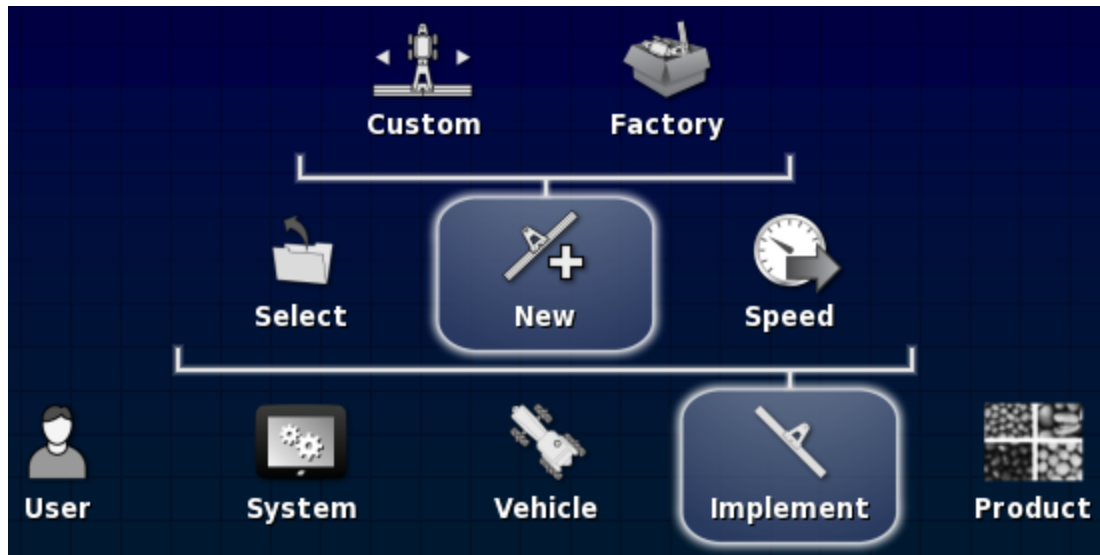# 7.2. Setting up a new implement

Creates a new implement profile for the attached implement.

To create a new implement:

1. 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.

   Note: The following instructions do not apply if the implement is controlled by an ISOBUS ECU, refer to Setting up an ISOBUS implement, page 78.

5. Select **IMPLEMENT CONTROL**, select **NONE**, then confirm and select next.

6. Select **IMPLEMENT FUNCTION** and select the most appropriate option from the selection list.

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

   The Implement Geometry screen displays. Refer to Setting the implement geometry, page 80.

7.2.1. Setting up an ISOBUS implement

If an ISOBUS implement is required:

1. At step 5 above, select the required **IMPLEMENT CONTROL**:
   - Section control only
   - Section control and rate control, or
   - Rate control only
2. Confirm and select next.
3. Select **ECU TYPE**, select **ISOBUS**, then confirm and select next.
4. Select **IMPLEMENT FUNCTION** and select the most appropriate option from the selection list.

5. Ensure the implement ECU is connected, select **ECU ASSIGNMENT** and select the required ECU from the selection list. Select **Any ECU** if the specific ECU is not listed.

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

   The console restarts and the ECU Setup screen displays.

Changing ECU settings (ISOBUS)

It is possible to change the implement controls from the **ECU Setup Screen** once implements are fully set up in the system.

1. Select **Implement** / **ECU**.

- To change the type of control, select **IMPLEMENT CONTROL**.
- To change the type of function, select **IMPLEMENT FUNCTION**.
- Select **REFRESH ECU SETTINGS** to synchronize information between the ISOBUS ECU and the console.

Refer to Using universal terminal (ISOBUS), page 168 for implement operation.

7.3. Setting the implement geometry

Sets the implement measurements so that guidance can work accurately.

Note: Measure the implement dimensions as accurately as possible. The recommended tolerance is +/- 5 cm. When an ISOBUS implement is connected, some of the geometry items are provided by the implement and cannot be altered in the X30. Any changes to these must be made in the implement ISOBUS UT control screen.

To set the implement geometry:

1. Select **Implement** / **Geometry**. Also, the Implement Geometry screen displays automatically when an implement is created or selected.
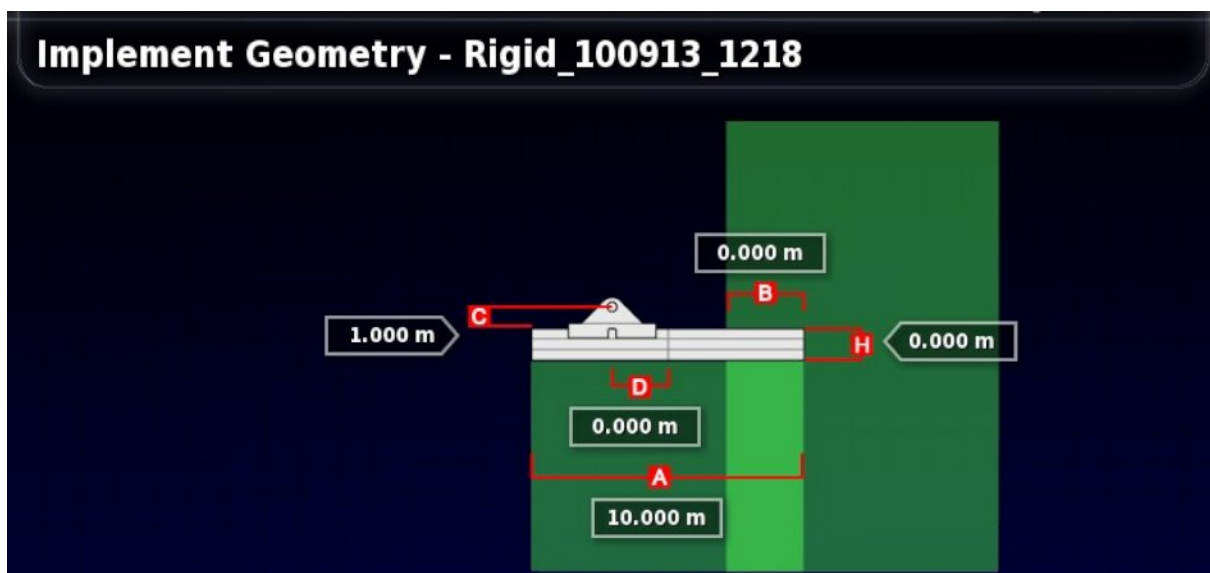
2. Select an implement dimension. The name of the dimension appears in the title bar.

   Dimensions requested vary according to the type of implement selected.

3. Add or adjust dimensions where needed and confirm.

The following lists measurements used in the system:

- **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 passes.

- **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.

Note: If the implement has multiple booms, the boom that is to be used for guidance must be selected from the **BOOM FOR GUIDANCE** selection list. This determines the swath width (spacing for the guidance lines). The implement geometry must be set for each boom on the numbered tabs.
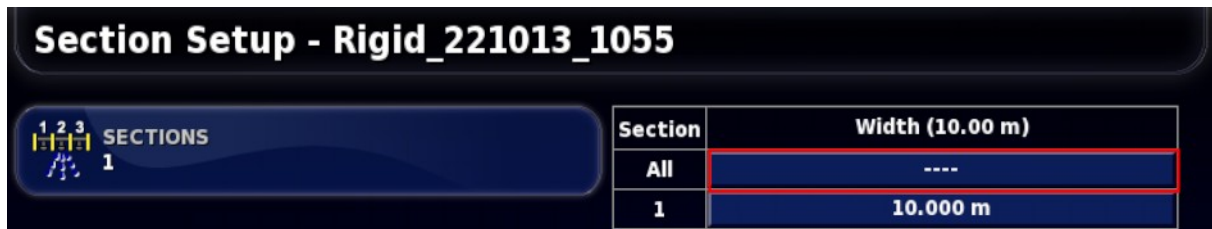
7.4. Setting up section control

To set up section control:

1. Select **Implement** / **Section Control** / **Sections**.
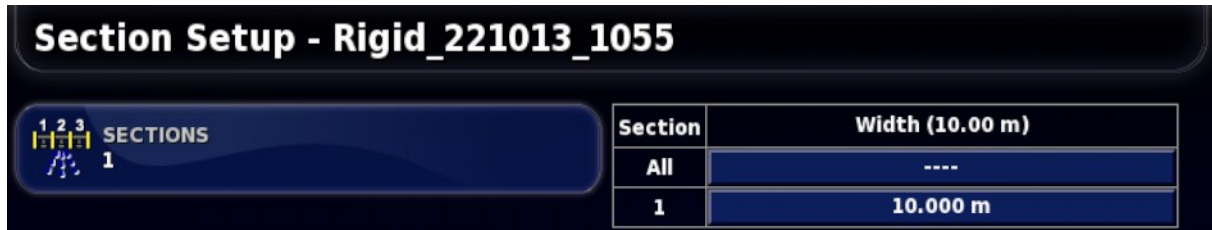
2. Select **SECTIONS** and use plus or minus to set the number of sections, then confirm.

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

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

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

6. Repeat for each section.

Refer to the Spreader / Sprayer operator manuals for more information.

7.4.1. Setting 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 calibration factor for the product has been calculated (refer to Product Setup, page 87).

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** / **Section Control** / **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.

7.4.2. Setting up the section switch

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

The type of switch cannot be selected with spreaders as the spinners' on/off action controls the two sections.

To configure the switches:

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

2. Select **TYPE**.

3. Select **Virtual** or **External ECU Sense** and confirm.

7.5. Setting up the master switch

The master switch turns on the application control (spreader, sprayer) 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.

Refer to the manual for the implement controller for information on setting up the switches for the implement.

External console input

Enables the master switch to be operated via an external switch (a physical switch box / master switch connected to the console).

Note: If an external switch is connected, this is usually done by the dealer during installation. The cable labeled 'Remote Mapping' connects to the console harness and provides power to activate/deactivate coverage map and master switch input.

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).

Follows device work state

Follows the state of the ISOBUS ECU. The virtual master switch is then for status display only.

7.6. Setting the vehicle speed

Sends vehicle speed information to the ISOBUS implement for performing rate control or other functions.

