Agricultural Application

PRE-DELIVERY CHECKS *As Applicable*	*Tick when passed*
All equipment correctly supplied in good order. Owners kit supplied.	
PUMP	
Check diaphragm pump oil level and gearbox if fitted to motorised unit.	
Check surge chamber pressure suits operating pressure if fitted.	
Check pump feet are secure	
Check pressure switch operates if fitted (12 Volt Models).	
FILTRATION	
Check lid strainer and suction filter element.	
Check suction filter O-ring for correct position.	
HOSING	
Check hoses for kinks or damage.	
Check clearance from wear points.	
Check hose clamps and fittings are tight.	
ELECTRIC CONTROLS	
Connect to 12 volt supply and check operation.	
TANK	
Check for sealing of all outlets.	
Clean contaminants from tank.	
Check lid for correct sealing.	
Check mounting points are correct and tight.	
BOOM OPERATION	
Ensure boom folds correctly.	
Ensure boom height control operates correctly	
ENGINE	
Check lubrication level and top up if necessary.	
Operate engine and ensure it starts and runs correctly.	
MISCELLANEOUS	
Lubricate all grease points as per operators manual.	
Check all safety gaurds are secure and safety decals are in place.	
Check all optional equipment supplied for completeness and fitment.	

OPERATION & INSTALLATION CHECKS	*Tick when passed*
OPERATION	
Fill tank with water above all fittings and check the drain plug, filter, suction and by-pass hoses for leaks.	
Check folding operation of boom.	
Check optional equipment fitted for correct operation.	
Attach to vehicle, ensure control valve is in by-pass and all taps off.	
Start motor and adjust pump to maximum operating pressure and check for leaks at control, hoses and nozzles.	
All optional equipment fitted and operating correctly	
INSTALLATION	
Has pre-delivery check been carried out? Has the PTO shaft been installed and length checked?	
Are all safety covers and safety decals in place?	
Has customer received and read Operator's Manual?	
Has the customer been fully instructed by the dealer of the safe operation in actual working and transport conditions?	
Has the customer been fully instructed in calibration?	
Is the customer satisfied with the sprayer's performance?	
Is the customer fully instructed in the sprayer's service and maintenance requirements?	
Does the customer fully understand the Silvan New Product Warranty Policy?	

IMPORTANT

By signing this Pre-delivery, Installation and Warranty Registration Form:
(a) The Customer acknowledges that he is trained and fully responsible for the safe operation of the sprayer.
(b) The Customer undertakes further, to train any person who might be required to operate the sprayer in all safety aspects as per the Operator's Manual.

Customer Name: _____

Address: _____

_____ P/C _____

Date of installation: _____

Customer Signature: _____

In signing the Dealer meets his obligations of installation, service and warranty start-up as a servicing dealer and supplier of plant.

Dealer Name: _____

Address: _____

_____ P/C _____

Phone: _____

Dealer Signature: _____

SILVAN PUMPS & SPRAYERS (AUST) P/L
ACN 005 160 074
VICTORIA 89 LEWIS RD. WANTIRNA SOUTH 3152
Mail to P.O. Box 218 Wantirna South 3152
TELEPHONE (03) 9887 2788 FACSIMILE (03) 9887 1035

WHITE COPY - SEND TO SILVAN
BLUE COPY - RETAINED BY DEALER
YELLOW COPY - RETAINED BY OWNER

IT IS THE RESPONSIBILITY OF THE DEALER TO FILL OUT AND RETURN THIS FORM TO SILVAN