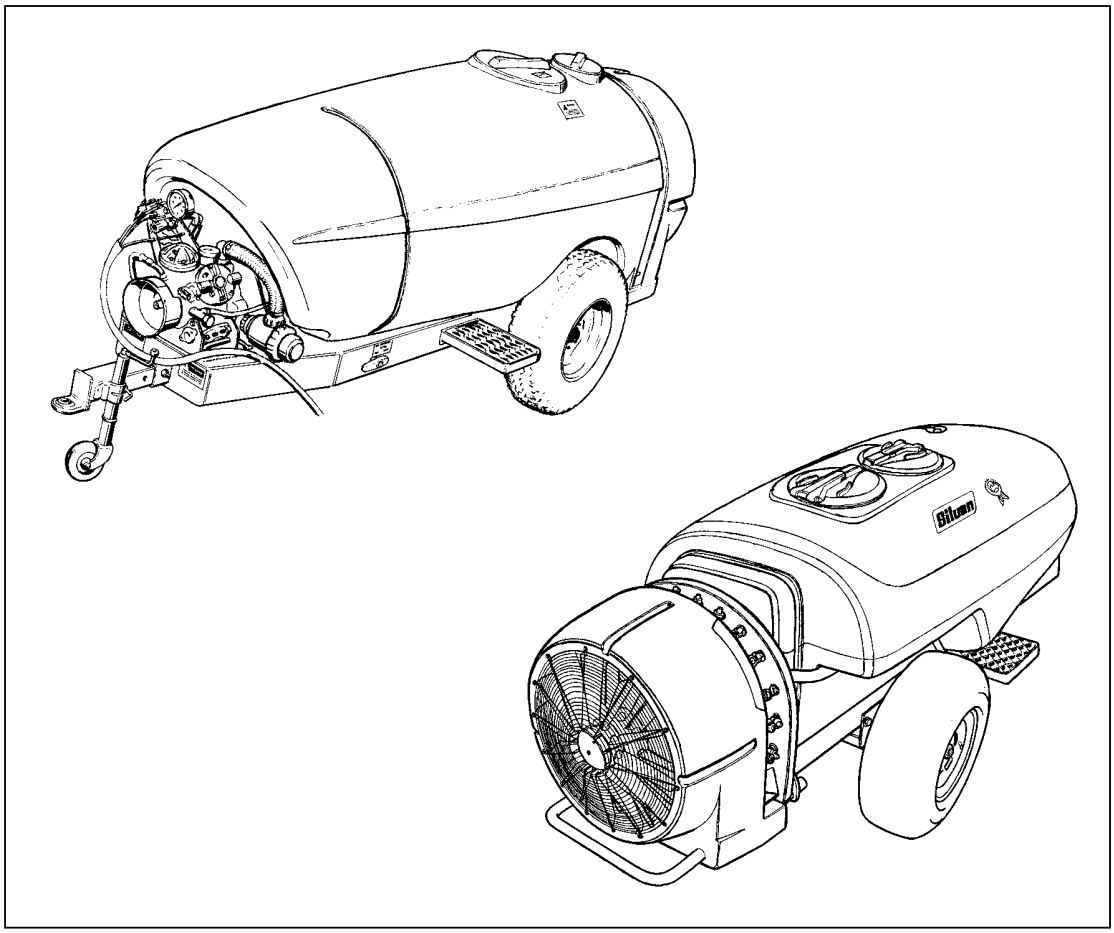
Operator's Manual

MANAB08 - Rev D 1/8/04

Airblast Sprayer
1500L Supaflo
2000L Supaflo
2000L Stiletto



Introduction

Silvan is an Australian owned company specialising in the 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 1500 and 2000 litre Supaflo and 2000 litre Stiletto Airblast Sprayers. These sprayers have been designed and manufactured to provide a high standard of performance and safety and incorporate many innovative features. To ensure continued efficient performance and safe operation of your sprayer, you need to read this manual thoroughly and fully familiarise yourself with all aspects of the sprayer'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.

YOUR SPRAYER DETAILS

Record the details of your Airblast sprayer here for future reference when discussing service with your Silvan dealer, ordering parts or making a warranty claim.

SERIAL NUMBER _____

MODEL _____

DATE OF DELIVERY _____

SELLING DEALER _____

ADDRESS _____

TELEPHONE NO. _____

INSTALLED BY _____

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Contents

About Your Warranty

Silvan Australia Pty. Ltd. welcomes any warranty repair and apologises for any inconvenience. See the following page for the express warranty coverage offered. 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 such as a seized PTO due to lack of lubrication.

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.

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 machine 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) All communication costs made by the owner in connection with the warranty repair.

New Product Warranty

WARRANTY POLICY

Silvan Australia 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 USE – 12 MONTHS
PRIVATE and COMMERCIAL AGRICULTURAL USE – 12 MONTHS
AGRICULTURAL CONTRACTORS – 6 MONTHS
GOVERNMENT and MUNICIPAL DEPARTMENTS – 6 MONTHS
ALL OTHER 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 an authorised Silvan Australia Pty. Ltd. service outlet so as, in any way in the sole and absolute judgement of Silvan Australia 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 any other consequential damages.

The repair of defective products qualifying under this warranty will be performed by an authorised Silvan Australia 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 Australia Pty. Ltd.

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

- **THIS WARRANTY IS THE ONLY WARRANTY APPLICABLE TO SILVAN AUSTRALIA 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 AUSTRALIA PTY. LTD. DOES NOT AUTHORISE ANY PERSON TO CREATE FOR IT ANY OTHER OBLIGATION OR LIABILITY IN CONNECTION WITH THESE PRODUCTS.**
- **SUBJECT ONLY TO LEGISLATIVE OBLIGATIONS TO THE CONTRARY, SILVAN AUSTRALIA PTY. LTD. SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM A PRODUCT PERFORMING IN BREACH OF THIS WRITTEN WARRANTY.**

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Specifications

General
The 1500L and 2000L Airblast Sprayers are designed for application of agricultural chemicals in orchards and vineyards. They use a high pressure pump and nozzles to atomise the chemical solution, together with a high volume axial flow air fan to distribute the spray.

Tank
Polytuff impact resistant polyethylene.
1500 or 2000 litre capacity.
Floating ball calibrated sight line.
455 mm diameter flip top lid and basket strainer.
Drain valve with 38 mm diameter outlet.
30 litre receptacle for chemicals (Supaflo only).
15 litre clean water tank (Stiletto only).

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

Drive
BYPY 540rpm shielded PTO shaft direct coupled to pump with shaft through to fan gearbox.

Pump
Positive displacement oil backed diaphragm pump of varying size depending on sprayer specification. Nitrile diaphragms and corrosion resistant, anodised aluminium body.
Pump output and maximum operating pressure at 540 PTO rpm as shown below.

Pump No.	Output (l/min)	Max.Pressure (Bar)
APS-121	115	50
APS-145	142	50
APS-166	163	50

Fan and Drive
Variable pitch 10 blade axial flow type of 900 mm diameter with cast aluminium hub and blades.
Adjustable polyethylene cowling with protective mesh screen.
Airblast straightening vanes.
Two speed, oil bath gearbox with neutral position direct coupled to fan through centrifugal clutch.

	Max.
Speed - at 540 PTO rpm	2,160 rpm
Air speed - at full pitch	50 m/sec
Capacity - at full pitch	85,500 m^3/hr

Controls
Quick detach, cab mounted cable system with central lever for by-pass or spray mode and two outer levers to control fluid flow to either side.
Three outlet valves with one vacant outlet and manual screw type pressure regulator.
Pressure gauge 0-60 Bar glycerine filled.

Nozzles
16 twin non-drip jet nozzles for easy changing of application rate. Flip over action to turn on or off.
Brass body with removable ceramic jets and stainless steel swirl plates.

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

Filtration
Four stage with removable elements.
1) Tank lid strainer 30 mesh.
2) Suction line filter 50 mesh (white).
3) Pressure filter Integral on cable control valve
4) Nozzle strainers Stainless steel.

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

Axle and Wheels
50 mm square axle with sliding track adjustment.
Track width to outside of tyres
Min. 1500 mm Max.1580 mm.
50mm drop axle on Supaflo.
100mm drop axle on Stiletto.
Galvanised steel rims.
31x10.5x15 tubeless tyres.
Operating pressure 250 kpa (35 psi).

Optional Equipment
Electric controls.
11.00 x 16 wheels.
Double sided Full Row Vineyard conveyor with Albuz ATR ceramic hollow cone jets.
Double sided Adjustable Vineyard deflector.
Constant velocity PTO shaft.
Extended drawbar.
Glideflex suspension axle.
40L clean water tank (Supaflo only).

Dimensions and Weights
With standard drawbar retracted and wheels in narrowest track.

Model	**Length**	**Width**	**Height**	**Mass** (kg)	
	(all dimensions in mm)			Empty	Full
1500 Supaflo	3300	1500	1530	600	2100
2000 Supaflo	3750	1500	1530	640	2640
2000 Stiletto	3800	1500	1500	640	2800

To calculate part filled mass, add to empty mass 1 kg per litre of fluid, e.g. 500 kg for 500 litre.

Tractor Power Requirement
Minimum 40 PTO HP at 540 rpm

Maximum Towing Speed
Depends on tractor power and terrain but should not exceed 30 kph under any circumstances.

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 your Silvan Airblast 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.
- ▲ Only operate the sprayer on a tractor fitted with a roll-over protective structure (ROPS), or a cab incorporating a ROPS, complying with AS1636 or equivalent.
- ▲ Wear ear protection when operating the sprayer on a tractor that is not fitted with a sound proofed cabin.
- ▲ Ensure the towing capacity and power of the tractor is suitable for the loaded weight and power requirement 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. Adjust the sprayer wheel track for maximum stability on side slopes. Refer also to the tractor 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 the tractor and sprayer safety shields in place. Carefully check that PTO and driveline shields are correctly installed.
- ▲ Stop the tractor, disengage the PTO, apply the parking brake and switch off the tractor engine before performing any service work on the sprayer.
- ▲ Disconnect the PTO shaft at the tractor and ensure the sprayer is properly supported and restrained 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 equipment. Dispose of empty chemical containers in accordance with the instructions supplied by the chemical manufacturer.
- ▲ Always wear gloves when removing and cleaning filters.
- ▲ Ensure that all operators and associated personnel are familiar with the legal regulations and codes of practice that apply to the safe use, storage and disposal of spray chemicals.
- ▲ **Do not enter the sprayer tank under any circumstances.** If service to the tank is required contact Silvan for correct maintenance procedures.

