X-Family Consoles

ASC-10 Sprayer Control
Operator's Manual

TOPCON

ASC-10 Sprayer Controller

Operator Manual

Part Number: AGA4372-EN

Rev Number: 2.5

For use with Software Version 3.23

www.topconpa.com

Preface

This manual provides information about operating and maintaining this Topcon Precision Agriculture product. Correct use and servicing is important for safe and reliable operation of the product.

It is very important that you take the time to read this manual before using the product.

Information in this manual is current at the time of publication. A system may vary slightly. The manufacturer reserves the right to redesign and change the system as necessary without notification.

Terms and Conditions

Note: Please read these Terms and Conditions carefully.

General

APPLICATION - You accept these Terms and Conditions by purchasing the product from Topcon Precision Agriculture (TPA) or from one of TPA's product dealers.

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IMPORTANT: SAFETY - Improper use of the product can lead to death or injury to persons, damage to property and/or malfunction of the product. The product should only be repaired by authorized TPA service centers. You should closely review the safety warnings and directions as to the proper use of the product in this manual and at all times comply with the same.

Limited Warranty

ELECTRONIC AND MECHANICAL COMPONENTS -TPA warrants that the electronic components manufactured by TPA shall be free of defects in materials and workmanship for a period of one year from the original date of shipment to the dealer. TPA warrants that all valves, hoses, cables and mechanical parts manufactured by TPA shall be free of defects in materials and workmanship for a period of 90 days from the date of purchase.

RETURN AND REPAIR - During the respective warranty periods, any of the above items found defective may be shipped to TPA for repair. TPA will promptly repair or replace the

defective item at no charge, and ship it back to you. You must pay the shipping and handling charges in respect of the same. Calibration of components, labor and travel expenses incurred for in-field removal and replacement of components are not covered in this warranty policy. The foregoing warranty shall NOT apply to damage or defects resulting from:

(i) disaster, accident or abuse

(ii) normal wear and tear

(iii) improper use and/or maintenance

(iv) unauthorized modifications of the product; and/or

(v) use of the product in combination with other products not supplied or specified by TPA.

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These Terms and Conditions may be amended, modified, superseded or cancelled, at any time by TPA. These Terms and Conditions will be governed by, and construed in accordance with:

- the laws of South Australia if the product is sold and supplied to you in Australia (in which case the courts of South Australia or the Federal Court of Australia (Adelaide Registry) have exclusive jurisdiction in respect of any claim or dispute) or

- the laws of the State of California if the product is sold and supplied to you outside of Australia

- the provisions of the United Nations Convention on Contracts for the International Sale of Goods shall not apply to these Terms and Conditions.

All information, illustrations, and applications contained herein are based on the latest available information at the time of publication. TPA reserves the right to make product changes at any time without notice.

If any part of these Terms and Conditions would be unenforceable, the provision must be read down to the extent necessary to avoid that result, and if the provision cannot be read down to that extent, it must be severed without affecting the validity and enforceability of the remainder of these Terms and Conditions.

Service Information

Service assistance can be provided by contacting your local TPA Authorized Dealer.

Communications Regulation Information

FCC Compliance Statement (USA)

This equipment has been tested and found to comply with the limits for a Class 'A' digital device, pursuant to Part 15 of the FCC Rules. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's expense.

FCC Compliance Statement (Canada)

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulation.

CE EMC Statement (European Community)

Warning: This is a class 'A' product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

'C' Tick EMC Statement (Australia & New Zealand)

This product meets the applicable requirements of the Australia and New Zealand EMC Framework.

Type Approval and Safety Regulations

Type approval may be required in some countries to license the use of transmitters on certain band frequencies. Check with local authorities and your dealer. Unauthorized modification of the equipment may void that approval, the warranty and the license to use the equipment.

The receiver contains an internal radio-modem. This can potentially send signals. Regulations vary between countries, so check with the dealer and local regulators for information on licensed and unlicensed frequencies. Some may involve subscriptions.

Radio and Television Interference

This computer equipment generates, uses, and can radiate radio-frequency energy. If it is not installed and used correctly in strict accordance with TOPCON Precision Agriculture instructions, it may cause interference with radio communication.

You can check if interference is being caused by this equipment by turning the Topcon equipment off to see if the interference stops. If the equipment is causing interference to a radio or other electronic device, try:

- Turning the radio antenna until the interference stops
- Moving the equipment to either side of the radio or other electronic device
- Moving the equipment farther away from the radio or other electronic device
- Connecting the equipment to another circuit that is not linked to the radio.

To reduce potential interference operate the equipment at the lowest gain level that will allow successful communication.

If necessary contact your nearest Topcon Precision Agriculture dealer for assistance.

Note: Changes or modifications to this product not authorized by TOPCON Precision Agriculture could void the EMC compliance and negate authority to operate the product.

This product was tested for EMC compliance using Topcon Precision Agriculture peripheral devices, shielded cables and connectors. It is important to use Topcon Precision Agriculture devices between system components to reduce the possibility of interference with other devices

General Safety

 DANGER: It is essential that the following information and the product specific safety information is read and understood.

Most incidents arising during operation, maintenance and repair are caused by a failure to observe basic safety rules or precautions. Always be alert to potential hazards and hazardous situations.

Always follow the instructions that accompany a Warning or Caution. The information these provide aims to minimize risk of injury and/or damage to property. In particular follow instructions presented as Safety Messages.

Safety Messages and Warnings

The safety symbol is used with the relevant word: DANGER, WARNING or CAUTION.

Messages marked in this way recommend safety precautions and practices. LEARN and apply them.

DANGER: Indicates an imminently hazardous situation that, if not avoided, could result in DEATH OR VERY SERIOUS INJURY.

WARNING: Indicates a potentially hazardous situation that, if not avoided, could result in DEATH OR SERIOUS INJURY.

CAUTION: Indicates a potentially hazardous situation that, if not avoided, may result in MINOR INJURY.

Safety Signs

WARNING: DO NOT remove or obscure safety signs. Replace any safety signs that are not readable or are missing. Replacement signs are available from your dealer in the event of loss or damage.

If a used vehicle has been purchased, make sure all safety signs are in the correct location and can be read. Replace any safety signs that cannot be read or are missing. Replacement safety signs are available from your dealer.

Operator Safety

WARNING: It is YOUR responsibility to read and understand the safety sections in this book before operating this vehicle. Remember that YOU are the key to safety.

Good safety practices not only protect you, but also the people around you. Study this manual as part of your safety program. This safety information only relates to Topcon equipment and does not replace other usual safe work practices.

WARNING: Ensure power is removed from the Topcon equipment prior to maintenance or repair of the vehicle or implements.

WARNING: Ensure appropriate precautions are taken prior to handling any hazardous substances. Always read the Material Safety Data Sheet prior to commencing work.

WARNING: In some of the illustrations or photos used in this manual, panels or guards may have been removed for demonstration purposes. Never operate the vehicle with any panels or guards removed. If the removal of panels or guards is necessary to make a repair, these MUST be replaced before operation.

WARNING: Always check that any suspended vehicle attachments are lowered to the ground before beginning repair or maintenance work on a vehicle.

WARNING: Vehicle and implement parts can become hot during operation and may be under pressure. Refer to vehicle manuals.

WARNING: Wear appropriate protective clothing for the task being undertaken and conditions.

WARNING: Do not operate equipment around explosive equipment or supplies.

WARNING: Topcon is committed to good environmental performance and minimizes the use of any potentially harmful substances in its products. However, it is always advisable not to handle damaged electronic equipment. This Topcon product may contain a sealed lithium battery. Always dispose of any electronic equipment thoughtfully and responsibly.

Exposure to Radio Frequency

Exposure to energy from radio frequencies is an important safety issue. Keep a distance of at least 20 cm (7.8 inches) between people and any radiating antenna. Keep a distance of at least 20 cm between transmitting antennas.

WARNING: Products using cellular modem or an RTK base station can transmit radio frequency energy. Check with your dealer.

This device is designed to operate with TPA approved antennas. Discuss with your dealer.

Preparation for Operation

- Read and understand this manual and learn all of the controls before you use the equipment.
- Keep the manual with the equipment.
- If the equipment is moved to another vehicle, move the manual as well.
- Read the manual for the vehicle with which the equipment will be used and check that the vehicle has the correct equipment required by local regulations.

- Make sure you understand the speed, brakes, steering, stability, and load characteristics of the vehicle before you start.
- Check all controls in an area clear of people and obstacles before starting work.
- Identify possible hazards.

WARNING: Topcon equipment must not be used by an operator affected by alcohol or drugs. Seek medical advice if using prescription or over-the-counter medication.

Disclaimer

Topcon accepts no responsibility or liability for damages to property, personal injuries, or death resulting from the misuse or abuse of any of its products.

Further, Topcon accepts no responsibility for the use of Topcon equipment or the GNSS signal for any purpose other than the intended purpose.

Topcon cannot guarantee the accuracy, integrity, continuity, or availability of the GNSS signal.

The operator must ensure that the equipment is correctly turned off when not in use.

Before operating any vehicle equipped with Topcon products, read and understand the following product specific safety precautions.

Important Safety Information

Operator Alertness and Responsibility

The console helps the operator to steer the vehicle, but the operator remains in charge and must be alert and in complete control of the vehicle at all times. The operator is ultimately responsible for safe operation of this equipment.

It is essential that safety requirements are met when operating the console and any of its components. All operators and other relevant personnel must be advised of safety requirements.

Electrical Safety

WARNING: Incorrectly connected power can cause severe injury and damage to people or the equipment.

When working with electrical components, you must do the following:
- Make sure the negative terminal of the battery is disconnected before doing any welding on the vehicle.
- Check that all power cables to system components are connected to the correct polarity as marked. Please refer to the vehicle manual for safety information.
- Check that equipment is grounded in accordance with installation instructions.

Operation and Risk of Obstacles

The following list is not exhaustive or limited. To use the console for assisted steering along a defined wayline, the operator must ensure that it is used:

- Away from people and obstacles
- Away from high voltage power lines or other overhead obstructions (identify any clearance problems before activating the console)
- On private property without public access
- Within cleared fields
- Off public roads or access ways.

Note that:

- The operator needs to know the vehicle's position and the field conditions at all times.
- The operator will need to respond if the GNSS satellite or differential correction signal is lost momentarily.
- The console cannot detect obstacles (people, livestock or other).
- Only use the console in areas that are clear of obstacles and keep a proper distance.
- Steering needs to be disengaged for manual control if an obstacle appears in the path or the vehicle moves away from the wayline.

On/Off and Manual Control

WARNING: Ensure the steering switch is Off to prevent unintentional engagement of the assisted steering. When repairing or maintaining the vehicle/implement, ensure the vehicle CANNOT be moved. Disengage steering, apply brakes and remove keys.

The operator must ensure that the steering switch is Off (*all* LED indicators are off) when assisted steering is not being used.

The operator must disengage assisted steering and use manual control if an obstacle is in the line of travel or moves into the line of travel, or if the vehicle steers away from the desired wayline.

To disengage assisted steering:

- Turn the steering wheel a few degrees OR
- Select the Disengage Auto Steering button on the console AND/OR
- If using an external steering switch, disengage using the switch if the above actions do not disengage assisted steering.

Vehicle Shut Down Safety

Before leaving the vehicle, disengage assisted steering, disengage external steering switch if this is being used, and remove the key from the key switch.

Using a Reference (Base) Station

WARNING: Do not move a reference station while in operation. Moving an operating reference station can interfere with the controlled steering of a system using the reference station. This could result in personal injury or damage to property.

Operators and other affected personnel must be advised of the following safety precautions.

- Do not erect the reference station under or within the vicinity of high voltage power lines.
- When using the portable reference station, make sure that the tripod is securely mounted.

To Get the Best Out of the Product

Back up data regularly. The console has large, but limited storage capacity. Use the Diagnostics Mini-view to view capacity available. A warning screen displays if storage is reaching its limit.

Be aware of file format compatibility. Discuss compatible formats with the dealer.

Topcon Agricultural Products are hardy and designed to work in tough conditions. However, if equipment is unused for a length of time, store away from water and direct heat sources.

Alert Symbols

In this manual two alert symbols are used:

Note: This offers additional information.

WARNING: A warning signal appears on safety signs and in this manual to show that this information is very important to your safety. LEARN these and APPLY them.

Table of contents

Chapter 1 – Introduction

The Sprayer Controller is used with the X family of consoles. Refer also to the Guidance and Auto Steering Operator's Manual supplied with the console.

The Sprayer and Auto Section Controller allows better control of the amount of product being applied to a field. Once set up, it will adjust the flow according to vehicle speed, the area being covered and the preset application rate. This provides greater accuracy to manage product over specified areas.

Auto Section Control minimizes wastage, turning parts of the sprayer on and off and varying rates as the equipment passes through the defined areas. The system will turn on when it detects an area that has not been covered and it will turn off when it detects areas that have already been covered. The controller can be configured to control up to 30 sections if using three ASC-10 ECUs (10 sections with one ASC-10 for the X14 console).

