CROPLANDS

OPERATORS MANUAL
QUANTUM FUSION

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STOP

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

HT-OMFUSION-A

INTRODUCTION | GENERAL MANAGER'S WELCOME

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

CONTENTS

SECTION 1
IMPORTANT INFORMATION

FOREWORD

Croplands Equipment is a subsidiary of Nufarm Australia Ltd and operates as Croplands Equipment Pty Ltd in Australia and Croplands Equipment Ltd in New Zealand. Croplands are a leading manufacturer and supplier of spraying equipment.

This operator's manual covers the Croplands' Fusion Controller, as supplied (as required) with horticulture Sprayers.

Manufactured to a high standard for use in Agriculture and Horticulture, every effort has been made to include all information needed for the correct use of your controller/sprayer.

ABOUT THIS MANUAL

This manual is to be used in conjunction with the sprayer's operators manual.

Some features explained is this manual may not be applicable to your model.

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

This manual, HT-OMFUSION-A, was published in October 2022. Check online as there may be more recent revisions of this manual.

BEFORE OPERATING YOUR SPRAYER

1. Before attempting to use your sprayer, make sure you read the Operator's Manual and Safety Manual.
2. Always wear applicable protective clothing.

NOTE

To convey useful operating information.

WARNING

To stress potential dangers and the importance of personal safety.

CAUTION

To highlight potential injury or machinery damage.

DANGER

Probability of death or serious injury if an accident occurs

TERMINOLOGY

These terms/symbols used throughout this manual:

WARRANTY POLICY

Refer to your Croplands Specification, Safety, Warranty & Delivery Booklet supplied with your sprayer. Always make contact with 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.

SECTION 2
SAFETY

Please refer to the Croplands 20 page Safety Manual, part number "GP-SAFE-A" which will be supplied with this your sprayer. If for any reason the Safety manual is not available, please see your dealer, Croplands Customer service or the Croplands Web Site to obtain a copy.

This product should not be operated before first reading and understanding the full safety manual.

Be especially vigilant of the PTO shaft and high pressure oil leaks.

SECTION 3
PRODUCT IDENTIFICATION & INSTALLATION

PRODUCT IDENTIFICATION

Always use the serial number of the controller (and or 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 (and sprayers etc) should also be recorded for future reference.

Note the Fusion controller serial plate in the below photo.

GENERAL SPECIFICATION

The SMART Sprayer is Croplands premium vineyard sprayer that comes in double row and triple row configurations. The Quantum Mist™ system uses a combination of individual hydraulically driven Spray fans with 5-blade fans to give the maximum possible spray coverage in grapes and dwarf tree crops.

All Smart Sprayers feature the Fusion Control system which allows for full electric over hydraulic control for many of the Smart Sprayer features.

Note; An additional manual (HT-OMRECAP2-A) is supplied with the Smart Spray Recapture system as it uses several features of the Fusion controller not listed in this manual.

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

The Croplands Fusion control system is a premium purpose built controller for Quantum Mist sprayers.

The easy to use system allows for full electric over hydraulic control of many or all (depending upon model) sprayer functions such as spray rates, fan speed control and boom function / hydraulic control.

Includes integrated joystick control and full-colour touch screen.

- CANBUS design with in-built diagnostics and software upgradeable functionality.
- Up to 8 x boom sections.
- L/ha or L/100m capability.
- Individual L/R fan speed control (Wind Comp.), programmable boom width control.
- Optional tank level sensor.

This manual is to be used in conjunction with the separately available sprayer's operators manual.

Some features explained is this manual may not be applicable to your model.

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

SECTION 3
PRODUCT IDENTIFICATION & INSTALLATION

FUSION CONNECTION

Applicable to Quantum Mist Sprayers equipped with the Fusion Controller. The first truly intuitive controller designed for viticulture.

From battery to cab is a power loom (UP-119C), and thereafter is the Fusion loom (CHLOOM/FUSION) which connects to the ECU module (generally mounted at the front of the sprayer).

The front end of the loom has 3 connections for:

- Console (12 pin)
- Joystick (6 pin)
- Updating port (4 pin) or optional Nupoint

Followed by a power lead which picks up the (UP-119C).

Behind the cab is a connection to break tractor from sprayer – a handy way to make sure everything is off.

Note the section valves can draw a small current even with the controller turned off.

At the sprayer the loom connects to the ECU Module with 2 large pins. From here are connections for:

- Micro Power Pack (level switch)
- Pump speed
- Flow meter
- Proximity or GPS Speed Sensor
- Spray "dump" / by-pass valve
- Flow Meter
- Pressure Transducer
- Tank level (optional)

At the rear of the sprayers there are connections for ...

- Section valves
- Boom position sensors and boom fold control.

And

- Main hydraulic function block which, including ...
  - Fan speed control (2)
  - Dump

SECTION 3
PRODUCT IDENTIFICATION & INSTALLATION

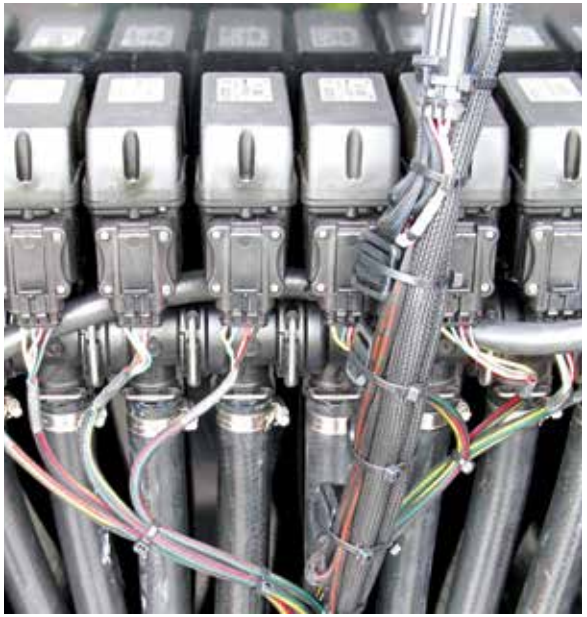
NOTE; Actual use and location of connections can vary from sprayer model to model. Refer to the sprayer manual for specific information.

Some examples of connections are;

Shown below are connections to 8 spray section valves. Refer to Section 4 re the 3 tiered spraying function.

Shown in the middle column is connection to the main hydraulic block of a QM Smart Spray unit. Refer to Section 4 re the WindComp function.

Shown to the right are wheel speed sensor and flow meter.



SECTION 3
PRODUCT IDENTIFICATION & INSTALLATION

JOYSTICK & MOUNTING

FIT FUSION CONTROLLER TO TRACTOR

The Fusion controller (if supplier with a sprayer) will have been fitted and adjusted at the factory but has been disconnected and packed for transit.

Also supplied along with this operators manual will be the joystick, power / controller looms and mounting hardware.

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

Repeat the same for the joystick.

Connect the controller couplings to the supplied loom.

The loom goes from battery

- ➔ joystick
- ➔ display screen

NOTE; As the section valves can draw a small current even with the controller turned off, hence disconnecting at the back of the tractor is a good way to make sure everything is off.

Hardware part numbers;

HP-100	Joystick
HP-318-11	Joystick mount plate (right angle)
HP-318-12	Console mount plate (stainless)

SECTION 4
PRODUCT FEATURES/FAMILIARISATION

TIERED SPRAYING

Dual spray rings make it possible to achieve a greater application rate spectrum, more consistent spray pressures, reduces nozzle changes & helps eliminate off target spray drift via 3 Tier spraying.

- Tier1 / Low rates = Inner rings ON / Outer rings OFF.
- Tier 2 / Medium rates = Inner rings OFF / Outer rings ON.
- Tier 3 / High rates = Inner & Outer rings ON.

All sections are activated via in cab Fusion screen & Joystick control.

Photo 1

Note; Smart Sprayers are using the convention of:

- The smaller / inside spray ring uses the smaller nozzles.
- The larger / outer spray ring uses the bigger nozzles.

Note both rings use the same diameter stainless steel tube, it's the circumference of the ring that's smaller or larger.

Operators can change nozzles to suits their specific requirements – it might be the same nozzle on every spray ring, or it might be a specialist nozzle on either of the spray rings. The choices are never-ending.

Photo 1 shows inlet (top) and outlet (tap at the bottom) of the outer / larger diameter spray ring. To the inside shows the inner spray ring which has similar connections on the opposite side.

