

**CROPLANDS**

OPERATORS MANUAL  
**CROPLINER  
SLIMLINE 2000**

POLY & FIBREGLASS VERSIONS

[WWW.CROPLANDS.COM.AU](http://WWW.CROPLANDS.COM.AU)

**STOP**

**BEFORE COMMENCING**  
operation, **ENSURE** you read  
& understand this manual, its  
contents, and any additional  
information supplied.



HT-OMSLIMLINE-E



CROPLANDS IS CONTRIBUTING TO A SUSTAINABLE FUTURE

# INTRODUCTION

## GENERAL MANAGER'S WELCOME



**Sean Mulvaney**  
**General Manager**

Dear Customer

Congratulations on the purchase of your new sprayer and thank you for supporting another true blue Australasian manufacturer. For over 50 years Croplands have been delivering spraying solutions and ongoing support for a variety of applications whilst investing in long term partnerships with our suppliers, distributors, end users and local communities. These partnerships are absolutely key in our commitment to support our products into the future.

At Croplands, we are committed to sourcing the very best technology from around the globe and adapting these products to our specific requirements. When these products don't yet exist, we innovate through continuous investment in our own research and development.

Croplands is a wholly owned subsidiary of Nufarm Ltd, the largest supplier of crop protection products in Australasia. This brings a unique understanding and collaborative approach to new market developments, challenges and opportunities.

Please take the time to thoroughly read this manual before you operate your sprayer. This will provide direction to ensure safe usage and help optimise the performance of your investment. Your feedback is welcome and valued.

We trust you will be happy with your sprayer and the level of support - our goal is to be your preferred spraying solutions partner from this point onwards.

Yours Sincerely

**Sean Mulvaney**  
**General Manager**

Croplands has taken steps to ensure this operator's manual is as current and as accurate as possible. Due to the ever-changing markets of cropping and farming, Croplands is constantly striving to be at the forefront of innovation and technology. While the information in this manual is considered accurate at the time of writing, Croplands reserves the right to change this information without notice. Croplands will not accept liability for any inaccuracy in this publication, or changes forthwith.



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# SECTION 1

## IMPORTANT INFORMATION

### ABOUT THIS MANUAL

This manual provides assembly, setting up, operating and maintenance instructions for the Croplands Cropliner Slimline series of sprayers.

In addition to this manual, the sprayer will be delivered with the General Safety Manual (GP-SAFE-A) and all other relevant manuals..

Some features and options explained in this manual may not be installed on your sprayer.

Please pass on this manual with the sprayer at the time of resale for usage by the new owner.

This manual, HT-OMSLIMLINE-E, was first published in January 2024, replacing all previous versions including HT-POM00840 and HT-POM009612.

**Check online** as there may be more recent revisions of this manual. [www.croplands.com.au](http://www.croplands.com.au)

### TERMINOLOGY

These terms/symbols used throughout this manual:



|                |   |
|----------------|---|
| <b>NOTE</b>    | This Note sign is in place to convey useful information and will help you to identify the best possible way to operate the machine.   |
| <b>CAUTION</b> | This Caution sign shows the potential for incident. An incident may include damage to the machine itself, or possible injury to the operator.                                   |
| <b>WARNING</b> | This Warning sign shows the potential for risk or injury and highlights the need for steps to be taken to protect ones safety.  |
| <b>DANGER</b>  | This Danger sign will be used in areas where the highest risk is present. Always read the information on these signs and ensure you are taking steps to prevent risk or injury. |

### BEFORE OPERATING YOUR SPRAYER

Before attempting to use your sprayer, make sure you read all Operator Manuals for this sprayer including but not limited to:

This Operator's Manual, **and all other supplied manuals** for items such as controller, pump and PTO etc.

And properly understand:

- All Safety Issues.
- Assembly & Installation instructions.
- Calibration of the sprayer.
- Sprayer Operation.
- Sprayer Maintenance.

For details not covered by the manuals, please contact Technical Support on 1300 650 724

### INTENDED USE

Croplands sprayers are designed to be used for multi-purpose spraying of herbicides, pesticides and fertilisers. The sprayer must not be used for any other purpose.

## NOTE

**To convey useful operating information.**

## CAUTION

**To highlight potential injury or machinery damage.**

## WARNING

**To stress potential dangers and the importance of personal safety.**

## DANGER

**Probability of death or serious injury if an accident occurs**

# SECTION 1

## IMPORTANT INFORMATION

### WARRANTY POLICY

Each sprayer will be delivered with a Specifications, Safety, Warranty & Delivery Booklet which includes:

- the sprayer's specification sheet including the sprayer's unique serial number,
- a safety induction checklist,
- a delivery checklist and customer induction,
- the Croplands Warranty policy and warranty registration form.

Always contact your Croplands Dealer first and foremost for warranty matters.

### NOTE

For full conditions of warranty and warranty policy, please see the Specification, Safety, Warranty & Delivery booklet provided with this sprayer.

**CROPLANDS**

**SPRAYER SPECIFICATIONS  
SAFETY, WARRANTY & DELIVERY  
HORTICULTURE**

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**STOP**  
BEFORE COMMENCING operation, **ENSURE** you read & understand this manual, its contents, and any additional information supplied.

**INCLUDES SAFETY INDUCTION**

**GP-WARH-B**

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# SECTION 2

## SAFETY

### SAFETY FIRST

Please read and understand all supplied manuals, guides and safety decals before operating this sprayer. This includes the **Croplands Operators Safety Manual** – as pictured here.

This manual is available on the Croplands Web site, or for printed versions contact Croplands customer support and ask for part number GP-SAFE-A (or later version if available).



# SECTION 2

## SAFETY

### SAFETY SIGNS AND DECALS

All signs and decals for sprayer safety and operation must be maintained in good order and replaced if damaged or missing. Most Croplands labels have a part number printed on the decal to aid identification and replacement.

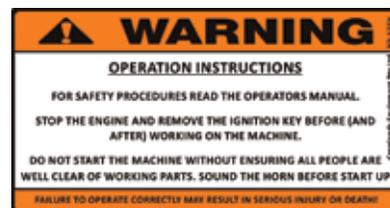
Some examples are shown below.



Part No: XD -123



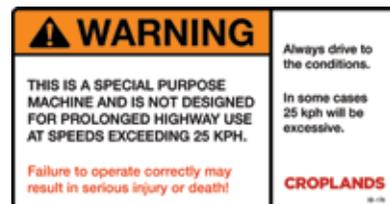
Part No: XD -182



Part No: XD -125V



Part No: XD -126V



Part No: XD -176



Part No: XD -122V



Part No: XD -127V



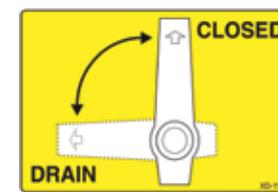
Part No: XD -124V



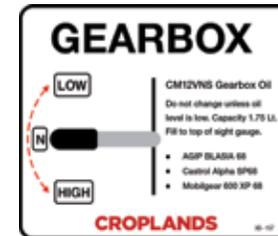
Part No: XD -195



Part No: XD -175



Part No: XD -115



Part No: XD -157

# SECTION 3

## PRODUCT IDENTIFICATION, SHIPPING & SPECIFICATION

Machine specifications are subject to change without prior notification.

### PRODUCT IDENTIFICATION

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

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

The serial numbers of all controllers, pumps etc should also be recorded for future reference.



### SHIPPING INFORMATION

All provided tie down points (and more) should be used to help secure the sprayer for transporting.

Note serial number plate in the attached image.



|  |  |
|--|--|
| <b>⚠ WARNING</b>   |  |
| <p><b>THIS IS A SPECIAL PURPOSE MACHINE AND IS NOT DESIGNED FOR PROLONGED HIGHWAY USE AT SPEEDS EXCEEDING 25 KPH.</b></p> <p>Failure to operate correctly may result in serious injury or death!</p> | <p>Always drive to the conditions.</p> <p>In some cases 25 kph will be excessive.</p> <p style="text-align: right;"><b>CROPLANDS</b></p> |

### WEIGHTS

The below is a general guide to standard model empty weights. For more detailed information consult the Croplands Customer Service team.

| Model                           | Axle Weight dry | Drawbar Weight dry | TOTAL DRY    | Axle Weight tanks full | Drawbar Weight tanks full | TOTAL FULL                                   |
|---------------------------------|-----------------|--------------------|--------------|------------------------|---------------------------|--|
| Cropliner 2000 SLIMLINE 920 DSV | 720             | 126                | <b>846kg</b> | 2410                   | 408                       | <b>2818kg</b><br>full to brim, no flush tank |
| Cropliner 2000 NZ FRP, 920 DSV  |                 |                    | TBA          |                        |                           | TBA  |

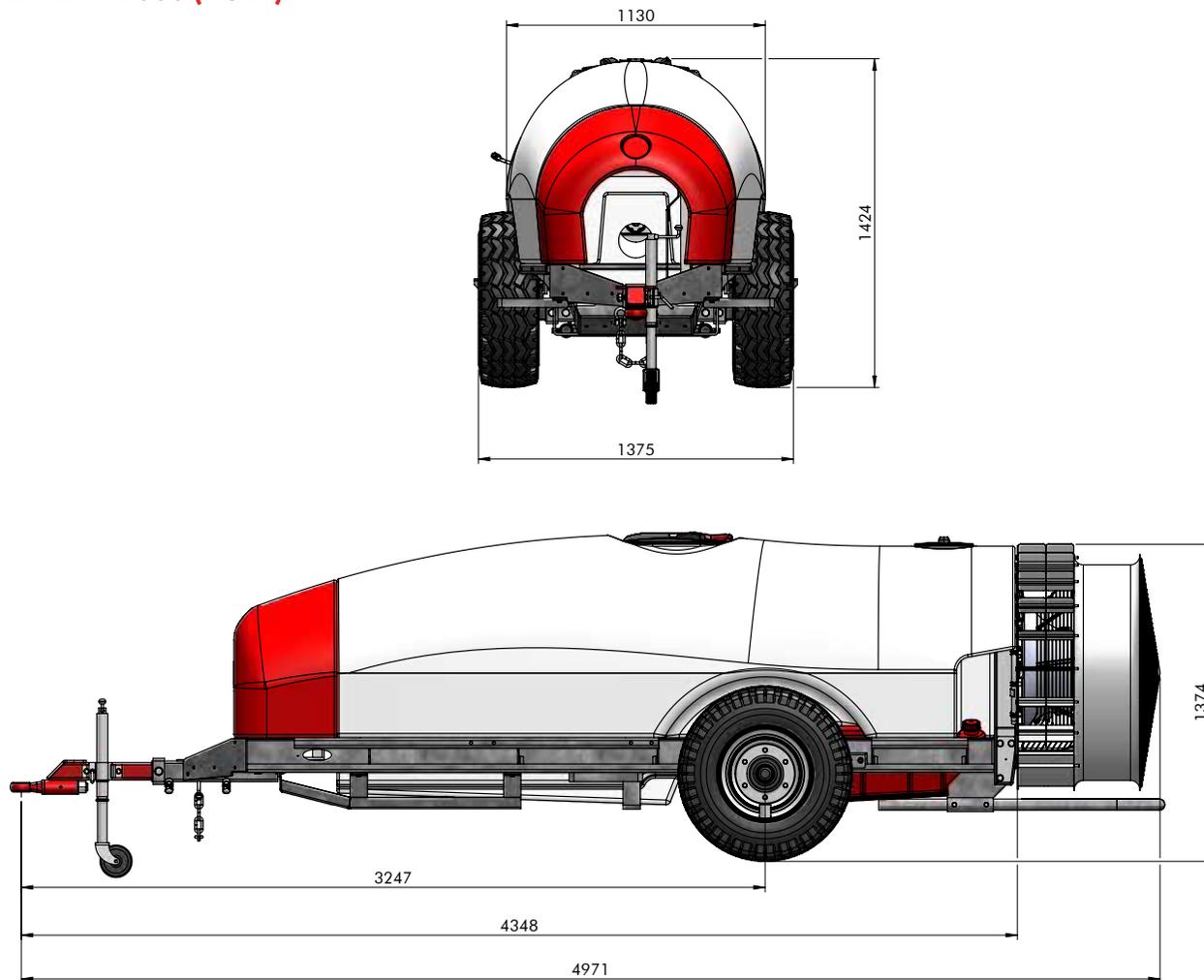


# SECTION 3

## PRODUCT IDENTIFICATION, SHIPPING & SPECIFICATION

Machine specifications are subject to change without prior notification.

### DIMENSIONS SLIMLINE 2000 (POLY)

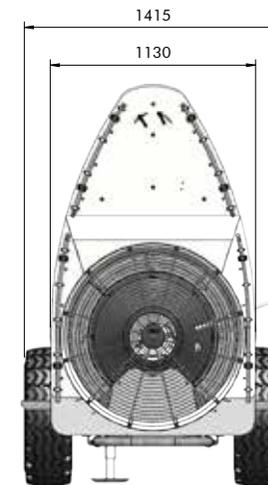
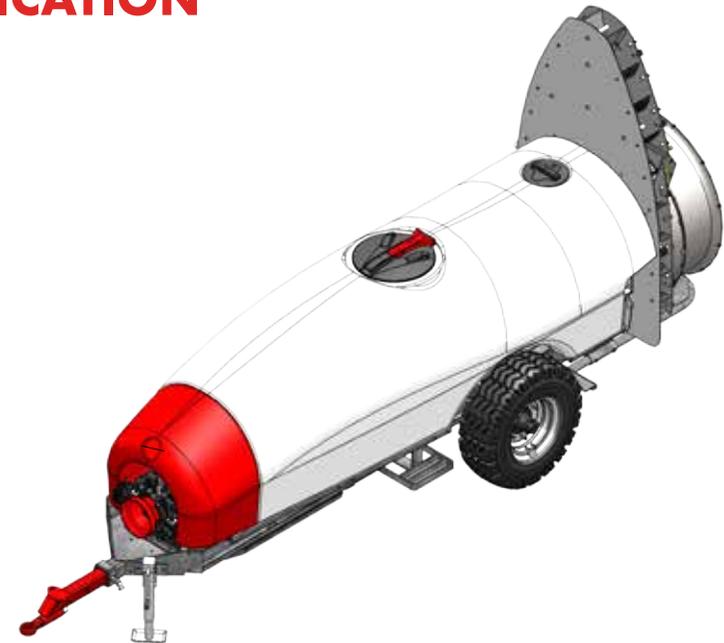
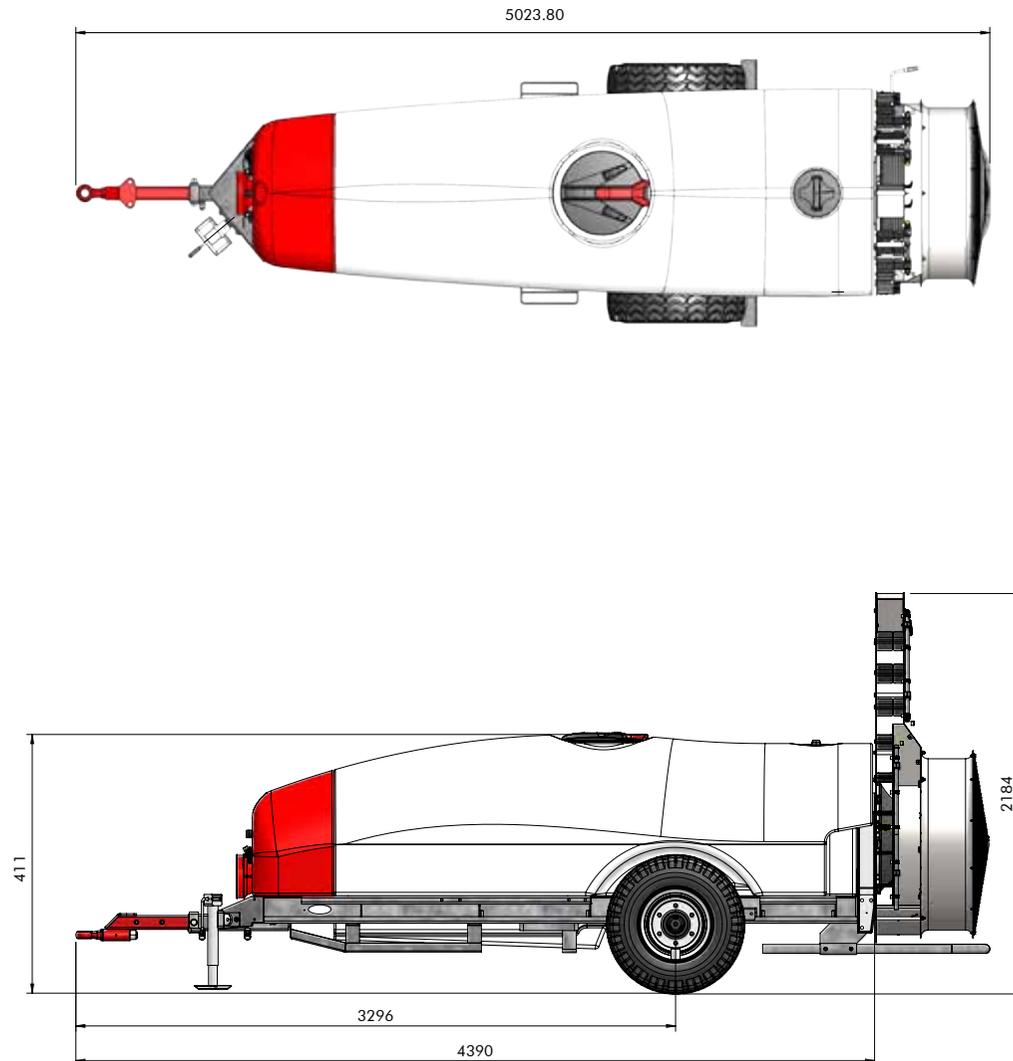


# SECTION 3

## PRODUCT IDENTIFICATION, SHIPPING & SPECIFICATION

Machine specifications are subject to change without prior notification.

### DIMENSIONS SLIMLINE WITH LINEAR TOWER



# SECTION 3

## PRODUCT IDENTIFICATION, SHIPPING & SPECIFICATION

Machine specifications are subject to change without prior notification.

### GENERAL SPECIFICATION

The Croplands range of Cropliner sprayers are built with a respect for Australia and New Zealand's tough and varying terrain.

Engineered to endure, Croplands spraying equipment gives growers the confidence to take on row after row.

The sprayers are available with a wide selection of tank sizes, fan sizes and options.

**For more detailed specification, see Section 4, Product Features / Familiarisation.**

This manual is applicable to the Poly (polyethylene) and the (New Zealand only) Fibreglass versions of the 2000 Lt Slimline airblast sprayer.

Note the 1,500 litres to 5,000 litre Cropliner XL or XV models use a different manual, HT-OMCROPLINE-E.

### HIGH PERFORMANCE AIR BLAST FANS

All our air-blast fans are engineered by Fieni, a global leader in agricultural fan design, manufacturing, and innovation.

Croplands and Fieni have been collaborating since 1972, and together we set the standard for fan sprayer performance, efficiency, crop penetration, and coverage.

For performance specification, refer Page 15.



#### 920MM DSV FAN

Stainless steel volute.

Variable pitch, high strength, glass-reinforced nylon blades – shaped for maximum air delivery with lowest possible power input.

2-speed heavy-duty gearbox and centrifugal clutch.

Stainless steel spray ring with 14 brass roll-over nozzle bodies per side.

Fully guarded for safety.

83,798m<sup>3</sup>/hour max air output.



#### 920MM LINEAR TOWER FAN

Stainless steel volute.

Variable pitch, high strength, glass-reinforced nylon blades – shaped for maximum air delivery with lowest possible power input.

Stainless steel spray ring with 13 brass roll-over nozzle bodies per side.

Fully guarded for safety.

83,798m<sup>3</sup>/hour

Delivers even coverage in the narrowed plantings.

# SECTION 3

## PRODUCT IDENTIFICATION, SHIPPING & SPECIFICATION

Machine specifications are subject to change without prior notification.



Poly model (shown with old 920 SV fan)



Fibreglass model (shown with new 920 DSV fan)

### Tanks (sight gauges / sump / drain)

Slimline sprayers are available in 2 tank versions.

#### Poly

The poly tanks are constructed from opaque white, impact-resistant polyethylene and UV stabilized. The 2000 litre main tank is fitted with hinged lid, premix filling basket, large sump, quick fill system and suction probe fitted standard. Calibrated, clear sight gauge hose on the left hand side. Plus a separate 80 litre flushing tank and 15 litre fresh water tank.

#### Fibreglass (New Zealand only)

2000 litre (red and white) gel-coated fibreglass construction tank for high strength and smooth finish. fitted with hinged lid, premix filling basket, large sump, quick fill system and suction probe fitted standard. Calibrated,

clear fibreglass "sight glass" panel on both sides of the tank. Refer page 98. Separate built-in 30L freshwater tank.

#### Chassis, drawbar & axle

Full length, heavy duty, galvanised chassis, single step, adjustable drawbar, jockey wheel, sump guard, rear bumper and leaf guard.

Adjustable axle only on the AU poly version & wheel (mud) scrapers.

Fixed axle only for the Fibreglass version & wheel (mud) scrapers.

#### Wheels & Tyres

10.0/75 x 15.3" wheels and 10 ply tubeless tyres are fitted as standard.

Optional 31 x 13.5 – 15" (HP-202V) flotation tyres in lieu of standard tyre.

NZ only; 13.0 x 55 – 16" (HP-202T) flotation tyres.

#### Drive/PTO

SH6-AG Series PTO driveshaft with safety covers and quick release pins.

Optional wide angle constant velocity (CV) shaft available, (Standard in NZ).

#### Pumps

High pressure brass head pump – ARBHS170 (max. 50-bar) – large capacity (163 L/min\*) four diaphragm pump featuring front external bronze manifolds and brass heads to minimise corrosion.

Optional AR BHS-200, 194 L/min brass pump (in lieu of ARBHS170)

Optional (NZ only) ARBHA140 alloy pump (in lieu of ARBHS170)

\*Note – pump output in litres per minute is at zero pressure, open flow.

# SECTION 3

## PRODUCT IDENTIFICATION, SHIPPING & SPECIFICATION

Machine specifications are subject to change without prior notification.



### Agitation

The agitation system is driven by the pump via twin SUPERMIX tank agitators & bypass agitation.

### Nozzles

Brass roll-over nozzle bodies fitted with 1 set of ALBUZ Ceramic disc and cores and 1 set ALBUZ ceramic hollow cone nozzles to allow a greater choice of application rates.

Note the customer can specify the specific nozzle requirements at the time of order.

Each sector of nozzle body(s) is fitted with a non drip diaphragm.

### Filtration

Lid-strainers & chemical mixing baskets are standard on all models. Large suction filter.

Optional high pressure brass pressure filters.



### Chemical Handling

Quick fill system and chemical suction probe standard on all models.

### Speed Sensors

Proximity sensors are used for Wheel (travel) speed if using a spray rate controller.

### Controls

Manual remote mounted ARBMH50 controller standard. Functions include left/right, shut-off, simultaneous shut-off, full bypass, pressurised bypass, manual pressure adjustment with pressure gauge.

Options:

- Electric – high pressure solenoid valves, 2-section in-cab control with electric pressure adjustment
- Croplands HV-2400, 2-section auto-rate controller
- HV-4000 auto-rate controller, 2-section (left/right) with optional 4-section control (left/right/upper/lower)

- Bravo 180S auto-rate controller, 2-section (left/right) with optional 4-section control (left/right/upper/lower)

### Factory fitted options (other)

- 920 Linear Tower Fan (refer to Horticulture buyers guide).

NZ only; Visio spray monitor fitted - comes with flowmeter, sensors, cable to cab and brass block control.

NZ only; Quick fill with camlok coupling

### Tractor requirements

Tractor size / power required is dependent upon a combination of tractor weight, sprayer weight (with full tanks), boom size, farm conditions (soil and terrain) and road (or inter-farm) travel requirements.

As a general rule, under ideal conditions, the gross sprayer weight should not exceed 150% of the gross tractor weight and the tractor front axle weight should not be less than 20% of gross tractor weight ... (refer New Zealand Agricultural Vehicles Guide 2017).

Determining the correct tractor should be done in consultation with the tractor dealer.

Approximate engine HP requirements.

Models with 920 DSV fan = 70 HP

Also refer Fan specification information for fan only requirements (page 15).

**Sprayer specifications are subject to change without prior notification.**

# **SECTION 4**

## **PRODUCT FEATURES / FAMILIARISATION**

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# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

### FIENI FANS

The attached table lists the performance details for each Cropliner Fieni fan model.

The DSV fan was designed for low noise and lower power absorption, while still guaranteeing a large air volume.

The 9 blades of the DSV fan are made of a composite material and have been specifically designed to guarantee high performance.

Rear intake fans run anticlockwise.

The fan blades can be set at three different pitch angles to adapt the Fieni sprayer unit to the power of the tractor available. All Cropliner sprayers are tested and supplied with the fan set to the **middle blade pitch setting**.

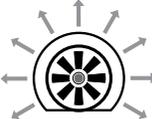
The fans are equipped with a centrifugal clutch made of metal with brake lining.

Each fan is PTO shaft driven via a 2 speed (plus neutral), low maintenance, heavy duty gearbox.

Designed for maximum PTO speed = 540 rpm.

Each fan has a series of small independent moveable flat blades fitted on the air outlet, to help direct the air to where it is required.

Each side of the fan is a stainless steel "spray ring" with 13 or 14 nozzles per side. Each nozzle is of the brass "roll-over" type.

|   | 920 LINEAR TOWER (LT) FAN     | 920 DSV FAN    |
|---|-------------------------------|----------------|
| <b>ORDER CODE</b>   | <b>KH-5037</b>                | <b>KH-5035</b> |
| <b>9-BLADE FAN</b>  |                               |                |
|  | Fan blade diameter mm         | 913            |
|   | Standard RPM (PTO 540) (High) | 1,780          |
| <b>OUTPUT AND POWER</b>   |                               |                |
|  | Pitch                         | 26°            |
|   | M3/HR                         | 73,682         |
|   | HP                            | 26.4           |
|   | <b>Pitch</b>                  | <b>34°</b>     |
|   | <b>m3/hr</b>                  | <b>81,285</b>  |
|   | <b>HP</b>                     | <b>36.9</b>    |
|   | Pitch                         | 42°            |
|   | M3/HR                         | 83,798         |
|   | HP                            | 47.5           |
| <b>FAN GEARBOX MODEL</b>  |                               |                |
|   | 2-speed plus neutral          | 2 + N          |
|   | Low box ratio                 | 1:2.93         |
|   | High box                      | 1:3.29         |
| <b>PERFORMANCE* (*in ideal conditions)</b>  |                               |                |
|   | Y = metres                    | 6              |
|   | Z = metres                    | 13             |
|   | Suitable tank size            | 1500 - 4000    |
|   | Recommended tractor HP        | ≥ 65           |
|   | Nozzles per side              | 13 + 13 (26)   |
|   | Noise rating (dB) @ 7.5m      | 92             |
|   | Fan weight                    | 178            |

The maximum canopy height and width figures are entirely subject to the canopy density, size, shape and weather conditions.

# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

### FAN PITCH ANGLE

All Cropliner fans have multiple pitch settings and are normally supplied in the middle position.

To maximise performance, the blade pitch can be adjusted to match the tractor's capability / chosen operating parameters such as PTO rpm.

To increase the blade angle will increase air (spray) velocity and penetration, increase noise, and increase tractor power requirements.

The opposite is true for reducing pitch angles.

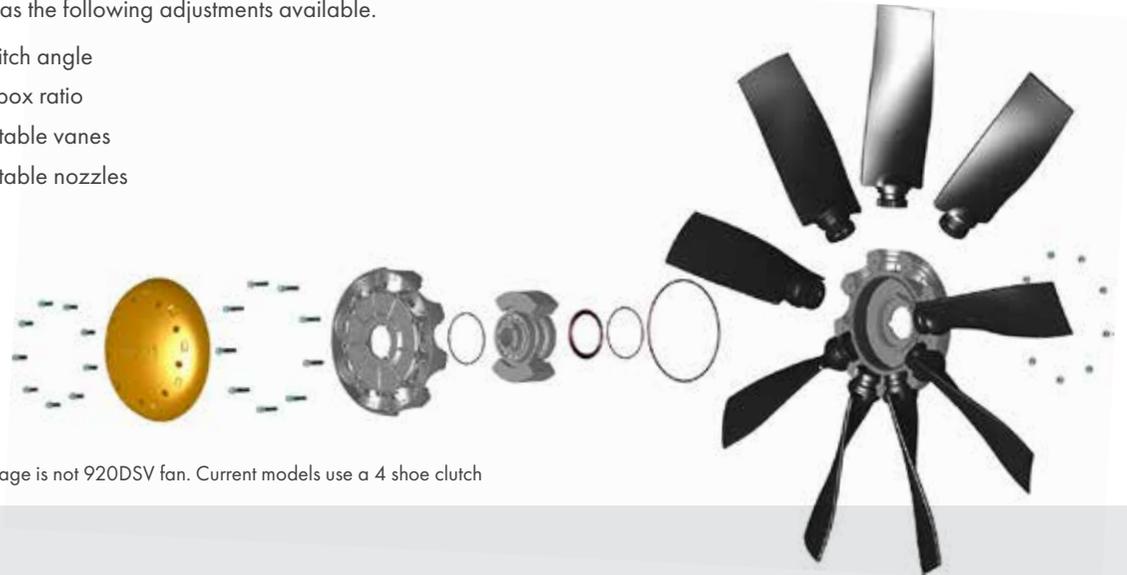
Adjusting the pitch angles can be done on the sprayer as follows.

- a. Disconnect the PTO drive.
- b. Remove the safety fan guard.
- c. Remove the hub cover.
- d. Loosen the fan hub bolts.
- e. It's now possible to move the blades. All blades need to be set to the same pitch angle.
- f. Re-tighten the fan hub bolts. Makes sure the hub is snugly fitting back together – if not, it's a sign that one or more of the fan blade splines are not correctly fitted.
- g. Re-attach the hub cover, and safety guards.

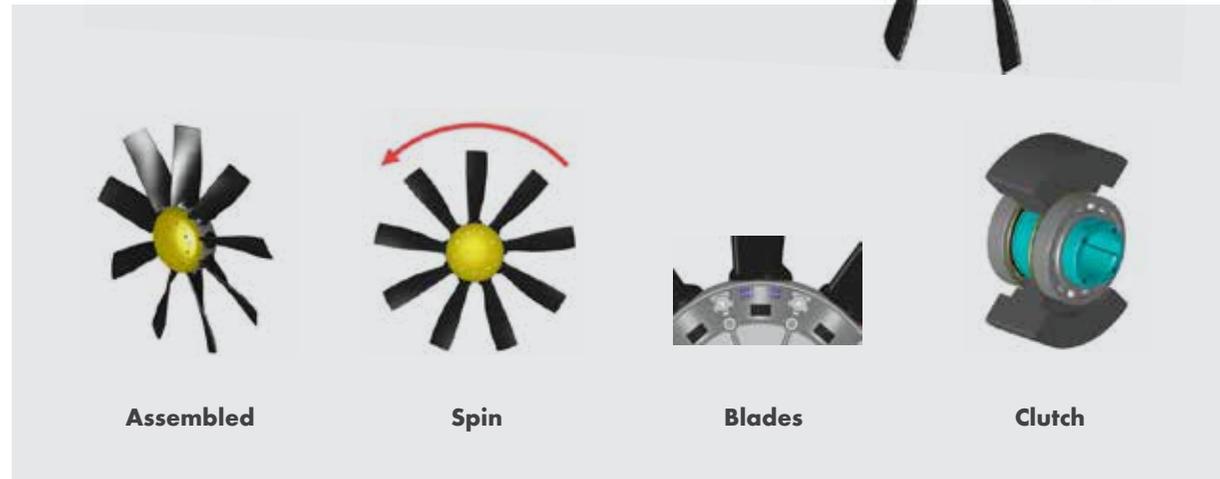
### Fan Set-up

The fan has the following adjustments available.

- Fan pitch angle
- Gearbox ratio
- Adjustable vanes
- Adjustable nozzles



Note image is not 920DSV fan. Current models use a 4 shoe clutch





# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

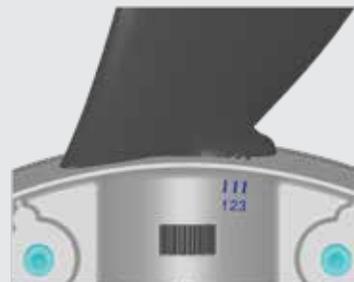
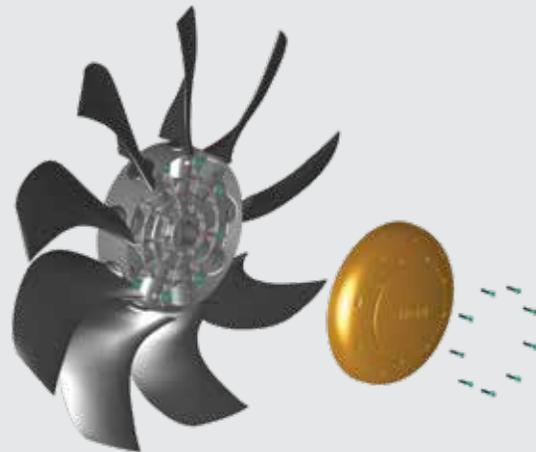
The fan has been supplied “balanced”. Swapping blades and hub components around risks upsetting the balance.

Do not operate with damaged fan blades.

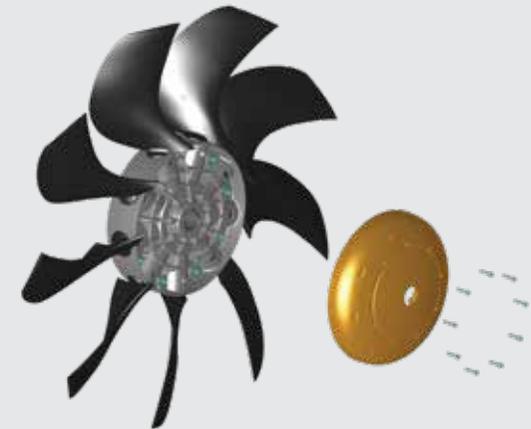
If replacing a damaged blade, it's necessary to re-balance the fan.