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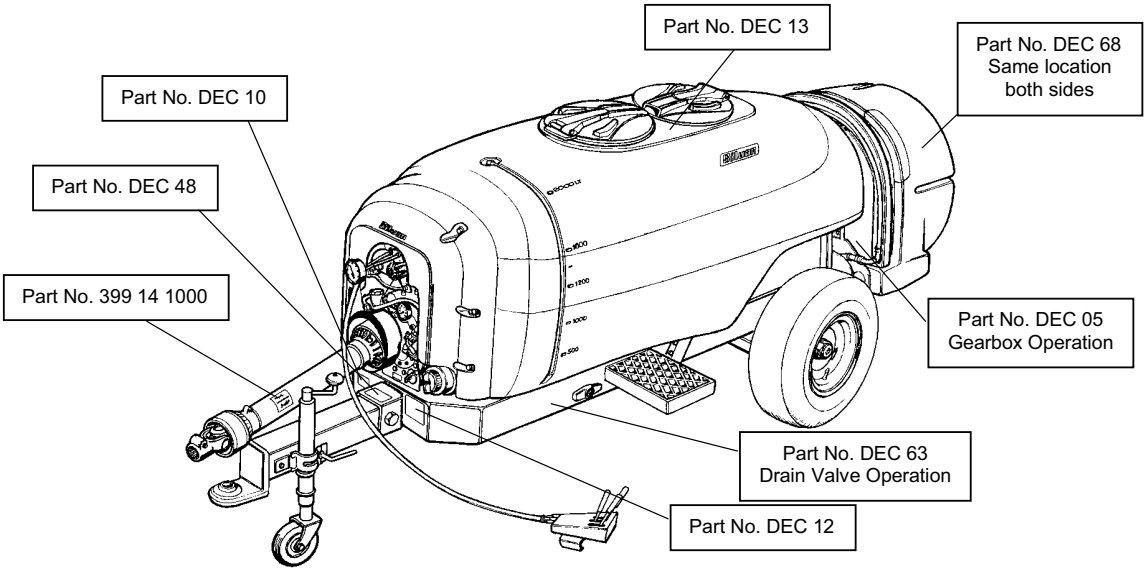
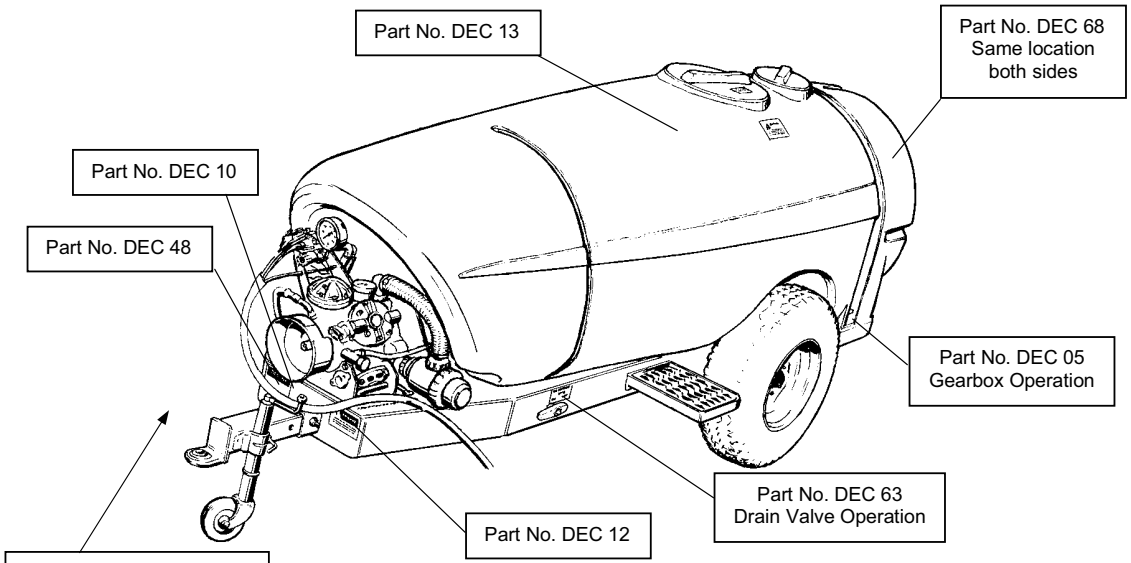
Safety Information

WARNING

The locations of the safety decals fitted to Airblast Sprayers are shown in the diagrams below. The wording of the decals is shown on the following page.
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.



SUPAFLO 2000 AIRBLAST SPRAYER
SUPAFLO 1500 USES SAME DECALS AND DECAL LOCATIONS



STILETTO 2000 AIRBLAST SPRAYER
DECAL LOCATIONS

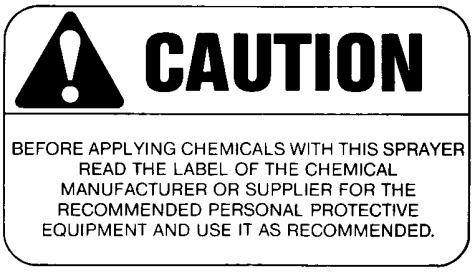
Safety Information

Wording of Safety Warnings

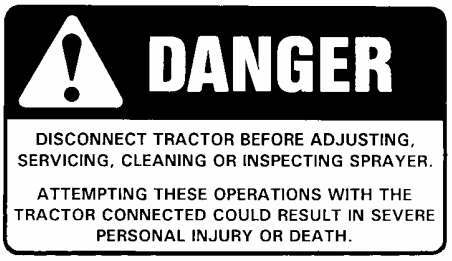
WARNING

The wording of the safety decals shown on the previous pages is given below.
Before operating the sprayer read all safety warning decals.
Failure to comply with these warnings could result in serious injury or death

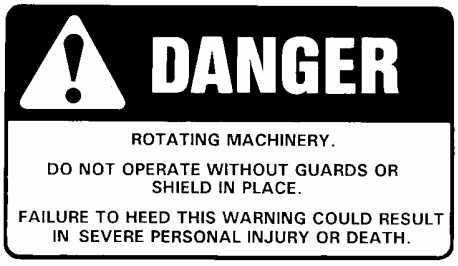
Part Number DEC 48



Part Number DEC 13



Part Number DEC 10



Part Number DEC 12

Part Number DEC 68

Part Number 399 14 1000

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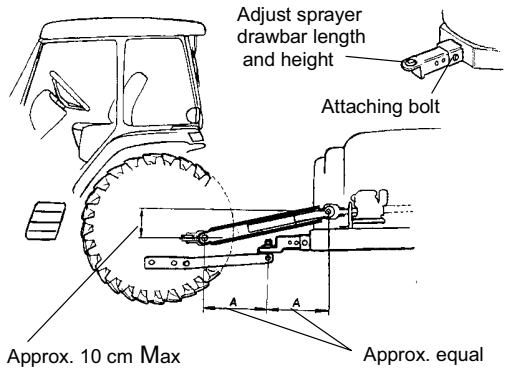
Installation

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 sprayer hitch to level the sprayer. The hitch on the sprayer drawbar can be installed 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.

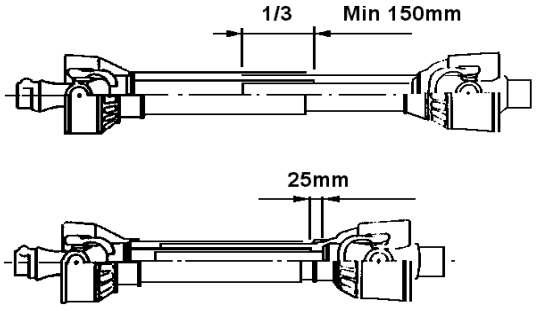


PTO SHAFT ALIGNMENT - Fig 1.

The hitch point between the tractor and sprayer should be approximately midway between the two joints of the PTO shaft and the height difference between the joints should not be greater than about 10 cm, refer Fig 1. This will ensure the joint angles are approximately equal during turns and do not exceed the allowable limit.

The telescoping tubes must overlap by at least 1/3 their length, but not less than 150mm, in all possible operating positions and there must be at least 25mm telescopic movement remaining at the minimum operating length, refer Fig 2.

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



PTO SHAFT ALIGNMENT - Fig 2.

where the bolt holes align. Reinstall the drawbar bolt and tighten securely.

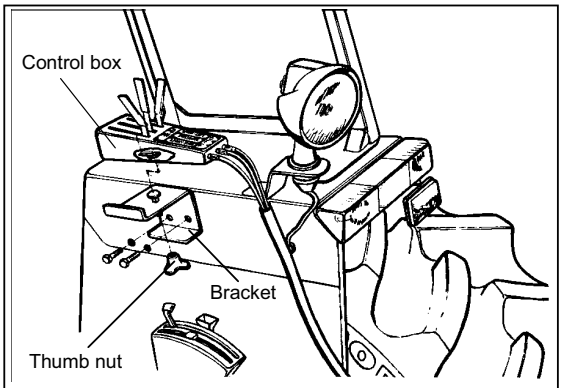
The length of the tractor drawbar may also need to be adjusted.

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 Mounted Cable Controls
Using the mounting bracket as a template, drill two 11mm holes and install the mounting bracket in a convenient location on the tractor with two 10mm bolts, nuts and washers. Ensure that the control levers will be clearly visible and within easy reach of the driver.

Loosen the black thumb nut and slide the Control Box over the square head of the quick attach bolt. Ensure that the cables are clear of the PTO shaft and tractor wheels.



CABIN LEVER CONTROL INSTALLATION

Installation

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 without 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.

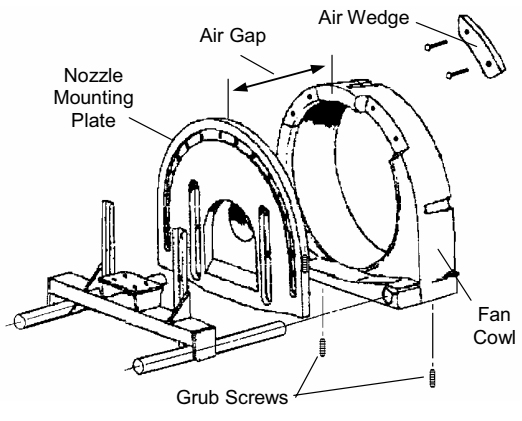
Loosen the four axle U-bolts and the four set screws in the axle adjustment sleeve. Slide the axle shaft on each side to the required track and retighten the U-bolts and set screws securely.