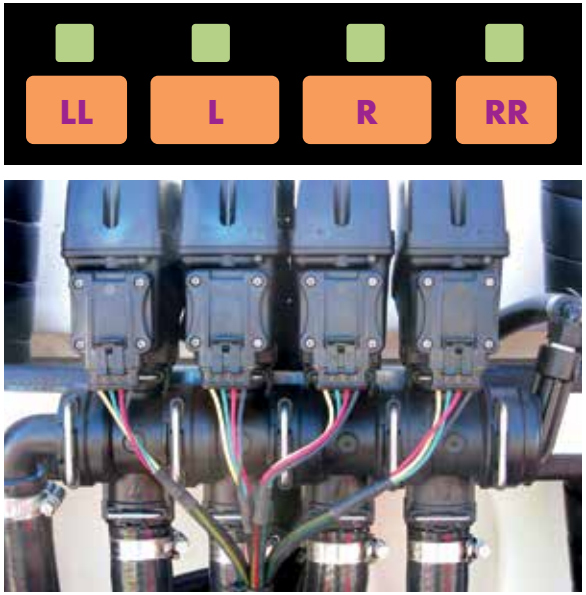


Photo 2

4 Section control (Photo 2)

For a 2 row sprayer:

LL Left outer rings

L Left inner rings

R Right inner rings

RR Right outer rings

Using L and R together is Tier 1, all fans are spraying with the inner spray ring.

Using LL and RR together is Tier 2, all fans are spraying with the outer spray ring.

Using LL, L, R & RR together is Tier 3, all fans and all sprayer rings are in operation.

8 Section control (Photo page 8)

For a 3-row sprayer.

LL is the left 3rd row fan, and can be operated as Tier1 only, Tier 2 only or Tier 3 with both T1 & T2 together.

L are the left 1st & 2nd row fans and have the same T1, T2 and T3 options.

R are the left 1st & 2nd row fans and have the same T1, T2 and T3 options.

RR is the Right 3rd row fan, and can be operated as T1 only, T2 only or T3 with both T1 & T2 together.

See Section 6 and the separate Fusion Manual for more information on operating the controller & spray system.

SECTION 4
PRODUCT FEATURES/FAMILIARISATION

WINDCOMP HYDRAULICS

Wind Comp (wind compensation via independent Left/Right fan speed control) is a new feature made possible by the new Fusion hydraulic system. The fans facing left or right sides can be run independent of each other. This is ideal for combating cross winds or spraying in exposed / challenging conditions. For example, instead of running both sides of the sprayer at 2,200 rpm, with Wind Comp it's possible to increase fan speed against the wind to say 2,500 rpm, and on the downwind side the rpm will drop to around 1,900 rpm.

Note the **laws of physics still apply**, if the maximum speed is 2,500 rpm on all fans, it's not possible to increase one side to 2,800 and leave the other at 2,500.

NOTE

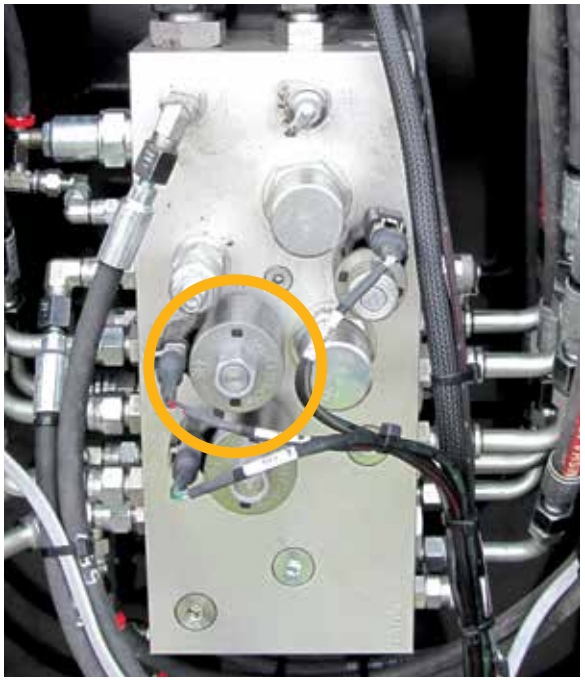
The block shown in the middle column is highlighting the rpm solenoid from a Smart Spray machine and may not be the same block used on your sprayer.

PTO Speed / Hydraulic Requirements

Due to the configuration of the hydraulic control block, the PTO / Pump / Tractor (depending on how oil is being supplied) needs to maintain a minimum output in order to supply both sides of the fan circuits with the same operating rpm. For example, if at PTO = 420 rpm and both LH & RH fans are running at 2,400 rpm, as the PTO speed reduces below the minimum, one side will maintain priority and continue to run at 2,400 rpm and the other side will drop away and run slower. This feature can be used to determine best PTO speed to economically run the sprayer.

Recommended minimum PTO speed = 420 rpm

Note the actual minimum (at which point the LH and RH fans differ) will change from sprayer to sprayer and is more likely to be lower than 400 rpm.



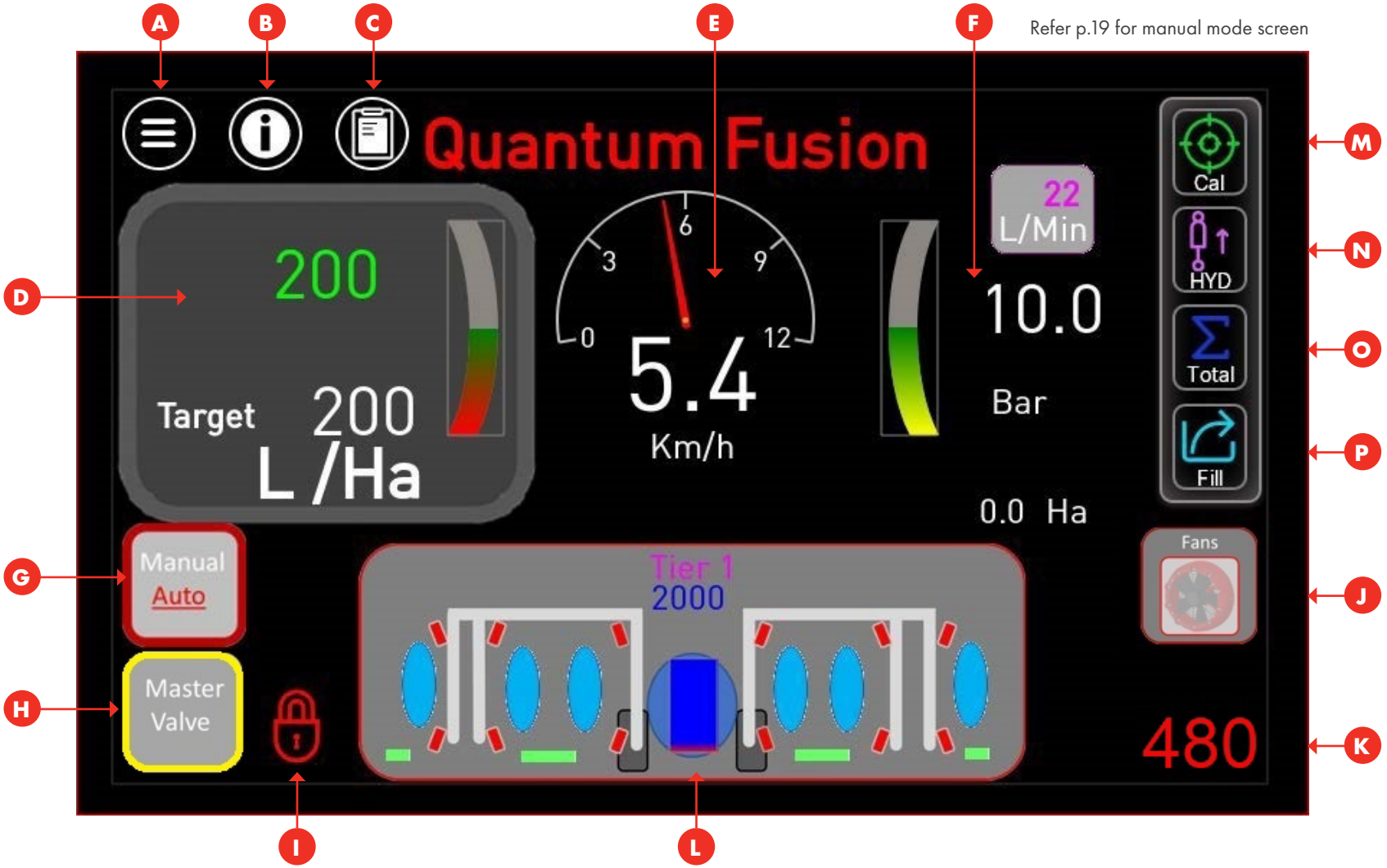
VINE PRO SPRAYER

New features to be published in 2023.