The sprayer pressure is adjusted with factors such as speed of the vehicle, unlike a manual pressure controlled sprayer where the pressure remains constant during speed changes.

Variable Rate Control presets the different spray rates for particular fields, using a VRC prescription map (Shapefile or ISOXML file formats). It will automatically adjust the spray rate for different zones as the implement moves through the mapped areas (Variable Rate Control is not available with the X14 console).

Once set up, Sprayer Control, Auto Section Control and Variable Rate Control can be enabled and disabled through the console.

Note: Regional information such as time and product measurement units can be set by selecting **User** / **Region** from the Setup screen. Refer to the Guidance and Auto Steering Manual.
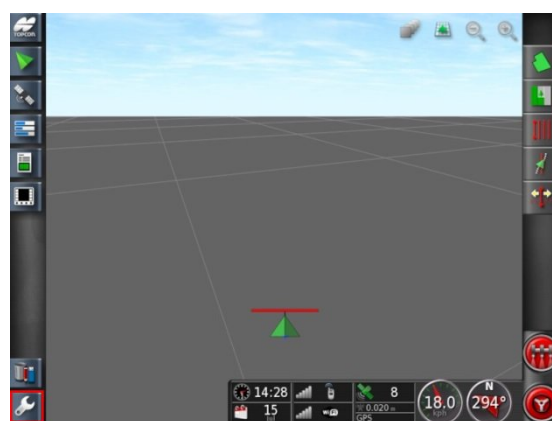
1.1. Switching between setup and operation screen

The consoles have two main screens; the Setup screen and the Operation screen.

X14 console
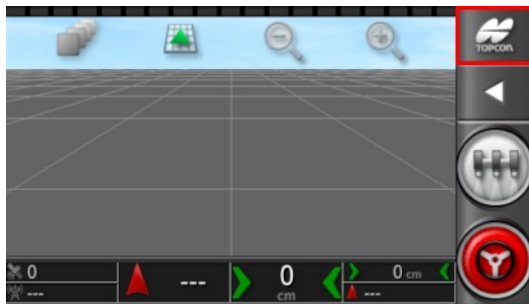
X35, X30 and X25 console

Use the highlighted buttons to switch between the screens.

Chapter 2 – Implement Setup

This chapter explains how to setup and configure the console for use with the Sprayer Controller and Auto Section Control features.
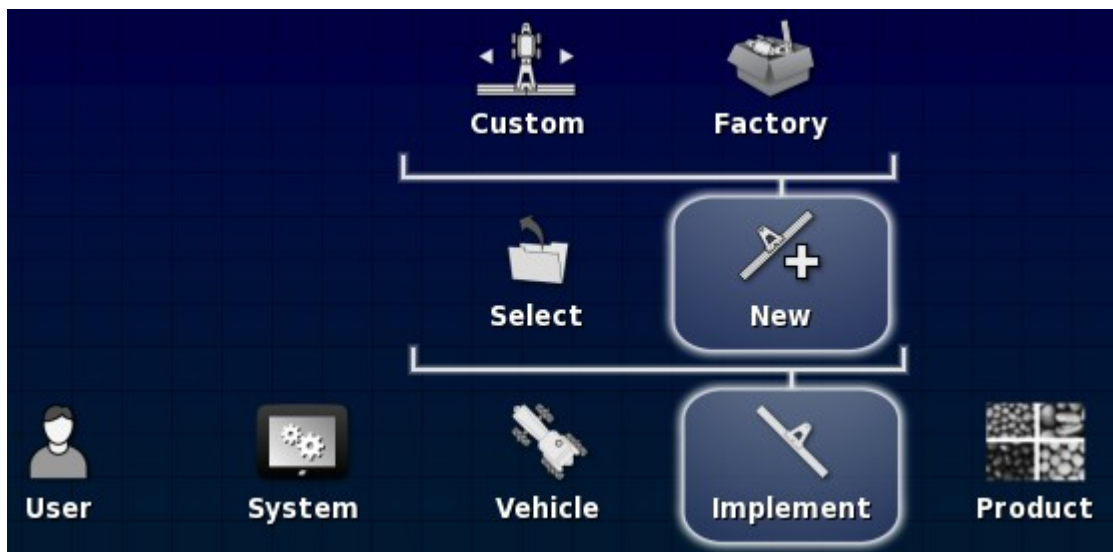
2.1. Setting up a new implement

2.1.1. X35, X30 and X25 consoles

Creates a new implement profile for the attached implement.

Note: Existing implement files can be imported from a USB. Refer to the Guidance and Auto Steering manual.

To create a new implement:

1. On the Setup screen, select **Implement** / **New** .

- **Custom**: Create a new implement profile.
- **Factory**: Select an implement template from a pre-defined list.

2. If the required implement is not available in the **Factory** templates, select **Custom**.

3. Use the arrows to select the implement **Type** and confirm.

rigid

pivoted (tow behind)

front mount

double pivoted (tow between)

A message displays stating that the console will restart once the implement has been created.

A default name for the implement is displayed.

Note: It is highly recommended that items are named in a thoughtful and structured way to allow easy use in future seasons.

4. To change the default name, select **IMPLEMENT NAME** and enter the new name, then confirm.

   The New Implement Setup wizard displays.

5. Select **IMPLEMENT CONTROL**, select **Section Control Only** or **Section Control and Rate Control**, confirm and select next.

6. Select **ECU TYPE**, select **ASC-10**, confirm and select next.

   Note: The Sprayer Controller interface described in Chapters 3 and 4 of this manual is only used to control sprayers equipped with the Topcon ASC-10 ECUs.

   If ISOBUS ECU is chosen, functionality will depend on the ISOBUS unit connected. The ISOBUS ECU can be operated via the Universal Terminal feature of the console. Please refer to the ISOBUS ECU documentation.

7. Select **IMPLEMENT FUNCTION**, select **Sprayer**, confirm and select next.

Note: Multiple ECUs are required if there are more than 10 sections or more than one tank.

ECUs should be connected to the CAN2 connector on the console's termination harness. Start with all ECUs disconnected from the CAN line and confirm that the harness is connected to the console. Only one termination is necessary, placed at the ECU farthest from the console.

Follow the steps below and, when prompted, connect the first ECU to the CAN line. Only one ECU can be detected at a time. Once each ECU is detected, connect the next ECU when prompted.

The blue status indicator on the ASC-10 will flash three times slowly, then three times quickly to indicate normal operations.

8. Check only one ECU is connected and select next.

   The system will try to detect the connected ECU. If not successful, check that the ECU is connected.
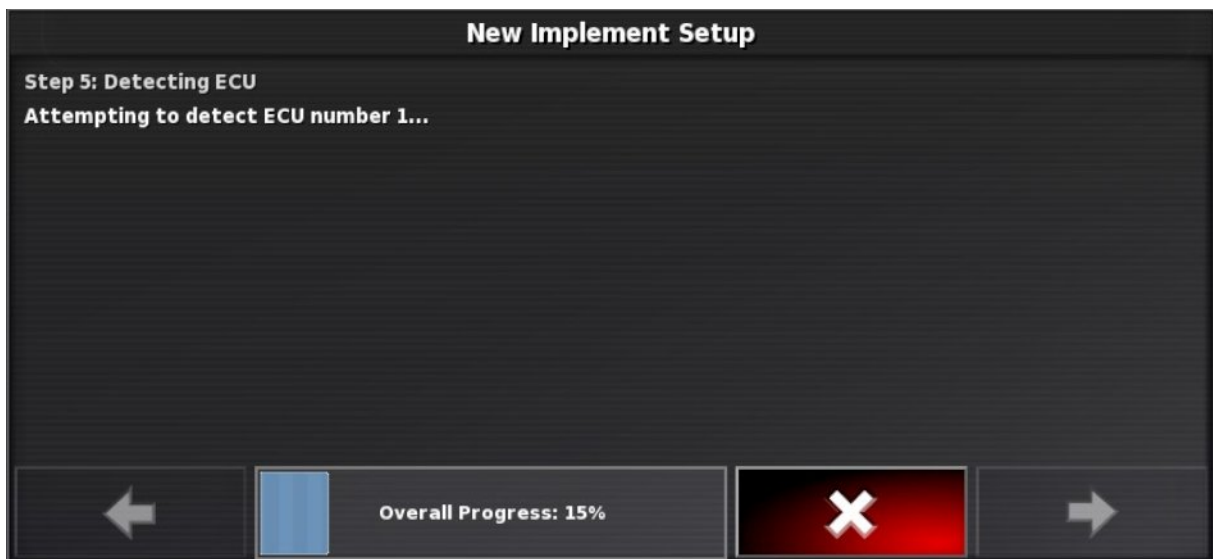
9. Once the ECU is detected, select next.

   A summary of detected ECUs appears.

New Implement Setup

Step 7: ECU Summary
1 ECUs detected:

ECU	Section Control	Rate Control	Name
1	Enabled	Enabled	ECU 1

Overall Progress: 55%
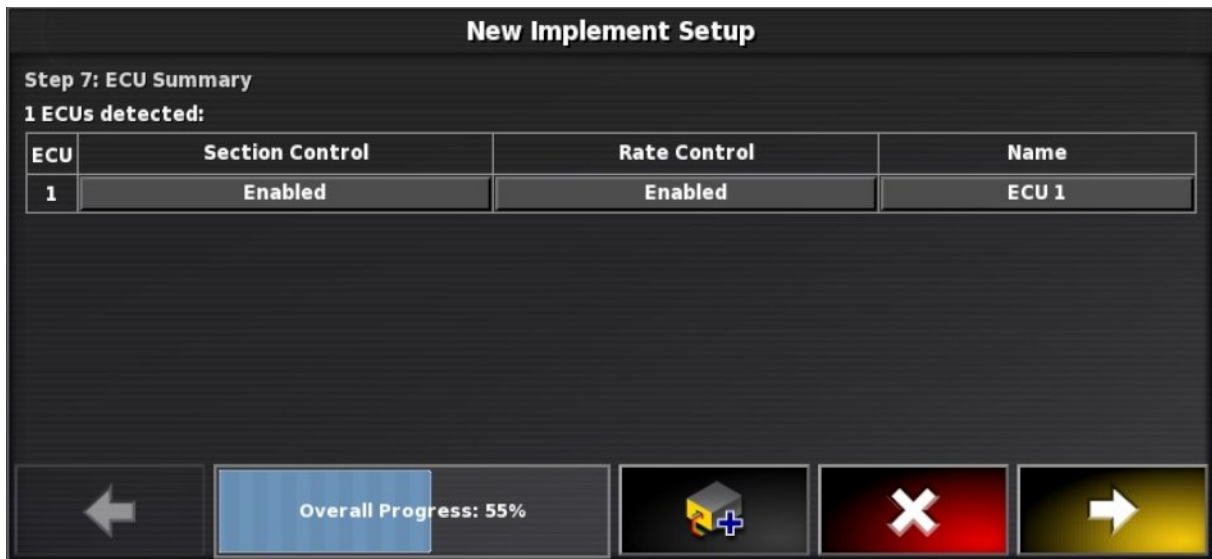
10. To add more ECUs, select Add ECU ![icon] and follow the steps as prompted. When all ECUs are detected, select next.

11. Select which ECU will receive wheel sensor input, if required, confirm and select next.

    Note: If there is only one tank, the Rate Control for ECU 2 must be disabled.

12. When the screen shows that the setup is complete, confirm.

2.1.2. X14 console

Creates a new implement profile for the attached implement.

Note: Existing implement files can be imported from a USB. Refer to the Guidance and Auto Steering manual.

To create a new implement:

1. Ensure the ASC-10 ECU is connected to the CAN bus.

   If the ASC-10 is not detected during implement profile creation, the implement will not be configured for rate control.

2. On the Setup screen, select **Implement** / **New** .

3. Use the arrows to select the implement **Type** and confirm.
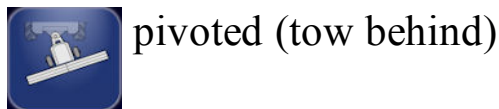
   rigid

   pivoted (tow behind)

   front mount

   double pivoted (tow between)

   A message displays stating that the console will restart once the implement has been created.

   A default name for the implement is displayed.

   Note: It is highly recommended that items are named in a thoughtful and structured way to allow easy use in future seasons.

4. To change the default name, select **IMPLEMENT NAME** and enter the new name, then confirm. The console will restart and show the implement geometry screen.

2.2. Setting the implement geometry

Sets the implement measurements so that guidance and product application can work accurately.

Note: Measure the implement dimensions as accurately as possible. The recommended tolerance is +/- 5 cm.