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

Adjusting the Fan

The Supaflo fan has four separate adjustments which can be used to regulate the air flow to suit particular applications.

1. Air Gap The volume and velocity of the airflow can be regulated by adjusting the gap between the fan cowl and the mounting plate for the spray nozzles. Moving the cowl in reduces the gap and increases the air velocity, which is best suited to vines and similar close plantings. Moving the cowl out reduces the air velocity but increases the volume, which is more suited to tree crops such as citrus fruits.



ADJUSTING AIR GAP and REMOVING AIR WEDGES

The cowl slides on two bars at its base and the air gap is regulated by the threaded rod at the top. To adjust the gap, use a 5mm Allen key to loosen the two grub screws on the underside of the cowl that lock onto the slide bars. Loosen the nuts on the top threaded rod and move the cowl to the desired position. The minimum gap is 100mm and the maximum is 140mm. After adjusting, retighten the nuts and grub screws.

2. Air Wedges The air wedges are located on the forward face of the fan cowling at the 10 o'clock and 2 o'clock positions. Removing the wedges increases the air flow to the upper area of the tree canopy in crops such as apples and citrus fruits. To remove the wedges, first remove the two 6mm attaching bolts on each wedge.

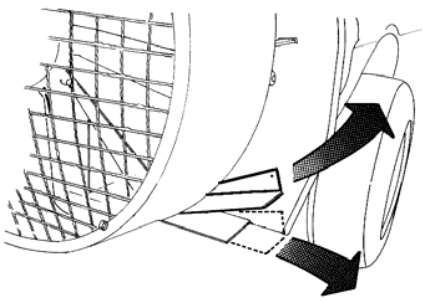
3. Airflow Adjusters An airflow adjuster is located at the base of the fan on either side to influence the direction of airflow. When angled upwards the adjusters direct the airflow upwards to suit free growing trees and taller crops. In the horizontal position the adjusters direct the air more laterally for spraying vines and small to medium height crops.

The adjusters are positioned by removing the outer attaching bolt, pivoting them to the required location and reinstalling the outer bolt.

4. Blade Pitch The pitch angle of the fan blades can be adjusted to match the power output of the tractor if required.

The larger the pitch angle the greater the volume of air that will be displaced and the higher the tractor power that will be required.

Normally when there is sufficient tractor power the fan should be operated at full pitch and if a lower volume of air is required the fan gearbox should be set in the low speed position.



AIRFLOW ADJUSTER

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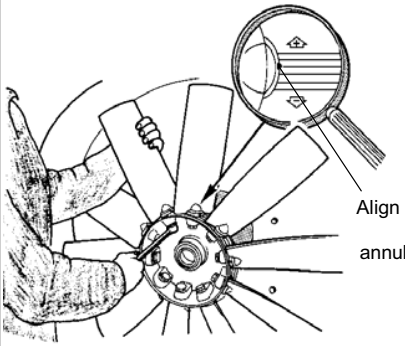
Installation

If power is limited, then the blade pitch should be set so that the power absorbed by the fan, in the high speed position, will leave sufficient tractor power to tow the sprayer over the particular terrain at the required spraying speed with a full tank and the pump at spraying pressure.

> **WARNING** Before adjusting the fan pitch ensure that the tractor engine is switched off, the PTO is disengaged and the fan gearbox is in neutral.

Unscrew the self tapping screws and remove the fan mesh guard. Unbolt the airblast straightening vanes then prise the plastic hub cover from the centre of the fan.



ADJUSTING PITCH OF FAN BLADES

Loosen the nut on each fan blade and turn the blade so that its location mark lines up with one of the annular lines on the hub, as shown in the diagram. Each line adjusts the power consumption of the fan by approximately 3.75 kW when operating at the high speed setting, as shown in the chart below. Ensure that all blades are set to the same annular line. The pitch should not be adjusted past the last annular line as settings beyond this point will not increase the air flow.

Annular Mark		Approx. Power (kW)
Minimum Power	1	15.00
	2	18.75
	3	22.50
	4	26.25
Maximum Power	5	30.00

Retighten the nuts on the fan blades to a torque of 125 N.M. Ensure that the washers are not removed from their respective blades as these are used to adjust the balance of the fan. If the blades or washers are removed or replaced the fan should be rebalanced by your Silvan dealer.

Refit the hub cap, airblast straightening vanes and safety mesh after adjusting the fan blades. Do not overtighten the self tapping screws as this may strip the thread in the plastic.

Airblast Straightening Vanes

Non-adjustable stationary vanes are installed at the rear of the fan cowling to improve the alignment and uniformity of the airblast.

The vanes impart a clockwise rotation to the incoming air to counteract the directional bias in the airblast which results from the anti-clockwise rotation of the fan. With the vanes installed the airblast will be more symmetrically distributed about the centreline of the sprayer and will provide more uniform crop coverage under critical conditions.

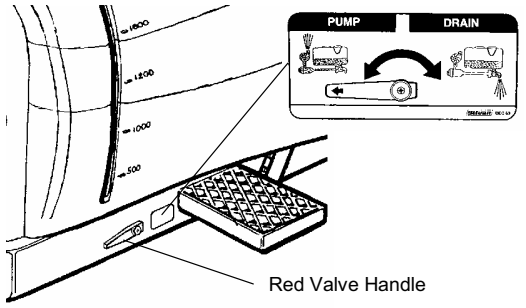
Operation

Starting the Sprayer

Before starting the sprayer for the first time grease all lubrication points including the PTO shafts. Check that the oil level in the diaphragm pump is level with the mark in the viewer and if necessary top up with SAE 20W-50 multigrade engine oil. Ensure that the gearbox oil level is correct. Refer Maintenance section for details.

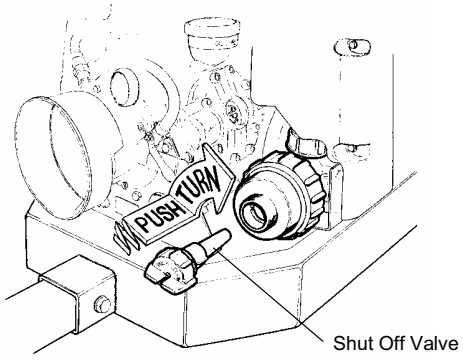
First conduct a trial using clean water only (no chemicals) to familiarise with the controls and to check that all systems are functioning correctly without leakage.

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

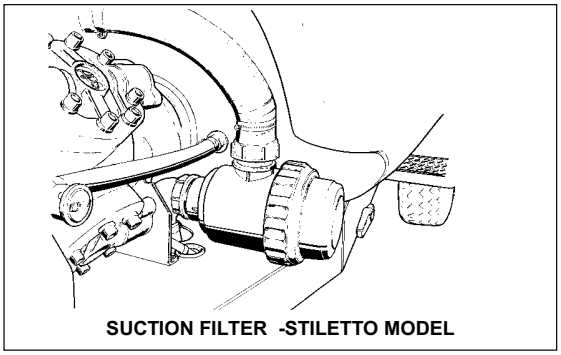


DRAIN VALVE

On Supaflo models ensure the shut off valve in the suction filter is open. It is open when the yellow cap is turned counterclockwise and closed when it is pushed in and turned clockwise. 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.

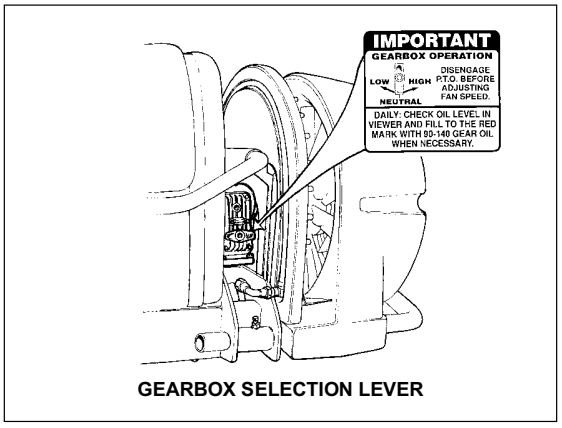


SUCTION FILTER - SUPAFLO MODELS



SUCTION FILTER -STILETTO MODEL

Check that the fan gearbox is engaged and the required speed is selected. Never engage the fan drive with the tractor engine running or the PTO engaged. Moving the gearbox lever to the high position produces maximum airflow. The low position produces less airflow and can be used to protect the crop canopy from damage. The neutral position enables the pump to be operated without the fan for hand spraying or similar operations.



GEARBOX SELECTION LEVER

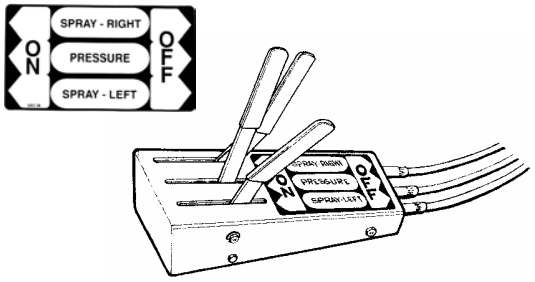
The fan incorporates a centrifugal clutch which protects the gearbox and driveline if the PTO is engaged rapidly. The sprayer should always be operated at 540 PTO rpm to ensure correct operation of the centrifugal clutch and to prevent its premature wear.

Flip the required number of spray nozzles to the open position. Refer to the Calibration section for information on nozzles and jet selection.

Before engaging the PTO, move all three levers of the cabin control to the "off" (or rearward) position. This places the pump into by-pass mode and closes the outlet valves to the spray nozzles on either side of the sprayer.

Engage the PTO slowly and allow the sprayer to run in by-pass mode. Once the pump is primed increase the tractor speed to 540 PTO rpm.