1. Select **Implement** / **Speed**.

GPS Speed Emulation Setup

ISO GROUND SPEED
Disabled

GPS NMEA2000
Disabled
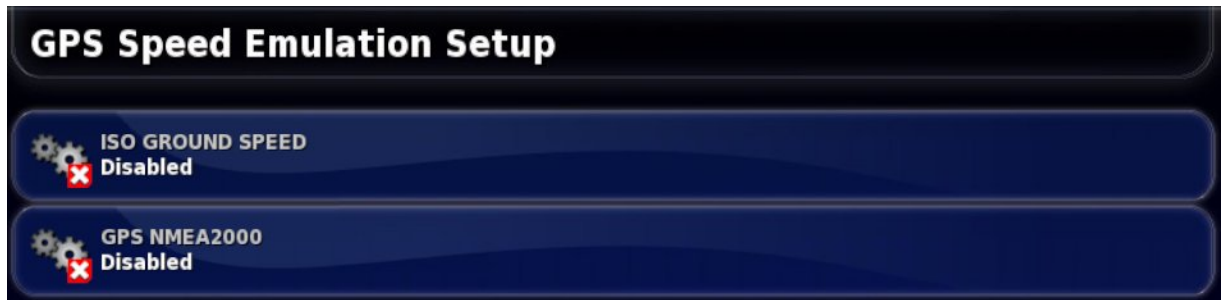
Outputs speed on ISO and/or NMEA2000 bus to the ECU.

2. Select the required output/s.

7.6. Setting the vehicle speed

# Chapter 8 – Product Setup

8.1. Setting up the product database

Product definitions can be saved in one common area. This allows common products to be used across a range of rate controllers without having to enter each product name and rate repeatedly.

Pre-set rates, increments and product densities can be set up and saved to be recalled in the appropriate rate controller.

The calibration factor for each product is assigned to each implement tank or bin. This means, for example, that you could have urea saved once with different calibration figures for each bin.

Refer to the Spreader / Sprayer operator manuals for detailed product information.

The **Product** menu option allows granular, liquid and NH3 (ammonia) product definitions to be created.
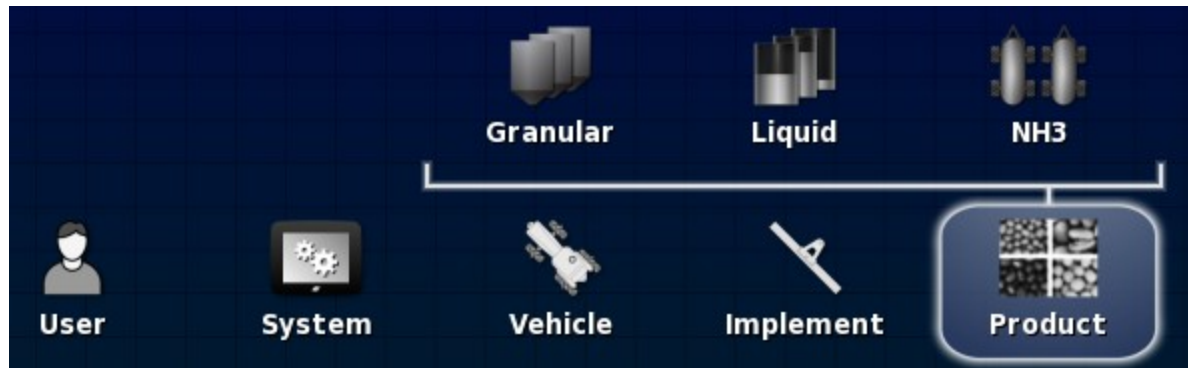
For each product, the following information must be defined:

- **Density** (granular only): Product density is used with tank volumes to determine tank capacities. Defined as kg/L or lb/gal.
- **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**. Refer to Application rate increment type, page 26.
- **Rate preset 1** / **Rate preset 2**: Defines preset application rates.

- **Calibration factor**: This is the amount of product dispersed per revolution of the product metering unit for granular products and the number of pulses from the flow meter per litre of liquid. This value can be viewed here but must be set for each implement and product. Refer to the Spreader / Sprayer operator manuals for more information.
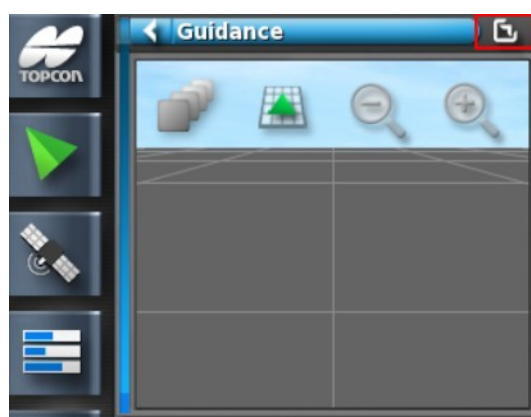
Chapter 9 – Operation Basics

9.1. Using mini-views
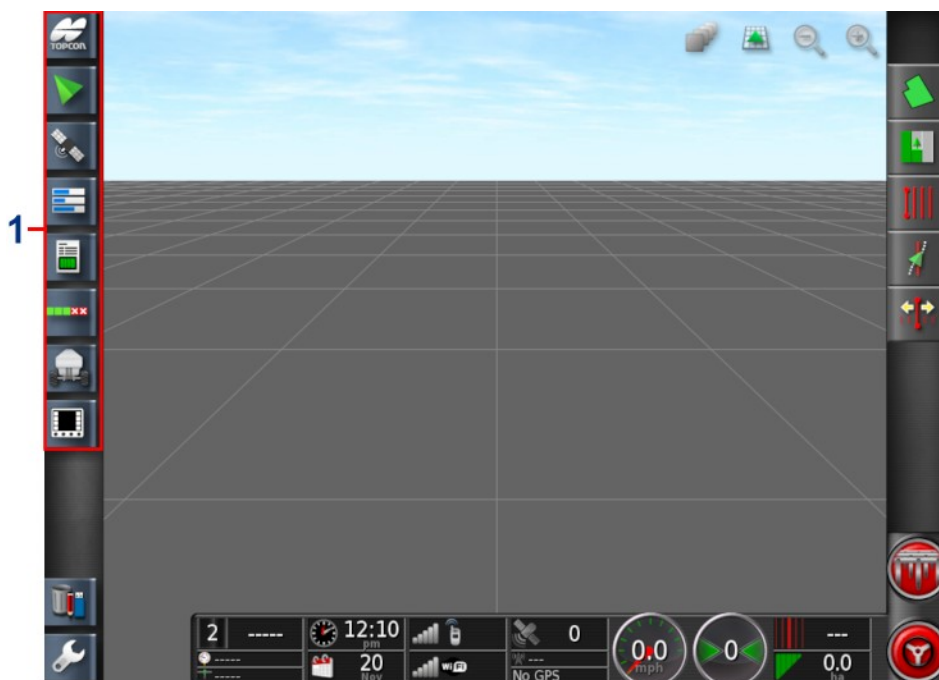
1 Navigation bar

Mini-views may be opened by selecting any feature on the Navigation bar.

Some mini-views have a maximize arrow. These may be expanded to display in full screen view by selecting the arrow or by swiping left to right across the mini-view (ending the swipe to the right of the mini-view screen).

To move the mini-view up or down, touch anywhere within the mini-view and slide it in the desired direction. The mini-view will start moving once your finger moves outside its area.

To close the mini-view, select the feature on the Navigation bar again, select the top left arrow or touch anywhere within the mini-view and slide it to the left into the navigation bar.
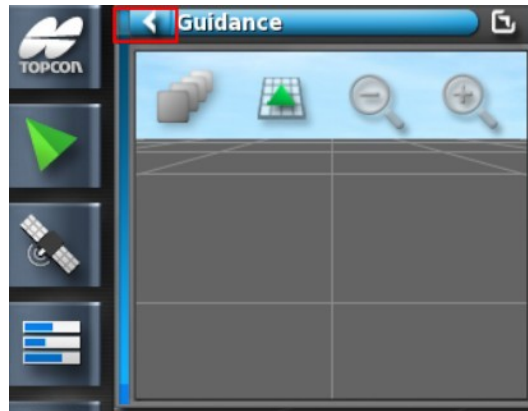
There is no minimize arrow on the full screen view. Expand another mini-view to replace the information on the main screen.

9.2. Viewing system information

The Topcon logo button on the Navigation bar is used to display software and system information summaries.

Maximize the mini-view to see the full **System Information** panel.
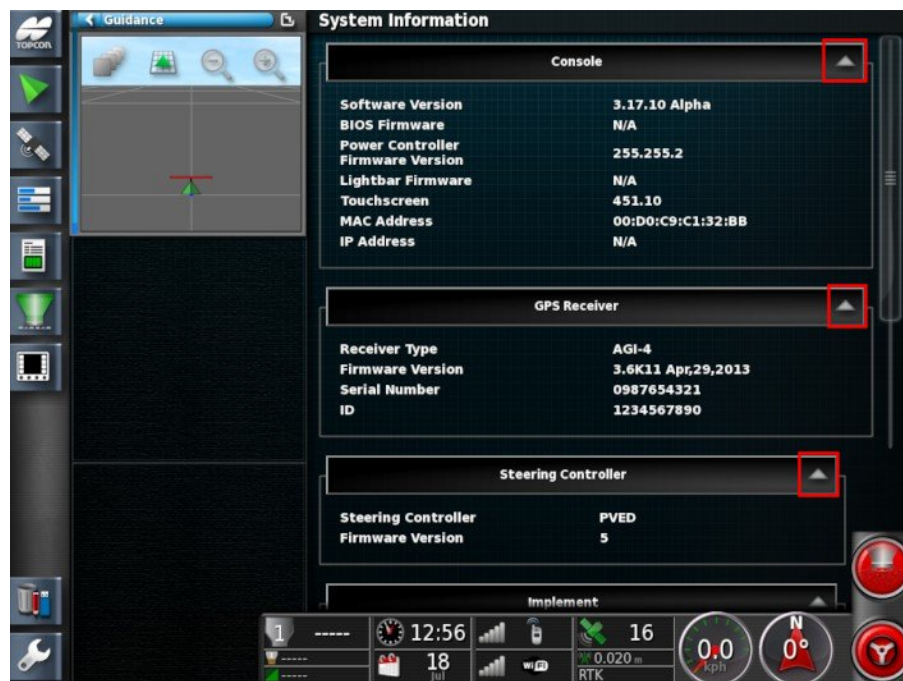
Use the arrows to expand or hide information. A scroll bar displays when needed.

9.3. Viewing guidance

The full guidance screen opens by default when the Operation screen is accessed for the first time. It can also be viewed in a mini-view.
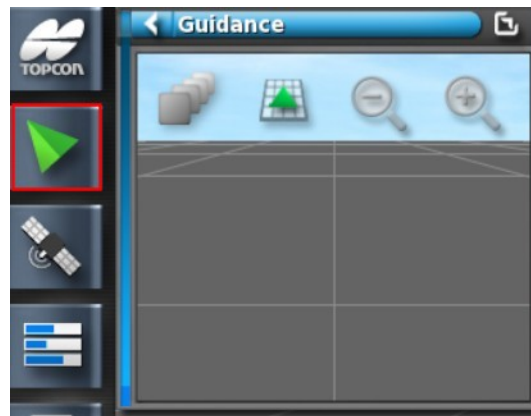
The view controls available on the mini-view may also be accessed on the guidance full screen view.