**VNS-A Fan**  
(rear air intake anti-clockwise)



**VNS-O Fan**  
(front air intake, clockwise)

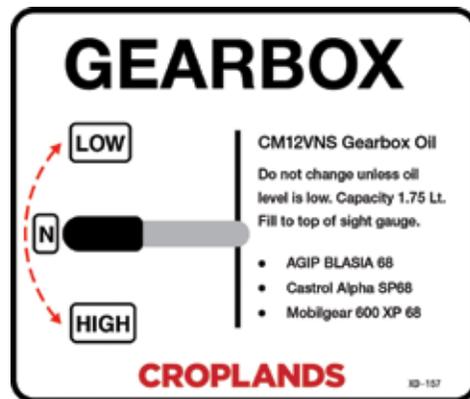


# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

### GEARBOX

Both the standard and linear tower 920 fans use the same CM12VNS gearbox. The gearbox has a low ratio, neutral (as the middle setting) and high ratio. Gear positions as per below decal.



All units are supplied with a lever to engage and disengage the fan.

To avoid damage to the gears of the gearbox and to the sprayer unit, **always disengage the PTO drive before operating the gearbox lever / changing gears etc.**

**Gearbox oil:** Annually check the oil level of the gearbox and if the level is low (below the middle of the sight gauge) it's necessary to add the oil (SAE 60:70) up to reach the correct oil level. It is not necessary to change the oil once a year, but only to add oil if the level is low.

The oil level sight gauge may be viewed via a hole in the internal cowling (refer to image / **yellow arrow**).



If a low oil level is detected, an investigation as to why the oil level has dropped should be undertaken.

To access the gearbox or the oil fill position will require the partial disassembly of the fan.

Fieni gearboxes use Agip Blasias 68 oil.

Some common equivalents are;

- Castrol Alpha SP68
- Mobilgear 600 XP 68
- Shell Omala S2 G 68

|          |          |
|----------|----------|
| Fan      | 920DSV   |
| G/box    | CM-12VNS |
| Oil (ml) | 1900     |

### Maximum PTO Speed

Maximum PTO speed is 540 rpm.

Check the tractor PTO RPM before operating the sprayer. Excessive RPM at the PTO can damage the sprayer unit and can be dangerous for the operator.

# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION



### ADJUSTABLE VANES

The adjustable vanes allow re-directing the air output more precisely to the target (tree sector).

Adjustment of vanes is often done in conjunction with variations in nozzle selection.

### NOZZLES

The Slimline 920 fans feature stainless steel spray rings with 13 (Linear Tower) or 14 (920) brass roll-over nozzles per side. Maximum total of 26 or 28 nozzles.

Each sprayer is supplied fitted with 1 x set (26 or 28) ALBUZ ceramic disc and cores and 1 set (26 ~ 28) ALBUZ ATR ceramic hollow cone nozzles to allow a greater choice of application rates.

Specific Nozzles can be selected at the time of ordering.

Each nozzle is fitted with a 1 Bar non-drip diaphragm.

The nozzle bodies are of the twin roll-over type enabling one of 2 nozzles to be selected or an off position as shown below in the vertical position.



### SECTIONS

Generally the spray rings are configured as  
Section 1 = left hand spray ring & nozzles  
Section 2 = right hand spray ring & nozzles

# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

### FAN SAFETY

#### Guards

The sprayer unit is supplied complete with safety guards for both incoming and outgoing (generated) air. The assembled guards are in place to prevent foreign bodies hitting the fan.

**NEVER operate the sprayer without these guards in place.**



#### Mud Scraper

All Slimline models are fitted with a mud-scraper just behind the rear of each tyre.

From time to time the incoming air guard may become clogged with leaves etc. Always disengage the fan before removing clogged leaves etc from the guards.

#### Bump / Leaf Guard

All Cropliner (Slimline models) are fitted with a galvanised steel Bump / Leaf guard. Do not remove this guard as it plays an important role in preventing damage to the fan housing and helps prevent ingestion of foreign objects.

Note sliding tube in the photo - left and below.



### Fan Safety Rules



The fan runs at high speed and is capable of ingesting loose objects or clothing or ejecting objects that have been ingested at high speed.

- DO NOT exceed maximum operating rpm (PTO = 540 rpm)
- DO NOT stay in the working area (air inlet or spray outlet) of the sprayer unit.
- Always stay at a safe distance from the machine when it is operating.
- DO NOT remove or modify the installed protections and guards.



# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

### CHASSIS, AXLE, WHEEL & TYRES

#### Chassis

Full length, heavy duty, hot-dipped galvanised chassis, fixed step(s), adjustable drawbar, jockey wheel, sump guard, rear bumper and leaf guard.

#### Drawbar

The adjustable drawbar is supplied at its longest length. If required, it can be shortened by 2 holes (110mm spacing between each).



#### Jockey stand(s)

All Cropliners come fitted with an extendable Jockey Stand suitable for (tank empty) storage of the sprayer.

Top middle photo shows the jockey stand in the extended position – it's recommended to remove from the sprayer when spraying.



#### Step / Platform access

The chassis(s) incorporate a fixed step(s) in front of the wheels / adjacent the tank lid.

The Poly version has a single step of the left hand side of the sprayer and the Fibreglass version has a step on both sides.

For access to any parts of a sprayer not readily accessed from the ground, the operator should use an appropriate platform step.

Such steps are commercially available from specialty suppliers. Larger purpose-built platforms are synonymous with well set-up sprayer filling stations.



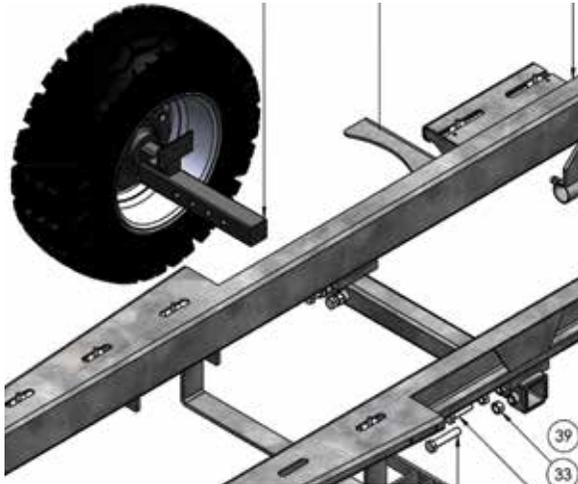
#### Sump guard

The chassis are fitted with a sump guard. NZ Fibreglass version shown. Also refer to Section 10 assembly drawings for the Poly version.



# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION



### Axles

A fixed axle is standard.

However there are design variations between the Poly (AU) and Fibreglass (NZ) versions. Refer to Section 10 - Assembly drawings for part number identification.



### Wheels & Tyres

For further identification of the axle, wheel, and tyre options see the Sprayer Specification Sheet that's included with every sprayer's Warranty & Pre-Delivery Booklet.

#### Standard tyre AU/NZ

HP-200A, (10.0/75 - 15.3)

Rolling dia = 760mm

Width = 265mm



#### Unlisted option (for extra ground clearance)

HP-200, (11.5/80 - 15.3")

Rolling dia = 840mm

Width = 290mm



#### Optional flotation tyre for AU

HP-202V, (31 x 13.5 - 15")

Rolling dia = 810mm

Width = 345mm



#### Optional flotation tyre for NZ

HP-202T, (31 x 13.5 - 15")

Rolling dia = 787mm

Width = 343mm



# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

### Wheel Speed Sensor

All trailed sprayers optioned with Auto-rate control are fitted with a Speed Sensor – normally via a proximity sensor installed on the right-hand side wheel.

The sensor needs to be 5mm from the target, which in this case is the head of the wheel studs.



The sensor is reading cm per pulse.

A GPS speed sensor (Atlas 100) can be fitted as an alternative option.

### TANKS, LIDS ETC

The poly (AU) model features three tanks, Main (chemical), Flushing (fresh water) and Hand-wash (fresh water) for operation, cleaning, and operator safety. The fibreglass (NZ) model is not equipped with a flushing tank.



Filling of flush and fresh water / handwash tanks should ideally be via a separate / clean water source.



All Main tanks are equipped with large lid and basket filter. All models have a Basket/Powder Mix function activated via a tap from the pressure manifold, plumbed to the basket. Refer pages 49, 58 & 59 for operation.

The main tank lids have integrated breathers.



Hand-wash tanks do not have a breather. Always keep the area surrounding the hand-wash tanks clean and clear of chemical.

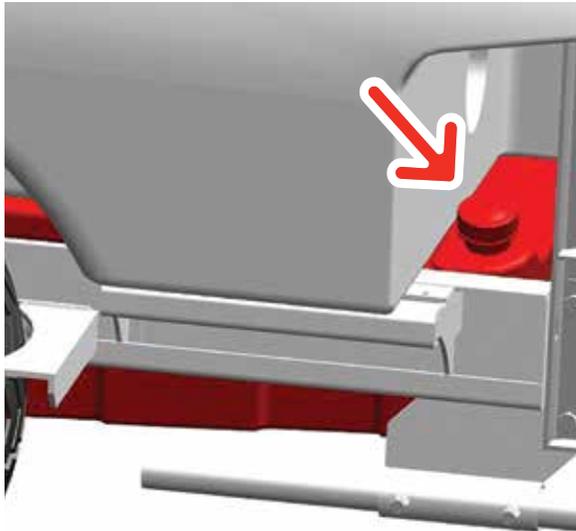
Flushing (when fitted) and Hand-wash tanks are labelled as WATER ONLY. Replacement labels are available under the part no. XD-127V.



# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

The flushing tank (poly version only) as accessed on the rear left-hand side of the sprayer.



No flush tank is used on the Fibreglass version.

All Hand-wash taps are clearly labelled as WATER FOR OPERATOR WASHING ONLY. Replacement labels are available under the part no. XD-124V.



POLY version handwash tap, at the rear LH side of the sprayer.



FIBREGLASS version handwash tap at the front LH side (under the hood).



# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

### Main Tank Fill

Fill can be via the top lid & basket, or via (optional) separate Quick-fill Camlock fitting into the top of the tank (refer bottom image).



### Main Tank Drain

Fibreglass version, main tank drain is close to the front left of the sprayer, as per below image (red arrow).



Poly tank version drain is between the wheel and step on the left hand side - as per below image (orange arrow).

Top handle pointing up is OFF. Refer page 7 for replacement label.



# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

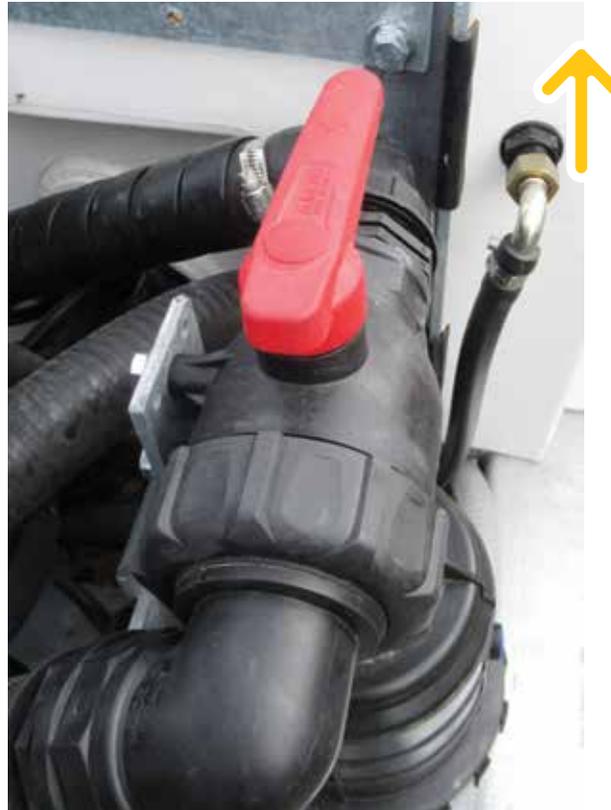
### Tank Selection Valve

The tank selection valve, at the top of the filter on the left hand side of the sprayer has 3 different positions.

1. OFF as pictured below - before inspecting, cleaning or replacing the suction filter (**blue arrow**).



2. MAIN - for drawing water from the sump of the MAIN tank, to the pump, (**yellow arrow**).



3. FLUSH - for drawing water from the FLUSHING tank, to the pump, (**green arrow**).



# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

A popular (but non standard option) re Poly tank customers is to order the sprayer without a flushing tank and to fit an external flush kit. This done via a “flushing” camlock fitting to the tank selection ball valve. This allows for a significantly larger volume of flushing water (from a separate source) to be used.

Refer circled image below.



### Suction Filter - Poly

The main (suction) filter for all models is on the front left-hand side of the sprayer.

When inspecting the suction filter it is recommended to disengage the tractor PTO / spray pump to depressurize the system.

1. Turn off the flow at the tank selection valve.
2. Wear safety gloves when inspecting, cleansing or replacing the filter(s).



### Suction Filter - Fibreglass

Note the Fibreglass (NZ) version does not feature a flushing tank, and hence does not require a tank selection valve. The main feed / suction is plumbed to the pump's suction manifold via the filter assembly (with no isolation tap).

The main suction filter incorporates an automatic shut off / valve release (yellow) knob which enables filter cleaning even when the tank is full.

To operate:

1. Disengage the tractor PTO / spray pump to depressurize the system.
2. Push up, turn anti-clockwise and withdraw the “yellow” plunger. This activates a spring loaded seal against the incoming liquid supply.
3. The main filter ring can now be undone and the mesh filter removed for cleaning.

**o ALWAYS Wear safety gloves when inspecting, cleaning or replacing the filter(s)**



# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

### PUMPS

The Annovi Reverberi (AR) range of reliable and robust diaphragm pumps have been industry leaders for more than 60 years and have partnered with Croplands for more than 40 years.

Croplands Cropliner sprayers use quality high-pressure AR pumps.

The choice of standard pump will vary from model to model.

AR pumps come fitted with an identification label with extra information re ...

- Model number
- Serial number
- Maximum rpm
- Pressure and flow ratings
- Oil type



|   |     |   |                |   |            |
|---|-----|---|----------------|---|------------|
|  <b>ANNOVI REVERBERI</b><br><small>The Power of Experience</small> |     | <small>VIA M.L.KING, 3 - 41122 MODENA - ITALY</small><br><small>MADE IN ITALY</small> |                |  |            |
| RPM MAX   | bar | l/min   | <b>BHS 200</b> |   |            |
| 550   | 0   | 193.7   |                |   |            |
|   | 50  | 183.3   | Cod: 30774     |   |            |
| S/N 3077400   |     | OP18006059  | 17180088       | Pr.238  | OIL SAE 30 |
| WWW.ANNOVIREVERBERI.IT  |     |   |                |   |            |

**ARBHS-170** (max. 50-bar) – large capacity (163 L/min) four diaphragm pump featuring front external bronze manifolds and brass heads to minimise corrosion. Fitted as standard on all Slimline sprayers.

Optional; **ARBHS-200** (max. 50-bar) – large capacity (194L/min) four diaphragm, brass head pump.

Optional; **ARBHA-140** (max. 50-bar) four diaphragm pump (142 L/min), cast anodised alloy.

All pumps are supplied with a separate manufacturers manual.



### PTO SHAFTS



The spray pump is driven via a PTO shaft connection to the tractor.

Supplied is the heavy duty SH6-AG Series PTO driveshaft with safety covers and quick release pins. A separate manual is supplied with each shaft.

The heavy duty, wide angle SHCV PTO shaft is standard in NZ (all models), and optional in Australia.



Refer Pre-Operations (section 5) re set-up of the PTO shaft between tractor and pump.

The Fieni fan is driven via a PTO through shaft connected from the spray pump to fan gearbox. Details of this shaft can be found in the Warranty booklet, specification page.

# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

### SPRAY SYSTEM OVERVIEW

Based on HT-IS4021 electric controller

**The liquid system, and positioning of components will vary from model to model; However, the same basic design principles are followed in all cases ....**

- A. Always ensure the Hand-wash tank is filled with fresh water before any other actions.
- B. Ideally fill the Flushing tank (if fitted) before filling the main tank.
- C. Fill the Main tank - preferably via the top fill camlock fitting (if fitted).

Alternative method is via the main lid. This is not recommended as the fill point is above the operators head.

- Make sure the drain tap is closed before filling.
- Always wear safety gloves.

D. See Spray Operations (section 6) re adding chemical.

E. Tank Selection Valve (photo E shows the valve in the off position).

- Always select off when cleaning the filter.
- Never select off when running the pump.
- Always turn off the pump before making a change.

Note the NZ / Fibreglass (FRP) models do not use a tank selection valve (refer p. 27).



E

F. When spraying, liquid flow is from the tank via the tank selection valve set as per photo F, through the filter onto the pump (photos Poly & FRP)



F



POLY

FRP

G. The pump's brass pressure manifold supplies the main spray (pressure) line, agitators, basket rinse and chemical probe.



G

To follow the main spray line .....

# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

H. Maximum spray pressure is set by the pressure regulator valve. Refer Spray Operations (section 6) for detailed instruction.

Note Poly versions fitted with the HT-IS4021 system (as per photo G, previous page) do not use a separate pressure regulator at the pump's manifold.

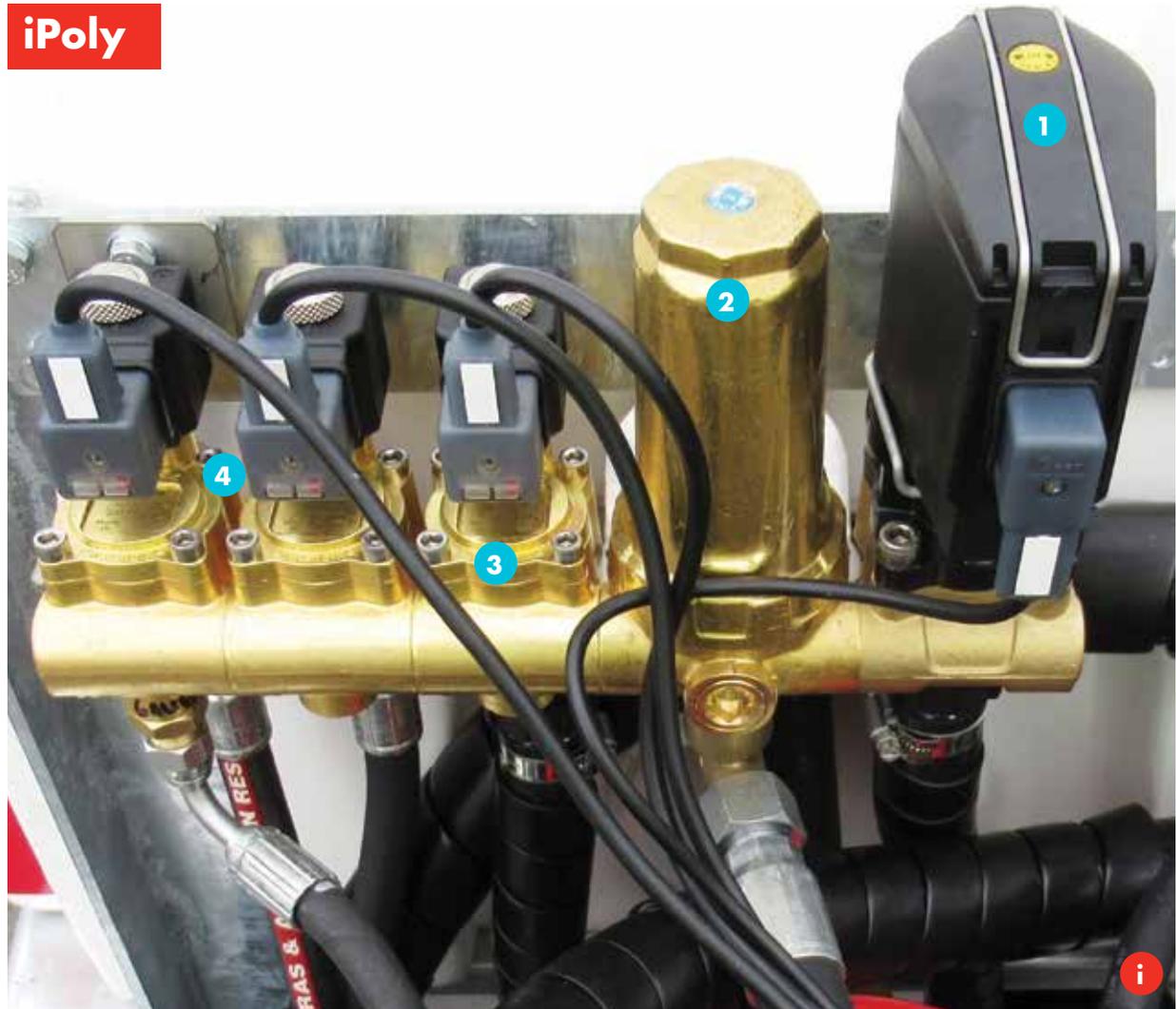


i. From the pump manifold / regulator, to the Sprayer's Pressure (spray) manifold which comprises of 4 main parts,

1. Pressure /Flow Regulating Servo valve (5 second)
2. Filter
3. Dump valve (Instantaneous shut-off)
4. Section control valves (left then right).

The Fibreglass models use this manifold in reverse configuration (next page).

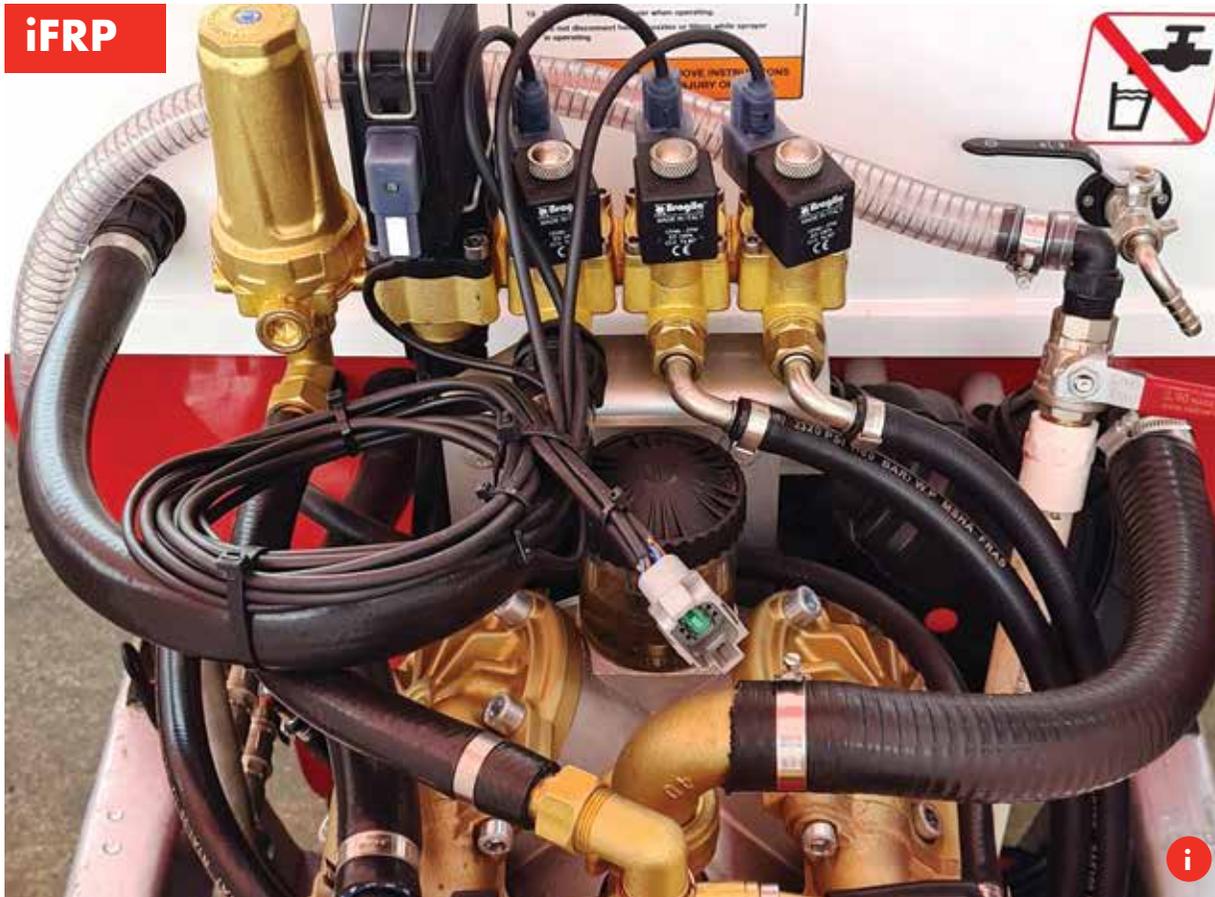
Refer Spray Operations (section 6) for detailed instruction.



# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

iFRP



The servo valve regulates spraying pressure. Any excess flow (the difference between the maximum system pressure (H) and spraying pressure (i)) is returned back to tank and will aid agitation.

The dump valve, dumps all pressure (hence flow) back to the main tank whenever not spraying and will boost agitation.

- J. Clean the Pressure Filter regularly. Clean regularly (or daily), or more often if the water source isn't clean, and whenever freshwater flushing.



# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

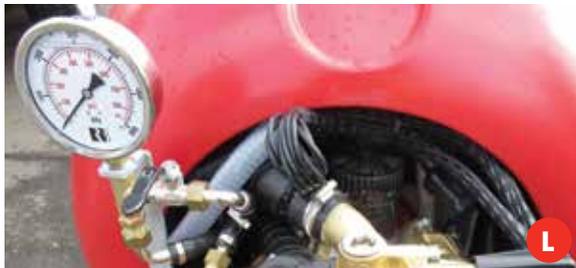
K. Sprayers equipped with Auto rate controllers will also be fitted with a flow meter.

Refer Spray Operations (section 6) for detailed instruction.



L. The spray pressure gauge is also connected to the spray manifold.

The tap on the side or back of the pressure gauge is used to drain sediment trapped in the gauge line. Use at least daily or more often if the water source isn't clean, and whenever freshwater flushing.



As per (G) on page 30, the pump's pressure manifold also supplies the ...

1. Twin Supa-Flo Agitators (Blue arrow),
2. Basket Rinse – (Yellow arrow) and
3. Chemical Suction Probe (Red arrow)(next page).

Each of these functions has an on / off tap at or adjacent the pump's pressure manifold for activation as required.

Refer Spray Operations (section 6) for detailed instructions.





# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

The chemical suction probe has two taps.

The first is at the pump which activates the venturi system to create the suction, and the second tap allows the probe to be turned on / off or set to partially open as required.

The probe is permanently plumbed into the venturi / non removable. For storage and transport the hose and probe are stored under the sprayers front "cover".

Refer Spray Operations (section 6) re adding chemical via the probe.



# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

### CONTROLS

#### Spray Control Options:

1. Manual remote mounted ARBMH50 controller is the base model option.
2. Standard electrics - high pressure solenoid valves, 2-section in-cab control with electric pressure adjustment
3. Croplands HV2400 auto-rate controller
4. HV4000 automatic rate controller, 2-section (left/right) with optional 4-section control
5. Bravo 180S automatic rate controller, 2-section (left/right) with optional 4-section control

All electric / auto rate controllers come supplied with their own manual.

The supplied controller has already been tested before leaving the factory.

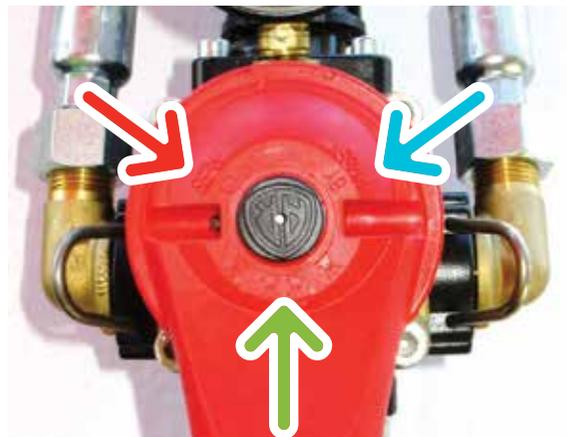
#### Manual controller, AR BMH-50

Functions include left/right shut-off, simultaneous shut-off, full bypass, pressurised bypass, manual pressure adjustment with pressure gauge.



Brass control unit with working pressure regulating valve, single lever for partial or total closure and discharge, glycerine bath pressure gauge with coloured dial.

- Must be mounted in a position which allows the operator easy access.
- All operations are controlled by a lever.
- Use knob to regulate working pressure: turn clockwise to increase pressure (+), counter-clockwise to decrease (-).
- Flush the control unit with water when you finish work to remove any internal deposits.



- **Blue Arrow** = Bypass
- **Green Arrow** = Boom selection (SX-DX), Left section only – All sections – Right section only
- **Red Arrow** = Closed / Pressure setting



Shown above in the bypass position. Photo to the far left is both booms on.

Refer to Sections 5 and 6 re using this controller.

# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

### Option; Standard Electrics HT-IS4021

High pressure solenoid valves, 2-section in-cab control with electric pressure adjustment is in effect an electrical version of the manual controls.

Comes with an 8-page manual.



Electric in-cab controller with switchbox. 2-section high-pressure electric valves for individual left/right shut off, electric pressure regulating valve and a master on/off can all be operated from the switchbox in the cab. Requires a reliable 12V power supply.

All controls via the switchbox.



Refer to Sections 5 and 6 re using this controller.

### Option; Croplands HV2400 auto-rate controller

A basic spray rate controller with 2-section solenoid control with up to 10 pre-set application rates. Programmable alarm settings with L/ha and L/100m capability.

Comes with a 48 page (3 part) manual.

Requires a reliable 12V power supply.



Refer to Sections 5 and 6 re using this controller.

### Option; HV4000 automatic rate controller

2-section (left/right) with optional 4-section control of motor valves or solenoids. Pre-set row width and application rates for simple, on-the-go adjustments.

Comes with a 74 page manual.

Requires a reliable 12V power supply.

Multiple screen selections, programmable audio, and visual alarms and up to 10 individual operating histories to keep the operator informed.

L/ha or L/100m capability.

Refer to Sections 5 and 6 re using this controller.



# SECTION 4

## PRODUCT FEATURES / FAMILIARISATION

### Option; Bravo 180S automatic rate controller

For the operator requiring GPS integration and data transfer via USB.

Comes with an operators manual on CD.

Requires a reliable 12V power supply.

2-section (left/right) with optional 4-section control

Pre-set row width and application rates for simple, on-the-go adjustments. Multiple screen selections, programmable audio, and visual alarms and up to 10 individual operating histories to keep the operator informed.

L/ha or L/100m capability.

Refer to Sections 5 and 6 re using this controller.

The Arag BRAVO 180S, #467183403 (4 section as shown) controller instruction manual is available online at;

<https://www.aragnet.com/EN/INT/246/products/?PRD=108693>

A 2 page Bravo 180S Quick Reference Guide is also available from Croplands customer support or the Arag web site.



# **SECTION 5**

## **TRACTOR CONNECTION & SPRAYER SET-UP**

|   |           |
|---|-----------|
| <b>SAFETY FIRST</b>                           | <b>38</b> |
| <b>CONNECTING TO TRACTOR</b>                  | <b>38</b> |
| <b>CONNECTING HV4000 AUTO RATE CONTROLLER</b> | <b>42</b> |
| <b>CONNECTING BRAVO 180S</b>                  | <b>43</b> |
| <b>CONNECTING HV2400</b>                      | <b>44</b> |
| <b>CONNECTING MANUAL CONTROLLER</b>           | <b>44</b> |
| <b>CONNECTING BRAGLIA ELECTRIC CONTROLLER</b> | <b>44</b> |
| <b>FUNCTIONALITY CHECKS</b>                   | <b>46</b> |
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| <b>GENERAL NOTES ON AUTO-RATE CONTROLLERS</b> | <b>50</b> |
| <b>CONFIGURE THE FAN</b>                      | <b>52</b> |
| <b>PRE-OPERATION CHECKLIST</b>                | <b>54</b> |

# SECTION 5

## TRACTOR CONNECTION & SPRAYER SET-UP

From arrival on farm, tractor connection and prepare the sprayer for operation.

### SAFETY FIRST



Before progressing further,

- Read and understand the Safety Manual (part no. GP-SAFE-A) supplied with this sprayer.
- Read and understand this manual to better familiarise yourself with the sprayer.
- Ensure the tractor to be used to tow this sprayer is fit for purpose (tow ratings etc...). If in doubt consult the tractor dealer/manual.



### CONNECTING TO TRACTOR

The Cropliner Sprayer has been fully tested before leaving the Croplands factory. Some components will require further assembly after shipping from the factory/dealer;

1. Determine the correct position for hitch & PTO shaft & Shaft type.

2. Adjust drawbar lengths
3. Connect to the tractor
4. Add safety chains (if supplied)
5. Fit PTO
6. Connect controller and all other relevant connections to the tractor

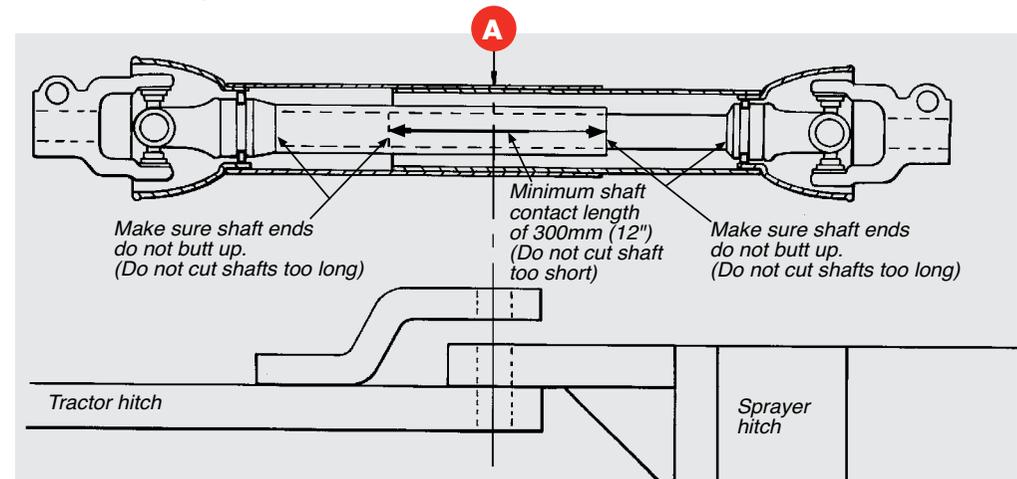
Always park the sprayer in a horizontal position and on firm, level ground. Use wheel chock's if required.