To set the implement geometry:

1. Select **Implement** / **Geometry** .

Implement Geometry - Rigid_100913_1218
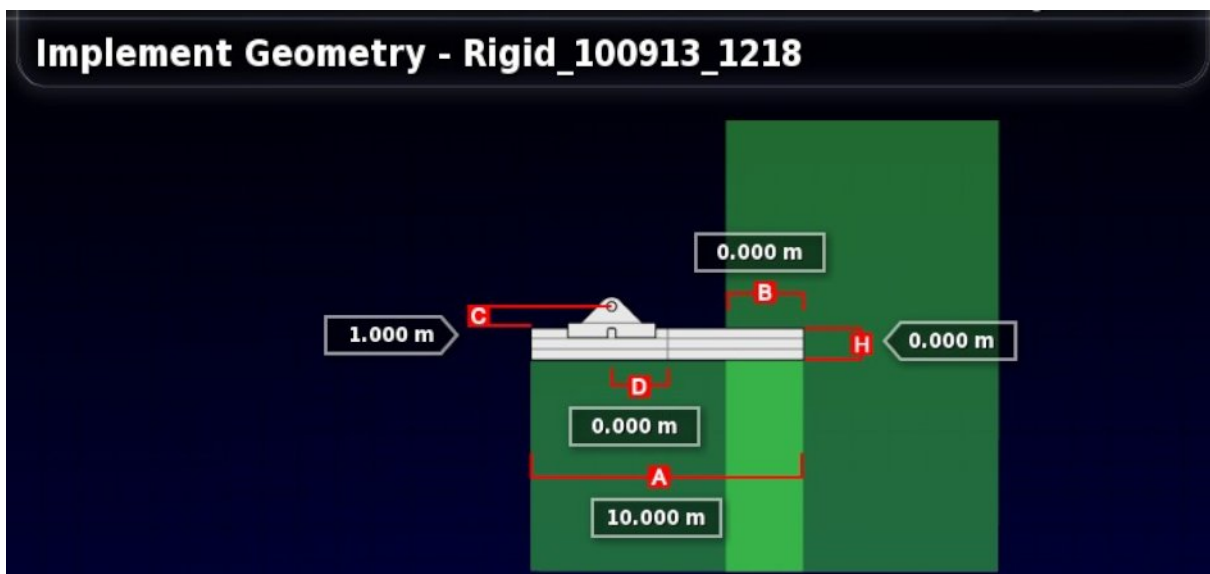
2. Select an implement dimension. The name of the dimension appears in the title bar.

   Dimensions requested vary according to the type of implement selected.

3. Add or adjust dimensions where needed and confirm.

The following measurements may be used:

- **Swath Width**: Measures the working width of the implement (that is, the width of the area that is treated during one pass of the implement).

- **Working Length**: Length from the start to the finish of the working area of the boom. Together with swath width, it defines

the 'Working Area', which is the region that product is applied over for that boom.

- **Overlap**: Measures the width of the overlap between two adjacent rows.

- **Implement Offset**: Measures the distance between the hitch point and the wheels of the implement.

- **Implement Wheels Offset**: Measures the distance between the wheels and the working area of the implement.

- **Inline Offset**: Measures the off-center offset of the implement relative to the hitch point. Enter a positive number if the implement is shifted to the right and a negative number if it is shifted to the left.

- **Trailer Offset**: Measures the distance between the trailer hitch point and the trailer wheels.

- **Trailer Wheels Offset**: Measures the distance between the implement hitch point and the trailer wheels.

2.3. Setting up the master switch

The master switch turns on the sprayer application control and also enables the coverage map on the guidance screen.

To set up the master switch:

1. Select **Implement** / **Master Switch** .

Virtual

Enables the master switch to be operated by selecting the virtual master switch on the console Operation screen.

External ECU sense

Enables the master switch to be operated via an external switch (a physical switch box / master switch connected to the ASC-10 ECU).

Chapter 3 – Boom Setup

3.1. Setting up sections

The console can support up to 30 sections if using three ASC-10 ECUs (10 sections with one ASC-10 for the X14 console).

An ISOBUS ECU can identify up to 32 sections automatically. Make any necessary changes on the ISOBUS ECU.

The maximum total width of all sections is 100 m, divided by the number of sections.

To set up section control:

1. Select **Implement** / **Boom** / **Sections** .

2. Select **SECTIONS** and use plus or minus to set the number of sections, then confirm.

Section	Width (10.00 m)	Low Speed Shutoff	Nozzles (1)	Select
All	1/1	1/1	1/1	✔
1	10.000 m	0.0 kph	1	✔

3. To set section width for all sections, select **Width** next to **All**.

Section	Width (10.00 m)	Low Speed Shutoff	Nozzles (1)	Select
All	1/1	1/1	1/1	✔
1	10.000 m	0.0 kph	1	✔

4. Enter the section width for all sections and confirm.

5. Alternatively, to set individual widths for sections, select the width next to a section, enter the width and confirm.

6. Repeat for each section.

7. To set the threshold for low speed, select **Low Speed Shutoff** next to a section (or next to **All**), enter the threshold and confirm. Sections will be shut off when the system is in auto control mode and the vehicle speed drops below this speed and will turn on when the vehicle speed exceeds this speed.

8. To set the number of nozzles for each section, select the section under **Nozzles**, enter the number and confirm.

   Note: It is important to set the number of nozzles attached to each section correctly. During operation this affects the display of flow per nozzle information and affects pressure based control.

3.2. Setting up timing

These settings set the response times for the sections when switched on or off. It is important to accurately calculate the response times to avoid overlaps or gaps in product application.

To calculate the response times:

1. Ensure the implement is ready to begin product application and that the flow meter calibration for the product has been performed (refer to Flow meter calibration, page 50).

2. Use a stop watch to time the delay between switching a section on and the application of product. This is the **ON TIME**.

3. When the section is switched off, time the delay between switching it off and the product ceasing to flow. This is the **OFF TIME**.

To set the response times:

1. Select **Implement** / **Boom** / **Timing** .

2. Select **ON TIME** to set how many seconds delay there is between switching a section on and the application of product, then confirm.

3. Repeat for **OFF TIME** and confirm. This will set how many seconds delay there is between switching a section off and stopping product flow.

3.3. Setting up section switching

The section switch can be either virtual (on the console screen) or external (a physical switch connected to the ASC-10 ECU).

To configure the switches:

1. Select **Implement** / **Boom** / **Section Switch** .

2. Select **TYPE**.

   Select **Virtual** to use a Virtual Switchbox on the Operation screen. An additional option appears on the screen and a mini-view icon is available in the navigation bar on the left . Selecting the icon displays the section state display. Selecting sections on the display will turn them on and off.
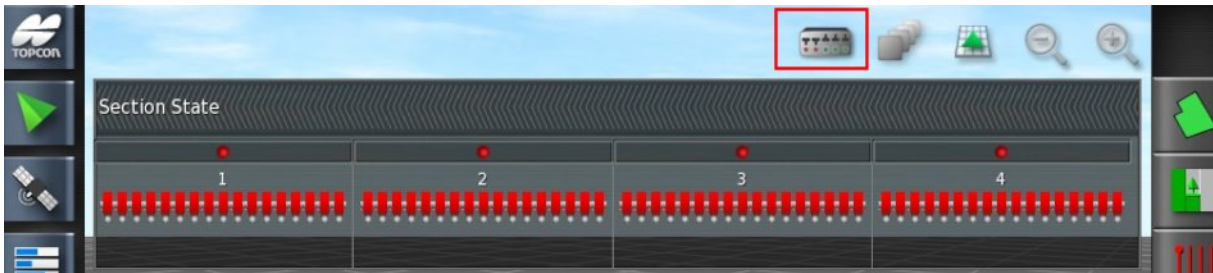
   Select **External ECU Sense** to use an external switchbox that is connected to the ASC-10 wiring.

   Select **None** if boom switching is not required.

If **Virtual** or **External ECU Sense** is selected, the following options display.

SWITCHES on the left is used to set how many section switches are available. This may be a different number to the total sections entered

in **Implement** / **Boom** / **Sections**, but cannot be greater than the number of sections.

The table on the right is used to determine which switch controls which section. Assign the required switch to each section.

3.4. Setting up nozzles

Note: At least one nozzle must be correctly configured for the system to be operational.

1. Select **Implement** ⬿ / **Boom** ⬛ / **Nozzles** ⬤ .

2. Select **New Nozzle** in the **Nozzle Name** list.

   A list of ISO standard default nozzles is supplied. Alternatively, custom nozzles can be setup.

3. Select from the list of ISO standard nozzles, or select **Custom Nozzle**.

4. Enter a new **Nozzle Name**.

5. Complete the following:

   • **Nozzle type**: Standard or Fence jet. Note that fence jet nozzles are not applicable for the ASC-10 ECU.

   • **Actual rate**: The actual rate of flow at the Reference Pressure. This value can be altered, if needed, to adjust for wear and tear. If unsure, test the actual rate by collecting the flow over a minute and measuring the amount collected.

- **Reference pressure**: The pressure at which the stated actual rate for the nozzle should be achieved. Check nozzle manufacturer's information.
- **Minimum pressure**: This setting is currently not applicable for the ASC-10 ECU.

Assigning the nozzle

To select the nozzle for the current spray line:

1. Select **Implement** / **Boom** / **Spray Line** .
2. Select the required nozzle from the drop down list.

3.4. Setting up nozzles

Chapter 4 – Sprayer Controller Setup

This chapter explains how to set up the Sprayer Controller. This controls the amount of product being applied to particular sections. This option is available if the implement and ECU setup has been completed or if an existing implement file has been imported to the console.

Variable Rate Control (VRC) options are only available if VRC has been enabled in the features menu (**System** / **Features** /

Implement). **Note**: Variable Rate Control is not available on the X14 console.

Note that these settings apply to rate control. They are not visible if the implement is set up for section control only.
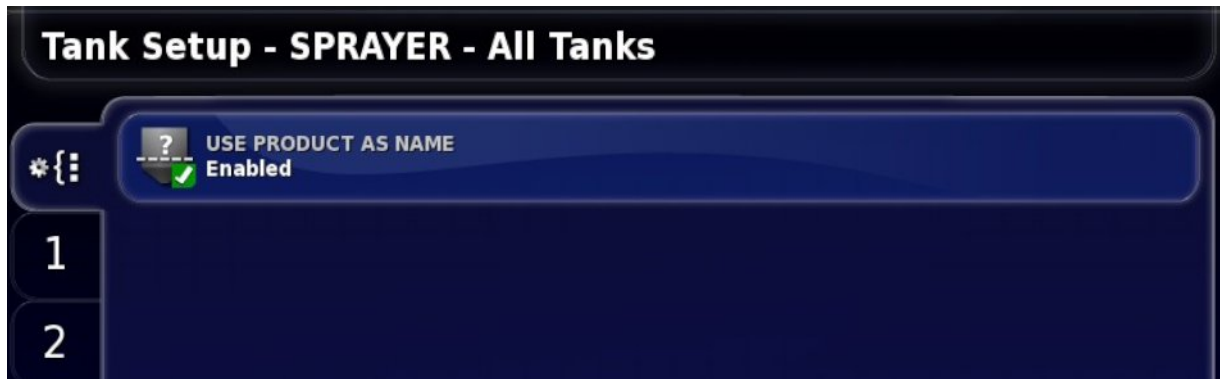
Note: Always refer to the sprayer manufacturer's manual to set efficient and safe settings for the particular implement.
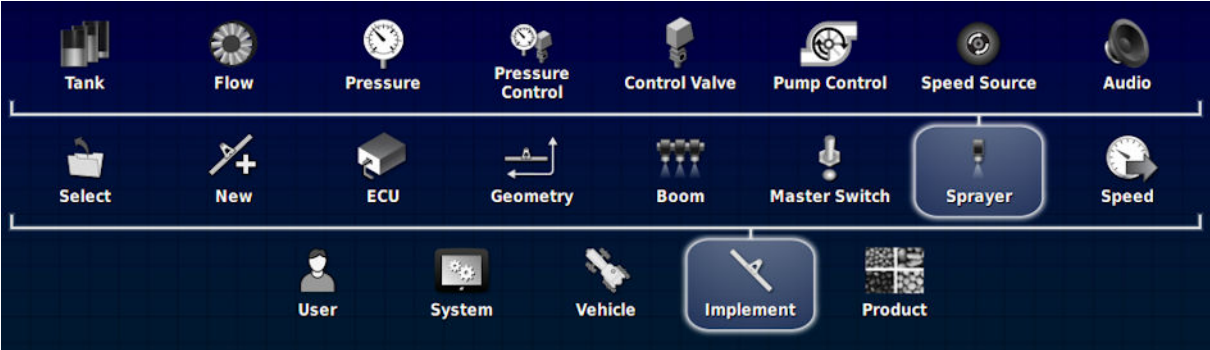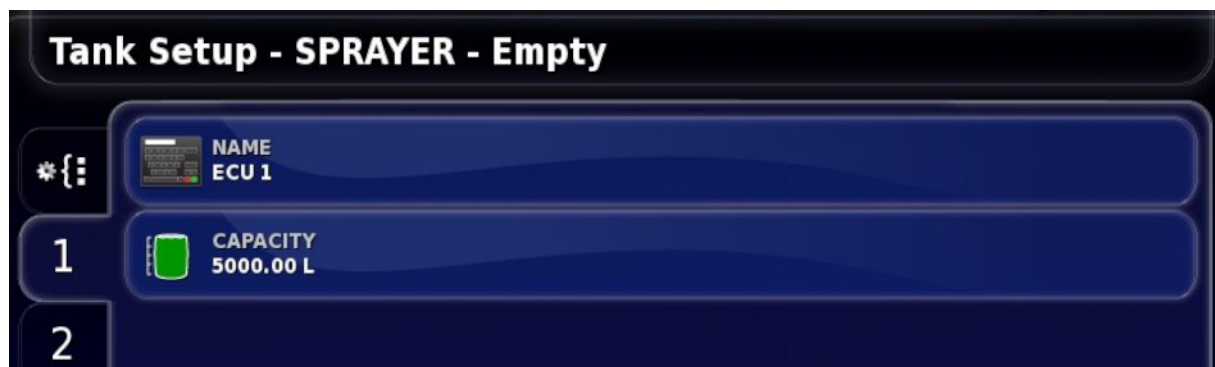
4.1. Setting up tanks

To set up a tank and its capacity:

1. Select **Implement**   / **Sprayer**   / **Tank** .

- **Use product as name**: On the Operation tank panel (refer to page 40), the product is displayed as the tank name if this is enabled. If disabled, the tank name entered in the step below is used.