SECTION 4
PRODUCT FEATURES/FAMILIARISATION

MAIN SCREEN - AUTO MODE SHOWN

Refer p.19 for manual mode screen



SECTION 4
PRODUCT FEATURES/FAMILIARISATION

A. SYSTEM MENU
This is the gateway to the back-end System and technical settings.

B. INFORMATION MENU
This menu contains the Fusion joystick button & axis function information.

C. SCREEN DISPLAY MENU
The screen display brightness (backlight) and screen saver menu are adjusted here.

D. SPRAY APPLICATION WINDOW
This window shows the selected target rate (white). The actual rate is displayed above.

E. GPS SPEED WINDOW
Displays GPS travel speed of the sprayer. Displays speeds between 0 - 12km per hour.

F. SPRAY PUMP PERFORMANCE
This section of the screen changes between Manual and Auto mode. Actual pump pressure is displayed as a (white) read out in Bar pressure.

G. MANUAL / AUTO MENU
This button selects the operating mode. Note Auto/ Manual can also be changed via the Joystick.

H. MASTER VALVE
This button turns on & off the Main dump valve.

I. SECTION SWITCH LOCK
This function is only used to assist a novice operator. It locks out the Section switches meaning the operator can only operate the sprayer as ON or OFF.

J. FANS
This button turns the hydraulic drive spray fans On / Off.

K. SPRAY PUMP RPM SPEED
When the pump is activated the pump RPM speed will be displayed in (red) in the RHS lower corner of the spray screen.

L. SPRAYER OPERATION WINDOW
This window contains the "live" operating spray functions. The Sprayer sections are displayed as green stripes.

More detailed information in the next Section.

M. CAL (Sprayer setting) MENU
This button takes you to the Calibration input page.

N. HYD (Hydraulic setting) MENU
This button takes you to the Fan Speed Control settings and Hydraulic boom settings page.

O. TOTAL (Jobs total) MENU
Up to 2 x jobs can be monitored on this page. Also displayed is the Sprayer Totals History (in hectares and litres).

P. FILL (Tank Volume Re-set) MENU
Confirm tank volume after every tank using the slider bar.

Refer to section 5 for more detailed information on these functions.

SECTION 4
PRODUCT FEATURES/FAMILIARISATION

JOYSTICK OPERATION

SW1 - LL Section
SW4 - Lh sec on/off

SW7 - Lh Boom X-Y axis
Double click to activate
LH wind comp

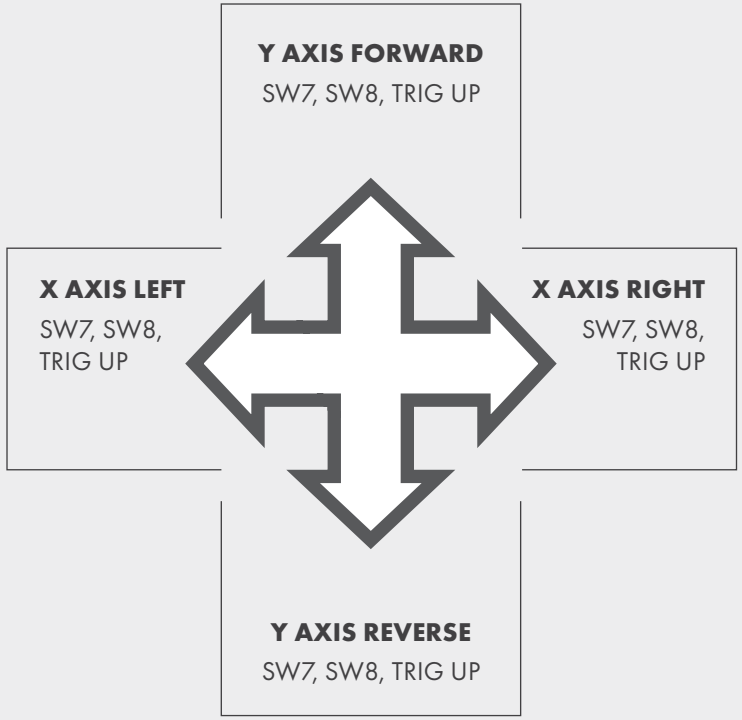
SW2 - Auto/Manual
SW6 - Fans on/off

SW3 - RR Section Valve
SW5 - Rh sec on/off

SW8 - Rh Boom X - Y axis
Double click to activate
RH wind comp

TRIG UP
Lh/Rh combined fold /
Lift via X axis

TRIG DOWN
Master spray on/off



SECTION 4
PRODUCT FEATURES/FAMILIARISATION

Left Boom Arm

Press and hold SW7 on the joy stick.
By moving the joystick to the X Axis Left position, the left boom arm will fold in.
By moving the joystick to the X Axis Right position the left boom arm will fold out.

Right Boom Arm

Press and hold SW8 on the joy stick.
By moving the joystick to the X Axis Left position the right boom arm will fold in.
By moving the joystick to the X Axis Right position the right boom arm will fold out.

Left Terracing

Press and hold SW7 on the joy stick. By moving the joystick to the Y Axis Forward position the left boom arm will lift. By moving the joystick to the Y Axis Reverse position, the left boom arm will go down.

Right Terracing

Press and hold SW8 on the joy stick. By moving the joystick to the Y Axis Forward position the right boom arm will lift. By moving the joystick to the Y Axis Reverse position, the right boom arm will go down.

SECTION 4
PRODUCT FEATURES/FAMILIARISATION

Fusion Fan Operation

Activating Fans

Enter the "Hydraulic" tab on the right side of the main screen. Set "Master" to 100 and "Wind Comp" to 0. Activate the fans by pressing SW6 on the joystick. The left and right fan rpms will appear under the Master and Wind Comp sliders. While the PTO speed is low one of the fan rpms will read around 2500 and the other will be lower. Gradually increase the PTO speed and the lower rpm reading will even up, at this point you now know the lowest PTO rpm you can run this system at to achieve 2500 fan rpm. It is recommended though that you run at least 500 PTO rpm to ensure sufficient hydraulic flow. See page 42 re confirming fan functionality.

Changing Fan Speeds

By moving the "Master" slider up or down both fan rpms will increase or decrease and will stay even when the wind comp is set to 0.

WindComp (see more re WindComp on pages 11 & 24

On the home spray screen you will notice there is an arrow pointing left or right. This arrow indicates which facing fans are blowing into the wind and will have a higher fan rpm if wind comp is activated. This arrow is changed by double tapping SW7 or SW8. For example, if the arrow is pointing left you will double tap SW8 to change to the right and then double tap SW7 to change back to the left.

Enter the "Hydraulic" tab on the home screen. With the Master slider set to 100, increase the Wind Comp slider. As you increase the Wind Comp slider you will notice the fan rpm going with the wind starts to drop off. You can then double tap the appropriate SW7 or SW8 and these fan rpms will flip.

If the Master is set to anything below 100 when the Wind Comp slider is increased the sprayer fans blowing into the wind will increase and the sprayer fans blowing with the wind will decrease.

To deactivate Wind Comp set the slider to 0. The arrow indicating which fans are going into the wind will still be present on the home screen but no change in fan speed will occur if SW7 or SW8 are double tapped.

To turn off the fans press SW6

Spraying

Selecting Tiers – From the "Spray" screen press on "Calibration". The bottom right section of the screen will have a box displaying which tier is currently selected. This can be pressed to select Tier 1, Tier 2 or Tier 3. On the spray screen there will be T1, T2 or T3 shown above the tank to indicate which tier is selected.

SECTION 4
PRODUCT FEATURES/FAMILIARISATION

- Tier1 / Low rates = Inner rings ON / Outer rings OFF.
- Tier 2 / Medium rates = Inner rings OFF / Outer rings ON.
- Tier 3 / High rates = Inner & Outer rings ON.

Setting target rate

From the "Spray" screen press on "Calibration".
Press the up/down arrows until the desired rate is shown.

Setting row width

From the "Spray" screen press on "Calibration".
Press the increase/decrease buttons either side of the row width to adjust.

Master/Dump Valve Operation

On the "Spray" screen there is a tap labelled "Master Valve". When this button has a Yellow border and writing the dump valve is activated and will operate via the joystick. When the button is Yellow with White writing the dump valve is locked in the spray position and will not change via the joystick.

Activating Sections

On the "Spray" screen there will be a picture of either a single row, 2-row or 3-row sprayer unit depending on your sprayer model. Each of these rows will have an oval shape next to them indicating the sections. If the oval is Grey then this section cannot be activated to spray via the joystick. To activate the sections press on the Grey ovals and they will turn Blue, these sections can now be activated to spray via the joystick. There is a bar below each section that is Grey when the sections are turned off and goes Green when the sections have been turned on via the joystick.

Joystick

Section LL is turned on/off with SW1

Section RR is turned on/off with SW3

Section L is turned on/off with SW4

Section R is turned on/off with SW5

All activated sections can be turned on/off at once with the "TRIG DOWN" switch and this will also work the dump valve if activated.

Manual/Auto mode

On the "Spray" screen there is a tab to select manual or automatic rate control modes. To change between the modes you press this button and the word in Red is what mode is selected.

When manual mode is selected an up and down button will appear on the spray screen. These can be used to adjust the spray pressure manually.