On Standard PTO shafts, the drawbar pin connecting the tractor & Cropliner should be centred between the two universal joints of the PTO shaft. For wide angle (constant velocity) shafts, see alternative settings, see on page 42.

Once the sprayer is connected to the tractor always ensure the park stands are removed or folded to the horizontal position before moving.

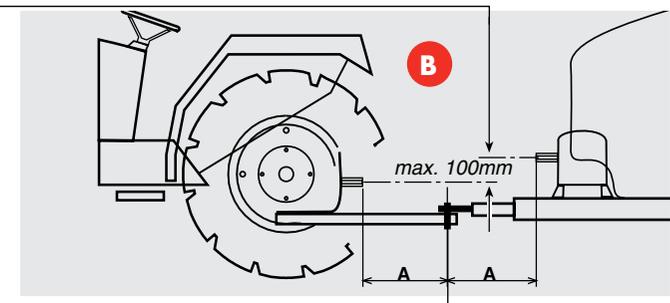
### Hitch & Standard PTO

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



Maximum spine height difference 100mm (approx) for Standard PTO shafts

Drawbar pivot midway with standard PTO shafts



# SECTION 5

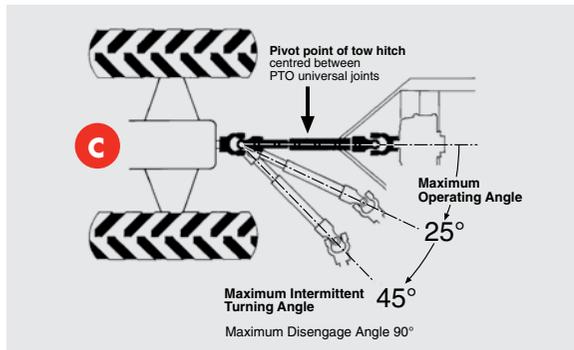
## TRACTOR CONNECTION & SPRAYER SET-UP

This enables the tractor to make maximum turns with minimal bending of the universals.

Important:

- Do not allow more than 10% difference in the two halves of drawbar length. If more than 10% difference occurs, a wide-angle shaft must be used.
- The Standard PTO shaft is only recommended where the maximum intermittent turning angles do not exceed 45° turning angle of the PTO.

### STANDARD PTO



Important:

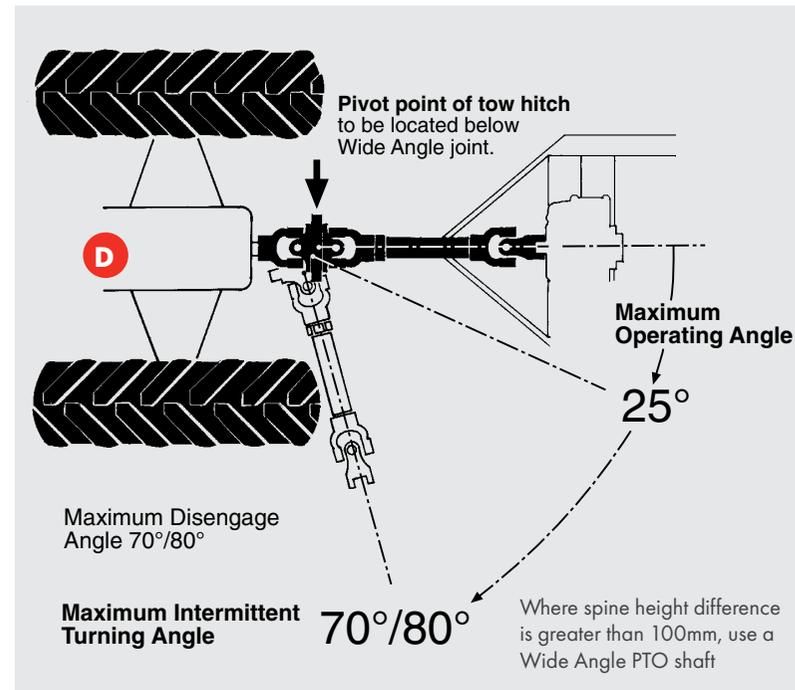
- Ensure that the drive shaft is the correct length to avoid it bottoming out & causing damage to the pump.
- When the tractor is towing the sprayer straight ahead, the two telescopic sections of the PTO shaft are at maximum extension.
- When turning or crossing an inversion, the telescopic shaft sections close up.

### Hitch & Wide-Angle PTO

Optional Wide-Angle PTO Shaft

The Wide Angle (constant velocity) PTO must be used where tight turning requires greater than 45° turning angle of the PTO, as illustrated (D)

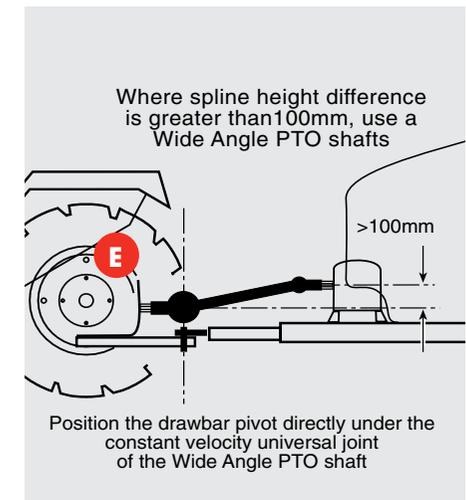
Where height variance between the tractor output spline and Cropliner input shaft is greater than 100mm, a wide angle (constant velocity) PTO must be used, as illustrated (E).



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

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

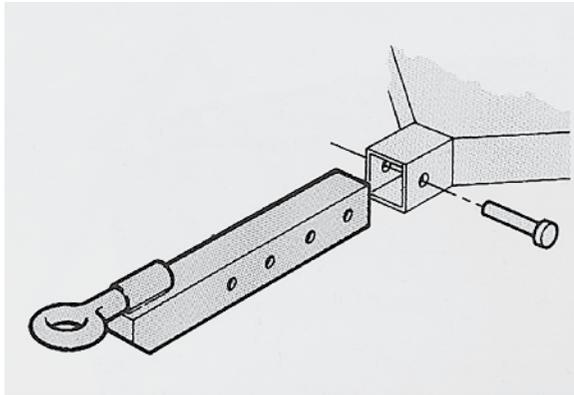
Refer page 41 re PTO installation.



# SECTION 5

## TRACTOR CONNECTION & SPRAYER SET-UP

### DRAWBAR



All Cropliner Sprayers are fitted standard with an adjustable length drawbar. It can be used with the tow eye on top or on the bottom.

To adjust the position of the Cropliner hitch:

- Make sure the Cropliner cannot roll and support the front of the chassis.
- Loosen the locking nut and bolt (on the corner) of the Cropliner hitch.



- Remove the nut and then the bolt that goes horizontally through the hitch
- Slide the hitch in or out of the Cropliner frame to the length required
- Replace and tighten the through bolt locking nut.

### CONNECT SPRAYER TO THE TRACTOR

Align drawbars of tractor and Cropliner, then insert & lock the drawbar pin in position ensuring it cannot come out while transporting or operating.

Lift up and/or remove the park stands for sprayer operation.

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



### Optional Self-Steering Drawbar

The self-tracking drawbar can be used where tight turning requires greater than 45°.

It is also suitable for ensuring the sprayer wheels track on the same lines as those of the tractor to make row exit & entry easier.

Note this is not a standard option. It is shown here for reference only.

Must use wide angle PTO shaft (unlike the shaft shown here).



Ensure the pivot points are greased regularly (every spray-round).

To adjust the self-steering drawbar length, follow the steps as for the standard drawbar hitch.



# SECTION 5

## TRACTOR CONNECTION & SPRAYER SET-UP

### SAFETY CHAINS

If supplied, install the safety chain(s).



### FIT THE PTO SHAFT

A new standard-length PTO shaft is supplied with the sprayer. In most cases this will require cutting to a shorter length - specific to the tractor & sprayer dimensions.

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

**Note for new installations, the dealer will oversee the fitting of the new shaft.**

Also, refer to the user manual that is supplied with every new PTO shaft.



- Remove the PTO shaft which is usually delivered strapped to the Cropliner™. Check the PTO shaft has not been damaged in transit

- Grease the universal joints, telescoping shafts & safety cover bushes
- Measure and fit the PTO to the sprayer ensuring the locking pin is correctly located.
- Cutting the PTO shaft to length requires knowledge of this procedure. If you have not carried out this procedure before, ensure your dealer carries out this important step.
- If the Cropliner is hitched too closely, remove excess PTO shaft to avoid bottoming out that will cause additional damage.



**Before operating the drive shaft, be sure that all safety guards are in place & safety chains are securely fitted (refer to PTO User Manual).**

Do not exceed the maximum RPM of the pump or gearbox (540 RPM).



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

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

# SECTION 5

## TRACTOR CONNECTION & SPRAYER SET-UP

### CONNECTING HV4000 AUTO RATE CONTROLLER

If ordered.

The controller has been fitted and adjusted at the factory but has been disconnected and packed for transit, along with the required power/connection looms and in cab RAM mount.

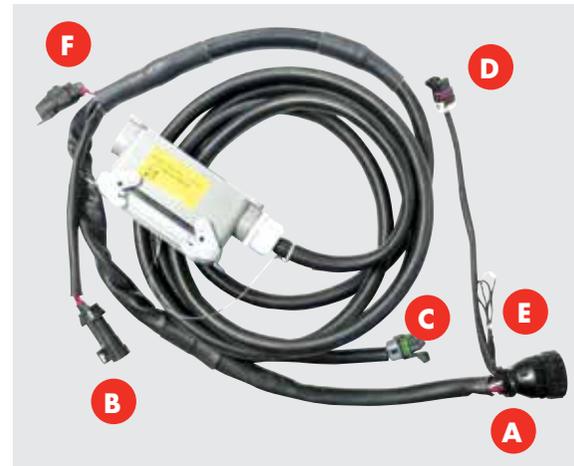
Connect the main loom. Find a suitable position external of the cab for the 24 pin plug connection. It's recommended that the connection be orientated as per photo right, with the cable entry on the bottom side (to help prevent water ingress).

Normally this connection is positioned behind and external of the cab/somewhere near the hydraulic remotes. Route the loom into the cab and find the best position for the controller with the remaining length of the harness.



Fit the controller/console into the tractor cab in a convenient & safe location for the operator.

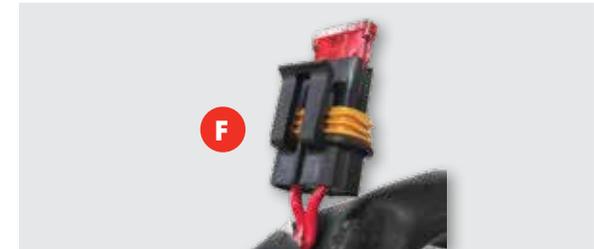
Ensure the wiring cannot interfere with the PTO shaft or any tractor functions.



The connection loom features ....

- A. Connection to the HV4000 controller
- B. Power connection

- C. The "green" 5 pin connector is not used for Cropliner models
- D. Speed - GPS (or can be any speed via pulse)
- E. Earthing lead – not generally used
- F. Fuse, 10 amps



- A. Connection to the HV4000 console via Con port 2. Refer to photo 1. Be careful to correctly align the pins before tightening.



photo 1

# SECTION 5

## TRACTOR CONNECTION & SPRAYER SET-UP

B. Power connection requires a connection to the power loom (supplied). Refer to photo 2.

It's highly recommended the power loom(s) are hard-wired at the tractor battery rather than hooking up to cab connections. Only qualified persons should assemble/disassemble or service electrical components. The fuse is 10 amps.

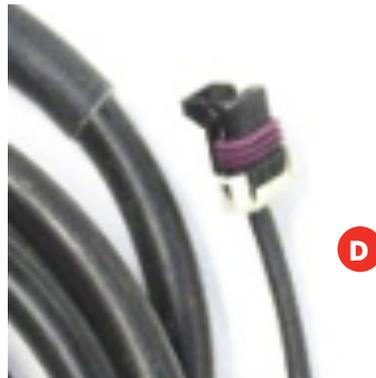


photo 2



photo 4

D. The "purple" 3 pin connector is used when GPS speed or an extra speed-related connection (pump speed etc) is required.



D

photo 3

Supplied with each HV4000 is a "RAM" Mount. This will normally be fitted by the tractor dealer as a part of the installation process.



### CONNECTING BRAVO 180S

Connecting the Bravo 180S is similar to the HV4000 at the sprayer end – with different connections at the cab and controller.

It's highly recommended the power loom(s) are hard-wired at the tractor battery rather than hooking up to cab connections. Only qualified persons should assemble/disassemble or service electrical components. The fuse is 10 amps.

Ensure the wiring cannot interfere with the PTO shaft or any tractor functions.



# SECTION 5

## TRACTOR CONNECTION & SPRAYER SET-UP

### CONNECTING HV2400

For sprayers fitted with the optional HV2400 basic 2 section spray-rate controller.

The controller has been fitted and adjusted at the factory but has been disconnected and packed for transit.

Follow the controller's manual for instructions on connecting to a suitable (tractor battery) power source.

Find a suitable position on the tractor / within the cab for the control switchbox.

Connect the supplied control / switch to the tractor and sprayer ...

1. Connect to a suitable (tractor) power source
2. Connect to the controller manifold loom

Take care to route the wiring looms away from PTO shafts, linkage arms etc.



### CONNECTING MANUAL CONTROLLER

The standard manual controller, (AR BMH-50), if fitted, has been run and adjusted at the factory.

Mount the manual controller in a suitable position, external of the cab (should never have pressure lines within a tractor cab), but within easy reach of the main control arm and easy reading of the pressure gauge.

Ensure all hoses are free of linkage arms, PTO shafts etc.



### CONNECTING BRAGLIA (HT-IS4021) ELECTRIC CONTROLLER

For sprayers fitted with the optional Braglia I-S4021 electric (in-cab) controller / pressure manifold.

The controller has been fitted and adjusted at the factory but has been disconnected and packed for transit.

Follow the controller's manual for instructions on connecting to a suitable (tractor) power source.

Find a suitable position on the tractor / within the cab for the control switchbox.

Connect the supplied control / switch to the tractor and sprayer ...

1. Connect to a suitable (tractor battery) power source
2. Connect to the controller manifold loom

Take care to route the wiring looms away from PTO shafts, linkage arms etc.

# SECTION 5

## TRACTOR CONNECTION & SPRAYER SET-UP



The control box unit has switch functions for ...

1. 3 position master on / off / off switch
2. 2 x section control on / off switches
3. pressure control toggle switch.

### Set-up

Before start-up make sure all switches are in the off position. Engage PTO at low speed.

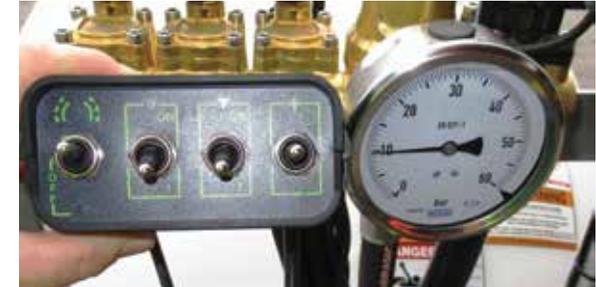


The master switch has 2 off positions.

The fully down OFF position (shown above) will draw power (light is on). The bypass (dump) valve is open and there will be no pressure.

The middle OFF position will draw no power, the pressure relief valve is active. With the PTO running, the pressure will show on the gauge.

Adjust the pressure via the toggle switch on the right-hand side of the control box.



The up position is ON. To activate spraying, activate either or both spray section switches to ON. Adjust the pressure to suit.

Always finish with the master switch in the middle position (to avoid a flat battery).

# SECTION 5

## TRACTOR CONNECTION & SPRAYER SET-UP

### FUNCTIONALITY CHECKS

With the connection completed, the functions need to be tested before using the sprayer with chemicals. Also refer to the Pre-operation checklist at the end of this chapter on page 54.

It's advised that a freshwater test be done to check for leaks and to familiarise the operator(s) with the sprayer and set the sprayer to maximise results in the field.

These checks have been conducted in the factory prior to shipping, however, there is a chance that transit could have loosened some fittings.

Before progressing further,



- Read and understand the Safety Manual.
- Read and understand this manual, and the operator is familiar with all controls.

1. Check that the sprayer is correctly connected up to the (suitable) tractor. Jockey wheel or park stand is properly stowed or removed.
2. Check the sprayer wheel nuts (normally M18 / minimum torque setting of 344 Nm)



3. Check tyres for correct pressure and are even on both sides.  
All tyres will have maximum rating listed on the tyre sidewall. From the factory, sprayers are delivered with 40 ~ 50 psi in each tyre (will vary from model to model).
4. Check PTO and fan guards are in place. **NEVER** operate with exposed PTO or Fan.



5. Spray controller correctly connected and powered.
6. Check pump oil levels and surge chamber pressure - air pressure should be 20 ~ 25% of operating pressure levels (refer pump manual for more detail).



7. Check that all fittings are tight, nothing is loose or damaged.
8. Double check for loose objects in the vicinity of the Airblast fan. Ask any onlookers to keep a safe distance away.
9. Check for wear and tear on all chemical and hydraulic hoses and wiring looms.
10. Ensure fill, suction & pressure filters are clean. Be safety aware as some spillage is likely.



11. Ensure the tank drain valve is in the closed position.



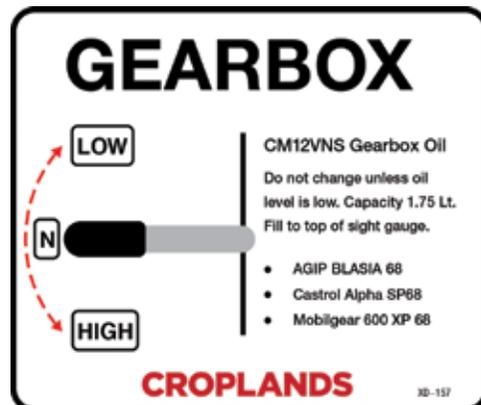
# SECTION 5

## TRACTOR CONNECTION & SPRAYER SET-UP

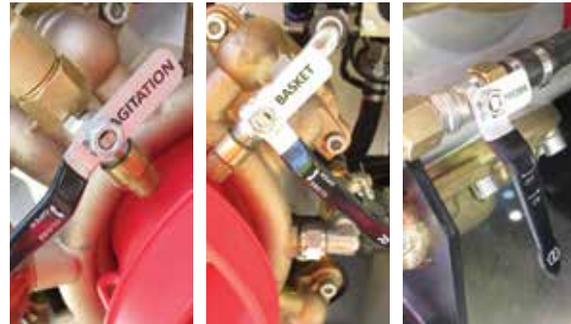
12. Add sufficient clean fresh water to all the tanks (see section 4 for tank details). Ensure the water level is above both agitators in the main tank.
13. Select the spray pump's water source to be the main tank / SPRAY. N/A for Fibreglass tank version.



14. Make sure the Fan (gearbox) is in the middle / neutral position (see page 18), and nozzles are on.



15. The pump pressure manifold will have taps for AGITATION, BASKET (rinse) and PROBE. Turn all of these to the OFF position. These will be checked once the system is pressurised.



16. Ensure all spray function controls are in the OFF / bypass position. This will vary depending upon the controller used.

**For the manual controller,** set to the BYPASS position.



**For the Braglia Electric controller,** before start-up make sure all switches are in the off position.



The master switch has 2 off positions. The fully down OFF position (shown above) will draw power (light is on). The bypass (dump) valve is open and there will be no pressure.

The middle OFF position will draw no power, the pressure relief valve is active. With the PTO running, the pressure will show on the gauge.



Note: Re this controller, always finish with the master switch in the middle off position (to avoid a flat battery).

# SECTION 5

## TRACTOR CONNECTION & SPRAYER SET-UP

For the **HV2400**, **HV4000** or **Bravo 180S** auto rate controllers, follow the controller instructions / operator's manual to set them to "HOLD". This will open the servo "dump" valve to tank.



17. Power up the tractor (brakes on) and engage the PTO - no need for full power at this stage, set to approximately 350rpm.
18. At this stage the pump will be drawing from the main tank and bypassing (dumping at) the pressure regulator back to the tank via the return hose.
19. Activate the spray controls, to confirm the spraying functionality. This operation will vary depending upon the controller used. See the appropriate manuals (for electric / auto rate controllers) and following instructions for operation of the manual controller and setting system pressures.

The following pictures show the HV2400, HV4000 and Bravo 180S controllers in "run" mode.

At this stage the Fieni fan is not operating.

While water is being pumped / sprayed through left, right, and then both sets of nozzle manifolds check for any leakages or blockages throughout the sprayer.

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





# SECTION 5

## TRACTOR CONNECTION & SPRAYER SET-UP



20. Check the operation of AGITATION, BASKET (rinse) and PROBE functions. Leave the agitators ON whilst performing the final checks.
21. Once operation at lower speeds and pressures is confirmed, slowly increase operating (PTO) speeds until the maximum of 540 rpm is achieved. Re-check functions and hose connections etc.
22. On the completion of these tests, turn off the spray functions and bring the PTO back to low speed.
23. Confirm fan operation. With low PTO speed (tractor must be above idle), engage the Fieni fan into low gear (normally this is lever up / refer page 18).

Always disengage the PTO drive before operating the gearbox lever / changing gears etc.

**CAUTION** – make sure the area around the fan is clear of bystanders and the fan air intake is free of debris.

24. Confirm smooth operation throughout the complete speed range up to full speed (PTO = 540 rpm).
25. Repeat at the higher speed gear setting.
26. With the fan operating, turn on the spray functions and confirm all systems are operating.
27. On completion of checking the sprayer turn controls off by placing the master switch and boom switches in the off position. Disengage the PTO after the spray controls are turned off.
28. Final checks & clean filters, including the “boom” filters at the rear of the sprayer



### SET-UP SPRAY PRESSURE

Note: The Fieni fan does not have to be engaged during this process.

Croplands recommends setting the maximum system pressure to be 10% above the chosen spray pressure which

is normally an extra 1.0 – 1.5 bar.

If fitted with a spray rate controller, the auto rate controller will make automatic pressure adjustments to control rate.

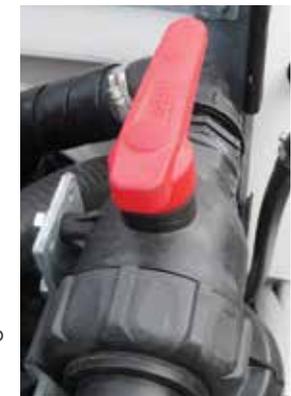
All systems (except the electric Braglia I-S4021) will have a manual adjustable regulator valve available for setting the system’s maximum pressure.

The regulator will need to be adjusted from time to time as spray rates will vary throughout the year.

**WARNING:** To set and forget at a high pressure will put undue stress/wear and tear on the system. Maximum recommended pressure is 20 bar, but 10 ~ 15 bar is the normal recommendation.

### To set PRESSURE for the first time:

- Ensure that the nozzles fitted on the sprayer are applicable to your desired rate & recommended operating pressure.
- Ensure the tank selection valve is in the SPRAY position.
- Wind the pressure control knob anticlockwise to ensure the sprayer starts up with limited pressure
- Start the tractor & ensure the electric control box or auto rate controller (if fitted) is turned ON.
- Start the pump by engaging the Tractor PTO. Set to operate at your required rpm, usually between 450 and 540 rpm



# SECTION 5

## TRACTOR CONNECTION & SPRAYER SET-UP



- Engage both Front and rear Agitators
- Activate spraying via the fitted (be it manual or auto rate



controller), with the required spray rates and with all relevant sections open.

- Wait 10 seconds to allow the system to settle, then ....
- Slowly wind the pressure control knob clockwise (if needing to increase pressure) until your required operating pressure is reached and add a further 10% surplus pressure.
- Example - If the application rate is 500 L/ha and with

your row width/nozzles & spraying speed the rate is achieved at 10 bar, you would set the maximum system pressure to 11 bar.

- Once done, leave the manifold setting "as is" until a change of operating pressure is required.

### GENERAL NOTES ON AUTO-RATE CONTROLLERS

#### Function of Auto-rate Spray Controllers.

If your Cropliner is fitted with either a Bravo 180S, HV4000 or HV2400 controller, you will have available to you a lot of additional functions & features.



An auto-rate controller, regardless of manufacturer, uses on-the-go inputs to determine the spray rate being applied at that moment in time.

It is designed to adjust an electric/regulator/bypass valve (usually referred to as the "Servo" valve) to either return

# SECTION 5

## TRACTOR CONNECTION & SPRAYER SET-UP

excess flow to the tank, or force more liquid out the nozzles & therefore onto the crop/canopy you are spraying.

The servo valve, along with the inputs of flow & speed, are the components most likely to give problems if they are not working correctly. To identify where a problem exists with a controller, performing a pre-field check by operating the controller in manual mode will often provide the answer.

### Inputs

The auto-rate controller requires a speed input from a wheel sensor, and a flow input from a flowmeter. Using this information, along with row width data, the controller can display the actual flow rate in litres per 100 metres or in litres per hectare, depending on your choice of application monitoring.

### Functions

If the speed of the tractor changes, the controller senses the change & sends power to the servo valve to either open or close the servo valve. If the tractor slows down, the servo will open to allow more flow to return to the tank, thereby reducing the flow to the nozzles.

Liquid will always take the easiest path, and as the servo bypass line is unrestricted to the tank, the liquid will bypass rather than flow out of the nozzles.

Conversely, if the tractor speeds up, the servo will close and force a lift in pressure, ensuring the liquid must pass through the nozzles, which in turn ensures the spray rate to the crop/canopy is maintained.

The flowmeter sends information to the controller at the same time as the speed input, ensuring that when the correct flow

to match the determined spray rate is reached, the servo “locks on” to that position and maintains the required rate.

### Common faults

If the controller does not receive the flow input, speed input, or if the servo cannot function, the controller cannot reach it's programmed spray rate or shuts down altogether. These three faults are the most common cause of problems.

Another problem that can occur is when the nozzles installed on the sprayer cannot work within the parameters you have asked the controller to work within.

Simply put, if the nozzles are too small or too large to attain your pre-set spray rate, the controller cannot deliver or bypass sufficient liquid to function.

### Pre-field check

By testing the controller in manual mode, we can determine if it is (a) correctly set up so it will perform properly in auto mode, and (b) find out where a problem exists if the controller is not functioning correctly.

The Bravo 180S, HV4000 or HV2400 can be set to MANUAL (or MAN) mode by pressing the appropriate key on the console. (refer to the controller manual to identify key functions).

Once in MANUAL mode, the sprayer can be operated in a stationary position, and the operator can take control of the servo valve.

In **Manual** mode, with the PTO running & liquid spraying out of the nozzles, the “+” & “-” keys (or ▲&▼ keys) will manually open and close the servo.

By performing this function, the operator can observe the pressure on the sprayer gauge, and the flow on the console readout to see if this matches the desired pressure & flow to achieve the desired spray rate.

This test also determines if the servo is working correctly, and if the flowmeter is registering the correct liquid output or if there is in fact no flow showing (indicating a faulty sensor or flowmeter). This step is important for troubleshooting.

By increasing the flow & pressure with the “+” & “-” keys (or ▲&▼ keys), the operator can also check that the manual regulating/pressure relief valve is set in the right position to allow correct flow for the system.

If the manual PRV (pressure regulating valve) is not set right, the pressure or flow your nozzles require may not get to the desired level if the PRV is allowing too much liquid to bypass.

Likewise, if the PRV is adjusted too tightly, the servo may not be able to bypass enough liquid when fully open, resulting in over-application.

By opening and closing the servo in manual mode with the “+” & “-” keys (or & keys), the range of pressure & flow can be checked.

As a rule of thumb, you should close the servo fully (hold the “+” or ▲key until maximum pressure/flow is reached).

If this is not what you require to achieve your upper level, then adjust the PRV by turning it clockwise. If the upper level is too high in pressure or flow, turn the PRV anticlockwise until your upper limit of pressure or flow is reached.

# SECTION 5

## TRACTOR CONNECTION & SPRAYER SET-UP

Then press the “—” or ▼ key to check the controller can reach an acceptable low level of flow/pressure - this will ensure in auto mode that the servo can bypass adequate liquid when the tractor slows right down.

Lastly, check the speed input by simply driving the unit along and ensuring a speed input is being logged by the controller.

**If the controller works in Manual mode, it should operate perfectly in Auto-mode provided calibration data is correct and a speed input is being received.**

These notes are a general explanation of the system functions of the Bravo 180S, HV4000 or HV2400.

For more detailed information, refer to the operator’s manual for the controller, or your service agent or dealer.

### CONFIGURE THE FAN

It is recommended that the setting up of the Cropliner fan re fan speeds, vane and nozzle positions etc should be done in conjunction with a qualified specialist. (Croplands dealer, Croplands Representative, Agronomist or Spray manager).

The optimum set-up will vary significantly from vineyard / orchard & stage of canopy growth.

### Nozzle Choice

Check and / or fit the chosen nozzles to the unit.

Refer to Section 7 for nozzle layout details.

For more information on nozzle availability, refer to the Croplands Buyers Guide nozzle section or the Nufarm SprayWise Hort book. Also refer pages 77 & 78.



Fan air exit vanes can be adjusted to modify air patterns. Above image is for illustration purposes only.

| NOZZLE SELECTION                         |   |                   |       |                          |              |               |            |        |        |        |        |  |
|--|---|-------------------|-------|--------------------------|--------------|---------------|------------|--------|--------|--------|--------|--|
| DISCS & CORES                            |   |                   |       |                          |              |               |            |        |        |        |        |  |
| NOZZLES - DISCS AND CORES                |   |                   |       |                          |              |               |            |        |        |        |        |  |
| NOZZLE                                   | TYPE AND DESCRIPTION                                      | SAMPLE ORDER CODE | TYPE  | SIZE RANGE, MATERIAL     | \$ (EX. GST) | \$ (INC. GST) | PROD. CAT. |        |        |        |        |  |
|  | Disc and Core Jets  | AZ-AD*            | Disc  | 1 to 7<br>Pink ceramic   |              |               | C          |        |        |        |        |  |
|  | Full and hollow cone spray patterns                       | AZ-AC**           | Core  | 13 to 56<br>Pink ceramic |              |               | C          |        |        |        |        |  |
|  | Medium to fine droplets for use in ar assisted situations |                   |       |                          |              |               |            |        |        |        |        |  |
|  | 0-20 bar recommended range                                |                   |       |                          |              |               |            |        |        |        |        |  |
| DISC AND CORE ALBUZ CERAMIC - FLOW RATES |   |                   |       |                          |              |               |            |        |        |        |        |  |
| DISC SIZE                                | CORE SIZE   | ORIFICES DIAMETER | L/MIN |                          |              |               |            |        |        |        | ANGLES |  |
|  |   |                   | 3 BAR | 4 BAR                    | 5 BAR        | 6 BAR         | 10 BAR     | 15 BAR | 20 BAR | 10 BAR | 20 BAR |  |
| AD 1                                     | AC 1  | 0.8               | 0.24  | 0.37                     | 0.3          | 0.33          | 0.41       | 0.43   | 0.56   | 20°    | 70°    |  |
| AD 2                                     | AC 13   | 1.02              | 0.31  | 0.35                     | 0.39         | 0.42          | 0.53       | 0.64   | 0.73   | 67°    | 97°    |  |
| AD 3                                     | AC 13   | 1.2               | 0.36  | 0.41                     | 0.45         | 0.49          | 0.61       | 0.74   | 0.84   | 80°    | 98°    |  |
| AD 4                                     | AC 13   | 1.56              | 0.45  | 0.52                     | 0.57         | 0.62          | 0.76       | 0.91   | 1.06   | 90°    | 102°   |  |
| AD 5                                     | AC 13   | 2                 | 0.55  | 0.62                     | 0.69         | 0.75          | 0.94       | 1.13   | 1.29   | 102°   | 105°   |  |
| AD 1                                     | AC 23   | 0.8               | 0.28  | 0.32                     | 0.35         | 0.38          | 0.48       | 0.57   | 0.65   | 80°    | 74°    |  |
| AD 2                                     | AC 23   | 1.02              | 0.37  | 0.43                     | 0.47         | 0.51          | 0.64       | 0.77   | 0.88   | 67°    | 90°    |  |
| AD 3                                     | AC 23   | 1.2               | 0.44  | 0.51                     | 0.56         | 0.61          | 0.76       | 0.92   | 1.04   | 84°    | 92°    |  |
| AD 4                                     | AC 23   | 1.56              | 0.56  | 0.64                     | 0.71         | 0.77          | 0.97       | 1.16   | 1.32   | 92°    | 98°    |  |
| AD 5                                     | AC 23   | 2                 | 0.72  | 0.82                     | 0.91         | 0.99          | 1.24       | 1.49   | 1.7    | 90°    | 98°    |  |
| AD 6                                     | AC 23   | 2.4               | 0.85  | 0.97                     | 1.07         | 1.18          | 1.46       | 1.75   | 2      | 90°    | 101°   |  |
| AD 1                                     | AC 25   | 0.8               | 0.41  | 0.46                     | 0.51         | 0.55          | 0.7        | 0.84   | 0.95   | 60°    | 60°    |  |
| AD 2                                     | AC 25   | 1.02              | 0.59  | 0.67                     | 0.74         | 0.8           | 1.01       | 1.21   | 1.38   | 57°    | 60°    |  |
| AD 3                                     | AC 25   | 1.2               | 0.72  | 0.81                     | 0.9          | 0.98          | 1.23       | 1.48   | 1.68   | 67°    | 69°    |  |
| AD 4                                     | AC 25   | 1.56              | 1.02  | 1.16                     | 1.28         | 1.39          | 1.75       | 2.1    | 2.39   | 73°    | 80°    |  |
| AD 5                                     | AC 25   | 2                 | 1.41  | 1.6                      | 1.77         | 1.92          | 2.42       | 2.9    | 3.3    | 77°    | 80°    |  |
| AD 6                                     | AC 25   | 2.4               | 1.73  | 1.97                     | 2.18         | 2.37          | 2.98       | 3.57   | 4.07   | 82°    | 85°    |  |
| AD 1                                     | AC 25   | 2.8               | 2.07  | 2.36                     | 2.61         | 2.83          | 3.57       | 4.38   | 4.97   | 88°    | 91°    |  |
| AD 1                                     | AC 45   | 0.8               | 0.48  | 0.55                     | 0.61         | 0.66          | 0.83       | 1      | 1.14   | 32°    | 30°    |  |
| AD 2                                     | AC 45   | 1.02              | 0.73  | 0.83                     | 0.92         | 1             | 1.26       | 1.51   | 1.72   | 40°    | 33°    |  |
| AD 3                                     | AC 45   | 1.2               | 0.85  | 1.05                     | 1.16         | 1.26          | 1.64       | 1.9    | 2.16   | 40°    | 32°    |  |
| AD 4                                     | AC 45   | 1.56              | 1.04  | 1.24                     | 1.37         | 1.46          | 2.02       | 2.39   | 2.73   | 50°    | 40°    |  |

# SECTION 5

## TRACTOR CONNECTION & SPRAYER SET-UP

### Swing-Over Nozzles

Adjust the fitted non-drip roll-over nozzles according to your calibration and spraying requirements (also refer to Section 7).