The numbered tabs on the left show which tank is being viewed.

2. Select **NAME** to change the default name, or **CAPACITY** to set the tank capacity.

3. Repeat for other tanks as needed.

4.2. Setting up product flow

This section sets up the values that affect the flow of product. Check the calibration factor on the tag on the flow meter of the sprayer.

Note that manually specifying the calibration factor on this screen should only be performed if the flow factor is already known or has previously been calculated via Flow meter calibration, page 50.

If the **Calibration Factor** is not known, this field should be left blank and the Auto Flow Calibration wizard followed, refer to Flow meter calibration, page 50.

1. Select **Implement** / **Sprayer** / **Flow** .

- **Calibration factor**: The number of pulses from the flow meter per liter of liquid.
- **Minimum flow**: This sets the minimum flow that the flow meter can effectively measure. When in auto mode, the system will not control below this value. This could cause over application of product, but will ensure that stable control can always be achieved. Refer to the flow meter manufacturer's information.
- **Minimum nozzle flow (all tanks)**: This sets the minimum flow that will create an adequate spray pattern. When in auto mode, the system will not allow control below the flow rate that is calculated

by the minimum nozzle flow multiplied by the number of nozzles activated. Refer to nozzle manufacturer's information.

- **Reverse dump valve**: The dump valve releases liquid back to the tank. In some cases the valve may have been wired to work in the opposite direction. To allow the dump valve to work in reverse, select Reverse Dump Valve.

- **Balanced valves**: The sprayer software is capable of controlling systems that use balanced valves. These valves, when closed, bypass the flow from the boom section back to the tank. This bypass flow is adjustable. This enables the system to maintain sprayer pressure when turning the sections off or on. In a normal system, when a section is turned off, the sprayer is working with a lesser width, and the regulator reduces the pressure to maintain the flow rate for the remaining sprayer width. This can affect the nozzle performance and thus the effectiveness of the sprayer. With a balanced valve system, the pressure is maintained and thus the spray pattern will always be optimal. Refer to Valve balancing wizard, page 51 for instructions on balancing the valves.

4.3. Setting up pressure

This section sets up pressure sensors and controls. Refer to the specifications of the sprayer being used for correct settings.

1. Select **Implement** / **Sprayer** / **Pressure** .
2. Select the tank from the tabs on the left and select **SENSOR TYPE**.
3. Select **Voltage** and confirm.
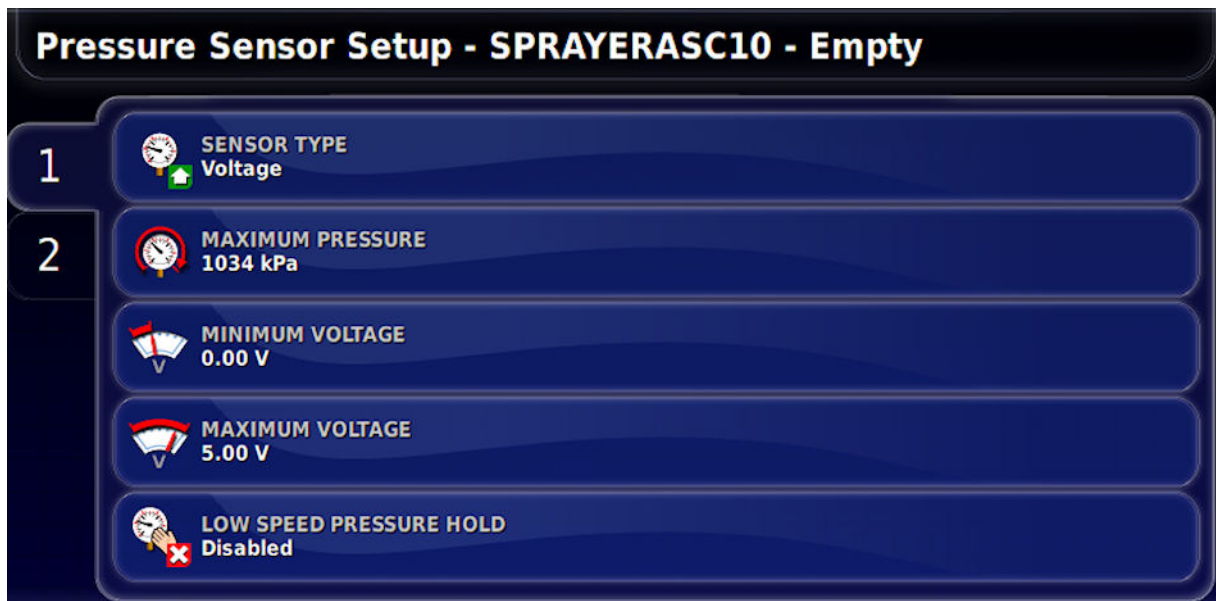
- **Maximum pressure**: The maximum pressure rating that the sensor can read.
- **Minimum voltage**: The rated minimum voltage (0-5) for the sensor.
- **Maximum voltage**: The rated maximum voltage (0-5).
- **Low speed pressure hold**: This allows the system to go into 'low pressure hold' based on speed. If the controller is in auto and the speed drops below the set value, the system will stop controlling to the set application rate and go into manual mode. When the speed goes back above this value it will go back into auto mode. The speed threshold must be entered.

4.4. Setting up pressure control

Refer to the specifications of the sprayer and an ISO standard nozzle rate chart for correct settings.

The console supports **Pressure Only** or **Pressure Fallback** control. Pressure fallback control uses flow control unless the flow falls below a set flow rate. It will then use pressure control until the flow increases.

Note that this setting is disabled if **Sensor Type** is set to **None** under **Implement** / **Sprayer** / **Pressure**.

1. Select **Implement** / **Sprayer** / **Pressure Control** .
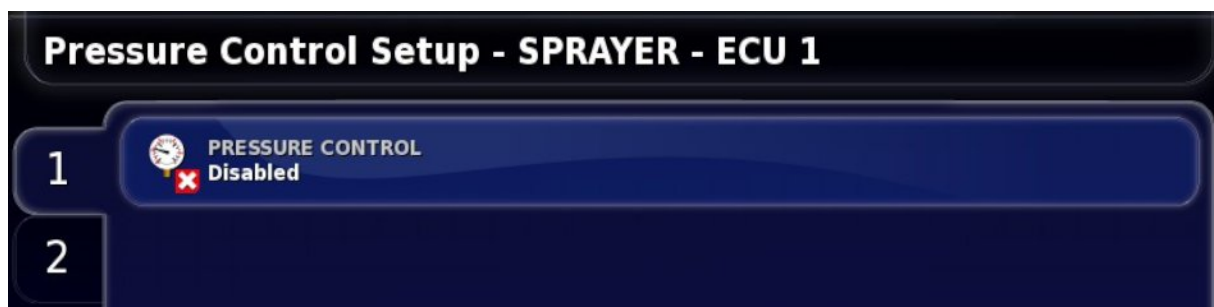
2. Select the tank from the tabs on the left and select **PRESSURE CONTROL**.
3. Select **Pressure Only** or **Pressure Fallback**. The following screens and options will vary based on this selection. Confirm.

Pressure only

- **Density**: The density of the liquid (water = 1).

Pressure fallback

- **Density**: The density of the liquid (water = 1).
- **Control switch point**: The low flow rate that will activate pressure control.

4.5. Setting up the control valve

The control valve is used to meter/control the volume of product discharged from the boom.

4.5.1. Regulator valve system

Regulator valve systems are placed in line with the pump and adjust the flow of product to the boom by diverting excess flow back to the tank.

1. Select **Implement** / **Sprayer** / **Control Valve** .
2. Select **CONTROL VALVE** and select **Regulator**.

- **Flow meter sampling**: Sets how frequently sampling is done. Standard sampling is recommended. Reduced is recommended only if flow may be highly irregular (for example, on worn equipment).

- **Valve speed**: Sets the speed at which the valve is driven to control the rate.

- **Close valve when off**: Ensures that the valve is closed when the tank is not in use. This closes the valve when the Master Switch is off and/or when all sections are turned off.

- **Reverse valve**: In some sprayers the valve may have been wired to work in the opposite direction. This setting allows the valve to work in reverse.

- **Minimum on time**: The minimum time that power needs to be applied to move the valve.

- **Maximum on time**: The maximum time that power can be applied to move the valve.

- **Gain setting**: This sets how quickly the controller will try to achieve the required rate. If set too high, the sprayer may pass the target rate and take time to adjust, searching for the right level. If set too low, the valve will take a long time to move to the desired rate and control will be slow to respond. Find the best gain percentage for the equipment being used.

- **PWM setting**: This is the time that the Pulse Width Modulation (PWM) is active. This setting is used to reduce the overall applied voltage to the actuator. Use with caution as this will reduce the torque that the actuator is able to apply. Control of a motor or valve is achieved by varying the amount of time power is switched on/off. This happens at a very fast rate.

4.5.2. Proportional valve system

Proportional valve systems typically control a hydraulic valve that adjusts the speed of the pump to control the flow that is being delivered directly to the boom.

1. Select **Implement** / **Sprayer** / **Control Valve** .
2. Select **CONTROL VALVE** and select **Proportional**.

- **Flow meter sampling**: Sets how frequently sampling is done. Standard sampling is recommended. Reduced is recommended only if flow may be highly irregular (for example, on worn equipment).
- **Add dither**: Dither makes the valve vibrate slightly to help prevent sticking. Valve quality and brand will dictate whether this setting is required.
- **Minimum PWM**: The time that the Pulse Width Modulation (PWM) is active. Higher values set the pulse of power for longer during a pulse cycle. Minimum PWM is used to locate at what point a valve or motor will respond to the power provided. Anything under this figure the implement (motor, valve actuator) will not respond.
- **Maximum PWM**: The time that the Pulse Width Modulation (PWM) is active. Higher values set the pulse of power for longer

during a pulse cycle. Anything over this figure the implement (motor, valve actuator) will not respond.

- **Controller response**: This sets how quickly the controller will try to achieve the required rate. If set too high, the sprayer may pass the target rate and take time to adjust, searching for the right level. If set too low, the valve will take a long time to move to the desired rate and control will be slow to respond. Find the best setting for the equipment being used.

- **PWM frequency**: The frequency at which the valve is driven. Higher quality valves respond better to high frequency PWM.

4.6. Setting up pump control

Some sprayers have a hydraulically driven pump and have a speed sensor fitted to monitor the driven speed of the pump.

Setting up pump control allows the pump speed to be monitored during operations.

