

CROPLANDS

OPERATORS MANUAL
ORCHARD
4000

WWW.CROPLANDS.COM.AU

STOP

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



INTRODUCTION

GENERAL MANAGER'S WELCOME



A handwritten signature in black ink, appearing to read 'S. Mulvaney', written in a cursive style.

Sean Mulvaney
General Manager

Dear Customer

Congratulations on the purchase of your new Croplands Sprayer. Croplands have been in the business of building sprayer equipment since 1972. For over 50 years we have been supplying sprayers to farmers, contractors, growers and all our customers involved in growing crops and in the control of pests and diseases.

Croplands is a wholly owned subsidiary of Nufarm Ltd, the largest supplier of crop protection chemicals for Australasia, and one of the fastest growing global suppliers world-wide.

At Croplands, we pride ourselves on our commitment to supplying machinery that is at the forefront of the industry's needs. We believe we can back up our products and through

constant research and development, bring to you the best equipment you can find.

We welcome any feedback from you about our equipment.

On the back cover you will find our contact details, and locations where our staff can be reached during business hours. After hours, you can email us and expect a reply the following morning.

Please read this manual in its entirety before you operate your sprayer. This will ensure you have a trouble free start up.

We trust you will get years of good use from your Croplands Sprayer.

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 Orchard herbicide sprayer in both Standard (WEED-IT ready) and WEED-IT versions.

In addition to this manual, the sprayer will be delivered with the General Safety Manual (GP-SAFE-A) and where applicable the Controller Manual. For details not covered by the manuals, please contact Technical Support on 1300 650 724.

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-OMORCH-B, was first published in May 2023.

Check online as there may be more recent revisions of this manual. www.croplands.com.au

NOTE

To convey useful operating information.

WARNING

To stress potential dangers and the importance of personal safety.

TERMINOLOGY

These terms/symbols used throughout this manual:



NOTE	This Note sign is in place to convey useful information and will help you to identify the best possible way to operate the machine.
CAUTION	This Caution sign shows the potential for incident. An incident may include damage to the machine itself, or possible injury to the operator.
WARNING	This Warning sign shows the potential for risk or injury and highlights the need for steps to be taken to protect ones safety.
DANGER	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.

CAUTION

To highlight potential injury or machinery damage.

DANGER

Probability of death or serious injury if an accident occurs

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 Pumps and PTO etc.

And properly understand:

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

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.

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.



GP-WARH-B

INCLUDES SAFETY INDUCTION

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 Website, 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 - 125V



Part No: XD - 126V



Part No: XD - 176



Part No: XD - 182



Part No: XD-199A



Part No: XD-190



Part No: XD - 175



Part No: XD - 116V



Part No: XD - 127V



Part No: XD - 124V

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.



Spray Rate Controller serial plate



Pump serial number plate



Note serial number plate in the above image.

SHIPPING INFORMATION

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



WEIGHTS

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

Weights, in spray mode, (approximate), kg.

Empty tank, drawbar weight	tba
Empty tank, axle weight	tba
Full tank, drawbar weight	tba
Full tank, axle weight	tba

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.

Tractor hydraulics required = minimum of 30 Lt/min.

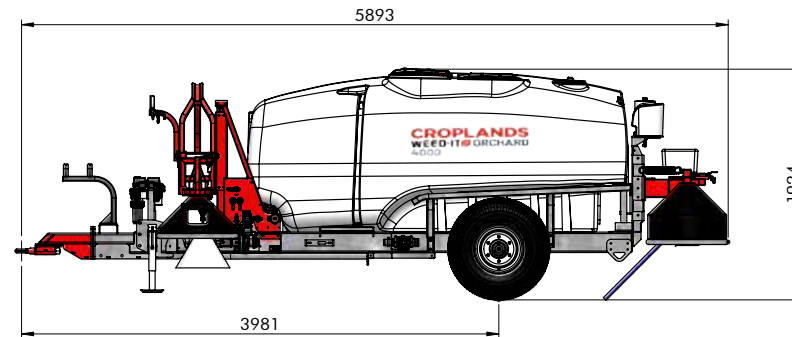
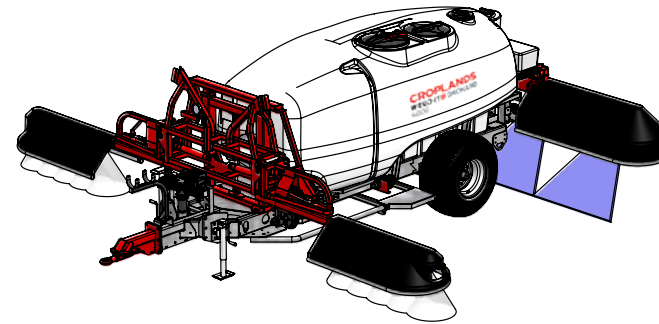
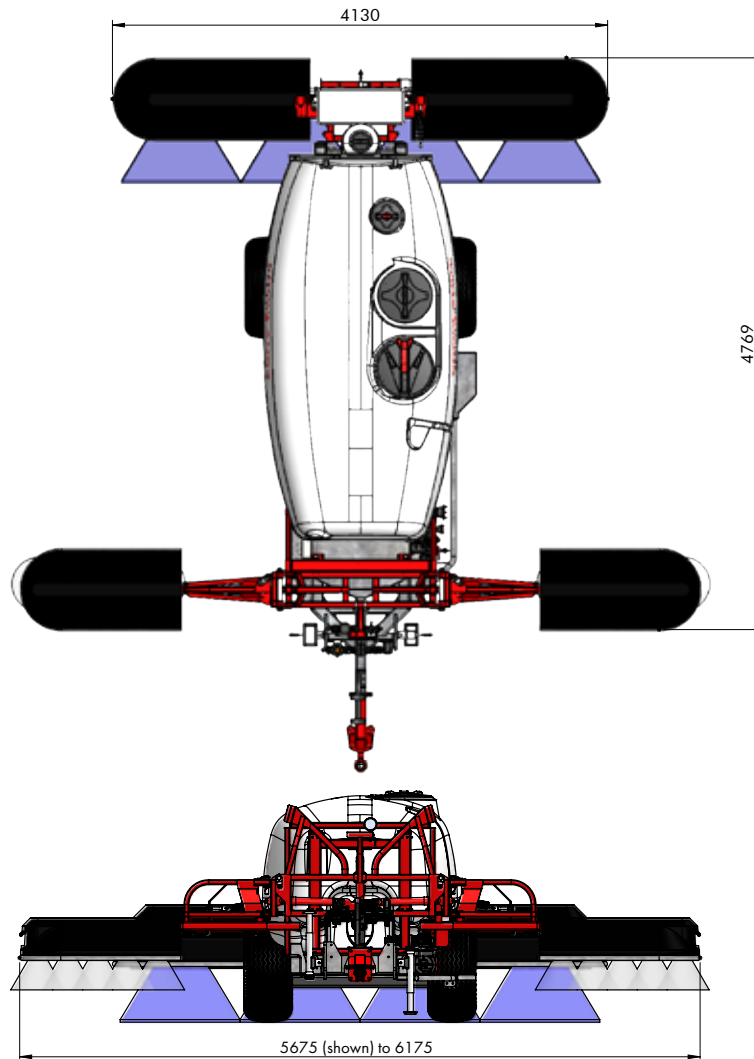
SECTION 3

PRODUCT IDENTIFICATION, SHIPPING & SPECIFICATION

Machine specifications are subject to change without prior notification.

DIMENSIONS ORCHARD 4000 (BOOMS OPEN)

Front boom lift in lowest position



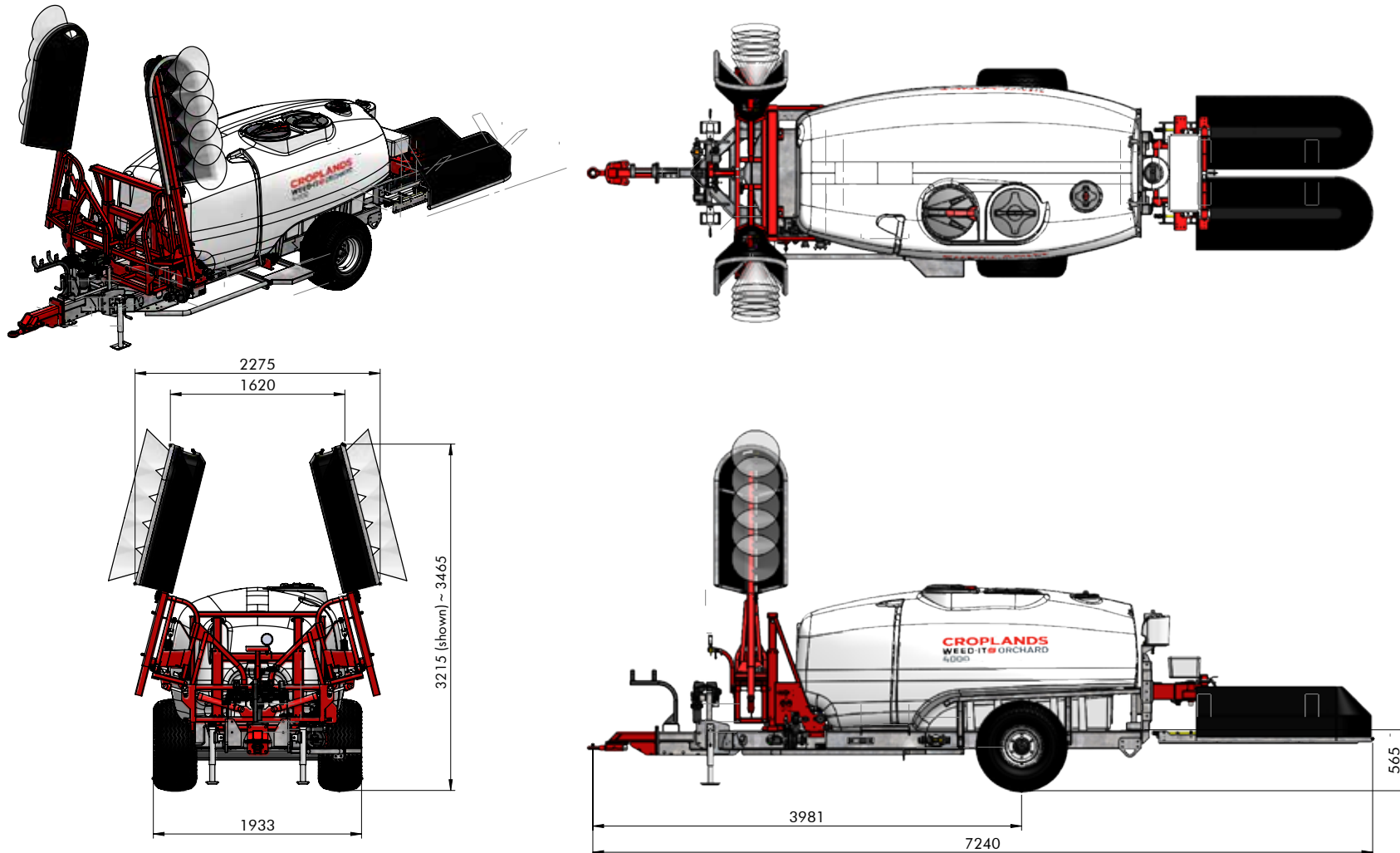
SECTION 3

PRODUCT IDENTIFICATION, SHIPPING & SPECIFICATION

Machine specifications are subject to change without prior notification.

ORCHARD 4000 (BOOMS PARKED)

Front boom lift in lowest position



SECTION 3

PRODUCT IDENTIFICATION, SHIPPING & SPECIFICATION

Machine specifications are subject to change without prior notification.



Tanks (sight gauges / sump / drain)

All tanks are constructed of impact-resistant polyethylene and UV stabilized.

Main tank capacity is 4000+ litres and features....

- Flip open filling lid with large basket strainer.
- Quick fill system (camlock direct fill).
- Calibrated sight tube for filling level indication.
- Drain completely via a large drain valve and sump.

No Flushing tank is fitted.

All models are supplied with a 15 Lt Hand-wash / freshwater tank with conveniently positioned tap.

Chassis & drawbar

Hot-dipped galvanised full-length, heavy-duty chassis with adjustable tow hitch. Fixed step & jockey stand.

Axle

Fitted with a single fixed axle as standard.

Wheels & Tyres

400 x 15.5" flotation tyres are fitted as standard on 3,000 & 4000 Litre models.

BOOMS

The Front boom incorporates hydraulic left and right folding, shrouded boom arms. Each boom arm has a spring loaded breakaway function.

The (front) centre section (without spray nozzles) has a hydraulic lift range of 250mm.

The left and right rear boom arms are mounted to a fixed centre section at the rear of the sprayer. Each arm uses shear pin breakaway protection or can be folded rearwards for shipping / transport (as per below).

Boom folding and lift functions are controlled via a hydraulic switch box.



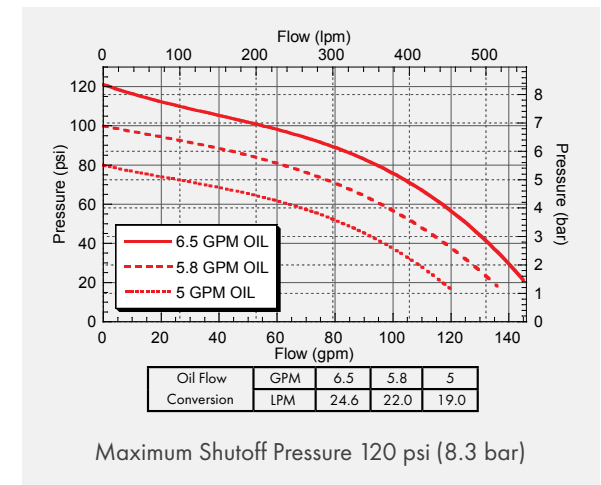
PUMP

ACE centrifugal pump, part no. ACE48926 - model FMSCS-155FS-HYD-206.

Refer to the supplied pump manual for more detailed information.



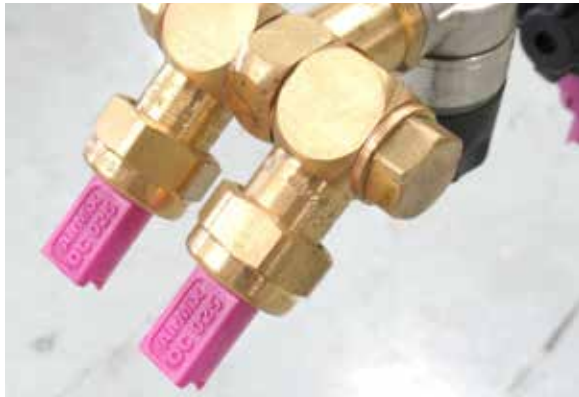
Performance Chart



SECTION 3

PRODUCT IDENTIFICATION, SHIPPING & SPECIFICATION

Machine specifications are subject to change without prior notification.



Nozzles

Supplied standard with 1/2" stainless steel boom tubes, fitted with non-drip, quick-release single nozzle bodies every 50cm in the rear / centre row boom and 25cm spacing on the under row booms.

Twin OC nozzles (with on-off tap) for fenceline spraying (front boom only).

Customer nozzle choice will vary depending on operational requirements (refer Section 7).

Agitation

The agitation system is driven by the pump via a single supra-flow venturi tank agitator & bypass agitation.

Filtration

The main tank lid is supplied with a basket strainer. Note there is no basket rinse function.

The pressure / spray line is fitted with a self cleaning filter.

Note there is no filter on the fill or suction lines.

Operator Control Panel

The Fill, Probe, Agitation, Pump pressure gauge, WEED-IT tap and Hand wash tap are mounted to a compact control panel on the left hand side of the sprayer.



Tank Filling

Fill via Camlock quick fill system (connection point **circled in yellow**).

Drain tap via the main tank (suction) ball valve.

Chemical induction probe, (connection **circled in blue**)



Toolbox

A toolbox is fitted to the rear of each sprayer. An ideal position for storing the shear pins and U-bolts for rear boom parking, personal protection equipment etc.



SECTION 3

PRODUCT IDENTIFICATION, SHIPPING & SPECIFICATION

Machine specifications are subject to change without prior notification.

Controls

Bravo 180S auto-rate controller, 3-section - Left, Centre and Right. Note fenceline nozzles are manual taps.



5-section version shown.

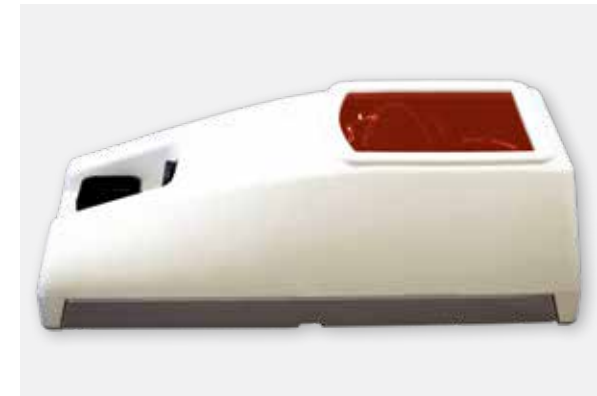
Hydraulic switch-box to control all boom functions plus SPRAY pump ON & OFF



Speed Sensors

GPS (Arag Atlas) or wheel proximity sensors are used for (travel) speed.

WEED-IT equipped models require dual speed sensors.



WEED-IT

The WEED-IT version of the sprayer uses 4 x WEED-IT optical sensors, and separate spray rails mounted into the rear boom.

Refer to Section 8 for the WEED-IT operation

SECTION 4

PRODUCT FEATURES / FAMILIARISATION

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SECTION 4

PRODUCT FEATURES / FAMILIARISATION

CHASSIS, DRAWBAR, BOOM, WHEEL ETC

Chassis

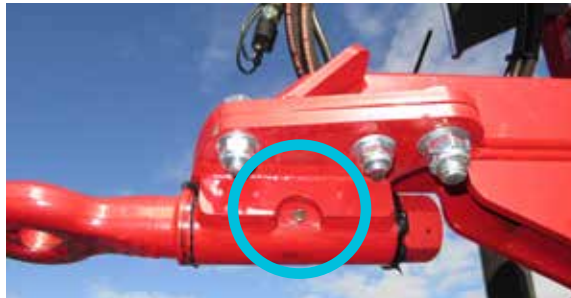
Hot-dipped galvanised full-length, heavy-duty chassis with fixed step, bolt on hitch swivel & dual jacking stands.



Drawbar & Safety Chain

The drawbar uses a bolt-on 45mm swivel tow eye. The drawbar pin should not be less than 33mm diameter.

Note the greasing nipple (blue circle).



Each unit is shipped with safety chain + shackles - note the sprayers shackle connection point (purple circle).

Jockey stands

Shown below is the left-hand height adjustable Jacking Stand in the deployed / vertical position. Suitable for empty storage of the sprayer.

Both the left and right hand stands must be stowed in the horizontal position, or removed after the empty sprayer is hitched to the tow vehicle.



SECTION 4

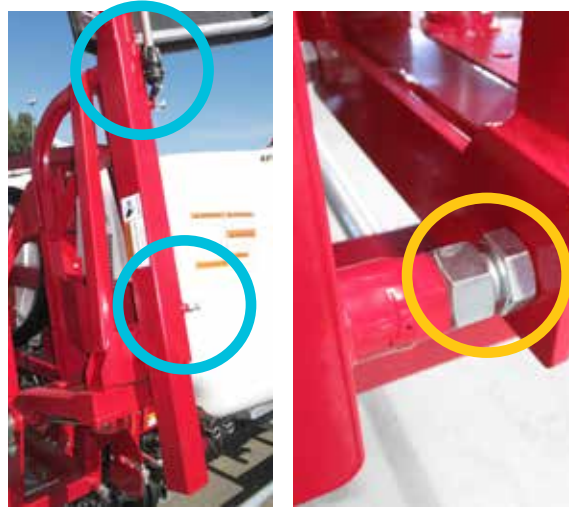
PRODUCT FEATURES / FAMILIARISATION

FRONT / UNDER TREE BOOMS

Left and right boom arms, hydraulic folding, front mounted, shrouded, outer row / under tree boom arms are mounted to a common centre section which incorporates a hydraulic lift.



The centre section has a lift range of 250mm. This enables a nozzle height range of 500mm to 750mm above ground.



Manual width adjustment 6,500mm (including spray swath), plus fence-line nozzles. Note the lock bolts used to adjust boom width (**blue circle**), and the adjustment bolts to fine tune the boom horizontal level position (**yellow circle**).

Each boom arm has a spring loaded breakaway function. Adjust the tension to suit the required breakaway properties.



Boom left & right folding and lift functions are actioned via the 3 lower toggle switches of the hydraulic switch box.



SECTION 4

PRODUCT FEATURES / FAMILIARISATION

REAR / MID ROW BOOMS

The rear mounted / mid row, shrouded boom is mounted to the rear of the sprayer chassis - in a fixed height position. Nozzles are 400mm above ground.



Both left and right boom arms can be manually folded to a position trailing behind the sprayer for transport purposes (as per right side of above photo - and per below). Note the U-bolts used to hold the boom in it's folded position.



Shear pin breakaway protection when in the open / spraying position. Use an M6 x 40mm mild steel bolt + nylock nut in one of the two 6mm holes provided.

Remove the shear pin before folding.



Shear pin bolt requires 20mm of plain shank

BOOM SHROUDS

Both front & rear booms are protected with heavy duty moulded polyethylene shrouds.

To aid removal for inspection, the rear boom shrouds are fitted to the frame with M6 x 20 Wing bolts.



SECTION 4

PRODUCT FEATURES / FAMILIARISATION

BOOM NOZZLES

Supplied standard with 1/2" stainless steel boom tubes. Non-drip, quick-release single nozzle bodies with fitted with drift reducing Agrotop AirMix® low pressure air-induction nozzles, 110°.

Nozzles every 25cm on the front / under row booms and every 50cm in the rear / centre row boom.

Standard nozzle setup is ...

Green (015) @ 250mm spacing for the front / outer row booms plus twin Lilac (025) OC nozzles for fence-line spraying (with on-off tap).

Lilac (025) @ 500mm spacing for the rear / centre row boom.

Note; customer nozzle choice will vary depending on operational requirements (refer Section 7).

Refer to Section 8 for WEEDit nozzle configuration.



SECTION 4

PRODUCT FEATURES / FAMILIARISATION

Axle, Wheel & Tyre

Robust, bolt on, heavy duty fixed axle.

HP-202GA, 400 x 15.5 flotation wheel & tyre.

Standard tyre for 3000 / 4000 Lt models

HP-202GA, (400 x 15.5")

Rolling dia = 850mm

Width = 400mm



Wheel Speed Sensor

A proximity Speed Sensor is installed on the right-hand 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.



WEEDit Speed Sensor

Note sprayers equipped with the WEEDit system require a second speed sensor (to the same RH wheel) and a 12 slot speed ring.

Step / Lid Access

The step is incorporated into the ball valve & tyre protection structure at the bottom left-hand side of the sprayer. This step should not be used for anything other than general observation of the sprayer. Do not lift loads onto or via this step.

For access to lids or any other 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.



Access to the top of a spray tank is best effected by using a purpose built platform.

SECTION 4

PRODUCT FEATURES / FAMILIARISATION

TANKS, LIDS & FILL

4000+ Lt Main Tank

This sprayer is fitted with an unencumbered version of the "standard" Croplands 4000 XL tank.

The main tank has a two, calibrated level indication sight gauge tubes with floats. Do not overfill.



There are 3 lids to the top of the sprayer - with a filter basket fitted to the forward most lid.

Do not use these lids as a fill point unless the operator has a purpose-built platform to allow safe access to the lid (refer previous page).



Bottom Fill is via a 2" camlock fitting from an external water (and / or chemical source). Shown below with camlock connected to the water source and ball valve (blue handle) turned on. Note there is a one way valve to prevent flow back to the operator. Water supply must be filtered.



The main tank valve / drain is positioned near the step on the left-hand side of the sprayer.

The main ball valve has 3 positions. Always check this position before proceeding with filling, spraying, flushing or draining. The yellow handle has a "FLOW arrow".

Left	to the Pump / spraying
Up (or down)	OFF
Right	Drain



Please dispose of any chemical in a safe and environmentally responsible manner.

SECTION 4

PRODUCT FEATURES / FAMILIARISATION

Freshwater / hand wash tank

A 15 Lt freshwater / hand-wash tank is fitted to the rear of the sprayer. This tank supplies 2 x hand-wash taps (a) at the control panel and (b) at the rear, adjacent the toolbox (see next page).

Filling of the fresh water / hand-wash tank should ideally be via a separate / clean water source.

Always keep the area surrounding the hand-wash tanks clean and clear of chemical.

The rear hand-wash tank is labeled as WATER ONLY. Replacement labels are available under the part no. XD-127V.



The rear hand-wash taps is labeled as WATER FOR OPERATOR WASHING ONLY. Replacement labels are available under the part no. XD-124V.



Toolbox

Note the toolbox at the rear of the sprayer. Handy for storage of gloves, boom shear bolts, tools etc.

Circled in BLUE is the position of the rear freshwater tap.



SECTION 4

PRODUCT FEATURES / FAMILIARISATION

HYDRAULICS

A single set of hydraulic hoses are used for all (closed centre) hydraulic functions

The hydraulic pressure line is identified with a double red band (green arrow).

ALWAYS double check the return line is properly connected before engaging the hydraulics.



Hydraulic functions include :

- Spray Pump
- Boom Height
- Boom Left Arm
- Boom Right Arm

Note hydraulic priority is given to the centrifugal pump.



The hydraulics system utilizes a bank of CETOP valves. **Circled in BLUE** is a needle valve - this should be left in the fully open position - flow adjustment should be at the tractor.

Circled in YELLOW is the pump on / off solenoid.

Circled in PURPLE are over-run and reverse flow check valves connected to the centrifugal pump.

All functions are activated by the hydraulic switch box.




SECTION 4

PRODUCT FEATURES / FAMILIARISATION

PUMP

ACE centrifugal pump, part no. ACE48926 - model FM CSC-155FS-HYD-206. Each pump is fitted with a serial number plate (refer page 8).

Refer to the supplied pump manual for more detailed information.



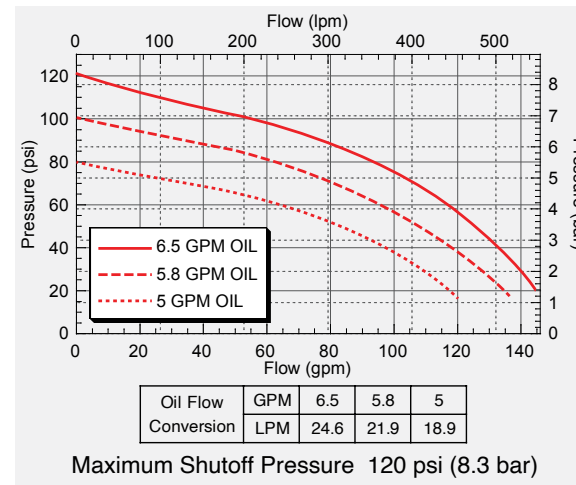
High Performance Hydraulic Motor Driven Centrifugal Pump
FM CSC-155FS-HYD-206



The pump is activated via the switch box.



Performance Chart



RATE CONTROLLER

Bravo 180S automatic rate controller

Comes with an operator's manual on CD.

Requires a reliable 12V power supply.

3-section control. Note 5 sections shown below.