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

The nozzles bodies are the twin roll-over type enabling one of two different nozzles to be selected.

Pictured are an ATR nozzle (yellow) or (grey) disk and core. Off is in the horizontal position, as per photo bottom right.



**Fieni 920 DSV Fan, as factory fitted "standard", AlbuZ ATR Hollow Cone Nozzles.**

Note customer can nominate an alternative nozzle configuration at time of order.

| ◀ Front Spray Ring |                   |              |                               | Rear Spray Ring  |                          |              |                              |
|--------------------|-------------------|--------------|-------------------------------|------------------|--------------------------|--------------|------------------------------|
| Nozzle             | ALBUZ Hollow Cone | Discharge    | Spray angle                   | Nozzle           | ALBUZ Hollow Cone        | Discharge    | Spray angle                  |
| <b>Top 1</b>       | AZ-ATR-YW-80C     | 1.03         | 80 deg                        | <b>Top 8</b>     | AZ-ATR-YW-80C            | 1.03         | 80 deg                       |
| <b>2</b>           | AZ-ATR-YW-80C     | 1.03         | 80 deg                        | <b>9</b>         | AZ-ATR-YW-80C            | 1.03         | 80 deg                       |
| <b>3</b>           | AZ-ATR-YW-80C     | 1.03         | 80 deg                        | <b>10</b>        | AZ-ATR-YW-80C            | 1.03         | 80 deg                       |
| <b>Middle 4</b>    | AZ-ATR-YW-80C     | 1.03         | 80 deg                        | <b>Middle 11</b> | AZ-ATR-YW-80C            | 1.03         | 80 deg                       |
| <b>5</b>           | AZ-ATR-YW-80C     | 1.03         | 80 deg                        | <b>12</b>        | AZ-ATR-YW-80C            | 1.03         | 80 deg                       |
| <b>6</b>           | AZ-ATR-YW-80C     | 1.03         | 80 deg                        | <b>13</b>        | AZ-ATR-YW-80C            | 1.03         | 80 deg                       |
| <b>Bottom 7</b>    | AZ-ATR-YW-80C     | 1.03         | 80 deg                        | <b>Bottom 14</b> | AZ-ATR-YW-80C            | 1.03         | 80 deg                       |
|                    |                   | one side =   | 7.21                          |                  |                          | one side =   | 7.21                         |
| <b>10 Bar</b>      | <b>Pressure</b>   | <b>14.42</b> | <b>L/min FRONT Spray Ring</b> | <b>28.84</b>     | <b>L/Min ALL NOZZLES</b> | <b>14.42</b> | <b>L/min REAR Spray Ring</b> |



### Record Keeping

Record the nozzle configuration in the Calibration Worksheet (refer Section 7 for more details), or other prescribed record keeping method.

# SECTION 5

## TRACTOR CONNECTION & SPRAYER SET-UP

### PRE-OPERATION CHECKLIST

Before operating the sprayer, please check the following items.



|   |
|---|
| All chemical & safety guides have been read, understood and acted upon.   |
| Operator is familiar with all control functions.  |
| Secure sprayer connected to the tractor – jockey wheels or park stands are stowed away.   |
| Wheel nuts (M18) checked for correct torque.  |
| <div style="border: 1px solid black; padding: 5px;"> <p><b>⚠ WARNING</b> Never operate your sprayer with a loose rim, wheel or axle.</p> <p><b>ENSURE ALL WHEEL NUTS ARE TIGHT BEFORE USE.</b> Anytime wheel nuts are loosened, retighten to specified torque.</p> <p>Failure to do so may result in a serious accident.</p> <p><b>CROPLANDS</b></p> </div>   |
| <div style="border: 1px solid black; padding: 5px;"> <p><b>⚠ WARNING</b></p> <p><b>Ensure wheel nuts are tight before every use.</b></p> <p><b>Recommended Torque settings:</b></p> <p><b>M12 = 100 Nm (73 ft. lbs.)</b></p> <p><b>M14 = 166 Nm (122 ft. lbs.)</b></p> <p><b>M16 = 235 Nm (173 ft. lbs.)</b></p> <p><b>M18 = 344 Nm (253 ft. lbs.)</b></p> <p><b>M20 = 504 Nm (372 ft. lbs.)</b></p> <p><b>M22 = 600 Nm (442 ft. lbs.)</b></p> </div> |
| Check tyre pressures are even on both sides. All tyres will have maximum rating listed on the tyre sidewall. From the factory, sprayers are delivered with 40 ~ 50 psi in each wheel (will vary from model to model).   |

|   |
|---|
| PTO connected, greased and safety guards correctly installed.                 |
| Spray controller correctly connected and operational.                         |
|   |
| Check pump(s) oil levels.   |
| Confirm the spray pump operation.   |
| Manual pressure regulator is set.   |
| Check for wear and tear on all chemical and hydraulic hoses and wiring looms. |

|   |
|---|
| Ensure fill, suction & pressure filters are clean. <b>Be safety aware</b> as some spillage is likely. |
|   |
| Check that nothing is loose or damaged.   |
| Check the alignment of all fans, vanes etc.   |
| Check fan intake is free of leaves and loose objects.   |
| Check that all tanks and spray lines are clean and empty, and the drain tap is closed.                |
|   |

# SECTION 6

## SPRAY OPERATIONS

### EMERGENCY ACTION PLAN

Never operate the sprayer without an action plan in place for when things go wrong ...

**“Take 5”** to evaluate the risks

Actions for most foreseeable machine issues such as breakages start with ...

**“Drop the speed”**

**“Dump the pressure”**

then evaluate further.

|  |           |
|--|-----------|
| <b>SAFETY FIRST</b>                              | <b>56</b> |
| <b>FILTERS</b>                                   | <b>56</b> |
| <b>FILLING THE SPRAYER</b>                       | <b>57</b> |
| <b>AGITATION</b>                                 | <b>58</b> |
| <b>MIXING BASKET</b>                             | <b>58</b> |
| <b>CHEMICAL SUCTION PROBE</b>                    | <b>59</b> |
| <b>CALCULATE WATER &amp; CHEMICAL QUANTITIES</b> | <b>60</b> |
| <b>PROCEED TO SPRAY</b>                          | <b>61</b> |
| <b>DRAIN &amp; FLUSHING</b>                      | <b>62</b> |
| <b>TANK CLEANING</b>                             | <b>63</b> |
| <b>UNHITCHING THE SPRAYER FROM THE TRACTOR</b>   | <b>64</b> |
| <b>PRESSURE GAUGE RELIEF</b>                     | <b>64</b> |
| <b>FAN CLEANING</b>                              | <b>64</b> |

# SECTION 6

## SPRAY OPERATIONS

The tractor connection and set-up tasks must be completed before commencing spray-operations.

Also, refer to the familiarisation section, pages 14 ~ 36.

### SAFETY FIRST



Before progressing further,

- Read and understand the Safety Manual (part no. GP-SAFE-A) supplied with this sprayer.
- Read and understand this manual to better understand the sprayer.

### FILTERS

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

- Always ensure the basket filter is in place when filling the main tank.
- All filters should be cleaned regularly, or after each spraying period. Wear protective clothing.
- If the filter screen is damaged, replace it with a new screen.

#### Cleaning the suction filter

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

To clean the filter:

- **Always wear safety gloves**
- Completely stop all sprayer functions.



- Place the Tank Selection Valve in the closed position to shut OFF liquid from the main tank.
- Remove the outer filter screw and bowl, and then remove the filter and thoroughly clean it.
- Some spillage is likely, therefore perform this operation in an appropriate place, and with safety clothing.
- Check the condition of the O-Ring before reassembling the filter.
- Remember to turn the ball valve back to SPRAY or FLUSH when finished.



#### Cleaning the Pressure Filters

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

To clean the pressure spray manifold filter:

- **Always wear gloves**
  - Some spillage is possible, therefore perform this operation in an appropriate place, and with safety clothing.
  - Completely stop all sprayer functions.
  - Remove the outer filter bowl, and then remove the filter and thoroughly clean the filter before re-assembly.
- To clean the high pressure bass filters (if fitted);
- Opening the red tap at the bottom of the filter will drain any captured impurities to ground. Close the tap before continuing.



# SECTION 6

## SPRAY OPERATIONS



 **CAUTION**

**Always follow chemical label safety instructions. When handling chemicals always wear protective clothing ie. gloves, face mask, spray suit. Should chemical come in contact with skin immediately rinse off with water.**

### FILLING THE SPRAYER

Sprayer must be connected to the tractor before filling tanks, tractor hand brake must be on and chock the sprayer wheels.



Use freshwater (preferably rainwater), free of suspended organic matter or clay as some chemicals are de-activated when they contact these materials. Ensure sufficient water quantity to allow correct product blending.

#### Main Tank

When filling the main tank (freshwater only), open the spray tank lid and fill the tank with the basket filter in place. Clean the basket and replace the lid after filling.

Or ...

Fill via the separate Camlock fill (freshwater or chemical premix) – refer to pages 26 - 32. Connect to the water source before opening the ball valve (if fitted, as shown).

# SECTION 6

## SPRAY OPERATIONS



Some operators prefer to fill from a premixed tank, others will prefer to add powders via the basket or concentrate chemical via the probe to a fully or partially filled main tank.

### Flushing Tank

Use FRESH WATER ONLY (preferably rainwater) in the flushing tank. Unscrew the lid and fill before spraying. Replace the lid after filling.

For more information re flush tank positions across the range refer Section 4, pages 26 - 32.



### Hand-wash Tank

Fill the hand-wash tank with FRESHWATER ONLY from a source remote to any chemical source. Replace the lid after filling.

Always maintain the correct caution label at the fill point.

For more information on the tank positions across the range refer Section 4, pages 26 - 32.



### AGITATION

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

- Check the Tank Selection valve (located at the front of the sprayer) is open to SPRAY.
- Start the tractor.
- Start the pump by engaging the Tractor PTO. Set to operate at your required rpm, usually between 450 and 540 rpm.
- Turn ON the Agitator tap (assuming some liquid is in the tank). Shown here in the OFF position.
- Check that tank agitators are working.
- If agitation causes too much foaming in the tank, turn off

one or both agitators, and monitor.

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



### MIXING BASKET

A separate chemical mixing basket is provided in the main tank to allow the operator to add and mix chemicals to the main tank while it is filling.

#### To operate the mixing basket:

- Fill the main tank with the appropriate amount of water
- **Always wear safety gloves**
- Measure the chemical required for the tank mix and place the chemical (liquid, powder or granules) into the mixing basket & close the mixer lid. This process is best done in several smaller batches of chemical.

# SECTION 6

## SPRAY OPERATIONS



- Check the Tank Selection valve (located at the front of the sprayer) is open to SPRAY.
- Start the Tractor.
- Make sure the electric or auto rate controller is NOT in Spray mode.
- Start the pump by engaging the Tractor PTO. Set to operate at your required rpm, usually between 450 and 540 rpm.
- Activate the AGITATORS.
- Activate the mixing BASKET valve (**make sure the lid is closed**).



- Allow sufficient time for the chemical to mix into the tank. The actual time will vary depending upon the product used.
- **Close the mixing basket valve** before next opening the lid.

### CHEMICAL SUCTION PROBE

An alternative to the mixing basket (which is best used for powders and granules) is the chemical probe. Designed to suck liquid chemical, via a venturi system, straight from containers and into the main tank. Also refer to page 32.

- **Always wear safety gloves**
- Connect the probe to the sprayer as pictured making sure the ball valve (as shown) is in the off position



- Prepare the chemical source. **Be especially vigilant of chemical safety.**
- Check the Tank Selection valve (located at the front of the sprayer) is open to SPRAY.
- Start the Tractor
- Make sure the controller is NOT in Spray mode.
- Start the pump by engaging the Tractor PTO. Set to operate at your required rpm, usually between 450 and 540 rpm. Higher rpm will give better suction.

# SECTION 6

## SPRAY OPERATIONS



- Activate the PROBE tap (shown below as closed)



- Place / hold the probe's tube into the chemical source (usually a drum or bucket of chemical).



- To suck chemical from the drum to tank, turn on the probe ball valve (**circled in orange**, shown in the off position). Use the ball valve to control the suction. Modulate the tap opening to adjust liquid transfer speed. Turn to off when finished or the required volume of chemical has been transferred to the spray tank.
- Flush with / rinse from a clean water source when finished.
- Activate the AGITATORS.
- Once the process is complete, turn off the probe's ball valve and the tap at the pump.

### CALCULATE WATER & CHEMICAL QUANTITIES

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

For **CHEMICAL required** expressed in litres or kg per hectare (land area), use the following formula:

$$\begin{aligned} \text{Chemicals required (Litres (or Kg))} &= \\ &\frac{\text{Tank Volume (L)} \times \text{Recommended Chemical Rate (L/ha) or (Kg/ha)}}{\text{Spray Application Rate (L/ha)}} \\ \text{eg.} \quad &\frac{3000 \times 5}{900} \text{ (L/ha)} \\ &= 21.4 \text{ Litres or (Kg)} \end{aligned}$$

For **tank VOLUME OF MIXTURE required** to spray the selected area, use the following formula:

$$\begin{aligned} \text{Tank Volume Required (Litres)} &= \\ &\text{Area (ha)} \times \text{Spray Application Rate (L/ha)} \\ \text{eg.} \quad &\frac{3.25 \times 900}{1} \\ &= 2925 \text{ Litres} \end{aligned}$$



# SECTION 6

## SPRAY OPERATIONS

For **AREA COVERED (ha)**,

**= Tank Volume (litres) +  
Spray Application Rate (L/ha)**

eg. 
$$\frac{2925 \div 900}{= 3.25 \text{ hectares}}$$

For **CHEMICAL RATES** expressed in Litres or kg per 100 litres of water (water volume), use the following formula:

**Chemicals Required (Litres) =  
Tank Volume (Litres) x  
Recommended Chemical Rate (L/ 100 litres)**

eg. 
$$\frac{1500 \times 3 \div 100}{= 45 \text{ Litres}}$$

### NOTE

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

### PROCEED TO SPRAY

Once the pre-operation checklist on page 54 has been completed, and chemical mixture is in the tank, proceed to spray:

- **Anyone operating this sprayer must be conversant with the Croplands Safety manual.**
- **Spray operations should be done in conjunction with an agronomist/spray manager/someone skilled in the art of spraying and operating machinery.**

The spray manager will have predetermined the job requirements, such as the following example ...

- The block to be sprayed, and hence row width and any special instruction on fan setup
- Operating speed (often around 4 ~ 6 Kph)
- Application rate (for example 1,500 L/Hectare). There can be significant variations in application rates due to the crop type (grapes vs tree crop) and product to be applied
- The nozzles to be used
- Spray pressures to be used (often around 10 ~ 20 bar)
- PTO and Spray pump rpm (often between 450 & 540)

### Operating Pointers

- Always drive to the conditions taking into account the load, the terrain and the weather
- In mixed terrain, spray the flat ground before spraying the hills

### When preparing to spray for the first time.

Stop.

Check that all tank lids are closed, and the Tank Selection Valve is in the SPRAY position. Double check the electric controls or auto rate controller settings (if fitted) – now ready to spray.

While spraying, continually confirm that:

- Recommended and PTO speed are correct
- Correct operating pressure is being maintained
- Ground speed is suitable, safe and constant
- The Fieni Spray fan and nozzles are aimed and operating correctly.

## WARNING

### SAFETY INSTRUCTIONS

Never operate the sprayer without an emergency action plan /appropriate Personal Protective Equipment or suitable first aid kit.

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

FAILURE TO FOLLOW THE ABOVE INSTRUCTIONS  
MAY RESULT IN SERIOUS INJURY OR DEATH.

Croplands Equipment Pty Ltd XD123 MS

# SECTION 6

## SPRAY OPERATIONS

### DRAIN

To DRAIN the Poly Slimline sprayer.

1. Open tank drain valve to drain the remaining spray mixture from the tank (as pictured below).
2. Close the valve when finished.

**Ensure the site for draining, flushing and cleaning the sprayer meets with environmental and statutory regulations.**



### FLUSHING

The Poly, Slimline 2000 Lt sprayers are equipped with an 80 litre flushing tank for cleaning the sprayer when changing chemicals, and for flushing at the end of the day / spray round.

- Refer to pages 26 for an overview of the flushing selection valve and page 27 for the optional external flush system.
- Be aware that the flushing tank may need to be refilled during the process.



To FLUSH the Slimline sprayer:

1. Open main tank DRAIN
2. Turn the Tank Selector Valve to source from the flush tank or external fresh water source.
3. As per the following page, follow stages 5 to 13 to flush clean water through all spray lines etc.
4. On completion of flushing, close the drain, shut down all controls and disengage the PTO/ hydraulic drive.



# SECTION 6

## SPRAY OPERATIONS

### TANK CLEANING

If a cleaning agent is required (refer to the chemical label), as is often recommended when changing from one chemical group to another or as an end of season clean before storage.



Product now discontinued.

Nufarm's Tank and Equipment Cleaner as pictured below is no longer available. Comparable cleaners are available from most good "spray shops".

Below is a generic guide procedure. Wherever possible follow the instructions provided with the cleaner used.

1. First, completely flush the sprayer with water as outlined in the previous FLUSHING section. Then ...
2. Fill the spray tank with freshwater
3. Add cleaning agent into the mixer basket (use according to instructions)
4. Open the Tank Selection Valve to the SPRAY tank
5. Open mixing basket valve
6. Open the agitator valves
7. Start the Tractor
8. Make sure the controller / electric controls or auto rate controller is NOT in Spray mode. Ensure all sections are selected to enable all spray sections to be flushed.
9. Start the pump by engaging the Tractor PTO. Set to operate at your required rpm, usually between 450 and 540 rpm.
10. Activate the controller SPRAY mode. This will pressurise the system and operate the tank agitators & basket rinse.
11. Adjust to normal operating pressures
12. Turn ON all spray sections.
  - a. Make sure the area around the fans is clear of bystanders.
  - b. Make sure the fans are downwind of the operator.
13. After sufficient cleaning, turn OFF the spray sections.
14. If you require the cleaning agent to soak or stand for a period, turn the spray booms OFF and completely shut down the sprayer for the desired period.
15. When soaking is completed, start the machine following steps to flush the tank and spray lines
16. On completion of flushing, shut down all controls and disengage the PTO/ hydraulic drive.
17. Open spray tank drain valve and allow cleaning mixture to drain from the tank
18. Delay the final flushing of the sprayer (again) with freshwater as outlined in the previous FLUSHING section, until just before the sprayer is next used – that might be in 1 hour or 6 months away if the sprayer is going into storage for the offseason.

### NOTE

**Sulphur & Copper compounds lead to rapid deterioration of metal and polyethylene surfaces on your sprayer. It is strongly recommended that you use an exterior cleaner such as FARM MATE after every spray. FARM MATE is available from your Spray Shop**

# SECTION 6

## SPRAY OPERATIONS

### UNHITCHING THE SPRAYER FROM THE TRACTOR

Locate sprayer on level ground and chock the wheels so that sprayer does not roll when the sprayer is unhitched.

Disconnect PTO shaft and controllers from the tractor.

Attach and adjust all Jockey or park stands before unhitching.

Ensure all caps for the electrical (looms) and hydraulic hose fittings are utilised to help prevent water, dust & dirt ingress.



### Wheel Chocks

Wheel chocks should be used whenever the sprayer is not attached to the tractor.



### PRESSURE GAUGE RELIEF

The pressure gauge tap (circled below) is used to relieve sediment trapped in the gauge line.

Use at least daily or more often if the water source isn't clean, and whenever freshwater flushing.



### FAN CLEANING

The Fieni fan air intake guards should be regularly checked and if necessary cleaned of leaves and similar debris. ALWAYS disengage the fan when cleaning the guards.



# **SECTION 7**

## **SPRAYING INFORMATION**

|   |           |
|---|-----------|
| <b>SPRAYWISE</b>  | <b>66</b> |
| <b>CALIBRATION</b>  | <b>66</b> |
| <b>FLOWMETER CALIBRATION</b>                                    | <b>67</b> |
| <b>STEP 1 - ENSURE EQUIPMENT IS IN GOOD WORKING ORDER</b>       | <b>67</b> |
| <b>STEP 2 - DETERMINING THE ACTUAL SPEED OF TRAVEL</b>          | <b>69</b> |
| <b>STEP 3 - DETERMINE SPRAYING VOLUME REQUIRED</b>              | <b>69</b> |
| <b>STEP 4 - DETERMINE SPRAYER CONFIGURATION</b>                 | <b>69</b> |
| <b>STEP 5 - DETERMINE THE IDEAL SPRAY PRESSURE</b>              | <b>70</b> |
| <b>STEP 6 - DETERMINE &amp; SELECT CORRECT NOZZLES</b>          | <b>70</b> |
| <b>STEP 7 - FIT &amp; TEST SELECTED NOZZLES</b>                 | <b>73</b> |
| <b>STEP 8 - CALCULATE THE ACTUAL APPLICATION RATE</b>           | <b>73</b> |
| <b>STEP 9 - IF THE TESTED RATE IS UNSATISFACTORY</b>            | <b>74</b> |
| <b>STEP 10 - COVERAGE ASSESSMENT</b>                            | <b>74</b> |
| <b>STEP 11 - ADD THE CORRECT AMOUNT OF CHEMICAL TO THE TANK</b> | <b>75</b> |
| <b>STEP 12 - RECORD ALL DATA FOR FUTURE REFERENCE</b>           | <b>75</b> |
| <b>DISCS &amp; CORES</b>  | <b>78</b> |
| <b>CALIBRATION WORK SHEET</b>                                   | <b>80</b> |

# SECTION 7

## SPRAYING INFORMATION

Spraying should be done in conjunction with an agronomist / spray manager / someone skilled in the art of spraying. The best setup might vary significantly from crop to crop, season to season etc.

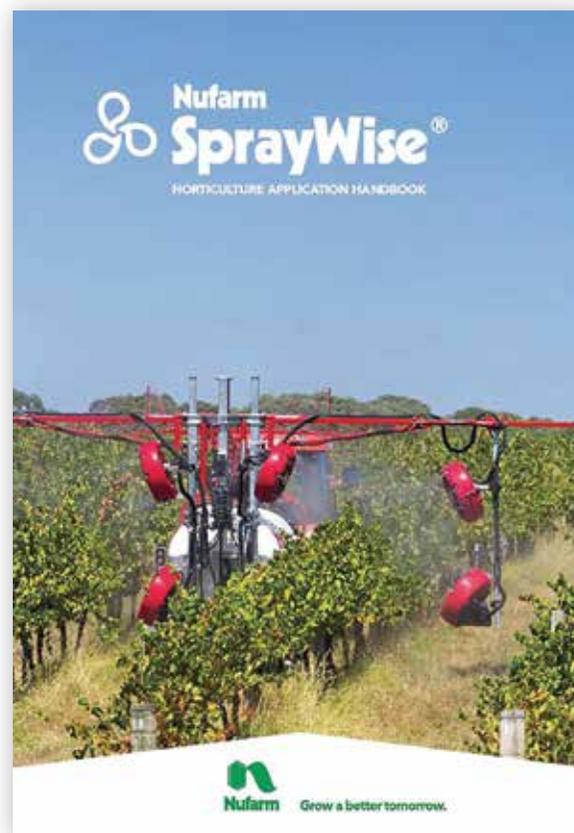
### SPRAYWISE

It's highly recommended that all operators of this sprayer and spray program managers should be fully conversant with the information supplied in the **Nufarm SprayWise Horticultural Application Handbook** (refer photo) before undertaking spray operations.

The book includes chapters discussing re;

- Droplet Size
- Nozzle Types
- Dilute Spraying
- Concentrate Spraying
- Coverage & Assessment
- Selecting Nozzles
- Drift
- Weather
- Adjuvants
- Formulations & Mixing Order
- Cleaning
- Calibration
- Record Keeping
- And more

This book is supplied with every Cropliner, and is available from Croplands dealers, under the part number: SPRAYWISEHK.



### CALIBRATION

Applying the correct amount of chemical to a crop is only possible if **the sprayer is calibrated, operated and maintained correctly.**

The variables of spray application (distance, time, working width, liquid, and chemical volumes) must be measured and controlled accurately to ensure chemicals are applied at the correct rate.

Proper calibration involves setting up the sprayer (nozzle selection, pressure, speed), calculating chemical and water rates, and measuring the performance of the sprayer itself. Only then can you be totally confident in applying chemicals correctly.

### Fully Automatic Spray Controller (HV4000/ Bravo 180S)

Automatic spray rate controllers maintain the application rate (as set by the operator) when operated in the Auto position.

The controller monitors speed of travel (speed sensor) and flow rate (flow meter) and automatically adjusts flow rate (via a pressure regulating or servo valve) to maintain the correct application rate irrespective of speed variations within the limits of the nozzles used.

### IMPORTANT:

- It should be remembered that the spray controller does not eliminate the necessity to measure and check the accuracy of nozzle spray patterns and outputs. These must be checked regularly to ensure correct and uniform application rates because nozzles wear with use.

# SECTION 7

## SPRAYING INFORMATION

- Flow meters used by the Cropliner Sprayer need to be checked and calibrated on a regular basis.

The following page demonstrates how to maintain and check your Rapid-check flowmeter. It is recommended this is done regularly during the spraying season.



### FLOWMETER CALIBRATION

If optioned with auto rate controller, as a part of the initial factory testing / calibration, a value (pulses per litre) will have been recorded and written on the body of the flow meter see example here.



To check / improve the resolution of the flow meter calibration use the below method after having sprayed out a reasonable volume of liquid (the more sprayed the better the resolution);

- The current flow meter calibration number in the controller = X
- Take the total volume the controller says was sprayed and divided by the actual volume sprayed = Your new flow meter calibration.
- Then manually enter this number into the controller settings.

For example;

Current flow cal number (X) = 250. Controller says we have sprayed 4400L after having put 4000L in the tank.

$$250 \times 4400 = 1100000$$

$$1100000 / 4000 = 275 \text{ (new flow cal number)}$$

### STEP 1 - ENSURE EQUIPMENT IS IN GOOD WORKING ORDER

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

Follow the pre-operation checklist, maintenance and operating instructions in this manual.

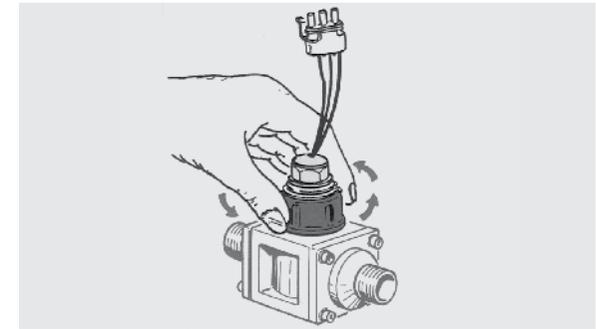
Install, calibrate and operate the spray controller according to the spray controller operators manual.

Inspections of the Flowmeter should be performed regularly.

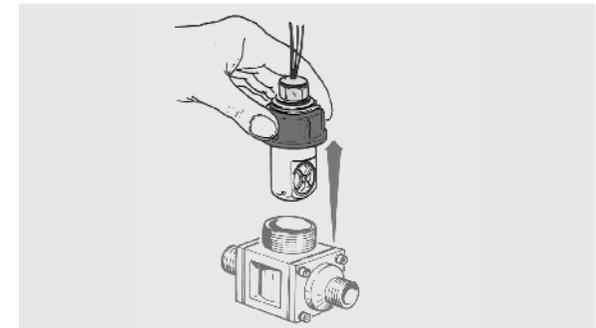
### Daily Check & Maintenance of Flowmeter

This is to be performed every day after work is finished:

1. Unscrew the assembly that holds the Rapid Check unit in the body.
2. Remove the Rapid Check unit from the body.



Unscrew the Rapid Check assembly

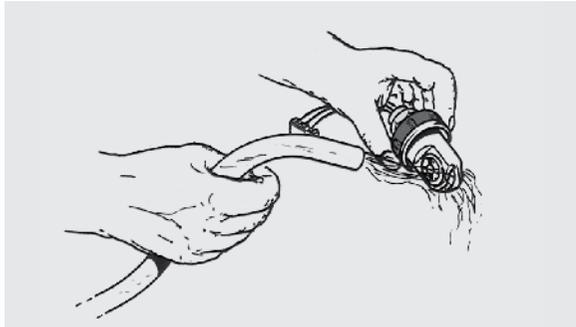


Remove the Rapid Check unit

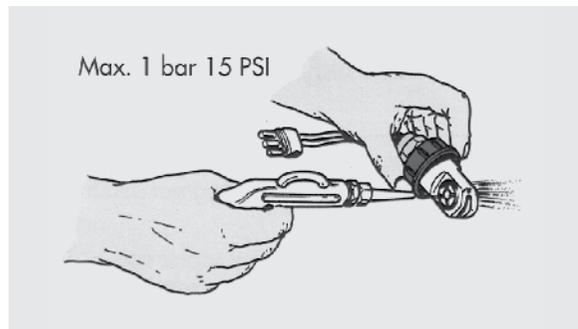
# SECTION 7

## SPRAYING INFORMATION

3. Use clean water to wash any impurities out of the removable turbine unit.



Wash any impurities out of the removable turbine unit



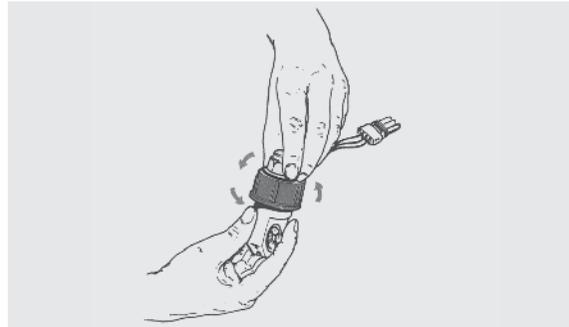
Use compressed air to check that the turbine unit rotates freely

4. Use compressed air to verify that the turbine unit rotates freely (maximum air pressure 1 BAR [15 psi]).

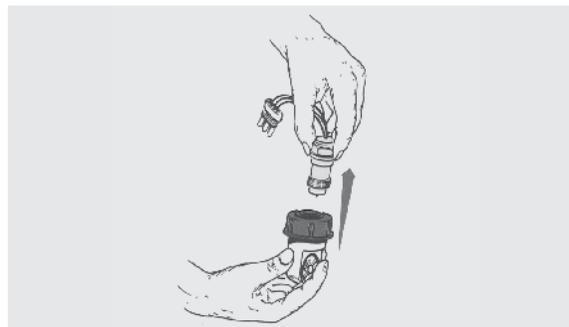
### Every 50 Hours

Carry out the following procedure after every 50 hours of operation:

1. Unscrew the sensor.

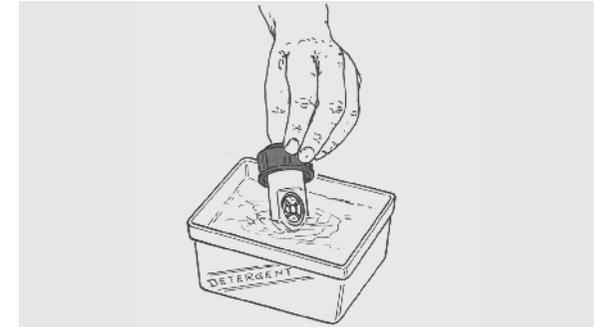


2. Separate the sensor from the Rapid Check unit.



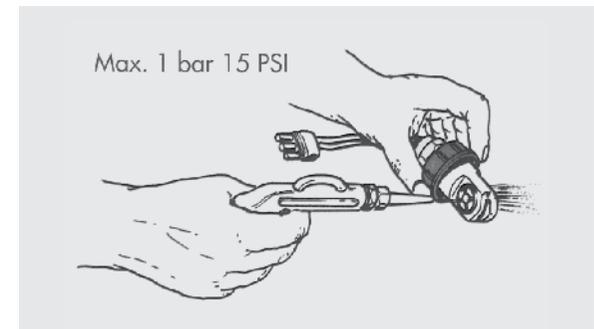
Separate the sensor from the Rapid Check unit

3. Place the Rapid Check unit in a detergent bath for a few hours.



Place the Rapid Check unit in a detergent bath

4. Remove the Rapid Check unit from detergent bath.  
Use compressed air to verify that the turbine unit rotates freely (maximum air pressure 1 BAR [15 psi]).  
If necessary, replace the Rapid Check unit with a new one.



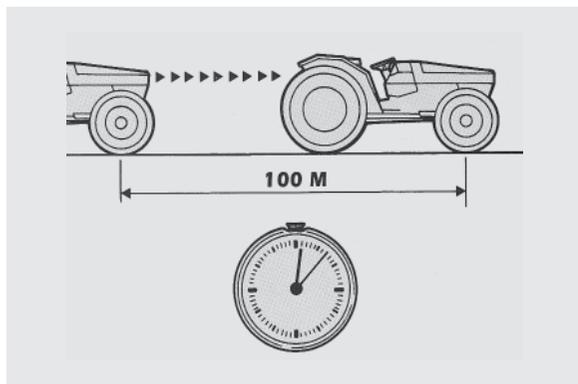
Use compressed air to check that the turbine unit rotates freely

# SECTION 7

## SPRAYING INFORMATION

### STEP 2 - DETERMINING THE ACTUAL SPEED OF TRAVEL

If optioned with auto rate controller, your sprayer has been factory set with a calibration number. This should be fine tuned prior to commencement of spraying and checked by your dealer. This is done by traveling a known distance (usually 100 metres) and comparing the distance measured by the Spray Controller to the known distance. If there is a discrepancy, the Spray Controller Manual explains how to easily adjust the calibration number automatically.



To manual check the speed...

- Half fill the sprayer tank with water and mark out a test strip of 100 metres (simulating spraying conditions).
- Set the sprayer operating and record the time taken to travel 100 metres at your required spraying speed.