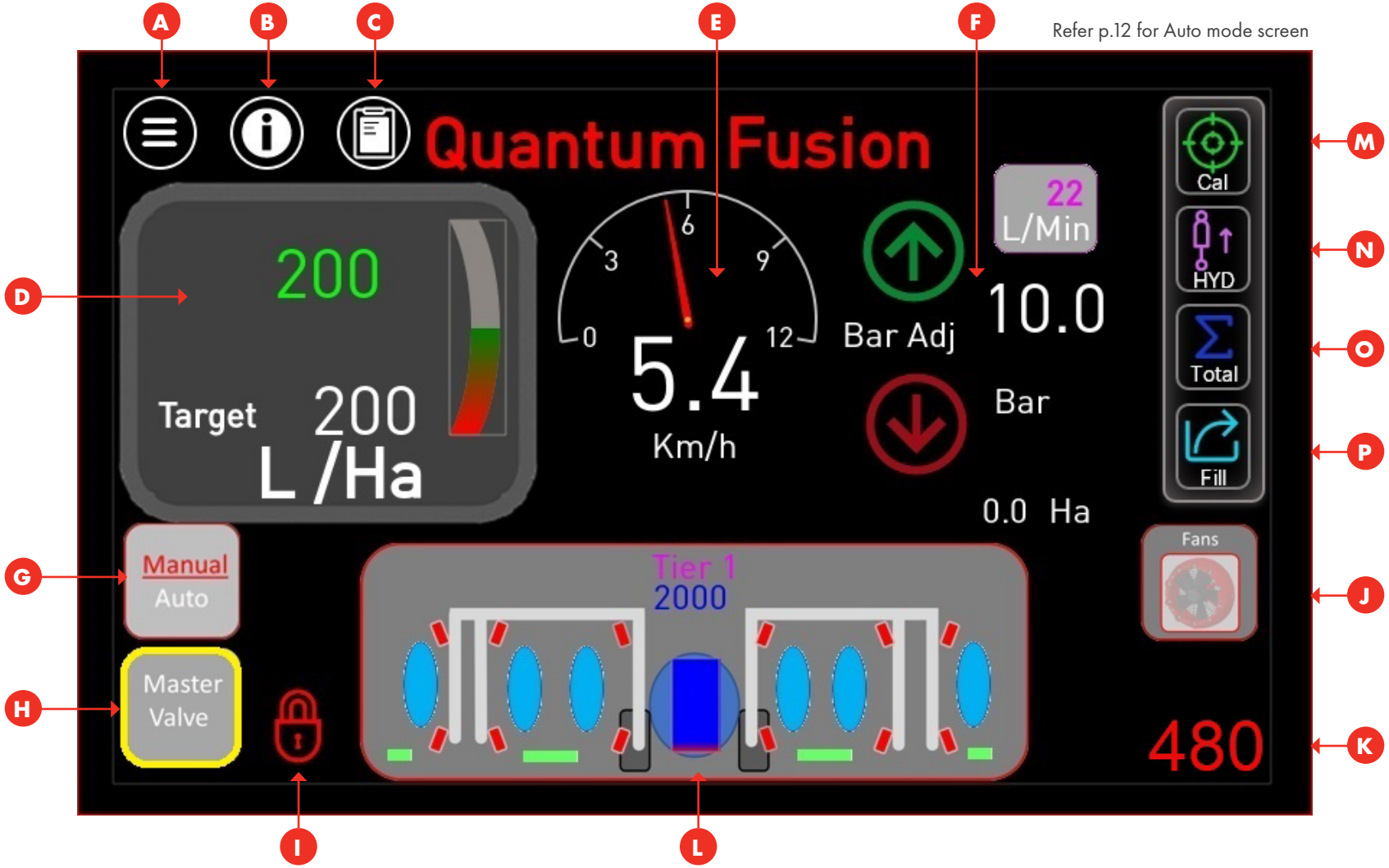
When auto mode is selected the controller will lock onto the target rate shown on the screen. The target rate can be changed in the "Calibration" screen.

SECTION 5
SETTINGS & PROGRAMMING

SECTION 5
SETTINGS & PROGRAMMING

MAIN SCREEN - MANUAL MODE OVERVIEW

Refer page 12 for AUTO mode screen



SECTION 5
SETTINGS & PROGRAMMING

A. SYSTEM MENU
This is the gateway to the back-end System and technical settings.

The button needs to be pressed & held for 10 x seconds to enlarge the icon. Once enlarged press again to progress to the Main menu option page. Also refer pages 28 ~ 32.

B. INFORMATION MENU
This menu currently contains the Fusion joystick button & axis function information. Also refer to pages 14 ~ 17.

C. SCREEN DISPLAY MENU
The screen display brightness (backlight) and screen saver menu are adjusted here.

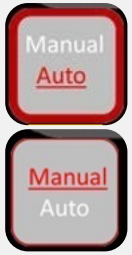
D. SPRAY APPLICATION WINDOW
This window shows the selected target rate (white).
The actual rate is displayed above.

If it matches the target rate is shown as (green). If it is different to the target rate it will be shown as (red).

E. GPS SPEED WINDOW
Displays GPS travel speed of the sprayer. The tacho has been designed to display speeds between 0 - 12km per hour.

F. SPRAY PUMP PERFORMANCE
This section of the screen changes between Manual and Auto mode.
In manual mode 2 x arrows (Green for Increase) and (Red for Decrease) are displayed. Pump pressure can be increased or decreased using these 2 x buttons.

Actual pump pressure is displayed as a (white) read out in Bar pressure. Above the pressure readout actual Spray pump litres per minute is also displayed.



G. MANUAL / AUTO MENU
This button selects the operating mode.
In MANUAL mode the sprayer can be operated stationary (when flushing out the sprayer after use).

In AUTO mode the sprayer needs to be moving to spray. Auto/Manual can also be changed via the Joystick.

H. MASTER VALVE
It can be used in the off position when mixing or inducting chemical using the Chemical suction probe.

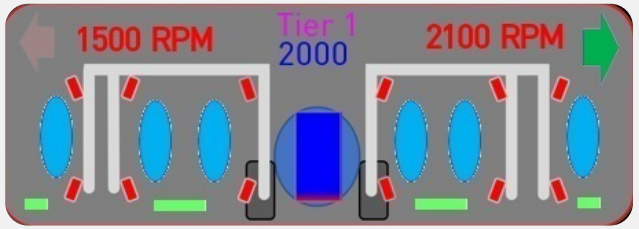
This button turns on & off the Main dump valve. It is recommended that this valve is in the ON position (Highlighted in yellow) to avoid excessive Spray pump pressure.

SECTION 5
SETTINGS & PROGRAMMING

I. SECTION SWITCH LOCK
This function is only used to assist a novice operator.
It locks out the Section switches meaning the operator can only operate the sprayer as ON or OFF. The section switches cannot be turned on or off via the Fusion joystick.
Red lock means the sections can't be individually turned off via the Joystick.

J. FANS
This button turns the hydraulic drive spray fans On / Off.
When on the fan icon is highlighted red.
The hydraulic spray fans can also be turned On / Off via the Fusion Joystick (Refer joystick information).

K. SPRAY PUMP RPM SPEED
When the pump is activated (either by PTO engagement or Tractor hydraulic remote lever) the pump RPM speed will be displayed in (red) in the RHS lower corner of the spray screen.



L. SPRAYER OPERATION WINDOW
This window contains the "live" operating spray functions. The Sprayer sections are displayed as green stripes (3-row = 4 x sections, 2-row = 2 x sections).

When the sections are spraying, oval shapes (representing the vine canopy) turn blue.

When the sections are not spraying the oval shapes remain grey.

Above the tank icon will display RV (Remaining volume) in the main spray tank (blue).

Above this value will be a Tier Reference (Tier 1, 2 or 3) (purple).

This confirms to the operator which Tier has been selected via the Calibration menu page.

At the top of the Spray window Left & right fan speeds are displayed in (red).

At the LHS top of the Spray window is a (red / grey) arrow.

At the RHS top of the Spray window is a (green /grey) arrow.

These 2 x arrows represent the direction of fan speed when using the Wind Compensation feature.

Above the Spray Window on the RHS is a Hectare meter.

This calculates area sprayed when starting a new spray job.

SECTION 5
SETTINGS & PROGRAMMING

M. CAL (Sprayer setting) MENU
This button takes you to the Calibration input page. The rate, row width and Tier selection are adjusted on this page. Also shown are the 3 x Spray job Pre-sets, the Sim speed button.

N. HYD (Hydraulic setting) MENU
This button takes you to the Fan Speed Control settings and Hydraulic boom settings page.

O. TOTAL (Jobs total) MENU
Up to 2 x jobs can be monitored on this page. Also displayed is the Sprayer Totals History (in hectares and litres).