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

L/ha or L/100 metre capability.

Refer to Sections 5 and 6 re using this controller.



SECTION 4

PRODUCT FEATURES / FAMILIARISATION

SPRAY SYSTEM OVERVIEW

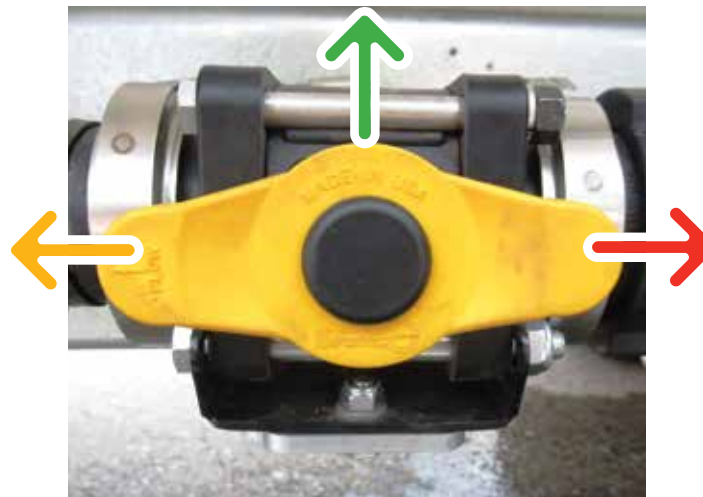
- A. Always ensure the Hand-wash tank is filled with fresh-water before any other actions.
- B. Fill the Main tank - preferably via the camlock fitting (refer page xx). See Spray Operations (Section 6) re adding chemical.
 - Make sure the drain tap is closed before filling.
 - Always wear safety gloves.



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

- C. MAIN TANK BALL VALVE
The main ball valve / selection valve, adjacent the step on the left hand side, has 3 positions. Always check this position before proceeding with filling, spraying, flushing or draining. The yellow handle has a "FLOW arrow".

Left	From the selection valve (C) via the centrifugal PUMP (D)
Up (or down)	OFF
Right	Drain



Note; the pump's hydraulic drive is activated via the hydraulic function switch-box.

Pump output is routed through the chassis to the PRESSURE MANIFOLD, input at the pressure regulator (E).



SECTION 4

PRODUCT FEATURES / FAMILIARISATION

E. The Manual Pressure Regulator (PRV) sets the maximum pressure (usually 1.5 to 2 bar above the desired spray pressure). Excess pressure (flow) returns to tank and aids agitation.

Flow from the manual PRV continues via the 80 mesh Filter (F) and onto the electric pressure regulating (7 second servo) valve (H).

Between the filter and servo valve is the line (G) to the WEEDit ready ball valve.

A hose from the servo crosses back to the right hand side connecting to the flow meter (i) (**green arrow**), with the flow terminating at the 3 section valves (J) for Right boom, Centre (rear) boom and Left boom.

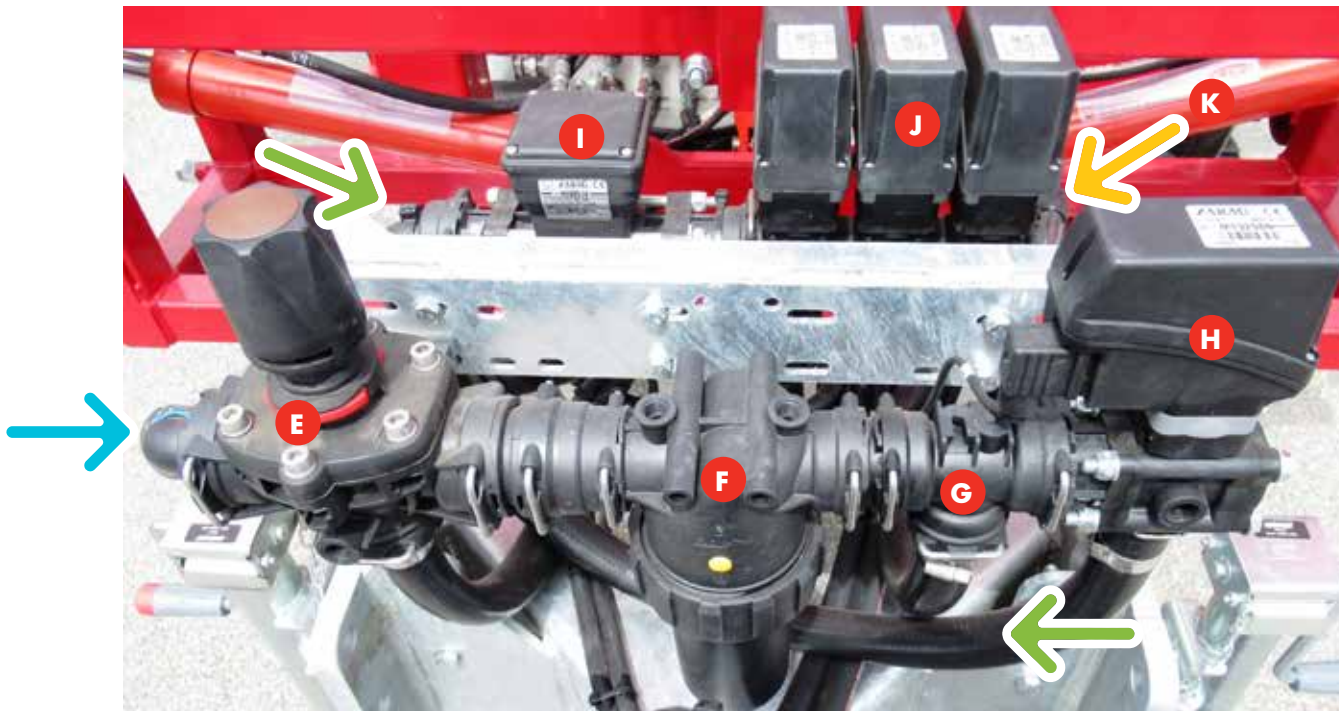
To summarise the spray system;

1. Pump (B) supplies the manual PRV (E)
2. Flow is filtered (F)
3. Flow is Tee'd off (G) to the WEEDit system

4. Spray pressure is controlled via the electric pressure regulator (servo) valve (H)
5. Flow rate is metered (i)
6. Section controls (J), for Left, Centre & Right.

Refer Spray Operations (Section 5) for detailed instruction on setting the pressure - note that pump speed is also has an effect on setting pressure.

The probe and agitator functions are connected to a separate pressure line (refer next page).



SECTION 4

PRODUCT FEATURES / FAMILIARISATION

K; the spray system **Pressure gauge** is connected to the spray manifold. "Normal" range of pressures between 2.5 ~ 5 Bar), with 3 Bar for WEEDit.

The gauge tap (**yellow arrow**) 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 the system.



Filter

The spray / pressure manifold incorporates a single line filter which **MUST** be cleaned regularly. Clean at least daily or more often if the water source isn't clean. Best practice is to clean at every tank load.

Wear safety gloves when inspecting, cleaning or replacing the filter(s).



AGITATION & PROBE

The agitator and probe functions are connected to an independent (of spraying) pressure line.

Agitator

The tank uses a single rear agitator, activated from the control panel.

Shown below in the ON position.

Some degree of agitation is also created by the bypass flow from the manual PRV, (E).



SECTION 4

PRODUCT FEATURES / FAMILIARISATION



Connection to rear agitator shown below.



Probe

The probe is used to add chemical to the tank from a drum, bucket, etc.

Requires the pump to be operating.

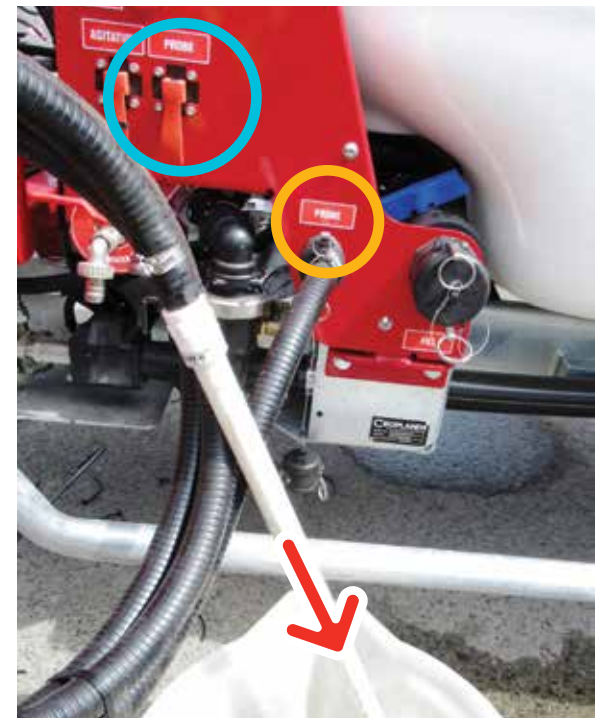
The system is activated via the red tap valve (blue circle)

The supplied probe is camlock fitted to the panel (orange circle) with the probe tube submerged into the chemical source (red arrow).

All flow goes to the main tank.

Refer Spray Operations (Section x) re adding chemical via the probe.

Wear appropriate PPE (safety gloves as a minimum) when handling the probe.



SECTION 4

PRODUCT FEATURES / FAMILIARISATION

WEEDit Panel

All Orchard sprayers come supplied with a "WEEDit" ready control panel.

If the sprayer is not equipped with WEEDit optical sensors, leave the ball valve in the OFF position.

For sprayers equipped with WEEDit sensors, set the ball valve to WEEDit.

Never leave it in the mid position as shown below.



SPRAY CONTROLLER

Arag Bravo 180S automatic rate controller, 3-section controls, (left/centre/right).

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

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

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

Refer to manual Section 5 & 6 for spray operations.

Note this is a 5 section controller shown. Sections 1 & 5 are not used when only using 3 sections.





SECTION 5

HOOK-UP & PREPARE TO SPRAY

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SECTION 5

HOOK-UP & PREPARE TO SPRAY

From arrival on farm, hook up 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. Also refer to page 8 re specifications.



HOOK UP

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

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

1. Determine the correct hitch etc
2. Connect to the tractor
3. Add safety chains
4. Once the sprayer is connected to the tractor always ensure the park stands are removed or (if applicable) folded to the horizontal position before moving.
5. Connect hydraulics
6. Connect controller(s), power looms and all other relevant connections to the tractor



1. Hitch type

The Orchard sprayer can be connected to a conventional tractor drawbar, or a purpose built vehicle such as the Flory Shuttle Truk.

This manual is refers to the conventional tractor configuration.



SECTION 5

HOOK-UP & PREPARE TO SPRAY

2. Connect to tractor

To connect a conventional tractor drawbar.

The drawbar uses a bolt-on 45mm swivel tow eye, hence the drawbar pin should not be less than 33mm diameter.



Note the drawbar pin shown above is too small.

Align drawbars of tractor and the sprayer.

Check the sprayer is level fore and aft. The sprayer should be slightly lower at the front. If not, make the necessary drawbar adjustments to achieve the correct alignment.

Insert & lock the drawbar pin in position ensuring it cannot come out while transporting or operating.

3. Safety Chain

Each unit is shipped with safety chain + shackles - note the sprayers shackle connection point (**purple circle**).

Ideally the chains should cross over (left side of sprayer to right side of the tractor etc).



4. Jacking Leg to Park or Remove

Shown below is the left-hand height adjustable Jacking Stand in the deployed / vertical position.

Both the left and right hand stands must be stowed in the vertical or horizontal position, or removed after the empty sprayer has been hitched to the tow vehicle.



SECTION 5

HOOK-UP & PREPARE TO SPRAY

5. Connect Hydraulics

A single set of hydraulic hoses are used for all (closed centre) hydraulic functions.

The hydraulic pressure line is identified with a double red band, and different sized hoses.

Pressure line	1/2"
Return line	5/8"



Hydraulic functions are;

- Spray Pump
- Boom Height
- Boom Left Arm
- Boom Right Arm

Note hydraulic priority is given to the centrifugal pump. The pump is activated via the Hydraulic switch box.

6. Connect Controllers & Looms

Mount / position the Bravo console and switch box in the tractor cab so that they are;

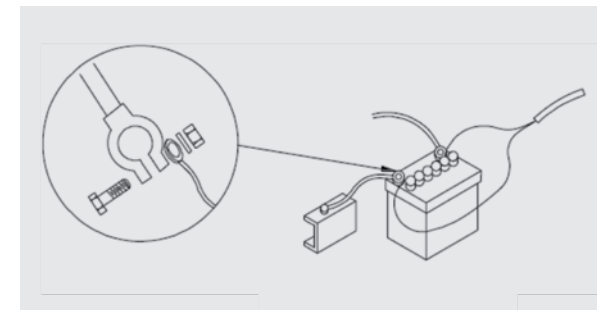
1. Easily-reached for operating.
2. Easily-read.
3. Secure

Connect the circular plug to the rear of the Arag Bravo 180S console.

Connect the rectangular plug to the Switch Box.



Connect both controller and switch box power leads to the tractor battery.



UN-HOOKING is the reverse of the hook-up process. Sprayer should be empty and clean before unhooking. The use of wheel chocks is highly recommended.

Take care to cap / protect all disconnected fittings from dust and water etc.

SECTION 5

HOOK-UP & PREPARE TO SPRAY

FRONT BOOM ADJUSTMENTS

The front boom has the following adjustments;

1. Width
2. Horizontal level
3. Breakaway spring tension
4. Height

Once set the boom will only need adjustment for specific changes in the spraying environment or application.

1. Width

Each boom arm has approximately 300mm of row width adjustment. Usually supplied in the narrowest position for ease of transport.



Note the 2 lock bolts used to set the boom width position. Shown here in the vertical parked position - adjustments should only be made when in the horizontal position.



2. Horizontal level

A pair of adjustment bolts (blue circles) are used to fine tune the boom arm horizontal level position.



3. Breakaway Spring Tension

The force required to activate the boom arm breakaway function can be adjusted via the adjustment bolt (green circle).



SECTION 5

HOOK-UP & PREPARE TO SPRAY

4. Front boom height

The front boom centre section has a single hydraulic cylinder lift range of 250mm. This enables a nozzle height range of 500mm to 750mm above ground.

Shown below in the lowest / parked position.



The boom slides (circled above) on each side of the lift are low friction UHMW pads.

REAR BOOM ADJUSTMENTS

As delivered, the rear booms are likely to be trailing behind the sprayer in the parked / road transport position. To prepare for spraying

1. Remove the U-bolts holding the boom in the trailing position. Store in the nearby toolbox.
2. Open the boom and install a shear pin (bolt + nylock nut to prevent loss of the pin) into the appropriate set of holes.



Note multiple holes have been provided, with the position shown, and using an M6 x 40 bolt as the preferred option. (also refer page 17).



SECTION 5

HOOK-UP & PREPARE TO SPRAY

CHECK BOOM OPERATION

The following boom functions should be checked and set before proceeding.

- Boom Centre, Height lift
 - Boom Left Arm lift
 - Boom Right Arm lift
1. The hydraulic switch box must be correctly connected to the tractor.
 2. The sprayer hydraulics must be correctly connected to the tractor.
 3. Tractor must be powered-up and hydraulics engaged before the boom functions will operate.
 4. Brakes must be engaged and all bystanders clear of the sprayer before operating the boom.

See yellow box for the relevant switches.

Note; each switch is sprung loaded to a central neutral or off position. To adjust the boom positions up or down requires function switches to be held against the spring until the required movement has been performed. Release back to centre.

When operating for the first time, check that all boom functions are moving in a full and correct manner.

NO NOT activate the pump switch at this time



SECTION 5

HOOK-UP & PREPARE TO SPRAY

CHECK FILL FUNCTION

Main Tank Ball Valve

The main ball valve has 3 positions. Always check this position before proceeding with filling, spraying, flushing or draining. The yellow handle has a "FLOW arrow".

Left	to the Pump / spraying
Up (or down)	OFF
Right	Drain



Fill Main Tank

The main tank has a maximum capacity of 4000+ Litres with fill via the top lid & basket (not recommended unless the work site has a purpose built platform to allow safe access to the lid), or

Do not use the lid as a fill point unless the operator has purpose-built platform to allow safe access to the lid.

Check the main tank ball valve / drain tap is closed / or Spray mode (pointing towards the pump).

Bottom Fill is via a 2" camlock fitting from an external water (and / or chemical source). Shown below left with the fill port capped and the valve turned off. Below right is connected to the water source and turned on. Note there is a one way valve to prevent flow back to the operator. Water supply must be filtered.



SECTION 5

HOOK-UP & PREPARE TO SPRAY

PRE-SPRAY CHECKS

With the hook up and boom set-up completed, the spray functions need to be tested before using the sprayer with chemicals.

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.



Clean the filter before or after running the spray system. Wear GLOVES and appropriate PPE.



With the following tasks completed;

- sprayer hitched
- hydraulics connected
- spray controller connected
- hydraulic switch box connected
- filter checked and clean
- water in the main tank and tractor running at an operational speed

1. Main tank ball valve set to the Pump / Spraying (left)



1

2. Panel's WEEDit Ready valve set to OFF (vertical). Set the Agitator tap valve to ON and the Probe tap valve to OFF.



2

3. Go to the Arag controller, turn on the master on/off switch and all three boom sections. Hold the manual pressure switch up (as shown) for 5 seconds to set maximum pressure with all boom sections spraying. Note the photo is of a 5 section controller (using middle 3 sections).



3

SECTION 5

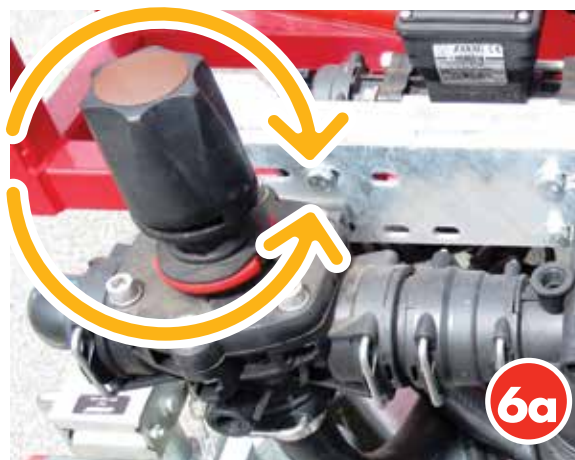
HOOK-UP & PREPARE TO SPRAY



4. Engage the pump, by turning the pump switch to ON (up)
5. Adjust the tractor's oil flow to the sprayer
 - a. until 5 bar pressure is achieved at the pump
(yellow arrow)
 - b. **This assumes the required spray pressure is 3 Bar** (as is the case for WEEDit versions). At this stage the spray pressure gauge will probably be reading between 3 to 5 Bar.



6. Adjust the Spray pressure via the pressure regulator
 - a. whilst monitoring the main pressure gauge
 - b. Set to required pressure – nominally 3 Bar.



- Check that all nozzles are spraying correctly. Clean if required.
- Check for fenceline operation – adjust spray position / turn off or on as required.



- Clean the filter before or after running the spray system.
Wear GLOVES and appropriate PPE.

SECTION 5

HOOK-UP & PREPARE TO SPRAY

CHEMICAL INDUCTION PROBE

Wear **GLOVES** and appropriate **PPE**.

The probe is used to add chemical to the tank from a drum, bucket, etc.

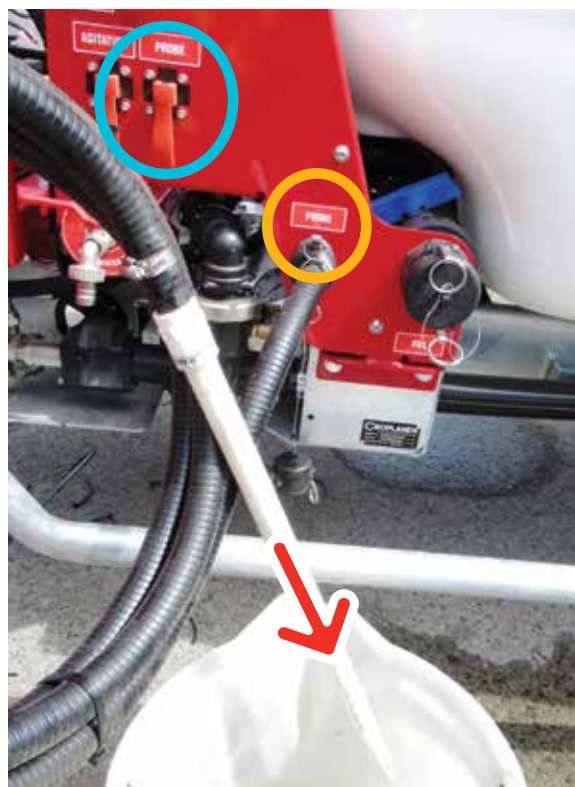
The main tank must have sufficient water to enable the pump's operation for the duration of the probe's use. Note as this is a closed circuit, all water returns to the Main tank.

Set main tank ball valve to the left (pump/spray).

Connect the probe to the camlock fitting, **(purple circle)**.

Place the probe into the source container (use fresh water or dye if checking the functionality).

Engage the pump (assuming sprayer hitched, hydraulics connected, switch box connected, tractor on), by turning the pump switch to ON, refer image below.



With the pump running, engage (lift) the PROBE tap **(blue circle)** whilst making sure the probe is submersed in liquid **(red arrow)**.

Once sufficient chemical has been transferred to the main tank, turn off the red tap valve. Note the photo is in the off position.

The probe should be rinsed by repeating the process with a supply of fresh water. Shut down and disconnect. Re-cap the probe port.

AGITATION

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

Agitation is via ...

1. Bypass flow from the pressure regulating and "dump" valves.
2. Rear venturi type agitator – activated via the red tap valve on the control panel (shown here in the ON position **(Green circle)**).



SECTION 5

HOOK-UP & PREPARE TO SPRAY

DRAIN

Ensure the site for draining, flushing and cleaning the sprayer meets with environmental and statutory regulations. Open main tank drain valve to drain the remaining spray mixture from the tank



FLUSHING

This sprayer is not equipped with an on board flushing tank. Flushing is via fresh water fills & drain, with agitator on and spray system pumping back to tank. Make sure to also flush the spray boom lines and filter.

READY TO SPRAY

Once the pre-operation checks on the preceding pages have been completed, and chemical mixture is in the tank, proceed to spray (use fresh water or dye if checking the functionality).:

- 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 the setup
- Operating speed (often around 6 ~ 8 Kph)
- Application rate (for example 300 L/Hectare).
- The nozzles to be used
- Spray pressures to be used (normally around 3 bar)

To stop spraying at any stage, flick the switches down. The MASTER OFF is on the left hand side.



SECTION 5

HOOK-UP & PREPARE TO SPRAY

GENERAL NOTES ON AUTO-RATE CONTROLLERS

Function of Auto-rate Spray Controllers.

Your Cropliner is fitted with a Bravo 180S controller.



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 bypass valve (usually referred to as the "Servo" valve) to either return 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 its 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, 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 pump 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

SECTION 5

HOOK-UP & PREPARE TO SPRAY

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.

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.

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

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 p.83.



SECTION 5

HOOK-UP & PREPARE TO SPRAY

FINAL CHECKS


Also refer to the Pre-operation checklist at the end of this chapter on page 46.



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 hooked 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. Spray controller correctly connected and powered.
5. Check that all fittings are tight, nothing is loose or damaged. 
6. Double check for loose objects in the vicinity of the sprayer. Ask any onlookers to keep a safe distance away.

7. Check for wear and tear on all chemical and hydraulic hoses and wiring looms.
8. Ensure fill, suction & pressure filters are clean. Be safety aware as some spillage is likely.
9. Ensure the tank drain valve is in the closed position.



10. Add sufficient clean fresh water to all the tanks. Ensure the water level is above agitator in the main tank.
11. Select the spray pump's water source to be the main tank / SPRAY.
12. Turn (flick) the agitator to OFF. This will be checked once the system is pressurised.
13. Ensure all spray function controls are in the OFF / bypass position.

The following picture shows the Bravo 180S controller in "run" mode.

While water is being pumped / sprayed through left, centre, 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. Rectify any problems.

14. Check the operation of AGITATION functions. Leave the agitator ON.
15. On completion of checking the sprayer turn controls off by placing the master switch and boom switches in the off position. Disengage the pump after the spray controls are turned off.
16. Final checks & clean filters.



SECTION 5

HOOK-UP & PREPARE TO SPRAY

SET-UP SPRAY PRESSURE

Croplands recommends setting the maximum system pressure to be 10% above the chosen spray pressure which is normally an extra 1.0 bar.

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

All systems will have a manual adjustable 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 6 bar (4 bar for WEED-IT).

To set PRESSURE:

- 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 auto rate controller is turned ON
- Start the pump (via hydraulic switch box), and dial up (or down) the tractor oil supply until the pump pressure gauge shows between 4 and 5 bar.



- Engage Rear Agitator
- Activate spraying via the auto rate controller with the required spray rates and with all 3 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.
- Once done, leave the manifold setting "as is" until a change of operating pressure is required.

SECTION 5

HOOK-UP & PREPARE TO SPRAY

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 – jacking stands stowed away.
Wheel nuts (M18) checked for correct torque.
<div style="border: 1px solid black; padding: 5px;"> <p>⚠ WARNING Never operate your sprayer with a loose rim, wheel or axle.</p> <p>ENSURE ALL WHEEL NUTS ARE TIGHT BEFORE USE. Anytime wheel nuts are loosened, retighten to specified torque.</p> <p>Failure to do so may result in a serious accident.</p> <p>CROPLANDS</p> </div>
<div style="border: 1px solid black; padding: 5px;"> <p>⚠ WARNING</p> <p>Ensure wheel nuts are tight before every use.</p> <p>Recommended Torque settings:</p> <p>M12 = 100 Nm (73 ft. lbs.)</p> <p>M14 = 166 Nm (122 ft. lbs.)</p> <p>M16 = 235 Nm (173 ft. lbs.)</p> <p>M18 = 344 Nm (253 ft. lbs.)</p> <p>M20 = 504 Nm (372 ft. lbs.)</p> <p>M22 = 600 Nm (442 ft. lbs.)</p> </div>
Check tyre pressures are even from side to side. 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).

Hydraulic hoses are correctly connected. ** double check the return line is properly connected to the tractor - failure connect can lead to catastrophic failure ***
Hydraulic switch box is correctly connected and is operational.
Spray controller correctly connected and operational.
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 pressure filters are clean. Be safety aware as some spillage is likely.
Check that nothing is loose or damaged.
Check the alignment of all boom arms/spray rails etc.
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.

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SECTION 6

SPRAY OPERATIONS

The hook-up, test and familiarisation tasks must be completed before commencing spray-operations.

Also, refer to the familiarisation section, pages 14 ~ 28.

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

The filter should be cleaned regularly, or after each spraying period. Wear protective clothing.

- Always ensure the basket filter is in place if filling the main tank via the lid.
- If the filter screen is damaged, replace it with a new screen.

There are no fill (other than basket) or suction filters, hence it's important that the filling source incorporates a filter.

- Place the Tank 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 when finished.



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.

SECTION 6

SPRAY OPERATIONS

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 preferably

Fill via the separate Camlock fill (freshwater or chemical premix) – refer to pages 37. Connect to the water source before opening the ball valve.



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.

Filter the fill

There are no fill (other than basket) or suction filters, hence it's important that the filling source incorporates a filter.

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.