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

**For SPEED, km/hr** = using the following formula:

$$\frac{\text{Distance (m)} \times 3.6}{\text{Time (sec)}}$$

eg.  $100(\text{m}) \times 3.6 \div 72(\text{seconds})$

$$= 5\text{km/hr travel speed}$$

An alternative formula is:

$$\text{km/hr} = \text{Metres travelled in 1 minute}$$

### STEP 3 - DETERMINE SPRAYING VOLUME REQUIRED

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

The spray volume requirement should be determined by / in conjunction with an agronomist / spray manager / someone skilled in the art of spraying.

The term "litres per hectare" must be related to foliage and not just to land area. The amount of liquid needed to effectively spray any given crop will vary greatly with:

- The type of crop
- Row spacing
- Width of canopy
- Height of canopy
- Stage of growth
- Density of foliage

- Type of leaf surface
- Type of fruit (single or bunched)
- Type of sprayer used

For example, using a Slimliner, spray volumes for Grapes will typically vary from 600 to 1200 L/Ha.

Tree crops (e.g. Almonds, Avocado, Citrus etc) tend to be 1000 ~ 2000 L/Ha but can be 6,000 L/Ha or more in some applications.

### STEP 4 - DETERMINE SPRAYER CONFIGURATION

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

- The **number of row(s)** to be sprayed in one pass (always 1 row for a Cropliner), and
- The **total number of nozzles** to be used.

Both these factors can vary with the model of sprayer used and other factors mentioned under step 3.

#### Example A

A Slimline sprayer equipped with Fieni 920mm fan, to spray grapes, using 10 of the 14 nozzles per side (top 4 nozzles turned off), for a total of 20 nozzles spraying a spray one row per pass.

#### Example B

A Cropliner equipped with Fieni 1060mm fan, to spray avocados with 15 nozzles each side (total nozzles 30) spraying all one row per pass.

# SECTION 7

## SPRAYING INFORMATION

### STEP 5 - DETERMINE THE IDEAL SPRAY PRESSURE

Before determining the correct nozzles, it's best to have an idea of the spray pressure required. As a general rule, a pressure of 10 - 20 bar is considered ideal for Cropliner spraying. Note nozzles also have differing optimal pressure ranges. Refer to the Spraywise book for more information.

Setting up the sprayer around a pressure of say 14 - 16 bar will allow lower pressures (say 10 - 13 bar) to be used in early season and higher pressure (say 17 - 20 bar) for later season without having to change nozzles mid season. It will also offer some margin around travelling slower or faster than the chosen speed.

The advice provided above is general information only and operators should seek specialised advice from their agronomist/spray manager/someone skilled in the art of spraying.

### STEP 6 - DETERMINE & SELECT CORRECT NOZZLES

Knowing actual travel speed, application rate required, number of rows to be sprayed in one pass, total number of nozzles to be used and ideal spray pressure, we can determine the nozzles required for the sprayer.

The calculation formulation is;

$$\frac{\text{Litres/Minute/Nozzle}}{\text{(Litres per minute per nozzle)}} = \frac{\text{Litres/Ha} \times \text{Km/hr} \div 600}{\text{total number of nozzles used} \times \text{row spacing (m)} \times \text{number of rows in one pass}}$$

Once the flow rate per nozzle is known select the most appropriate nozzle from a flowrate chart for the nozzle being used. Flowrate charts are available from relevant nozzle suppliers. Croplands supplies and recommends the ALBUZ ATR Hollow Cone or Disc & Core ceramic nozzles.

Pictured left and overleaf is a screenshot taken from a small spreadsheet program freely available from the Croplands Web Site or Croplands Customer Service titled "ALBUZ Nozzle Selection Worksheet" which makes it much quicker to calculate nozzle requirements. For more nozzles see the Croplands Compact buyers guide.

Refer to page 78 for the Disk & Core flow rate information.

### ALBUZ Nozzle Selection Worksheet

#### Step 6A

Enter data in grey boxes.

| Example 1            |                                  |                         |                                |
|----------------------|----------------------------------|-------------------------|--------------------------------|
| Target rate (L/ha)   | <input type="text" value="900"/> | Speed (km/hr)           | <input type="text" value="5"/> |
| Row spacing (m)      | <input type="text" value="3"/>   | Number of rows          | <input type="text" value="1"/> |
| Number of nozzles    | <input type="text" value="28"/>  |                         |                                |
| <b>Total L/min =</b> | <b>22.5</b>                      | <b>L/min per nozzle</b> | <b>0.80</b>                    |

#### Step 6B

Select nozzles from chart, (see page 82 for disk and core information).

| ALBUZ NOZZLE | PART NUMBER   | MESH | 5 Bar | 6 Bar | 7 Bar | 8 Bar | 9 Bar | 10 Bar | 11 Bar | 12 Bar | 13 Bar | 14 Bar | 15 Bar | 16 Bar | 17 Bar | 18 Bar | 19 Bar | 20 Bar |
|--------------|---------------|------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| WHITE        | AZ-ATR-WE-80C | 100  | 0.27  | 0.29  | 0.32  | 0.34  | 0.36  | 0.38   | 0.39   | 0.41   | 0.43   | 0.44   | 0.46   | 0.47   | 0.48   | 0.50   | 0.51   | 0.52   |
| LILAC        | AZ-ATR-IC-80C | 50   | 0.36  | 0.39  | 0.42  | 0.45  | 0.48  | 0.50   | 0.52   | 0.55   | 0.57   | 0.59   | 0.61   | 0.63   | 0.64   | 0.66   | 0.68   | 0.70   |
| BROWN        | AZ-ATR-BN-80C | 50   | 0.48  | 0.52  | 0.56  | 0.60  | 0.64  | 0.67   | 0.7    | 0.73   | 0.76   | 0.79   | 0.81   | 0.84   | 0.86   | 0.89   | 0.91   | 0.93   |
| YELLOW       | AZ-ATR-YW-80C | 50   | 0.73  | 0.80  | 0.86  | 0.92  | 0.97  | 1.03   | 1.07   | 1.12   | 1.17   | 1.21   | 1.25   | 1.29   | 1.33   | 1.37   | 1.4    | 1.44   |
| ORANGE       | AZ-ATR-OE-80C | 50   | 0.99  | 1.08  | 1.17  | 1.24  | 1.32  | 1.39   | 1.45   | 1.51   | 1.57   | 1.63   | 1.69   | 1.74   | 1.84   | 1.84   | 1.89   | 1.94   |
| RED          | AZ-ATR-RD-80C | 50   | 1.38  | 1.51  | 1.62  | 1.73  | 1.83  | 1.92   | 2.01   | 2.09   | 2.17   | 2.25   | 2.33   | 2.40   | 2.54   | 2.54   | 2.6    | 2.67   |
| GREY         | AZ-ATR-GY-80C | 50   | 1.5   | 1.63  | 1.76  | 1.87  | 1.98  | 2.08   | 2.17   | 2.26   | 2.35   | 2.43   | 2.51   | 2.59   | 2.74   | 2.74   | 2.81   | 2.88   |
| GREEN        | AZ-ATR-GN-80C | 50   | 1.78  | 1.94  | 2.09  | 2.22  | 2.35  | 2.47   | 2.58   | 2.69   | 2.79   | 2.89   | 2.99   | 3.08   | 3.25   | 3.25   | 3.34   | 3.42   |
| BLACK        | AZ-ATR-BK-80C | 50   | 2     | 2.18  | 2.35  | 2.50  | 2.64  | 2.78   | 2.9    | 3.03   | 3.14   | 3.26   | 3.36   | 3.47   | 3.67   | 3.67   | 3.76   | 3.85   |
| BLUE         | AZ-ATR-BE-80C | 50   | 2.45  | 2.67  | 2.87  | 3.06  | 3.24  | 3.40   | 3.56   | 3.71   | 3.85   | 3.99   | 4.12   | 4.25   | 4.49   | 4.49   | 4.61   | 4.72   |

# SECTION 7

## SPRAYING INFORMATION

In the example on previous page, using the following Spray parameters ...

Target rate = 900 (L/Ha)

Row Spacing = 3 (M)

Number of Nozzles = 28

Speed = 5 (km/hr)

Number of Rows = 1

These parameters calculate to a requirement of 22.5 L/min, which divided across the 28 nozzles calls for 0.80 L/Min per nozzle.

Cross referencing this rate to the Albuz nozzle chart shows the Brown nozzle at 15 Bar (0.81 L/min) to be a suitable choice.

Across the spraying season the variables (such as chemical type, rates and speeds) may often change. With a well setup system small variations will be easily accommodated. Larger variations may require a change of nozzles.

### Example 2

Below is an example of a higher spray rate requirement in wide rows at slow speed across more nozzles. The suggested nozzle (starting point) would be the Grey Albuz nozzles at 15 Bar.

| Example 2            |                                   |                         |                                |
|----------------------|-----------------------------------|-------------------------|--------------------------------|
| Target rate (L/ha)   | <input type="text" value="1800"/> | Speed (km/hr)           | <input type="text" value="5"/> |
| Row spacing (m)      | <input type="text" value="5"/>    | Number of rows          | <input type="text" value="1"/> |
| Number of nozzles    | <input type="text" value="30"/>   |                         |                                |
| <b>Total L/min =</b> | <b>75</b>                         | <b>L/min per nozzle</b> | <b>2.5</b>                     |

### Step 6C Basic Nozzle Configuration

The Fieni 920 DSV fan feature dual rows of nozzles. Use the calibration worksheet to determine the basic nozzle configuration.

The below nozzle layout example shows the Yellow ATR nozzles as standard fitment to Fieni 920 DSV fans. (Refer next page for disk & core layout).

This formula matches 960 L/Ha at 3m row spacing, 28 nozzles, 6 k/hr speed in 1 row = 28.8 L/min



**NOTE**

Earlier Cropliner sprayers (and the current Linkage Cropair 300/600 range) use Fieni fans with a single row of nozzle bodies.

### Fieni 920 DSV Fan, as factory fitted "standard", Albuz ATR Hollow Cone Nozzles.

Note customer can nominate an alternative nozzle configuration at time of order.

| ◀ Front Spray Ring |                   |              |                               | Rear Spray Ring  |                          |              |                              |
|--------------------|-------------------|--------------|-------------------------------|------------------|--------------------------|--------------|------------------------------|
| Nozzle             | ALBUZ Hollow Cone | Discharge    | Spray angle                   | Nozzle           | ALBUZ Hollow Cone        | Discharge    | Spray angle                  |
| <b>Top 1</b>       | AZ-ATR-YW-80C     | 1.03         | 80 deg                        | <b>Top 8</b>     | AZ-ATR-YW-80C            | 1.03         | 80 deg                       |
| <b>2</b>           | AZ-ATR-YW-80C     | 1.03         | 80 deg                        | <b>9</b>         | AZ-ATR-YW-80C            | 1.03         | 80 deg                       |
| <b>3</b>           | AZ-ATR-YW-80C     | 1.03         | 80 deg                        | <b>10</b>        | AZ-ATR-YW-80C            | 1.03         | 80 deg                       |
| <b>Middle 4</b>    | AZ-ATR-YW-80C     | 1.03         | 80 deg                        | <b>Middle 11</b> | AZ-ATR-YW-80C            | 1.03         | 80 deg                       |
| <b>5</b>           | AZ-ATR-YW-80C     | 1.03         | 80 deg                        | <b>12</b>        | AZ-ATR-YW-80C            | 1.03         | 80 deg                       |
| <b>6</b>           | AZ-ATR-YW-80C     | 1.03         | 80 deg                        | <b>13</b>        | AZ-ATR-YW-80C            | 1.03         | 80 deg                       |
| <b>Bottom 7</b>    | AZ-ATR-YW-80C     | 1.03         | 80 deg                        | <b>Bottom 14</b> | AZ-ATR-YW-80C            | 1.03         | 80 deg                       |
|                    |                   | one side =   | 7.21                          |                  |                          | one side =   | 7.21                         |
| <b>10 Bar</b>      | <b>Pressure</b>   | <b>14.42</b> | <b>L/min FRONT Spray Ring</b> | <b>28.84</b>     | <b>L/Min ALL NOZZLES</b> | <b>14.42</b> | <b>L/min REAR Spray Ring</b> |

# SECTION 7

## SPRAYING INFORMATION

### Step 6D Final Nozzle Configuration

Depending on size and shape of the spray target it may be necessary to turn some nozzles off due to a lack of foliage, or to specifically target certain zones of the canopy with higher spray rates.

For example, within grapes it's quite common for one or more top rows of nozzles to be turned off due to no foliage and to target the bunch line with a higher spray rate - whilst maintaining the chosen spray rates and pressures. Refer to example shown.



**Fieni 920 DSV Fan, DETAILED NOZZLE PLAN, Albuz ATR Hollow Cone Nozzles.**

| ◀ Front Spray Ring |                   |              |                              | Rear Spray Ring  |                          |              |                             |
|--------------------|-------------------|--------------|------------------------------|------------------|--------------------------|--------------|-----------------------------|
| Nozzle             | ALBUZ Hollow Cone | Discharge    | Spray angle                  | Nozzle           | ALBUZ Hollow Cone        | Discharge    | Spray angle                 |
| <b>Top 1</b>       | AZ-ATR-BN-80C     | OFF          | n/a                          | <b>Top 8</b>     | AZ-ATR-BN-80C            | OFF          | n/a                         |
| <b>2</b>           | AZ-ATR-BN-80C     | 0.67         | 80 deg                       | <b>9</b>         | AZ-ATR-BN-80C            | 0.67         | 80 deg                      |
| <b>3</b>           | AZ-ATR-YW-80C     | 1.03         | 80 deg                       | <b>10</b>        | AZ-ATR-YW-80C            | 1.03         | 80 deg                      |
| <b>Middle 4</b>    | AZ-ATR-OE-80C     | 1.39         | 80 deg                       | <b>Middle 11</b> | AZ-ATR-OE-80C            | 1.39         | 80 deg                      |
| <b>5</b>           | AZ-ATR-RD-80C     | 1.92         | 80 deg                       | <b>12</b>        | AZ-ATR-RD-80C            | 1.92         | 80 deg                      |
| <b>6</b>           | AZ-ATR-YW-80C     | 1.03         | 80 deg                       | <b>13</b>        | AZ-ATR-YW-80C            | 1.03         | 80 deg                      |
| <b>Bottom 7</b>    | AZ-ATR-YW-80C     | 1.03         | 80 deg                       | <b>Bottom 14</b> | AZ-ATR-YW-80C            | 1.03         | 80 deg                      |
|                    |                   | one side =   | 7.07                         |                  |                          | one side =   | 7.07                        |
| <b>10 Bar</b>      | <b>Pressure</b>   | <b>14.14</b> | L/min<br>FRONT<br>Spray Ring | <b>28.28</b>     | <b>L/Min ALL NOZZLES</b> | <b>14.14</b> | L/min<br>REAR<br>Spray Ring |

**Fieni 1060 DSV Fan, as factory fitted "standard", Disk & Core Nozzles.**  
Note customer can nominate an alternative nozzle configuration at time of order.

| ◀ Front Spray Ring |                 |              |                              |              | Rear Spray Ring                            |              |                             |            |             |
|--------------------|-----------------|--------------|------------------------------|--------------|--|--------------|-----------------------------|------------|-------------|
| Nozzle             | Disc No.        | Core No.     | Discharge                    | Spray angle  | Nozzle                                     | Disc No.     | Core No.                    | Discharge  | Spray angle |
| <b>Top 1</b>       | AD4             | AC56         | 3.52                         | 35 deg       | <b>Top 9</b>                               | AD4          | AC56                        | 3.52       | 35 deg      |
| <b>2</b>           | AD4             | AC56         | 3.52                         | 35 deg       | <b>10</b>                                  | AD4          | AC56                        | 3.52       | 35 deg      |
| <b>3</b>           | AD4             | AC56         | 3.52                         | 35 deg       | <b>11</b>                                  | AD4          | AC56                        | 3.52       | 35 deg      |
| <b>Middle 4</b>    | AD4             | AC56         | 3.52                         | 35 deg       | <b>Middle 12</b>                           | AD4          | AC56                        | 3.52       | 35 deg      |
| <b>5</b>           | AD3             | AC56         | 2.05                         | 28 deg       | <b>13</b>                                  | AD3          | AC56                        | 2.05       | 28 deg      |
| <b>6</b>           | AD3             | AC56         | 2.05                         | 28 deg       | <b>14</b>                                  | AD3          | AC56                        | 2.05       | 28 deg      |
| <b>7</b>           | AD3             | AC35         | 2.2                          | 44 deg       | <b>Bottom 15</b>                           | AD3          | AC35                        | 2.2        | 44 deg      |
| <b>Bottom 8</b>    | AD3             | AC35         | 2.2                          | 44 deg       | Note the rear spray ring has 1 less nozzle |              |                             |            |             |
|                    |                 |              | one side =                   | 22.58        |  |              |                             | one side = | 20.38       |
| <b>10 Bar</b>      | <b>Pressure</b> | <b>45.16</b> | L/min<br>FRONT<br>Spray Ring | <b>85.92</b> | <b>L/Min ALL NOZZLES</b>                   | <b>40.76</b> | L/min<br>REAR<br>Spray Ring |            |             |

It's suggested that a photocopy of the blank worksheet (see pages 80 ~ 87) be used for each calibration and kept for future reference.

Refer to pages 82, 83, 86 & 87 for blank worksheets to suit 920 Linear Tower.

Below left is a sample calibration sheet using disk & core nozzles fitted to a Fieni 1060 fan for a high volume application.

### NOTE

Remember when selecting nozzle outputs that higher pressures and wider spray angles usually give finer droplet sizes than lower pressures and narrower spray angles.

### NOTE

The flow rate of each nozzle is dependent on the nozzle size and operating pressure.

### DISCLAIMER:

Because of the many variable factors involved Croplands can not be held responsible for any down grading or loss of crop resulting from the use of any information in this manual.



# SECTION 7

## SPRAYING INFORMATION

### STEP 7 - FIT & TEST SELECTED NOZZLES

The most important calibration is to test for the actual litres per hectare achieved through your sprayer.

- Use the following method to fit and test the selected nozzles:
- Fit selected nozzles to the sprayer.
- Fill your spray tank to maximum capacity & set the specified pump pressure and operate the sprayer for a short period to make sure all lines are full and nozzles are working properly (no blockages, leaks etc).
- Stop the sprayer and top up the tank with water to maximum capacity again.
- Operate the sprayer in the stationary position at the required pressure for not less than one minute.
- Measure how much water is required to refill the tank to the brim.
- Now, divide the volume measured by the time taken (minutes). The longer the test time the more accurate the figure.

The calculation formulation is;

Output (L/min) =

$$\frac{\text{Output (litres)}}{\text{Time (minutes)}}$$

| Example 1            |                                  |                         |                                |
|----------------------|----------------------------------|-------------------------|--------------------------------|
| Target rate (L/ha)   | <input type="text" value="900"/> | Speed (km/hr)           | <input type="text" value="5"/> |
| Row spacing (m)      | <input type="text" value="3"/>   | Number of rows          | <input type="text" value="1"/> |
| Number of nozzles    | <input type="text" value="28"/>  |                         |                                |
| <b>Total L/min =</b> | <b>22.5</b>                      | <b>L/min per nozzle</b> | <b>0.80</b>                    |

Test as per example 1 (page 75) as above.

$$\frac{28.5 \text{ litres}}{1.25 \text{ minutes (75 seconds)}} = 22.8 \text{ litres/min}$$

Which is slightly more than the target of 22.5L/min (0.8 L/min per nozzle x 28 nozzles for 1.0 min)

- Excessive output is a sign of worn nozzles. See steps 8 & 9.
- Insufficient output is a sign of blockages. See steps 8 & 9.



## CAUTION

**Do not use a worn nozzles to set the pressure setting and nozzle rates, otherwise inaccurate calibration will occur.**

### STEP 8 - CALCULATE THE ACTUAL APPLICATION RATE

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

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

$$\text{Application Rate (L/ha)} = \frac{\text{Total sprayer output (L/min)} \times 600 \div \text{speed (Km/hr)} \div \text{row spacing (m)}}{\div \text{number rows in one pass}}$$

Example 1 (as per Tier 1 example)

$$\frac{22.8 \text{ (L/min)} \times 600}{\div 5 \text{ (kph)} \div 3 \text{ m (row)} \div 1 \text{ (row)}} = 912 \text{ litres/ha}$$



## WARNING

**Do not use mixed pesticides for testing. Use only clean water. Use of pesticides when testing is hazardous to your health.**

# SECTION 7

## SPRAYING INFORMATION

### LITRES PER 100 METRES / ROW

Many Auto Rate controllers have an option for Litres per 100 metres and is occasionally the unit of preference in some vineyard operations. It's a simpler formula as row width is not relevant.

The calculation requires volume and distance, such as 11 litres per 100 metres (of rows). The operator only needs to follow the chemical label rate for mixing concentrate per 100 L.

Flowrate conversion charts are available in the Nufarm SprayWise Horticultural application handbook and the Croplands Compact Sprayers buyers guide.

#### Example 1

Using the chart on page 81, 900 Lt / ha x 3m rows correlates to 27 litres per 100 metres of row.

### STEP 9 - IF THE TESTED RATE IS UNSATISFACTORY

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

#### A) In Auto mode - if the application rate is not being achieved:

- Operating pressure will be excessive if nozzles are too small or blocked or speed is too fast.

Likewise, if your pressure filter is blocked (even partially), you may experience excessive pressure at the pump.

Make adjustments accordingly.

- Operating pressure will fall if nozzles are too large or speed is too slow. Make adjustments accordingly.

#### B) In Manual mode - the Controller application rate can be altered by:

- Adjusting pressure up or down to increase or decrease rate of application (use +/- keys).
- Adjusting spraying speed up or down to decrease or increase rate of application.
- Changing to a different nozzle capacity.

Repeat necessary testing procedures and calculation of application rate if adjustments or changes are made

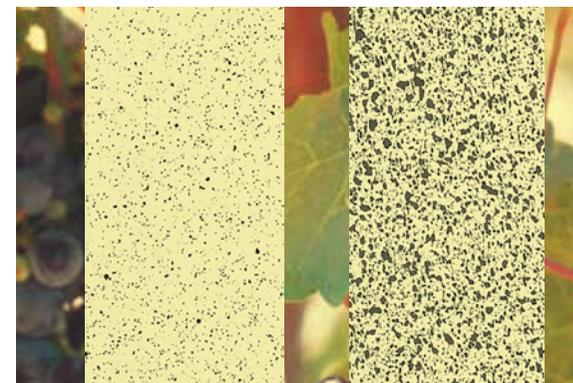
### STEP 10 - COVERAGE ASSESSMENT

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

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

Coverage checks can be done using:

- Water Sensitive Papers (as pictured) and available through Croplands dealers – see Croplands Buyers guide for further details.
- Clay Markers as available through Croplands dealers – see Croplands Buyers guide for further details.
- Fluorescent Dye system as available through Croplands dealers – see Croplands Buyers guide for further details.



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

Ensure water sensitive papers are strategically placed on both upper and lower surfaces.

Spray testing, evaluation and adjustment to the sprayer (say fan positions) or spray settings (say nozzles, pressures and rates) should be done in conjunction with an agronomist / spray manager / someone skilled in the art of spraying. The best setup might vary significantly from crop to crop, season to season etc.

# SECTION 7

## SPRAYING INFORMATION

### STEP 11 - ADD THE CORRECT AMOUNT OF CHEMICAL TO THE TANK

#### For land area rates (Litres or kg per hectare)

Use the following formula:

$$\text{Chemical required (Litres)} = \frac{\text{Tank volume (Litres)} \times \text{recommended chemical rate (L/ha)}}{\div \text{spray application rate (L/ha)}}$$

For example;

$$\begin{aligned} &2000 \text{ (litre tank)} \times 2.0 \text{ (chemical rate L/ha)} \\ &\div 50 \text{ (spray application rate L/ha)} \\ &= 80 \text{ litres of chemical} \end{aligned}$$

#### If chemical recommendation is given in water volume rates

Use the following formula:

$$\text{Chemical required (Litres)} = \frac{\text{Tank volume (Litres)} \times \text{recommended chemical rate (L/100 litres)}}{\div 100}$$

For example;

$$\begin{aligned} &2000 \text{ (litre tank)} \times 4 \text{ (chemical rate L/100 litres)} \\ &\div 100 = 80 \text{ litres of chemical} \end{aligned}$$

#### For tank volume required,

Use the following formula:

$$\text{Tank volume required (Litres)} = \text{Area (ha)} \times \text{spray application rate (L/ha)}$$

For example;

$$\begin{aligned} &20 \text{ (hectares)} \times 50 \text{ (application rate, L/ha)} \\ &= 1000 \text{ litres of spray tank capacity required} \end{aligned}$$

### STEP 12 - RECORD ALL DATA FOR FUTURE REFERENCE

Record all your calibration data on the work sheets given at the end of this section.

Photocopy the work sheets to obtain the number of work sheets required.

# SECTION 7

## SPRAYING INFORMATION

| L/ha ↔ L/100 m       |      |      |     |     |     |      |      |      |      |      |      |      |      |      |      |     |      |      |      |     |      |      |      |     |      |      |      |
|----------------------|------|------|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|-----|------|------|------|-----|------|------|------|-----|------|------|------|
| Row Spacing (metres) |      |      |     |     |     |      |      |      |      |      |      |      |      |      |      |     |      |      |      |     |      |      |      |     |      |      |      |
|                      | 1.6  | 1.8  | 2   | 2.1 | 2.4 | 2.5  | 2.7  | 2.8  | 2.9  | 3    | 3.1  | 3.2  | 3.3  | 3.5  | 3.6  | 4   | 4.5  | 5    | 5.5  | 6   | 6.5  | 7    | 7.5  | 8   | 8.5  | 9    | 10   |
| 100                  | 1.6  | 1.8  | 2   | 2.1 | 2.4 | 2.5  | 2.7  | 2.8  | 2.9  | 3    | 3.1  | 3.2  | 3.3  | 3.5  | 3.6  | 4   | 4.5  | 5    | 5.5  | 6   | 6.5  | 7    | 7.5  | 8   | 8.5  | 9    | 10   |
| 150                  | 2.4  | 2.7  | 3   | 3.1 | 3.6 | 3.8  | 4    | 4.2  | 4.4  | 4.5  | 4.7  | 4.8  | 5    | 5.3  | 5.4  | 6   | 6.8  | 7.5  | 8.3  | 9   | 9.8  | 10.5 | 11.3 | 12  | 12.8 | 13.5 | 15   |
| 200                  | 3.2  | 3.6  | 4   | 4.2 | 4.8 | 5    | 5.4  | 5.6  | 5.8  | 6    | 6.2  | 6.4  | 6.7  | 7    | 7.2  | 8   | 9    | 10   | 11   | 12  | 13   | 14   | 15   | 16  | 17   | 18   | 20   |
| 250                  | 4    | 4.5  | 5   | 5.2 | 6   | 6.3  | 6.7  | 7    | 7.3  | 7.5  | 7.8  | 8    | 8.3  | 8.8  | 9.0  | 10  | 11.3 | 12.5 | 13.8 | 15  | 16.3 | 17.5 | 18.8 | 20  | 21   | 23   | 25   |
| 300                  | 4.8  | 5.4  | 6   | 6.3 | 7.1 | 7.5  | 8.1  | 8.4  | 8.7  | 9    | 9.3  | 9.6  | 10   | 10.5 | 10.8 | 12  | 13.5 | 15   | 16.5 | 18  | 19.5 | 21   | 23   | 24  | 26   | 27   | 30   |
| 350                  | 5.6  | 6.3  | 7   | 7.3 | 8.3 | 8.8  | 9.4  | 9.8  | 10.2 | 10.5 | 10.9 | 11.2 | 11.7 | 12.3 | 12.6 | 14  | 15.8 | 17.5 | 19.3 | 21  | 23   | 25   | 26   | 28  | 30   | 32   | 35   |
| 400                  | 6.4  | 7.2  | 8   | 8.3 | 9.5 | 10   | 10.8 | 11.2 | 11.6 | 12   | 12.4 | 12.8 | 13.3 | 14   | 14.4 | 16  | 18   | 20   | 22   | 24  | 26   | 28   | 30   | 32  | 34   | 36   | 40   |
| 450                  | 7.2  | 8.1  | 9   | 9.4 | 11  | 11.3 | 12.1 | 12.6 | 13.1 | 13.5 | 14   | 14.4 | 15   | 15.8 | 16.2 | 18  | 20   | 23   | 25   | 27  | 29   | 32   | 34   | 36  | 38   | 41   | 45   |
| 500                  | 8    | 9    | 10  | 10  | 12  | 12.5 | 13.5 | 14   | 14.5 | 15   | 15.5 | 16   | 16.7 | 17.5 | 18   | 20  | 23   | 25   | 28   | 30  | 33   | 35   | 38   | 40  | 43   | 45   | 50   |
| 600                  | 9.6  | 10.8 | 12  | 13  | 14  | 15   | 16.2 | 16.8 | 17.4 | 18   | 18.6 | 19.2 | 20   | 21   | 22   | 24  | 27   | 30   | 33   | 36  | 39   | 42   | 45   | 48  | 51   | 54   | 60   |
| 700                  | 11.2 | 12.6 | 14  | 15  | 17  | 17.5 | 18.9 | 19.6 | 20   | 21   | 22   | 22   | 23   | 25   | 25   | 28  | 32   | 35   | 39   | 42  | 46   | 49   | 53   | 56  | 60   | 63   | 70   |
| 750                  | 12   | 13.5 | 15  | 16  | 18  | 18.8 | 20   | 21   | 22   | 23   | 23   | 24   | 25   | 26   | 27   | 30  | 34   | 38   | 41   | 45  | 49   | 53   | 56   | 60  | 64   | 68   | 75   |
| 800                  | 12.8 | 14.4 | 16  | 17  | 19  | 20   | 22   | 22   | 23   | 24   | 25   | 26   | 27   | 28   | 29   | 32  | 36   | 40   | 44   | 48  | 52   | 56   | 60   | 64  | 68   | 72   | 80   |
| 900                  | 14.4 | 16.2 | 18  | 19  | 21  | 23   | 24   | 25   | 26   | 27   | 28   | 29   | 30   | 32   | 32   | 36  | 41   | 45   | 50   | 54  | 59   | 63   | 68   | 72  | 77   | 81   | 90   |
| 1000                 | 16   | 18   | 20  | 21  | 24  | 25   | 27   | 28   | 29   | 30   | 31   | 32   | 33   | 35   | 36   | 40  | 45   | 50   | 55   | 60  | 65   | 70   | 75   | 80  | 85   | 90   | 100  |
| 1100                 | 17.6 | 19.8 | 22  | 23  | 26  | 28   | 30   | 31   | 32   | 33   | 34   | 35   | 37   | 39   | 40   | 44  | 50   | 55   | 61   | 66  | 72   | 77   | 83   | 88  | 94   | 99   | 110  |
| 1200                 | 19.2 | 22   | 24  | 25  | 29  | 30   | 32   | 34   | 35   | 36   | 37   | 38   | 40   | 42   | 43   | 48  | 54   | 60   | 66   | 72  | 78   | 84   | 90   | 96  | 102  | 108  | 120  |
| 1300                 | 21   | 23   | 26  | 27  | 31  | 33   | 35   | 36   | 38   | 39   | 40   | 42   | 43   | 46   | 47   | 52  | 59   | 65   | 72   | 78  | 85   | 91   | 98   | 104 | 111  | 117  | 130  |
| 1400                 | 22   | 25   | 28  | 29  | 33  | 35   | 38   | 39   | 41   | 42   | 43   | 45   | 47   | 49   | 50   | 56  | 63   | 70   | 77   | 84  | 91   | 98   | 105  | 112 | 119  | 126  | 140  |
| 1500                 | 24   | 27   | 30  | 31  | 36  | 38   | 40   | 42   | 44   | 45   | 47   | 48   | 50   | 53   | 54   | 60  | 68   | 75   | 83   | 90  | 98   | 105  | 113  | 120 | 128  | 135  | 150  |
| 1600                 | 26   | 29   | 32  | 33  | 38  | 40   | 43   | 45   | 46   | 48   | 50   | 51   | 53   | 56   | 58   | 64  | 72   | 80   | 88   | 96  | 104  | 112  | 120  | 128 | 136  | 144  | 160  |
| 1700                 | 27   | 31   | 34  | 35  | 40  | 43   | 46   | 48   | 49   | 51   | 53   | 54   | 57   | 60   | 61   | 68  | 77   | 85   | 94   | 102 | 111  | 119  | 128  | 136 | 145  | 153  | 170  |
| 1800                 | 29   | 32   | 36  | 38  | 43  | 45   | 49   | 50   | 52   | 54   | 56   | 58   | 60   | 63   | 65   | 72  | 81   | 90   | 99   | 108 | 117  | 126  | 135  | 144 | 153  | 162  | 180  |
| 1900                 | 30   | 34   | 38  | 40  | 45  | 48   | 51   | 53   | 55   | 57   | 59   | 61   | 63   | 67   | 68   | 76  | 86   | 95   | 105  | 114 | 124  | 133  | 143  | 152 | 162  | 171  | 190  |
| 2000                 | 32   | 36   | 40  | 42  | 48  | 50   | 54   | 56   | 58   | 60   | 62   | 64   | 67   | 70   | 72   | 80  | 90   | 100  | 110  | 120 | 130  | 140  | 150  | 160 | 170  | 180  | 200  |
| 2500                 | 40   | 45   | 50  | 52  | 60  | 63   | 67   | 70   | 73   | 75   | 78   | 80   | 83   | 88   | 90   | 100 | 113  | 125  | 138  | 150 | 163  | 175  | 188  | 200 | 213  | 225  | 250  |
| 3000                 | 48   | 54   | 60  | 63  | 71  | 75   | 81   | 84   | 87   | 90   | 93   | 96   | 100  | 105  | 108  | 120 | 135  | 150  | 165  | 180 | 195  | 210  | 225  | 240 | 255  | 270  | 300  |
| 4000                 | 64   | 72   | 80  | 83  | 95  | 100  | 108  | 112  | 116  | 120  | 124  | 128  | 133  | 140  | 144  | 160 | 180  | 200  | 220  | 240 | 260  | 280  | 300  | 320 | 340  | 360  | 400  |
| 5000                 | 80   | 90   | 100 | 104 | 119 | 125  | 135  | 140  | 145  | 150  | 155  | 160  | 167  | 175  | 180  | 200 | 225  | 250  | 275  | 300 | 325  | 350  | 375  | 400 | 425  | 450  | 500  |
| 6000                 | 96   | 108  | 120 | 125 | 143 | 150  | 162  | 168  | 174  | 180  | 186  | 192  | 200  | 210  | 216  | 240 | 270  | 300  | 330  | 360 | 390  | 420  | 450  | 480 | 510  | 540  | 600  |
| 7000                 | 112  | 126  | 140 | 146 | 167 | 175  | 189  | 196  | 203  | 210  | 217  | 224  | 233  | 245  | 252  | 280 | 315  | 350  | 385  | 420 | 455  | 490  | 525  | 560 | 595  | 630  | 700  |
| 8000                 | 128  | 144  | 160 | 167 | 190 | 200  | 216  | 224  | 232  | 240  | 248  | 256  | 266  | 280  | 288  | 320 | 360  | 400  | 440  | 480 | 520  | 560  | 600  | 640 | 680  | 720  | 800  |
| 9000                 | 144  | 162  | 180 | 188 | 214 | 225  | 243  | 252  | 261  | 270  | 279  | 288  | 300  | 315  | 324  | 360 | 405  | 450  | 495  | 540 | 585  | 630  | 675  | 720 | 765  | 810  | 900  |
| 10000                | 160  | 180  | 200 | 208 | 238 | 250  | 270  | 280  | 290  | 300  | 310  | 320  | 333  | 350  | 360  | 400 | 450  | 500  | 550  | 600 | 650  | 700  | 750  | 800 | 850  | 900  | 1000 |

### LITRES PER 100 METRES / ROW

Many Auto Rate controllers have an option for Litres per 100 metres and is occasionally the unit of preference in some vineyard operations. It's a simpler formula as row width is not relevant.