9.3.1. Using view controls

Note: An option for panning across the map is also available (refer to Map panning, page 31).

1 View controls

Select visible map layers

1. Select to choose which coverage and information layers will appear on the screen.

Map layers

- **Grid lines**: Show grid lines on the guidance screen.
- **Exclusion zones**: Refer to Setting exclusion zones, page 128.
- **All fields**: Displays all defined fields in the current farm.
- **Flag points**: Refer to Setting flag points, page 126.
- **Line numbers**: Displays guidelines as a row of numbered lines across the field (applies only to AB Lines).

Coverage map

The coverage map selector enables one type of coverage map to be selected. This is done by pressing the center button and selecting from a list or by pressing the left/right arrows to scroll through the list with a live preview of that layer in the map in the background. The popup list has slightly longer descriptions of the layers, which may make selecting the correct map easier.
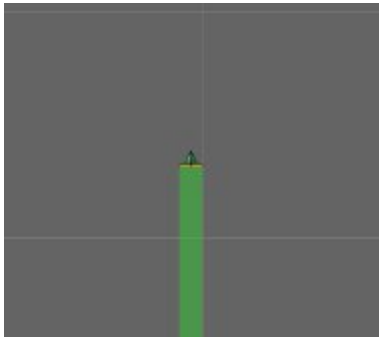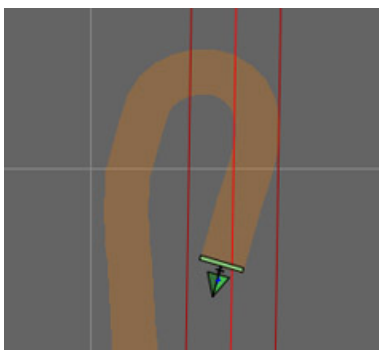
Coverage shows in green.
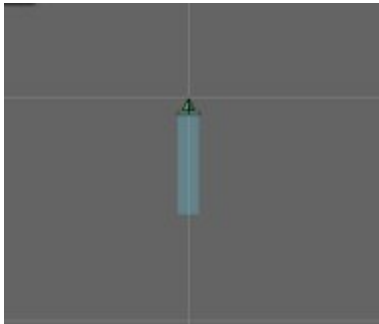
Applied rate shows in selectable colors.

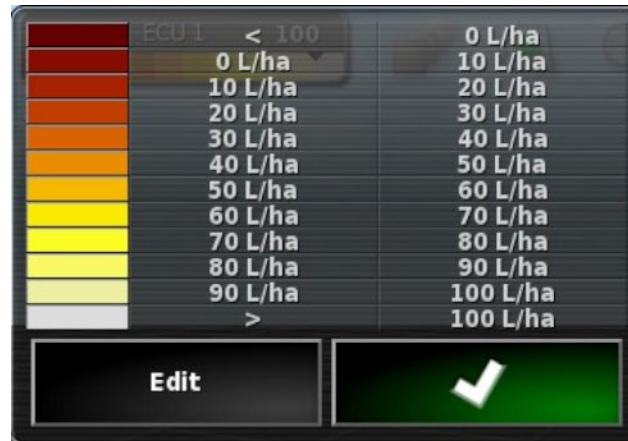Legend displays for applied rates.

GPS quality shows in orange.

Legend displays for GPS quality.

Editing the legends

The legends that are displayed for Applied Rate and GPS Quality may be edited.

1. Click on the legend to display the legend color and range map.

2. Select **Edit** to change the colors and ranges used.

VRC map

If Variable Rate Control is enabled on the Setup screen (**System** / **Features** / **Implement**), the VRC Map option displays below the coverage map selector. (X25 Max only)
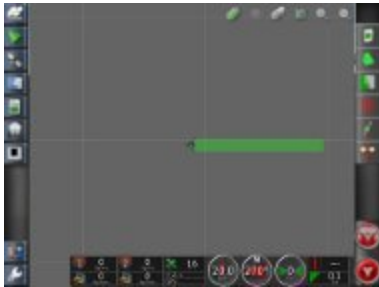
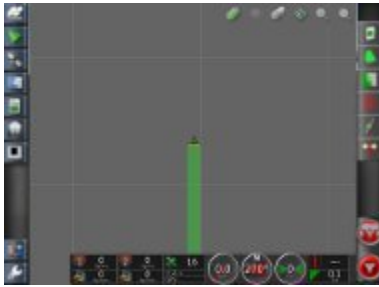The VRC map selector enables a VRC map layer to be displayed (or hidden by selecting **None**).

Toggle map view mode

1. Select to toggle views of the map (North Up, Overhead or Perspective).

In North Up View the top of the screen represents North.

In Overhead View the top of the screen represents the vehicle's current direction.

Perspective View places the map into virtual perspective with a virtual horizon.

Map zoom

Select to zoom in or out if needed. Press and hold to zoom quickly.

9.4. Viewing GPS details

To view and monitor GPS information:

1. Select **GPS Information** from the **Navigation bar**. Positioning information displays.

Latitude and Longitude show the positioning of the vehicle.

Easting and Northing shows the Universal Transverse Mercator (UTM) position and zone of the vehicle. They are measured in meters.

The grid numbers on the east-west (horizontal) axis are called Eastings, and the grid numbers on the north-south (vertical) axis are called Northings.

2. Select the **Vehicle Orientation** tab.

This shows altitude, heading (degrees), actual speed of the vehicle and roll/pitch (degrees).

Roll is the left/right tipping of the vehicle.

Pitch is the forward/back tipping of the vehicle.

3. Select the **GPS Accuracy** tab.

This displays the number of available satellites, the correction age (seconds) and the HDOP (lower value indicates better accuracy) and HRMS (lower value indicates better accuracy).

Note: The HDOP (Horizontal Dilution of Precision) indicates the effect on accuracy of a number of satellite sources and their geometry. Keep the antennae clear of obstructions to maintain accurate GPS readings.

HDOP < 1.0	Good accuracy
HDOP between 1.0 and 4.0	Average accuracy
HDOP > 4	Poor accuracy
GPS invalid 0	No signal

The HRMS (Horizontal Root Means Squared) calculates an average horizontal position from the source information from the satellites.
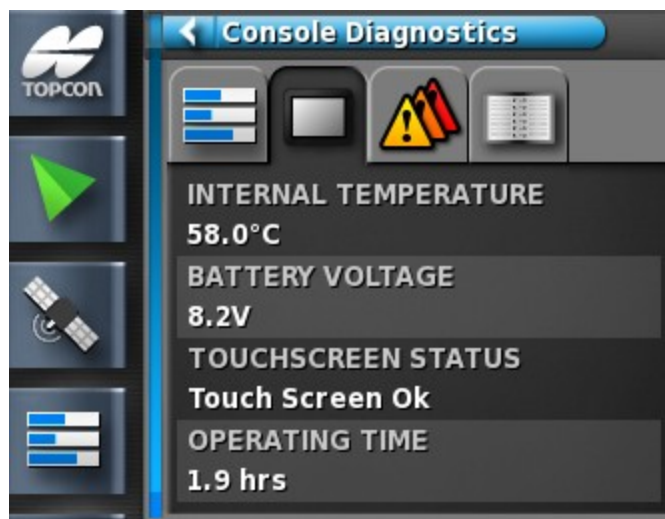
9.5. Viewing diagnostics

To view diagnostic information:

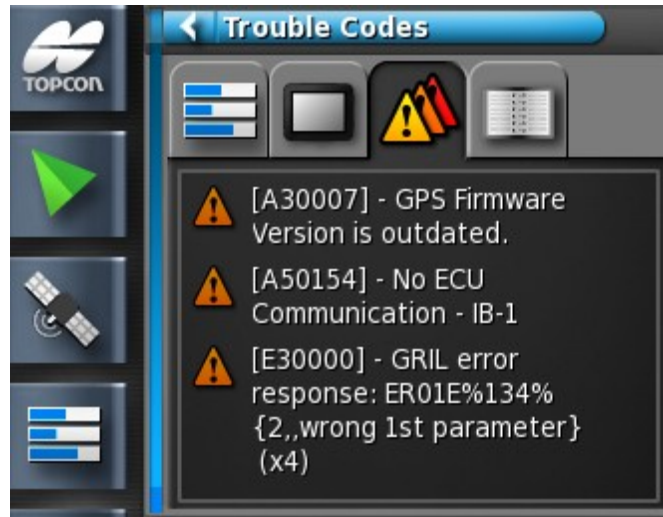1. Select **System Diagnostics** from the **Navigation bar**. Memory usage displays.
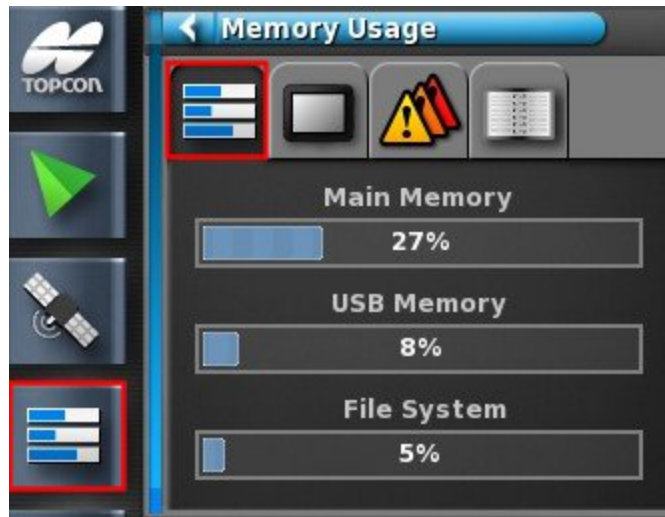
2. Select the **Console Diagnostics** ⬛ tab. Console status information displays.