Operation



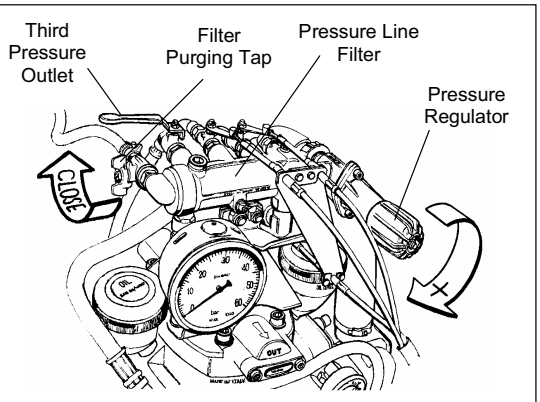
CABIN CONTROLS

Pressure Adjustment

The central lever can then be moved to the pressure "on" position which changes the pump from by-pass to pressure mode. The pressure can now be adjusted with the regulator knob whilst observing the gauge. Rotating the knob in a clockwise direction increases pressure and rotating it anti-clockwise decreases pressure.

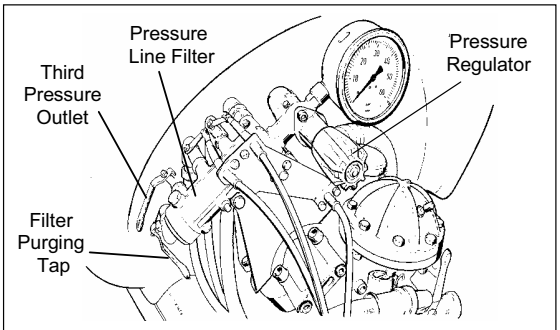
The pump is designed to operate up to 50 Bar (725 psi). The pressure used for spraying may be varied between 10 Bar (145 psi) and the pump's maximum pressure, depending on the application rate - refer to the Calibration section.

Move either, or both, the outer levers to the "on" position to start spraying. Moving one lever directs pressurised liquid to either the left or right side of the sprayer. Moving both levers directs liquid to both sides. Once the outer levers have been positioned, spraying can be started and stopped using the central lever.



PRESSURE CONTROL VALVE – SUPAFLO MODELS

The control valve of both models includes a third outlet that can be used to connect a spray gun or other device. It is operated by a hand lever and is open when the lever is in line with the direction of flow and closed when the lever is across the flow.



PRESSURE CONTROL VALVE – STILETTO MODEL

The control valves are also fitted with an integral filter on the pressure output side. The filter can be cleaned by opening the tap at the end of the filter body to flush any foreign material back to tank. Ensure the tap is closed when spraying.

When familiar with the operation of the controls conduct a trial spraying run using water to verify that the sprayer is functioning correctly and is set up for your application. In particular, observe the airflow direction, measure the nozzle output rate and check that the system is free from any leaks.

To shut the sprayer down move the central lever to the pressure "off" position, reduce engine speed and disengage the tractor PTO drive.

Chemicals can now be added to the tank.

Adding Chemicals

Before adding chemicals read and follow the chemical manufacturer's instructions and wear the recommended protective clothing.

Chemicals can be added to the tank through the top opening or, on Supaflo models, more safely and conveniently by use of the chemical inductor.

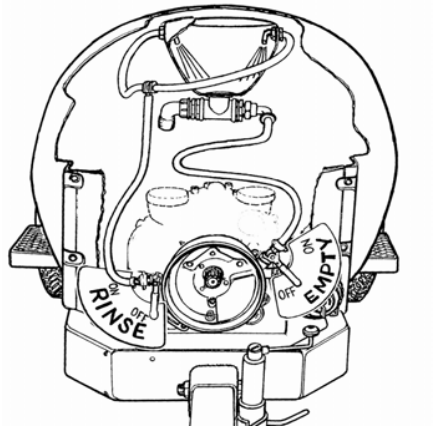
Take care to avoid the spillage of chemicals or mixed solution. Wear gloves, eye protection and the recommended protective clothing whilst filling with chemicals. Wash your hands after filling if they have come into contact with concentrate or mixed solution.

Store unused chemicals and dispose of empty chemical containers as recommended by the chemical manufacturer or relevant authority.

Operation

Adding Chemicals with the Inductor System
Supaflo Models Only
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 the front of the sprayer on either side of the pump as shown below. The “Empty” valve directs pressurised liquid to the venturi beneath the receptacle, which creates suction to empty the chemicals into the tank. The “Rinse” valve directs pressurised water to the top of the receptacle to wash any chemical residue into the tank after filling.



CHEMICAL INDUCTOR SYSTEM

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.

Ensure that the spray left and spray right levers are in the “off” position. Move the pressure tap towards the “on” position until a maximum of 10 Bar is recorded on the pressure gauge. For electric controls refer to options page.

Open the inductor “Empty” 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 “Rinse” 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 rear opening. During this time the by-pass flow and the mechanical agitator will thoroughly mix the solution.

Note: This is the only operation permitted with the sprayer running while the operator is off the tractor.

Adding Chemicals to the Stilletto Sprayer
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.

Ensure that the spray left and spray right levers are in the “off” position. Move the pressure tap towards the “on” position until a maximum of 10 Bar is recorded on the pressure gauge.

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. Add the required chemical through the rear opening of the tank.

Complete filling the tank with water through the rear opening. During this time the by-pass flow and the mechanical agitator will thoroughly mix the solution.

Note: This is the only operation permitted with the sprayer running while the operator is off the tractor.

Emptying the Sprayer
At the end of each day partly fill the tank with water and run this through the pump, spray lines and nozzles to purge them of chemicals. Use a cleaning agent such as Silvan Clean Spray.

Rinse the tank through the lid and empty with the drain valve to remove powdered material. Never leave chemicals in the tank that 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.

Road Travel
When towing the sprayer on a public road always ensure that it is equipped with all the necessary lights and signs to comply with local regulations.

Travel at slow speed and only with the main tank empty. The weight of the sprayer with a full tank could overload the braking capability of the tractor and result in an accident.

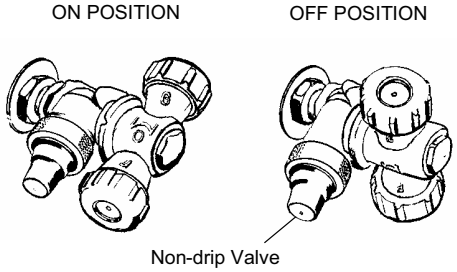
Silvan

Operation

Spray Nozzles
The spray nozzles have an outlet at each end but only the jet that is flipped to the outward facing position is “on”. This facilitates easy changing between jets of different sizes, for example, when requiring different application rates to suit concentrated and diluted spraying.

Individual nozzles can be turned off when not needed by flipping the nozzle 90 degrees so that neither of its jets is facing outwards. Nozzle direction can be adjusted by loosening the attaching nut and angling the nozzle.

The nozzles include a non-drip valve, which closes when the pressure drops below 1 Bar.



SPRAY NOZZLE

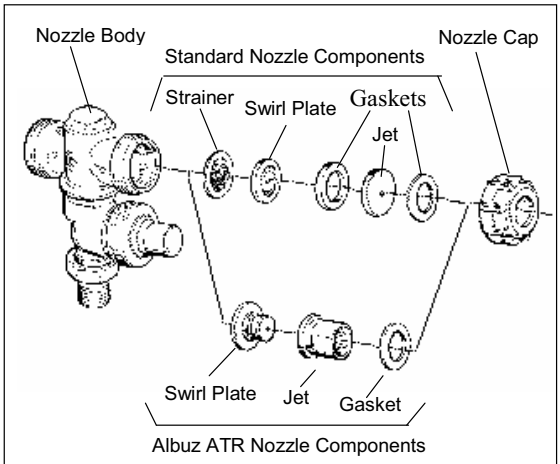
Standard Jets
Standard nozzles feature ceramic jets, stainless steel swirl plates and stainless steel mesh strainers, separated by neoprene gaskets, as shown in the component diagram opposite.

Nozzle output at a particular pressure can be varied by fitting different jet and swirl plate combinations, refer to the Single Nozzle Output Chart on page 17.

Ceramic jets are sized according to the diameter of the central hole in millimetres.

The purpose of the swirl plate is to create a conical spray pattern. They either have a closed centre, identified as CC, or a central hole which is sized in millimetres. Closed centre swirl plates are fitted for low outputs. At higher outputs, swirl plates with a central hole are needed to fill the centre of the conical spray pattern and when fitted they should be one size smaller than the ceramic jet.

Ceramic jets and swirl plates normally have a long wear life and require little maintenance other than regular checking and cleaning of strainers. The spray pattern should be observed periodically against a dark background to detect signs of wear that will be indicated by a streaky or broken pattern. If worn jets are detected then the full set of jets, swirl plates and gaskets should be replaced.



NOZZLE COMPONENTS

Albuz ATR Jets
Albuz ATR hollow cone ceramic jets produce superior misting and are fitted to one side of each nozzle in the optional Double Sided Full Row Vineyard Conveyor, refer Optional Equipment section. They are not suitable for other applications on Supaflo or Stilletto sprayers due to the shape of the spray pattern.

The ATR components fit the standard nozzle body and use the standard nozzle cap as shown in the above diagram.

Nozzle output can be varied by fitting a different size ceramic jet but the same swirl plate is used in all cases. Refer to the ATR Jet Chart on page 17.

They can be used in various combinations with the standard jets, which are fitted to the opposite end of each nozzle in the Double Sided Conveyor.

Calibration

Nozzle Selection and Calibration Checking
Chemical application rates and hence nozzle selections 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.

Nozzle selection can be made by following the four simple steps shown below. The final step, checking calibration after nozzle selection, is essential for spraying efficiency by ensuring a known amount of spray is applied per hectare.

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

a) **Application rate (l/ha)** in litres per hectare.

b) **Travel speed (km/hr)** The 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.

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

c) **Row width (m)** The distance between rows measured in metres. For single sided spraying use half the row width.

d) **Spray pressure (Bar)** A pressure of between 20 and 30 Bar is usually selected. Lower spray pressures will produce larger droplets which are generally less effective than the smaller droplets produced at higher pressures.

STEP 2 ***Total Output Required***
Calculate the total spray output required in litres per minute (l/min) using the following formula, or alternatively use the Spraying Output Chart on the following page.

$$\textbf{Total Output (l/min)} = \frac{\textbf{Application rate (l/ha) x Speed (km/hr) x Row width (m)}}{600}$$

Check that the calculated output does not exceed the rated capacity of the pump. If it does, reduce the travel speed or the application rate.