The calculation requires volume and distance, such as 11 litres per 100 metres (of rows). The operator only needs to follow the chemical label rate for mixing concentrate per 100 L.

Flowrate conversion charts are available in the Nufarm SprayWise Horticultural application handbook and the Croplands Compact Sprayers buyers guide.

#### Example 1

Using the chart left, 900 Lt / ha x 3m rows correlates to 27 litres per 100 metres of row.

# SECTION 7

## SPRAYING INFORMATION

Standard (refer page 57) supplied hollow cone nozzle is Albus Yellow.

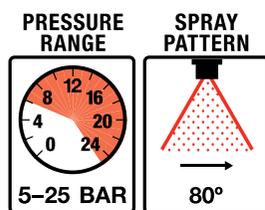
### ALBUZ-ATR 80° HOLLOW CANE NOZZLES



AZ-ATR-\*\*-80C  
**\*\*DENOTES COLOUR, E.G. YW**

\*\* Colour codes:

**WE** = white    **LC** = lilac  
**BN** = brown    **YW** = yellow  
**OE** = orange    **RD** = red  
**GY** = grey    **GN** = green  
**BK** = black    **BE** = blue  
**PE** = purple



#### Features:

- Hollow cone angle of 80° at 5 bar
- Polished ceramics ensure perfect sealing and precise flow rate
- Easily dismantled for cleaning
- Perfect sealing of swirl chamber for precise flow rate
- Pressure range 0–25 bar (optimum 8–15 bar)
- Ideal for fungicides and insecticides
- Fine to very-fine droplets for excellent spray coverage
- European colour coded (see chart below for pressure, flow rates and colours)

#### Applications:

- For fungicides and insecticides
- Recommended for orchards and vineyards.



### ALBUZ ATR 80° HOLLOW CONE NOZZLE CHART

| ALBUZ NOZZLE            | PART NUMBER   | MESH                 | 5 Bar | 6 Bar | 7 Bar | 8 Bar | 9 Bar | 10 Bar | 11 Bar | 12 Bar | 13 Bar | 14 Bar | 15 Bar | 16 Bar | 17 Bar | 18 Bar | 19 Bar | 20 Bar |      |
|-------------------------|---------------|----------------------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| WHITE                   | AZ-ATR-WE-80C | 100                  | 0.27  | 0.29  | 0.32  | 0.34  | 0.36  | 0.38   | 0.39   | 0.41   | 0.43   | 0.44   | 0.46   | 0.47   | 0.48   | 0.50   | 0.51   | 0.52   |      |
| LILAC                   | AZ-ATR-LC-80C | 50                   | 0.36  | 0.39  | 0.42  | 0.45  | 0.48  | 0.50   | 0.52   | 0.55   | 0.57   | 0.59   | 0.61   | 0.63   | 0.64   | 0.66   | 0.68   | 0.70   |      |
| BROWN                   | AZ-ATR-BN-80C | 50                   | 0.48  | 0.52  | 0.56  | 0.60  | 0.64  | 0.67   | 0.7    | 0.73   | 0.76   | 0.79   | 0.81   | 0.84   | 0.86   | 0.89   | 0.91   | 0.93   |      |
| <b>CURRENT STANDARD</b> | <b>YELLOW</b> | <b>AZ-ATR-YW-80C</b> | 50    | 0.73  | 0.80  | 0.86  | 0.92  | 0.97   | 1.03   | 1.07   | 1.12   | 1.17   | 1.21   | 1.25   | 1.29   | 1.33   | 1.37   | 1.4    | 1.44 |
|                         | ORANGE        | AZ-ATR-OE-80C        | 50    | 0.99  | 1.08  | 1.17  | 1.24  | 1.32   | 1.39   | 1.45   | 1.51   | 1.57   | 1.63   | 1.69   | 1.74   | 1.84   | 1.84   | 1.89   | 1.94 |
|                         | RED           | AZ-ATR-RD-80C        | 50    | 1.38  | 1.51  | 1.62  | 1.73  | 1.83   | 1.92   | 2.01   | 2.09   | 2.17   | 2.25   | 2.33   | 2.40   | 2.54   | 2.54   | 2.6    | 2.67 |
|                         | GREY          | AZ-ATR-GY-80C        | 50    | 1.5   | 1.63  | 1.76  | 1.87  | 1.98   | 2.08   | 2.17   | 2.26   | 2.35   | 2.43   | 2.51   | 2.59   | 2.74   | 2.74   | 2.81   | 2.88 |
|                         | GREEN         | AZ-ATR-GN-80C        | 50    | 1.78  | 1.94  | 2.09  | 2.22  | 2.35   | 2.47   | 2.58   | 2.69   | 2.79   | 2.89   | 2.99   | 3.08   | 3.25   | 3.25   | 3.34   | 3.42 |
|                         | BLACK         | AZ-ATR-BK-80C        | 50    | 2     | 2.18  | 2.35  | 2.50  | 2.64   | 2.78   | 2.9    | 3.03   | 3.14   | 3.26   | 3.36   | 3.47   | 3.67   | 3.67   | 3.76   | 3.85 |
|                         | BLUE          | AZ-ATR-BE-80C        | 50    | 2.45  | 2.67  | 2.87  | 3.06  | 3.24   | 3.40   | 3.56   | 3.71   | 3.85   | 3.99   | 4.12   | 4.25   | 4.49   | 4.49   | 4.61   | 4.72 |

# NOZZLE SELECTION DISCS & CORES

## NOZZLES - DISCS AND CORES

|                             |   |                          |
|-----------------------------|---|--------------------------|
| <b>TYPE AND DESCRIPTION</b> | Disc and Core Jets:   |                          |
|                             | <ul style="list-style-type: none"> <li>• Full and hollow cone spray patterns</li> <li>• Medium to fine droplets for use in air assisted situations</li> <li>• 5–20 bar recommended range</li> </ul> |                          |
| <b>SAMPLE ORDER CODE</b>    | <b>AZ-AD*</b>   | <b>AZ-AC*</b>            |
| <b>TYPE</b>                 | Disc  | Core                     |
| <b>SIZE RANGE, MATERIAL</b> | 1 to 7<br>Pink ceramic  | 13 to 56<br>Pink ceramic |

Standard (refer to page 77) supplied disk & core is Albus AD4 / AC35 and /or AD4 / AC56.

## DISC AND CORE ALBUS CERAMIC - FLOW RATES

| DISC SIZE | CORE SIZE | ORIFICES |       |       |       | L/MIN |        |        |        |        | ANGLES |  |
|-----------|-----------|----------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--|
|           |           | DIAMETER | 3 BAR | 4 BAR | 5 BAR | 6 BAR | 10 BAR | 15 BAR | 20 BAR | 10 BAR | 20 BAR |  |
| AD 1      | AC 3      | 0,8      | 0,24  | 0,27  | 0,3   | 0,33  | 0,41   | 0,49   | 0,56   | 70     | 79     |  |
| AD 2      | AC 13     | 1,02     | 0,31  | 0,35  | 0,39  | 0,42  | 0,53   | 0,64   | 0,73   | 87     | 97     |  |
| AD 3      | AC 13     | 1,2      | 0,36  | 0,41  | 0,45  | 0,49  | 0,61   | 0,74   | 0,84   | 89     | 98     |  |
| AD 4      | AC 13     | 1,56     | 0,45  | 0,52  | 0,57  | 0,62  | 0,78   | 0,93   | 1,06   | 99     | 103    |  |
| AD 5      | AC 13     | 2        | 0,55  | 0,62  | 0,69  | 0,75  | 0,94   | 1,13   | 1,29   | 102    | 105    |  |
| AD 1      | AC 23     | 0,8      | 0,28  | 0,32  | 0,35  | 0,38  | 0,48   | 0,57   | 0,65   | 66     | 74     |  |
| AD 2      | AC 23     | 1,02     | 0,37  | 0,43  | 0,47  | 0,51  | 0,64   | 0,77   | 0,88   | 83     | 93     |  |
| AD 3      | AC 23     | 1,2      | 0,44  | 0,51  | 0,56  | 0,61  | 0,76   | 0,92   | 1,04   | 84     | 92     |  |
| AD 4      | AC 23     | 1,56     | 0,56  | 0,64  | 0,71  | 0,77  | 0,97   | 1,16   | 1,32   | 92     | 98     |  |
| AD 5      | AC 23     | 2        | 0,72  | 0,82  | 0,91  | 0,99  | 1,24   | 1,49   | 1,7    | 96     | 99     |  |
| AD 6      | AC 23     | 2,4      | 0,85  | 0,97  | 1,07  | 1,16  | 1,46   | 1,75   | 2      | 99     | 101    |  |
| AD 1      | AC 25     | 0,8      | 0,41  | 0,46  | 0,51  | 0,55  | 0,7    | 0,84   | 0,95   | 50     | 60     |  |
| AD 2      | AC 25     | 1,02     | 0,59  | 0,67  | 0,74  | 0,8   | 1,01   | 1,21   | 1,38   | 57     | 66     |  |
| AD 3      | AC 25     | 1,2      | 0,72  | 0,81  | 0,9   | 0,98  | 1,23   | 1,48   | 1,68   | 63     | 69     |  |
| AD 4      | AC 25     | 1,56     | 1,02  | 1,16  | 1,28  | 1,39  | 1,75   | 2,1    | 2,39   | 75     | 80     |  |
| AD 5      | AC 25     | 2        | 1,41  | 1,6   | 1,77  | 1,92  | 2,42   | 2,9    | 3,3    | 77     | 80     |  |
| AD 6      | AC 25     | 2,4      | 1,73  | 1,97  | 2,18  | 2,37  | 2,98   | 3,57   | 4,07   | 82     | 85     |  |
| AD 7      | AC 25     | 2,8      | 2,07  | 2,36  | 2,61  | 2,83  | 3,57   | 4,28   | 4,87   | 88     | 91     |  |
| AD 1      | AC 45     | 0,8      | 0,48  | 0,55  | 0,61  | 0,66  | 0,83   | 1      | 1,14   | 32     | 39     |  |
| AD 2      | AC 45     | 1,02     | 0,73  | 0,83  | 0,92  | 1     | 1,26   | 1,51   | 1,72   | 46     | 53     |  |
| AD 3      | AC 45     | 1,2      | 0,92  | 1,05  | 1,16  | 1,26  | 1,58   | 1,9    | 2,16   | 48     | 52     |  |
| AD 4      | AC 45     | 1,56     | 1,35  | 1,54  | 1,7   | 1,85  | 2,32   | 2,79   | 3,17   | 59     | 60     |  |
| AD 5      | AC 45     | 2        | 1,92  | 2,19  | 2,42  | 2,63  | 3,31   | 3,97   | 4,52   | 68     | 70     |  |
| AD 6      | AC 45     | 2,4      | 2,46  | 2,79  | 3,09  | 3,35  | 4,22   | 5,07   | 5,77   | 72     | 75     |  |
| AD 7      | AC 45     | 2,8      | 3,01  | 3,43  | 3,79  | 4,11  | 5,18   | 6,21   | 7,07   | 79     | 80     |  |
| AD 1      | AC 46     | 0,8      | 0,55  | 0,62  | 0,69  | 0,75  | 0,94   | 1,13   | 1,29   | 23     | 27     |  |
| AD 2      | AC 46     | 1,02     | 0,92  | 1,05  | 1,16  | 1,26  | 1,58   | 1,9    | 2,16   | 26     | 30     |  |
| AD 3      | AC 46     | 1,2      | 1,2   | 1,37  | 1,51  | 1,64  | 2,06   | 2,48   | 2,82   | 30     | 30     |  |
| AD 4      | AC 46     | 1,56     | 2,03  | 2,32  | 2,56  | 2,78  | 3,5    | 4,2    | 4,78   | 35     | 35     |  |
| AD 5      | AC 46     | 2        | 3,11  | 3,54  | 3,91  | 4,24  | 5,34   | 6,41   | 7,3    | 40     | 42     |  |
| AD 6      | AC 46     | 2,4      | 4,12  | 4,69  | 5,18  | 5,62  | 7,08   | 8,49   | 9,67   | 45     | 46     |  |
| AD 7      | AC 46     | 3,230    | 5,49  | 6,40  | 7,10  | 7,84  | 10,16  | 12,43  | 14,33  | 55     | 53     |  |
| AD 1      | AC 31     | 0,8      | 0,53  | 0,61  | 0,67  | 0,73  | 0,92   | 1,1    | 1,25   | 39     | 39     |  |
| AD 2      | AC 31     | 1,02     | 0,82  | 0,93  | 1,03  | 1,12  | 1,41   | 1,69   | 1,92   | 87     | 95     |  |
| AD 3      | AC 31     | 1,2      | 0,87  | 0,99  | 1,1   | 1,19  | 1,5    | 1,8    | 2,05   | 65     | 62     |  |
| AD 1      | AC 35     | 0,8      | 0,53  | 0,61  | 0,67  | 0,73  | 0,92   | 1,1    | 1,25   | 34     | 40     |  |
| AD 2      | AC 35     | 1,02     | 0,92  | 1,05  | 1,16  | 1,26  | 1,58   | 1,9    | 2,16   | 39     | 39     |  |
| AD 3      | AC 35     | 1,2      | 1,28  | 1,46  | 1,61  | 1,75  | 2,2    | 2,64   | 3      | 44     | 42     |  |
| AD 4      | AC 35     | 1,56     | 2,08  | 2,37  | 2,62  | 2,84  | 3,58   | 4,3    | 4,89   | 77     | 72     |  |
| AD 5      | AC 35     | 2        | 2,62  | 2,98  | 3,3   | 3,58  | 4,51   | 5,41   | 6,16   | 37     | 34     |  |
| AD 2      | AC 56     | 1,02     | 0,88  | 1     | 1,11  | 1,2   | 1,52   | 1,82   | 20,7   | 21     | 20     |  |
| AD 3      | AC 56     | 1,2      | 1,19  | 1,36  | 1,5   | 1,63  | 2,05   | 2,46   | 2,8    | 28     | 32     |  |
| AD 4      | AC 56     | 1,56     | 2,05  | 2,33  | 2,58  | 2,8   | 3,52   | 4,23   | 4,81   | 35     | 38     |  |
| AD 5      | AC 56     | 2        | 3,46  | 3,94  | 4,36  | 4,73  | 5,96   | 7,15   | 8,14   | 43     | 40     |  |
| AD 6      | AC 56     | 2,1      | 5,11  | 5,82  | 6,43  | 6,98  | 8,78   | 10,54  | 12     | 56     | 49     |  |
| AD 7      | AC 56     | 2,3      | 6,87  | 7,81  | 8,64  | 9,38  | 11,8   | 14,17  | 16,12  | 68     | 64     |  |



For Cropliner XL (shown here) or CROPLINER XV models please refer to Croplands customer service, or the Croplands Web site for the applicable manual, HT-OMCROPLINE-E.

# SECTION 7

## SPRAYING INFORMATION

### CALIBRATION WORK SHEET

## Fieni 920 DSV Fan ; Disk & Core Nozzles

#### Step 1

Check the Sprayer is in Good Working Order

#### Step 2

##### Determine Actual Speed of Travel

Measure and mark a straight path of 100 metres (or more) of travelling conditions similar to the orchard or vine yard you are going to spray.

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

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

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

|               |  |
|---------------|--|
| Tractor model |  |
| Gear          |  |
| Range         |  |
| Dual power    |  |
| Engine RPM    |  |
| Speed Km/h    |  |

**Kilometres per Hour = Distance traveled (m) x 3.6/time (seconds)**

#### Step 3

##### Determine Spraying Volume Required

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

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

..... litres/ha

#### Step 4

##### Determine Sprayer Configuration

|  |     |
|--|-----|
| Number of rows to be sprayed in one pass | = 1 |
| Total number of nozzles to be used:      |     |

#### Step 5

Determine ideal spray pressure (bar)

#### Step 6A, B, C

##### Determine & Select Nozzles

Determine nozzle flow rate required:

$$\frac{\text{Litres/Minute}}{\text{Litres/Ha} \times \text{Km/hr} \div 600 \div \text{Total Number of Nozzles Used} \times \text{Row Spacing (m)} \times \text{Number of Rows in One Pass}}$$

$$\frac{\text{ } \times \text{ } \div 600 \div \text{ } \times 1}{\text{ }} = \text{ } \text{ litres/minute/for all nozzles (divide by 2 for each half)}$$

#### Step 7

##### Fit & Test Selected Nozzles

The most important calibration is to test for actual litre per hectare.

Fill your spray tank to overflowing and run the sprayer for one minute, at the above operating settings, and record the total litres per minute used.

$$\frac{\text{Output/min/side (l/min)}}{\text{Output (litres)} \div \text{Time (minutes)}} = \text{ } \div \text{ } = \text{ } \text{ litres/minute}$$

#### Step 8

##### Calculate the Actual Application Rate

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

$$\text{Application Rate (l/ha)} = \frac{\text{Total Sprayer Output (l/min)} \times 600 \div \text{Speed (Km/hr)} \div \text{Row Spacing (m)} \div \text{Number Rows in One Pass}}{\text{ }} \times 600 \div \text{ } \div \text{ } \div 1 = \text{ } \text{ litres/ha}$$

**DISCLAIMER:**  
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#### Step 6D Calibration Work Sheet ; Fieni 920 DSV Fan ; Disk & Core Nozzles

| Front Spray Ring |          |          |           |                        | Rear Spray Ring   |          |          |           |                       |
|------------------|----------|----------|-----------|------------------------|-------------------|----------|----------|-----------|-----------------------|
| Nozzle           | Disc No. | Core No. | Discharge | Spray angle            | Nozzle            | Disc No. | Core No. | Discharge | Spray angle           |
| Top 1            |          |          |           |                        | Top 8             |          |          |           |                       |
| 2                |          |          |           |                        | 9                 |          |          |           |                       |
| 3                |          |          |           |                        | 10                |          |          |           |                       |
| Middle 4         |          |          |           |                        | Middle 11         |          |          |           |                       |
| 5                |          |          |           |                        | 12                |          |          |           |                       |
| 6                |          |          |           |                        | 13                |          |          |           |                       |
| Bottom 7         |          |          |           |                        | Bottom 14         |          |          |           |                       |
|                  |          |          |           | one side =             |                   |          |          |           | one side =            |
| Pressure         |          |          |           | L/min FRONT Spray Ring | L/Min ALL NOZZLES |          |          |           | L/min REAR Spray Ring |



# SECTION 7

## SPRAYING INFORMATION

### CALIBRATION WORK SHEET

## Fieni 920 DSV Fan ; Disk & Core Nozzles

#### Step 1

Check the Sprayer is in Good Working Order

#### Step 2

##### Determine Actual Speed of Travel

Measure and mark a straight path of 100 metres (or more) of travelling conditions similar to the orchard or vine yard you are going to spray.

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

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

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

|               |  |
|---------------|--|
| Tractor model |  |
| Gear          |  |
| Range         |  |
| Dual power    |  |
| Engine RPM    |  |
| Speed Km/h    |  |

**Kilometres per Hour = Distance traveled (m) x 3.6/time (seconds)**

#### Step 3

##### Determine Spraying Volume Required

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

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

..... litres/ha

#### Step 4

##### Determine Sprayer Configuration

|  |     |
|--|-----|
| Number of rows to be sprayed in one pass | = 1 |
| Total number of nozzles to be used:      |     |

#### Step 5

Determine ideal spray pressure (bar)

#### Step 6A, B, C

##### Determine & Select Nozzles

Determine nozzle flow rate required:

$$\frac{\text{Litres/Minute}}{\text{Litres/Ha} \times \text{Km/hr} \div 600 \div \text{Total Number of Nozzles Used} \times \text{Row Spacing (m)} \times \text{Number of Rows in One Pass}}$$

$$\frac{\text{ } \times \text{ } \div 600 \div \text{ } \times 1}{\text{ }} = \text{ } \text{ litres/minute/for all nozzles (divide by 2 for each half)}$$

#### Step 7

##### Fit & Test Selected Nozzles

The most important calibration is to test for actual litre per hectare.

Fill your spray tank to overflowing and run the sprayer for one minute, at the above operating settings, and record the total litres per minute used.

$$\frac{\text{Output/min/side (l/min)}}{\text{Output (litres)} \div \text{Time (minutes)}} = \text{ } \div \text{ } = \text{ } \text{ litres/minute}$$

#### Step 8

##### Calculate the Actual Application Rate

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

$$\text{Application Rate (l/ha)} = \frac{\text{Total Sprayer Output (l/min)} \times 600 \div \text{Speed (Km/hr)} \div \text{Row Spacing (m)} \div \text{Number Rows in One Pass}}{\text{ } \times 600 \div \text{ } \div \text{ } \div 1} = \text{ } \text{ litres/ha}$$

**DISCLAIMER:**  
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#### Step 6D Calibration Work Sheet ; Fieni 920 DSV Fan ; Disk & Core Nozzles

| Front Spray Ring |          |          |           |                        | Rear Spray Ring   |          |          |           |                       |
|------------------|----------|----------|-----------|------------------------|-------------------|----------|----------|-----------|-----------------------|
| Nozzle           | Disc No. | Core No. | Discharge | Spray angle            | Nozzle            | Disc No. | Core No. | Discharge | Spray angle           |
| Top 1            |          |          |           |                        | Top 8             |          |          |           |                       |
| 2                |          |          |           |                        | 9                 |          |          |           |                       |
| 3                |          |          |           |                        | 10                |          |          |           |                       |
| Middle 4         |          |          |           |                        | Middle 11         |          |          |           |                       |
| 5                |          |          |           |                        | 12                |          |          |           |                       |
| 6                |          |          |           |                        | 13                |          |          |           |                       |
| Bottom 7         |          |          |           |                        | Bottom 14         |          |          |           |                       |
|                  |          |          |           | one side =             |                   |          |          |           | one side =            |
| Pressure         |          |          |           | L/min FRONT Spray Ring | L/Min ALL NOZZLES |          |          |           | L/min REAR Spray Ring |

# SECTION 7

## SPRAYING INFORMATION

### CALIBRATION WORK SHEET

## Fieni LT Fan ; Disk & Core Nozzles

#### Step 1

Check the Sprayer is in Good Working Order

#### Step 2

##### Determine Actual Speed of Travel

Measure and mark a straight path of 100 metres (or more) of travelling conditions similar to the orchard or vine yard you are going to spray.

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

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

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

|               |  |
|---------------|--|
| Tractor model |  |
| Gear          |  |
| Range         |  |
| Dual power    |  |
| Engine RPM    |  |
| Speed Km/h    |  |

**Kilometres per Hour = Distance traveled (m) x 3.6/time (seconds)**

#### Step 3

##### Determine Spraying Volume Required

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

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

..... litres/ha

#### Step 4

##### Determine Sprayer Configuration

|  |     |
|--|-----|
| Number of rows to be sprayed in one pass | = 1 |
| Total number of nozzles to be used:      |     |

#### Step 5

Determine ideal spray pressure (bar)

#### Step 6A, B, C

##### Determine & Select Nozzles

Determine nozzle flow rate required:

$$\frac{\text{Litres/Minute}}{\text{Litres/Ha} \times \text{Km/hr} \div 600 \div \text{Total Number of Nozzles Used} \times \text{Row Spacing (m)} \times \text{Number of Rows in One Pass}}$$

$$\text{Litres/Minute} = \text{Litres/Ha} \times \text{Km/hr} \div 600 \div \text{Total Number of Nozzles Used} \times \text{Row Spacing (m)} \times \text{Number of Rows in One Pass}$$

= ..... litres/minute/for all nozzles (divide by 2 for each half)

#### Step 7

##### Fit & Test Selected Nozzles

The most important calibration is to test for actual litre per hectare.

Fill your spray tank to overflowing and run the sprayer for one minute, at the above operating settings, and record the total litres per minute used.

$$\frac{\text{Output/min/side (l/min)}}{\text{Output (litres)} \div \text{Time (minutes)}}$$

= ..... litres/minute

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#### Step 6D Calibration Work Sheet ; Fieni 920 Linear Tower ; Fieni 1060 DSV Fan ; Disk & Core Nozzles

| Bottom Spray Ring                |          |          |           |             | TOP Spray Rings        |                   |          |           |             |  |                       |
|----------------------------------|----------|----------|-----------|-------------|------------------------|-------------------|----------|-----------|-------------|--|-----------------------|
| Nozzle                           | Disc No. | Core No. | Discharge | Spray angle | Nozzle                 | Disc No.          | Core No. | Discharge | Spray angle |  |                       |
| Top of linear tower              |          |          |           |             | front 1                |                   |          |           |             |  |                       |
|                                  |          |          |           |             | rear 2                 |                   |          |           |             |  |                       |
|                                  |          |          |           |             | front 3                |                   |          |           |             |  |                       |
|                                  |          |          |           |             | rear 4                 |                   |          |           |             |  |                       |
|                                  |          |          |           |             | front 5                |                   |          |           |             |  |                       |
|                                  |          |          |           |             | rear 6                 |                   |          |           |             |  |                       |
|                                  |          |          |           |             | front 7                |                   |          |           |             |  |                       |
|                                  |          |          |           |             | rear 8                 |                   |          |           |             |  |                       |
| Middle (bottom of tower section) |          |          |           |             |                        |                   |          |           |             |  |                       |
| 9                                |          |          |           |             |                        |                   |          |           |             |  |                       |
| 10                               |          |          |           |             |                        |                   |          |           |             |  |                       |
| 11                               |          |          |           |             |                        |                   |          |           |             |  |                       |
| 12                               |          |          |           |             |                        |                   |          |           |             |  |                       |
| 13                               |          |          |           |             |                        |                   |          |           |             |  |                       |
| Bottom                           |          |          |           |             |                        |                   |          |           |             |  |                       |
| one side =                       |          |          |           |             | L/min FRONT Spray Ring | one side =        |          |           |             |  | L/min REAR Spray Ring |
| Pressure                         |          |          |           |             |                        | L/Min ALL NOZZLES |          |           |             |  |                       |

#### Step 8

##### Calculate the Actual Application Rate

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

$$\frac{\text{Application Rate (l/ha)}}{\text{Total Sprayer Output (l/min)} \times 600 \div \text{Speed (Km/hr)} \div \text{Row Spacing (m)} \div \text{Number Rows in One Pass}}$$

= ..... litres/ha

# SECTION 7

## SPRAYING INFORMATION

### CALIBRATION WORK SHEET

## Fieni LT Fan ; Disk & Core Nozzles

#### Step 1

Check the Sprayer is in Good Working Order

#### Step 2

##### Determine Actual Speed of Travel

Measure and mark a straight path of 100 metres (or more) of travelling conditions similar to the orchard or vine yard you are going to spray.

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

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

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

|               |  |
|---------------|--|
| Tractor model |  |
| Gear          |  |
| Range         |  |
| Dual power    |  |
| Engine RPM    |  |
| Speed Km/h    |  |

**Kilometres per Hour = Distance traveled (m) x 3.6/time (seconds)**

#### Step 3

##### Determine Spraying Volume Required

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

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

..... litres/ha

#### Step 4

##### Determine Sprayer Configuration

|  |     |
|--|-----|
| Number of rows to be sprayed in one pass | = 1 |
| Total number of nozzles to be used:      |     |

#### Step 5

Determine ideal spray pressure (bar)

#### Step 6A, B, C

##### Determine & Select Nozzles

Determine nozzle flow rate required:

$$\frac{\text{Litres/Minute}}{\text{Litres/Ha} \times \text{Km/hr} \div 600 \div \text{Total Number of Nozzles Used} \times \text{Row Spacing (m)} \times \text{Number of Rows in One Pass}}$$

$$\text{Litres/Minute} = \text{Litres/Ha} \times \text{Km/hr} \div 600 \div \text{Total Number of Nozzles Used} \times \text{Row Spacing (m)} \times \text{Number of Rows in One Pass}$$

= ..... litres/minute/for all nozzles (divide by 2 for each half)

#### Step 7

##### Fit & Test Selected Nozzles

The most important calibration is to test for actual litre per hectare.

Fill your spray tank to overflowing and run the sprayer for one minute, at the above operating settings, and record the total litres per minute used.

$$\frac{\text{Output/min/side (l/min)}}{\text{Output (litres)} \div \text{Time (minutes)}}$$

= ..... litres/minute

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#### Step 6D Calibration Work Sheet ; Fieni 920 Linear Tower ; Fieni 1060 DSV Fan ; Disk & Core Nozzles

| Bottom Spray Ring                |          |          |           |             | TOP Spray Rings        |                   |                       |           |             |  |  |
|----------------------------------|----------|----------|-----------|-------------|------------------------|-------------------|-----------------------|-----------|-------------|--|--|
| Nozzle                           | Disc No. | Core No. | Discharge | Spray angle | Nozzle                 | Disc No.          | Core No.              | Discharge | Spray angle |  |  |
| Top of linear tower              |          |          |           |             | front 1                |                   |                       |           |             |  |  |
|                                  |          |          |           |             | rear 2                 |                   |                       |           |             |  |  |
|                                  |          |          |           |             | front 3                |                   |                       |           |             |  |  |
|                                  |          |          |           |             | rear 4                 |                   |                       |           |             |  |  |
|                                  |          |          |           |             | front 5                |                   |                       |           |             |  |  |
|                                  |          |          |           |             | rear 6                 |                   |                       |           |             |  |  |
|                                  |          |          |           |             | front 7                |                   |                       |           |             |  |  |
|                                  |          |          |           |             | rear 8                 |                   |                       |           |             |  |  |
| Middle (bottom of tower section) |          |          |           |             |                        |                   |                       |           |             |  |  |
| 9                                |          |          |           |             |                        |                   |                       |           |             |  |  |
| 10                               |          |          |           |             |                        |                   |                       |           |             |  |  |
| 11                               |          |          |           |             |                        |                   |                       |           |             |  |  |
| 12                               |          |          |           |             |                        |                   |                       |           |             |  |  |
| 13                               |          |          |           |             |                        |                   |                       |           |             |  |  |
|                                  |          |          |           |             | Bottom                 |                   |                       |           |             |  |  |
| one side =                       |          |          |           |             | L/min FRONT Spray Ring | one side =        |                       |           |             |  |  |
| Pressure                         |          |          |           |             |                        | L/Min ALL NOZZLES |                       |           |             |  |  |
|                                  |          |          |           |             |                        |                   | L/min REAR Spray Ring |           |             |  |  |

#### Step 8

##### Calculate the Actual Application Rate

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

$$\frac{\text{Application Rate (l/ha)}}{\text{Total Sprayer Output (l/min)} \times 600 \div \text{Speed (Km/hr)} \div \text{Row Spacing (m)} \div \text{Number Rows in One Pass}}$$

= ..... litres/ha

# SECTION 7

## SPRAYING INFORMATION

### CALIBRATION WORK SHEET

## Fieni 920 ; AlbuZ ATR

#### Step 1

Check the Sprayer is in Good Working Order

#### Step 2

##### Determine Actual Speed of Travel

Measure and mark a straight path of 100 metres (or more) of travelling conditions similar to the orchard or vine yard you are going to spray.

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

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

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

|               |  |
|---------------|--|
| Tractor model |  |
| Gear          |  |
| Range         |  |
| Dual power    |  |
| Engine RPM    |  |
| Speed Km/h    |  |

**Kilometres per Hour = Distance traveled (m) x 3.6/time (seconds)**

#### Step 3

##### Determine Spraying Volume Required

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

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

..... litres/ha

#### Step 4

##### Determine Sprayer Configuration

|  |     |
|--|-----|
| Number of rows to be sprayed in one pass | = 1 |
| Total number of nozzles to be used:      |     |

#### Step 5

Determine ideal spray pressure (bar)

#### Step 6A, B, C

##### Determine & Select Nozzles

Determine nozzle flow rate required:

$$\frac{\text{Litres/Minute}}{\text{Litres/Ha} \times \text{Km/hr} \div 600 \div \text{Total Number of Nozzles Used} \times \text{Row Spacing (m)} \times \text{Number of Rows in One Pass}}$$

$$= \frac{\text{ } \times \text{ } \div 600 \div \text{ } \times 1}{\text{ }} \text{ litres/minute/for all nozzles (divide by 2 for each half)}$$

#### Step 7

##### Fit & Test Selected Nozzles

The most important calibration is to test for actual litre per hectare.