3. Select the **Trouble Codes** ⚠ tab.

Error messages are listed. If problems do happen, take note of these for customer support personnel.
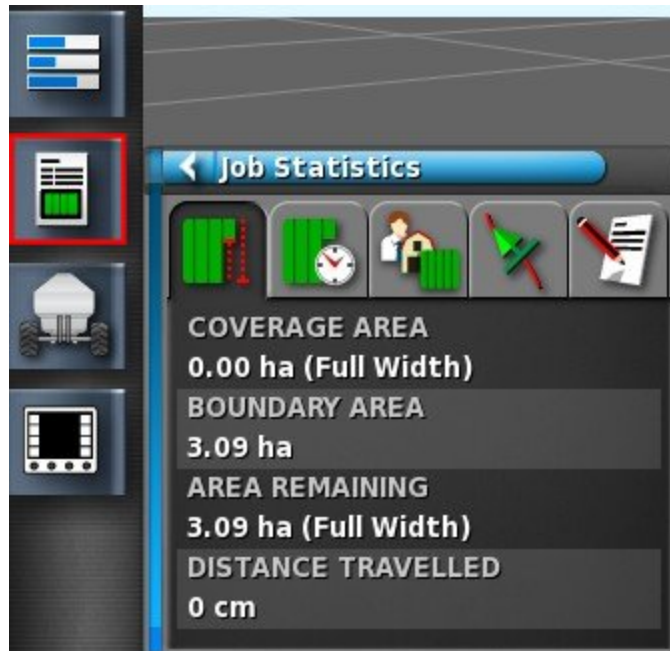
The **Logging** tab is used by customer support personnel. However, if Topcon support personnel send a logging configuration file, it can be loaded from USB and run using this screen.
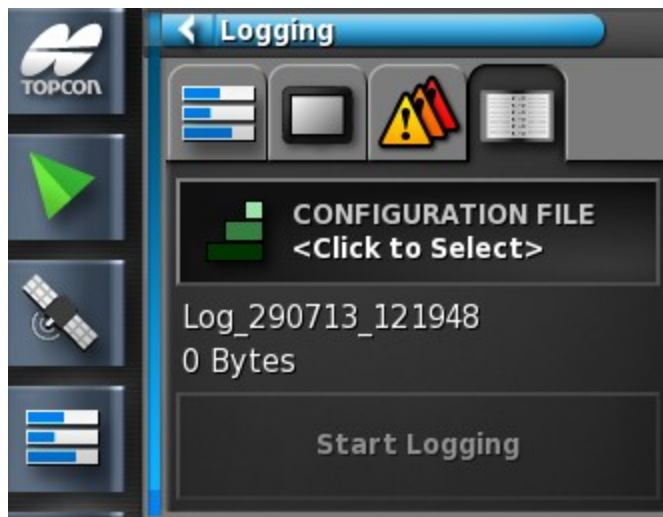
9.6. Viewing job information

To view job information:

1. Select **Job Information** from the **Navigation bar**.
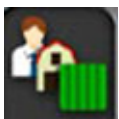

This shows overall information on the job's progress.

2. To view other information or to take notes, select the following tabs.

 Job Statistics

 Job Settings

 Guidance Settings

 Job Notes - Select anywhere in the Job Notes screen to bring up a keyboard.

If an implement with more than one boom is selected, an icon is displayed to select the boom about which to view information.

9.7. Monitoring on the dashboard

The display on the dashboard can be adjusted. The display below is the default.

9.7.1. Customizing the dashboard

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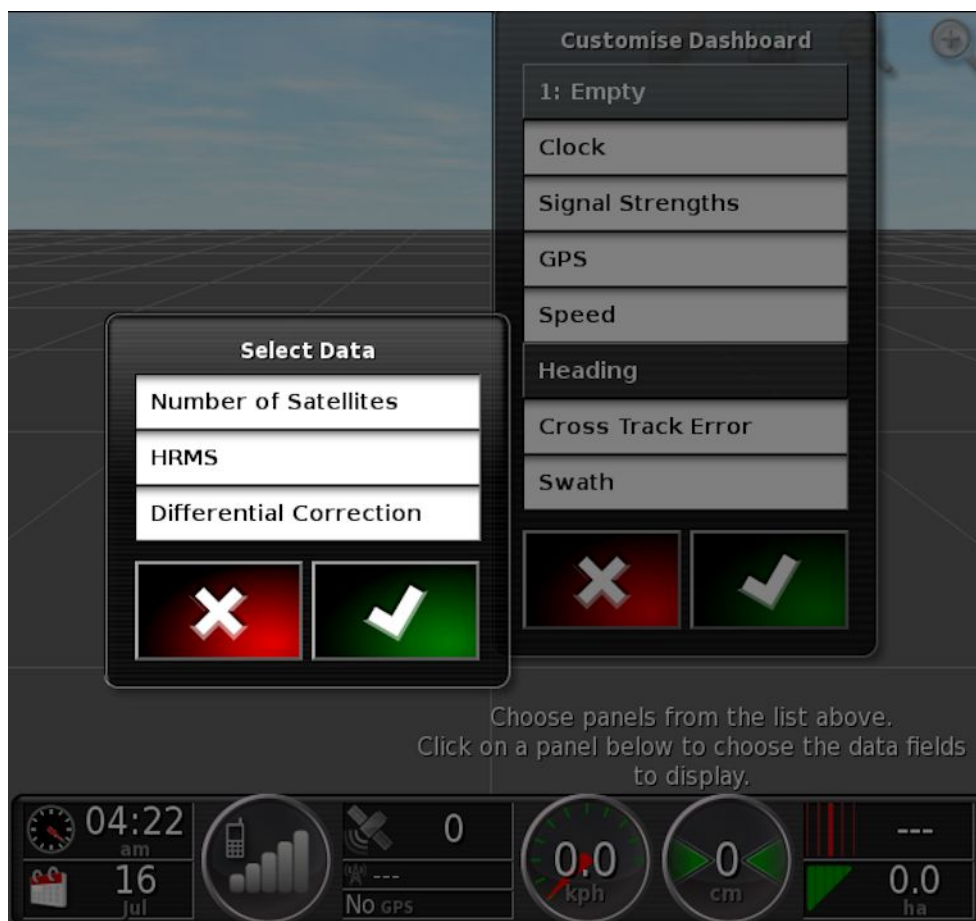
4. Confirm the new dashboard display. The chosen options appear on the dashboard.

Time and date

Time is set via the Setup screen, **User** / **Region** / **Time/Date**. Date is supplied via the GPS signal.

Signal strength

The signal strength panel shows the GPRS signal strength.

GPS and correction source

The GPS panel shows:

- System readiness (satellite icon) and the number of satellite signals available
- Correction quality and position accuracy
- Correction source in use (DGPS, PPS, RTK, Float RTK, SBAS, OmniSTAR VBS, OmniSTAR XP, OmniSTAR HP, OmniSTAR G2, Invalid, Unknown, Estimated, GPS, Manual Input).

Accuracy to within 2 cm is high level accuracy.

Note: If correction source is set to **Autonomous**, the dashboard displays **GPS**.

Satellite icon

A green satellite icon shows that the GPS and correction source are converged and is based on HDOP. Other colors indicate that information is not available:

Grey: No correction source, no signal

Red: Poor accuracy

Yellow: Average accuracy

Green: Good accuracy

Note: If **AUTOMATIC** was chosen during GPS setup, the colors may shift during operation as different correction sources are detected. If a specific source was chosen during GPS setup, then the system will seek to detect the chosen system. Refer to page 49 for more information on correction sources and to page 97 for more information on HDOP.

Correction icon

Green: Correction source has converged for auto steering. (Position accuracy on steering status panel page is green.)

Yellow: Correction source received but not accurate enough to engage auto-steering. Check differential correction and position accuracy on steering status.

Red: Correction source received is different from configuration.

Grey: No correction source received.

Guidance information

The guidance information panels may be configured to display four of six possible options: cross track error, speed, heading, swath, area covered or area remaining.

Note: Cross track error displays the distance of the vehicle from the nearest wayline.

The vehicle speed icon will change depending on the vehicle speed source selected in the Setup screen **Implement** / controller / **Speed Source**. If the vehicle speed is displaying incorrectly, calibration of the speed source may be required.

9.8. Storing information about jobs

The console allows operators to record and store features and working files for many fields and for each job on each field.

Under each field, additional information such as obstacles and boundaries can be stored.

Under each job, information about the job can be stored. It is important to create clear names for farms, fields and jobs so that the information can be accessed easily next season.

The operator can then select the field easily in the future and access the same boundaries, flag points and guidelines without having to recreate them.

9.9. Recognizing color and working status

The Operation screen uses colors to indicate the status of functions. The exact meanings will vary slightly with the implements, choices and features established during setup.

In general terms:

- Red indicates that the function cannot be used. Check that all necessary items have been enabled and set up correctly.
- White indicates that the function is ready to use.
- Yellow and/or green indicate that the function is currently working.

9.10. Understanding default file names

When new vehicles, implements, guidelines or jobs are created, the system displays a default name which can be changed by the operator.

Each default name consists of three parts:

- a letter to indicate the type of item (line, curve, job and so on) - default job names also include the name of the implement
- the date (MMDDYY) on which the item was created
- the time that the item was created.

Examples:

C_020114_1351 is a curve created on February 1 2014 at 1.51 pm.

J_Sprayer_011414_1121 is a job created on January 14 2014 at 11.21am.

Note: The **User** / **Region** / **Time/Date** setting on the Setup screen allows the month to be placed before or after the day.

Note: Renaming items in a structured way is recommended. This allows items to be easily identified in later seasons.

9.10. Understanding default file names

Chapter 10 – Steering Calibrations

The console uses the satellite data it receives, through the receiver attached to the top of the vehicle, to identify the precise coordinates of the vehicle. Using this and other data, the system is able to estimate the vehicle's position and control the vehicle's steering system.

For this to work properly the system needs to be calibrated for the individual vehicle. If the system has not been calibrated for this vehicle, follow the steps in this chapter.

 WARNING: Drive the vehicle to a suitable area with level ground, away from people and obstacles, with room to drive in complete circles. To ensure accurate calibration, the vehicle should have open sky visibility and be well away from trees, high voltage power wires and buildings.

It is recommended to remove the implement if it is a trailed, pivoted type implement to avoid implement draw bar interference.

Note: Calibration screens may vary depending on the vehicle selected. Some steering controllers may offer hydraulics calibration.

10.1. Calibrating the compass

Follow the steps to start the calibration wizard. Drive to a place that will not interfere with the calibration before beginning. This should be away from high voltage and large metal objects, with space to drive in complete circles.

Note: Calibration screens may vary depending on the vehicle selected. **ALWAYS READ THE SCREEN PROMPTS CAREFULLY**.

1. Select **Steering Options Menu** / **Auto Steer Calibration** .

   The Steering Calibration screen displays.

2. Select **COMPASS**. If the component reports as calibrated, still complete the calibration procedure if the receiver has not been calibrated on this vehicle.

3. Read the screen and find an appropriate flat place away from high voltage and large metal objects. Then select next .

4. Drive the vehicle in a circle at approximately 75% of full lock, the direction does not matter. Once 1 and ½ turns have been

completed, stop and select next.

5. Drive the vehicle straight ahead for approximately 100 m then STOP the vehicle. Select next.

6. The system will begin to save calibration data. Wait until the screen states that the calibration is completed successfully and then confirm .