P. FILL (Tank Volume Re-set) MENU
Confirm tank volume after every tank using the slider bar.

SECTION 5
SETTINGS & PROGRAMMING

1. To set basic spray job settings.

A. Press the **CAL** (Sprayer setting) MENU.

B. Press **INC or DEC arrows** to set the desired application rate in Litre / hectare. If preference is for litre / 100 metre please refer page x for detailed instructions.

C. Press **INC or DEC** to set the desired row width. (This is displayed in metres to 1 decimal point)

D. Press T1 to set the desired spray tier.

Tier 1 will spray only the inner ring nozzles (early season rates).

Tier 2 will spray only the outer ring nozzles (mid-season rates).

Tier 3 will spray both rings / all nozzles (full canopy rates).

By pressing the Green tick button your settings will be saved and will be displayed on the main Spray screen.

To set up the 3 x Spray job pre-sets refer "Programming - Additional Settings" on page 24 ~ 26.

2. Select Quantum Mist fan speed.

A. Press HYD (Hydraulic setting menu).

B. Press Master fan speed control

C. Set the Master fan speed control to the desired speed.

D. Set the Wind Comp Offset to the same speed.

E. The fans on both the Right & Left side of the sprayer will operate at the same speed.

When Windcomp is required set the master fan speed to the speed you want the fans going into the wind to be doing and set the Windcomp to the fan speed you want the fan going with the wind to be doing

3. Set the Spray tank volume.

A. Press FILL (Tank volume reset).

B. Use the slider bar to confirm the spray tank volume.

With these basic settings confirmed the operator can now commence spraying in AUTO mode.

SECTION 5
SETTINGS & PROGRAMMING

PROGRAMMING ADDITIONAL SPRAYER SETTINGS

Setting up Spray Job Pre-sets

Enter the CAL (Sprayer setting) screen and press and hold the pre-set number you want to configure, after 3 seconds a red square will appear next to the number. Press the red square and it will take you to another screen where you can set the rate and row width.

The operator can now select 1, 2 or 3 to lock in a Spray job which will be transferred onto the Main Spray screen.

NOTE - The Operator will still need to select the appropriate TIER SELECTION for the chosen Spray Job.

Programming the Wind Compensation Function

Press HYD 

(Hydraulic setting menu).

Press Master Fan speed

This will set the fan speed that will be "pushing" into an opposing cross wind. (In most instances this will be set to the Max. speed, however, it will also be relative to canopy density and growth stage.

Press Wind Comp Offset.

This will set the fan speed on the "wind assisted" side of the sprayer. (Set to a speed that ensures maximum spray is contained in the canopy and doesn't penetrate through as off target drift.

When setting the Wind Compensation Function, it is highly recommended to use an observer to determine and film (using a mobile phone) sprayer performance & penetration to achieve optimum sprayer coverage whilst minimising off target drift.

When satisfied with the Master Fan speed (MAX.) and Wind Comp Offset (MIN.) settings return to the Main Spray screen.

***The Operator must ensure that the Left and Right facing fans are at the correct orientation to the cross wind before commencing spraying.

The Left and Right fan speed is displayed on the Main Spray screen along with a Red (Left) and Green (Right) arrow to simplify orientation.

To change over or invert the Fan speed settings at the end of the completed row the operator will double click the left or right lower button on the Fusion Joystick control to perform the directional fan speed change.

WindComp (see more re WindComp on pages 11, 14 & 16).

SECTION 5
SETTINGS & PROGRAMMING

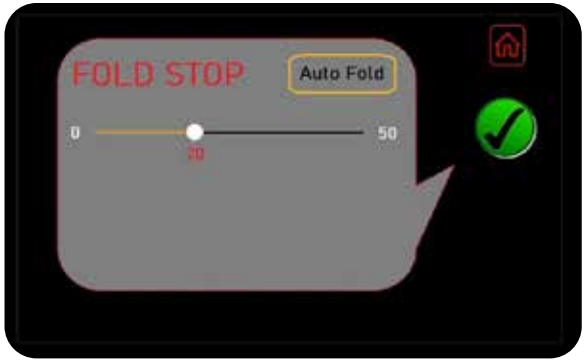
Programming Hydraulic Boom Settings

The Croplands Quantum Smart Spray is fitted with two electronic boom position sensors, 1 x left boom and 1 x right boom. These sensors are calibrated at factory to fold out to the required row width setting chosen by the operator.

To ensure this function is activated,

Press HYD (Hydraulic setting menu).

At the RHS Lower corner of the screen press the arrow left & right icon. This will enter a new screen.



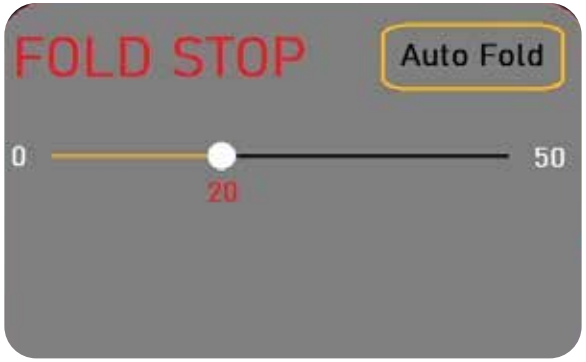
The AUTO FOLD button needs to be highlighted in Yellow to confirm the function is ON. The boom arms will now only fold out to the distance the row width is set to in the CAL screen.

NOTE; The Croplands Quantum Vine Pro sprayer is fitted with an additional boom position sensor for the rear (inner row) boom arms.

Using FOLD STOP

The FOLD STOP function stops the booms from folding all the way in (as a part fold).

Use the Slider bar to set from 0 - 50 the desired part fold setting.



This can be a handy function when needing to part fold the Sprayer booms whilst performing tight headland turns.

Re-Setting Work Totals

The Fusion Controller has 2 x Job totals it can calculate at any one time. Access via the TOTAL icon.

These are titled RESET A and RESET B and display hectares and litres sprayed.

These Job totals can be re-set by simply pressing either of the RESET A or RESET B buttons.

The RESET TOTAL is a good record of the Sprayers history and can be used as a service indicator reminder.

SECTION 5
SETTINGS & PROGRAMMING

Monitoring Recapture % Performance

If the Croplands Quantum Smart Spray is factory fitted with the (optional) Croplands Recapture kit, the sprayer will also be fitted with a Tank level sensor.

At the beginning of each new spray tank the operator must manually & accurately set the correct tank volume in the fill screen.

An ongoing an accurate Recapture % will be displayed on the TOTAL (Jobs total) MENU.

The Recapture % is calculated based on the Actual Tank Level sensor value compared to the Theoretical Liquid Remaining value.

For further information re the Recapture system refer to the Recapture operators manual, HT-OMRECAP2-A

Setting Alarms

By setting the Sprayer alarms a visual and audible alarm will alert the Operator if the sprayer performs outside of the set parameters.

To access the ALARM PARAMETER MENU, Press the SYSTEM MENU button for approx. 10 x seconds until the Icon enlarges.

Press button again.

Select the ADJUST MENU.

Scroll down to the bottom of the screen and select the ALARM PARAMETER MENU.

Select PUMP LOW ALARM

Tap on the numeric value and set to the desired speed (Croplands recommend 350). If the Spray pump drops below 350 RPM an alarm will be triggered. Tap the tick icon to save.

Select PUMP HIGH ALARM.

Set the numeric value to the desired speed (Croplands recommend 545). If the Spray pump spikes above 545 RPM an alarm will be triggered. Tap the tick icon to save.

Select BAR / PSI LOW ALARM.

Set the numeric value to the desired pressure (Croplands recommend 5 x BAR). If the Spray pump pressure drops below 5 x BAR an alarm will be triggered. Tap the tick icon to save.

Select BAR / PSI HIGH ALARM.

Set the numeric value to the desired pressure (Croplands recommend 12 x BAR). Tap the tick icon to save. If the Spray pump pressure spikes above 12 x BAR an alarm will be triggered. Return to the Main Spray screen.

SECTION 5
SETTINGS & PROGRAMMING

Setting a Simulated Spray Speed

If turning off individual spray heads & nozzles or using specialty nozzles for a particular application, it is advisable to perform a stationary spray pressure test.

To do this we need to give the sprayer a "Simulated Spray Speed" to replicate working conditions.

1. AUTO model must be selected.
2. Press CAL (Spray settings) MENU.
3. Press the SIM button.

4. Press the SIM / GPS SPEED function and select ON.
5. Press the SIM SPEED MANUAL function and set the normal desired working speed (8 km/hr).
6. Return to the Main Spray screen.

Although stationary the Sprayer now thinks it is traveling at 8 km/hr.

In AUTO model commence spraying to perform a Spray pressure test.

NOTE: When a stationary test has been completed the SIM Speed function must be turned OFF.