Fill your spray tank to overflowing and run the sprayer for one minute, at the above operating settings, and record the total litres per minute used.

$$\frac{\text{Output/min/side (l/min)}}{\text{Output (litres)} \div \text{Time (minutes)}} = \text{ } \div \text{ } = \text{ } \text{ litres/minute}$$

#### Step 8

##### Calculate the Actual Application Rate

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

$$\text{Application Rate (l/ha)} = \frac{\text{Total Sprayer Output (l/min)} \times 600 \div \text{Speed (Km/hr)} \div \text{Row Spacing (m)} \div \text{Number Rows in One Pass}}{\text{ }} \times 600 \div \text{ } \div \text{ } \div 1 = \text{ } \text{ litres/ha}$$

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#### Step 6D Calibration Work Sheet ; Fieni 920 ; AlbuZ ATR

| ◀ Front Spray Ring |                   |           |                        | Rear Spray Ring   |                   |           |                       |
|--------------------|-------------------|-----------|------------------------|-------------------|-------------------|-----------|-----------------------|
| Nozzle             | ALBUZ Hollow Cone | Discharge | Spray angle            | Nozzle            | ALBUZ Hollow Cone | Discharge | Spray angle           |
| Top 1              |                   |           |                        | Top 8             |                   |           |                       |
| 2                  |                   |           |                        | 9                 |                   |           |                       |
| 3                  |                   |           |                        | 10                |                   |           |                       |
| Middle 4           |                   |           |                        | Middle 11         |                   |           |                       |
| 5                  |                   |           |                        | 12                |                   |           |                       |
| 6                  |                   |           |                        | 13                |                   |           |                       |
| Bottom 7           |                   |           |                        | Bottom 14         |                   |           |                       |
|                    |                   |           | one side =             |                   |                   |           | one side =            |
| Pressure           |                   |           | L/min FRONT Spray Ring | L/Min ALL NOZZLES |                   |           | L/min REAR Spray Ring |

# SECTION 7

## SPRAYING INFORMATION

### CALIBRATION WORK SHEET

## Fieni 920 ; Albus ATR

#### Step 1

Check the Sprayer is in Good Working Order

#### Step 2

##### Determine Actual Speed of Travel

Measure and mark a straight path of 100 metres (or more) of travelling conditions similar to the orchard or vine yard you are going to spray.

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

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

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

|               |  |
|---------------|--|
| Tractor model |  |
| Gear          |  |
| Range         |  |
| Dual power    |  |
| Engine RPM    |  |
| Speed Km/h    |  |

**Kilometres per Hour = Distance traveled (m) x 3.6/time (seconds)**

#### Step 3

##### Determine Spraying Volume Required

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

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

..... litres/ha

#### Step 4

##### Determine Sprayer Configuration

|  |     |
|--|-----|
| Number of rows to be sprayed in one pass | = 1 |
| Total number of nozzles to be used:      |     |

#### Step 5

Determine ideal spray pressure (bar)

#### Step 6A, B, C

##### Determine & Select Nozzles

Determine nozzle flow rate required:

$$\frac{\text{Litres/Minute}}{\text{Litres/Ha} \times \text{Km/hr} \div 600 \div \text{Total Number of Nozzles Used} \times \text{Row Spacing (m)} \times \text{Number of Rows in One Pass}}$$

$$= \frac{\text{ } \times \text{ } \div 600 \div \text{ } \times 1}{\text{ }} \text{ litres/minute/for all nozzles (divide by 2 for each half)}$$

#### Step 7

##### Fit & Test Selected Nozzles

The most important calibration is to test for actual litre per hectare.

Fill your spray tank to overflowing and run the sprayer for one minute, at the above operating settings, and record the total litres per minute used.

$$\frac{\text{Output/min/side (l/min)}}{\text{Output (litres)} \div \text{Time (minutes)}} = \text{ } \div \text{ } = \text{ } \text{ litres/minute}$$

#### Step 8

##### Calculate the Actual Application Rate

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

$$\text{Application Rate (l/ha)} = \frac{\text{Total Sprayer Output (l/min)} \times 600}{\text{Speed (Km/hr)} \div \text{Row Spacing (m)} \div \text{Number Rows in One Pass}}$$

$$= \text{ } \times 600 \div \text{ } \div \text{ } \div 1 = \text{ } \text{ litres/ha}$$

**DISCLAIMER:**  
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#### Step 6D Calibration Work Sheet ; Fieni 920 ; Albus ATR

| ◀ Front Spray Ring |                   |           |                        | Rear Spray Ring |                   |           |                       |
|--------------------|-------------------|-----------|------------------------|-----------------|-------------------|-----------|-----------------------|
| Nozzle             | ALBUZ Hollow Cone | Discharge | Spray angle            | Nozzle          | ALBUZ Hollow Cone | Discharge | Spray angle           |
| Top 1              |                   |           |                        | Top 8           |                   |           |                       |
| 2                  |                   |           |                        | 9               |                   |           |                       |
| 3                  |                   |           |                        | 10              |                   |           |                       |
| Middle 4           |                   |           |                        | Middle 11       |                   |           |                       |
| 5                  |                   |           |                        | 12              |                   |           |                       |
| 6                  |                   |           |                        | 13              |                   |           |                       |
| Bottom 7           |                   |           |                        | Bottom 14       |                   |           |                       |
|                    |                   |           | one side =             |                 |                   |           | one side =            |
|                    |                   |           | L/min FRONT Spray Ring |                 |                   |           | L/min REAR Spray Ring |
|                    |                   |           | Pressure               |                 |                   |           | L/Min ALL NOZZLES     |

# SECTION 7

## SPRAYING INFORMATION

### CALIBRATION WORK SHEET

## Fieni LT ; Albuz ATR

#### Step 1

Check the Sprayer is in Good Working Order

#### Step 2

##### Determine Actual Speed of Travel

Measure and mark a straight path of 100 metres (or more) of travelling conditions similar to the orchard or vine yard you are going to spray.

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

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

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

|               |  |
|---------------|--|
| Tractor model |  |
| Gear          |  |
| Range         |  |
| Dual power    |  |
| Engine RPM    |  |
| Speed Km/h    |  |

**Kilometres per Hour = Distance traveled (m) x 3.6/time (seconds)**

#### Step 3

##### Determine Spraying Volume Required

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

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

..... litres/ha

#### Step 4

##### Determine Sprayer Configuration

|  |     |
|--|-----|
| Number of rows to be sprayed in one pass | = 1 |
| Total number of nozzles to be used:      |     |

#### Step 5

Determine ideal spray pressure (bar)

#### Step 6A, B, C

##### Determine & Select Nozzles

Determine nozzle flow rate required:

**Litres/Minute**

**Litres/Ha x Km/hr ÷ 600 ÷ Total Number of Nozzles Used x Row Spacing (m) x Number of Rows in One Pass**

$$\text{Litres/Minute} = \frac{\text{Litres/Ha} \times \text{Km/hr} \div 600 \div \text{Total Number of Nozzles Used} \times \text{Row Spacing (m)} \times \text{Number of Rows in One Pass}}{1}$$

= ..... litres/minute/for all nozzles (divide by 2 for each half)

#### Step 7

##### Fit & Test Selected Nozzles

The most important calibration is to test for actual litre per hectare.

Fill your spray tank to overflowing and run the sprayer for one minute, at the above operating settings, and record the total litres per minute used.

**Output/min/side (l/min)**

**Output (litres) ÷ Time (minutes)**

$$\text{Output (litres)} \div \text{Time (minutes)} = \text{litres/minute}$$

#### DISCLAIMER:

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

#### Step 6D Calibration Work Sheet ; Fieni 920 Linear Tower ; Fieni 1060 ; Albuz ATR

| Bottom Spray Ring                |                   |            |             | TOP Spray Rings        |                   |           |                       |
|----------------------------------|-------------------|------------|-------------|------------------------|-------------------|-----------|-----------------------|
| Nozzle                           | ALBUZ Hollow cone | Discharge  | Spray angle | Nozzle                 | ALBUZ Hollow cone | Discharge | Spray angle           |
| Top of linear tower              |                   |            |             | front 1                |                   |           |                       |
|                                  |                   |            |             | rear 2                 |                   |           |                       |
|                                  |                   |            |             | front 3                |                   |           |                       |
|                                  |                   |            |             | rear 4                 |                   |           |                       |
|                                  |                   |            |             | front 5                |                   |           |                       |
|                                  |                   |            |             | rear 6                 |                   |           |                       |
|                                  |                   |            |             | front 7                |                   |           |                       |
|                                  |                   |            |             | rear 8                 |                   |           |                       |
| Middle (bottom of tower section) |                   |            |             |                        |                   |           |                       |
| 9                                |                   |            |             |                        |                   |           |                       |
| 10                               |                   |            |             |                        |                   |           |                       |
| 11                               |                   |            |             |                        |                   |           |                       |
| 12                               |                   |            |             |                        |                   |           |                       |
| 13                               |                   |            |             |                        |                   |           |                       |
|                                  |                   |            |             | Bottom                 |                   |           |                       |
|                                  |                   | one side = |             | L/min FRONT Spray Ring | one side =        |           |                       |
| Pressure                         |                   |            |             | L/Min ALL NOZZLES      |                   |           | L/min REAR Spray Ring |

#### Step 8

##### Calculate the Actual Application Rate

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

**Application Rate (l/ha)**

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

$$\text{Total Sprayer Output (l/min)} \times 600 \div \text{Speed (Km/hr)} \div \text{Row Spacing (m)} \div \text{Number Rows in One Pass} = \text{litres/ha}$$

# SECTION 7

## SPRAYING INFORMATION

### CALIBRATION WORK SHEET

## Fieni LT ; Albuz ATR

#### Step 1

Check the Sprayer is in Good Working Order

#### Step 2

##### Determine Actual Speed of Travel

Measure and mark a straight path of 100 metres (or more) of travelling conditions similar to the orchard or vine yard you are going to spray.

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

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

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

|               |  |
|---------------|--|
| Tractor model |  |
| Gear          |  |
| Range         |  |
| Dual power    |  |
| Engine RPM    |  |
| Speed Km/h    |  |

**Kilometres per Hour = Distance traveled (m) x 3.6/time (seconds)**

#### Step 3

##### Determine Spraying Volume Required

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

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

..... litres/ha

#### Step 4

##### Determine Sprayer Configuration

|  |     |
|--|-----|
| Number of rows to be sprayed in one pass | = 1 |
| Total number of nozzles to be used:      |     |

#### Step 5

Determine ideal spray pressure (bar)

#### Step 6A, B, C

##### Determine & Select Nozzles

Determine nozzle flow rate required:

**Litres/Minute**

$$\text{Litres/Ha} \times \text{Km/hr} \div 600 \div \text{Total Number of Nozzles Used} \times \text{Row Spacing (m)} \times \text{Number of Rows in One Pass}$$

$$\text{ } \times \text{ } \div 600 \div \text{ } \times 1 = \text{ } \text{ litres/minute/for all nozzles (divide by 2 for each half)}$$

#### Step 7

##### Fit & Test Selected Nozzles

The most important calibration is to test for actual litre per hectare.

Fill your spray tank to overflowing and run the sprayer for one minute, at the above operating settings, and record the total litres per minute used.

**Output/min/side (l/min)**

**Output (litres) ÷ Time (minutes)**

$$\text{ } \div \text{ } = \text{ } \text{ litres/minute}$$

#### DISCLAIMER:

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

#### Step 6D Calibration Work Sheet ; Fieni 920 Linear Tower ; Fieni 1060 ; Albuz ATR

| Bottom Spray Ring                |                   |            |             | TOP Spray Rings        |                   |           |                       |
|----------------------------------|-------------------|------------|-------------|------------------------|-------------------|-----------|-----------------------|
| Nozzle                           | ALBUZ Hollow cone | Discharge  | Spray angle | Nozzle                 | ALBUZ Hollow cone | Discharge | Spray angle           |
| Top of linear tower              |                   |            |             | front 1                |                   |           |                       |
|                                  |                   |            |             | rear 2                 |                   |           |                       |
|                                  |                   |            |             | front 3                |                   |           |                       |
|                                  |                   |            |             | rear 4                 |                   |           |                       |
|                                  |                   |            |             | front 5                |                   |           |                       |
|                                  |                   |            |             | rear 6                 |                   |           |                       |
|                                  |                   |            |             | front 7                |                   |           |                       |
|                                  |                   |            |             | rear 8                 |                   |           |                       |
| Middle (bottom of tower section) |                   |            |             |                        |                   |           |                       |
| 9                                |                   |            |             |                        |                   |           |                       |
| 10                               |                   |            |             |                        |                   |           |                       |
| 11                               |                   |            |             |                        |                   |           |                       |
| 12                               |                   |            |             |                        |                   |           |                       |
| 13                               |                   |            |             |                        |                   |           |                       |
|                                  |                   |            |             | Bottom                 |                   |           |                       |
|                                  |                   | one side = |             | L/min FRONT Spray Ring | one side =        |           |                       |
| Pressure                         |                   |            |             |                        | L/Min ALL NOZZLES |           | L/min REAR Spray Ring |

#### Step 8

##### Calculate the Actual Application Rate

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

**Application Rate (l/ha)**

$$\text{Total Sprayer Output (l/min)} \times 600 \div \text{Speed (Km/hr)} \div \text{Row Spacing (m)} \div \text{Number Rows in One Pass}$$

$$\text{ } \times 600 \div \text{ } \div \text{ } \div 1 = \text{ } \text{ litres/ha}$$

# SECTION 8

## LUBRICATION & MAINTENANCE

### GENERAL MAINTENANCE

All the various maintenance operations must be carried out after each use and when the machine is not in operation.

1. Remove any foreign bodies from the protective guards and replace any damaged ones.
2. No deposits should be allowed to accumulate on the fan. It must be cleaned with a pressurised water jet.
3. Remove from the various parts any residue of the chemical products used, as they could damage the materials.
4. Periodically check, clean and replace any worn nozzles.
5. Before the winter period, completely empty the nozzle-holding tubes of liquids, in order to safeguard against their breaking.
6. Have the sprayer unit checked once a year by qualified technical personnel.
7. Repairs should only be undertaken by suitably qualified personnel.

**If replacing a damaged fan blade it is necessary to re-balance the fan. Do not operate with damaged fan blades.**

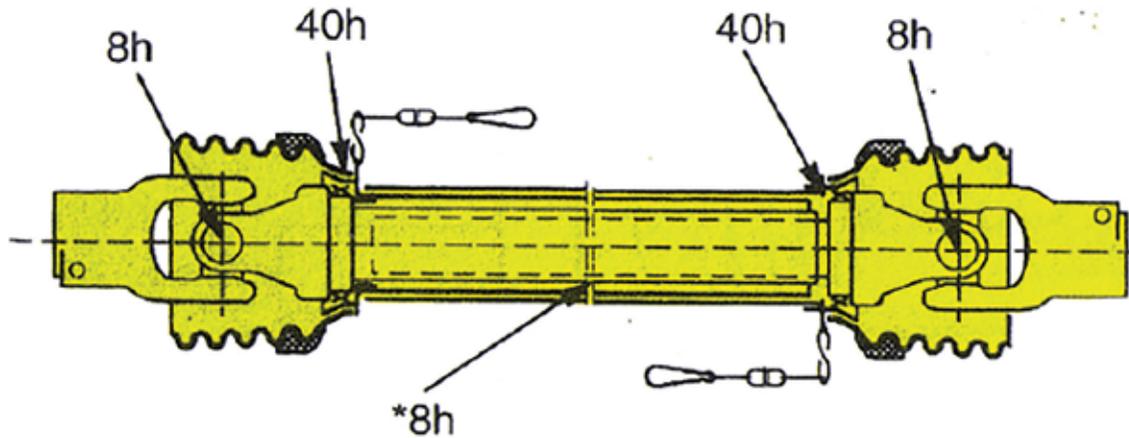


|  |           |
|--|-----------|
| <b>GREASING &amp; SERVICE PROCEDURES</b> | <b>89</b> |
| <b>EVERY 200 HOURS</b>                   | <b>89</b> |
| <b>GREASE POINTS</b>                     | <b>89</b> |
| <b>DIAPHRAGM PUMPS</b>                   | <b>90</b> |
| <b>FILTERS</b>                           | <b>91</b> |



# SECTION 8

## LUBRICATION & MAINTENANCE



Grease the PTO shaft as shown. \* Pull shaft apart - apply grease to the inside of the outer telescopic profile.

### GREASING & SERVICE PROCEDURES

1. Clean suction line filter after completion of each tank.
2. Clean pressure line filter regularly.
3. Check tyre pressure ((350kPa / 50 psi), and check wheel nuts.
4. Clean Rapid-check flowmeter (refer to page 71), if fitted.
5. Grease tractor to sprayer PTO universal joints every 8 hours. Grease lightly until grease becomes firm in seals. Over greasing will break seals and allow dust and moisture to penetrate - increasing wear.
6. Grease PTO inner tubes every 8 hours. To lubricate the inner tube, slide PTO shaft apart, clean the telescopic tubes, grease and reassemble.
7. Grease the PTO covers every 40 hours.
8. Ensure safety covers and safety chains are in place and in good working order
9. Check pump air chamber pressure on a regular basis. As a general guideline it should be 10%-20% of operating pressure (70-100 kPa [10-15 psi]). Refer to pump manual for more information.
10. To ensure trouble free spraying, flush the sprayer with fresh water thoroughly each day, and before changing chemicals. Dispose of tank wash according to chemical manufacturers instructions.
11. Grease all joints, height adjusting points and other grease points.

### EVERY 200 HOURS

1. Lubricate quick release lock pins on PTO shaft.
2. Re-pack wheel bearings with grease.
3. Grease and check & adjust castellated nut both LH & RH of walking beam axle.
4. Grease all tank lid seals with vaseline.
5. Check to ensure agitators have not become blocked with sulphur/chemicals.
6. Check pump mounts.
7. Check fan RPM and oil pressure at test port.

### GREASE POINTS



Grease all swivel drawbar grease points

1. Drawbar swivel grease points.
2. Wheel hubs, if fitted with grease nipples.

# SECTION 8

## LUBRICATION & MAINTENANCE



Grease wheel hubs

3. PTO shaft - all crosses (knuckles), both ends and sliding tubes. Refer to page 41-42 for frequency.

### DIAPHRAGM PUMPS

#### Diaphragm Pumps Maintenance

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

#### Daily Before Starting the Pump

1. Check that oil is visible in sight glass (half way up) and top up if necessary with good clean motor oil 20W/30 or 20W/40.
2. Clean all sprayer filters. Blocked or semi blocked filters place extra stress on diaphragms.
3. Start with zero pressure and the pump will self prime immediately and clear air locks in suction line.



#### Daily after Use

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

#### Every 50 Hours

Check surge chamber pressure and adjust as follows:

- Air pressure 70-100kPa (10-15psi) [Should be 10-20% of operating pressure].

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

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

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

The above pressure range is a guide to the correct pressure.

However, if difficulties recur, adjust the pressure until an even flow is obtained from the pump (no pulsing of liquid



**Running a diaphragm pump faster than specified will not improve performance, but will damage and wear out moving parts. Warranty will be made void by speeds in excess of those indicated on the pump name plate.**

at operating RPM). The pressure is best increased with a bicycle pump, hand pump or foot pump.

#### Every 250 hours or Every Season - Whichever Comes Sooner

1. Change oil and refill with 20W/30 oil. Attention should be made to remove trapped air behind the diaphragms by rocking from side to side as instructed. It is also good practise run the pump for 10 minutes without pressure, and then, top up with oil before working the pump.
2. When changing the pump oil, check diaphragms and replace them if they are showing signs of wear. Diaphragm valves should be replaced every 400 hours regardless of wear. This is normally a pre-season maintenance procedure which can be done easily as no special tools are required. You can avoid unnecessary down time in spraying seasons by carrying out preventative maintenance.
3. Also check inlet and outlet valves and replace if worn. Worn valves not only reduce the output of the pump, but may reduce the life of the diaphragms.

# SECTION 8

## LUBRICATION & MAINTENANCE

### Excessive Diaphragm Failure

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

1. Most Important - Pump not being flushed out daily with clean water after use.
2. Oil level too low allowing air between piston and diaphragm.
3. Air leaks in suction line.
4. Restricted suction line.
5. Restriction through suction filter.
6. Not cleaning suction filter regularly.
7. Worn suction and discharge valves.
8. Bypass line too small to carry full capacity of pump.
9. In cold climates - frozen suction/discharge lines or water remaining in the pump after flushing.
10. Incorrect air setting or no air in air chamber.
11. Agitator excessively restricting bypass from pump.
12. Diaphragm material construction incorrect for chemical or solution being pumped.
13. Chemicals containing toluene or other aggressive solvents may require viton diaphragms - particularly if the pump is not properly flushed after use.

### Pre-Season Servicing

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

### Pump Storage and Corrosion Protection

#### 1. Warm Climates

If you operate in a warm climate with no chance of frost in the winter, you will not have any problems with frost damage.

If you are storing your sprayer between seasons, ensure your pump has been thoroughly flushed with clean water. A good idea is to run a mixture of 1% solution of summer mineral spraying oil through the pump and plumbing system. Summer spraying oil is water-soluble oil such as DC-Tron. This will coat and protect all internal pump parts. Ensure this mixture is flushed out before spraying commences in the new season.

#### 2. Cold Climates

For prolonged storage, an anti-freeze mixture can be flushed through the pump. Ensure this is thoroughly flushed out prior to the commencement of spraying again.

If the pump is being stored overnight and a risk of freezing is imminent, drain all liquid from the pump and lines, including boom lines.

### FILTERS

#### Filter Maintenance

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

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



The pump suction valve CLOSED to the main tank

#### Suction Filter

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

To clean the filter:

1. Completely stop all sprayer functions.
2. Place the tank selection valve in the closed position to shut off liquid from the main tank.
3. Remove the outer filter screw and bowl.
4. Remove the filter screen & thoroughly clean it and other components before reassembling the filter.

# SECTION 8

## LUBRICATION & MAINTENANCE



Remove the outer filter screw and bowl. Photo from Cropliner XL



Remove & clean the filter element & components. Photo from Cropliner XL

5. Carefully reassemble the filter, ensuring the screen O-Rings are in place, and then, tighten the outer filter screw so that the outer O-ring is properly sealed.



Reassemble and tighten the outer filter screw. Photo from Cropliner XL

6. **Open the tank selection valve** to access liquid from the main tank, then check the filter is sealed correctly. If leaking, further tighten the outer screw until sealed. If this does not stop the leaking, check the alignment of the O-ring and/or the condition of the O-ring. Replace if necessary.  
Vaseline is the best lubricant for filter seals.

### NOTE

**Be careful not to damage or deform the mesh or O-ring while cleaning and refitting the suction filter. If the filter screen or O-ring is damaged, replace the part.**

### CAUTION

**Ensure the TANK SELECTION VALVE IS OPEN before starting the pump. Starting the pump with the Tank Selection valve closed will seriously damage the suction valve and warranty will be made void.**

Note, FRP models use (RED) filter A316162

# SECTION 8

## LUBRICATION & MAINTENANCE

### Pressure filters

Clean the Pressure Filter regularly. Clean at least daily or more often if the water source isn't clean, and whenever freshwater flushing.



### In-line Pressure Filters (if fitted)

The in-line high pressure brass filters should be cleaned regularly, or after each spray tank has been emptied.

To flush each filter, open and close the filter tap while system is pressurised.

The filter & bowl assembly will need to be disassembled for thorough cleaning.



### Non-Drip Diaphragms

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

To clean the non-drip diaphragms:

1. Completely stop all sprayer functions.
2. Unscrew and remove the diaphragm cap.
3. Remove and clean any sediment off the diaphragm membrane. Replace the diaphragm membrane if damaged.
4. Replace the diaphragm.
5. Refit the diaphragm cap and carefully tighten.



# SECTION 9

## TROUBLESHOOTING

### DIAPHRAGM PUMP PROBLEMS

| PROBLEM  | PROBABLE CAUSE  | REMEDY  |
|--|---|---|
| <b>A. Pump does not draw or deliver liquid. Pressure gauge fluctuates badly</b>                | <ol style="list-style-type: none"> <li>1. The pump is sucking in air through suction line.</li> <li>2. Air has not been entirely evacuated from the pump.</li> <li>3. Blocked suction filter.</li> <li>4. Damaged or worn suction valves.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Examine the suction hose and ensure it is firmly secured.</li> <li>2. Rotate the pump with outlet hose and taps open.</li> <li>3. Clean suction filter.</li> <li>4. Replace suction valves.</li> </ol>  |
| <b>B. Liquid flow is irregular (Also check items under A)</b>                                  | <ol style="list-style-type: none"> <li>1. The air in the air chamber of the pump is incorrectly set.</li> <li>2. Diaphragm split.</li> <li>3. Damaged or worn valves.</li> <li>4. Foreign matter holding valves open.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Check pressure in air chamber of pump. Set as required (refer p.49).</li> <li>2. Replace diaphragm.</li> <li>3. Replace valves.</li> <li>4. Clean valves.</li> </ol>  |
| <b>C. Pump delivers insufficient pressure</b>  | <ol style="list-style-type: none"> <li>1. Regulating valve: <ul style="list-style-type: none"> <li>• Sticking open</li> <li>• Not set for pressure</li> <li>• Damaged or worn seat or spring</li> </ul> </li> <li>2. Cylinder diaphragm ruptured.</li> <li>3. Pump valves blocked, worn or damaged.</li> <li>4. Spray nozzles worn, missing or exceed pump capacity.</li> </ol> | <ol style="list-style-type: none"> <li>1. Fix the regulator: <ul style="list-style-type: none"> <li>• Unstick/renew the valves</li> <li>• Set the pressure</li> <li>• Replace the spring</li> </ul> </li> <li>2. Replace diaphragms.</li> <li>3. Unblock valves and or replace.</li> <li>4. Replace spray nozzles with appropriate size.</li> </ol> |
| <b>D. Output drops &amp; pump is noisy</b>   | <ol style="list-style-type: none"> <li>1. Blocked suction lines or filter screen.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Check and clean as required.</li> </ol>   |
| <b>E. Oil being discharged through delivery line or discoloured oil in sight glass of pump</b> | <ol style="list-style-type: none"> <li>1. One or more diaphragms split or ruptured.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Immediately drain oil from pump and flush to remove all spray residues from sump. Remove pump heads &amp; fit new diaphragms. Fill to correct level with oil as per pump manual.</li> </ol>   |

# SECTION 9

## TROUBLESHOOTING

### DIAPHRAGM PUMP PROBLEMS

| PROBLEM   | PROBABLE CAUSE  | REMEDY  |
|---|---|---|
| <b>SUCTION SIDE OF PUMP</b>   |   |   |
| <b>F. Suction hose vibration... / hunting</b>                                   | 1. Air getting into suction.  | 1. Check suction lines for leaks.   |
| <b>G. Pump valves hammering</b>   | 1. Suction tap partly turned off.<br>2. Suction strainer(s) blocked.  | 1. Seal all joints securely with tape or stag. Firm up clamps.<br>2. Check the suction filter is sealed.        |
| <b>H. No water flow in suction hose</b>   | 1. Suction Tank Selection Valve turned off.<br>2. Suction strainer(s) blocked.  | 1. Turn valve fully on.<br>2. Clean filters.  |
| <b>DISCHARGE SIDE OF PUMP</b>   |   |   |
| <b>I. Manual regulator valve leaking from spindle</b>                           | 1. Split diaphragm or O-rings.  | 1. Remove 4 body set screws, replace diaphragm and O-rings.   |
| <b>J. Pressure gauge showing correct working pressure no pressure at nozzle</b> | 1. Faulty solenoids.<br>2. Blocked discharge filter where fitted.<br>3. Ants, wasps build nests in discharge line or nozzles. | 1. Service or replace.<br>2. Clean discharge filter.<br>3. Clean nozzles of foreign materials with tooth brush. |

# SECTION 9

## TROUBLESHOOTING

### GENERAL SPRAYER PROBLEMS

| PROBLEM   | PROBABLE CAUSE   | REMEDY  |
|---|--|---|
| <b>1. No spray when turned on</b>               | <ol style="list-style-type: none"> <li>1. Filter on the inlet side of the pump blocked.</li> <li>2. Faulty pump.</li> <li>3. Control valves not working</li> </ol>   | <ol style="list-style-type: none"> <li>1. Dismantle, clean &amp; re-assemble.</li> <li>2. Change pump.</li> <li>3. Check all motor valves and manual Pressure Regulating Valve.</li> </ol>  |
| <b>2. Sprays for short time only</b>            | <ol style="list-style-type: none"> <li>1. Air inlet to tank blocked.</li> <li>2. Filter on suction side of pump blocking or blocked.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Clean air vent.</li> <li>2. Dismantle, clean &amp; re-assemble the filter.<br/>If filter problem persists, clean out the tank &amp; start again.</li> </ol>   |
| <b>3. Spray pattern is uneven</b>               | <ol style="list-style-type: none"> <li>1. Blocked nozzles.</li> <li>2. Nozzle tips worn.</li> <li>3. Different pressure at nozzles; wrong nozzles fitted.</li> </ol>   | <ol style="list-style-type: none"> <li>1. Remove, clean &amp; check. Check output &amp; for streaks.</li> <li>2. Check nozzle output, replace worn nozzles.</li> <li>3. Remove a nozzle in each section &amp; check that flow rate is the same.<br/>If different, check for blockages.</li> </ol> |
| <b>4. Pressure going up - output going down</b> | <ol style="list-style-type: none"> <li>1. Blocked nozzles.</li> <li>2. Pressure filter blocking.</li> </ol>  | <ol style="list-style-type: none"> <li>1. Dismantle, clean &amp; refit. Check pressure returns to normal.<br/>Check all filters and spray mixture.</li> <li>2. Check &amp; clean the pressure filter.</li> </ol>  |
| <b>5. Pressure falling</b>                      | <ol style="list-style-type: none"> <li>1. Filter on suction side blocked.</li> <li>2. Nozzle tips worn.</li> <li>3. Pressure gauge faulty.</li> <li>4. Pump worn.</li> <li>5. Worn manual PRV (pressure regulating valve)</li> </ol> | <ol style="list-style-type: none"> <li>1. Dismantle &amp; clean the filter.</li> <li>2. Check nozzle output, replace worn nozzles.</li> <li>3. Check with new pressure gauge.</li> <li>4. Repair or replace the pump.</li> <li>5. Replace PRV</li> </ol>  |
| <b>6. Spray pattern narrow or faltering</b>     | <ol style="list-style-type: none"> <li>1. Pressure too low.</li> <li>2. Nozzles blocked or partially blocked.</li> </ol>   | <ol style="list-style-type: none"> <li>1. Check that the correct nozzles are being used... check and clean..</li> <li>2. Check that the tank is not empty. If not, there is an air leak between the pump &amp; tank or in the pump. Check plumbing &amp; repair.</li> </ol>                       |
| <b>7. Foam in the tank</b>                      | <ol style="list-style-type: none"> <li>1. Too much agitation.</li> </ol>   | <ol style="list-style-type: none"> <li>1. Switch Off one or both agitators.</li> </ol>  |



# SECTION 9

## TROUBLESHOOTING

### MOTOR VALVE PROBLEMS

| PROBLEM   | PROBABLE CAUSE   | REMEDY  |
|---|--|---|
| 1. Section line valve opens when it should be closed and closes when it should be open. | 1. Wiring incorrect.   | 1. Reverse polarity of valve by changing wires at the valve cap.  |
| 2. Water leaks past valve when valve is shut.   | 1. Worn seat.  | 1. Replace seat/hosetail and/or valve system if necessary.  |
| 3. Valve won't operate.   | 1. No power to valve.<br>2. Motor failure.<br>3. Valve clogged.          | 1. Check all connections, supply - loom.<br>2. Replace motor.<br>3. Clean internals of valve and/or put a new valve kit in the valve. |
| 4. Servo valve not regulating flow.   | 1. Valve jamming.<br>2. No power.  | 1. Clean out valve or replace.<br>2. Check all power leads and supply, or replace motor.  |
| 5. Dump valve not releasing pressure in system on shut-off.                             | 1. No power to valve.<br>2. Valve motor failed.<br>3. Dump-line blocked. | 1. Check power supply and all connections.<br>2. Check motor and replace if required.<br>3. Clean valve and return line.              |

### OTHER PROBLEMS

| PROBLEM | PROBABLE CAUSE | REMEDY |
|---------|----------------|--------|
|         |                |        |
|         |                |        |



CAUTION  
USE FRESH  
WATER ONLY

2000

ROPLANDS

PLINER  
LANDS

# SECTION 10

## ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

**ALL PARTS INFORMATION is now listed on the Croplands website:**

- Go to [croplands.com.au](http://croplands.com.au)
- Search in the Parts Information section linked to the home page.

### NOTE

Drawings are for illustration purpose only - refer to sprayer for actual plumbing. Parts listed are indicative of the sprayer type. Items in italics or without a part number are non stocked items and may need to be specially ordered. For further parts information refer to: [www.croplands.com.au](http://www.croplands.com.au)

### NOTE

Contact Croplands Technical Support for further information:  
**1300 650 724**

|   |            |
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| <b>SLIMLINE 2000 FRP / 920DSV</b>                               | <b>102</b> |
| <b>SLIMLINE 2000 PLUMBING SYSTEM HV4000, HV2400, BRAVO 180S</b> | <b>103</b> |
| <b>SLIMLINE ELECTRICAL / CONTROLLER - HV4000</b>                | <b>104</b> |
| <b>SLIMLINE ELECTRICAL / CONTROLLER - HV2400</b>                | <b>105</b> |
| <b>SLIMLINE ELECTRICAL / CONTROLLER - BRAVO 180S</b>            | <b>106</b> |
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## ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

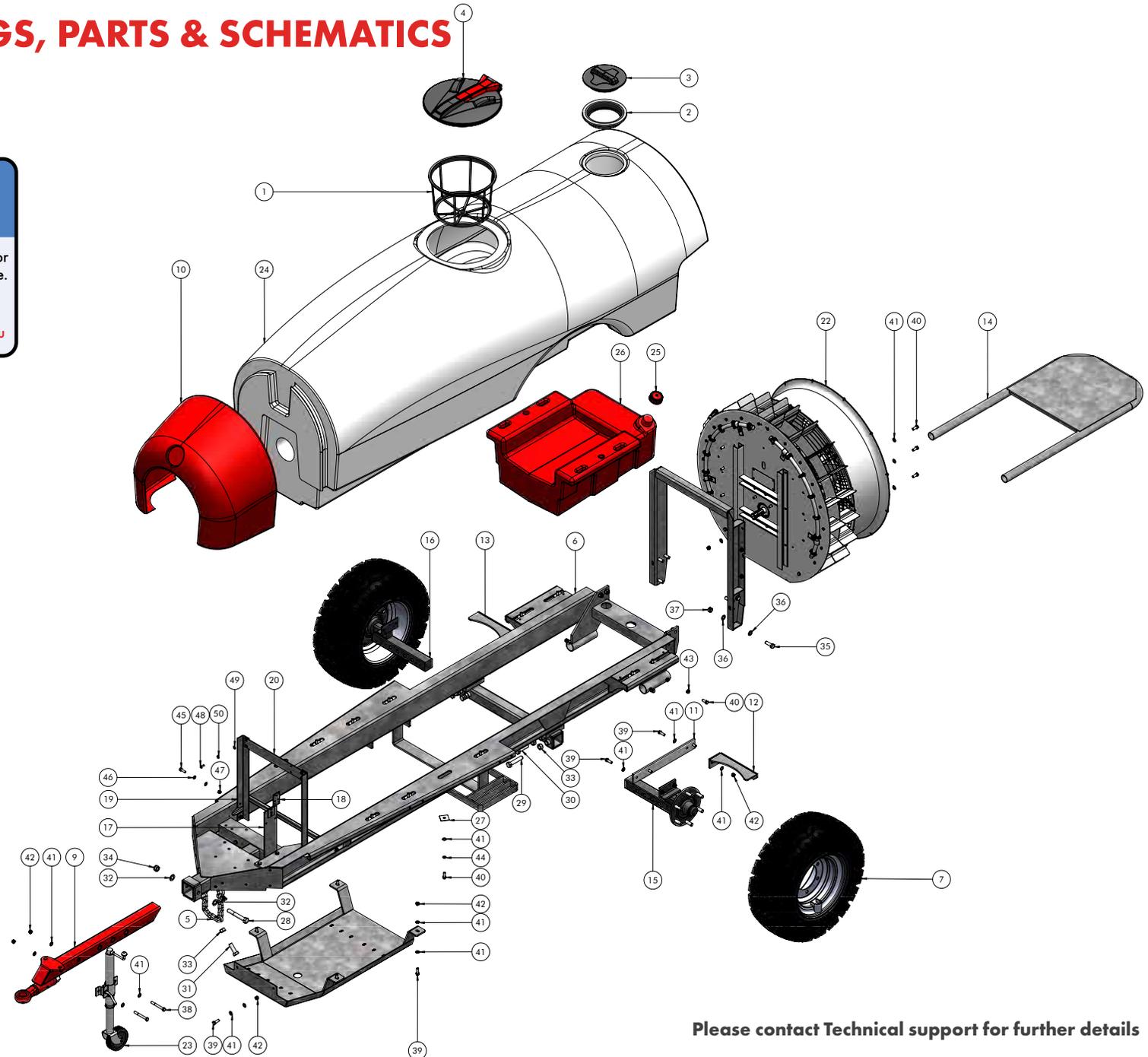
SLIMLINE 2000 (POLY) / 920 DSV

### NOTE

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Items in italics or without a part number are non stocked items and may need to be specially ordered.