SECTION 6

SPRAY OPERATIONS

AGITATION

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

- Check the Tank valve (located at the left side of the sprayer) is open to SPRAY.
- Start the tractor.
- Start the pump by engaging the Tractor hydraulics. (Assuming the tractor hydraulics have been set-up as per Section 5 (p.33).
- Turn ON the Agitator tap (assuming sufficient liquid is in the tank).
- Check that tank agitators are working.
- If agitation causes too much foaming in the tank, turn off the agitator, and monitor. Note some degree of agitation is also created by the bypass flow from the manual PRV.
- 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.



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 x.

- **Always wear safety gloves**
- Connect the probe to the sprayer as pictured



- Prepare the chemical source. **Be especially vigilant of chemical safety.**
- Check the Tank valve (located at the left side of the sprayer) is open to SPRAY.



- Start the Tractor
- Make sure the Bravo controller is NOT in Spray mode.
- Start the pump by engaging the Tractor hydraulics. (Assuming the tractor hydraulics have been set-up as per Section 5 (p.33).



- 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 flick tap (**circled in green**).



SECTION 6

SPRAY OPERATIONS

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 AGITATOR.
- Once the process is complete and the probe thoroughly cleaned, disconnect from the panel. Re-cap the panel and store the probe in a clean environment.

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:

$$\text{Chemicals required (Litres (or Kg))} = \frac{\text{Tank Volume (L)} \times \text{Recommended Chemical Rate (L/ha) or (Kg/ha)}}{\text{Spray Application Rate (L/ha)}}$$

eg. $\frac{4500 \times 0.8 \div 300 \text{ (L/ha)}}{= 12 \text{ Litres or (Kg)}}$

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

$$\text{Tank Volume Required (Litres)} = \text{Area (ha)} \times \text{Spray Application Rate (L/ha)}$$

eg. $\frac{3.25 \times 900}{= 3000 \text{ Litres}}$



For **AREA COVERED (ha)**,

$$= \frac{\text{Tank Volume (litres)} + \text{Spray Application Rate (l/ha)}}{\text{eg. } \frac{4500 \div 300}{= 15 \text{ hectares}}}$$

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

$$\text{Chemicals Required (Litres)} = \frac{\text{Tank Volume (Litres)} \times \text{Recommended Chemical Rate (L/ 100 litres)}}{100}$$

eg. $\frac{4500 \times 0.8 \div 100}{= 36 \text{ Litres}}$

NOTE

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

SECTION 6

SPRAY OPERATIONS

PROCEED TO SPRAY

Once the pre-operation checklist on page x 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 6 ~ 8 Kph)
- Application rate (for example 250 L/Hectare). There can be significant variations in application rates due to the crop type and product to be applied
- The nozzles to be used
- Spray pressures to be used (usually around 4 bar at the pump for 3 bar at the manifold)

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 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 speed are correct
- Correct operating pressure is being maintained
- Ground speed is suitable, safe and constant
- The Spray 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 XD-123MS

DRAIN

To drain the sprayer

1. Ensure the site for flushing and cleaning the sprayer meets with environmental and statutory regulations
2. Open tank drain valve to drain the remaining spray mixture from the tank



Note the drain is fitted with a camlock connection and a short length of hose.

This enables the operator to easily install a longer (or shorter) hose to enable specific redirection of the drainage OR Some customers use this feature to drain a spray tank in the event of say bogging the full sprayer into a wash-out / boggy area of the orchard.

SECTION 6

SPRAY OPERATIONS

FLUSHING

- The sprayer does not include an on board flushing tank. Flushing is via an external clean water source.
 - Connect an external clean, freshwater source to the FILL camlock and add the required amount of water. Thorough flushing might take several cycles of fill and “flush”.
3. Check that agitator is open.
 4. Place sprayer controls in start-up position according to the instructions of the controller fitted.
 5. Engage the spray pump. Clean water is now being passed through the dump valve back into the tank. The system is not pressurised, and tank agitator is working.
 6. Turn the spray booms ON, but firstly
 - a. Make sure the area is clear of bystanders.
 - b. Make sure the nozzles are downwind of the operator.Fresh water now flushes through the suction line, pump, agitator(s), pressure (spray) lines, pressure filters and nozzles.
 7. On completion of flushing, shut down all controls and disengage the tractor.
 8. Remove and clean and reassemble all filters.
 9. Reset all valves back to operating (spray) mode.
 - a. Close tank drain valve.
 - b. Select Off or Pump / Spray from the main tank valve.
 - c. Close the agitator valves.

If required, wash/hose down the outside of the sprayer.

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



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.

Nufarm's Tank and Equipment Cleaner is a suitable cleaning agent. Note this product is available from ratified Croplands Dealers under part code L-H9704.

Below is a guide procedure, but if in doubt, follow the instructions provided with the cleaner.

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 the agitator valve
6. Start the Tractor
7. 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.
8. Start the pump hydraulics.
9. Activate the controller SPRAY mode. This will pressurise the system and operate the tank agitator.
10. Adjust to normal operating pressures

SECTION 6

SPRAY OPERATIONS

11. Turn ON all spray sections.
 - a. Make sure the area around the nozzles is clear of bystanders.
 - b. Make sure the nozzles are downwind of the operator.
12. After sufficient cleaning, turn OFF the spray sections.
13. 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.
14. When soaking is completed, start the machine following steps to flush the tank and spray lines
15. On completion of flushing, shut down all controls and disengage the hydraulic drive.
16. Open spray tank drain valve and allow cleaning mixture to drain from the tank
17. 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.

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 hydraulics and controllers from the tractor.

Attach and adjust 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.



SECTION 7

SPRAYING INFORMATION

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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 sprayer, 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.

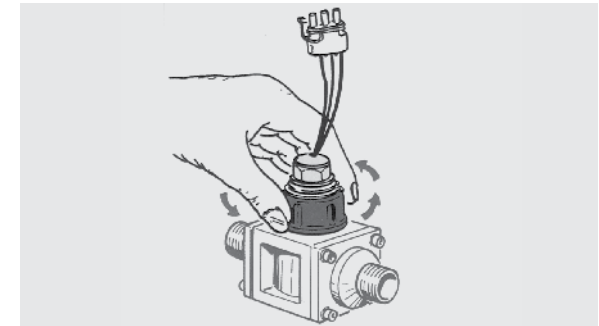
Install, calibrate and operate the spray controller according to the spray controller operators manual.

Inspections of the Flowmeter should be performed regularly.

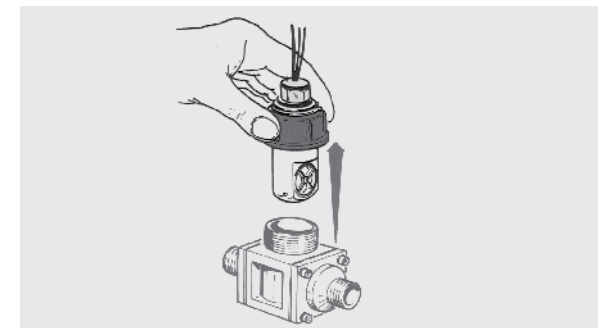
Daily Check & Maintenance of Flowmeter

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

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



Unscrew the Rapid Check assembly

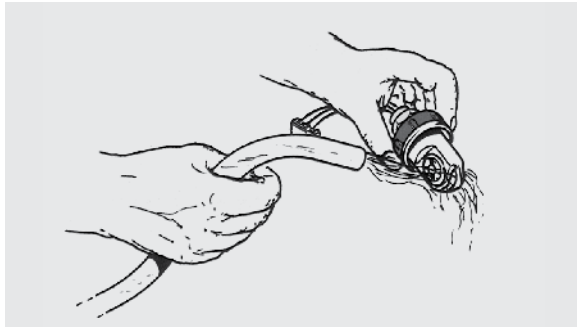


Remove the Rapid Check unit

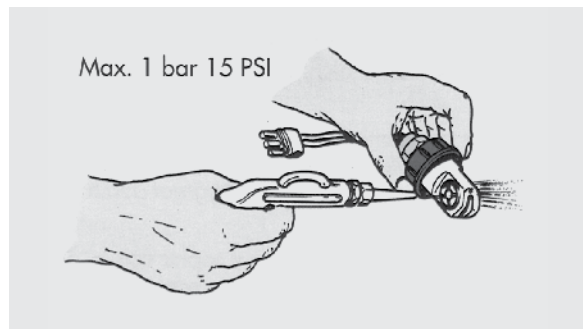
SECTION 7

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



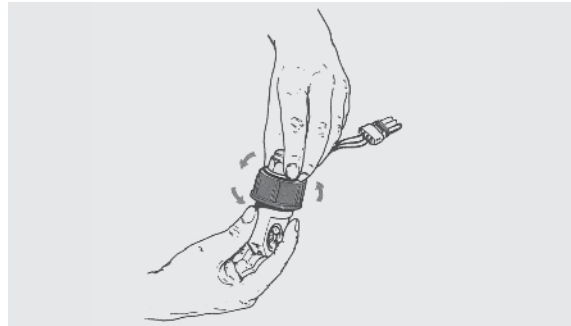
Use compressed air to check that the turbine unit rotates freely

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

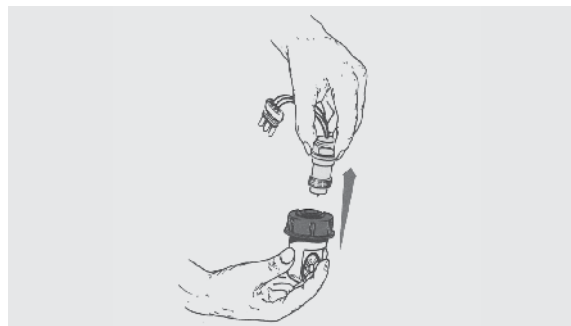
Every 50 Hours

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

1. Unscrew the sensor.

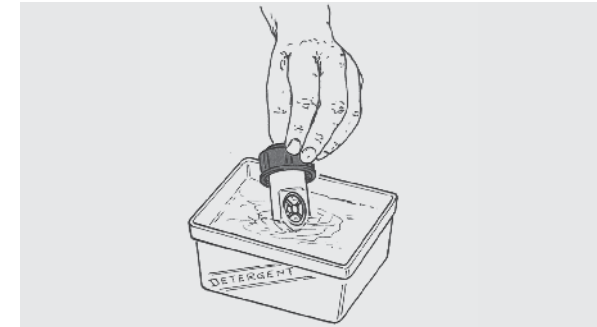


2. Separate the sensor from the Rapid Check unit.



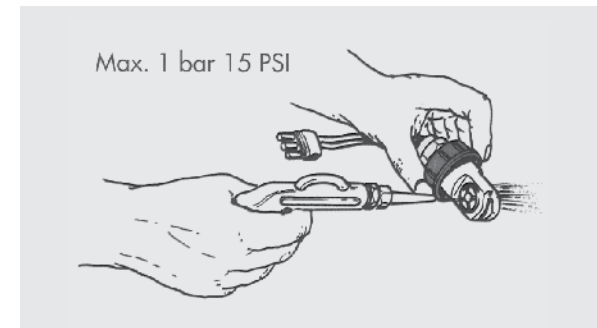
Separate the sensor from the Rapid Check unit

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.



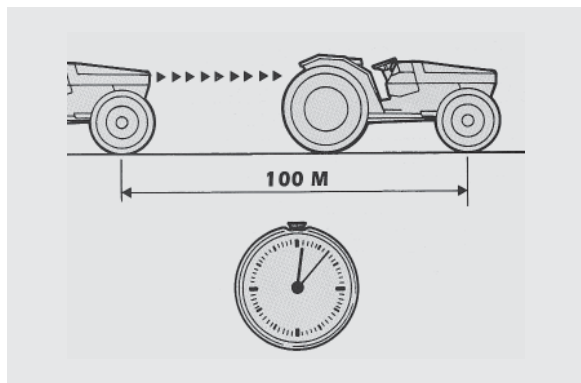
Use compressed air to check that the turbine unit rotates freely

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. $100(\text{m}) \times 3.6 \div 72(\text{seconds})$
 = 5km/hr travel speed

An alternative formula is:

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

STEP 3

Measure Swath Width

The spray controller requires the boom width to be entered in 3/4/5/6 parts.

Measure the nozzle spacing and multiply nozzle spacing by the number of nozzles on each boom section to establish the width of each boom section.

eg. $0.5\text{m} \times 12 = 6\text{m}$
 $0.5\text{m} \times 12 = 6\text{m}$
 $0.5\text{m} \times 12 = 6\text{m}$

NOTE

Boom sections may vary on some booms.



Agrotop TDam-110-015 Airmix nozzle

STEP 4

Select Nozzle Type & Size

Select Nozzle Type & Size according to:

- Chemical recommendations.
- Application rate required.
- Pressure setting.
- Swath width.
- Chosen speed of travel. (Use actual speed of travel, refer to step 2)



AI nozzle - courtesy of Teejet

SECTION 7

SPRAYING INFORMATION

Two methods of selecting nozzle output are:

- Use the charts on pages 64 or the manufacturer's nozzle chart.
- Calculate Required Nozzle Flow Rate.

NOTE

Boom sections may vary on some booms.

- Use Your Manual's Chart Or Manufacturer's Nozzle Chart

Using the chart on pages 64 or the manufacturer's nozzle rate chart, reference:

- Application rate (eg 50 L/ha),
 - Speed of travel (eg 12km/hr), &
 - Pressure setting (eg 250kPa),
- find the nearest nozzle to suit your requirements.

Also check to see what speed variations are available for applying the same rate.

It is usually best to select mid range pressure as this will allow the spray controller to adjust pressure up or down when speed variations occur.

NOZZLE SELECTION AGROTOP

	NO. 1 SELLER	NO. 2 SELLER	NO. 3 SELLER	NO. 4 SELLER
KEY INFORMATION	<p>• Ideal pressure range 1-4 Bar</p> <p>• Easy, wheel control, pilot health and spray health</p> <p>• Up to 95% drift reduction</p>	<p>• Ideal pressure range 4-8 Bar</p> <p>• Easy wheel control, pilot health and spray health</p> <p>• Up to 95% drift reduction</p>	<p>• Ideal pressure range 3-4 Bar</p> <p>• Easy wheel control, pilot health and spray health</p> <p>• Up to 95% drift reduction</p>	<p>• Ideal pressure range 3-8 Bar ONLY</p> <p>• Low drift allows for NEEDS of soft targets</p>
KEY BENEFITS	<ul style="list-style-type: none"> • Excellent value • Proven performance • Proportionally Coarse-Medium droplets for good coverage • Compact design • Produced at world's best facilities • Two piece for easy cleaning, assembly • Also available as an all-weather nozzle 	<ul style="list-style-type: none"> • Superior operator safety and self-protection • Droplet drift rate variation over pressure range • Up to three times the life of inferior nozzles • Designed for water efficiency • Excellent performance using high pressure 	<ul style="list-style-type: none"> • Variable droplet spectra from coarse to fine at pressure maximum • Reduced self-reduction of coarse pressure • Two piece for easy disassembly 	<ul style="list-style-type: none"> • Specifically designed for use with the NEEDS of typical soft targets • Excellent self-reduction • Two piece for easy cleaning, in use
SPRAY QUALITY	01 to 04	01 to 02	01 to 02	02
AVAILABLE BOOMS	TECH 1100***	TECH 1100***	TECH 1100***	TECH 1100***
UNIQUE NOZZLE PRICE	\$ EX. GST: 6.32 \$ INC. GST: 14.25	\$ EX. GST: 24.32 \$ INC. GST: 28.75	\$ EX. GST: 20.38 \$ INC. GST: 23.82	\$ EX. GST: 13.88 \$ INC. GST: 15.85
PRG. C&C	0	0	0	0
10 PACK (extra) nozzle - same P&C as 01	\$ EX. GST: 78.90 \$ INC. GST: 84.59			
ORDER CODE	707-0088			

- Calculate Required Nozzle Flow Rate

If you know:

- the application rate required (eg 50 L/ha),
- speed of travel (eg 12km/hr),
- swath width (eg 18m), &
- the number of nozzles on the boom (eg 36).

The following formula can be used to establish required flow rate per nozzle:

$$\text{Nozzle Flow Rate (L/min)} = \frac{\text{Speed (km/hr)} \times \text{Swath Width (m)} \times \text{Application Rate (L/ha)} \div 600 \div \text{Number of nozzles}}$$

eg.
$$\frac{[(12 \times 18 \times 50) \div 600] \div 36}{=} = 0.5 \text{ L/min for each nozzle}$$

An alternative formula is:

$$\text{Nozzle Flow Rate (L/min)} = \frac{\text{Speed (km)} \times \text{Nozzle Spacing (cm)} \times \text{Application Rate (L/ha)} \div 60,000}$$

eg.
$$\frac{[12 \times 50 \times 50] \div 60,000}{=} = 0.5 \text{ L/min}$$

Now using the nozzle chart look down the nozzle capacity column (L/min) and select a nozzle to suit the output (eg 0.5 L/min). Refer to pages 64 for nozzle charts.

		L/HA AT VARIOUS SPEEDS (KM/HR) BASED ON A 50CM NOZZLE SPACING											
		5	10	15	20	25	30	35	40	45	50	55	60
01 Orange	1.0	0.28	56	84	112	140	168	196	224	252	280	308	336
	2.0	0.32	64	96	128	160	192	224	256	288	320	352	384
	3.0	0.40	80	120	160	200	240	280	320	360	400	440	480
	4.0	0.46	92	136	184	232	280	328	376	424	472	520	568
	5.0	0.51	102	153	204	255	306	357	408	459	510	561	612
	6.0	0.56	112	168	224	280	336	392	448	504	560	616	672
	7.0	0.60	120	180	240	300	360	420	480	540	600	660	720
	8.0	0.64	128	192	256	320	384	448	512	576	640	704	768
	9.0	0.68	136	204	272	336	400	464	528	592	656	720	784
	10.0	0.71	142	213	284	352	416	480	544	608	672	736	800
01B Green	1.0	0.76	152	228	304	380	456	532	608	684	760	836	912
	2.0	0.84	168	252	336	420	504	588	672	756	840	924	1008
	3.0	0.91	182	273	364	455	546	637	728	819	910	1001	1092
	4.0	0.96	192	288	384	480	576	672	768	864	960	1056	1152
02 Yellow	1.0	0.96	192	288	384	480	576	672	768	864	960	1056	1152
	2.0	1.05	210	315	420	525	630	735	840	945	1050	1155	1260
	3.0	1.12	224	336	448	560	672	784	896	1008	1120	1232	1344
	4.0	1.18	236	354	472	590	708	826	944	1062	1180	1298	1416

SECTION 7

SPRAYING INFORMATION

NOTE

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

STEP 5

Fit the Selected Nozzles to the Boom

Fit the selected nozzles to the boom as per the nozzle manufacturers specifications.

NOTE

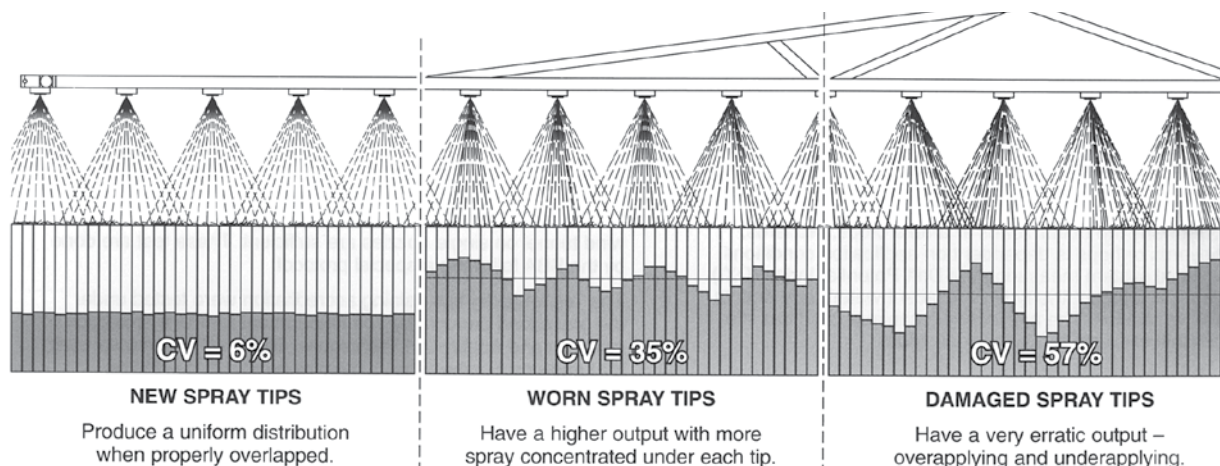
Remember when selecting nozzle outputs that higher pressures and wider spray angles usually give finer droplet sizes than lower pressures and narrower spray angles.

STEP 6 (Recommended)

Check Nozzle Accuracy & Determine Nozzle Output

Test the actual output of the nozzles using the following procedure:

- Ensure there is adequate water in the tank.
IMPORTANT: Do not use mixed pesticides for testing.
- Start the sprayer and set the spray Controller master switch into MANUAL position and adjust the operating pressure.
- Collect and measure the volume of spray from one nozzle and adjust pressure so that the nozzle gives the specified output (eg 0.5 L/min).



Test the actual output of the nozzles

IMPORTANT:

Do not use a worn nozzle to set the pressure setting and nozzle rates.

CAUTION

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

WARNING

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

- If the boom is not fitted with new nozzles, fit one new nozzle and use it to set the flow rate and pressure setting. This sets the standard flow rate, pressure setting and spray pattern with which to test the performance of other nozzles.
- When the pressure is set to give a specified nozzle output (using a new nozzle), collect and measure the volume of spray from each nozzle for one minute in a collection jar or calibrating jug.

SECTION 7

SPRAYING INFORMATION

Specially designed nozzle testing equipment such as nozzle calibrating jugs can be used to simplify nozzle calibration.

- e. Visually check nozzle spray patterns and spray angle for accuracy and, if necessary, replace any faulty nozzles.
- f. Discard and replace any nozzle that deviates more than 10% from the specified output (eg with a 0.5 L/min specification- discard any nozzles 0.45 L/min and under or 0.55 L/min and over).
- g. Check replacement nozzles by collecting and measuring output from each replacement.
- h. Record the output of each nozzle on the boom. Add the outputs together and divide by the number of nozzles to get the required output of each nozzles in one minute.

eg.
$$\frac{\text{Total spray output } 18 \text{ L/min}}{36 \text{ nozzles}} = 0.5 \text{ L/min per nozzle}$$

STEP 7

Calculate Application Rate

When operating the spray controller, the controller automatically calculates and shows the rate of application.

$$\text{Application Rate (L/ha)} = \frac{\text{Spray Output (L/min)} \times 600}{\text{Speed (km/hr)} \times \text{Swath Width (m)}}$$

eg.
$$\frac{[18 \times 600]}{[12 \times 18]} = 50 \text{ L/ha}$$

STEP 8

If tested application is not satisfactory:

- a. In Auto mode - if application rate is not being achieved:
 - i. Operating pressure will climb if nozzles are too small or blocked or speed is too slow.
Likewise, if your pressure filter is blocked (even partially), you may experience excessive pressure at the pump.
Make adjustments accordingly.
 - ii. 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:
 - i. Adjusting pressure up or down to increase or decrease rate of application (use +/- keys).
 - ii. Adjusting spraying speed up or down to decrease or increase rate of application.
 - iii. Changing to a different nozzle capacity.

STEP 9

Add The Correct Amount Of Chemical To The Tank

- a. For land area rates (litres or kg per hectare), use the following formula:

$$\text{Chemical Required (litres)} = \frac{\text{Tank Volume (litres)} \times \text{Recommended Chemical Rate (L/ha)}}{\text{Spray Application Rate (L/ha)}}$$

eg.
$$\frac{[2000 \times 2.0]}{50} = 80 \text{ litres}$$

- b. If chemical recommendation is given in water volume rates use the following formula:

$$\text{Chemical Required (litres)} = \frac{\text{Tank Volume (litres)} \times \text{Recommended Chemical Rate (L/100 litres)}}{100}$$

eg.
$$\frac{[2000 \times 4]}{100} = 80 \text{ litres}$$

- c. For land area covered, use the formula:

$$\text{Area Covered (ha)} = \frac{\text{Tank Volume (litres)}}{\text{Spray Application Rate (L/ha)}}$$

eg.
$$\frac{2000}{50} = 40 \text{ hectares}$$

SECTION 7

SPRAYING INFORMATION

d. For tank volume required, use the formula:

$$\frac{\text{Tank Volume Required (litres)}}{\text{Area (ha) x Spray Application Rate (L/ha)}}$$

eg. $\frac{20 \times 50}{= 1000 \text{ litres}}$

NOTE

Full instructions of controller operation are contained in your separate Controller Manual.

NOTE

All nozzles have a pressure and flow rate range to achieve the best results. Ensure you have selected the nozzle which best suits your application to avoid any problems.

STEP 10

Adjust Boom Height

Boom height should be adjusted to suit the type of nozzle used, terrain and crop or soil being sprayed.

Minimum boom height recommendations depend on the nozzle spray angle and nozzle spacing. Refer to Nozzle chart recommendations.

Optimum Spray Height

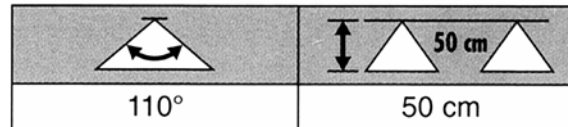


Image courtesy of www.TeeJet.com

STEP 11

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

AIR-MIX & TURBODROP® NOZZLE CHART

Nozzle Type	Pressure Bar	Flow Rate l/min	Application Rate (L/ha with km/h @ 50cm nozzle spacing)				
			4	6	8	10	12
110-010	1	0.231	46.2	46.2	34.7	27.7	23.1
	1.5	0.283	84.9	56.6	42.5	34	28.3
	2	0.327	98.1	65.4	49.1	39.2	32.7
	3	0.4	120	80	60	48	40
	4	0.462	139	92.4	69.3	55.4	46.2
	5	0.517	155	103	77.6	62	51.7
	6	0.566	170	113	84.9	67.9	56.6
110-015	1	0.346	69.2	69.2	51.9	41.5	34.6
	1.5	0.424	127	84.8	63.6	50.9	42.4
	2	0.49	147	98	73.5	58.8	49
	3	0.6	180	120	90	72	60
	4	0.693	208	139	104	83.2	69.3
	5	0.775	233	155	116	93	77.5
	6	0.849	255	170	127	102	84.9
110-02	1	0.462	92.4	92.4	69.3	55.4	46.2
	1.5	0.566	170	113	84.9	67.9	56.6
	2	0.653	196	131	98	78.4	65.3
	3	0.8	240	160	120	96	80
	4	0.924	277	185	139	111	92.4
	5	1.033	310	207	155	124	103
	6	1.131	339	226	170	136	113
110-025	1	0.577	115	115	86.6	69.2	57.7
	1.5	0.707	212	141	106	84.8	70.7
	2	0.816	245	163	122	97.9	81.6
	3	1	300	200	150	120	100
	4	1.154	346	231	173	138	115
	5	1.291	387	258	194	155	129
	6	1.414	424	283	212	170	141

AIR-MIX & TURBODROP® NOZZLE CHART

Nozzle Type	Pressure Bar	Flow Rate l/min	Application Rate (L/ha with km/h @ 50cm nozzle spacing)				
			4	6	8	10	12
110-03	1	0.693	139	139	104	83.2	69.3
	1.5	0.849	255	170	127	102	84.9
	2	0.98	294	196	147	118	98
	3	1.2	360	240	180	144	120
	4	1.386	416	277	208	166	139
	5	1.549	465	310	232	186	155
	6	1.697	509	339	255	204	170
110-04	1	0.924	185	185	139	111	92.4
	1.5	1.113	334	223	167	134	111
	2	1.306	392	261	196	157	131
	3	1.6	480	320	240	192	160
	4	1.848	554	370	277	222	185
	5	2.066	620	413	310	248	207
	6	2.263	679	453	339	272	226
110-05	1	1.155	231	231	173	139	116
	1.5	1.414	424	283	212	170	141
	2	1.633	490	327	245	196	163
	3	2	600	400	300	240	200
	4	2.309	693	462	346	277	231
	5	2.582	775	516	387	310	258
	6	2.828	848	566	424	339	283
110-06	1	1.386	277	277	208	166	139
	1.5	1.697	509	339	255	204	170
	2	1.96	588	392	294	235	196
	3	2.4	720	480	360	288	240
	4	2.771	831	554	416	333	277
	5	3.098	929	620	465	372	310
	6	3.394	1018	679	509	407	339

SECTION 7

SPRAYING INFORMATION

CALIBRATION WORK SHEET

Step 1

Check the Sprayer is in Good Working Order

Step 2

Determine Actual Speed of Travel

Follow Instructions on page 59 (Speed Calibration).