1. Select **Implement** / **Sprayer** / **Pump Control** .
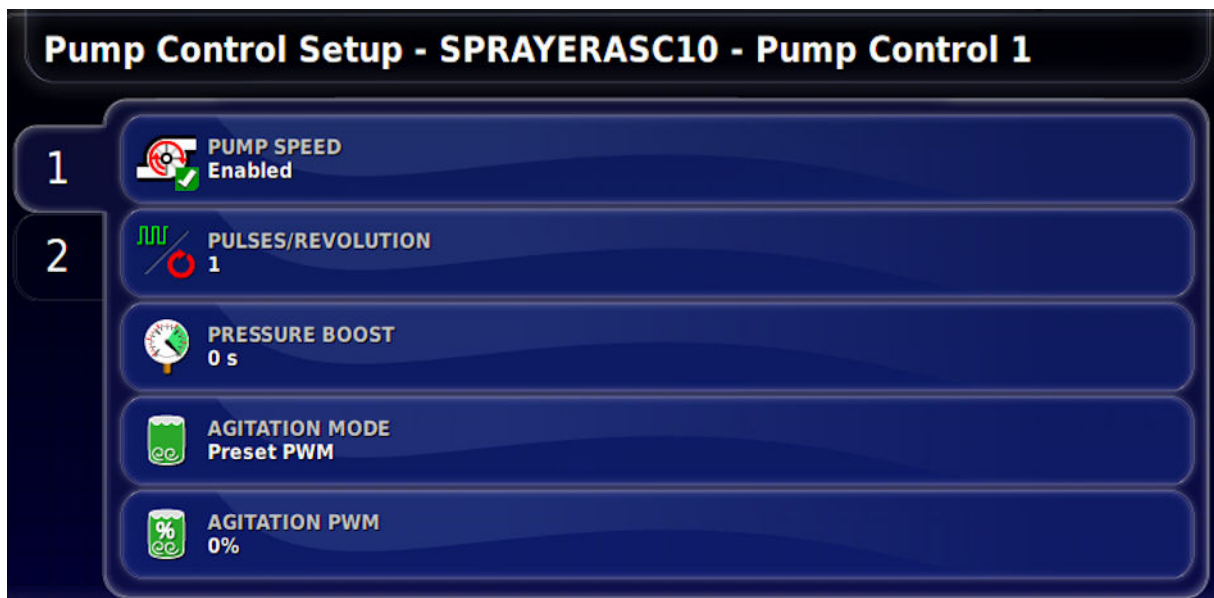
*   **Pulses/Revolution**: Sets the number of pulses recognized per revolution of the pump.
*   **Pressure boost**: This increases the pressure when the sprayer has been turned off. This drives the valve to increase pressure for a short time after the Master Switch is turned off. This allows spraying to resume at normal pressure when it is restarted. This option is not available if agitation is enabled.
*   **Agitation mode**: Keeps the proportional valve driving when the Master Switch is turned off. Agitation Mode allows slight agitation to keep the mixture moving.
    *   When agitation is enabled, the **Agitation PWM** option appears. This sets the speed of the pump during agitation.

4.7. Setting up speed source

Sets the source of speed information supplied to the implement which is used to determine the application rate required.

1. Select **Implement** ![icon] / **Sprayer** ![icon] / **Speed Source** ![icon] .
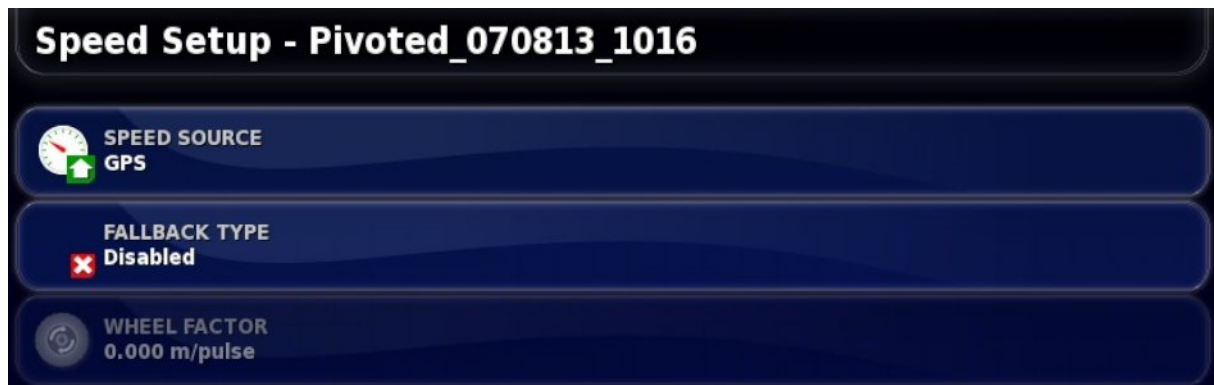

- **Speed source**: The speed source used to determine the required application rate from the sprayer.
- **Fallback type**: Speed source used if GPS is selected and the signal is lost.
- **Wheel Factor**: If **Wheel Sensor** is selected as the speed source, the wheel speed calibration factor must be calculated (or entered here if known). Refer to Wheel sensor calibration, page 49.

4.8. Setting up implement audio

Sets the sound feedback for implement operations.

1. Select **Implement**   / **Sprayer**   / **Audio**   .
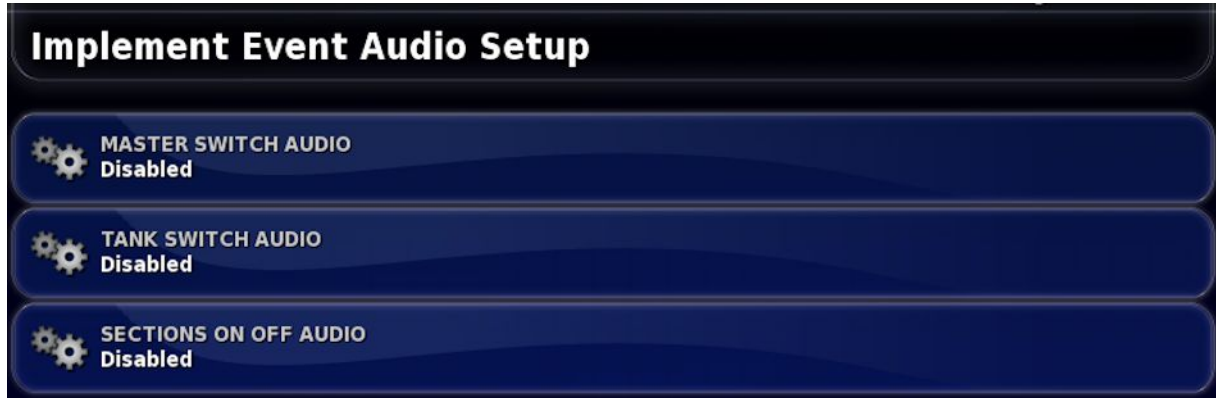
Sound can be enabled for the following operations: turning the master switch on and off, turning a tank on and off and turning a section on and off. Each sound is unique.

4.9. Setting up alarms

Alarms can be enabled for all alarms or individual alarms. Use the **All Sprayer Alarms** option to universally enable or disable all sprayer alarms.

1. Select **System** [icon] / **Alarms** [icon] / **Sprayer** [icon] .
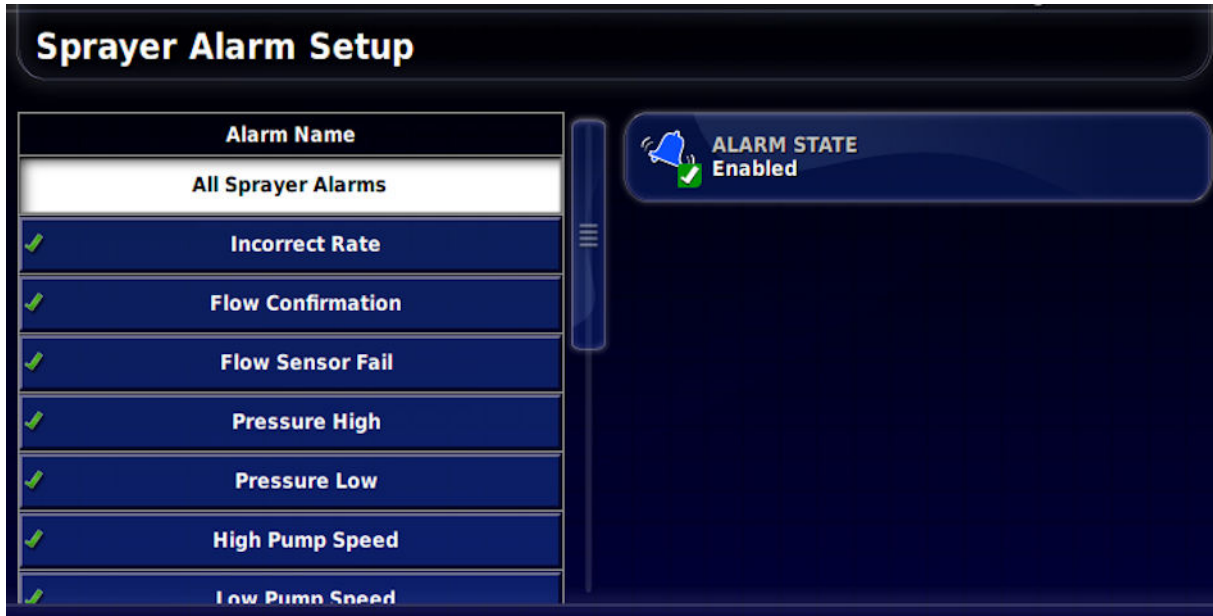
2. To enable all alarms, select **All Sprayer Alarms** / **Alarm State** and **Enabled**.

   This enables all sprayer alarms listed. Alarms that require more information are shown below.

   - **Incorrect Rate**: This alarm will sound and display if the detected actual rate is different from the preset rate by the threshold percentage amount. Enter the percentage in **INCORRECT RATE THRESHOLD** (lower is more sensitive).

   - **Pressure High**: This alarm will sound and display when pressure exceeds the preset maximum pressure (at which the sprayer nozzles become inefficient) for each tank.

   - **Pressure Low**: This alarm will sound and display when pressure drops below the preset minimum pressure (at which the sprayer nozzles become inefficient) for each tank.

- **High Pump Speed**: This alarm will sound and display when RPMs exceed the preset maximum RPMs for each tank.

- **Low Pump Speed**: This alarm will sound and display when RPMs drop below the preset minimum RPMs for each tank.

- **Tank Low**: This alarm will sound and display if the tank contents drop below the preset percentage for each tank.

4.10. Enabling section control

To use Auto Section Control, this must be enabled.

1. Select **System** [icon] / **Features** [icon] / **Implement** [icon] and set **AUTO SECTION CONTROL** to **Enabled**.

   Note: Only the Auto Section Control and Lock Setup Menu options are available on this screen if using an X14 console.

2. If using VRC prescription maps, select **VARIABLE RATE CONTROL**, choose **Enabled** and confirm.

3. Repeat for each feature you wish to enable or disable.

Chapter 5 – Operation (X35/X30/X25)

Once setup is complete and auto section control and sprayer controller are enabled, the auto section control and sprayer controller icons appear on the Navigation bar (left of screen).

Sprayer controller information is added to the dashboard and the sprayer master switch appears bottom right.

1 Auto section control icon

2 Sprayer controller icon

3 Sprayer dashboard

4 Sprayer master switch

5.1. Using the sprayer dashboard

Sprayer information is added to the dashboard when the Sprayer Controller is enabled.

1. Select anywhere on the dashboard to customize what is shown on the dashboard.

2. Press again on the particular panel to be customized and further options display.

3. Deselect and select options as required.

4. Confirm the new dashboard display. The selected options appear on the dashboard.

5.2. Opening auto section control

Auto section control is available when an implement and ECU have been set up and Auto Section Control has been enabled in the Setup screen (**System** / **Features** / **Implement**).

1. Select **Auto Section Control** . The Auto Section Control mini-view opens.

- **Control mode**: Use the slider or number keypad to set to avoid overlap (0) or avoid gaps (100). If avoid overlap is chosen, there may be some spaces where product is not applied. If avoid gaps is chosen, some overlap of application is likely near boundaries. The default (50) is a compromise.
- **Boundary limit**: Sets which type of boundary limit will turn off spraying when using auto section control.
  - **Field Boundary** and **Headland** are defined using the Field menu on the Operation screen. Refer to the Guidance and Auto Steering Operator Manual for more information on these.
- **ASC on/off**: Turn auto section control on/off.

5.3. Opening sprayer controller

The sprayer controller interface can appear either in a mini-view or in full screen. When the sprayer controller is in full screen, the guidance view can appear as a mini-view, so that the operator can still monitor the map.

1. Select the **Spray Rate Controller** to open a mini-view .

   Use the mini-view to monitor status, adjust rate or change tanks.

2. To move the mini-view to another position on the screen, slide up or down.

3. To open the sprayer controller to full screen, touch anywhere in the mini-view and slide left to right, or use the minimize / maximize button (top right). The Guidance screen can remain as a mini-view.