STEP 3 ***Nozzle Selection***
a) For many applications a nozzle set selected from the Standard Jet Set Chart on page 19 will be suitable. The outputs shown apply when all 16 nozzles are to be used. Single sided spraying will produce half the volume shown on the chart.

b) For special applications the jet and swirl plate combination for each individual nozzle can be selected by calculating the requirements for one side of the sprayer, as follows, then copying the pattern on the other side.

Decide on the number of nozzles to be used on one side and the percentage of spray required from each nozzle (the total should be 100%).

Calculate the individual nozzle flow rates by halving the total output from Step 2, to obtain the output for one side, then multiply this by the percentage output required from each nozzle.

$$\textbf{Output per side (l/min)} = \frac{\textbf{Total output (l/min)}}{2}$$

$$\textbf{Nozzle output (l/min)} = \frac{\textbf{Nozzle percentage (\%) x Output per side (l/min)}}{100}$$

Use the Single Nozzle Output Chart on page 17 to select the jet and swirl plate combination which is the closest match to the required nozzle output at the chosen pressure.

Add up the flow rates of the individual jets to check that the total output per side matches the calculated value. Small variations can be corrected by increasing pressure to increase output or reducing pressure to reduce output.

STEP 4 ***Calibration Checking***
After installing the selected jets, test the sprayer with water to confirm the application rate.

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

Measure the volume of water, in litres, required to refill the sprayer to the brim or the specific mark chosen then divide this volume by the time of the test run, in minutes.

$$\textbf{Output (l/min)} = \frac{\textbf{Volume to refill (litres)}}{\textbf{Time (min)}}$$

Verify that the measured output matches the value calculated at Step 2. For small variations increase the spraying pressure to increase the output or reduce the pressure to reduce output.

Albuz ATR Jets
The same calibration procedure as in 3) above applies when calibrating a Double Sided Conveyor fitted with Albuz ATR jets, except the Albuz ATR Nozzle Chart on page 17 is used instead of the Single Nozzle Output Chart.

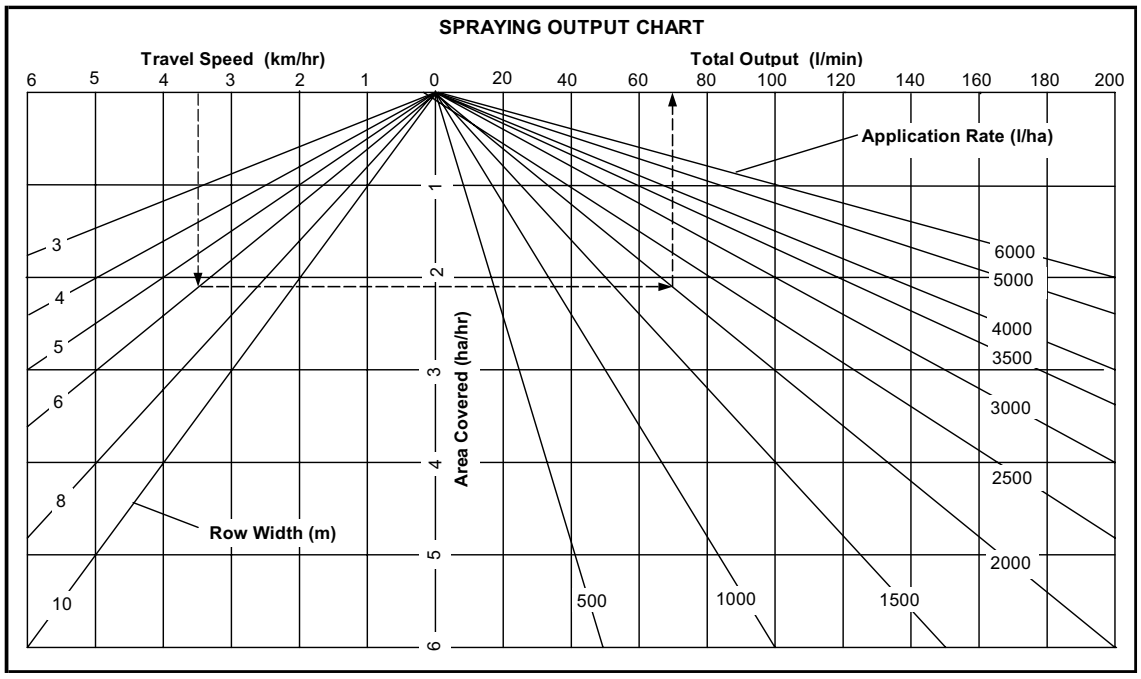
Silvan

Calibration

Spraying Output Chart

To use the chart draw a vertical line down from the Travel Speed axis, at the speed you will be using for spraying, until it intersects the diagonal line for the Row Width of your crop. From this point draw a horizontal line to intersect the diagonal line for the Application Rate that you have chosen, then draw a vertical line up to the Total Output axis to show the total litres/min you will need to use.

The dotted arrows on the chart show an example using a Travel Speed of 3.5 km/hr with a Row Width of 6m and an Application Rate of 2,000 l/ha. The point at which the final vertical line intersects the Total Output axis shows that the required total output rate is 70 l/min.



Calibration

Using the Single Nozzle Output Chart
The chart below is used to select the Jet and Swirl Plate combination to use in each individual nozzle when a particular distribution pattern is required, as covered by the procedure in Step 3b) on page 15.

Refer also to the Nozzle Selection Example on the following page for further explanation on the use of the Single Nozzle Output Chart.

SINGLE NOZZLE OUTPUT CHART								
JET SIZE	SWIRL PLATE	OUTPUT - IN LITRES PER MINUTE						
		10 Bar	**15 Bar**	**20 Bar**	**25 Bar**	**30 Bar**	**40 Bar**	**50 Bar**
0.8	CC	0.9	1.0	1.2	1.3	1.4	1.6	1.9
1.0	CC	1.3	1.5	1.7	1.9	2.1	2.4	2.7
1.2	CC	1.7	2.0	2.3	2.6	2.8	3.2	3.5
1.5	CC	2.3	2.7	3.1	3.3	3.6	4.0	4.3
1.8	CC	2.7	3.2	3.6	4.1	4.5	5.0	5.5
2.0	CC	3.4	3.8	4.3	4.7	5.1	5.7	6.3
2.2	CC	3.8	4.1	4.6	5.1	5.6	6.6	7.4
2.5	CC	3.9	4.7	5.4	6.0	6.6	7.7	8.5
1.0	1.0	1.6	1.9	2.2	2.4	2.6	3.0	3.4
1.2	1.0	2.5	3.0	3.4	3.8	4.1	4.7	5.4
1.5	1.2	3.6	4.2	4.8	5.3	5.8	6.9	7.7
1.8	1.5	5.0	5.9	6.7	7.4	8.0	9.5	10.6
2.0	1.8	6.2	7.8	8.7	9.6	10.4	11.8	13.2
2.2	2.0	7.4	8.7	9.9	11.2	12.5	14.3	16.4
2.5	2.2	8.8	10.5	12.1	13.5	14.7	16.2	17.5

Albuz ATR Nozzle Chart
Use the chart below to select jet sizes for the Albuz ATR nozzles fitted to the optional Double Sided Full Row Vineyard Conveyor, as covered by the procedure in Step 3b) on page 15.

ALBUZ ATR NOZZLE CHART								
	OUTPUT - IN LITRES PER MINUTE							
BAR	**WHITE ATR-03**	**LILAC ATR-04**	**BROWN ATR=06**	**YELLOW ATR-08**	**ORANGE ATR-12**	**RED ATR-16**	**GREEN ATR-20**	**BLUE ATR-28**
10	0.38	0.50	0.67	1.03	1.39	1.92	2.47	3.40
15	0.46	0.61	0.81	1.25	1.69	2.33	2.99	4.12
20	0.52	0.70	0.93	1.44	1.94	2.67	3.42	4.72
25	0.58	0.77	1.04	1.61	2.16	2.97	3.80	5.25

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Calibration

Nozzle Selection Example

STEP 1

a) Required application rate = 2100 l/ha
b) Chosen speed = 5 km/hr
c) Row width = 5 m
d) Spray pressure = 25 Bar

STEP 2

Total spray output needed (l/min) =

$$\frac{\text{Application Rate (l/ha) x Speed(km/h) x Row width(m)}}{600}$$

$$= \frac{2100 \times 5 \times 5}{600} = 87.5 \text{ l/min}$$

STEP 3

a) For a standard application use the Standard Jet Set Chart on the next page to select the set giving the closest match to the calculated total output at the required pressure.

Several sets may give the required output but provide different spray patterns, ie. a uniform pattern or one with more volume in the upper portion. The chart shows the proportion of output discharged from each nozzle in a standard set.

By looking at the outputs within the normal pressure range of 20 to 30 Bar the chart shows the required 87.5 l/min can be achieved using Standard Jet Set M2P between 26 and 28 Bar.

b) For a non standard application, nominate the proportion of spray which is required from each nozzle, as a percentage of the total output from one side of the sprayer, in a similar manner to that shown in the Jet Positions diagram above.

Halve the Total Output from Step 2 to determine the output from one side of the sprayer. Then calculate the output required from each nozzle at the required spray pressure, in a similar way to the calculations shown in the chart opposite.

Using the Single Nozzle Output Chart from the previous page select the closest matching jet and swirl plate combination for each nozzle.

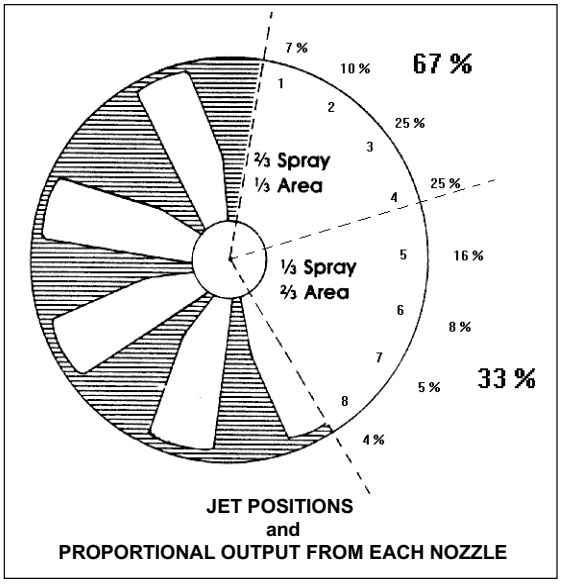
Total the outputs from the individual nozzles and check whether it matches the required output from one side of the sprayer. Small variations may be corrected by operating at a slightly higher pressure to increase output or a slightly lower pressure to reduce output.