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

Step 3

Measure Boom Widths

Boom section 1:	
Boom section 2:	
Boom section 3:	
Boom section 4:	
Boom section 5:	
Boom section 6:	
Boom section 7:	

Step 4

Select Nozzle Type & Size

Chemical:	
Type of Nozzle:	
Pressure Setting:	
Travel speed (km/hr):	
Total number of nozzles to be used:	

$$\text{Nozzle Flow Rate (L/min)} = \frac{\text{Speed (km/hr)} \times \text{Swath Width (m)} \times \text{Application Rate (L/ha)}}{600 \div \text{Number of nozzles}}$$

$$\begin{matrix} \boxed{} & \times & \boxed{} & \times & \boxed{} & \div & 600 & \div & \boxed{} \\ = & & & & & & & & \boxed{} \end{matrix} \text{ L/min for each nozzle}$$

Step 5

Fit Selected Nozzles to Boom

Nozzle Type:	
Nozzle Size:	
Nozzle Colour:	

Step 6

Check Nozzle Accuracy & Determine Nozzle Output

Thoroughly check nozzles & test the actual output of each nozzle.

Pressure Setting:	
Individual Nozzle Outputs:	
Sum of Nozzle Outputs:	

Step 7

Calculate Application Rate

The spray Controller automatically calculates and shows the rate of application.

$$\text{Application Rate (L/ha)} = \frac{\text{Spray Output (L/min)} \times 600}{\text{Speed (km/hr)} \times \text{Swath Width (m)}}$$

$$\begin{matrix} [\times 600] \div [\times] \\ = \end{matrix}$$

Step 8

If Tested Application is Not Satisfactory - Make Changes & Repeat Procedure

Step 9

Add Correct Amount of Chemical

Chemical:	
Water Quantity:	
Chemical Added:	

Step 10

Boom Height

Step 11

Record Data

Date	
Farm location	
Crop to be sprayed	
Spray Volume litres/ha	
Nozzle type	
Nozzle size & colour	
No. of nozzles used	
Nozzle pressure	
Tested Output in L/min	
Actual Litres/Hectare	

SECTION 7

SPRAYING INFORMATION

CALIBRATION WORK SHEET

Step 1

Check the Sprayer is in Good Working Order

Step 2

Determine Actual Speed of Travel

Follow Instructions on page 59 (Speed Calibration).

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

Step 3

Measure Boom Widths

Boom section 1:	
Boom section 2:	
Boom section 3:	
Boom section 4:	
Boom section 5:	
Boom section 6:	
Boom section 7:	

Step 4

Select Nozzle Type & Size

Chemical:	
Type of Nozzle:	
Pressure Setting:	
Travel speed (km/hr):	
Total number of nozzles to be used:	

$$\text{Nozzle Flow Rate (L/min)} = \frac{\text{Speed (km/hr)} \times \text{Swath Width (m)} \times \text{Application Rate (L/ha)}}{600 \div \text{Number of nozzles}}$$

$$\begin{matrix} \boxed{} & \times & \boxed{} & \times & \boxed{} & \div & 600 & \div & \boxed{} \\ = & & & & & & & & \boxed{} \end{matrix} \text{ L/min for each nozzle}$$

Step 5

Fit Selected Nozzles to Boom

Nozzle Type:	
Nozzle Size:	
Nozzle Colour:	

Step 6

Check Nozzle Accuracy & Determine Nozzle Output

Thoroughly check nozzles & test the actual output of each nozzle.

Pressure Setting:	
Individual Nozzle Outputs:	
Sum of Nozzle Outputs:	

Step 7

Calculate Application Rate

The spray Controller automatically calculates and shows the rate of application.

$$\text{Application Rate (L/ha)} = \frac{\text{Spray Output (L/min)} \times 600}{\text{Speed (km/hr)} \times \text{Swath Width (m)}}$$

$$\begin{matrix} [\boxed{} \times 600] \div [\boxed{} \times \boxed{}] \\ = \boxed{} \end{matrix}$$

Step 8

If Tested Application is Not Satisfactory - Make Changes & Repeat Procedure

Step 9

Add Correct Amount of Chemical

Chemical:	
Water Quantity:	
Chemical Added:	

Step 10

Boom Height

Step 11

Record Data

Date	
Farm location	
Crop to be sprayed	
Spray Volume litres/ha	
Nozzle type	
Nozzle size & colour	
No. of nozzles used	
Nozzle pressure	
Tested Output in L/min	
Actual Litres/Hectare	

SECTION 7

SPRAYING INFORMATION

CALIBRATION WORK SHEET

Step 1

Check the Sprayer is in Good Working Order

Step 2

Determine Actual Speed of Travel

Follow Instructions on page 59 (Speed Calibration).

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

Step 3

Measure Boom Widths

Boom section 1:	
Boom section 2:	
Boom section 3:	
Boom section 4:	
Boom section 5:	
Boom section 6:	
Boom section 7:	

Step 4

Select Nozzle Type & Size

Chemical:	
Type of Nozzle:	
Pressure Setting:	
Travel speed (km/hr):	
Total number of nozzles to be used:	

$$\text{Nozzle Flow Rate (L/min)} = \frac{\text{Speed (km/hr)} \times \text{Swath Width (m)} \times \text{Application Rate (L/ha)}}{600 \div \text{Number of nozzles}}$$

$$\begin{matrix} \boxed{} & \times & \boxed{} & \times & \boxed{} & \div & 600 & \div & \boxed{} \\ = & & & & & & & & \boxed{} \end{matrix} \text{ L/min for each nozzle}$$

Step 5

Fit Selected Nozzles to Boom

Nozzle Type:	
Nozzle Size:	
Nozzle Colour:	

Step 6

Check Nozzle Accuracy & Determine Nozzle Output

Thoroughly check nozzles & test the actual output of each nozzle.

Pressure Setting:	
Individual Nozzle Outputs:	
Sum of Nozzle Outputs:	

Step 7

Calculate Application Rate

The spray Controller automatically calculates and shows the rate of application.

$$\text{Application Rate (L/ha)} = \frac{\text{Spray Output (L/min)} \times 600}{\text{Speed (km/hr)} \times \text{Swath Width (m)}}$$

$$\begin{matrix} [\boxed{} \times 600] \div [\boxed{} \times \boxed{}] \\ = \boxed{} \end{matrix}$$

Step 8

If Tested Application is Not Satisfactory - Make Changes & Repeat Procedure

Step 9

Add Correct Amount of Chemical

Chemical:	
Water Quantity:	
Chemical Added:	

Step 10

Boom Height

Step 11

Record Data

Date	
Farm location	
Crop to be sprayed	
Spray Volume litres/ha	
Nozzle type	
Nozzle size & colour	
No. of nozzles used	
Nozzle pressure	
Tested Output in L/min	
Actual Litres/Hectare	

SECTION 7

SPRAYING INFORMATION

CALIBRATION WORK SHEET

Step 1

Check the Sprayer is in Good Working Order

Step 2

Determine Actual Speed of Travel

Follow Instructions on page 59 (Speed Calibration).

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

Step 3

Measure Boom Widths

Boom section 1:	
Boom section 2:	
Boom section 3:	
Boom section 4:	
Boom section 5:	
Boom section 6:	
Boom section 7:	

Step 4

Select Nozzle Type & Size

Chemical:	
Type of Nozzle:	
Pressure Setting:	
Travel speed (km/hr):	
Total number of nozzles to be used:	

$$\text{Nozzle Flow Rate (L/min)} = \frac{\text{Speed (km/hr)} \times \text{Swath Width (m)} \times \text{Application Rate (L/ha)}}{600 \div \text{Number of nozzles}}$$

$$\begin{matrix} \boxed{} & \times & \boxed{} & \times & \boxed{} & \div & 600 & \div & \boxed{} \\ = & & & & & & & & \boxed{} \end{matrix} \text{ L/min for each nozzle}$$

Step 5

Fit Selected Nozzles to Boom

Nozzle Type:	
Nozzle Size:	
Nozzle Colour:	

Step 6

Check Nozzle Accuracy & Determine Nozzle Output

Thoroughly check nozzles & test the actual output of each nozzle.

Pressure Setting:	
Individual Nozzle Outputs:	
Sum of Nozzle Outputs:	

Step 7

Calculate Application Rate

The spray Controller automatically calculates and shows the rate of application.

$$\text{Application Rate (L/ha)} = \frac{\text{Spray Output (L/min)} \times 600}{\text{Speed (km/hr)} \times \text{Swath Width (m)}}$$

$$\begin{matrix} [\boxed{} \times 600] \div [\boxed{} \times \boxed{}] \\ = \boxed{} \end{matrix}$$

Step 8

If Tested Application is Not Satisfactory - Make Changes & Repeat Procedure

Step 9

Add Correct Amount of Chemical

Chemical:	
Water Quantity:	
Chemical Added:	

Step 10

Boom Height

Step 11

Record Data

Date	
Farm location	
Crop to be sprayed	
Spray Volume litres/ha	
Nozzle type	
Nozzle size & colour	
No. of nozzles used	
Nozzle pressure	
Tested Output in L/min	
Actual Litres/Hectare	

SECTION 8

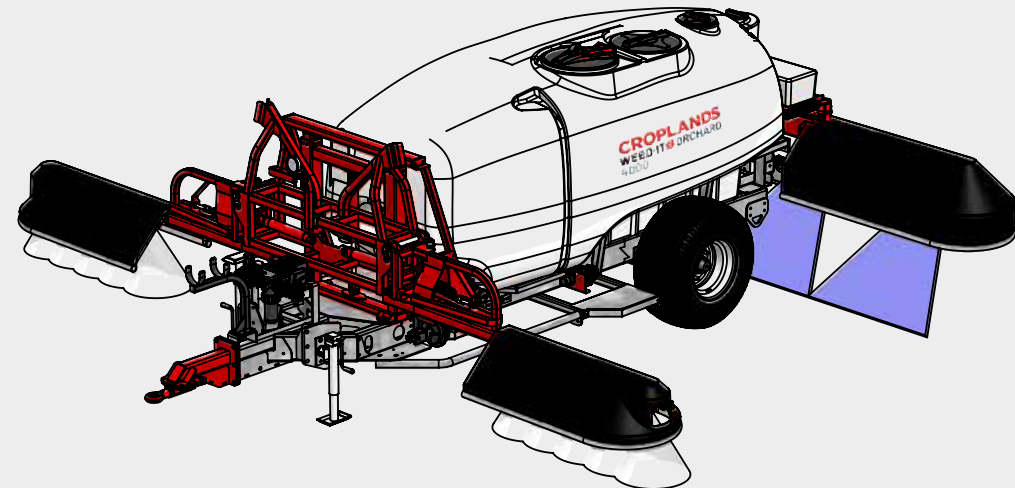
WEED-IT FAMILIARISATION

Refer to Section 11 for drawings and schematics

Refer to WEED-IT Parts List, BT-PMWEEDQ-C

Refer to WEED-IT QUADRO User Manual, BT-UMWEEDQ-C

Check online as there may be more recent revisions of these manuals



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SECTION 8

WEED-IT FAMILIARISATION

ORCHARD SPRAYER + WEED-IT

The Croplands Orchard Sprayers are available as WEED-IT Optical Spot Spraying equipped or as "WEED-IT ready" "conventional" sprayers.

Hence the conventional Orchard sprayer can be converted into a WEED-IT equipped version at a later stage.

Note; only the centre section of the sprayer is equipped with the WEED-IT sensors.

ABOUT WEED-IT

The WEED-IT is a weed control system that recognizes and sprays weeds based on the fluorescent properties of the chlorophyll molecules in the leaves of living plants.

The WEED-IT uses highly sensitive and accurate sensors. By spraying exactly on top of living plants only, saving chemical while at the same time minimizing environmental load.

It's also an excellent tool against herbicide resistance as it allows for a variety of (and sometimes expensive) herbicides to be used in an economical manner.

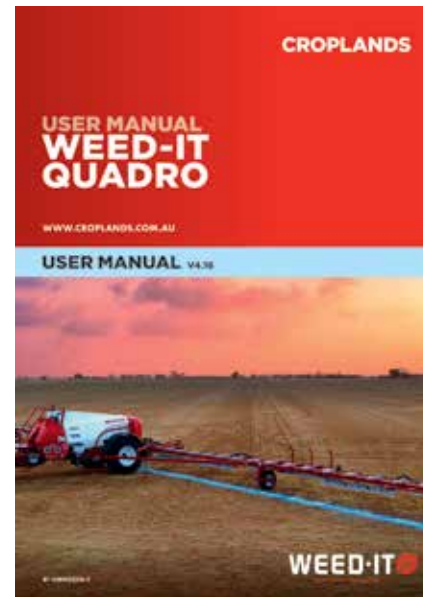
A series of sensors on the WEED-IT detects where the weeds are and immediately sends a signal to the relevant nozzle to spray the weed with herbicide.

WEED-IT MANUAL

Also supplied with a WEED-IT equipped sprayer (or update kit) will be several WEED-IT manuals.

1. WEED-IT User Manual, part no. code BT-UMWEEDQ-C
2. WEED-IT Parts Manual, part no. code BT-PMWEEDQ-C

Check online as there may be more recent revisions of these manuals. This is especially applicable to later upgrade kits. www.croplands.com.au



KEY WEED-IT COMPONENTS

- Power Converter - Small, (sometime referred to as the Wald Box), (1).
- WEED-IT Quadro Detection Sensor, (4) "cameras".
- Detection Sensor Harness, (1 x left, 1 x right).
- Spray Solenoids (16)
- Plus extension & adapter cabling, speed sensors, pressure sensors, nozzle bodies (Arag) etc, plus
- Quadro User Console. (1)



SECTION 8

WEED-IT INSTALLATION

TECHNICAL SUMMARY

Each sensor has 4 channels; each channel covers 25 cm or 100 cm per sensor.

Depending on the width of the vehicle used for the WEED-IT system, up to 36 sensors may be used to treat 36 metres in one operation.

The Orchard sprayer uses 4 sensors (two in each boom arm).

Each sensor must be 1100mm from the target - ideally 1100 mm above ground (especially in tall stubble). In the case of the Orchard sprayer the rear boom is physically lower (nozzles 565mm above ground) hence the WEED-IT sensors are angled forwards 45 degrees in order to obtain a 1100mm beam length.

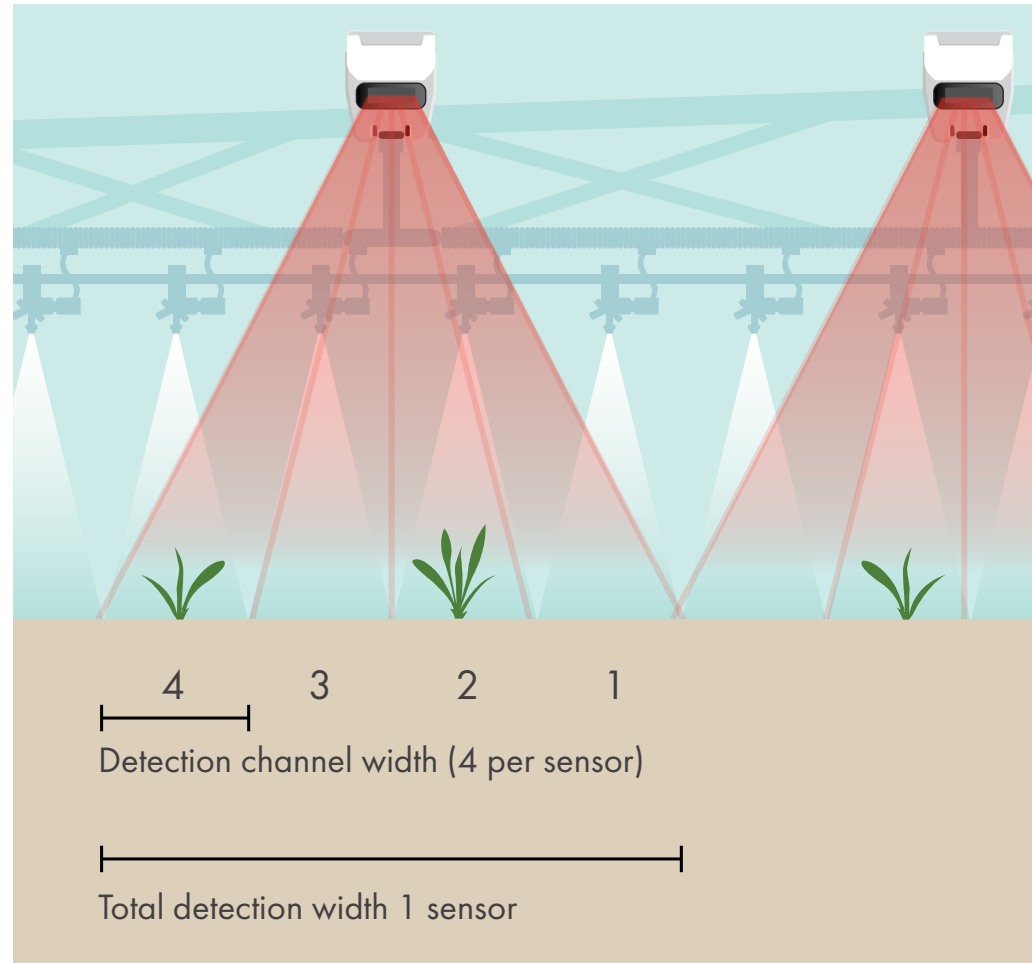
The system processes the sensor detection information along with speed and spray nozzle position settings and sends a signal to the relevant nozzle(s) solenoid(s) to spray. The system can be programmed for sensitivity and margins to help manage optimise the system's effectiveness.

If at any time the data feedback to the system steps outside the control algorithms, the system will default to ON.

All WEED-IT spraying is done at 3 Bar spray pressure.

For detailed information consult the WEED-IT User Manual, art no. code BT-UMWEEDQ-C

The Orchard sprayer is fitted with dual spray lines whereby the WEED-IT system is fitted side by side with the existing conventional broadcast spray lines (centre section only) thereby increasing the spray options available to the farmer.



SECTION 8

WEED-IT INSTALLATION

WEED-IT INSTALLATION

The dual line plumbing can be seen in the below photo (with shrouds removed), along with the optical sensor mounting at 45 degrees and associated plumbing and wiring looms etc.

Each optical sensor is connected to the system via the Optical Sensor Harnesses for coupling the Sensor to spray Solenoids, which come in 1, 2 or 3 sensors per harness, left and right hand versions and with different lengths of Sensor connections.

The Orchard sprayer uses the 2 sensor harnesses. Refer to the WEED-IT schematic on page xx.



Harness colour codes

Note the solenoid connections are numbered 1 to 4 and colour coded orange, purple, grey and white. The order of these is important, working from left to right across the boom this order must be maintained - with orange / no.1 being the first nozzle on the left, magenta as no.2, grey is no.3, and white / no.4 the last on the right. The images to the right show this order being - (note this example is from a single sensor harness).

Equally important to note is the variation between harnesses used on the Left or Right hand sides of the sprayer. The Left hand harnesses use black connectors, as per the harness photo above (highlighted in blue), and the Right hand harnesses use green connectors. These connections colours continue to the Power converter box as can be seen on the next page.



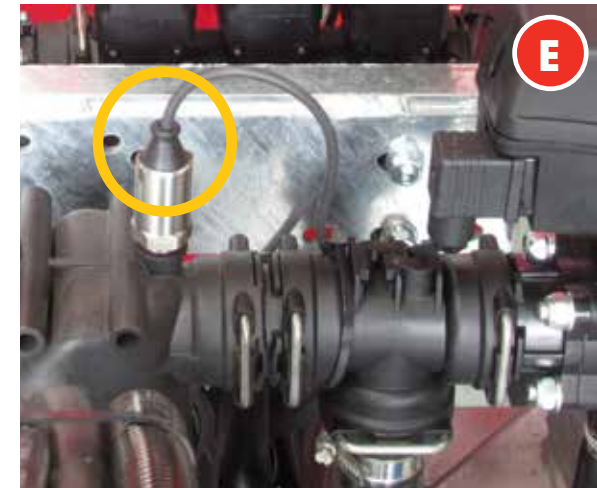
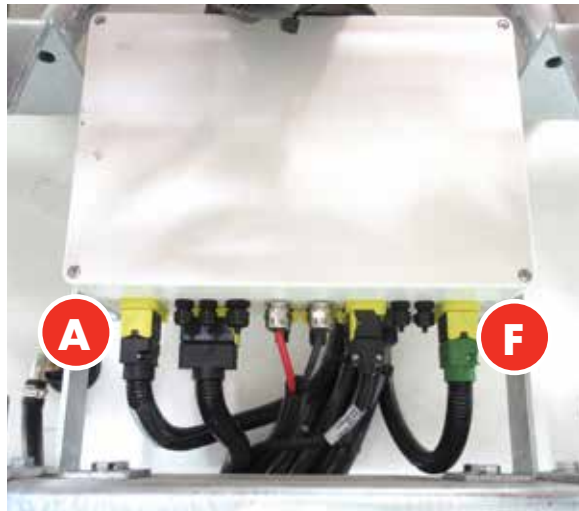
SECTION 8

WEED-IT OPERATION

Power Converter box

Mounted at the rear of the sprayer is the "Power Converter Box S", to which everything connects. Plugs from left to right...

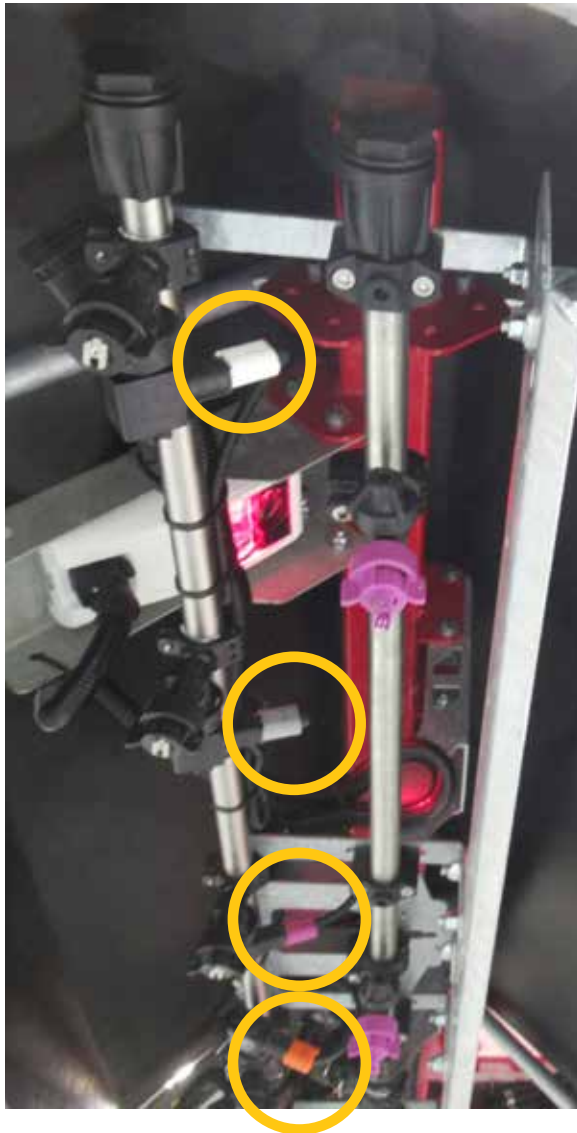
- A. Left hand boom harness (black plug)
- B. User Console (mount into the tractor cab)
- C. Main power cable. Important - this must connect to tractor battery
- D. Wheel speed sensor. Right wheel only. Note there is a wiring change on the extension lead - swap the blue and brown wires
- E. Pressure centre
- F. Right hand boom harness (green plug)



Correct = blue in the middle.

SECTION 8

WEED-IT OPERATION



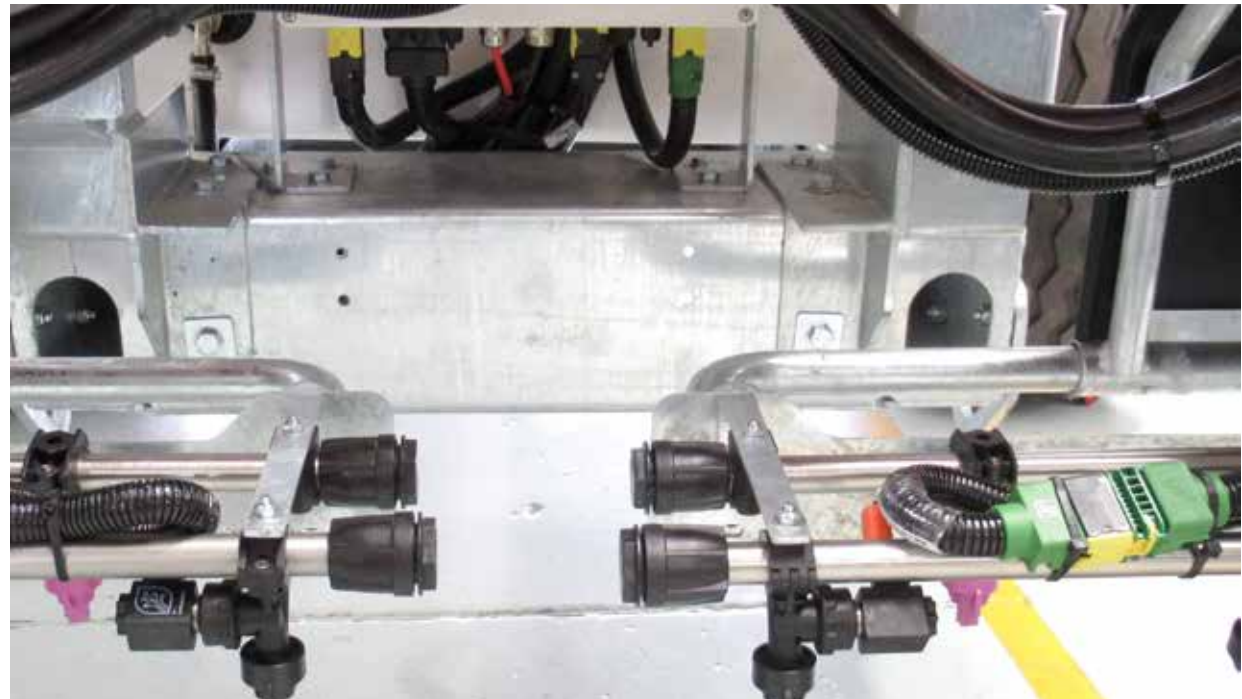
NOZZLE BODIES

Each single nozzle body is fitted with a WEED-IT 6V solenoid to control the spraying. Each connected to one of the four leads from the sensor as can be seen in the photo to the left.