   The sprayer controller full screen interface shows a number of panels.
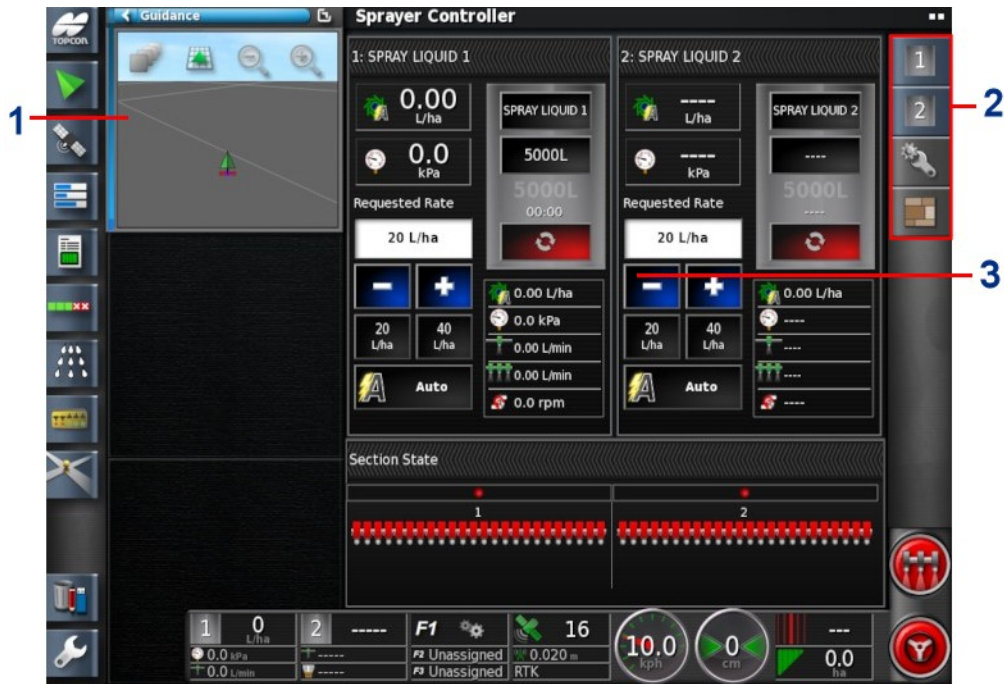
1 Guidance mini-view

2 Sprayer toolbar

3 Sprayer panels

4. Select the panels to view using the Sprayer toolbar.

5.4. Choosing/changing tanks

1. Select Tank on the toolbar to the right of the screen to open the panel for the tank being used.

   Note: If all panels are open, it may be necessary to slide some panels to the left or right to see the required information.

2. Touch the Tank Panel title bar to expand the panel to show product information.

1 Displays two parameters related to the specific tank. Selecting opens a customize data window with a list of available parameters to be displayed.

2 Requested application rate. Used to enter and display the application rate. The control system uses the calibration factor to adjust the product flow for the given product. This is disabled if VRC is being used.

3 Increase/decrease requested application rate by preset rate increment (increment is set by selecting button shown at 6).

4 Requested application rate presets. These are the user-defined default application rates (set by selecting button shown at 6). Selecting one of these icons adjusts the application rate to that value.

5 Rate control mode selector. Allows you to select VRC or Auto control for a specific tank or all products.

Manual may also be selected for all tanks (but not for a specific tank). Note that Auto Section Control will not work in manual mode. When in manual mode, the requested rate is greyed out and the actual rate may be adjusted using the + and – buttons.

6 Product configuration. Opens the product configuration window for the tank. Refer to Selecting / adding a product, page 43.

7 Tank fill. Opens the tank fill window to add volume of the product being used. Refer to Filling tanks, page 45.

8 Tank metering on/off toggle. Green when tank is on (metering running), red when tank is off (metering stopped).

9 Displays up to five parameters related to the specific tank. Opens a customize data window with a list of available parameters to be displayed.

5.4.1. Tank colors
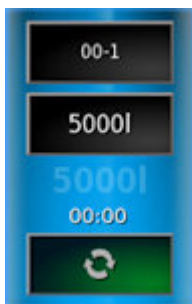
Grey tank. Red On/Off.

System is on standby. Tank is turned off.
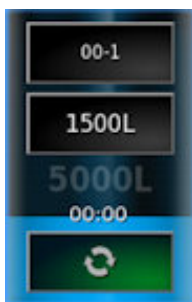
Check Master Switch and tank On/Off.

Red tank. Green On/Off.

Tank is turned on, but empty.
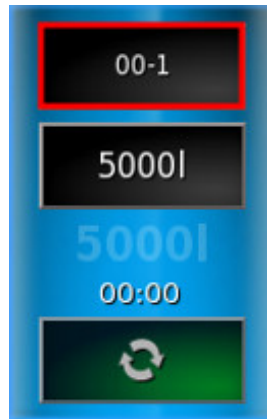
Blue tank. Green On/Off.

Tank is on.

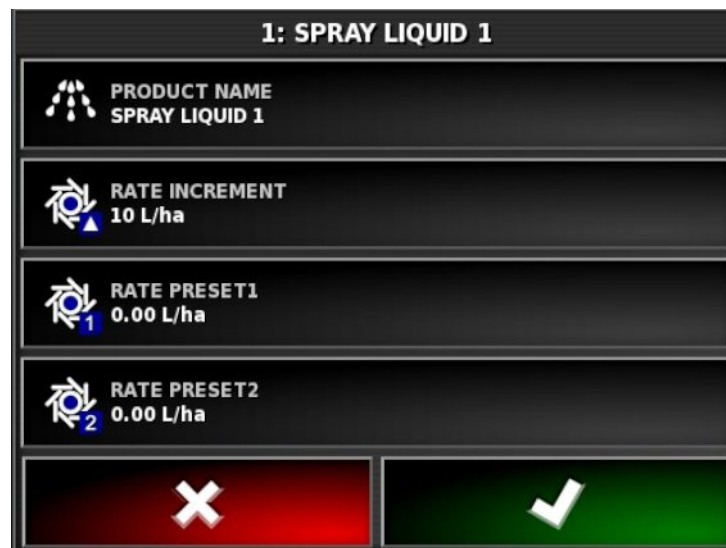Blue color dropping shows approximate level of product remaining.

5.4.2. Selecting / adding a product

To select or add a new product:

1. Select the Product Configuration button.

The Product Configuration screen displays.

2. Select **PRODUCT NAME** to select a product from the list, or to add a new product.

Selecting **New Product** opens the New Product Setup wizard.

Follow the wizard to add a new product. **Custom Product** may be selected to create a new product from scratch, or a product template may be selected from the list. Note that some of the available product templates apply only to granular products.

- **Rate increment**: Defines how much the application rate will change when the operator presses the application rate up/down button. The rate can be changed by a fixed rate or by a percentage of the rate set for **Rate Preset 1**. To change the rate increment type:

  1. On the Setup screen, select **User** / **Region** / **Units**. The **APPLICATION RATE INCREMENT TYPE** may be set to **Fixed rate** or **Percentage of Rate 1**.

- **Rate preset 1** / **Rate preset 2**: Defines preset application rates.

5.4.3. Filling tanks

To fill the sprayer tanks:
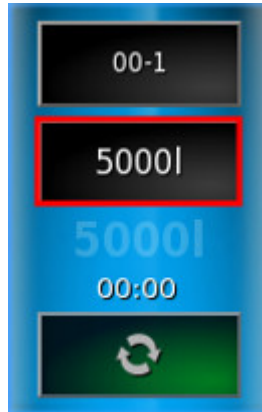
1. Select the Tank Fill button.

The Tank Fill screen displays.

 Set volume: Set the volume of product in the tank.

 Volume increment: Set the volume value to be used when increasing volume in the tank by increments.

 Fill tank to capacity: Fill the tank to the capacity entered on the Setup screen (**Implement** / **Sprayer** / **Tank**).

Increase volume by increment: Adds product by the volume set for **Volume increment**.

Fill all tanks to capacity: Fill all tanks to the capacity entered on the Setup screen (**Implement** / **Sprayer** / **Tank**).

Adjust calibration

This option is used to adjust the calibration factor when there is a known starting volume and a known error in the finishing volume. It allows the calibration factor to be automatically recalculated based on the percentage difference between the calculated and actual volume remaining. This may be useful when there is an inconsistency between the displayed and known product remaining.

1. Select **Adjust Calibration**.

2. Select **Actual Volume Remaining**.

3. Enter the volume of product remaining in the tank and confirm.

The Calibration Adjustment percentage is automatically calculated.

5.5. Configuring and calibrating

1. Select Configuration on the toolbar to the right of the screen.

The Configuration screen displays.

- **Manual speed**: Allows the user to select manual speed and override the selection made in the Setup screen **Implement** / **Sprayer** / **Speed Source**. This is only possible if the vehicle is stationary, or if GPS is selected and the signal drops out. The speed is used to calculate application rates.

Note that manual overrides a number of automatic features and is not recommended for operations. It should be used for stationary testing of nozzles only. It must be changed to the correct speed source before operating the sprayer under normal conditions.

- **Manual speed display**: Enables the manual speed to be entered. This indicator changes to **Wheel Sensor** if that is selected as the speed source in the Setup screen **Implement** / **Sprayer** / **Speed Source**, refer to Wheel sensor calibration, page 49.

- **Tank**: Displays the pressure sensor, pump speed and flow meter information for each tank.

- **Pressure sensor**: Shows the calibration status of the pressure sensor. Refer to Setup screen **Implement** / **Sprayer** / **Pressure**.

- **Valve balancing**: Displays the valve balancing wizard. Balanced valves must be enabled in the setup screen **Implement** / **Sprayer** / **Flow**. Refer to Valve balancing wizard, page 51.

- **Flow meter**: Displays the flow meter calibration wizard to be used if the calibration factor for the flow meter is not known and entered in the Setup screen **Implement** / **Sprayer** / **Flow**. Refer to Flow meter calibration, page 50.

5.5.1. Wheel sensor calibration

If **Wheel Sensor** is selected in the Setup screen **Implement** / **Sprayer** / **Speed Source**, the wheel factor must be calibrated.

Wheel factor defines how many meters per pulse are received from the wheel speed sensor.

To calibrate the wheel factor:

1. Select **Wheel Sensor** from the sprayer configuration screen.
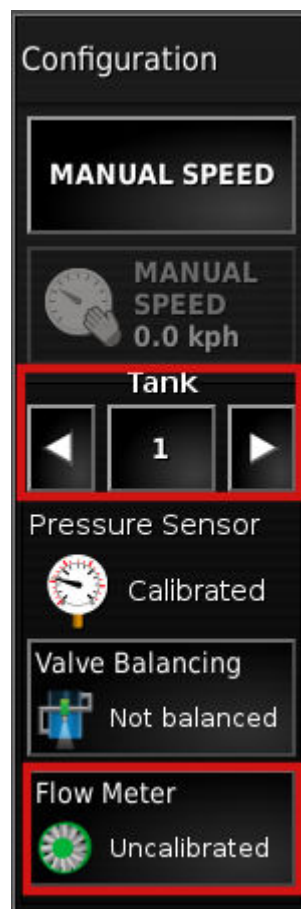

The Auto Speed Cal wizard displays.

2. Follow the wizard prompts to calibrate the wheel sensor.

5.5.2. Flow meter calibration

Flow meter calibration determines the number of pulses from the flow meter per liter of liquid.

To calibrate the flow meter:

1. Ensure the required tank is selected using the **Tank** left and right buttons.

2. Select **Flow Meter** from the sprayer configuration screen.

The Auto Flow Cal wizard displays.

3. Follow the wizard prompts to calibrate the flow meter.

At step 2, the larger the volume measured, the more accurate the flow meter calibration will be. The + and – buttons may be used to increase or decrease the flow and pressure.

5.5.3. Valve balancing wizard

For sprayers fitted with balanced section valves, the valve balancing wizard helps you to balance the flow that returns to the tank when the section valve is turned off, to the flow that goes to the nozzles when the section valve is turned on. The section switches are automatically toggled to streamline the process of ensuring valves are balanced.

1. Select the nozzles that are being used.

2. Enter the required application rate and speed, then turn on the master switch. The balancing process begins with all sections on at the entered rate and speed to determine the required flow rate and pressure.

3. Wait for the flow rate and pressure readings to settle. A lock is displayed next to the readings once they are confirmed.

4. Select the section to balance first (Section 1 is selected by default) and turn it off .
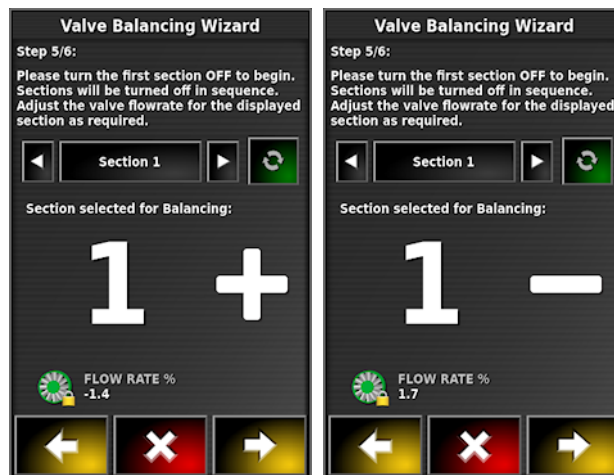
Section valves are then turned off incrementally and the valves can be adjusted as required. Sections can be skipped if required and the next section selected.
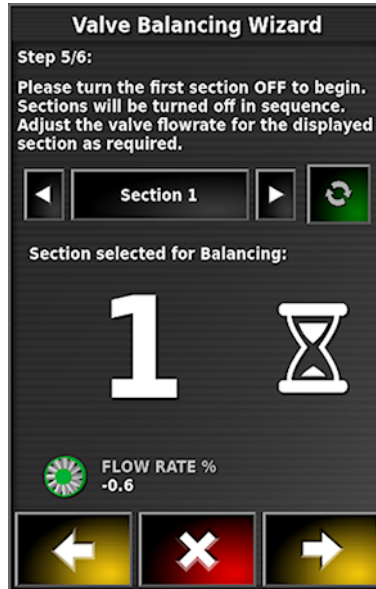
A + symbol next to the pressure reading indicates that the pressure is too low on that valve. Turn the knob to increase the pressure.