STEP 4

Install the selected jets and swirl plates on either side of the sprayer starting with jet position No. 1 at the top as shown in the diagram.

Conduct a test with water to verify the actual output as described on page 15. Small variations from the required output may be corrected by adjusting the pressure as stated previously.

In this example the proportion of the spray output required from each nozzle will be as shown in the diagram below and the pattern from the opposite side of the sprayer will be the same.



JET POSITIONS and PROPORTIONAL OUTPUT FROM EACH NOZZLE

Output per side (l/min) = $\frac{\text{Total output (l/min)}}{2}$

$= \frac{87.5}{2} = 43.8$ l/min

Use 44 l/min to simplify the calculations shown in the chart below.

NOZZLE SELECTION CALCULATION				
Nozzle No. from top	**% Flow** each nozzle	**Nozzle Output (l/min) = Flow per side x % / 100**	**Jet/Swirl Size**	**Output (l/min)** at 25 Bar
1	7	44 x 7/100 = 3·1	1·5/CC	3·3
2	10	44 x 10/100 = 4·4	1·8/CC	4·1
3	25	44 x 25/100 = 11·0	2·2/2·0	11·2
4	25	44 x 25/100 = 11·0	2·2/2·0	11·2
5	16	44 x 16/100 = 7·0	1·8/1·5	7·4
6	8	44 x 8/100 = 3·5	1·5/CC	3·3
7	5	44 x 5/100 = 2·2	1·0/1·0	2·4
8	4	44 x 4/100 = 1·8	1·0/CC	1·9
Total	100	**Total Output per Side (l/min)**		**44·8**

The calculated output of 44.8 l/min per side at 25 Bar is slightly higher than required. Reducing the spraying pressure to 24 Bar should give the required 44 l/min output per side. This can be verified during the trial run with water.

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Calibration

Using the Standard Jet Set Chart

The chart below is used to select a full set of jets and swirl plates which will give the required Total Output previously calculated in Step 2 on page 15, or by using the Spraying Output Chart on page 16.

In the bottom section of the chart locate the required total output (or nearest equivalent) at the selected pressure. The same column in the upper section of the chart shows the jet and swirl plate sizes to be fitted at each nozzle position. Adjust the pressure if necessary to achieve the exact output. For single sided spraying halve the output. Outputs in the shaded area may exceed the capacity of the pump and if so cannot be used, refer footnote on chart.

Several jet sets may give the required output at a pressure near to that chosen. However, the spray patterns from these sets may vary. The mid section of the chart identifies the pattern by showing the output percentage from each nozzle and the overall percentage from the upper four and lower four.

STANDARD JET SET CHART

JET POSITION Top Down	JET SET NUMBER and JET/SWIRL PLATE SIZES 2.0/1.8 = 2.0mm Jet over a 1.8mm Swirl Plate CC = Closed Center Swirl Plate												
	MOO	**MO**	**M1**	**M1P**	**M2**	**M2P**	**M3**	**M3P**	**M4**	**M5**	**M6**	**M7**	**M8**
1	2.0/1.8	2.0/1.8	1.8/1.5	1.0/1.0	1.5/1.2	1.0/1.0	1.2/1.0	0.8/CC	1.2/CC	1.0/CC	0.8/CC	0.8/CC	CLOSED
2	2.0/1.8	2.0/1.8	2.0/1.8	1.5/1.2	1.8/1.5	1.0/1.0	1.5/1.2	1.0/1.0	1.5/CC	1.0/CC	1.0/CC	0.8/CC	0.8/CC
3	2.5/2.2	2.2/2.0	2.0/1.8	2.0/1.8	1.8/1.5	1.8/1.5	1.5/1.2	1.5/1.2	1.5/CC	1.0/CC	1.0/CC	0.8/CC	CLOSED
4	2.5/2.2	2.2/2.0	2.0/1.8	2.0/1.8	1.8/1.5	1.8/1.5	1.5/1.2	1.5/1.2	1.5/CC	1.0/CC	1.0/CC	0.8/CC	0.8/CC
5	2.2/2.0	2.2/2.0	2.0/1.8	2.0/1.8	1.8/1.5	1.8/1.5	1.5/1.2	1.5/1.2	1.2/CC	1.0/CC	1.0/CC	0.8/CC	0.8/CC
6	2.2/2.0	2.0/1.8	1.8/1.5	1.8/1.5	1.5/1.2	1.5/1.2	1.2/1.0	1.2/1.0	1.2/CC	1.0/CC	0.8/CC	0.8/CC	CLOSED
7	2.0/1.8	2.0/1.8	1.8/1.5	1.5/1.2	1.5/1.2	1.2/1.0	1.2/1.0	1.0/1.0	1.2/CC	1.0/CC	0.8/CC	0.8/CC	0.8/CC
8	2.0/1.8	1.8/1.5	1.5/1.2	1.5/1.2	1.2/1.0	1.2/1.0	1.0/1.0	1.0/1.0	1.0/CC	1.0/CC	0.8/CC	0.8/CC	CLOSED
JET POSITION	**PROPORTIONAL OUTPUT FROM EACH NOZZLE** From one side of Sprayer when fitted with above Jet Set at 25 Bar. May vary slightly at other pressures.												
1	10.9%	12.1%	11.2%	4.5%	10.7%	5.8%	10.9%	4.6%	11.7%	12.5%	10.2%	12.5%	0.0%
2	10.9%	12.1%	14.6%	9.7%	14.9%	5.8%	15.1%	8.5%	14.9%	12.5%	14.8%	12.5%	25.0%
3	15.4%	14.1%	14.6%	17.6%	14.9%	17.9%	15.1%	18.8%	14.9%	12.5%	14.8%	12.5%	0.0%
4	15.4%	14.1%	14.6%	17.6%	14.9%	17.9%	15.1%	18.8%	14.9%	12.5%	14.8%	12.5%	25.0%
Upper 4 Jets	**52.6%**	**52.4%**	**55.0%**	**49.4%**	**55.4%**	**47.4%**	**56.2%**	**50.7%**	**56.4%**	**50.0%**	**54.6%**	**50.0%**	**50.0%**
5	12.8%	14.1%	14.6%	17.6%	14.9%	17.9%	15.1%	18.8%	11.7%	12.5%	14.8%	12.5%	25.0%
6	12.8%	12.1%	11.2%	13.6%	10.7%	12.8%	10.9%	13.5%	11.7%	12.5%	10.2%	12.5%	0.0%
7	10.9%	12.1%	11.2%	9.7%	10.7%	12.8%	10.9%	8.5%	11.7%	12.5%	10.2%	12.5%	25.0%
8	10.9%	9.3%	8.0%	9.7%	8.3%	9.1%	6.9%	8.5%	8.5%	12.5%	10.2%	12.5%	0.0%
Lower 4 Jets	**47.4%**	**47.6%**	**45.0%**	**50.6%**	**44.6%**	**52.6%**	**43.8%**	**49.3%**	**43.6%**	**50.0%**	**45.4%**	**50.0%**	**50.0%**
PRESSURE Bar	**TOTAL OUTPUT - LITRES PER MINUTE** From both sides of Sprayer when fitted with above Jet Set on each side. Halve for single sided spraying.												
10	114	104	87	72	67	54	47	38	30	25	17	14	7
12	125	114	95	79	73	59	51	41	33	28	19	15	8
14	135	123	103	85	79	63	56	45	35	30	20	16	8
16	145	132	110	91	84	68	59	48	38	32	22	18	9
18	153	140	116	97	89	72	63	51	40	34	23	19	9
20	162	147	123	102	94	76	66	53	42	36	24	20	10
22	170	154	129	107	99	79	70	56	44	37	25	21	10
24	177	161	134	111	103	83	73	59	46	39	26	22	11
26	184	168	140	116	107	86	76	61	48	41	27	22	11
28	191	174	145	120	111	90	79	63	50	42	29	23	12
30	198	180	150	125	115	93	81	66	52	44	30	24	12
32	205	186	155	129	119	96	84	68	54	45	30	25	12
34	211	192	160	133	123	99	87	70	55	47	31	26	13
36	217	197	165	137	126	102	89	72	57	48	32	26	13
38	223	203	169	140	130	104	92	74	58	49	33	27	14
40	229	208	174	144	133	107	94	76	60	51	34	28	14
42	234	213	178	147	136	110	96	78	61	52	35	29	14
44	240	218	182	151	140	112	99	79	63	53	36	29	15
46	245	223	186	154	143	115	101	81	64	54	37	30	15
48	251	228	190	158	146	117	103	83	66	55	37	30	15
50	256	233	194	161	149	120	105	85	67	57	38	31	16

Total Output exceeds the capacity of the APS-121 pump in the complete shaded area, the APS-145 pump in the shaded area to the left of the bold line and the APS-166 pump in the shaded area to the left of the double line.

Siluan

Calibration

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

Date of Test: ______________
Application Rate: ______________ litres/ha
Speed of Travel: ______________ km/hr
Row Spacing: ______________ metres

Output (l/min) = $\frac{\text{Application Rate x Speed x Row Width}}{600}$

= $\frac{\quad \text{x} \quad \text{x} \quad}{600}$

= litres/min

Standard Jet Set (from Chart): __________
or
Individually selected jet/swirl plate combination:

1 2 3 4 5 6 7 8
/ / / / / / / /

Pressure Setting: ________ Bar

Measured Output: _______ litres/min
(from test run)

Date of Test: ______________
Application Rate: ______________ litres/ha
Speed of Travel: ______________ km/hr
Row Spacing: ______________ metres

Output (l/min) = $\frac{\text{Application Rate x Speed x Row Width}}{600}$

= $\frac{\quad \text{x} \quad \text{x} \quad}{600}$

= litres/min

Standard Jet Set (from Chart): __________
or
Individually selected jet/swirl plate combination:

1 2 3 4 5 6 7 8
/ / / / / / / /

Pressure Setting: ________ Bar

Measured Output: _______ litres/min
(from test run)

Date of Test: ______________
Application Rate: ______________ litres/ha
Speed of Travel: ______________ km/hr
Row Spacing: ______________ metres

Output (l/min) = $\frac{\text{Application Rate x Speed x Row Width}}{600}$

= $\frac{\quad \text{x} \quad \text{x} \quad}{600}$

= litres/min

Standard Jet Set (from Chart): __________
or
Individually selected jet/swirl plate combination:

1 2 3 4 5 6 7 8
/ / / / / / / /

Pressure Setting: ________ Bar

Measured Output: _______ litres/min
(from test run)

Date of Test: ______________
Application Rate: ______________ litres/ha
Speed of Travel: ______________ km/hr
Row Spacing: ______________ metres

Output (l/min) = $\frac{\text{Application Rate x Speed x Row Width}}{600}$

= $\frac{\quad \text{x} \quad \text{x} \quad}{600}$

= litres/min

Standard Jet Set (from Chart): __________
or
Individually selected jet/swirl plate combination:

1 2 3 4 5 6 7 8
/ / / / / / / /

Pressure Setting: ________ Bar

Measured Output: _______ litres/min
(from test run)

Calibration

Nozzle Sets for Typical Spraying Applications
The nozzle sets in the following four examples are suitable for typical applications when spraying grapes, orchard fruits at either low or high spraying volume, or citrus fruits.