The “normal” spray rail is also visible, as is an active WEEDit sensor.



WEED-IT nozzle bodies are fitted with TeeJet Evenband Flat Stainless Steel nozzles. Part no. TP4003E-SS



SECTION 8

WEED-IT OPERATION

WEED-IT QUADRO SOFTWARE OPERATION

Note. Most other functions remain as per standard manual.

Start tractor engine and allow the revs to settle to idling speed.

- Turn "ON" the WEED-IT console in the top left corner.
- Select the appropriate tank (main or spot, depending on sprayer) to test sensors and nozzles.
- Set the WEED-IT recirculation valve to return to the source tank (as above).
- Activate tractor hydraulics to start the spray pump, adjusting air flow until 3 Bar spray pressure is achieved.
- Press green square (menu) button in the centre of the console for a few seconds until the 100 menus display in the top right corner of the display.
- Repeat pressing the menu button to show menu 102.
- Press the Leaf button to activate Test mode, this will flash repeatedly when activated.
- With a fresh green weed on the end of a stick, wave the weed forwards and back in the driving direction confirming the sensor is activating and each nozzle is spraying. Use PPE (personal protective equipment) when performing this test.
- When testing is completed press the escape arrow button in the bottom left corner of the display.

SELECTION & USE OF SENSITIVITY SETTINGS

- Press Menu button and 1 of 5 Sensitivity settings will pop up briefly on the screen (**highlighted next page in blue**).
- Sensitivity and random firing will increase in freshly harvested crops (ie: barley & wheat) and with more sun intensity mid afternoons.
- Starting in new paddocks; Select the most sensitive setting No.1. Reduce sensitivity settings over a short distance to 2,3 or 4 etc. until a setting appropriate to the target size is achieved. Some random firings are advantageous and necessary particularly when targeting ver small weeds.
- Advantages of starting new paddocks on Sensitivity 1. Flushes the dust from infrequently used nozzles and activates a boom line surge/flush which is helpful if boom recirculation is not fitted.

1	Ultra Sensitivity	Small weeds or Double knock , targeting all weeds for a second chemical application, possibly a different chemical group. A powerful tool in herbicide resistance management.
2	Very Sensitive	Small weeds or Stressed weeds , possibly after extended periods of no rain. Moisture stressed plants.
3	Sensitive	Medium weeds
4	Very Insensitive	Larger weeds , will miss some smaller weeds Sensitivity 4 is selected in the image below
5	Ultra Sensitive	Very large weeds or combining Dual line , applications with pre-emergent blanked spray — used with dual tank and dual chemistry.

The Quadro sensor has been calibrated for Australian conditions and is now less affected by low sun angles such as sunrise and sunset — thus eliminating the need for extra / night sensitivity settings.



SECTION 8

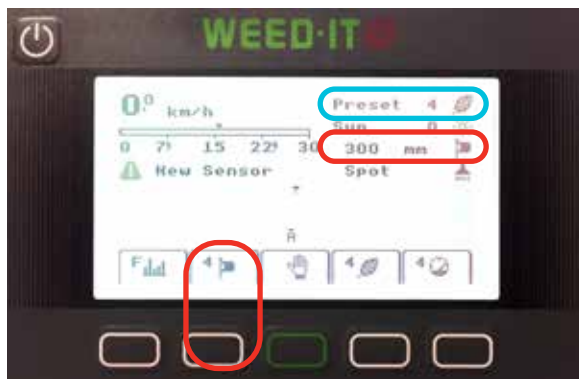
WEED-IT OPERATION

SELECTING & USE OF MARGIN SETTINGS

New Quadro delivers more power and speed, the benefit provides the option of larger spraying Margins allowing for steep contour banks and drains where Sensor height may vary significantly across the boom.

- Press Menu button and 1 of 4 Margin settings will pop up briefly on the screen (**highlighted below in red**).

Standard Margin 1	= 200mm margin
Margin 2	= 235mm
Margin 3	= 270mm
Margin 4	= 300mm improving coverage in rough terrain



Humidity Sensor

Inbuilt to each sensor is a "Warning" if the glass is broken or a damaged housing allows moisture into the Sensor. This can be repaired before further damage from water occurs.

Warning Light

Menu 204 Page 3 is a new Red LED "Warning flasher" ideal for noisy tractor cabs and gains the attention of fatigued operators when selected.

Boom recirculation valve may be adjusted towards OFF to achieve more spraying pressure. Only turn valve OFF when conducting maintenance on the nozzles solenoids or filters.

For all other information on the Quadro system, please consult the Quadro User Manual.

SECTION 9

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 guards.
2. Clean any residue chemicals as they pose a risk to safety and machine functionality.
3. Periodically check and replace any worn nozzles.
4. Before the winter period, (if in an area prone to freezing), completely empty the sprayer / boom tubes etc of liquids, in order to safeguard against breakage.
5. Have the sprayer unit checked once a year by qualified technical personnel.
6. Repairs should only be undertaken by suitably qualified personnel.



REGULAR SERVICE ITEMS	94
GREASE POINTS	94
PUMP MAINTENANCE	
EVERY 200 HOURS	
FILTER	

SECTION 9

LUBRICATION & MAINTENANCE

REGULAR SERVICE ITEMS

1. Check and repair leaks (spray and hydraulic).
2. Clean pressure line filter regularly.
3. Check tyre pressure ((350kPa / 50 psi), and check wheel nuts.

NOTE

The sprayer wheel tyre pressures given above are a general guide - always check and follow the minimum pressure of the supplied tyre.

4. Clean Rapid-check flowmeter (refer to page x).
5. Check the centrifugal pump - refer to the pump's instruction manual.
6. Ensure safety chains are in place and in good working order.
7. 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.
8. Grease all joints, height adjusting points and other grease points.

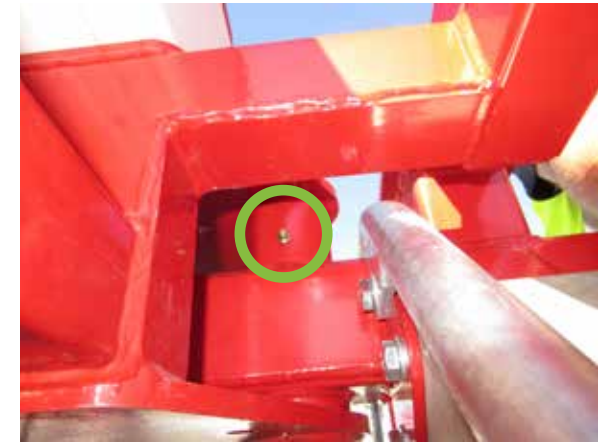
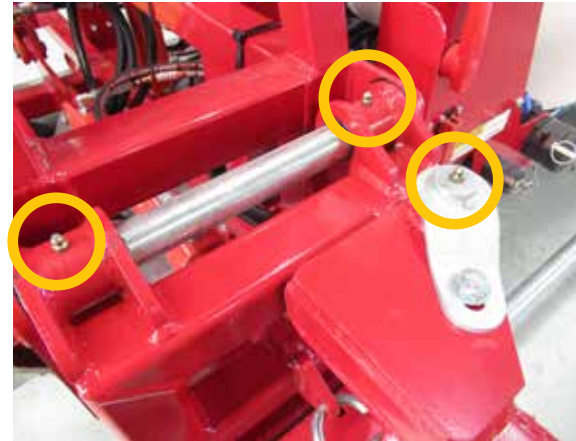
GREASE POINTS

The sprayer has a total of 13 grease nipples.

1. Swivel eye on the drawbar (**blue**).
2. Front boom fold & breakaway hinge

(**yellow**) (3 per side)

3. Rear boom fold pivot (**green**) (1 ea side)
4. Wheel hubs (1 ea side)



Grease all swivel drawbar grease points

SECTION 9

LUBRICATION & MAINTENANCE

PUMP MAINTENANCE

Refer to the pump's instruction manual for all information relating to pump maintenance and trouble shooting etc.



EVERY 200 HOURS

1. Re-pack wheel bearings with grease.
2. Grease all tank lid seals with vaseline.
3. Check to ensure agitator has not become blocked with sulphur / chemicals.
4. Check pump mounts.

NOTE

Be careful not to damage or deform the mesh or O-ring while cleaning and refitting the suction filters. If the filter screen or O-ring is damaged, replace the part.



FILTER

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



CAUTION

Ensure the main tank valve is in the OFF (or drain) position before cleaning the pressure filter.

SECTION 10

TROUBLESHOOTING

GENERAL SPRAYER PROBLEMS

PROBLEM	PROBABLE CAUSE	REMEDY
1. No spray when turned on	<ol style="list-style-type: none"> 1. Filter blocked. 2. Faulty pump. 3. Control valves not working 	<ol style="list-style-type: none"> 1. Dismantle, clean & re-assemble. 2. Change pump. 3. Check all motor valves and manual Pressure Regulating Valve.
2. Sprays for short time only	<ol style="list-style-type: none"> 1. Air inlet to tank blocked. 2. Filter on suction side of pump blocking or blocked. 	<ol style="list-style-type: none"> 1. Clean air vent. 2. Dismantle, clean & re-assemble the filter. If filter problem persists, clean out the tank & start again.
3. Spray pattern is uneven	<ol style="list-style-type: none"> 1. Blocked nozzles. 2. Nozzle tips worn. 3. Different pressure at nozzles; wrong nozzles fitted. 	<ol style="list-style-type: none"> 1. Remove, clean & check. Check output & for streaks. 2. Check nozzle output, replace worn nozzles. 3. Remove a nozzle in each section & check that flow rate is the same. If different, check for blockages.
4. Pressure going up - output going down	<ol style="list-style-type: none"> 1. Blocked nozzles. 2. Pressure filter blocking. 	<ol style="list-style-type: none"> 1. Dismantle, clean & refit. Check pressure returns to normal. Check all filters and spray mixture. 2. Check & clean the pressure filter.
5. Pressure falling	<ol style="list-style-type: none"> 1. Nozzle tips worn. 2. Pressure gauge faulty. 3. Pump worn. 4. Worn manual PRV (pressure regulating valve) 	<ol style="list-style-type: none"> 1. Check nozzle output, replace worn nozzles. 2. Check with new pressure gauge. 3. Repair or replace the pump. 4. Replace PRV
6. Spray pattern narrow or faltering	<ol style="list-style-type: none"> 1. Pressure too low. 2. Nozzles blocked or partially blocked. 	<ol style="list-style-type: none"> 1. Check that the correct nozzles are being used... check and clean.. 2. Check that the tank is not empty. If not, there is an air leak between the pump & tank or in the pump. Check plumbing & repair.
7. Foam in the tank	<ol style="list-style-type: none"> 1. Too much agitation. 	<ol style="list-style-type: none"> 1. Switch Off agitator.

SECTION 10

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. 2. Motor failure. 3. Valve clogged.	1. Check all connections, supply - loom. 2. Replace motor. 3. Clean internals of valve and/or put a new valve kit in the valve.
4. Servo valve not regulating flow.	1. Valve jamming. 2. No power. 3. Power clogged.	1. Clean out valve or replace. 2. Check all power leads and supply, or replace motor. 3. Clean out valve and/or put a new valve kit in the valve.
5. Dump valve not releasing pressure in system on shut-off.	1. No power to valve. 2. Valve motor failed. 3. Dump-line blocked.	1. Check power supply and all connections. 2. Check motor and replace if required. 3. Clean valve and return line.

OTHER PROBLEMS

PROBLEM	PROBABLE CAUSE	REMEDY
Hydraulic system overheating	1. Improper hydraulic motor size.	1. Refer to pump selection guide to determine proper size for your system.
	2. Bypass adjustment screw set to bypass too much oil.	2. Close adjustment screw on side of hydraulic motor to lessen the amount of bypassing oil.
	3. Insufficient hydraulic hose size.	3. Check hydraulic hose size. Hose should be at least 1/2". For large open-centre systems 3/4".

SECTION 10

TROUBLESHOOTING

CENTRIFUGAL PUMP PROBLEMS

PROBLEM	PROBABLE CAUSE	REMEDY
1. Hydraulic system overheating	<ol style="list-style-type: none"> 1. Bypass adjustment screw set to bypass too much oil. 2. Insufficient hydraulic hose size. 	<ol style="list-style-type: none"> 1. Close adjustment screw on side of hydraulic motor to lessen the amount of bypassing oil. 2. Check hydraulic hose size. Hose should be at least ½". For large open-centre systems ¾".
2. Blown seal in hydraulic motor	<ol style="list-style-type: none"> 1. Most common cause is failure to correctly connect pressure return line before operating. 	<ol style="list-style-type: none"> 1. Always double check return line hose connection.
3. Pump overheating/damage to seals	<ol style="list-style-type: none"> 1. Running the pump dry or excessive cavitation. 	<ol style="list-style-type: none"> 1. Never run dry/match pump speed to flow.
4. Pump does not prime	<ol style="list-style-type: none"> 1. Leak in suction line. 2. Obstruction in suction line. 	<ol style="list-style-type: none"> 1. Check hose and fittings for leaks and correct. 2. Inspect hose for obstructions and remove.
5. Low discharge	<ol style="list-style-type: none"> 1. Pump rotates incorrectly. 2. Blocked suction hose. 3. Pump worn. 	<ol style="list-style-type: none"> 1. Correct rotation of pump. 2. Inspect suction hose and repair as necessary. 3. Repair pump.

SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

ALL PARTS INFORMATION is now listed on the Croplands website:

- Go to 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

NOTE

Contact Croplands Technical Support for further information:
1300 650 724

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ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

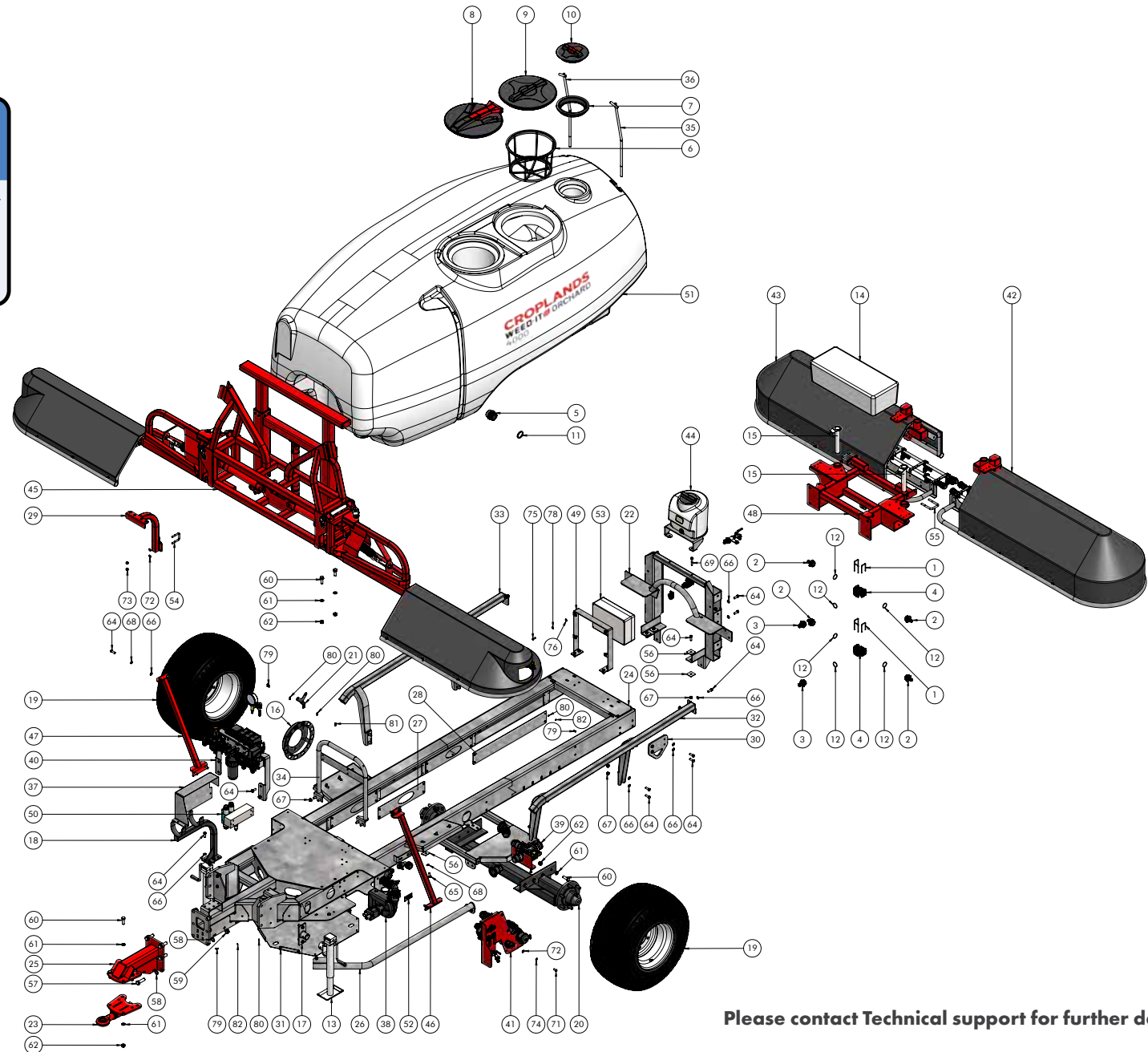
ORCHARD - OVERALL ASSY

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Please contact Technical support for further details

SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

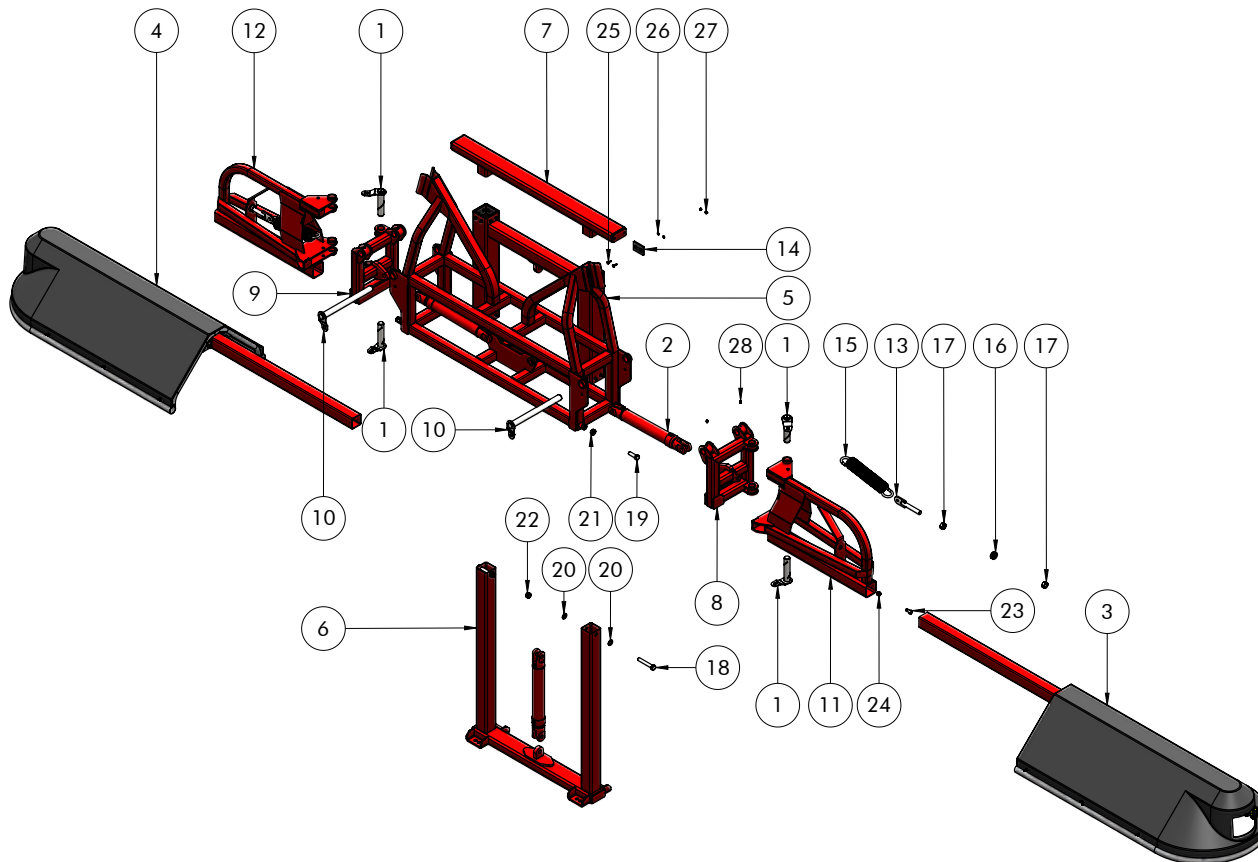
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.	NOTE
1	A010005	INLET FORK	6	option
2	A1091520	HOSETAIL T5M D.20	4	option
3	A1091525	HOSETAIL T5M D.25	2	option
4	A139055	TEE T5F	2	option
5	A249177	BULKHEAD T7M 2" SHORT	1	
6	A300130	FILTER BASKET LARGE 254MM DEEP	1	
7	A350620	LID RING WITH GASKET	1	
8	A356060	LID HINGE 455MM 180DEG	1	
9	A3510060	LID/RING KIT 455MM	1	
10	A3522221	LID SMALL LAB BREATHER 255MM	1	
11	AG11017	O RING T7	2	
12	AG11063	O RING EPDM	6	option
13	BP-184A	JOCKEY STAND SHORT PINTO	2	
14	BP-633	TOOLBOX POLY PEGASUS	1	
15	BP-700A-2A	DRAWBAR PIN 4000/5000	2	
16	BP-700C-9-1B	SPEED RING 6 X 205PCD	1	option
17	HP-006	SPIGOT PLATE JACK STAND	2	
18	HP-024-7A	CABLE HOLDER BRACKET SHORT	1	
19	HP-202GA	WHEEL/TYRE 400X15.5 NO OFFSET	2	
20	HP-205A	AXLE ASSEMBLY 4000LT LOW CLEARANCE	1	
21	HP-205A-1	SPEED SENSOR BRACKET OLAM WEEDIT	1	option
22	HP-284BA	BRACKET TANK/BOOM 4000LT OLAM	1	
23	HP3000ABD-1	SWIVEL TOW HITCH 3000LT HERBICIDE	1	
24	HP4000ABD	CHASSIS 4000LT OLAM FLORY READY	1	
25	HP4000ABD-1	DRAWBAR ADAPTOR 4000LT OLAM	1	
26	HP4000ABD-3	BUMPER PUMP PROTECTION 4000LT OLAM	1	
27	HP4000ABD-4	COVER CHASSIS RAIL FRONT	6	
28	HP4000ABD-5	COVER CHASSIS RAIL REAR	2	
29	HP4000ABD-7	GAUGE BRACKET OLAM WEEDIT	1	
30	HP4000ABD-11	BRACKET RESCUE TOW HITCH OLAM	2	
31	HP4000ABD-12	A FRAME BELLY SHIELD OLAM	1	
32	HP-704LB	SIDE RAIL 4000LT LH V2	1	
33	HP-704RB	SIDE RAIL 4000LT LH V2	1	
34	HP-711A	FRONT TANK SUPPORT 4000LT	1	
35	HP-715L	REAR LEFT TIE DOWN ROD 4000LT	1	
36	HP-715R	REAR RIGHT TIE DOWN ROD 4000LT	1	
37	HP-734	COVER CETOP VALVE OLAM	1	
38	KH-4101-01	OLAM HYDRAULIC PUMP KIT 12V	1	
39	KH-4101-02	OLAM SUCTION PLUMBING KIT V2	1	
40	KH-4101-03	OLAM PRESSURE MANIFOLD KIT	1	

41	KH-4101-04	OLAM FILL STATION/PANEL KIT	1	
42	KH-4101-07L	OLAM REAR BOOM ASSEMBLY LH	1	
43	KH-4101-7R	OLAM REAR BOOM ASSEMBLY RH	1	
44	KH-4101-12	OLAM HANDWASH ASSEMBLY	1	
45	MP-200-1CA	FRONT BOOM ASSEMBLY	1	
46	MP-200-1CA-7L	BRACE LH LIFT FRAME 4000LT	1	
47	MP-200-1CA-7R	BRACE RH LIFT FRAME 4000LT	1	
48	MP-201-1A	BOOM REAR CENTRE OLAM WEEDIT	1	
49	MP-201-9A	BRACKET WALD BOX ORCHARD WEEDIT	1	option
50	MP-629	HYDRAULIC VALVE CETOP3 3 FUNCTION	1	
51	P4000AB-RAW	TANK 4000LT AIRBLAST POLY RAW	1	
52	S/NO	SERIAL NUMBER PLATE	1	
53	WIBKC114B	BASIC CONSOLE PWRBOX KIT NO RAMSEY	1	option
54	XBMBB50	U-BOLT 50MM X 10	2	
55	XBMBB65	U-BOLT 65MM X 12MM	2	
56	50SQWASHER	50MM SQUARE WASHER	14	
57	M20X65	M20 X 65 SET SCREW HT ZP	6	
58	M20FWASHER	M20 FLAT WASHER ZP	12	
59	M20NNUT	M20 NYLOC NUT HT ZP	6	
60	M16X50	M16 X 50 HEX HEAD SET SCREW HT ZP	16	
61	M16FWASHER	M16 FLAT WASHER ZP	30	
62	M16NNUT	M16 NYLOC NUT HT ZP	18	
63	M12X45	M12 X 45 SET SCREW HT ZP	4	
64	M12X35	M12 X 35 SET SCREW HT ZP	52	
65	M12X30	M12 X 30 SET SCREW HT ZP	6	
66	M12FWASHER	M12 FLAT WASHER ZP	100	
67	M12NNUT	M12 NYLOC NUT HT ZP	54	
68	M12SWASHER	M12 SPRING WASHER ZP	10	
69	M10X65BOLT	M10 X 65 BOLT HT ZP	1	
70	M10X30	M10 X 30 SET SCREW HT ZP	4	
71	M10X25BHSREW	M10 X 25 BUTTON HEAD SCREW S/S	4	
72	M10FWASHER	M10 FLAT WASHER ZP	19	
73	M10NNUT	M10 NYLOC NUT HT ZP	10	
74	M10SWASHER	M10 SPRING WASHER ZP	3	
75	M8X25BHSREW	M8 X 25 BUTTON HEAD SCREW S/S	6	
76	M8FWASHER	M8 FLAT WASHER ZP	8	
77	M8NNUT	M8 NYLOC NUT HT ZP	2	
78	M8SWASHER	M8 SPRING WASHER ZP	4	
79	M6X16	M6 X 16 SET SCREW HT ZP	48	
80	M6FWASHER	M6 FLAT WASHER ZP	50	
81	M6NNUT	M6 NYLOC NUT HT ZP	2	
82	M6SWASHER	M6 SPRING WASHER ZP	46	

SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

ORCHARD - FRONT BOOM ASSY



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	BP-700-9AA	PIN 30MM X 155MM HAYLITE	4
2	HP-016	HYDRAULIC CYLINDER 2.0 X 10	3
3	KH-4101-06L	BOOM FRONT LH ASSEMBLY	1
4	KH-4101-06R	BOOM FRONT RH ASSEMBLY	1
5	MP-200-1CA-1	BOOM CENTER SECTION	1
6	MP-200-1CA-2	BOOM LIFT FRAME	1
7	MP-200-1CA-3	BOOM LIFT FRAME TOP BRACE	1
8	MP-200-1CA-4L	BOOM HINGE LH	1
9	MP-200-1CA-4R	BOOM HINGE RH	1
10	MP-200-1CA-5	PIN 30MM X 350MM OLAM	2
11	MP-200-1CA-6L	FRONT BOOM BREAK AWAY LH	1
12	MP-200-1CA-6R	FRONT BOOM BREAK AWAY RH	1
13	MP-200-1CA-9	SPRING TENSIONER	2
14	MP-200-1CA-10	WEAR PAD 8 X 50 NYLON	16
15	MP-519	SPRING TENSION 25 COILS 10 X 340 (MP-519)	2
16	0.75FWASHER	3/4" FLAT WASHER ZP	4
17	0.75UNFHNUT	3/4" UNF HEX NUT HT ZP	4
18	M16X100	M16 X 100 HEX HEAD SET SCREW HT ZP	2
19	M16X50	M16 X 50 HEX HEAD SET SCREW HT ZP	4
20	M16FWASHER	M16 FLAT WASHER ZP	4
21	M16HNUT	M16 HEX NUT HT ZP	4
22	M16NNUT	M16 NYLOC NUT HT ZP	2
23	M12X35	M12 X 35 SET SCREW HT ZP	4
24	M12HNUT	M12 HEX NUT HT ZP	4
25	M6X20CSSCREW	M6X20 C/S HEAD SCREW	32
26	M6FWASHER	M6 FLAT WASHER ZP	32
27	M6NNUT	M6 NYLOC NUT HT ZP	32
28	M6GNIPPLE	M6 GREASE NIPPLE	4

NOTE

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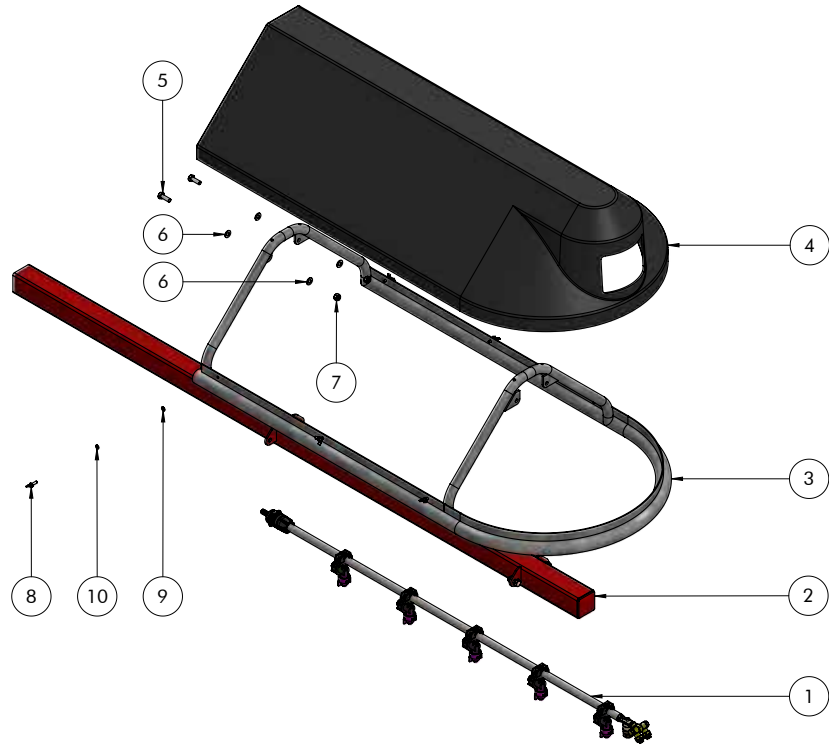
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SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

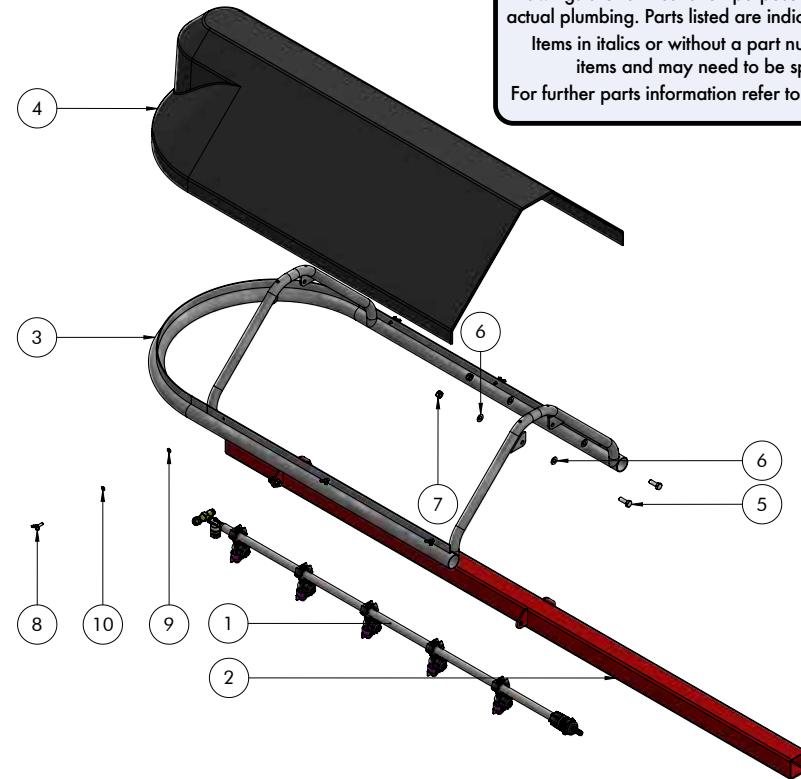
ORCHARD - FRONT BOOM ARMS LH / RH



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	KH-4101-06	FRONT NOZZLE TUBE PLUMBING KIT	1
2	MP-200-1CA-8L	BOOM LH FRONT	1
3	MP-201-5-1	BOOM FRONT SHROUD FRAME OLAM	1
4	MP-201-5-2	BOOM FRONT SHROUD OLAM	1
5	M10X30	M10 X 30 SET SCREW HT ZP	4
6	M10FWASHER	M10 FLAT WASHER ZP	8
7	M10NNUT	M10 NYLOC NUT HT ZP	4
8	6X20MZPWS	M6 X 20 ZINC WING SCREW	6
9	M6FWASHER	M6 FLAT WASHER ZP	6
10	M6SWASHER	M6 SPRING WASHER ZP	6

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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	KH-4101-06	FRONT NOZZLE TUBE PLUMBING KIT	1
2	MP-200-1CA-8R	FRONT BOOM RH	1
3	MP-201-5-1	BOOM FRONT SHROUD FRAME OLAM	1
4	MP-201-5-2	BOOM FRONT SHROUD OLAM	1
5	M10X30	M10 X 30 SET SCREW HT ZP	4
6	M10FWASHER	M10 FLAT WASHER ZP	8
7	M10NNUT	M10 NYLOC NUT HT ZP	4
8	6X20MZPWS	M6 X 20 ZINC WING SCREW	6
9	M6FWASHER	M6 FLAT WASHER ZP	6
10	M6SWASHER	M6 SPRING WASHER ZP	6

Please contact Technical support for further details

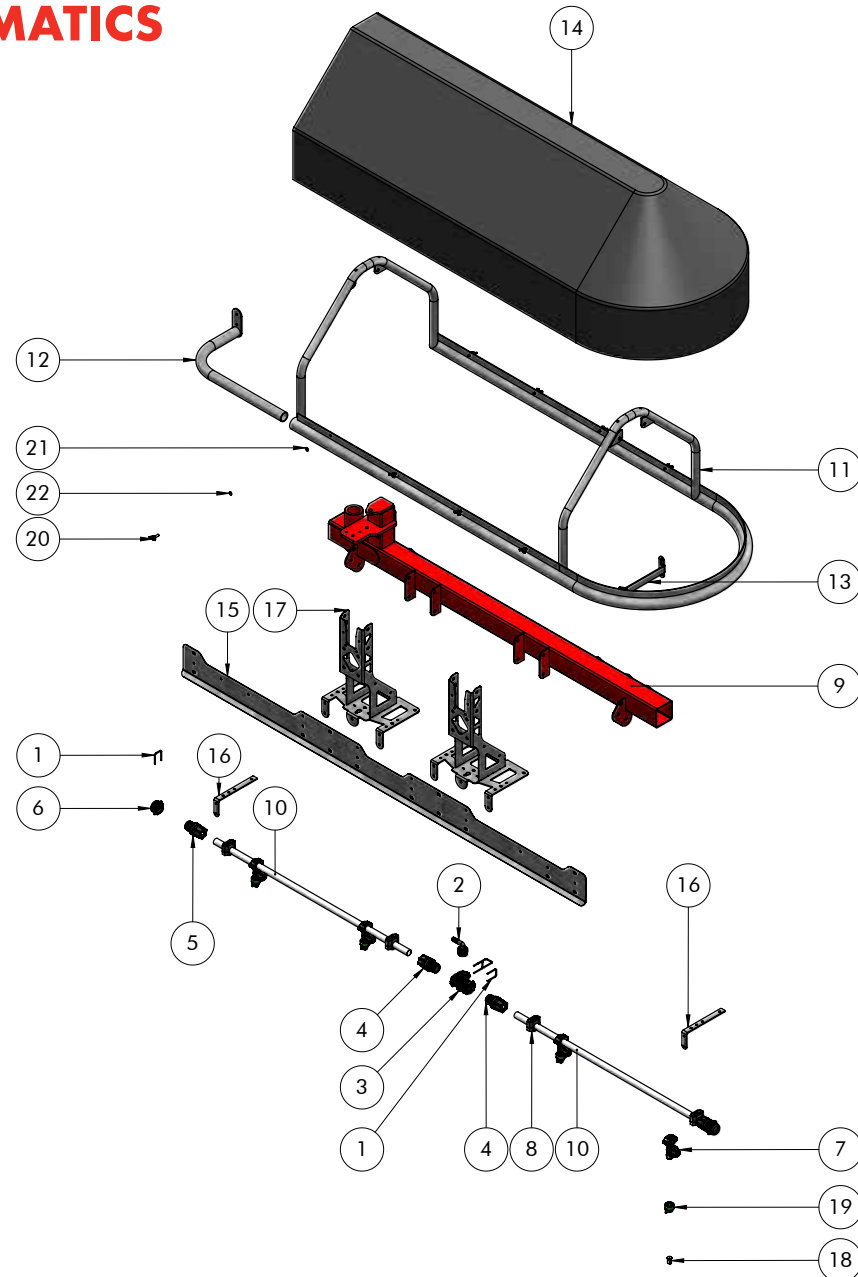
SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

ORCHARD - REAR LH BOOM ASSY

Blanket line only. Refer to page 90 for the WEED-IT + Blanket line version.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	A010003	MANIFOLD FORK T3	5
2	A1191313	ELBOW T3M D.13	1
3	A139033	T FITTING T3F-T3F-T3F	1
4	A190213	BOOM END FITTING FORK COUPLING MALE	2
5	A190313	BOOM END FITTING FORK COUPLING MALE	2
6	A219030	CAP T3	2
7	A402745	1/2" NOZZLE BODY 10MM NIB	4
8	A425130	CLAMP GB BOOM TUBE 21MM G1/2"	4
9	MP-201-1AL	BOOM REAR LH OLAM WEEDIT	1
10	MP-201-1A-1B	BOOM TUBE S/S 1/2" 2 HOLES 500MM	2
11	MP-201-4-1	BOOM REAR SHROUD FRAME OLAM	1
12	MP-201-4-1-1L	BRACKET NOZZLE RAIL INNER LH OLAM	1
13	MP-201-4-1-2	BRACKET NOZZLE RAIL OUTER OLAM	1
14	MP-201-4-2	BOOM REAR SHROUD OLAM	1
15	MP-333B	NOZZLE PROTECTION 1850 PLAIN OLAM	1
16	MP-334	NOZZLE PROTECTION BRACE	2
17	MP-336A	TUBE MOUNT BRACKET OLAM	2
18	TDAM-110015	AIR MIX JET 110 DEGREE #015	4
19	114441-5-CELR	CAP & SEAL GREEN CELCON	4
20	6X20MZPWS	M6 X 20 ZINC WING SCREW	8
21	M6FWASHER	M6 FLAT WASHER ZP	8
22	M6SWASHER	M6 SPRING WASHER ZP	8



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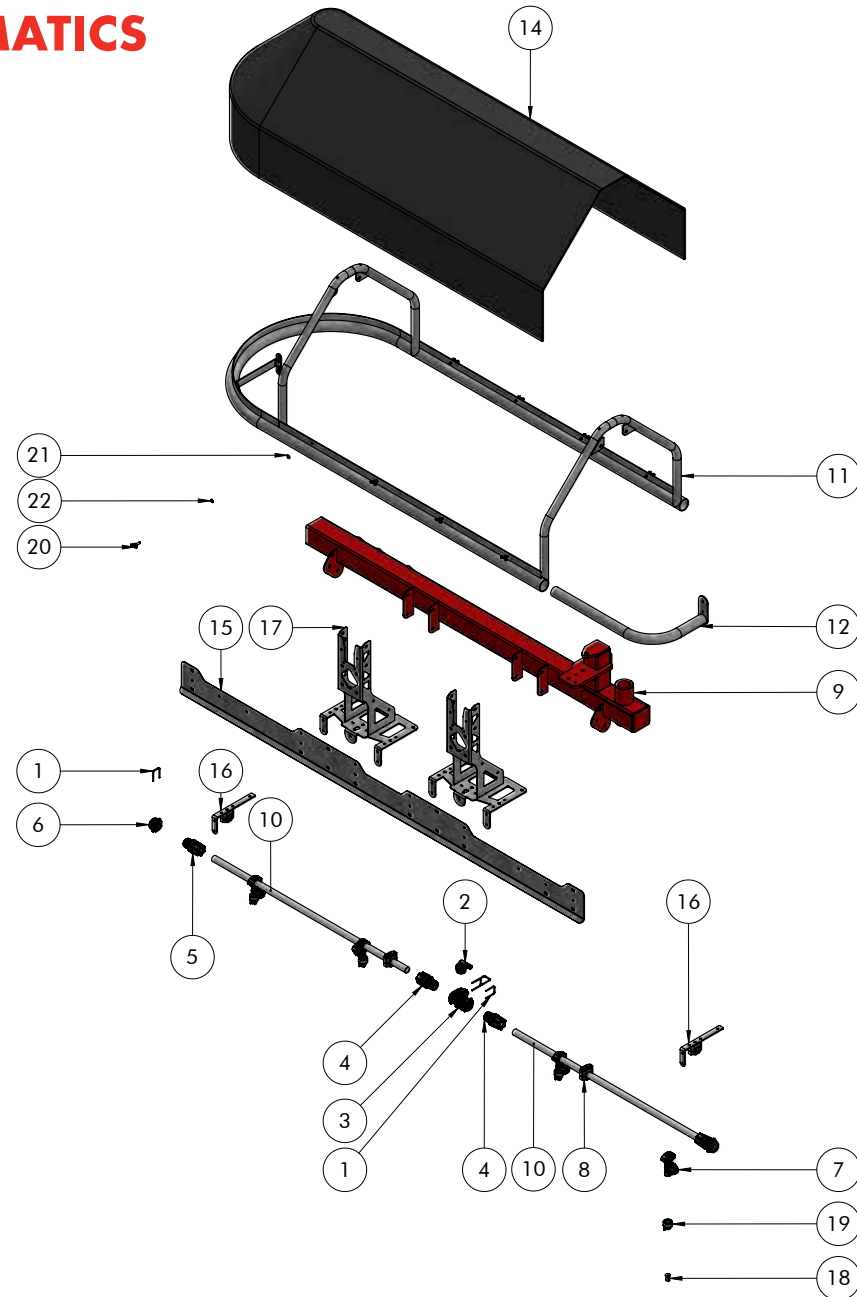
SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

ORCHARD - REAR RH BOOM ASSY

Blanket line only. Refer to page 91 for the WEED-IT + Blanket line version.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	A010003	MANIFOLD FORK T3	5
2	A1191313	ELBOW T3M D.13	1
3	A139033	T FITTING T3F-T3F-T3F	1
4	A190213	BOOM END FITTING FORK COUPLING MALE	2
5	A190313	BOOM END FITTING FORK COUPLING MALE	2
6	A219030	CAP T3	2
7	A402745	1/2" NOZZLE BODY 10MM NIB	4
8	A425130	CLAMP GB BOOM TUBE 21MM G1/2"	4
9	MP-201-1AR	BOOM REAR RH OLAM WEEDIT	1
10	MP-201-1A-1B	BOOM TUBE S/S 1/2" 2 HOLES 500MM	2
11	MP-201-4-1	BOOM REAR SHROUD FRAME OLAM	1
12	MP-201-4-1-1R	STIFFENER TUBE RH	1
13	MP-201-4-1-2	BRACKET NOZZLE RAIL OUTER OLAM	1
14	MP-201-4-2	BOOM REAR SHROUD OLAM	1
15	MP-333B	NOZZLE PROTECTION 1850 PLAIN OLAM	1
16	MP-334	NOZZLE PROTECTION BRACE	2
17	MP-336A	TUBE MOUNT BRACKET OLAM	2
18	TDAM-110015	AIR MIX JET 110 DEGREE #015	4
19	114441-5-CELR	CAP & SEAL GREEN CELCON	4
20	6X20MZPWS	M6 X 20 ZINC WING SCREW	8
21	M6FWASHER	M6 FLAT WASHER ZP	8
22	M6SWASHER	M6 SPRING WASHER ZP	8



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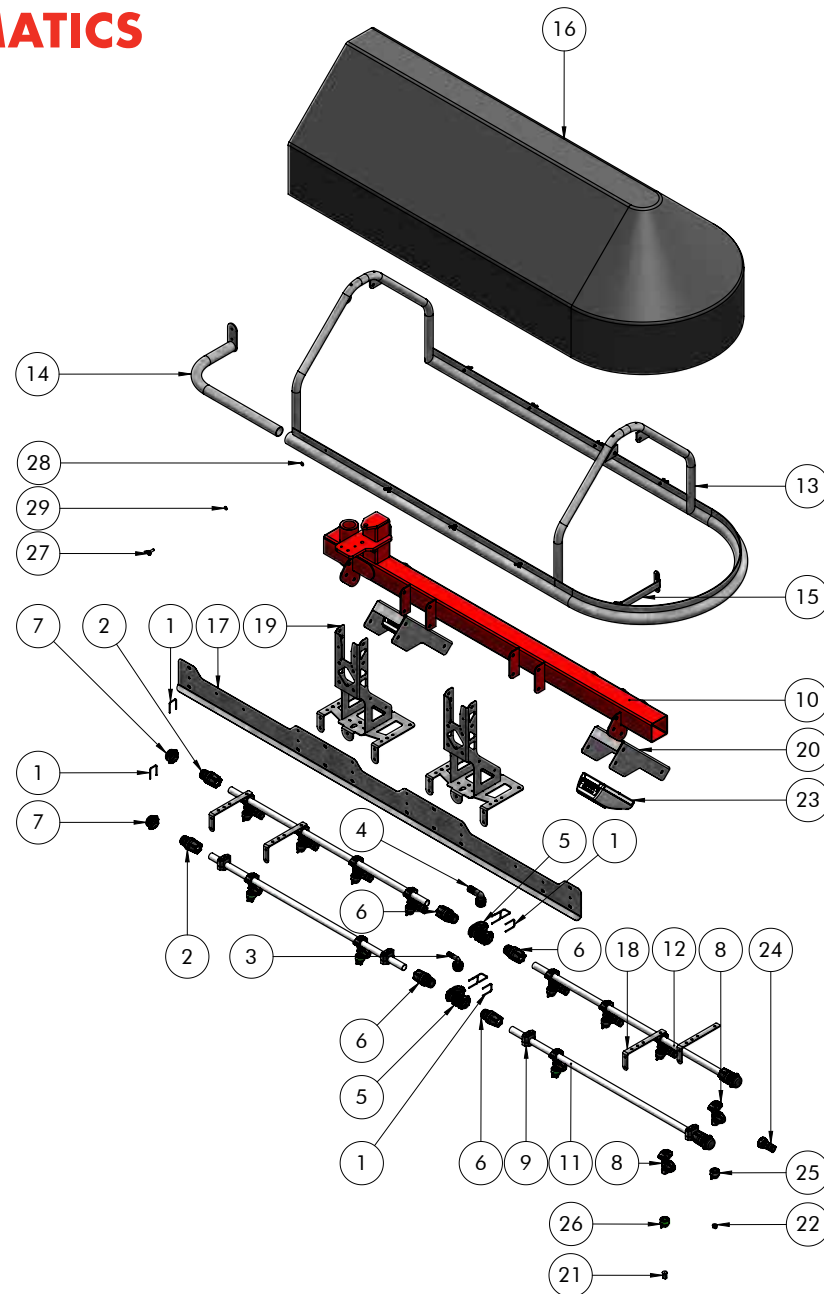
SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

WEED-IT ORCHARD - REAR LH BOOM ASSY

WEED-IT + Blanket line version. Refer to page 88 for the Blanket line only version.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	A010003	MANIFOLD FORK T3	10
2	A190313	BOOM END FITTING FORK COUPLING MALE	4
3	A1191313	ELBOW T3M D.13	1
4	A1191320	ELBOW T3M D.20	1
5	A139033	T FITTING T3F-T3F-T3F	2
6	A190213	BOOM END FITTING FORK COUPLING MALE	4
7	A219030	CAP T3	4
8	A402745	1/2" NOZZLE BODY 10MM NIB	12
9	A425130	CLAMP GB BOOM TUBE 21MM G1/2"	4
10	MP-201-1AL	BOOM REAR LH OLAM WEEDIT	1
11	MP-201-1A-1B	BOOM TUBE S/S 1/2" 2 HOLES 500MM	2
12	MP-201-1A-1W	BOOM TUBE S/S 1/2" 4 HOLES 250MM	2
13	MP-201-4-1	BOOM REAR SHROUD FRAME OLAM	1
14	MP-201-4-1-1L	BRACKET NOZZLE RAIL INNER LH OLAM	1
15	MP-201-4-1-2	BRACKET NOZZLE RAIL OUTER OLAM	1
16	MP-201-4-2	BOOM REAR SHROUD OLAM	1
17	MP-333B	NOZZLE PROTECTION 1850 PLAIN OLAM	1
18	MP-334	NOZZLE PROTECTION BRACE	4
19	MP-336A	TUBE MOUNT BRACKET OLAM	2
20	MP-340C	CAMERA BRACKET HERBICIDE	2
21	TDAM-110015	AIR MIX JET 110 DEGREE #015	4
22	TP4003E-SS	JET TP#3 40 DEG EVEN ST/STEEL	8
23	WI47004360K2	WEEDIT SENSOR QUADRO V3.46	2
24	WI47004424	SOLENOID BROWN O-RING FPV	8
25	114441-1-CELR	CAP & SEAL BLACK CELCON	8
26	114441-5-CELR	CAP & SEAL GREEN CELCON	4
27	6X20MZPWS	M6 X 20 ZINC WING SCREW	8
28	M6FWASHER	M6 FLAT WASHER ZP	8
29	M6SWASHER	M6 SPRING WASHER ZP	8



NOTE

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Please contact Technical support for further details

SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

WEED-IT ORCHARD - REAR RH BOOM ASSY

WEED-IT + Blanket line version. Refer to page 89 for the Blanket line only version.