For further parts information refer to: [www.croplands.com.au](http://www.croplands.com.au)



Please contact Technical support for further details

# SECTION 10

## ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

| NO. | PART NUMBER  | DESCRIPTION                      | QTY. |
|-----|--------------|----------------------------------|------|
| 1   | A300130      | FILTER BASKET LARGE 254MM DEEP   | 1    |
| 2   | A350620      | LID RING WITH GASKET             | 1    |
| 3   | A3522120     | LID ONLY 255MM CLOSED            | 1    |
| 4   | A356060      | LID HINGE 455MM 180DEG           | 1    |
| 5   | BP-543       | SAFETY TOWING CHAIN 10 X 960     | 1    |
| 6   | HP2000ABSL3A | CHASSIS SLIMLINE V3 HAYLITE      | 1    |
| 7   | HP-200A      | TYRE & WHEEL AWT 10/75-15.3      | 2    |
| 8   | HP-284C2A    | FAN & TANK BRACKET HS2000 920DSV | 1    |
| 9   | HP-400A      | DRAWBAR LONG                     | 1    |
| 10  | HP-800       | PUMP COVER SLIMLINE 2000         | 1    |
| 11  | HP-803-1     | ARM MUDSCRAPER                   | 2    |
| 12  | HP-803L      | HS2000 MUDSCRAPER LH             | 1    |
| 13  | HP-803R      | HS2000 MUDSCRAPER RH             | 1    |
| 14  | HP-807       | BUMPER C/W LEAF SHIELD HS2000    | 1    |
| 15  | HP-808L      | ADJUSTABLE STUB AXLE LH HS2000   | 1    |
| 16  | HP-808R      | ADJUSTABLE STUB AXLE LH HS2000   | 1    |
| 17  | HP-823       | FILTER MOUNTING BRACKET SLIMLINE | 1    |
| 18  | HP-824       | BALL VALVE BRACKET SLIMLINE      | 1    |
| 19  | HP-825       | MANIFOLD STAND SLIMLINE          | 1    |
| 20  | HP-826       | MANIFOLD PLATE SLIMLINE          | 1    |
| 21  | HP-828A      | SUMP GUARD 2000 SLIMLINE         | 1    |
| 22  | KH-5035      | FAN ASSEMBLY 920VNS S/STEEL      | 1    |
| 23  | MUJOCKEY     | JOCKEY WHEEL                     | 1    |
| 24  | P2000SAB-RAW | 2000LT TANK SLIMLINE AIRBLAST    | 1    |
| 25  | P30CAP       | CAP 30LT FM TANK C/W O RING      | 1    |

| NO. | PART NUMBER | DESCRIPTION                       | QTY. |
|-----|-------------|-----------------------------------|------|
| 26  | P80AB-RAW   | FLUSH TANK SLIMLINE 2000          | 1    |
| 27  | 50SQWASHER  | 50MM SQUARE WASHER                | 12   |
| 28  | M20X140BOLT | M20 X 140 HEX HEAD BOLT HT ZP     | 1    |
| 29  | M20X100     | M20 X 100 SET SCREW HT ZP         | 2    |
| 30  | M20X75      | M20 X 75 SET SCREW HT ZP          | 2    |
| 31  | M20X60      | M20 X 60 SET SCREW HT ZP          | 2    |
| 32  | M20FWASHER  | M20 FLAT WASHER ZP                | 2    |
| 33  | M20HNUIT    | M20 HALF NUT ZP                   | 6    |
| 34  | M20NNUT     | M20 NYLOC NUT HT ZP               | 1    |
| 35  | M16X50      | M16 X 50 HEX HEAD SET SCREW HT ZP | 6    |
| 36  | M16FWASHER  | M16 FLAT WASHER ZP                | 12   |
| 37  | M16NNUT     | M16 NYLOC NUT HT ZP               | 6    |
| 38  | M12X100BOLT | M12 X 100 HEX HEAD BOLT HT ZP     | 2    |
| 39  | M12X35      | M12 X 35 SET SCREW HT ZP          | 14   |
| 40  | M12X30      | M12 X 30 SET SCREW HT ZP          | 22   |
| 41  | M12FWASHER  | M12 FLAT WASHER ZP                | 56   |
| 42  | M12NNUT     | M12 NYLOC NUT HT ZP               | 22   |
| 43  | M12SSHNUIT  | M12 HEX NUT HT S/S                | 4    |
| 44  | M12SWASHER  | M12 SPRING WASHER ZP              | 12   |
| 45  | M10X35      | M10 X 35 SET SCREW HT ZP          | 6    |
| 46  | M10FWASHER  | M10 FLAT WASHER ZP                | 12   |
| 47  | M10NNUT     | M10 NYLOC NUT HT ZP               | 6    |
| 48  | M8X20       | M8 X 20 SET SCREW HT ZP           | 4    |
| 49  | M8FWASHER   | M8 FLAT WASHER ZP                 | 4    |
| 50  | M8SWASHER   | M8 SPRING WASHER ZP               | 4    |

# SECTION 10

## ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

SLIMLINE 2000 (FRP) / 920DSV

The fibreglass (FRP) drawing is unavailable at the time of publication. If required, check the Croplands website for an updated file or contact Croplands (New Zealand) customer support.

### NOTE

Drawings are for illustration purpose only - refer to sprayer for actual plumbing. Parts listed are indicative of the sprayer type.

Items in italics or without a part number are non stocked items and may need to be specially ordered.

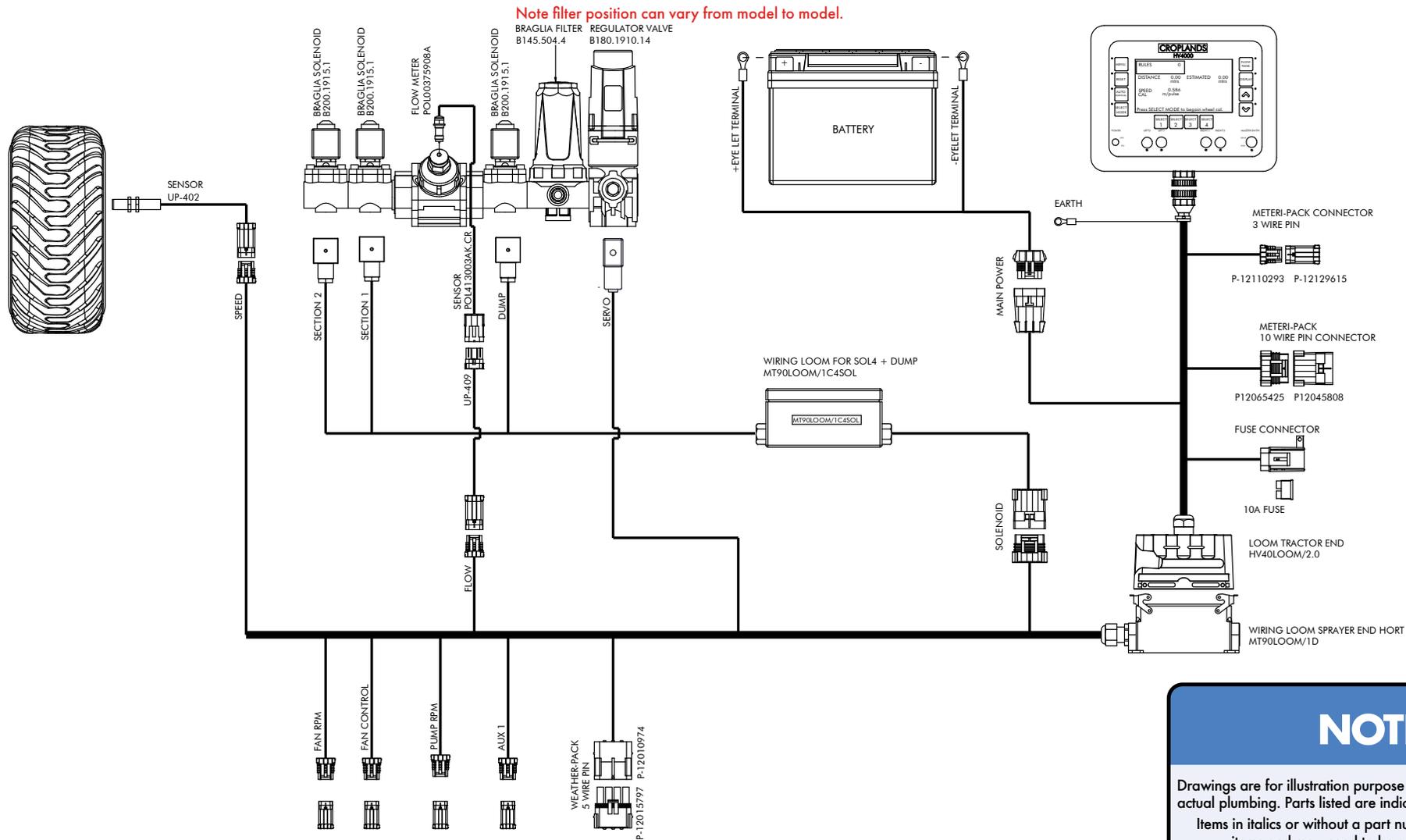
For further parts information refer to: [www.croplands.com.au](http://www.croplands.com.au)



# SECTION 10

## ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

### SLIMLINE ELECTRICAL / CONTROLLER - HV4000



## NOTE

Drawings are for illustration purpose only - refer to sprayer for actual plumbing. Parts listed are indicative of the sprayer type.

Items in *italics* or without a part number are non stocked items and may need to be specially ordered.

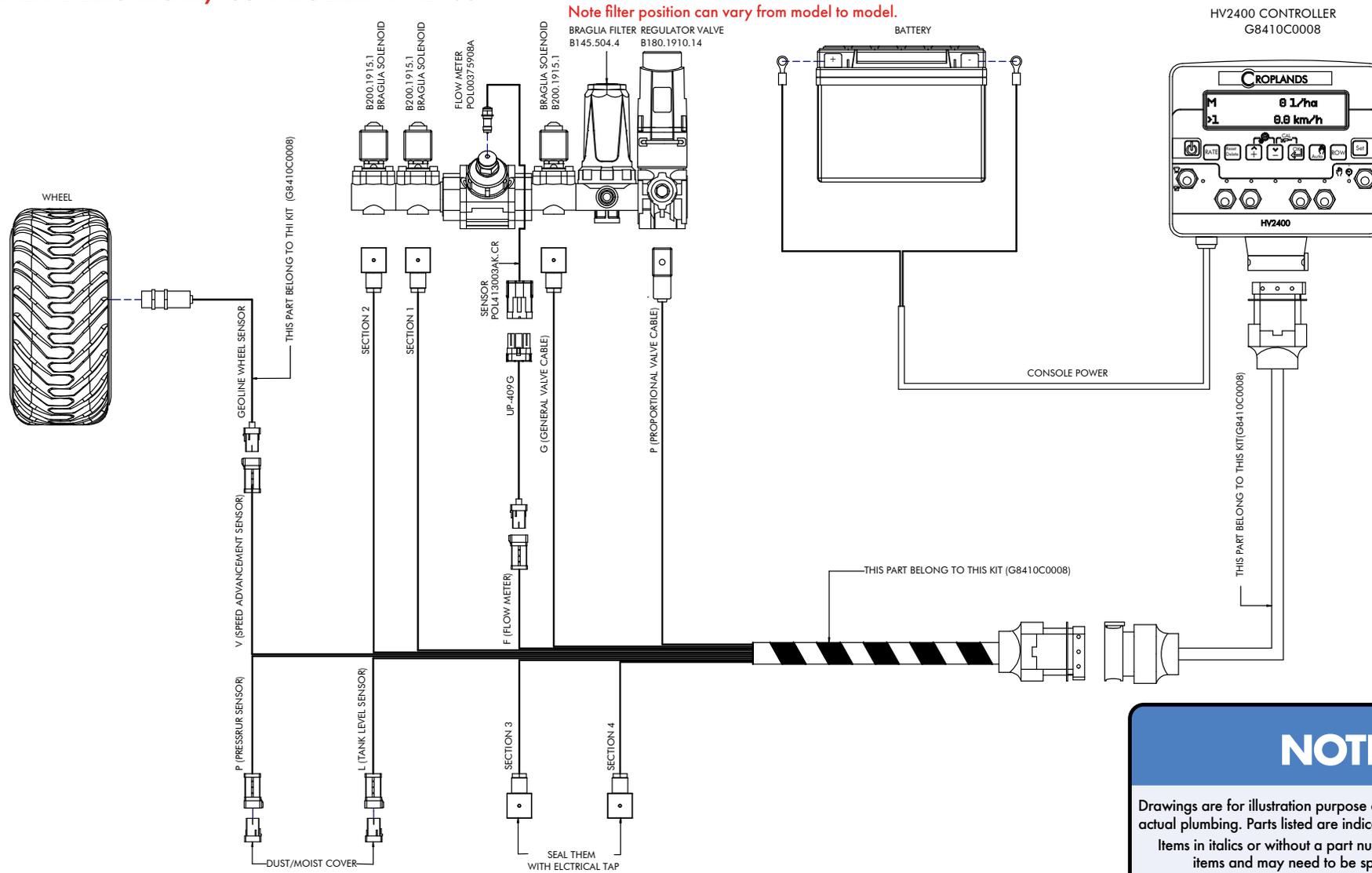
For further parts information refer to: [www.croplands.com.au](http://www.croplands.com.au)



# SECTION 10

## ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

### SLIMLINE ELECTRICAL / CONTROLLER - HV2400



**NOTE**

Drawings are for illustration purpose only - refer to sprayer for actual plumbing. Parts listed are indicative of the sprayer type.

Items in *italics* or without a part number are non stocked items and may need to be specially ordered.

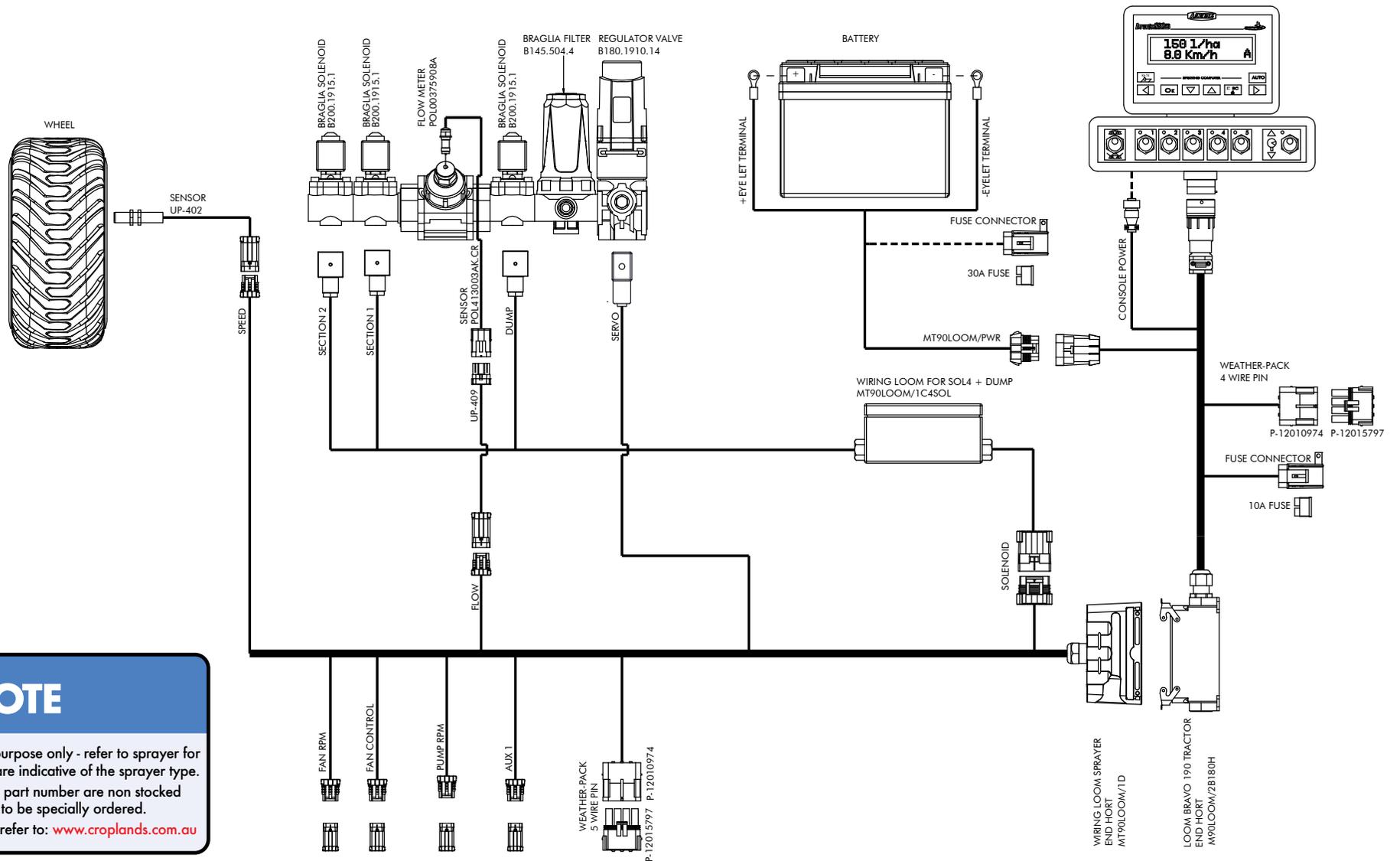
For further parts information refer to: [www.croplands.com.au](http://www.croplands.com.au)

Please contact Technical support for further details

# SECTION 10

## ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

### SLIMLINE ELECTRICAL / CONTROLLER - BRAVO 180S



### NOTE

Drawings are for illustration purpose only - refer to sprayer for actual plumbing. Parts listed are indicative of the sprayer type.

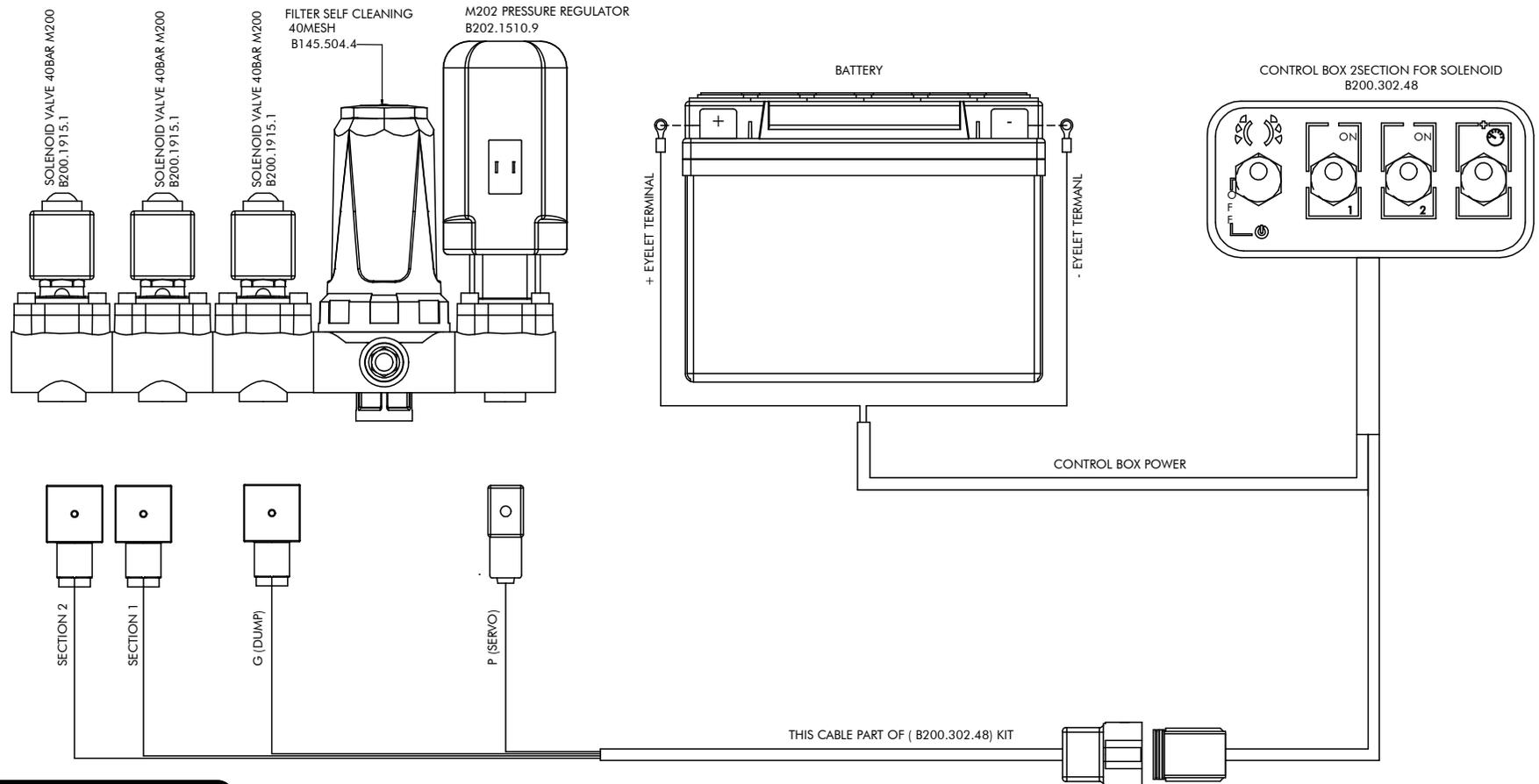
Items in *italics> or without a part number are non stocked items and may need to be specially ordered.*

For further parts information refer to: [www.croplands.com.au](http://www.croplands.com.au)

# SECTION 10

## ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

### SLIMLINE ELECTRICAL / CONTROLLER - BRAGLIA



## NOTE

Drawings are for illustration purpose only - refer to sprayer for actual plumbing. Parts listed are indicative of the sprayer type.

Items in *italics* or without a part number are non stocked items and may need to be specially ordered.

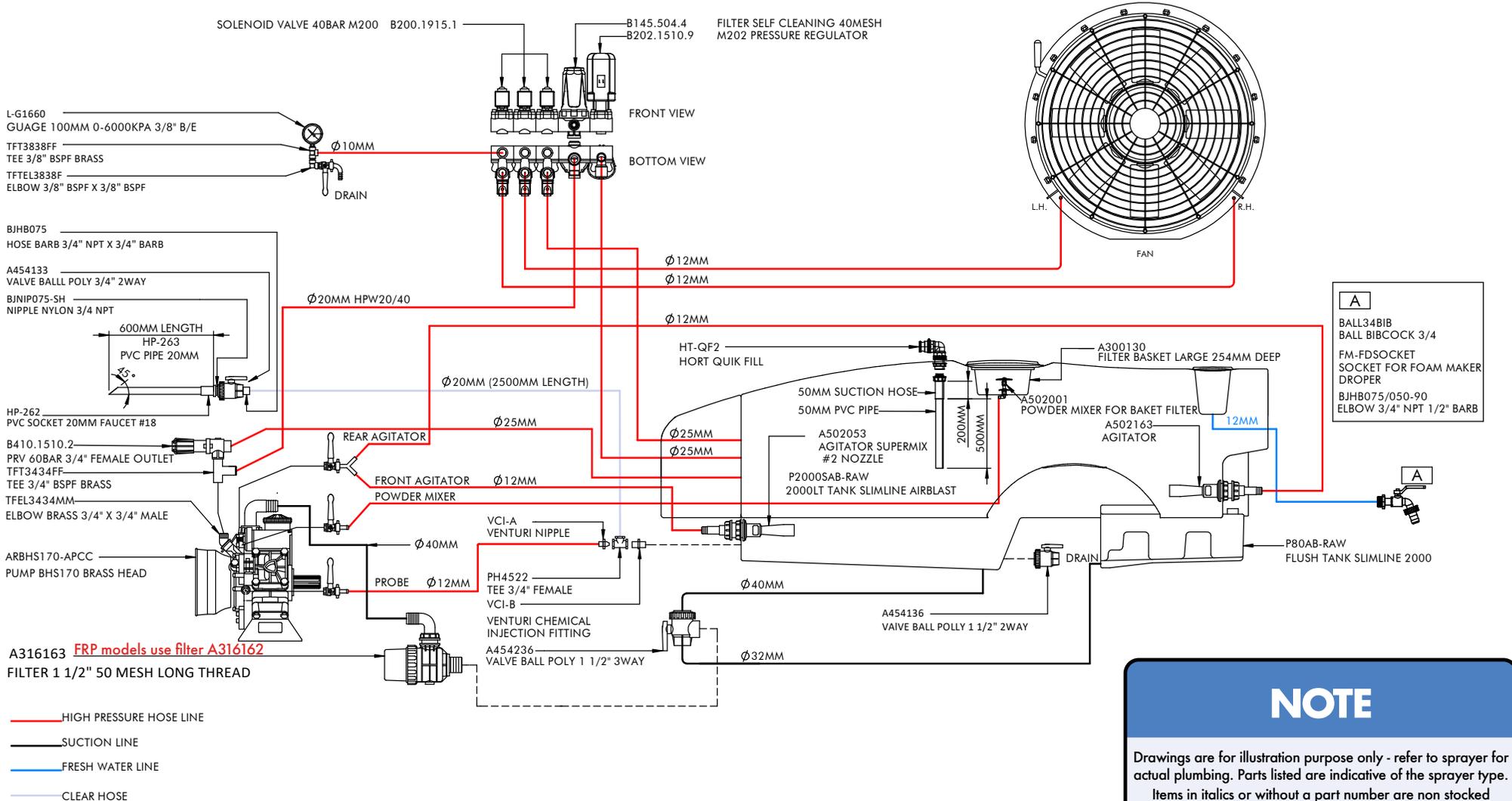
For further parts information refer to: [www.croplands.com.au](http://www.croplands.com.au)

Please contact Technical support for further details

# SECTION 10

## ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

### SLIMLINE 2000 PLUMBING SYSTEM - I-S4021 CONTROLLER



# SECTION 10

## ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

### PTO SHAFT OPTIONS

| MODEL                       | PTO SHAFT, TRACTOR TO PUMP   | PUMP                    | THROUGH SHAFT,<br>PUMP TO FAN | FAN SIZE      |
|-----------------------------|--|-------------------------|-------------------------------|---------------|
| <b>SLIMLINE 2000 (POLY)</b> | SH6AG-1200<br> | AR 170 BHS / AR 200 BHS | SHABTT2000ABA                 | FIENI 920 DSV |
| <b>SLIMLINE 2000 (FRP)</b>  | SHCV<br>       | AR 170 BHS / AR 200 BHS | SHABTT2000                    | FIENI 920 LT  |

### NOTE

Drawings are for illustration purpose only - refer to sprayer for actual plumbing. Parts listed are indicative of the sprayer type.

Items in italics or without a part number are non stocked items and may need to be specially ordered.

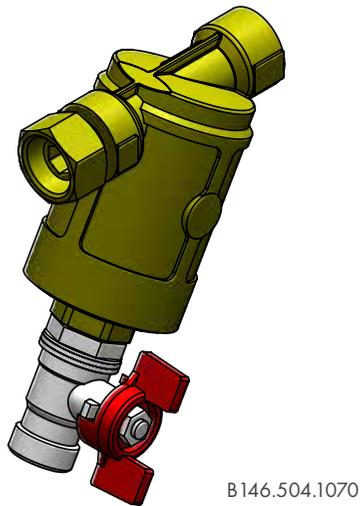
For further parts information refer to: [www.croplands.com.au](http://www.croplands.com.au)

Please contact Technical support for further details

# SECTION 10

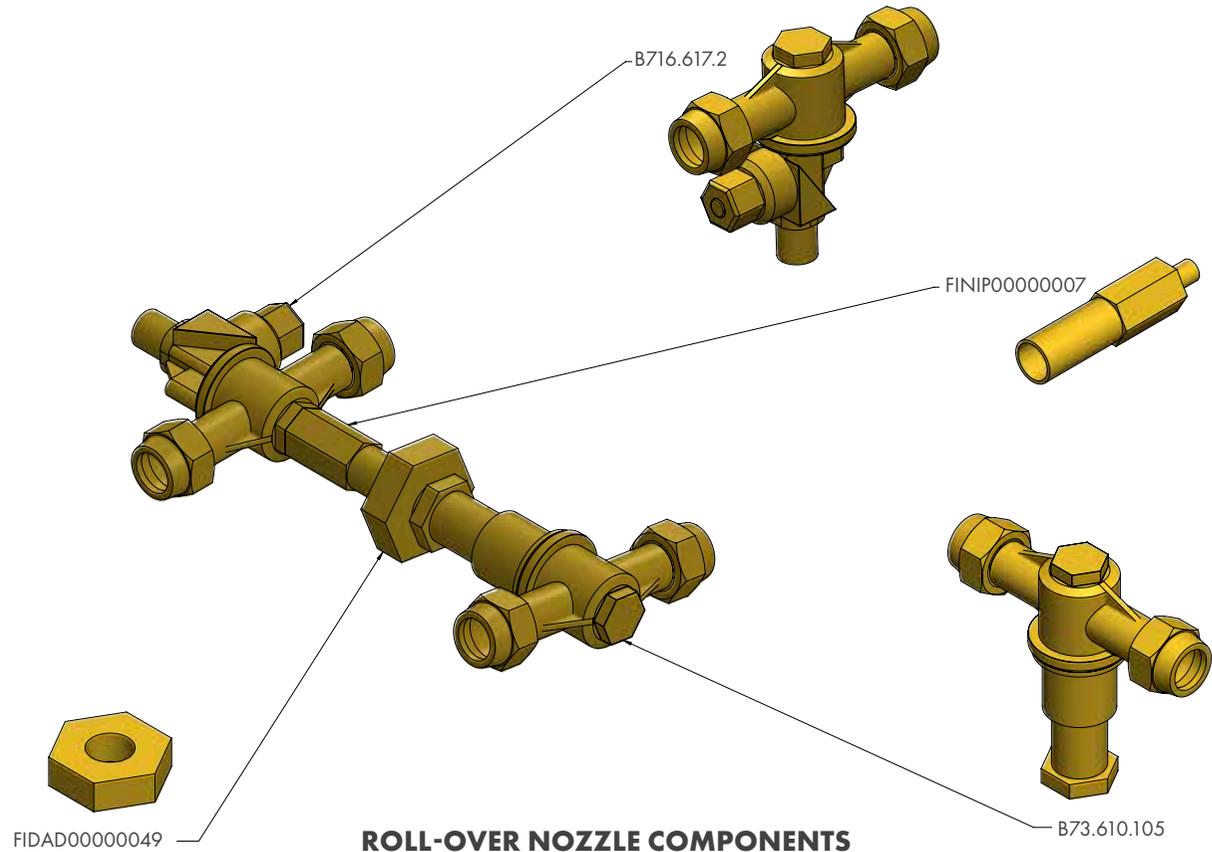
## ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

### MISCELLANEOUS



FRP model uses B 146.504.10

### IN-LINE PRESSURE FILTER



### ROLL-OVER NOZZLE COMPONENTS

## NOTE

Drawings are for illustration purpose only - refer to sprayer for actual plumbing. Parts listed are indicative of the sprayer type.

Items in italics or without a part number are non stocked items and may need to be specially ordered.

For further parts information refer to: [www.croplands.com.au](http://www.croplands.com.au)

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# SECTION 12

## HYBRID SLIMLINE, KIWILINER & AVOLINER SPRAYERS (NZ ONLY)

### HYBRID SLIMLINE 2000

Slimline sprayer with dual QM-500 fans on a single pole tower combining the best of Fieni and Quantum Mist technologies to access higher canopies.

Contact the New Zealand customer support team for further information.



### KIWILINER 2000

Low slung 2000 Lt poly tank combined with a front entry Fieni 820mm fan makes a fantastic Kiwi fruit sprayer.

Contact the New Zealand customer support team for further information.



### AVOLINER 2000

Low slung 2000 Lt poly tank combined with a Fieni 920 DCV fan makes a great sprayer in dense Avocado orchards.

Contact the New Zealand customer support team for further information.





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Your nearest Croplands Dealer  
can be found in the dealer section  
on the Croplands website