1. Grapes

Application rate	600 l/ha
Travel speed	5 km/hr
Row width	3.0 m
Spraying pressure	25 Bar

$$\text{Total Application Rate (l/min)} = \frac{\text{Application rate (l/ha) x Speed (km/hr) x Row width (m)}}{600}$$

$$= \frac{600 \times 5 \times 3}{600} = 15 \text{ l/min}$$

NOZZLE SET FOR TYPICAL GRAPE SPRAYING APPLICATION (600 l/ha)								
Nozzle Position from top down	1	2	3	4	5	6	7	8
Jet/Swirl Plate Size	Closed	Closed	0.8/CC	0.8/CC	0.8/CC	0.8/CC	0.8/CC	Closed

To provide a substantially horizontal spray pattern to suit vines the jets in positions 1, 2 and 8 are closed by flipping the nozzles through 90 degrees so that neither of the jets is facing outwards, refer diagram on page 14.

The fitment of the same sized 0.8 jet and closed centre swirl plate (CC) in each of the nozzle positions from 3 to 7 will produce a uniform density within the spray pattern.

2. Orchard Fruits - Low Volume Spraying

Application rate	1000 l/ha
Travel speed	5 km/hr
Row width	6.1 m
Spraying pressure	25 Bar

$$\text{Total Application Rate (l/min)} = \frac{\text{Application rate (l/ha) x Speed (km/hr) x Row width (m)}}{600}$$

$$= \frac{1000 \times 5 \times 6.1}{600} = 51 \text{ l/min}$$

NOZZLE SET FOR TYPICAL LOW VOLUME SPRAYING APPLICATION (1000 l/ha)								
Nozzle Position from top down	1	2	3	4	5	6	7	8
Jet/Swirl Plate Size	0.8/CC	1.0/1.0	1.5/1.2	1.5/1.2	1.5/1.2	1.2/1.0	1.0/1.0	1.0/1.0

This arrangement is the Standard Jet Set M3P. It will produce a spray pattern with approximately 70% of the output discharging from the four centre jets Nos. 3, 4, 5 and 6. Refer to the Standard Jet Set Chart on page 19 for full details of the output at various pressures and the percentage of the output discharged from each nozzle.

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Calibration

3. Orchard Fruits - High Volume Spraying

Application rate	2000 l/ha
Travel speed	5 km/hr
Row width	6.1 m
Spraying pressure	25 Bar

$$\text{Total Application Rate (l/min)} = \frac{\text{Application rate (l/ha)} \times \text{Speed (km/hr)} \times \text{Row width (m)}}{600}$$

$$= \frac{2000 \times 5 \times 6.1}{600} = 102 \text{ l/min}$$

NOZZLE SET FOR TYPICAL HIGH VOLUME SPRAYING APPLICATION (2000 l/ha)								
Nozzle Position from top down	1	2	3	4	5	6	7	8
Jet/Swirl Plate Size	1.5/1.2	1.8/1.5	1.8/1.5	1.8/1.5	1.8/1.5	1.5/1.2	1.5/1.2	1.2/1.0

This arrangement is the Standard Jet Set M2. It will produce a spray pattern which is biased towards the upper section to provide good coverage of the overhead canopy. Approximately 60% of the output is discharged from the four jets in positions Nos. 2, 3, 4 and 5. Refer to the Standard Jet Set Chart on page 19 for full details of the output at various pressures and the percentage of the output discharged from each nozzle.

4. Citrus Fruits

Application rate	6000 l/ha
Travel speed	2 km/hr
Row width	8.2 m
Spraying pressure	25 Bar

$$\text{Total Application Rate (l/min)} = \frac{\text{Application rate (l/ha)} \times \text{Speed (km/hr)} \times \text{Row width (m)}}{600}$$

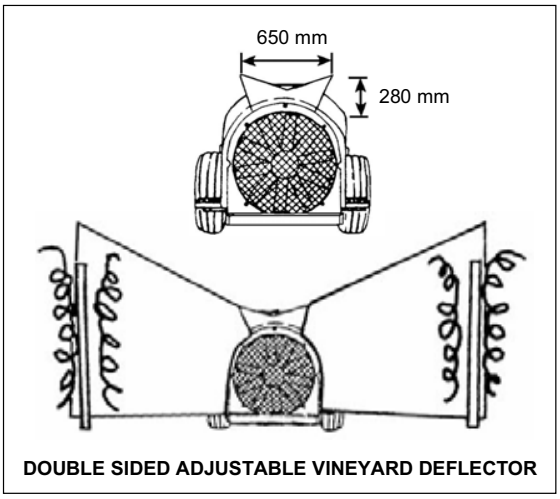
$$= \frac{6000 \times 2 \times 8.2}{600} = 164 \text{ l/min}$$

NOZZLE SET FOR TYPICAL CITRUS SPRAYING APPLICATION (6000 l/ha)								
Nozzle Position from top down	1	2	3	4	5	6	7	8
Jet/Swirl Plate Size	2.0/1.8	2.0/1.8	2.2/2.0	2.2/2.0	2.2/2.0	2.0/1.8	2.0/1.8	1.8/1.5

This arrangement is the Standard Jet Set M0. It will produce a spray pattern with a fairly uniform proportion of the discharge from each nozzle but with some small bias towards the upper section of the pattern. Refer to the Standard Jet Set Chart on page 19 for full details of the output at various pressures and the percentage of the output discharged from each nozzle.

Optional Equipment

Directional Conveyors
The optional directional conveyors described below increase spray penetration and coverage by concentrating the airblast directly at the target.

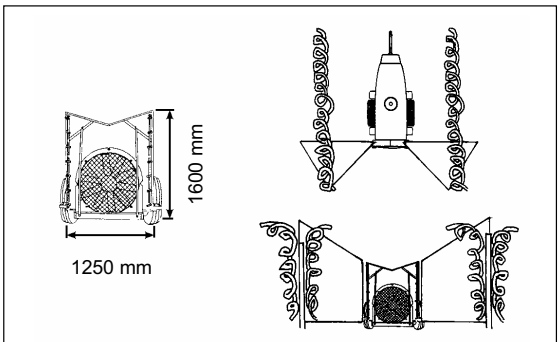


DOUBLE SIDED ADJUSTABLE VINEYARD DEFLECTOR

Double Sided Adjustable Vineyard Deflector
This attachment uses the existing nozzles of the sprayer and provides an economical method for directing all the available airblast at the crop on both sides of the row. It is ideal for vines and low height trellised crops. The fibreglass conveyor is fitted with an adjustable internal flute to regulate the direction of the airflow to suit the target.

Double Sided Full Row Vineyard Conveyor
This attachment directs air in a concentrated and controllable stream to both sides of the row for vines, trellised apples or any dense bushy plants such as berries and passionfruit.

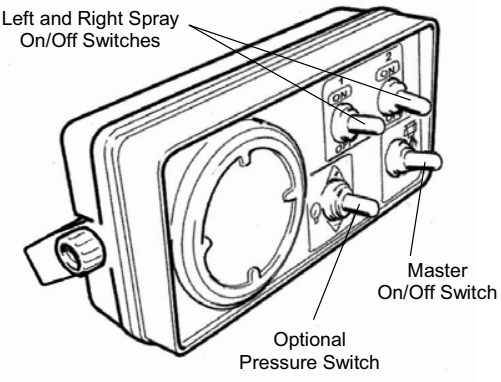
The poly-fibreglass double sided full row conveyor incorporates stainless steel spraybars fitted with 12 flip-over nozzles per side enabling the spray pattern to be regulated for efficient coverage. One side of each flip over nozzle is fitted with an Albuz ATR ceramic jet and the other side is fitted with a standard jet. Refer to page 14 for details.



DOUBLE SIDED FULL ROW VINE CONVEYOR

Electric Controls
An electric control system can be installed to operate the same three functions as the cable system, ie. pump pressure on/off, left and right spray outlets on/off.

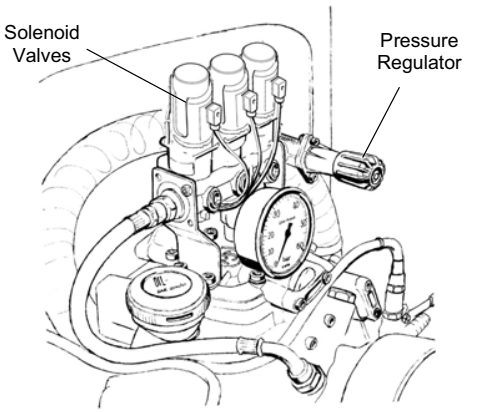
The system consists of a cabin mounted control box and a bank of three electric solenoid valves that are operated by the switches of the cabin control. A wiring loom fitted with a quick release coupling is used to connect the control box to the solenoid valves.



ELECTRIC CABIN CONTROL BOX

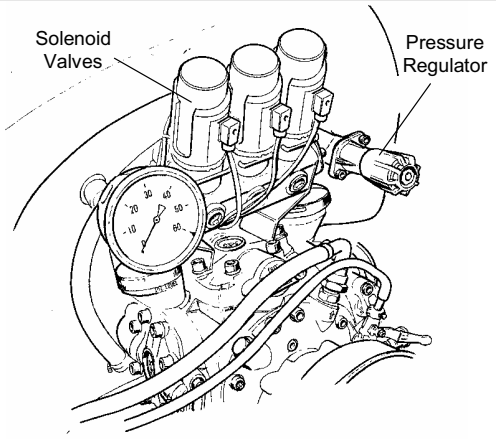
The upper pair of Spray switches, marked 1 and 2, activate the electric ball valves that stop and start spraying on the left and right sides of the sprayer. Spraying occurs when the switches are “on”.