10.2. Calibrating the wheel angle sensor

Note: Wheel angle sensor calibration should be performed once every 6-12 months.

 WARNING: Ensure there is sufficient space for the vehicle to complete the full maneuver before selecting Next. The calibration will take up to 60 seconds in each of these locked modes.

 WARNING: Some vehicle models may automatically move the wheels to the required position.

1. Select **Steering Options Menu** / **Auto Steer Calibration** .

   The Steering Calibration screen displays.

2. Select **WHEEL ANGLE SENSOR**. If the component reports as calibrated, still complete the calibration procedure if the receiver has not been calibrated on this vehicle.

Note: The number of screens and contents of screens may vary depending on the vehicle. If an error displays, read the message and take the recommended action before proceeding.

3. Drive the vehicle forward to start the procedure. The wheel angle sensor calibration should be completed at 2 kph (1.2 mph).

4. Turn the steering wheel full lock to the left and select next . The console will beep and move to the next step once calibrated.

5. Turn the steering wheel full lock to the right and select next. The console will beep and move to the next step once calibrated.

6. Ensure the vehicle is still moving at 2 kph (1.2 mph). Turn the steering wheel as close to the center position as possible.

    Note: Finding the center position and driving in a straight line, before selecting Next, is crucial for system performance.

 WARNING: Ensure there is sufficient space for the tractor to drive forward in the center position before proceeding.

7. Select next.

8. The system will begin to save calibration data. Wait until the screen states that the calibration is completed successfully and then confirm .

Note: Some steering controllers may cause the console to offer hydraulics calibration. If this is displayed, select hydraulics and follow the screen prompts.

10.3. Calibrating the mounting bias

Mounting bias refers to the initial offset from horizontal at which the GPS receiver is mounted on the roof of the vehicle. The following things can affect and change the mounting bias:

- Tire pressure
- Track tension
- Duals
- Tire sizing
- Cabin suspension
- Cabin repairs (suspension and mounts)
- Removing and refitting the receiver
- Mounting location has moved

Note: Mounting bias calibration should be performed if any of the above change or at a minimum once every 6-12 months.

It is advisable to still perform a mounting bias calibration when using **Autonomous** as the **Correction Source**, even though the screen reports that it is not required.

Mounting bias calibration is done in a clear area well away from obstacles. If the mounting of the receiver is not quite level, this calibration will adjust for the actual position.

> ⚠ **WARNING: Ensure the vehicle has sufficient space to travel in a straight line for at least 70 m/230 ft and then turn at each end of the wayline.**

1. Select **Steering Options Menu** / **Auto Steer Calibration** .

   The Steering Calibration screen displays.

2. Select **MOUNTING BIAS**. If the component reports as calibrated, still complete the calibration procedure if the receiver

has not been calibrated on this vehicle.

Note: To calibrate for mounting bias, 'A' and 'B' wayline points are plotted over 70 m/230 ft, driving the vehicle at 2 kph or 1.2 mph along the wayline. The operator turns the vehicle around at the end of the pass and repeats the procedure. It is important that the vehicle meets the 'A' and 'B' waypoints within approximately 30 cm, to initiate the next step in the calibration procedure.

3. Reposition the vehicle in an open area. When ready to start the procedure, select to mark the 'A' waypoint.

4. Drive forward in a straight line. The 'B' waypoint is created automatically when the **Distance To A** indicates 70 m/230 ft.

5. Turn the vehicle around and acquire the wayline just plotted, this track number should read '0'.

6. Select **Auto Steer Engage** on the operations screen to steer on the wayline. The color will turn green, an audible tone will sound and an 'engage message' will flash on screen to indicate the auto steering has engaged.

If steering does not engage when **Auto Steer Engage** is selected, the steering status box will appear.

7. Address any of the issues with red indicators before proceeding with the mounting bias calibration procedure (work through issues displayed from the top to the bottom of the screen).

8. Drive the vehicle over the 'B' point previously created during the calibration procedure.

9. Set the vehicle speed to 2 kph or 1.2 mph.

10. Steer along the wayline back to the 'A' point previously created.

    When the **Distance To A** indicates 50 m the blue line on the Calibration Progress bar will start to move and the percentage will increase.

    When the Calibration Progress bar reaches 50% the calibration bar will stop and the percentage will remain at 50%.

    This indicates the system has enough data for the first stage of the calibration and the mounting bias calibration will be paused at this point.

11. Proceed to cross the 'A' waypoint.

12. When the 'A' waypoint has been crossed, turn the vehicle around.

13. Acquire the track '0' and engage the auto steering again.

14. Cross over the 'A' waypoint again travelling in the opposite direction.

15. Set the vehicle speed to 2 kph or 1.2 mph.

16. Steer along the wayline back to the 'B' waypoint previously created.

When the **Distance To B** is less than 50 m, the blue line on the Calibration Progress bar will move from 50% and the percentage will increase.

When the Calibration Progress bar reaches 100% this indicates the system has enough data for the second stage of the calibration and the mounting bias calibration is paused at this point.

17. Proceed to cross the 'B' waypoint.

18. Stop the vehicle. Mounting Bias has been successfully calibrated.

19. Confirm ✔ to return to the calibration screen.

The Steering Calibration screen will display **Calibrated** for Compass, Wheel Angle Sensor and Mounting Bias.

Steering Calibration

STEERING CONTROLLER
PVED

COMPASS
Calibrated

WHEEL ANGLE SENSOR
Calibrated
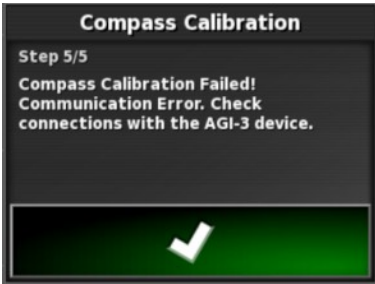
MOUNTING BIAS
Calibrated

✗ ✔
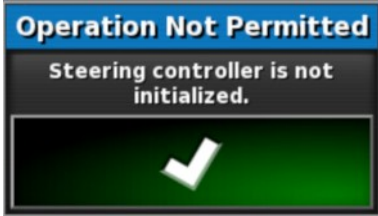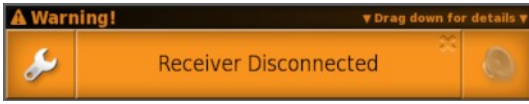
20. Confirm ✔ to return.

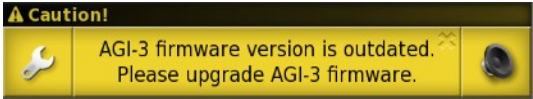Steering Status box indicators will now all be green.

10.4. Dealing with calibration errors/alarms

The following errors/alarms can occur during calibrations. Perform the recommended procedures below to fix the errors.

View	Error
Operation Not Permitted Steering controller is not initialized. ✓	**Steering controller not initialized** The steering subsystem is not turned on or is not ready for use. Check to see that the steering subsystem is powered on and ready for use.
⚠ Warning! ▾ Drag down for details ▾ 🔧 Steering Profile Mismatch	**Steering Profile Mismatch** The parameters in the selected vehicle profile do not match the vehicle configuration in the steering subsystem. Select the correct vehicle profile for this vehicle.
⚠ Warning! ▾ Drag down for details ▾ 🔧 Parameters Mismatch	**Parameters Mismatch** Vehicle geometry parameters do not match the geometry configuration in the steering system. Re-select the vehicle on the Setup screen or ensure the vehicle geometry in the vehicle geometry screen is correct.

View	Error
	Receiver Disconnected
	The AGI receiver has shutdown, lost power or the receiver – console serial connection has been broken.
	Check the power supply to the receiver and ensure the serial connection is good.
	Compass Calibration Failed
	Repeat compass calibration and ensure the vehicle completes 1½ turns. Ensure the vehicle is stopped when completing the procedure.
	Move the receiver away from magnetic sources.
	Wheel Angle Sensor Calibration Failed
	Repeat procedure and ensure the steering axle moves through the complete range.
	Confirm wheel angle sensor position information moves when steering axle is turned.
	Confirm wheel angle sensor harnesses and connections. Check wheel sensor condition.
	Failed wheel angle sensor.

10.4. Dealing with calibration errors/alarms

View	Error
Wheel Angle Sensor Calibration Step 5/5 Wheel Angle Sensor Not Detected. Please connect a Wheel Angle Sensor and try again.	**Wheel Angle Sensor Not Detected** Wheel angle sensor value is 0, check wheel angle sensor harnesses and sensor condition. Vehicle profile error. Guidance controller is not configured for wheel angle sensor use.
⚠ Caution! AGI-3 firmware version is outdated. Please upgrade AGI-3 firmware.	**Receiver firmware version is out of date** Update receiver firmware.

Chapter 11 – Field Menu

This chapter details how to set client, farm, field, boundaries, flag points and exclusion zones. These are the first steps when beginning a job.

The console will store the field information so that, once set up, the field details can be recalled for other jobs in the same field.

Drive to the field and follow the steps to set up a field and identify its features.

Note: The vehicle must be in or near the field for boundaries and related information to appear on the screen.

11.1. Creating a client / farm / field

1. Select **Field Menu** / **New Field** .

   Note: Default file names are provided when naming options appear. It is highly recommended that the operator names items in a thoughtful and structured way to allow easy use in future seasons.

2. Select **CLIENT NAME**, (or select an existing client if some have already been set up).

3. Select **New**, enter a name and confirm.

4. Select **FARM NAME**, (or select an existing farm name if some have already been set up).

5. Enter a name and confirm.

6. Select **FIELD NAME**, enter a name and confirm.

7. Completing this section selects the new field, proceed to Setting a new boundary, page 123.

Note: To change any of these settings after they have been confirmed, refer to Inventory Manager, page 171.

11.2. Selecting a client / farm / field

Note: The vehicle must be in or near the field for boundaries and related information to appear on the screen.

1. Select **Field Menu** / **Select Field** .

2. Select the required client, farm and field, then confirm.

3. To import field information from a USB, select USB .

4. To select the nearest field, select **Nearest Field** .

   The current GPS position is used. This will only work if the nearby fields have boundaries created.

5. Confirm field selections.

Note: To change any of these settings after they have been confirmed, refer to Inventory Manager, page 171.

11.3. Setting a new boundary

Setting the boundary establishes the perimeter of the field.

To do this, a boundary offset may be entered. This is the distance from the center of the vehicle to the actual boundary to be worked. This accounts for fences and other obstacles that do not allow the vehicle to drive exactly on the boundary.

Once the offset is entered, the vehicle must be driven around the boundary of the field.