1. Press CAL (Spray Settings) MENU.
2. Press SIM. Press SIM / GPS SPEED function and select OFF.

SECTION 5
SETTINGS & PROGRAMMING

FUSION SYSTEM & TECHNICAL SETTINGS

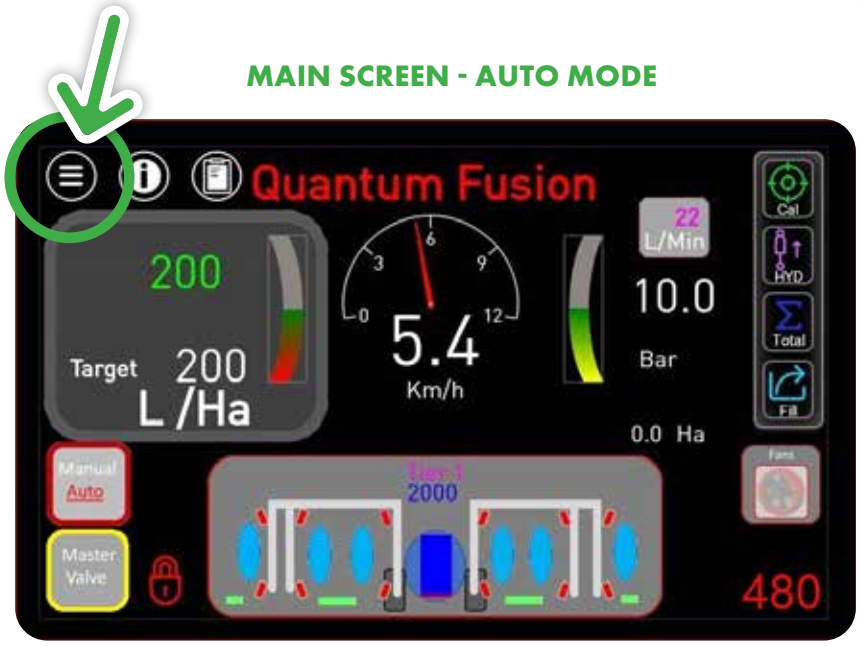
SYSTEM MENU's

This is the gateway to the back-end System and technical settings. The button needs to be pressed & held for 10 x seconds to enlarge the icon.

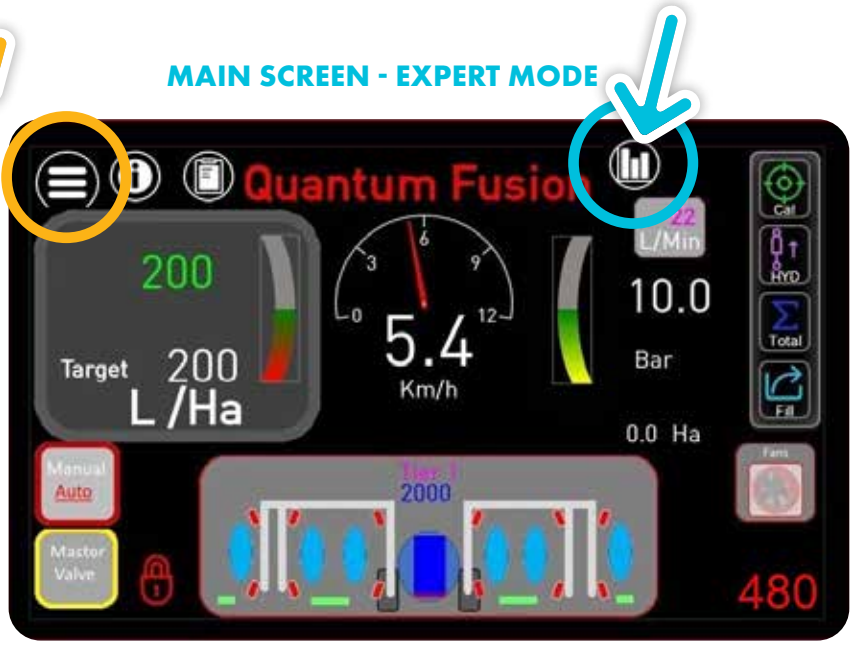
Once enlarged press again to progress to the Main menu option page.

To the right of screen is the icon to access the calibration page.