A - symbol indicates pressure is too high. Turn the knob to decrease pressure.

Once the valve is balanced, an information screen is displayed and the next section will turn off.

Once the flow rate is stable for each section, a lock is displayed next to the reading.

5.6. Setting area counters

Area counters are used with spreaders, sprayers and seeders to record data such as treated area, product used, operating time, average rate and productivity rate. Area counters are not available when using ISO implements.

To enable area counters:

1. On the Setup screen, select **System** / **Features** /

   Implement .

2. Select **AREA COUNTERS** and select one of the following:

   - **Enabled (Stored per job)**: Area counters are stored separately for each job, (if a job is started and coverage laid, then another job is selected and coverage laid, going back to the first job displays the area counters from the first job).

   - **Enabled (Stored per implement)**: Area counters continue across jobs, but loading a new implement displays new area counters. Reloading the first implement displays the area counters as they were when that implement was last used.

   - **Enabled (Stored per job and implement)**: Separate area counters are available for jobs and implements.

Reset job area counters

This option is only applicable if area counters per job is enabled.

- **Never**: The area counters must be reset manually, or they will continue to accumulate data.

- **Prompt**: When a job is erased you will be asked if area counters should be reset.

- **Auto**: Creating a new job or erasing a job will automatically reset the area counters.

To use area counters:

1. Select Area Counters on the toolbar to the right of the screen.

   Note: A separate icon for job and implement area counters is shown if both are enabled.

1 Set active area counter number

2 Reset area counter window

3 Treated area

4 Product used

5 Operating time

6 Average rate (area)

7 Productivity time

  2. To select the area counter against which the data will be stored, select **Set Active Area Counter Number** and select the required counter.

     The same area counter must be selected each time data on the same topic is to be stored.

Data stored against the area counter is displayed in the lower half of the window.

3. Use the arrows or select the middle **Area** button to view data stored against each area counter.

4. Use the arrows or select the middle **Tank** button to view data stored against each tank.

Reset area counter window

Select this option to reset data for a tank, the currently selected job or implement area counter, or all job or implement area counters.
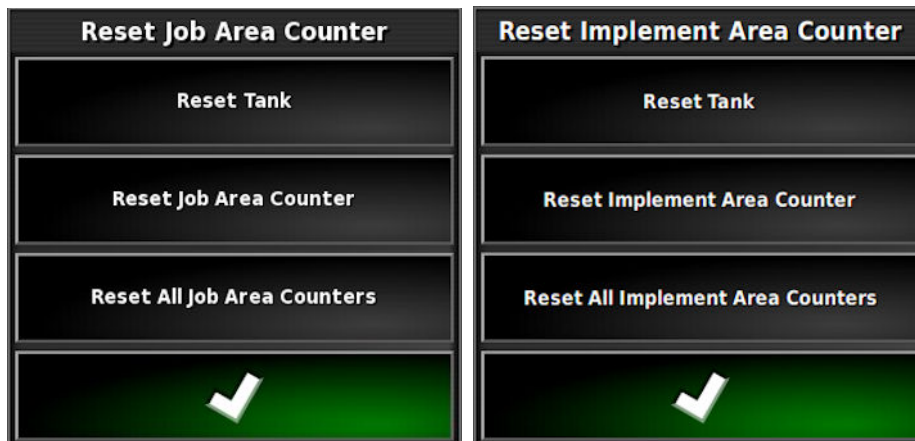
5.7. Using the master switch

When Virtual has been selected in the Setup screen (**Implement** /
Master Switch), the Sprayer Master Switch on the Operation screen
turns the sprayer system on. This switch does not work if External ECU
Sense is selected as the Master Switch.

The switch also indicates the readiness of the system.

Green

Sprayer Controller is on and working.
Select the Master Switch to turn the
sprayer off.

White

Sprayer Controller is in standby.
Select the Master Switch to turn the
sprayer on.

Red

Sprayer Controller is off and cannot
be used. Select the Master Switch to
see possible causes of the problem.
See the example below.

Green indicates that the system is ready. Red indicates that the system is
not ready. Select to return to the main screen and complete the
necessary action.

5.7. Using the master switch

The alarm bell button shows the number of active alarms.

Chapter 6 – Operation (X14)

Once setup is complete and auto section control and sprayer controller are enabled, the auto section control and sprayer controller icons appear on the Select View screen.
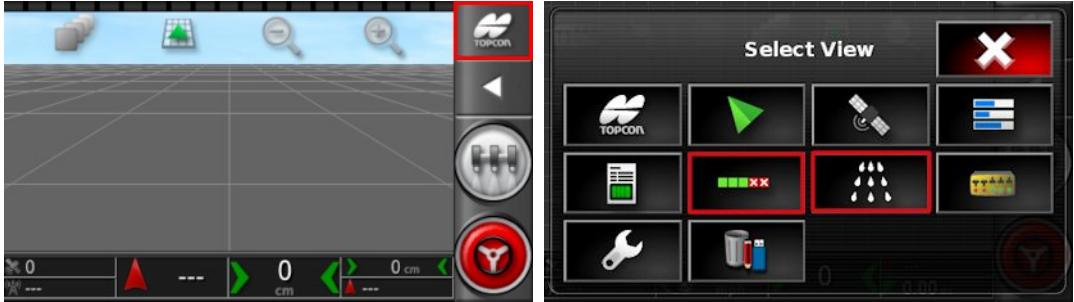
Sprayer controller information is added to the dashboard.

6.1. Opening auto section control

Auto section control is available when an implement and ECU have been set up and Auto Section Control has been enabled in the Setup screen (**System** / **Features** / **Implement**).

1. Select **Auto Section Control**.

The Auto Section Control screen opens.

- **Control mode**: Use the slider or number keypad to set to avoid overlap (0) or avoid gaps (100). If avoid overlap is chosen, there may be some spaces where product is not applied. If avoid gaps is chosen, some overlap of application is likely near boundaries. The default (50) is a compromise.

- **Boundary limit**: Sets which type of boundary limit will turn off spraying when using auto section control:

  - **Field Boundary** is defined using the Field menu on the Operation screen. Refer to the Guidance and Auto Steering Operator Manual for more information on this.
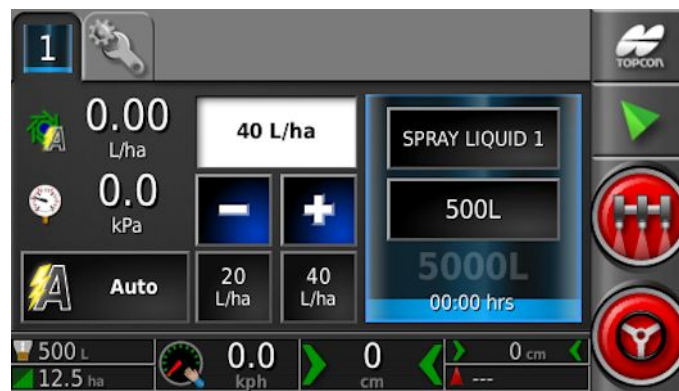
- **ASC on/off**: Turn auto section control on/off.

6.2. Opening the sprayer controller

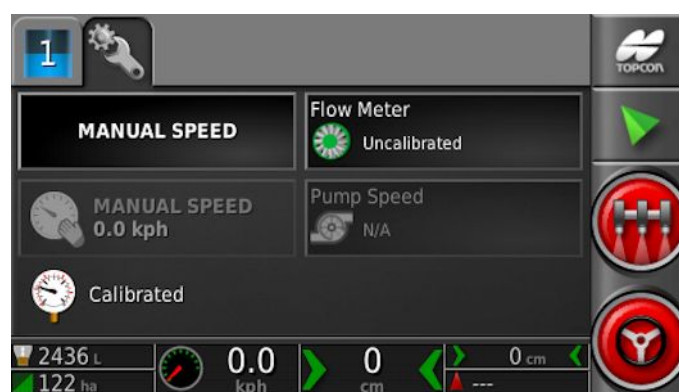To open the sprayer controller screens:
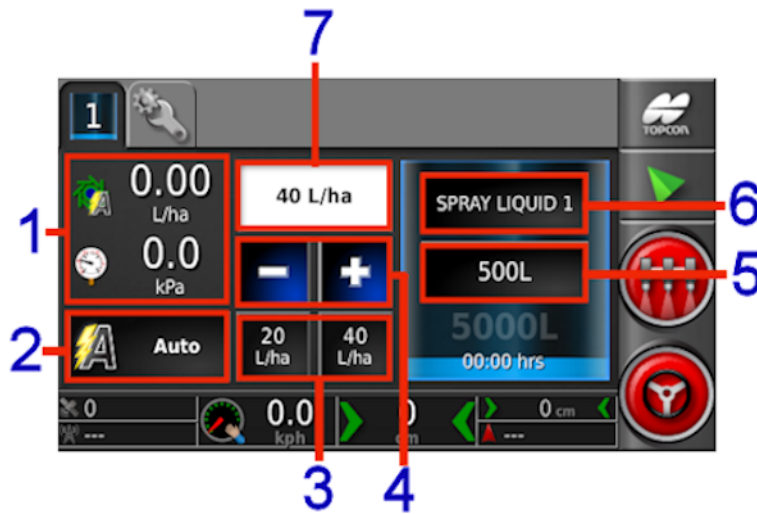
1. Select the **Spray Rate Controller** icon.

The sprayer controller screen opens.

The Configuration screen is available via the tab at the top of the screen.

6.3. Configuring tanks and application rates

1 Displays two parameters related to the tank. Selecting opens a customize data window with a list of available parameters to be displayed.

2 Rate control mode selector. Allows you to select Auto control.

Manual may also be selected. Note that Auto Section Control will not work in manual mode. When in manual mode, the requested rate is greyed out and the actual rate may be adjusted using the + and – buttons.

3 Requested application rate presets. These are the user-defined default application rates (set by selecting button shown at 6). Selecting one of these icons adjusts the application rate to that value.

4 Increase/decrease requested application rate by preset rate increment (increment is set by selecting button shown at 6).

5 Tank fill. Opens the tank fill window to add volume of the product being used. Refer to Filling tanks, page 66.

6 Product configuration. Opens the product configuration window for the tank. Refer to Selecting / adding a product, page 64.

7 Requested application rate. Used to enter and display the application rate. The control system uses the calibration factor to adjust the product flow for the given product.

6.3.1. Tank colors

 Blue tank. Tank is full.

 Red tank. Tank is empty.

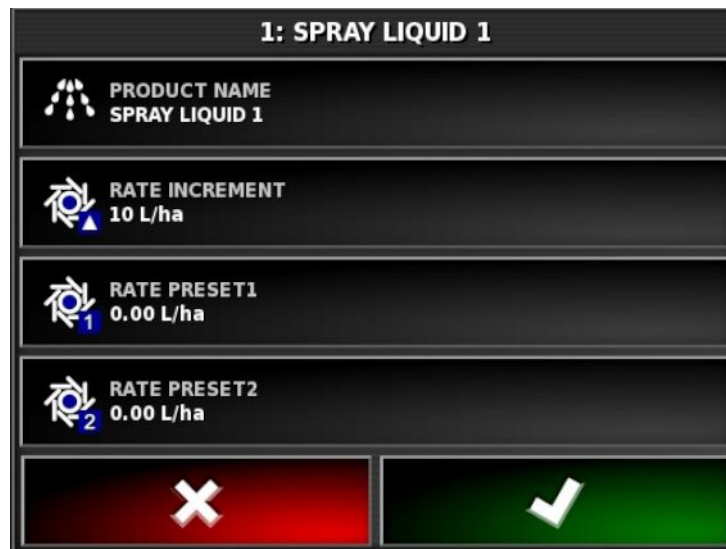 Blue color dropping shows approximate level of product remaining.

6.3.2. Selecting / adding a product

To select or add a new product:

1. Select the Product Configuration button.

The Product Configuration screen displays.

2. Select **PRODUCT NAME** to select a product from the list, or to add a new product.

Selecting **New Product** opens the New Product Setup wizard.

Follow the wizard to add a new product.

- **Rate increment**: Defines how much the application rate will change when the operator presses the application rate up/down button. The rate can be changed by a fixed rate or by a percentage of the rate set for **Rate Preset 1**. To change the rate increment type:

  1. On the Setup screen, select **User** / **Region** / **Units**. The **APPLICATION RATE INCREMENT TYPE** may be set to **Fixed rate** or **Percentage of Preset 1**.