1. Drive the vehicle to the edge of the field.

2. Select **Field Menu** / **Boundary Offset** .

3. Select **BOUNDARY OFFSET** and enter the offset distance from the boundary necessary to avoid contact with fences, tree lines etc.

    Note: Use negative offset if the boundary is to the vehicle / implement's left and positive offset if the boundary is to the vehicle / implement's right. A setting of zero indicates that the vehicle has driven exactly on the boundary.

    Note: An implement needs to have been established during setup, but the actual implement does not need to be physically attached to the vehicle.

4. Select **Record Field Boundary** .

5. Drive the vehicle around the boundary of the field. A blue line will display the boundary being recorded, taking into account any offset.

6. Select **Pause** to pause recording. This is useful if an obstacle prevents driving on the boundary. The icon will change to show the record option. Select **Record** to resume. The boundary will record a straight line between the point recording paused and the

point recording resumed. Note that boundary recording may be automatically paused if the master switch is turned off (see Pause boundary recording with master, page 32).

7. As the vehicle approaches the start point, select **Complete Field Boundary Recording** to automatically complete the boundary.

11.3.1. Creating a boundary from a shapefile

A boundary may be imported from a shapefile stored on a USB.

Note: The file should only contain a single shape, as otherwise the boundary will be defined from the first shape in the file, which may not represent the boundary.

1. Load the shapefile onto a USB.

2. Ensure the USB is inserted into the console.

3. Select **Field Menu** / **Create Boundary from Shapefile** .

4. Select the USB icon at base of the screen . The data objects turn blue.

5. Select the USB home icon to view the root of the USB file structure. Files and folders on the USB root are displayed.

6. 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.

7. Confirm to import the shapefile boundary.

11.3.2. Removing a boundary

If a boundary must be changed, it can be erased and a new boundary can be set.

1. Drive to the field.

2. Select **Field Menu** / **Select Field** to choose the client, farm and field names. The boundary will appear on the screen.

3. To remove the boundary, select **Clear Boundary** . A message will ask for confirmation.

   Note: Erasing a boundary is a permanent action.

11.4. Setting flag points

Flag points are used on the guidance map to indicate obstacles and noted items in the field.

Note: If required, flag points can be used with an exclusion zone around the obstacle (such as a large hole or electrical tower). If this is needed, read this section and read Setting exclusion zones, page 128.

1. Drive to the item to be flagged.

2. Select **Field Menu** / **Set Flag Point** .

3. To flag the obstacle, choose a flag symbol to be placed at that spot on the map.

   Note: To change Flag Point presets, refer to Setting up flag points, page 63.

4. To customize flag points, select **Custom** to define a particular flag point.

5. Select the required symbol.

6. Select **FLAG POINT NAME** and enter the name. Confirm the name. Confirm to add the customized flag point.

7. If an exclusion zone is needed around the obstacle, go to Setting exclusion zones, page 128.

8. If an exclusion zone is not needed, drive to the next item in the field to be flagged and repeat.

11.4.1. Removing or changing a flag point

To remove or change a flag point:

1. Select the flag point marker on the screen.

2. Select:

- **Change** to choose a different flag point.
- **Rename** to change the name showing on the flag point.
- **Delete** to remove the selected flag point or **Clear All** to clear all flag points from the field.
- **GPS Drift Correction** to move the vehicle to the flag point location to compensate for GPS drift. Note, to remove applied GPS drift compensation, refer to Compensating for GPS drift, 164.
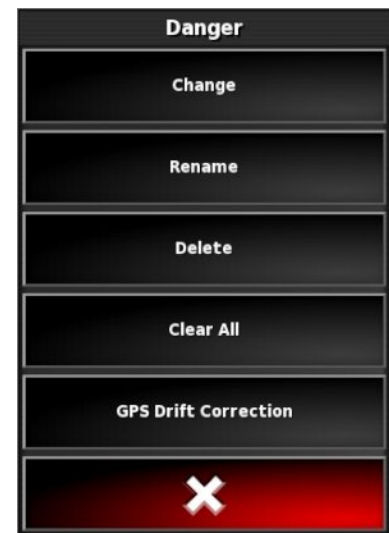
11.5. Setting exclusion zones

Exclusion zones are used to indicate areas that will not have product applied if section control is being used. Exclusion zones are deducted from the total field area.

Once a boundary is completed, the **Record Field Boundary** icon turns yellow (![icon] becomes ![icon]) and can be used to record internal boundaries as exclusion zones if these are needed (for example around a large hole).

1. Drive to the area.

2. If an offset is required to allow for any offset from the center of the vehicle's implement or to avoid contact with fences, tree lines and so on, refer to Setting a new boundary, page 123 for instructions on setting a boundary offset. If a boundary offset has already been defined, it is not necessary to redefine it.

   Note: An implement must have been established during setup (refer to Implement Setup, page 75), but the actual implement does not need to be physically attached to the vehicle.

3. To set the exclusion zone within the boundary area, select **Field Menu** ![icon] / **Record Exclusion Zone** ![icon], which now shows yellow.

4. Drive the vehicle around the exclusion zone. A yellow line displays the zone, drawn from the offset point that has been set.

5. Select **Pause** ![icon], to pause recording. This is useful if an obstacle prevents driving on the boundary. The icon will change to show the record option. Select **Record** ![icon] to resume and the missing section between these points is completed as a straight line.

6. As the vehicle approaches the start point, select **Complete Exclusion Zone Recording** ![icon] to automatically complete the

zone.

The exclusion zone displays as a shaded area.

11.5.1. Clearing an exclusion zone

If exclusion zones are no longer needed, these can be removed.

1. Select **Field Menu** / **Remove Exclusion Map** .

2. To restore the removed exclusion zones, select **Select Exclusion Map** .

3. Select the file and confirm. The exclusion map will reappear.

   Note: This action may also be used to import exclusion maps and shapefiles created externally. Insert a USB containing the files and select , , then and navigate to the required exclusion maps or shapefiles.

11.5. Setting exclusion zones

Chapter 12 – Job Menu

The Job Menu selects or sets up specific job information associated with the chosen field.

Using this menu, the job information is stored and activity can be recorded and reported.

12.1. Creating a new job

1. To set up a new job, select **Job Menu** / **Create New Job**
.

2. Select **JOB NAME**.

3. Enter a name and confirm.

   Note: Default file names are provided when naming options appear. It is highly recommended that the operator names items in a thoughtful and structured way to allow easy use in future seasons.

4. Confirm the new job.

12.2. Setting up a working headland

Implements often work around the boundary differently from the rest of the field. A headland creates a zone inside the line of the boundary that will be worked differently. The width will depend on the operator's method of working the field.

Note: A headland can only be created once a boundary has been recorded, refer to Setting a new boundary, page 123.

Follow the steps to set up the working headland for this job inside the field boundary.

1. Select **Job Menu** / **Configure headland for this job** .
2. Select **HEADLAND WIDTH**.

3. Choose the width of the headland from the inside of the boundary and confirm. A swath is the working width of the implement.

4. To increase the width of the headland, if needed, select **HEADLAND OFFSET**.

   This may be useful to supply a buffer zone for steering if the headland width has been set so that the tip of the implement would be touching the fence.

   If you have recorded the field boundary so that the blue line is on top of the fence line (the actual physical boundary of the field),

then set a headland of 1 swath, you would be required to drive with the tip of the implement touching the fence to fill this area with no overlap. Obviously this is not a particularly useful scenario. So in this situation you can add an offset of 1 meter (for example) to your headland, which will move the headland an extra 1 meter inside the boundary, allowing you to have a 1 meter gap between the implement and the fence.

5. Enter the offset measurement and confirm.

6. Select **LOOK AHEAD**. This sets how many meters in front of the vehicle that the system looks to respond with actions.

7. Enter the distance in front of the vehicle for actions and confirm.

8. Select **Configure actions**.

Action Name

- **Alarm**: Sets an alarm to trigger when approaching the headland.
- **Auto Zoom**: If this is enabled, the map view will zoom in or out to the defined zoom level as the vehicle approaches the headland and return to the original defined zoom level as the vehicle leaves the headland. Select the preferred zoom level.

Note: When an action is enabled it is marked with a ✔. When an action is disabled it is marked with a ✘.

Action state

Allows the map view to zoom in when approaching the headland.
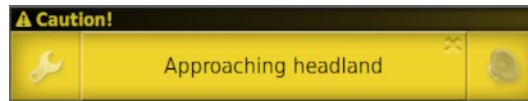
Message

Enter the words for a visual message (for example 'Approaching headland'). Enter the text and confirm.

Audio type

Sets an audible alarm. Choose the type and confirm.

9. Confirm the alarm and zoom actions. The screen can now display a headland in orange inside the boundary line.

Approaching the headland will trigger the alarm and zoom that has been set.

12.3. Selecting an existing job

Job information can be recorded, stored and transferred for later access.

Drive to the field and follow the steps to choose an existing job. To create a new job, refer to Creating a new job, page 131.

1. Before selecting an existing job, ensure the correct field is selected (refer to Selecting a client / farm / field, page 122).

2. To choose from a list of existing jobs, select **Job Menu** /

   Select Job .

3. Select the job and confirm.

Note: Changing the client, farm or field at the top of the Select Job window allows importing of a job from a neighboring field. This can be useful in order to reuse common information stored within the job, such as weather observations, crop information or product application notes. The coverage should be cleared manually before starting the new job.

Note: The same implement that was used to create the job must be selected to load an existing job.

12.4. Recording job details

The console can record details of the job and store and export these.

1. Select **Job Menu** [image] / **Record Job Details** [image] .

   Weather and site conditions are optional. Adding some crop and product information is recommended.

2. Select a category, enter the information and confirm.

3. Use the scroll bar or use the hide arrow to see crop and product options.

4. Select **CROP NAME**, enter the name and confirm.

5. Select categories as needed, enter the information and confirm.

   The **Product** section of this screen is intended to record the specific product mix that is being used for this job. This information is stored separately to the product definitions saved in the **Product** menu on the Setup screen.

6. Select **Product Name** from the list or select **Add a new product**.

7. Select **Rate** next to the product and enter the rate.

8. Select **Units** next to the product and choose the unit of measurement.

12.5. Exporting a job report

Job records can be exported in PDF format to a USB.

Exporting a job places the PDF report in D:/Reports and in D:/Client/Farm/Field/Reports. It also makes folders D:/Client/Farm/Field/CoverageShapefiles and D:/Client/Farm/Field/BoundaryShapefiles

1. Insert the USB into the console.

2. Select **Job Menu** / **Data Exchange** / **Export Job**

   Report to USB .

The following message may display.

Selecting **Yes** will alter the colors used in the report map shading so that the maximum variation in colors is used to illustrate the applied rates.