MAIN SCREEN - AUTO MODE



MAIN SCREEN - EXPERT MODE



SECTION 5
SETTINGS & PROGRAMMING

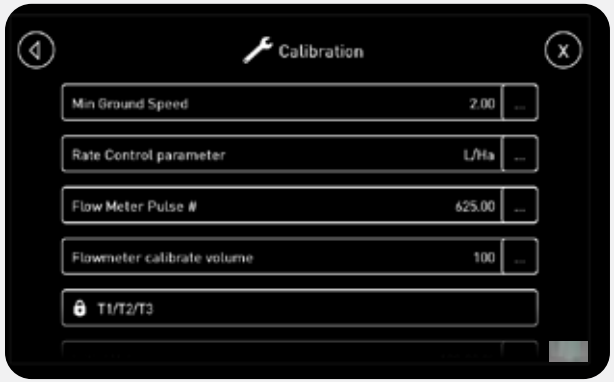
MAIN SYSTEM SETTINGS SCREEN

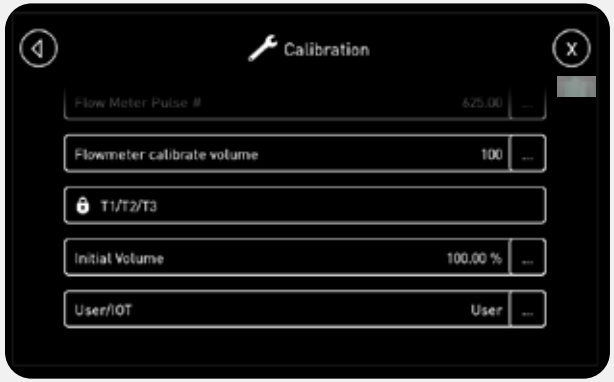
SECTION 5
SETTINGS & PROGRAMMING

MEASURE

ADJUST

CALIBRATION - SPEED & FLOW



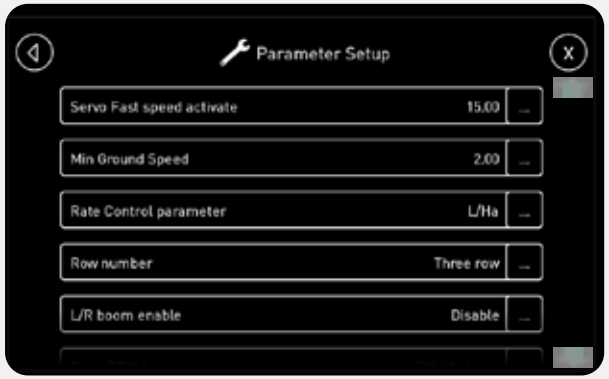


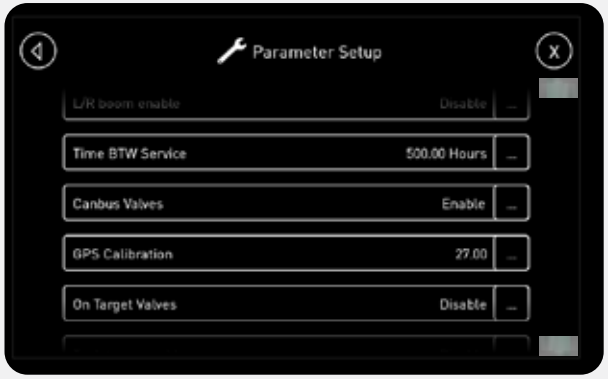
SECTION 5
SETTINGS & PROGRAMMING

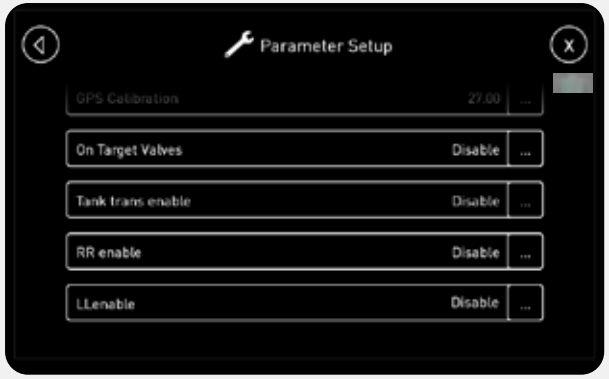
HYDRAULIC SETTINGS

SECTION 5
SETTINGS & PROGRAMMING

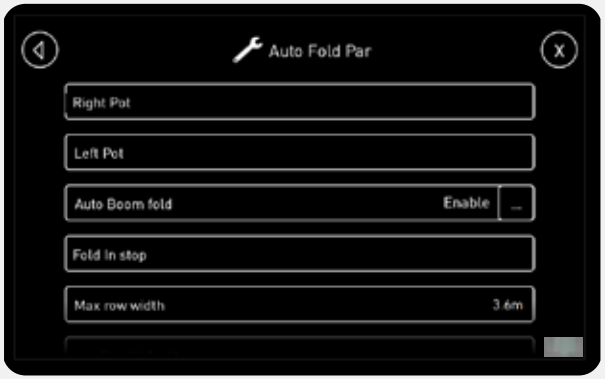
PARAMETER SETUP





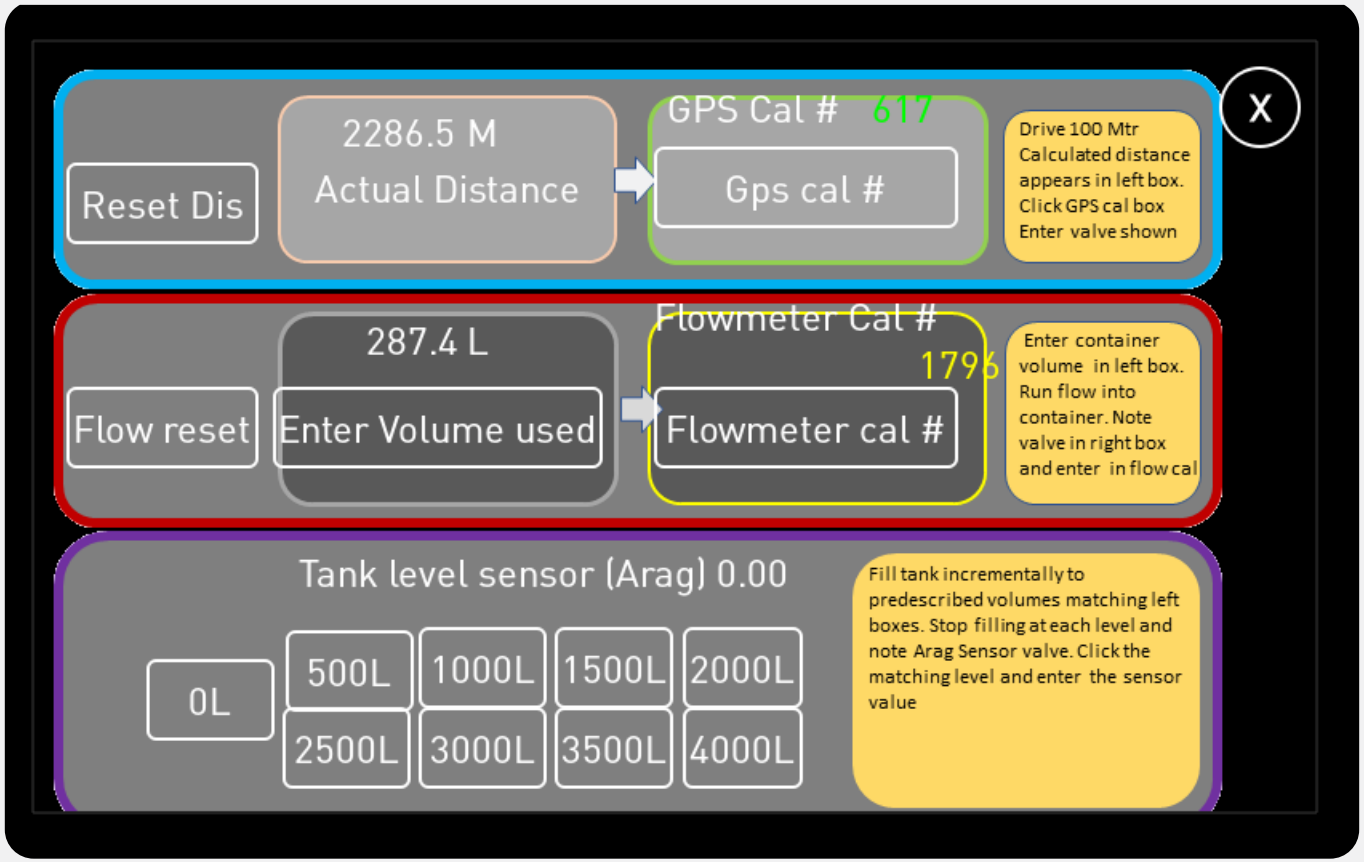


AUTO FOLD PARAMETER SETTINGS



SECTION 5
SETTINGS & PROGRAMMING

CALIBRATION SCREEN



SECTION 6
SPRAY OPERATIONS

Refer to Section 6 of the Croplands Quantum Mist Smart Spray manual for use of the Fusion system / 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 ...

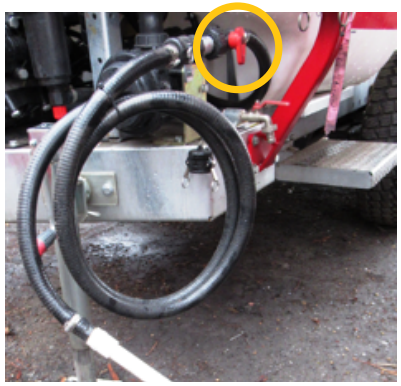
"Drop the speed"

"Dump the pressure"

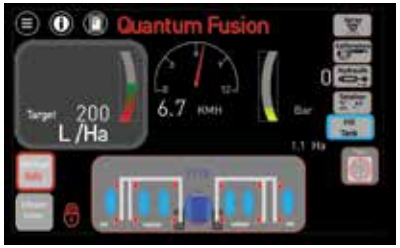
then evaluate further.

SECTION 6
SPRAY OPERATIONS

- Start the Tractor
- Make sure the Fusion controller is NOT in Spray mode (MASTER is yellow, no green section lights)
- Start the pump by engaging the Tractor remote (Micro Power Pack version) or PTO. Set to operate at your required rpm, usually between 450 and 540 rpm. Higher rpm will give better suction.
- Open (flick UP) the PROBE valve
- Place / hold the probe's tube into the chemical source (usually a drum of chemical).
- To suck chemical from the drum to tank, turn on the probe connection ball valve (circled in **yellow**, shown in the off position). Use the ball valve to control the suction. Turn to off when finished.



- Flush with / suck from a clean water source when finished.



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:

Chemicals required (Litres) =

Tank Volume (L) x Recommended Chemical Rate (L/ha)

Spray Application Rate (L/ha)

eg. $\frac{1500 \times 5 \div 400}{= 18.75 \text{ litres}}$

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

Tank Volume Required (Litres) =

Area (ha) x Spray Application Rate (L/ha)

eg. $\frac{3.75 \times 400}{= 1500 \text{ litres}}$

SECTION 7
TROUBLESHOOTING

GENERAL SPRAYER PROBLEMS

PROBLEM	PROBABLE CAUSE	REMEDY
1. Boom arms/terracing won't operate and controller is showing an error when the joystick operation is used of open load.	Failed HP-102-1 fold coil.	Swap the fold function that isn't working with another coil to see if the fault follows the coil or wiring.
2. Boom arms won't operate and controller is showing an error when using the joystick operation of Left or Right Pot.	Failed/damaged rotary fold sensor.	Press HYD on the spray screen and then press on the left and right arrows in the bottom right corner and disabled "Auto Fold". This will allow you to fold the boom arms wherever you want until the rotary sensor issue can be fixed.
3. All fans aren't operating. Either only the Left or Right facing fans are spinning and the controller is only showing one fan speed reading.	Failed fan speed sensor.	The fan speed sensor on the fans that are spinning has failed. The fusion system uses the fan speed sensors to control the fan speed coils and if one fails this side goes to full speed as it is looking for an rpm reading.

HOW TO TEST A UP-402 PROXIMITY SPEED SENSOR

1. Power the speed sensor by supplying 12 volts to the Brown positive wire and an earth to the Blue ground wire.
2. With your multimeter set to read DC voltage connect the multimeter's red terminal to the sensors signal wire and the multimeter's black terminal to the sensors ground wire. The multimeter will read 12 volts when no metal pickup is present and when a metal pickup is detected the multimeter will read 0 volts.

SECTION 7
TROUBLESHOOTING

NO FLOW

When the spray controller isn't reading flow, follow these steps to diagnose the issue.

1. Is the flow calibration number present/correct?

2. Is the turbine/paddle spinning freely?

3. Check the flow sensor for any visible signs of damage.

4. Is 12 volts supplied to the flow sensor?

   Croplands wiring is Pin A = Signal, Pin B = Positive & Pin C = Negative.

   You should read 12 volts on your multimeter between pins B & C when the controller thinks it's spraying and when possible check this with the sensor connected as some controllers lose their 12 volt supply when under load. If 12 volts is present move to the next step, if no 12 volts is present repeat the test at the next connector working back towards the tractor. Continue on until you find a bad cable or until you reach the back of the controller. Please note that Croplands MT90 series looms only power the flow meter when spraying with an MT90LOOM/6 relay box on Broadacre sprayers and a diode pack or relay box on the section valve loom on Horticultural sprayers. If the controller is not outputting 12 volts you can send it to Croplands to be repaired.