- **Rate preset 1** / **Rate preset 2**: Defines preset application rates.

6.3.3. Filling tanks

To fill the sprayer tanks:

1. Select the Tank Fill button.

The Tank Fill screen displays.

 Set volume: Set the volume of product in the tank.

 Volume increment: Set the volume value to be used when increasing volume in the tank by increments.

 Fill tank to capacity: Fill the tank to the capacity entered on the Setup screen (**Implement** / **Sprayer** / **Tank**).

 Increase volume by increment: Adds product by the volume set for **Volume increment**.
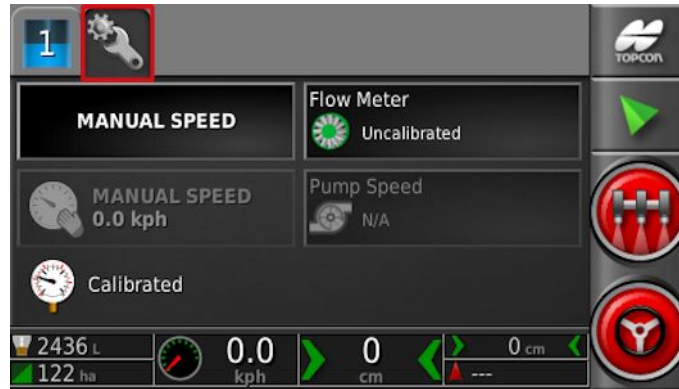
Adjust calibration

This option is used to adjust the calibration factor when there is a known starting volume and a known error in the finishing volume. It allows the calibration factor to be automatically recalculated based on the percentage difference between the calculated and actual volume remaining. This may be useful when there is an inconsistency between the displayed and known product remaining.

1. Select **Adjust Calibration**.

2. Select **Actual Volume Remaining**.

3. Enter the volume of product remaining in the tank and confirm.

The Calibration Adjustment percentage is automatically calculated.

6.4. Configuring and calibrating

1. Select the Configuration tab on the sprayer controller screen. The Configuration screen displays.

- **Manual speed**: Allows the user to select manual speed and override the selection made in the Setup screen **Implement** / **Sprayer** / **Speed Source**. This is only possible if the vehicle is stationary, or if GPS is selected and the signal drops out. The speed is used to calculate application rates.

  Note that manual overrides a number of automatic features and is not recommended for operations. It should be used for stationary testing of nozzles only. It must be changed to the correct speed source before operating the sprayer under normal conditions.

- **Manual speed display**: Enables the manual speed to be entered. This indicator changes to **Wheel Sensor** if that is selected as the speed source in the Setup screen **Implement** / **Sprayer** / **Speed Source**, refer to Wheel sensor calibration, page 69.

- **Pressure sensor**: Shows the calibration status of the pressure sensor. Refer to Setup screen **Implement** / **Sprayer** / **Pressure**.

- **Pump speed**: Shows the current status of the pump speed. Refer to Setup screen **Implement** / **Sprayer** / **Pump Speed**.

- **Flow meter**: Displays the flow meter calibration wizard to be used if the calibration figure for the flow meter is not known and entered in the Setup screen **Implement** / **Sprayer** / **Flow**. Refer to Flow meter calibration, page 70.
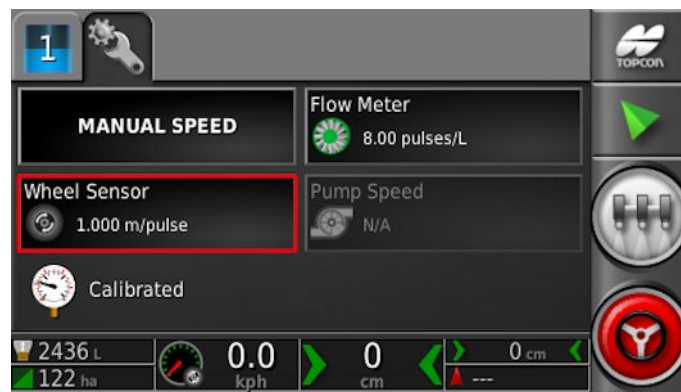
6.4.1. Wheel sensor calibration

If **Wheel Sensor** is selected in the Setup screen **Implement** / **Sprayer** / **Speed Source**, the wheel factor must be calibrated.

Wheel factor defines how many meters per pulse are received from the wheel speed sensor.

To calibrate the wheel factor:

1. Select **Wheel Sensor** from the sprayer configuration screen.

The Auto Speed Cal wizard displays.

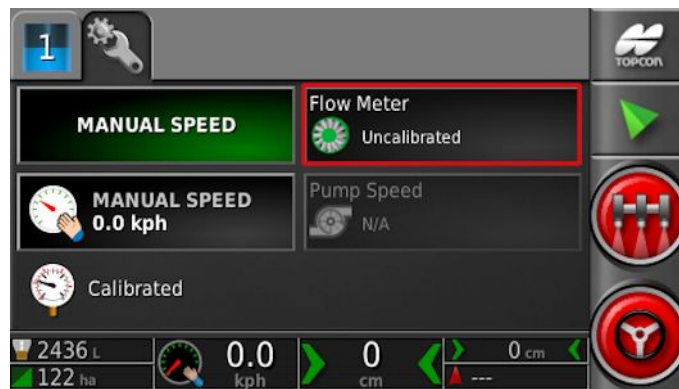2. Follow the wizard prompts to calibrate the wheel sensor.

6.4.2. Flow meter calibration

Flow meter calibration determines the number of pulses from the flow meter per liter of liquid.

To calibrate the flow meter:

1. Select **Flow Meter** from the sprayer configuration screen.

The Auto Flow Cal wizard displays.

2. Follow the wizard prompts to calibrate the flow meter.

At step 2, the larger the volume measured, the more accurate the flow meter calibration will be. The + and – buttons may be used to increase or decrease the flow and pressure.

Chapter 7 – Variable Rate Control

Note: Variable Rate Control is not available on the X14 console.

Before use, Variable Rate Control (VRC) must be set up with a controller and must be enabled on the Setup screen (**System** / **Features** / **Implement**).

Select to enable or disable the VRC Map display on the guidance screen.

7.1. If using VRC maps

There are three ways to perform VRC:

- Importing prescription maps (shapefiles and ISO XML files) into created jobs using the VRC import wizard.
- Using real-time sensor data from nitrogen sensors mounted on the tractor (for example: Topcon CropSpec).
- Using Task Data based prescription maps.

The following instructions describe the first two methods. If using task data, refer to the Guidance and Auto Steering Manual.

Both shapefiles (.shp) and ISO XML files (.xml) may be imported into created jobs. Note that only the prescription map portion of the data is used if .xml files are imported.

1. Select a client / farm / field.
2. Create a new job.
3. Select **Job Menu** / **Configure Variable Rate Control** .
4. Select next at step 1 of the VRC Configuration wizard.
5. Select the rate source(s) for the VRC and select next. The possible options are:

- Shapefiles
- ISO XML
- CropSpec (if enabled)

Note that shapefiles and ISO XML cannot be used at the same time. However CropSpec can be used in conjunction with shapefiles or ISO XML.

If **Shapefiles** or **ISO XML** are selected at step 2, all maps previously imported to the current field are displayed so that previously used maps can be recalled.

- If the desired maps are not already on the console, insert a USB with prescription maps.

- Select the USB icon at base of the screen . The window background turns blue to indicate you are viewing the USB file list.
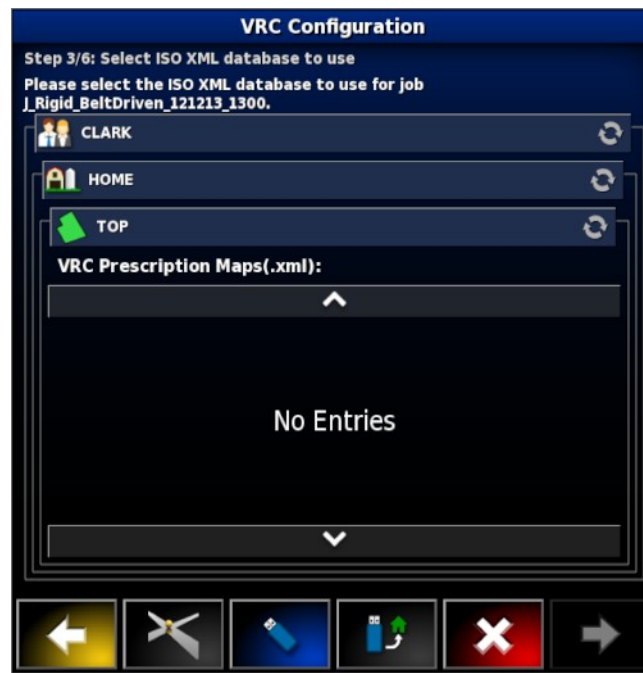
- Select the USB home icon to view the root of the USB file structure. Files and folders on the USB root are displayed.
- Select a folder to open it. Find the required file and select it. It will display as white and next is now enabled. Note that multiple files may be selected.
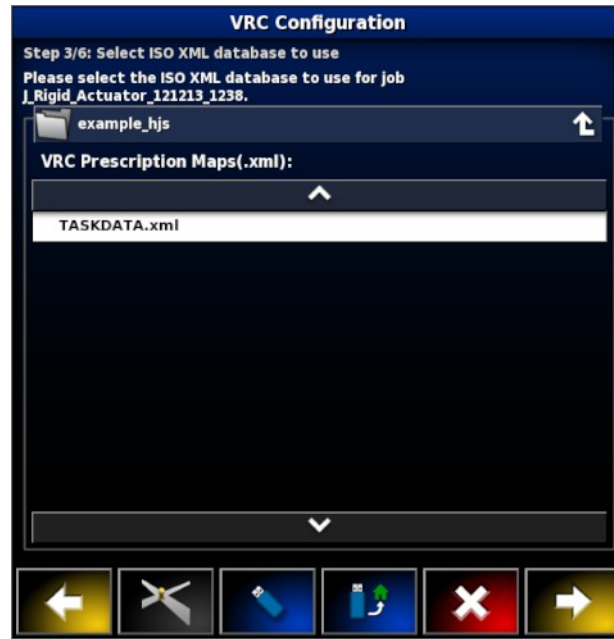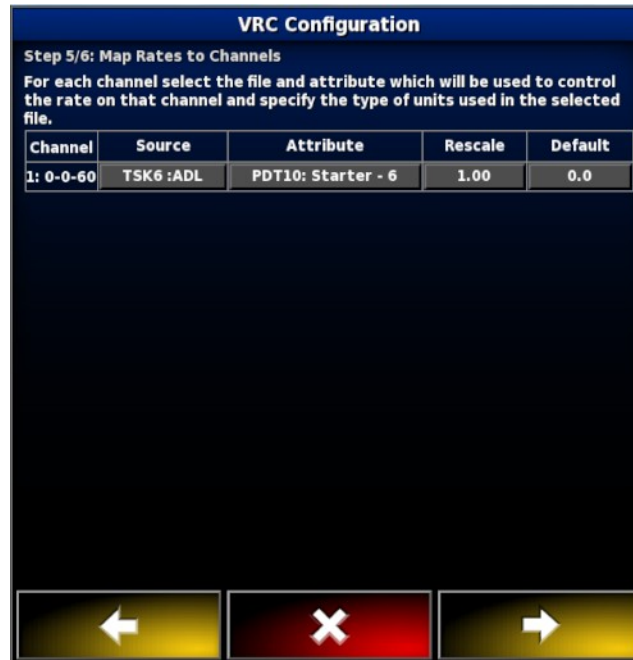
- Select next.

6. If ISO XML was selected in step 2, select the task that you wish to run. The file may have several tasks listed. Select the task that matches the implement that is hooked up.

7. Select next.

   Source and Attributes must now be assigned to channels.

   - **Channel**: The tank that is being controlled.
   - **Source**: The source of the prescription map for that channel. The list of files that were selected earlier on will appear here or you can also select a live source like CropSpec or Yara.
   - **Attribute**: One of the properties in the shape file or ISOXML file or the sensor output from CropSpec. The same shape file may have multiple attributes to define the rates for more than one tank so this allows the operator to map the prescription to the appropriate tank.
   - **Rescale**: This column defaults to 1, which means that the prescription defined in the source will be used directly. However, depending on weather conditions, the operator may choose to increase or decrease the rate of application. This allows a uniform increase for all defined rates. For example, a rescale of 1.1 will apply 110 percent of the rate defined in the source.

- **Default**: Defines the rate to use if the source doesn't specify a rate for that region of the paddock, or if the GPS signal drops out.

8. Select next.

9. On the final step, you must confirm the setup. This cannot be changed for the job, so ensure it is correct before continuing. Select Back to change the configuration or OK to confirm.

The map is displayed. If it does not display, ensure you are in close proximity geographically to the map's location.

7.1. If using VRC maps

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AGA4372