The active or current job is exported to a folder named Reports on the USB.

Before removing the USB, always disconnect first by touching the **USB Eject** icon (refer to Using the console toolbar, page 8). A message will display that it is safe to remove the USB. If this is not done, the report may be missing or corrupt.

When the export takes place it also exports the coverage and as applied shapefiles, along with the current boundary file.

This export can only happen when the unit has a GPS signal and the current job loaded is within 15 km.

Note: It is also possible to batch export job reports (and jobs) for non-active jobs using the Inventory Manager. Refer to Exporting jobs and job reports, page 174.

12.6. Clearing a job

This action will remove any coverage information on the screen and delete job data that has been recorded on the current job. It does not affect field information or guidelines set for the field.

1. Select **Job Menu** / **Clear Job Data** .

   The following message appears.
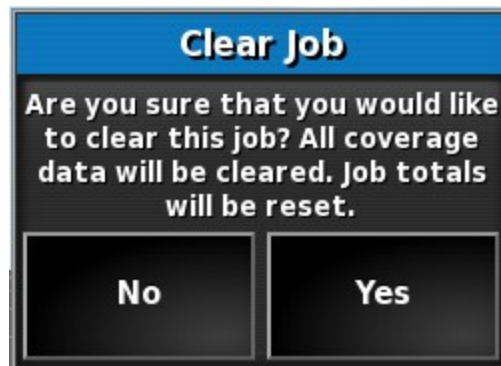
2. Select **Yes** to clear the data or **No** to keep the data.

To delete farms or fields or previously created job data, refer to Inventory Manager, page 171.

12.7. Using variable rate control

Note: This option is only available on the X25 Max.

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.

12.7.1. If using VRC maps

There are two 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).

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, refer to page 122.

2. Create a new job, refer to page 131.

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.
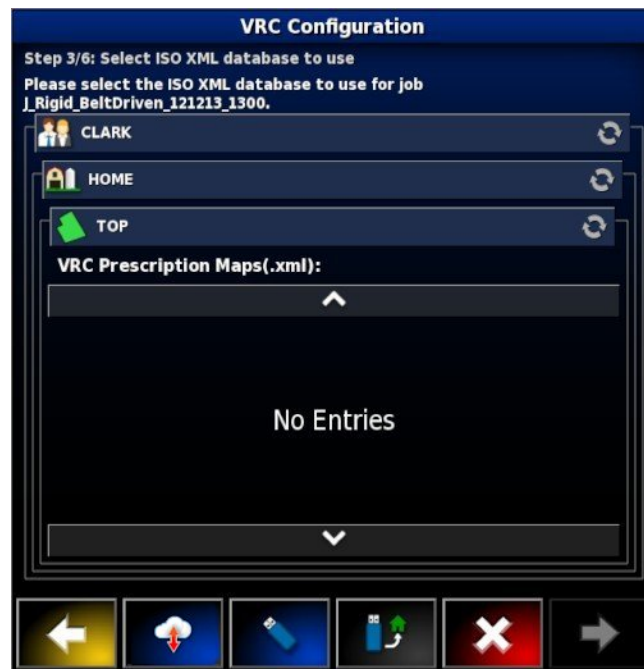
- Select the USB home icon to view the root of the USB file
  structure. Files and folders on the USB root are displayed.

- 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.
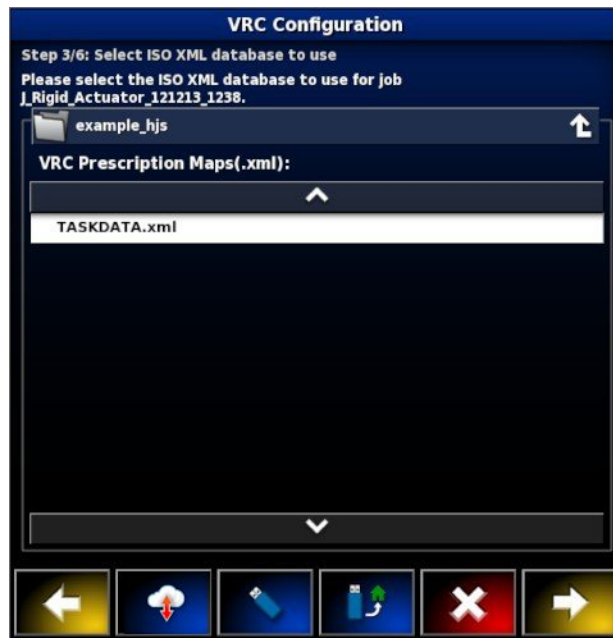
- Select next.

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 or bin that is being controlled.

   - **Source**: The source of the prescription map for that channel. The list of files that were selected earlier will appear here or you can also select a live source like CropSpec.

   - **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.

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.

12.7. Using variable rate control
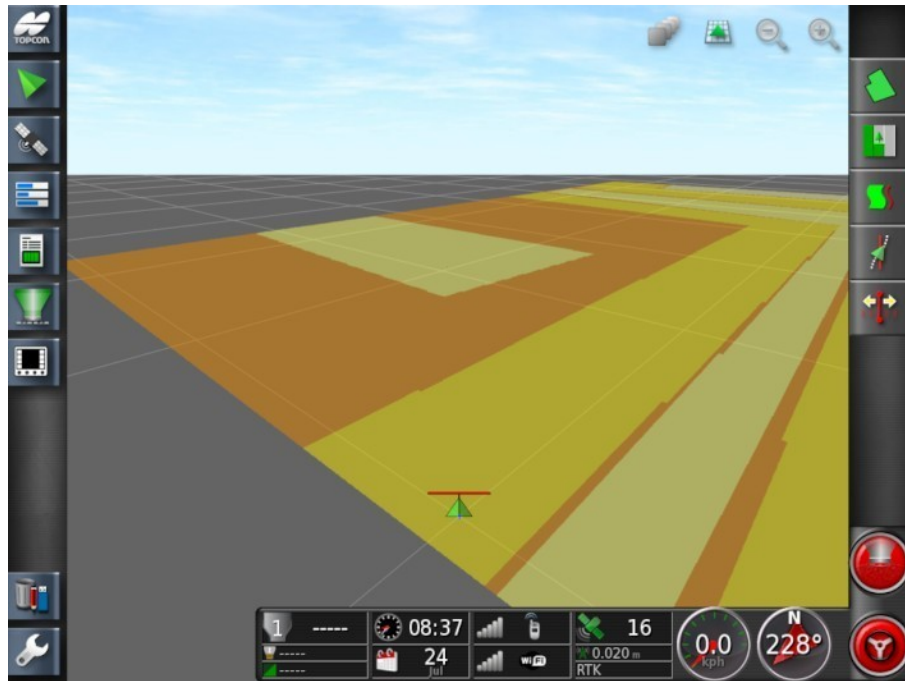
Chapter 13 – Guideline Menu

Guidelines are used to indicate the path that the vehicle should travel for optimum coverage. The system will use the implement width to set evenly spaced lines across the field.

Guideline types supported are:

Parallel AB Line guidelines, page 146

Identical Curve guidelines, page 148

Centre Pivot guidelines, page 149

Guidelock Guidance mode, page 150

Note: To clear a guideline once it has been created, refer to Inventory Manager, page 171. Select the required **Category** then select the guideline to be deleted.

13.1. Using straight lines guidelines

This option creates parallel lines for guidance, using the width of the implement to set the distance between guidelines.

Where working is generally done in straight lines, the AB line should be set near the headland line. This allows the lines to evenly space across the working area.

1. Position the vehicle.

2. Select **Guidelines Menu** / **Change Guidance Mode**, if necessary, to choose **AB Lines** .

3. To set the AB line, select **Create New AB line** .

4. To change the default name, select **GUIDELINE NAME**.

5. Enter a name and confirm. Confirm the new guideline.

6. Drive to the start of the swath. Select **Set A Point** .

7. To set a 'B' point, drive along the required swath and select . The 'B' point appears and parallel guidelines for steering display on the screen.

In most cases the screen will display the line being travelled and the two adjacent lines.

To view all guidelines across the field, select from the top of the screen and choose **Line Numbers**. (This requires a field boundary, refer to Setting a new boundary, page 123.)

13.1.1. Setting AB lines manually

It is also possible to set AB lines using coordinates.

1. Select **Guidelines Menu** / **Manual AB Line** .
   The Manual AB Line screen displays.

2. Set the 'A' point using one of the following methods:

- Drive to the desired location and select .
- Enter the coordinates (latitude/longitude) of the 'A' point.

3. Set the B point using one of the following methods:

- Drive to the desired location and select .
- Enter the coordinates (latitude/longitude) of the B point.
- Enter the Heading of the AB Line. The software will automatically place a 'B' point to create an AB line of the desired heading, relative to the 'A' point.

Note: To erase a guideline, select .

13.2. Using identical curve guidelines

Some fields are not rectangular and have a curved or shaped boundary. For these, identical curves may be the best option for guidelines. This can be useful for steering the boundary of a field and using this guideline for future operations.

Identical curves allows the operator to set a curved guideline and the system will create equidistant guidelines across the field, based on a swath width.

1. Position the vehicle.

2. Select **Guidelines Menu** / **Change Guidance Mode**, if

   necessary, to choose **Identical Curves** .

3. Select **Create New Identical Curve** .

4. Select **GUIDELINE NAME**.

5. Enter a name, if desired, and confirm. Confirm the new guideline.

6. Drive to the start of the swath. Select Set 'A' Point .

7. Drive along the curved swath. A black line will appear behind the vehicle on the map to indicate the curve that is being recorded.

8. At the end of the curved swath, select to indicate the end of the curve recording.

13.3. Using center pivot guidelines

Some fields are best worked in a circular shape. This setting allows the operator to create guidelines around a center pivot point.

1. Position the vehicle.

2. Select **Guidelines Menu** / **Change Guidance Mode**, if

   necessary, to choose **Center Pivot Lines** .

3. Select **Create New Center Pivot** .

4. Select **GUIDELINE NAME**.

5. Enter a name and confirm. Confirm the new guideline.

6. Drive around the center of the field. Once the system detects the arc, circular guidelines are created, based on the width of the implement. Remember to consider the turning circle of the vehicle and implement when driving the first arc.

13.4. Using guidelock guidance mode

Guidelock is a coverage based guidance mode. It generates a curve based on existing coverage, regardless of when that coverage was laid. This is convenient if wanting to steer around a contour or field boundary but you don't want to create and save a curve, or if you want to continue steering alongside some coverage that was treated earlier that you did not save a curve for. This guideline method is sometimes referred to as 'free form'.

1. Select **Guidelines Menu** / **Change Guidance Mode**, if

   necessary, to choose **Guidelock Guidance Mode** .