   Croplands have loan controllers so you can continue spraying while your controller is being repaired.

5. Enter a flow calibration of 1 pulse per litre and view the total volume screen on the controller.

   The controller needs to be in "Manual" mode and have at least 1 section turned on so the sprayer would actually be spraying if the pump was engaged.

   Start at the cable connecting to the flow sensor. With a small jumper wire (or paper clip), bridge a connection between the Ground and Signal wires using a "bridge, no bridge" motion. Each time a bridging connection is made the total volume should increase on the controller, if this works replace the flow sensor and re-enter the correct flow calibration. If total volume does not increase, repeat at the next connector towards the controller.

   Continue on until you find a bad cable or until you reach the back of the monitor. If the total volume does still not increase you can send the controller to Croplands to be repaired. Croplands have loan controllers so you can continue spraying while your controller is being repaired.

SECTION 7
TROUBLESHOOTING

NO GROUND SPEED

When the spray controller isn't reading ground speed, follow these steps to diagnose the issue.

1. Is the speed calibration number present/correct?

2. Is the speed sensor mounted correctly? The sensor tip should be 5mm from the pickups.

3. Check the speed sensor for any visible signs of damage.

4. Is 12 volts supplied to the speed sensor?

   Croplands wiring is Pin A = Signal, Pin B = Positive & Pin C = Negative.

   You should read 12 volts on your multimeter between pins B & C and when possible check this with the sensor connected as some controllers lose their 12 volt supply when under load. If 12 volts is present move to the next step, if no 12 volts is present repeat the test at the next connector towards the controller. Continue on until you find a bad cable or until you reach the back of the controller. If the controller is not outputting 12 volts you can send it to Croplands to be repaired.

   Croplands have loan controllers so you can continue spraying while your controller is being repaired.

5. Enter a speed calibration of 1cm per pulse and view the screen reading distance on the controller.

   The controller should be in "Manual" mode and have at least 1 section turned on so the sprayer would actually be spraying if the pump was engaged. Start at the cable connecting to the speed sensor. With a small jumper wire (or paper clip), bridge a connection between the Ground and Signal wires using a "bridge, no bridge" motion. Each time a bridging connection is made the distance should increase on the controller, if this works replace the speed sensor and re-enter the correct speed calibration. If distance does not increase, repeat at the next connector towards the controller.

   Continue on until you find a bad cable or until you reach the back of the controller. If the distance does still not increase you can send the controller to Croplands to be repaired. Croplands have loan controllers so you can continue spraying while your controller is being repaired.

SECTION 7
TROUBLESHOOTING

FUSION SPRAYERS READDRESSING CANBUS MOTOR VALVE ID'S

This guide shows you how to readdress the ID numbers in the CANBUS valves used on the Fusion sprayers.

Before starting the below process ensure ALL CANBUS valves are unplugged except the valve you are programming.

On the spray screen press "Cal" 

then press the red cog  in the bottom right of the screen.

This will open a screen called "Section controls". Press and hold the red cog in the bottom right corner and after 3 seconds a pin code screen will appear, enter 6 7 8 9 and press the tick. Now press on "Valve Id #" and it will ask for another pin code, enter 4 3 2 1 and press OK. This will now open a screen called "Canbus Valves" and you will need to press on "Arag reprogram" and enable this setting.

You can now press on "Valve Id #" and set the ID number you want to program into the new valve. Using the tables below enter the correct valve ID number and press the tick. Press the X in the top right corner to return to the "Section controls" screen. The final step is to press the "Reset Id" button and you have now programmed the ID selected into the new valve. All other CANBUS valves can now be plugged back in.

2 Row Machines	
Valve	**ID Number**
Tier 1 Left	0
Tier 1 Right	1
Tier 2 Left	2
Tier 2 Right	3
Dump	16
Left Recapture	17
Right Recapture	18
Servo	19

3 Row Machines	
Valve	**ID Number**
Tier 1 Inner Left	0
Tier 1 Inner Right	1
Tier 1 Outer Left	2
Tier 1 Outer Right	3
Tier 2 Inner Left	4
Tier 2 Inner Right	5
Tier 2 Outer Left	6
Tier 2 Outer Right	7
Dump	16
Servo	19

SECTION 8
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

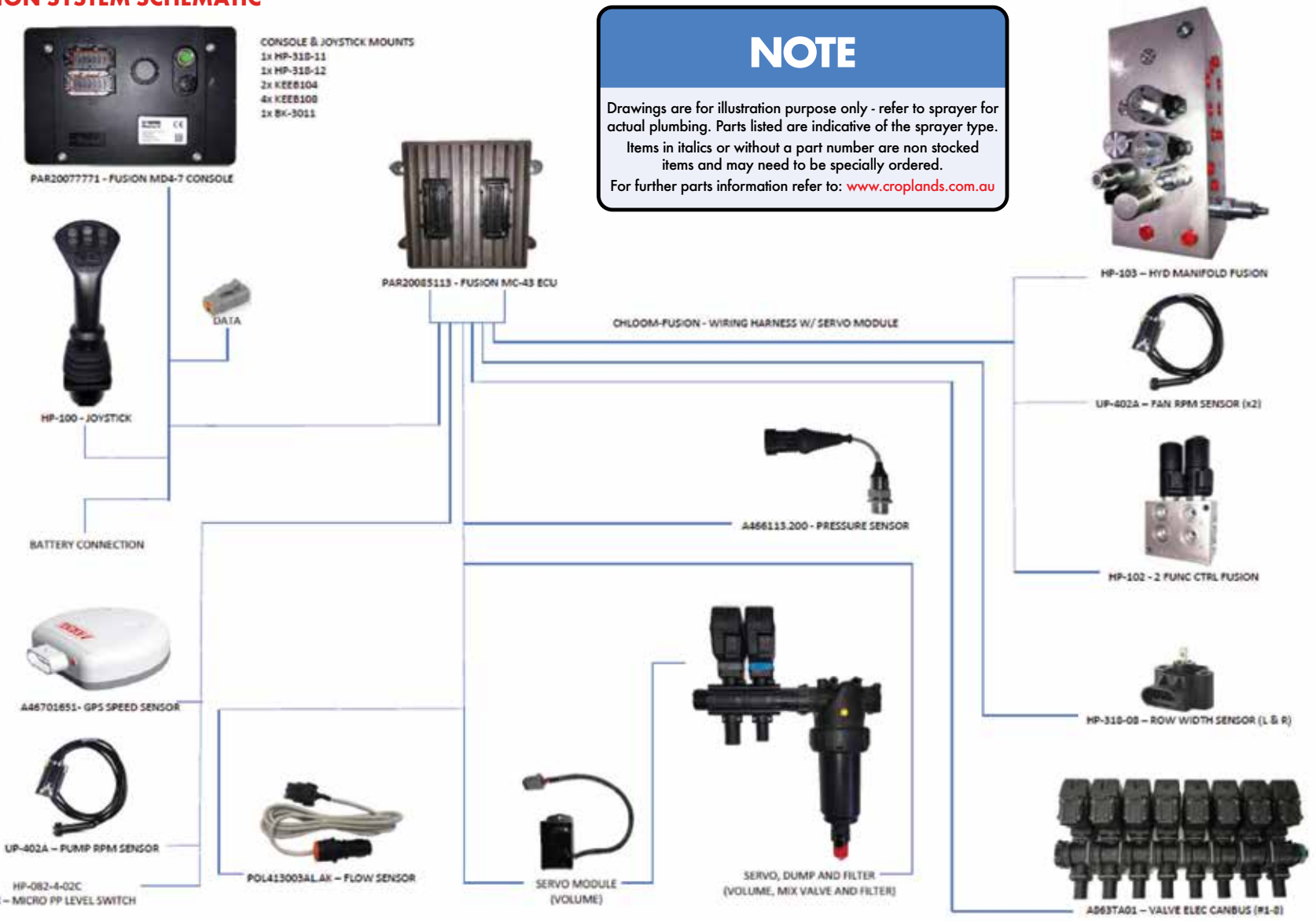
Drawings are for illustration purpose only - refer to sprayer for actual plumbing. Parts listed are indicative of the sprayer type.
Items in italics or without a part number are non stocked items and may need to be specially ordered.
For further parts information refer to: www.croplands.com.au

NOTE

Contact Croplands Technical Support for further information:
1300 650 724

SECTION 8
PARTS & SCHEMATICS
SMART SPRAYER - FUSION SYSTEM SCHEMATIC

See Croplands Technical Support for more information.
Version B updating ...
GPS & Mounts
Not shown is MT90-PWR loom



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

SECTION 9
INDEX

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Your nearest Croplands Dealer
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