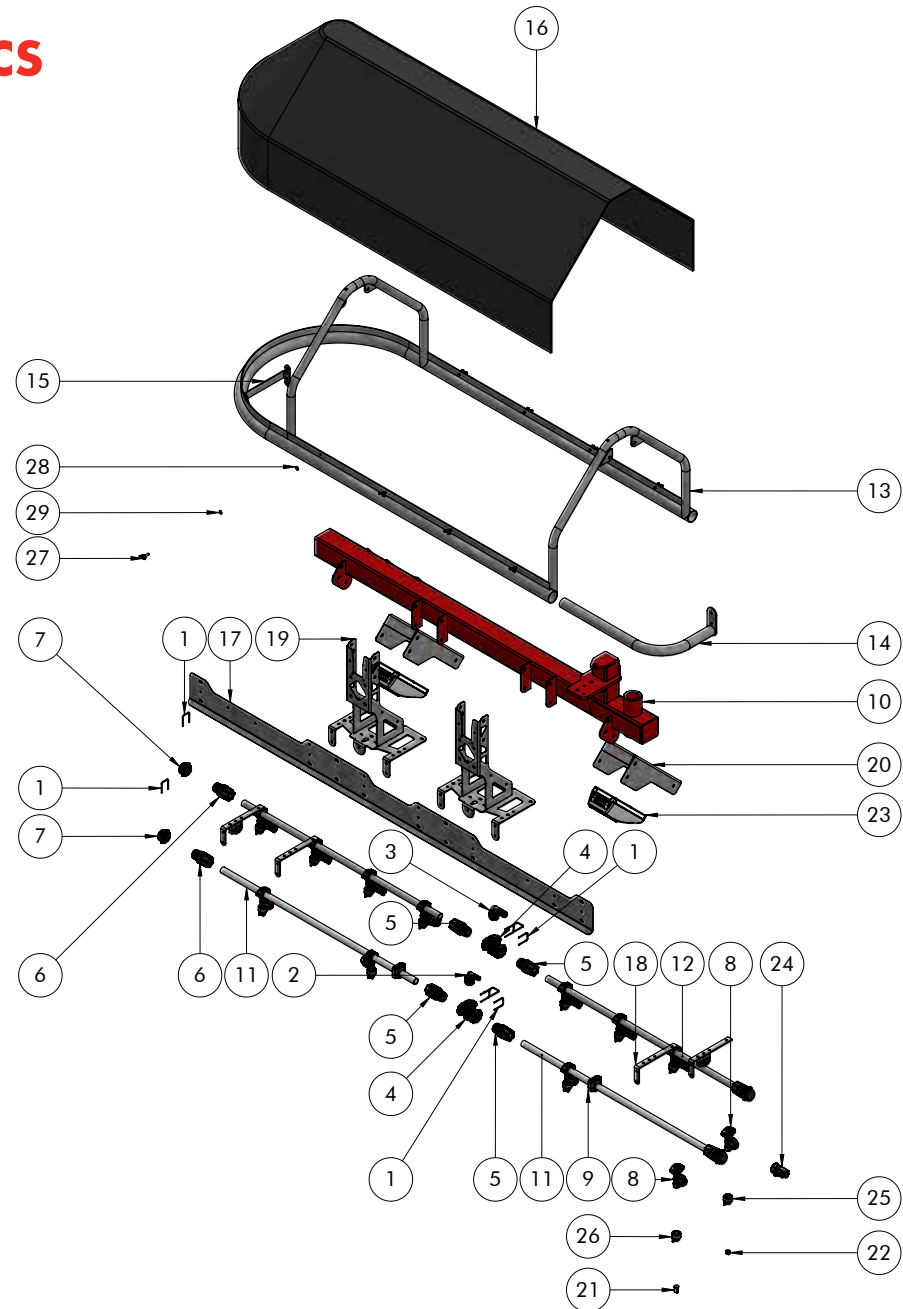
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	A010003	MANIFOLD FORK T3	10
2	A1191313	ELBOW T3M D.13	1
3	A1191320	ELBOW T3M D.20	1
4	A139033	T FITTING T3F-T3F-T3F	2
5	A190213	BOOM END FITTING FORK COUPLING MALE	4
6	A190313	BOOM END FITTING FORK COUPLING MALE	4
7	A219030	CAP T3	4
8	A402745	1/2" NOZZLE BODY 10MM NIB	12
9	A425130	CLAMP GB BOOM TUBE 21MM G1/2"	4
10	MP-201-1AR	BOOM REAR RH OLAM WEEDIT	1
11	MP-201-1A-1B	BOOM TUBE S/S 1/2" 2 HOLES 500MM	2
12	MP-201-1A-1W	BOOM TUBE S/S 1/2" 4 HOLES 250MM	2
13	MP-201-4-1	BOOM REAR SHROUD FRAME OLAM	1
14	MP-201-4-1-1R	STIFFENER TUBE RH	1
15	MP-201-4-1-2	BRACKET NOZZLE RAIL OUTER OLAM	1
16	MP-201-4-2	BOOM REAR SHROUD OLAM	1
17	MP-333B	NOZZLE PROTECTION 1850 PLAIN OLAM	1
18	MP-334	NOZZLE PROTECTION BRACE	4
19	MP-336A	TUBE MOUNT BRACKET OLAM	2
20	MP-340C	CAMERA BRACKET HERBICIDE	2
21	TDAM-110015	AIR MIX JET 110 DEGREE #015	4
22	TP4003E-SS	JET TP#3 40 DEG EVEN ST/STEEL	8
23	WI47004360K2	WEEDIT SENSOR QUADRO V3.46	2
24	WI47004424	SOLENOID BROWN O-RING FPV	8
25	114441-1-CEL	CAP & SEAL BLACK CELCON	8
26	114441-5-CEL	CAP & SEAL GREEN CELCON	4
27	6X20MZPWS	M6 X 20 ZINC WING SCREW	8
28	M6FWASHER	M6 FLAT WASHER ZP	8
29	M6SWASHER	M6 SPRING WASHER ZP	8

NOTE

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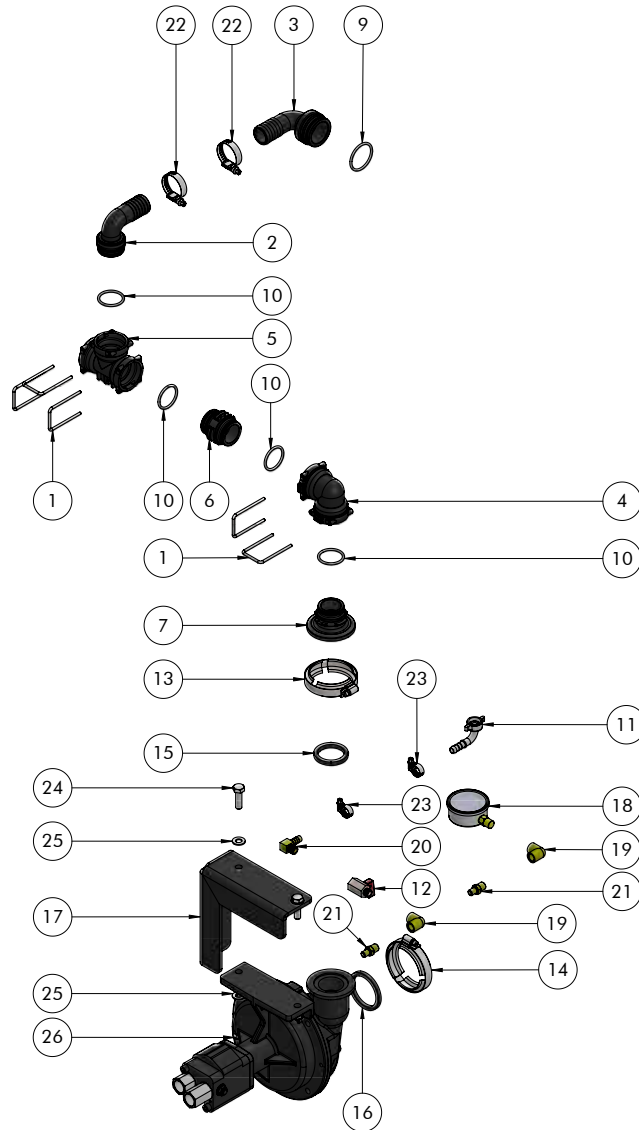


Please contact Technical support for further details

SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

KH-4101-01 - HYDRAULIC PUMP KIT



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	A010005	INLET FORK	5
2	A1191532	ELBOW T5 D.32	1
3	A1191632	ELBOW T6M D.32	1
4	A129055	ELBOW F-F T5	1
5	A139055	TEE T5F	1
6	A259155	NIPPLE T5M	1
7	A279157	ADAPTOR FLANGE T5-2INCH STD PORT	1
8	ACE48926	PUMP FMCS-155F-HYD-206	1
9	AG11023	O RING T6	1
10	AG11063	O RING EPDM	4
11	B163.604.4	ELBOW 10MM 90DEG C/W 1/2" WING NUT	1
12	BALL14MF2M	BALL VALVE 1/4" M/F	1
13	BJFC200	WORM SCREW CLAMP 2"	1
14	BJFC220	WORM SCREW CLAMP 2" FP	1
15	BJM201G	MANIFOLD GASKET 2 RIB EPDM	1
16	BJM221G	MANIFOLD GASKET 2" FP RIB EPDM	1
17	HP4000ABD-2	BRACKET PUMP MOUNTING 4000LT OLAM	1
18	L-G1420	GAUGE 63MM 0-1600KPA 1/4" B/E	1
19	TFEL1414FF	ELBOW 1/4" BSPF X 1/4" BSPF	2
20	TFEL1438	ELBOW 1/4" BSPM X 3/8" TAIL	1
21	TFM1418	NIPPLE 1/4" X 1/8" BRASS	2
22	TR114HC	HOSE CLAMP 32MM 1 1/4" WORM DRIVE	2
23	TR38HC	HOSE CLAMP 10MM 3/8" WORM DRIVE	2
24	M10X35	M10 X 35 BOLT	2
25	M10FWASHER	M10 FLAT WASHER ZP	4
26	M10NNUT	M10 NYLOC NUT HT ZP	2

NOTE

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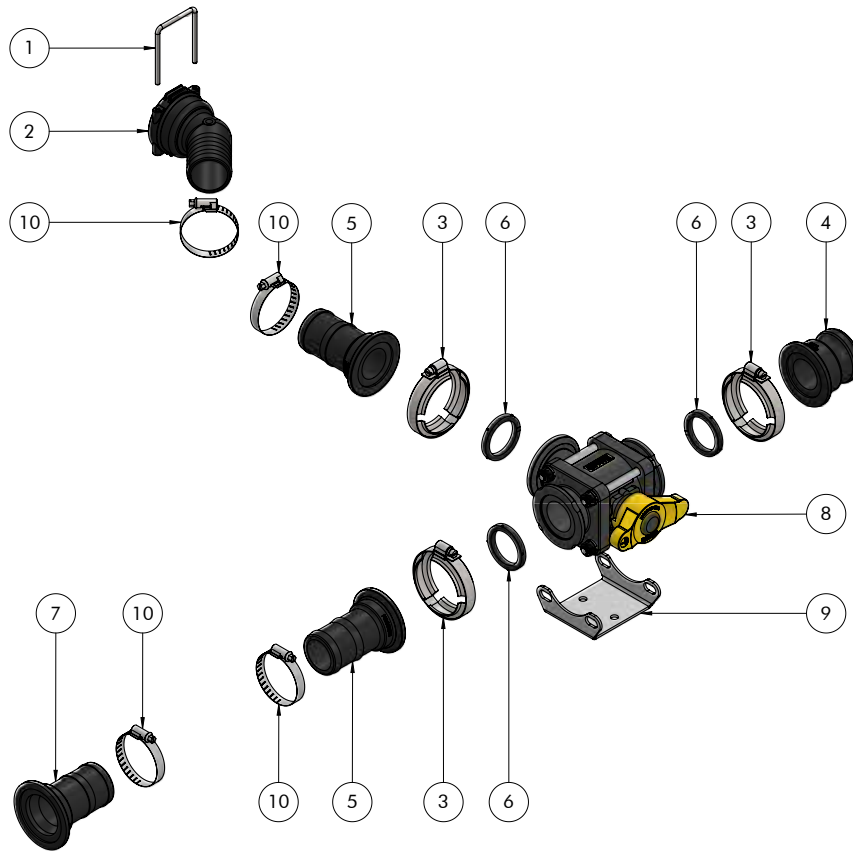
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SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

KH-4101-02 - SUCTION VALVE KIT

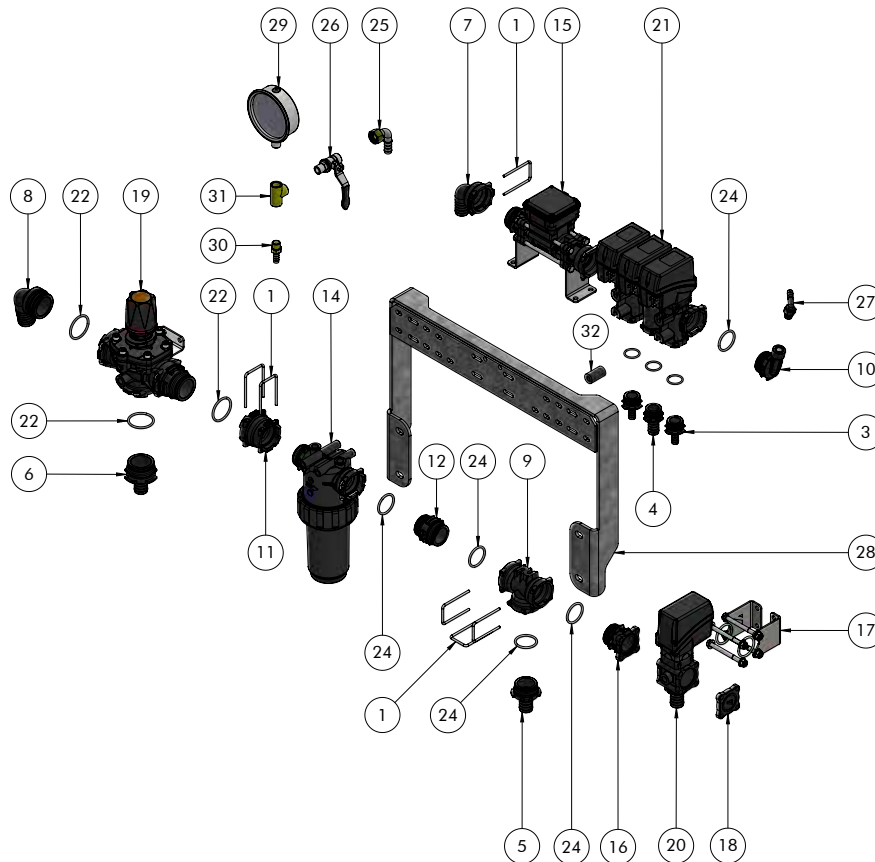


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	A010007	FORK D.5 INTERN 0.59 T7	1
2	A1192750	ELBOW 45DEG T7F D.50	1
3	BJFC200	WORM SCREW CLAMP 2"	3
4	BJM200A	CAMLOCK 2" MALE	1
5	BJM200BRB	MANIFOLD BARB 2 X 2	2
6	BJM201G	MANIFOLD GASKET 2 RIB EPDM	3
7	BJM220BRB	HOSE BARB 2 X 2 FP FLANGE	1
8	BJMV200BL	BALL VALVE 2" FP MANIFOLD	1
9	HP4000ABD-6	MOUNTING BRACKET-BJMV200BL	1
10	TR2HC	HOSE CLAMP 50MM 2" WORM DRIVE	4

SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

KH-4101-03 - PRESSURE MANIFOLD KIT



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	A010005	INLET FORK	5
2	A010006	FORK 453 SERIES T6	1
3	A1091313	HOSETAIL TM3 D.13	2
4	A1091320	HOSETAIL TM3 D.20	1
5	A1091525	HOSETAIL T5M D.25	1
6	A1091625	HOSE BARB T6M TO 1" BARB STRAIGHT	1
7	A1190525	ELBOW T5F D.25	1
8	A1191632	ELBOW T6M D.32	1
9	A139055	TEE T5F	1
10	A219350	GAUGE PORT T5M	1
11	A259056	REDUCER T5F-T6F	1
12	A259155	NIPPLE T5M	1
13	A259166	FORK NIPPLE T6M	1
14	A32620M35	FILTER LINE FORK 80 MESH	1
15	A46211A3A5B5	FLOWMETER EMAG 5-100 T5MF	1
16	A463000.156	T5M ADAPTOR FOR VALVES 463	1
17	A463000.910	MOUNTING KIT 1 VALVE	1
18	A463011.110	BLANK ADAPTOR	1
19	A475560	MANUAL PRESSURE VALVE T6F 8B	1
20	A86300245	PROP CONTROL VALVE 7 SEC	1
21	A863T003	VALVE 3 SECTION 863T	1
22	AG11023	O RING T6	4
23	AG11058	O-RING	3
24	AG11063	O RING EPDM	5
25	B163.604.13	ELBOW 1/2" C/W HEX NUT 1/2'	1
26	B165.1501.4	BALL VALVE 1/2" X 3/8" RH	1
27	BJHB025-038-90	ELBOW 1/4" NPT X 3/8" BARB	1
28	HP4000ABD-10	VALVE BRACKET OLAM	1
29	L-G1626	GAUGE 100MM 100MM 25BAR B/E	1
30	TFA3838	TAIL BRASS 3/8" BSPM X 3/8" TAIL	1
31	TFT3838FF	TEE 3/8" BSPF BRASS	1
32	UP-252	SPACER PRV 20 X 36	1

NOTE

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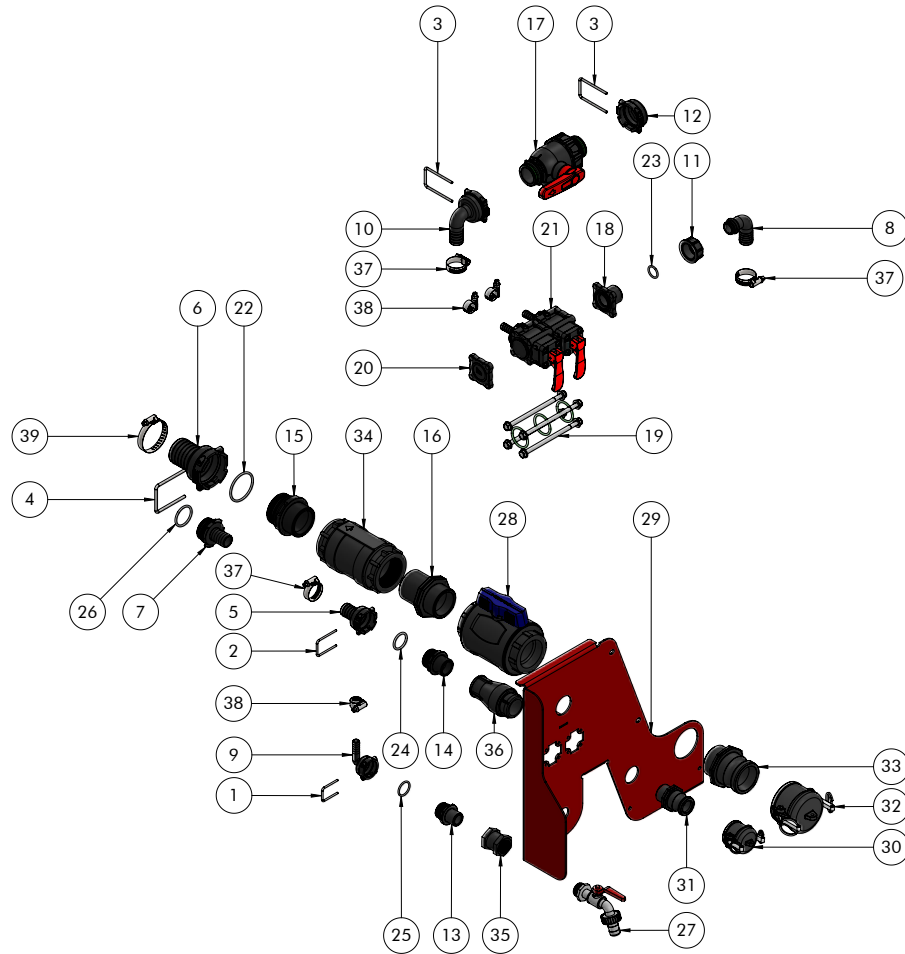
For further parts information refer to: www.croplands.com.au

Please contact Technical support for further details

SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

KH-4101-04 - FILL STATION / PANEL KIT

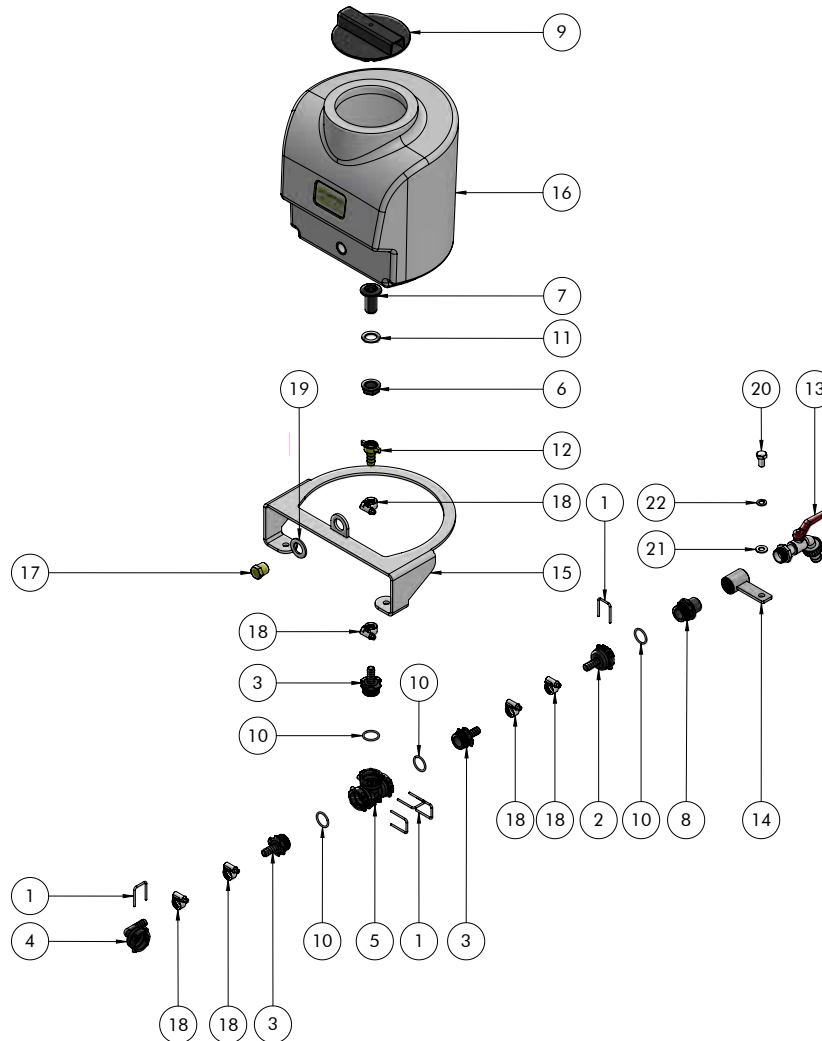


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	A010003	MANIFOLD FORK T3	1
2	A010004	MANIFOLD FORK T4	1
3	A010005	INLET FORK	2
4	A010007	FORK D.5 INTERN 0.59 T7	1
5	A1090425	HOSETAIL 25MM	1
6	A1090750	ELBOW T7F D.50	1
7	A1091525	HOSETAIL T5M D.25	1
8	A116425	ELBOW 0.25 FOR FLY	1
9	A1190313	ELBOW T3F D.13	1
10	A1190525	ELBOW T5F D.25	1
11	A200040	FLY NUT 1"	1
12	A219050	END CAP T5F	1
13	A249133	HOSETAIL T3M 3/4" M	1
14	A249144	ADAPTOR T4M 1" MALE	1
15	A249177	BULKHEAD T7M 2" SHORT	1
16	A250071	NIPPLE 2"	1
17	A45514405	BALL VALVE 1 1/4" 2 WAY TMS	1
18	A463000.040	FLANGE 463 SERIES 1" BSP	1
19	A463000.920	MOUNTING KIT 1 VALVE	1
20	A463011.120	CLOSED ADAPTOR	1
21	A463051	VALVE MANUAL 13MM TAIL	2
22	AG11017	O RING T7	1
23	AG10041	O RING 1"	1
24	AG11054	O RING 25MM	1
25	AG11058	O-RING	1
26	AG11063	O RING EPDM	1
27	BALL34BIB	BALL BIBCOCK 3/4"	1
28	GUGFBV50	BALL VALVE 2" FEMALE BLUE HANDLE	1
29	HP4000ABD-8	PANEL WEEDIT OLAM	1
30	K-100-CAP	CAMLOCK 1" CAP "DC" POLY GL	1
31	K-100-F	CAMLOCK 1" MALE THREAD "F"	1
32	K-200-CAP	CAMLOCK 2" CAP "DC" POLY GLASS	1
33	K-200-F	CAMLOCK 2" MALE THREAD "F" POLY	1
34	PH2600	NON RETURN VALVE 2"	1
35	PH4322	SOCKET 3/4"	1
36	PH5023	NON RETURN VALVE 1"	1
37	TR1HC	HOSE CLAMP 25MM 1" WORM DRIVE	3
38	TR12HC	HOSE CLAMP 20MM 1/2" WORM DRIVE	3
39	TR2HC	HOSE CLAMP 50MM 2" WORM DRIVE	1

SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

KH-4101-12 - HANDWASH ASSY



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	A010003	MANIFOLD FORK T3	5
2	A1090313	HOSETAIL TF3 D.13	1
3	A1091313	HOSETAIL TM3 D.13	3
4	A1190313	ELBOW T3F D.13	1
5	A139033	T FITTING T3F-T3F-T3F	1
6	A205020	BACK NUT 1/2"	1
7	A220020	TANK OUTLET 1/2"	1
8	A249133	HOSETAIL T3M 3/4" M	1
9	A3522000	BREATHER FOR 355MM & 455MM LID	1
10	AG11058	O-RING	4
11	AG40002	FLAT SEAL 1/2" EPDM	1
12	B162.604.3	HOSETAIL 1/2" W/ WINGED NUT 1/2"	1
13	BALL34BIB	BALL BIBCOCK 3/4"	1
14	FM-FDSOCKET	SOCKET FOR FOAM MARKER DROPPER	1
15	HP4000ABD-9	BRACKET HANDWASH 15LT	1
16	P600-15L	TANK HAND WASH TO SUIT 600/800LT	1
17	TFF12	PLUG 1/2" BSP BRASS	1
18	TR12HC	HOSE CLAMP 20MM 1/2" WORM DRIVE	6
19	M20FWASHER	M20 FLAT WASHER ZP	1
20	M10X20	M10 X 20 SET SCREW HT ZP	1
21	M10FWASHER	M10 FLAT WASHER ZP	1
22	M10SWASHER	M10 SPRING WASHER ZP	1

NOTE

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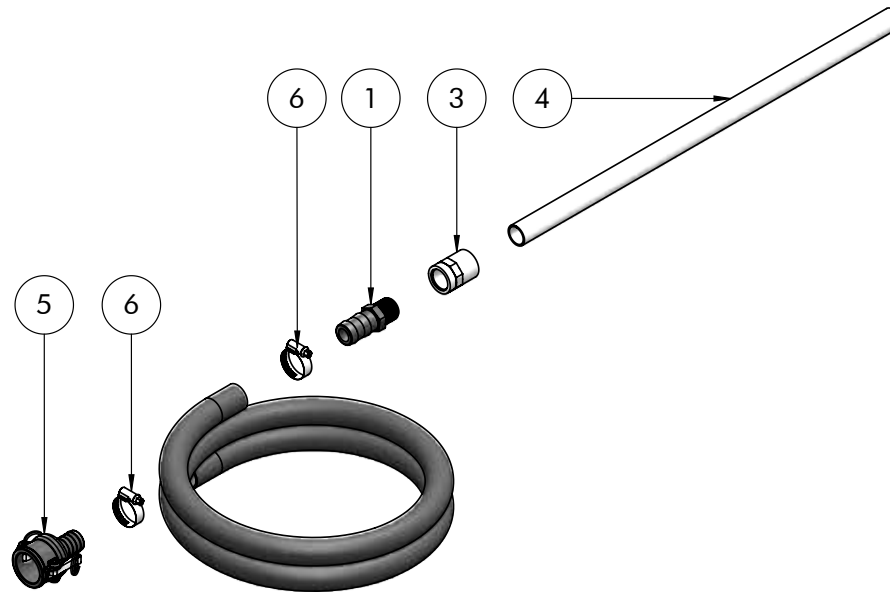
For further parts information refer to: www.croplands.com.au

SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

KH-4101-14 - PROBE KIT

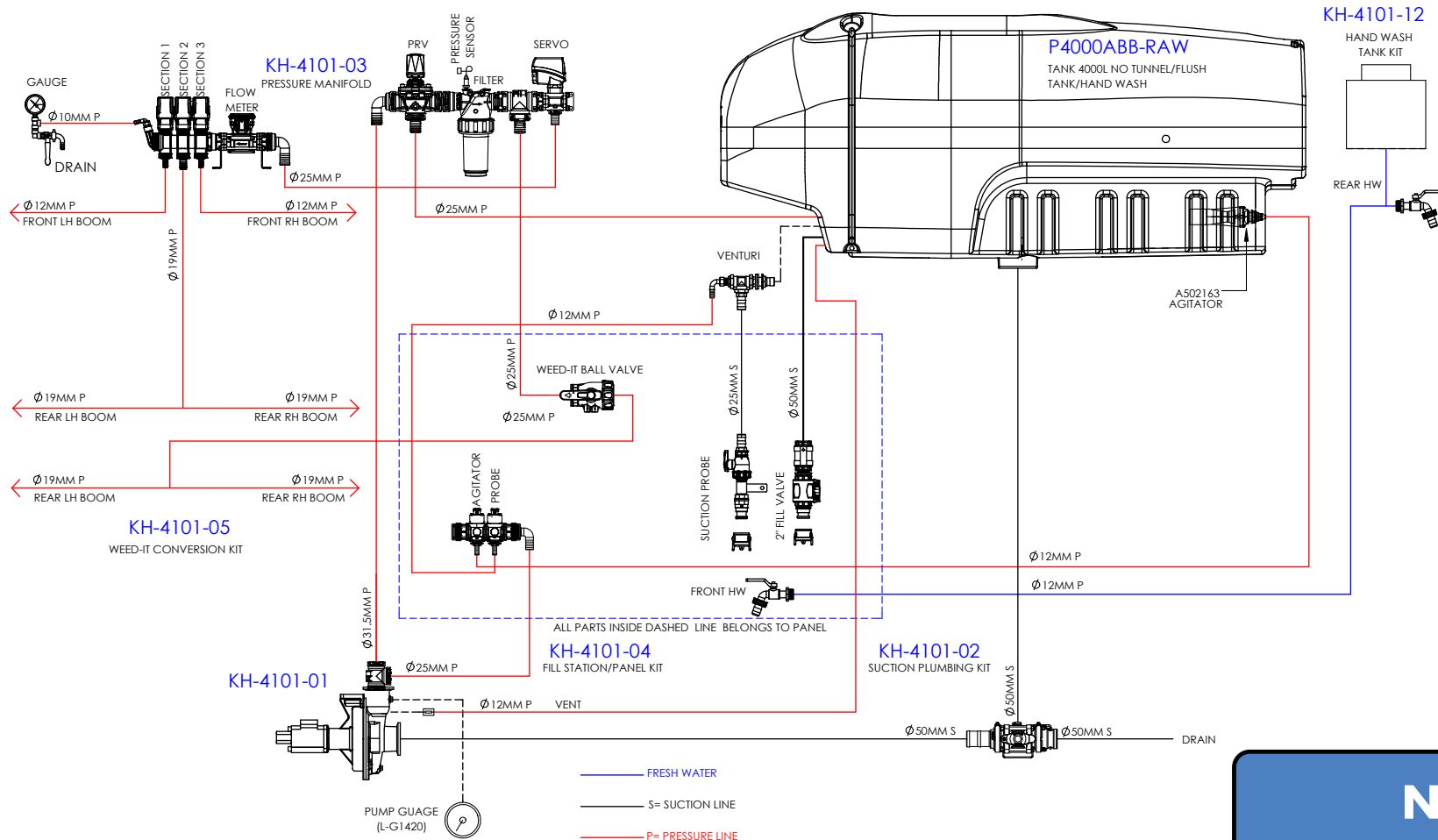
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	BJHB075-100	HOSEBARB 3/4" - 1" NPT MALE X 1"	1
2	HEP25	SUCTION HOSE (BLACK)	1
3	HP-262	PVC SOCKET 20MM FAUCET #18	1
4	HP-263	PVC PIPE 20MM PER METRE	1
5	K-100-C	CAMLOCK 1" HOSE SHANK "C" POL	1
6	TR1HC	HOSE CLAMP 25MM 1" WORM DRIVE	2



SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

PLUMBING SCHEMATICS - WEED-IT



NOTE

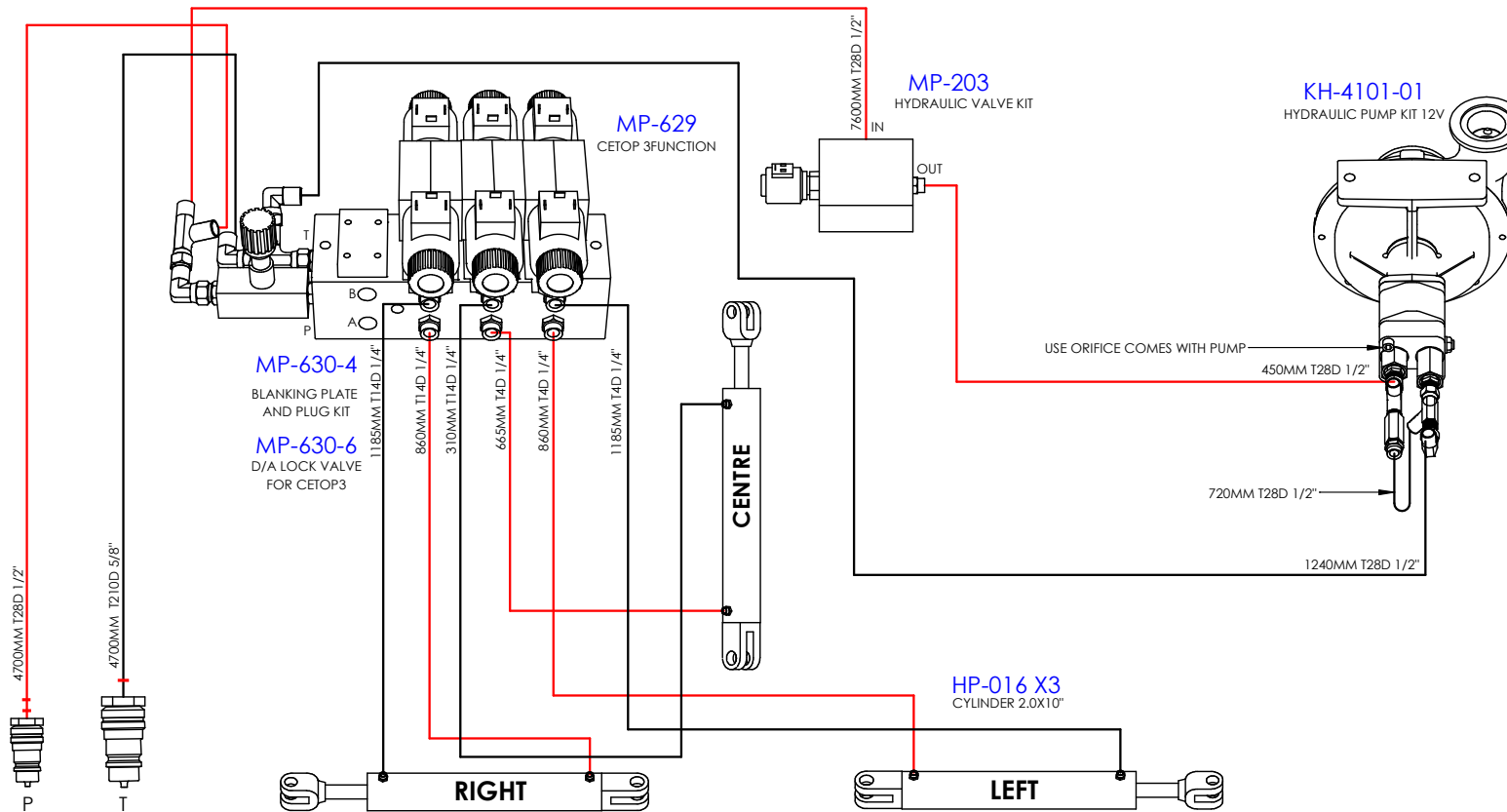
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SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

HYDRAULIC SCHEMATICS



P= PRESSURE A= PRESSURE PRESSURE LINE RETURN LINE
 T= TANK B= TANK

KH-4101-13
 HYDRAULIC HOSE KIT

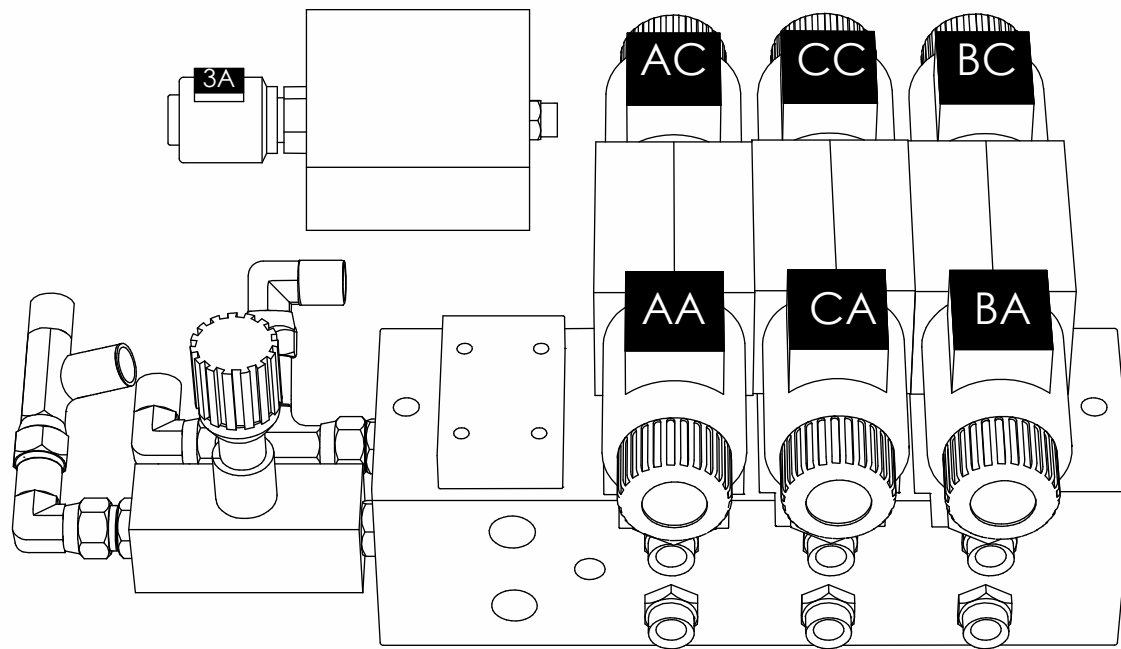
- KH-4101-08**
 HYDRAULIC KIT
1. HP-016 X3
 2. MP-629 X1
 3. MP-203 X1
 4. MP-630-4 X1
 5. MP-630-6 X2

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SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS



A466970705.100

CABLE HYDRAULIC 4+3 10 METRE



A46697020

SWITCH BOX HYD 2+3

MP-4230

FACE PLATE



ORIGINAL PUMP SWITCH IS REPLACED WITH BELOW

ASEL1202

NOTE

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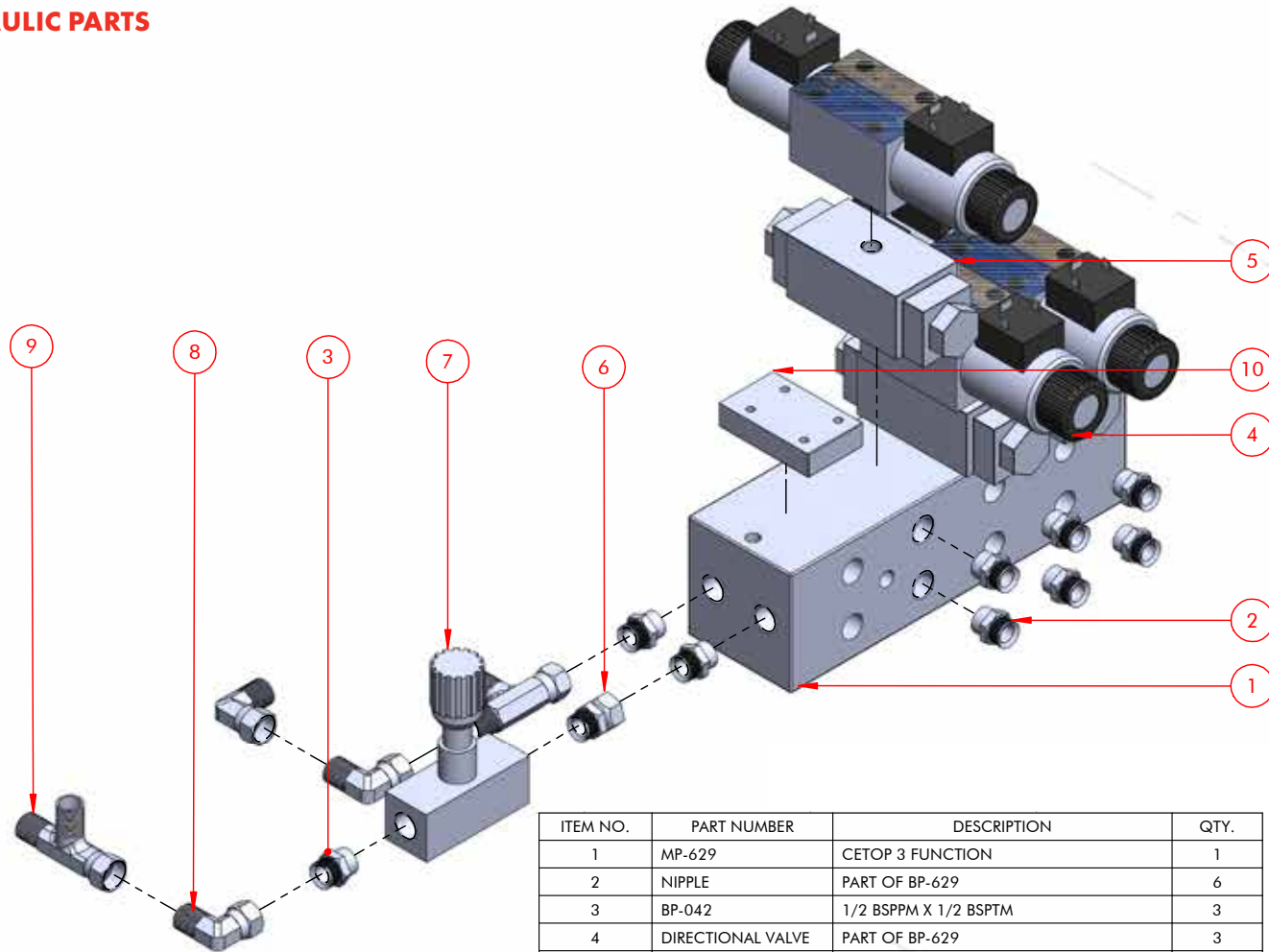
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SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

HYDRAULIC PARTS



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	MP-629	CETOP 3 FUNCTION	1
2	NIPPLE	PART OF BP-629	6
3	BP-042	1/2 BSPPM X 1/2 BSPTM	3
4	DIRECTIONAL VALVE	PART OF BP-629	3
5	MP-630-6	D/A LOCK VALVE FOR CETOP 3	3
6	S43-0808	N/A	1
7	NEEDLE VALE	PART OF MP-203	1
8	BP-047	1/2 BSPPM x 1/2BSPPFM SWIV ELBOW	3
9	BP-031	1/2 BSPTM 1/2 BSPPFM 1/2 BSPTM TEE	2
10	MP-630-04	BLANKING PLATE AND PLUG KIT	1

NOTE

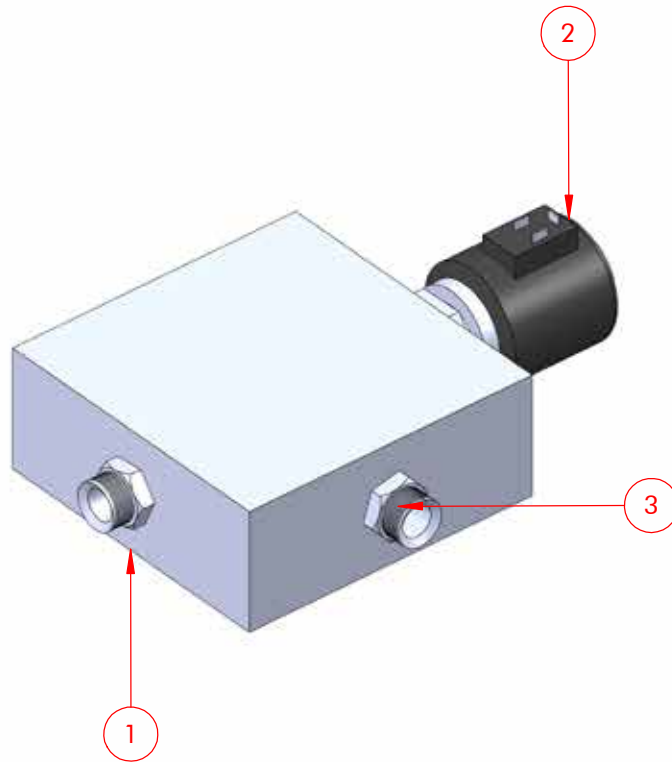
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SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	BLOCK	PART OF MP-203	1
2	SOLENOID	PART OF MP-203	1
3	S75-0812	N/A	2

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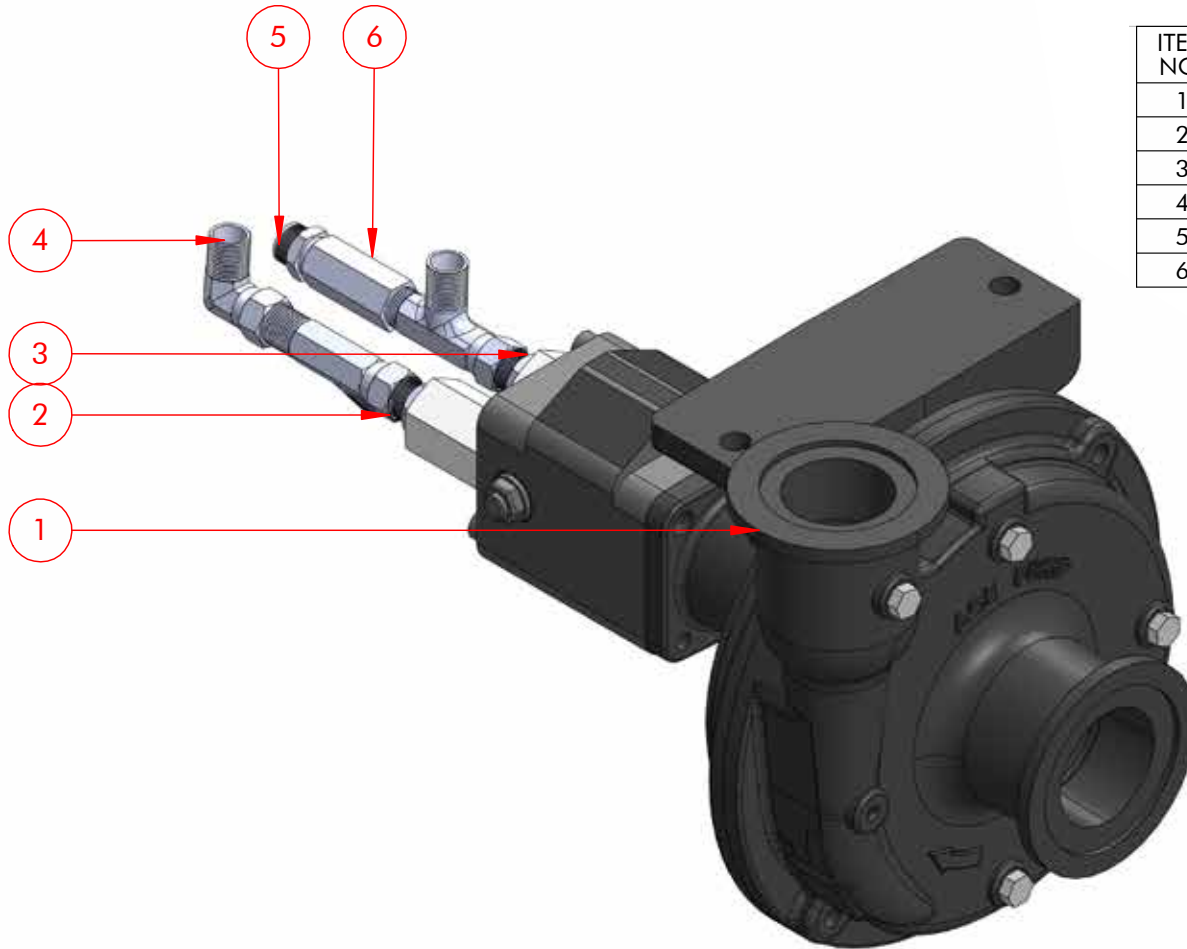
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SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

CENTRIFUGAL PUMP ASSY



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	ACE48926	PUMP FM CSC-155F-HYD-206	1
2	BP-031	1/2 BSPTM 1/2 BSPPFM 1/2 BSPTM TEE	2
3	BP-056	1/2 BBSPT x 78 UNOM NIPPLE	2
4	BP-047	1/2 BSPM x 1/2BSPPFM SWIV ELBOW	1
5	BP-042	1/2 BSPPM X 1/2 BSPTM	1
6	OVER RUN		1

NOTE

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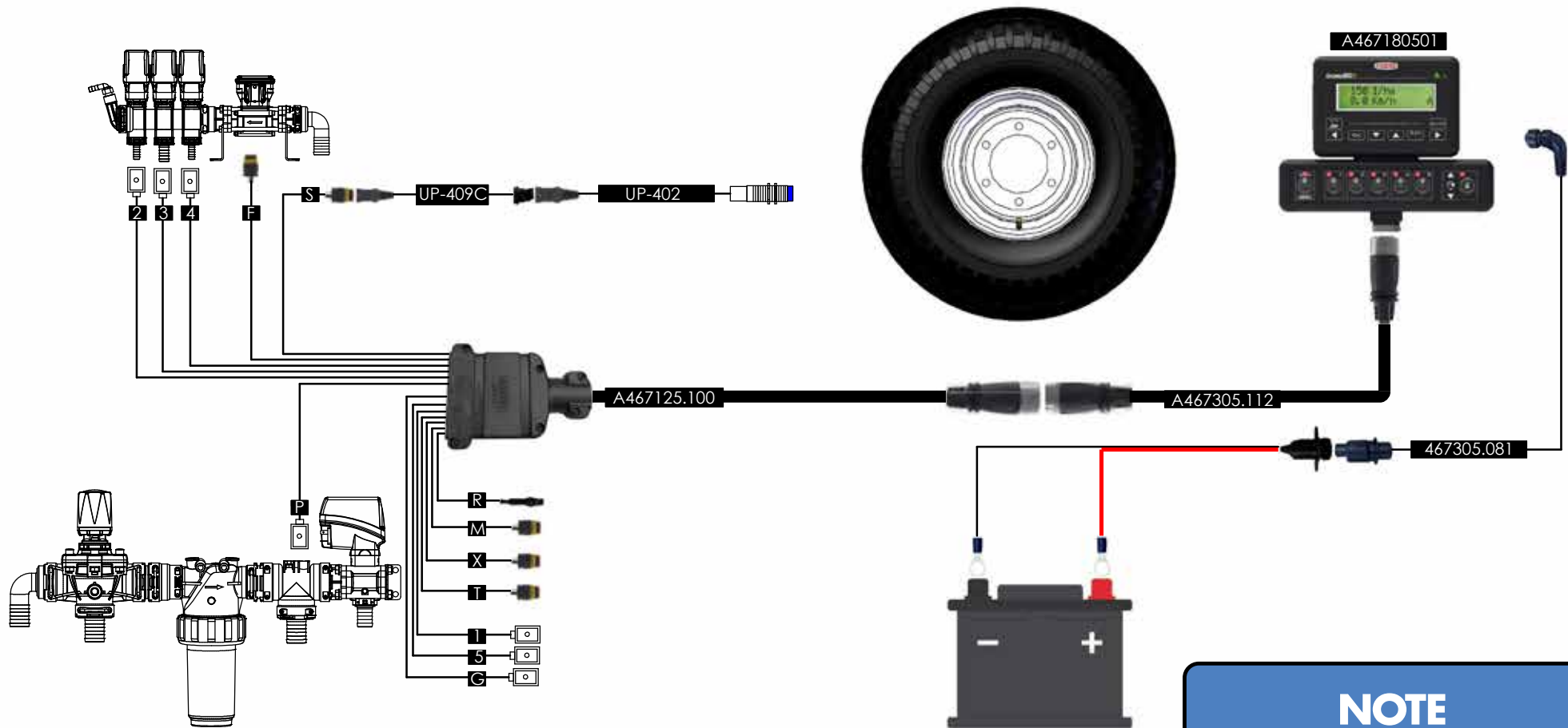
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SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

BRAVO 180S SCHEMATICS



NOTE

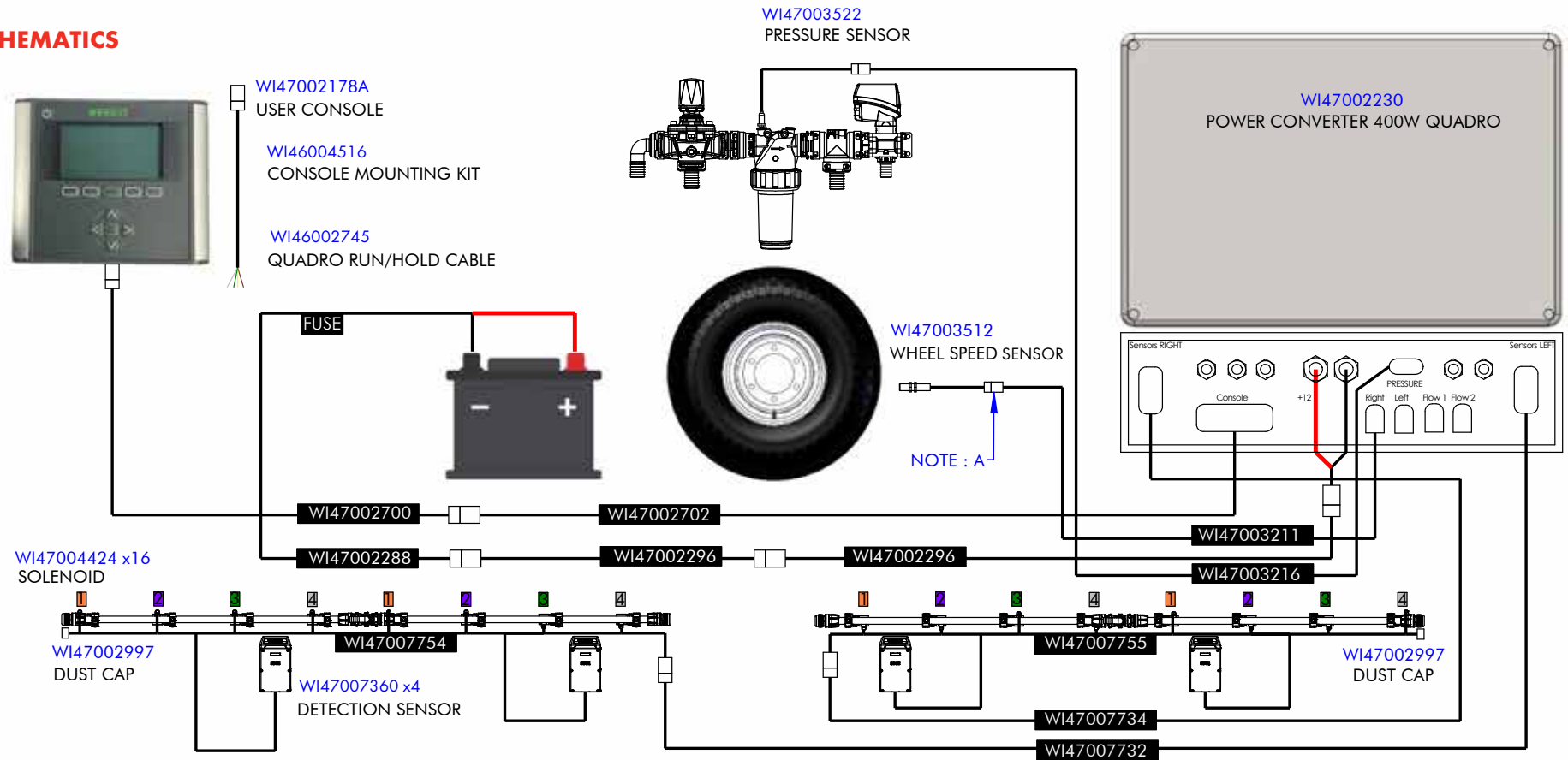
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SECTION 11

ASSEMBLY DRAWINGS, PARTS & SCHEMATICS

WEED-IT SCHEMATICS



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NOTE : A
SWAP BLUE AND BROWN WIRES

Please contact Technical support for further details

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on the Croplands website