The Master switch activates the electric ball valves which changes the pump between by-pass and pressure mode. The pump is in pressure mode when the Master On/Off switch is moved up and in by-pass when the switch is down.



ELECTRIC CONTROL VALVE - SUPAFLO

Lubrication and Maintenance



ELECTRIC CONTROL VALVE - STILETTO

Spraying pressure is adjusted manually with the rotary control knob on the valve bank in the same way as the standard cable control system.

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. All switches should be in the "off" position whilst installing.

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

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

The operating sequence for the control switches during start-up and spraying is the same as for the levers of the standard cable control system, refer to pages 11 and 12 of the Operation section.

Electric Controls – Operation of Chemical Inductor System

To operate the chemical inductor system with a sprayer fitted with optional electric controls first ensure that the left and right spray sections are turned off. Start the pump and operate at a slow speed. Turn the Master switch to the spray position with the left and right spraybars still in the off position. Check the pressure is not above 10 bar, if it is you will need to reduce it by adjusting the manual pressure regulator. You can now operate the chemical inductor system as described in the "Adding Chemicals with the Inductor System" section of this operation manual.

Wide Angle PTO Shaft

This shaft is fitted with a constant velocity joint at one end, which incorporates two universal joints, and a standard single universal joint at the other end. The constant velocity joint makes the shaft capable of operating at much greater angles than a standard PTO shaft.

A wide angle PTO shaft should only be needed if the tractor drawbar prevents correct alignment of the regular PTO shaft, refer to the Installation section.

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 from the tractor tyres when turning.

The extended drawbar may also be needed if a wide angle PTO is installed to provide clearance for the larger universal joint depending 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.

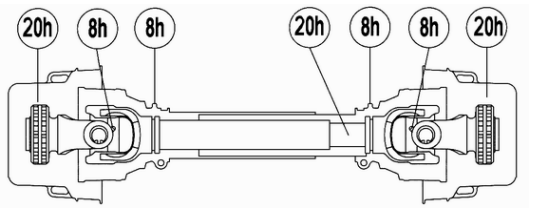
Due to its special design, the wheel track cannot be adjusted on the Glideflex axle.

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.

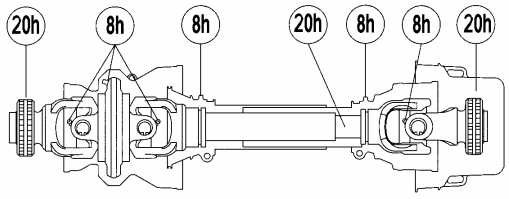
Every 20 hours slide the PTO shaft apart, clean the telescopic tubes with kerosene and apply multi-purpose grease to the sliding surfaces, then reassemble. This is most important in dusty conditions.



LUBRICATION OF STANDARD PTO SHAFT

If an optional wide angle PTO shaft is fitted, ensure that all three universal joints are greased, as shown in the diagram below. All other grease points on the shaft and the lubrication intervals are the same as a standard PTO.

Internal PTO Shaft
Grease the universal joints on the internal PTO



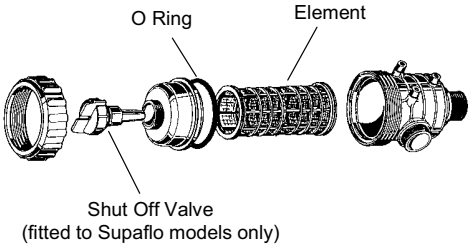
LUBRICATION OF WIDE ANGLE PTO SHAFT

shaft, which is connected between the rear of the pump and the fan drive at the rear of the sprayer, with multi-purpose grease every 500 hours, or during the annual inspection.

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.

Pump
Check the oil level in the viewer daily and if necessary top up with SAE 20W-40 multigrade engine oil. The oil must reach the mark on the side of the oil level viewer.

Gearbox
Check the oil level every 50 hours and if required top up with SAE 85W-140 gear oil. The level should be halfway up the viewer on the side of the gearbox.



SUCTION FILTER COMPONENTS

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 tank lid basket strainer before each fill.

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

Flush the pressure line filter daily by opening the red tap at the end of the filter housing and running the pump for a few minutes to purge any foreign material from the element, refer to the diagram of the appropriate pressure control valve in the Operation section.

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

In the case of frost or freezing conditions run the pump dry to prevent water freezing in it or the spray lines and damaging components.

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Lubrication and Maintenance

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, pump seals or electrical valves if fitted.

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

Diaphragm Pump
Drain the oil from the pump annually, or at the end of each spraying season. Refill with SAE 20W-40 multi-grade engine oil.

Remove the pump heads, carefully inspect the diaphragms and replace if necessary. Also check the inlet and outlet valves, seats and springs for wear, damage or chemical corrosion and replace as necessary.

Check the air pressure in the surge chamber at the side of the pump. The air pressure behind the surge chamber's diaphragm smooths out the pulsations in fluid flow and should be set in accordance with the spraying pressure being used, as shown in the chart below.

Spraying (Bar)	2 - 5	5 - 10	10 - 20	20 - 50
pressure (psi)	29 - 73	73 - 145	145 - 290	290 - 725
Surge air (Bar)	2	2 - 5	5 – 7	7
pressure (psi)	29	29 - 73	73 - 102	102

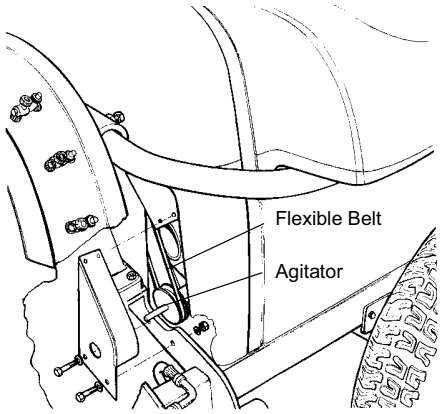
Adjust the pressure at the valve fitting on the chamber using using a compressed air hose fitted with a tyre valve connection and a reliable pressure gauge.

Refer to the pump instruction manual for further details on the above maintenance operations.

Agitator Drive Belt
The propeller agitator is driven directly from the PTO shaft at the rear 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, remove the four bolts attaching the belt drive cover at the RH rear corner of the tank and remove the cover.



AGITATOR DRIVE BELT

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 730 mm. Remove the connector from the cut out section and use it to rejoin the shortened belt. Reinstall the belt cover after adjustment.

Wheel Hubs
Remove the wheel hubs annually and check that the bearings and seals are in good condition. Repack the bearings 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.

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, including the tank mounting bolts, axle U-bolts and wheel nuts. Check that all hose connections are tight.

Trouble Shooting

Pump does not prime
- No liquid in tank or not covering 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.
- Control lever not in by-pass position.
- Pump valve springs broken or valves worn.
- Three way drain tap not properly closed.

Pump does not reach correct pressure
- Pump not operating at full 540 rpm.
- Suction filter blocked.
- Suction filter shut off valve partly closed (Supaflo models).
- Pressure regulator not correctly adjusted
- Pressure regulator valve and seats worn.
- Pressure gauge faulty
- Pump diaphragms ruptured (pump oil grey).
- Worn nozzles or capacity of nozzles greater than capacity of the pump.
- Chemical filler Rinse or Empty valves left open (Supaflo models).
- Pressure filter flushing valve left open.

Fan noisy and/or vibrating
- Gearbox bearings worn.
- Fan damaged or out of balance.
- Tractor PTO incorrectly installed.
- Hitch point and PTO geometry not correct.

Driveshaft noisy
- PTO shaft not secured properly to shafts.
- Universal joint crosses worn.
- Hitch point and PTO geometry not correct.

Airblast reduced
- Fan mesh blocked with leaves or debris.
- Not operating at full speed of 540 rpm.
- Fan gearbox not in gear.
- Fan clutch worn or slipping.

Poor tank agitation
- Chemical left in tank whilst not operating.
- Chemical incorrectly mixed before filling.
- Mechanical agitator belt loose and/or slipping

Pump and hoses vibrating.
- Pump surge chamber pressure incorrectly adjusted or surge diaphragm ruptured.
- Air entering the suction line through loose or damaged fittings.
- Pump valves or valve springs worn or damaged.
- Worn nozzles or capacity of nozzles greater than capacity of the pump.
- Air trapped in filter or suction lines.

PRE-DELIVERY, INSTALLATION AND WARRANTY REGISTRATION FORM FOR AIRBLAST

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.

AIRBLAST DETAILS	Optional Equipment
Model Description:	☐ _____ ☐ _____
Silvan Serial No.:	☐ _____ ☐ _____
Pump Model & Serial No.:	☐ _____ ☐ _____
Original Equipment Manufacture's	☐ _____
Serial No's:	

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.	
Check surge chamber pressure suits operating pressure if fitted.	
Check pump feet are secure.	
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.	
CONTROLS - Static checks Check control levers, pressure adjustments and dump valves for correct operation.	
ELECTRIC CONTROLS Connect to 12 volt supply and check operation.	
TANK Clean contaminants from tank.	
Ensure agitators are fitted and operating effectively.	
Check lid for correct sealing.	
Check mounting points are correct and tight.	
Check chemical mixer for correct operation (if fitted).	
AXLE (IF FITTED) Check wheel bearings.	
Check wheel studs for tension.	
Inspect suspension components.	
Adjust tyre pressures.	
FAN/ DRIVE ASSEMBLY Check fan drive gear box oil level.	
Free spin fan, check for alignment and blade settings.	
MISCELLANEOUS Lubricate all grease points as per operators manual.	
Check all safety guards are secure and safety decals are in place.	
Check all optional equipment supplied for completeness and fitment.	

OPERATION AND 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 optional equipment fitted for correct operation.	
Attach to vehicle, ensure control valve is in by-pass and all taps off.	
Start pump 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 all operator's manuals?	
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 operators 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 AUSTRALIA P/L

ABN 48 099 851 144

89 LEWIS ROAD. WANTIRNA SOUTH. VICTORIA 3152

Mail to P.O. Box 218 Wantirna South 3152

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