A guideline is generated that follows whichever path the vehicle takes.

13.5. Selecting an existing guideline

Once guidelines have been created within fields, these are stored and can be accessed on future jobs in the field.

1. From the **Guidelines Menu** , select the required guideline mode, then select **Select Guideline** .

2. Select client, select farm and select field. Existing guideline sets will display.

3. Choose the guideline set required and confirm.

13.5. Selecting an existing guideline

Chapter 14 – Auto Steering

The Steering Options Menu allows the operator to set options for the auto steering. To use this feature, it must be enabled. If it has not been enabled, refer to Guidance setup, page 39 to enable auto steering.

To calibrate the steering refer to Steering Calibrations, page 109.

14.1. Auto steer status

Auto Steer Status allows the operator to view the status of the conditions required for auto steering. Red indicates that the conditions are not met and therefore steering is not ready.

1. To review the status of the auto steering, select **Steering Options**

   Menu   / **Auto Steer Status**   .

   The Steering Status screen displays.

   Green indicates that the item is ready.

   Red indicates that the item is not ready.

   Steering alarms may be displayed by selecting the steering alarm button at the bottom left of the screen.

2. Select   to return to the main screen and complete the necessary actions (work through issues displayed from the top to the bottom of the screen).

14.1.1. Auto steer troubleshooting

Error Display	Actions	Page
	Auto Steering Engage is showing red. Auto steering does not engage. Select Auto Steering Engage to bring up the Steering Status panel. Red on the panel indicates that the item is not working correctly.	
Receiver hardware displays with red	Is the receiver connected correctly, mounted securely and turned on?	
Differential correction displays with red	Confirm setup in console matches the correction source requirements.	47
Position accuracy displays with red	Allow time for convergence to occur. What color is the satellite icon on the dashboard? How many satellites show next to the icon? You need at least four satellites available. Is the correction source correct? If not, select the appropriate correction source. Are you in an open space away from power lines? Drive to an open space and allow time for convergence. If on a subscription scheme, confirm current subscription. Confirm correct frequency has been set.	47

Error Display	Actions	Page
Steering controller displays with red	Confirm controller is connected and turned on. Confirm that the correct steering controller has been selected during setup. If using AES-25, power cycle the AES-25, then turn wheel a ¼ turn to enable steering.	72
Vehicle geometry displays with red	Return to Setting the Vehicle Geometry and reset dimensions correctly or re-select the vehicle profile.	70
Vehicle profile displays with red	Review which vehicle has been selected and review geometry.	67-70
Steering calibrated displays with red	Confirm calibrations have been done for this vehicle. Drive to an open space away from power lines and obstacles, reboot and repeat calibrations.	110-114
Lockout	The steering system has been put into a transport mode (i.e. when driving on a highway) so that the steering cannot be inadvertently engaged.	
Wayline available displays with red	Drive closer to the wayline (guideline). Confirm that guideline has been created and selected.	146-149
Wayline synchronized	Wayline (guideline) is not successfully loaded. Confirm connection with receiver and reload the wayline. Note that it may take some time for the wayline to be uploaded to the receiver, particularly for large curves.	

Error Display	Actions	Page
Prohibited operation	Steering cannot be engaged while certain actions are being performed. For example; steering calibration, changing GPS settings, exporting a job.	
Operator presence	The steering system will disengage if the driver leaves the control seat.	
Steering wheel	Let go of the steering wheel and try again.	
Speed displays with red	Adjust speed to between 1 and 25 kph (0.7-15 mph). The necessary speed may vary with the vehicle.	
Cross track error displays with red	Drive closer to the guideline before engaging auto steering.	
Heading error displays with red	Check the angle or reduce the speed of the vehicle's approach to the guideline.	

14.2. Tuning auto steer

It is important to tune the auto steering to suit the conditions, the type of job and the type of vehicle/implement.

1. Select **Steering Options Menu** / **Auto Steer Tuning Parameters** .
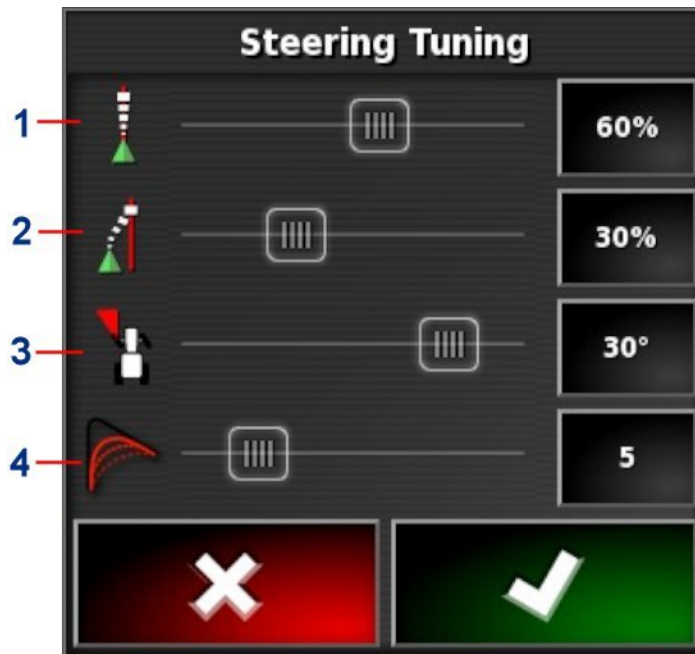
1 Online Aggressiveness sets how aggressively the steering will try to follow the guideline.

2 Approach Aggressiveness sets how aggressively the steering will approach the line. If too high, the vehicle may turn sharply.

3 Maximum Steering Angle limits the angle of turn to stay within the limits of the vehicle's safe capability.

4 Smoothing Radius for Curve Waylines sets how tight or loose the auto steering will adhere to curved waylines.

2. Set **Online Aggressiveness** to suit the precision necessary for the task.

3. Set **Approach Aggressiveness** considering accuracy for the job and safety for the equipment users.

4. Set **Maximum Steering Angle** to the safe levels for the vehicle and any implement being towed.

5. Set **Smoothing Radius for Curve Waylines** to the appropriate level. Lower values will follow the curved waylines more closely.

AES-25

Note that if **AES-25** is selected in the setup screen (**Vehicle** / **Steering** / **CONTROLLER**), three new options are added to this screen:

- **AES-25 Sensitivity Adjustment**: Adjusts the responsiveness of the steering when following guidelines.

- **AES-25 Deadband Adjustment**: Adjusts the amount of movement the AES-25 needs to make before the wheels respond.

- **AES-25 Disengage Threshold**: Adjusts the amount of effort required to disengage the steering wheel.

Direct spool

Note that if **Direct Spool** is enabled in the Setup screen (**Vehicle** / **Steering** / **DIRECT SPOOL**), two new options are added to this screen:

- **Direct Spool Sensitivity Adjustment**: Adjusts the responsiveness of the steering when following guidelines.

- **Direct Spool Deadband Adjustment**: Adjusts the amount of movement the steering wheel can make before the wheels respond.

14.3. Engaging auto steer

To use auto steering, the operator must have:

- Established guidelines (page 145)
- Enabled auto steering on the console (page 39)
- Calibrated the steering (page 109)
- Confirmed that all Steering Status items are green (page 153)
- Set the auto steering tuning to suit the task and vehicle type (page 157)
- Positioned the vehicle at the desired starting point.

1. Zoom and pan on the screen until the vehicle is in the center of the screen and at a comfortable size for viewing (if panning is enabled, refer to Setting up map options, page 31).

   Note: If an external auto steering engage switch is to be used, this needs to be enabled during setup for the vehicle. Refer to Setting up the steering controller, page 72. If using an AES-25, turn on the AES-25 and turn the steering wheel a quarter turn to enable auto steering.

2. Confirm that the Auto Steer Engage is showing white. This means it is ready to use.

Auto Steer is ready to use. Select **Auto Steer Engage** to begin.
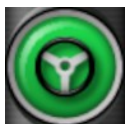
Auto Steer is engaged and active. Select **Auto Steer Engage** to change back to manual control. Note that the button may briefly flash blue before turning green.
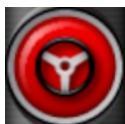
Auto steer cannot engage. Select **Auto Steer Engage** or return to the Steering Options Menu to see Steering Status for possible causes.

Auto steer is flashing in 'Delayed Engage' mode.

If Auto Steer is displaying red and the only condition displaying red on the Steering Status is easily resolved (for example speed), the operator may select **Auto Steer Engage** twice (double click) and flashing yellow will indicate that auto steer will engage if conditions are met within 15 seconds. If conditions are not met, it will return to red.

3. Correct any issue displaying red in the Steering Status Panel (work through issues displayed from the top to the bottom of the screen). When **Auto Steer Engage** is white, auto steer is ready to engage.

   For more information on Steering Status Errors refer to Auto Steering, page 153.

4. Drive slowly to meet a guideline, heading in the desired direction.

5. Select **Auto Steer Engage**. It will turn green. The vehicle will steer to the nearest guideline.

6. If it steers towards the line too aggressively, stop, disengage auto steering and adjust the Auto Steer Tuning Parameters from the Steering Options Menu.

14.4. Disengaging auto steer

Auto steer will automatically disengage when the necessary conditions (shown on the **Steering Status** screen) are no longer met.

To manually disengage auto steering:

- Turn the steering wheel a few degrees OR
- Select the **Auto Steer Engage** button on the console to disengage OR
- If using an external steering switch, disengage using the switch.

WARNING: Before leaving the vehicle, disengage auto steer, turn off the steering switch and remove the key.

Note: A visual and audible alarm will display and sound whenever auto steer is engaged or disengaged. The volume can be adjusted. Refer to Setting up alarms, page 56.

14.4. Disengaging auto steer

Chapter 15 – Nudge Menu

The Nudge menu allows for minor adjustments to the guidelines that have been set. This is useful for slightly realigning the guidelines to changing conditions or when returning to a field the next season. Guidelines can be nudged in a number of ways.

Nudge works with AB lines, center pivot guidelines and identical curves.

15.1. Using nudge options

1. Select **Nudge Menu** / **Open Nudge Options** .

2. To set how far a nudge will move a line, select **NUDGE OFFSET**.

3. Enter the required **NUDGE OFFSET**.

4. Use Nudge Left or Nudge Right on the Nudge Options screen or on the Nudge menu to nudge the lines.

5. **TOTAL NUDGE** calculates the total distance nudged. Select this to set a total nudge offset or to reset to 0.

6. Select **Save Nudged Guideline** to save the new guideline positions.

Nudging to the vehicle's position

To align the guidelines to the vehicle's current position:

1. Select **Nudge Guideline to the Vehicle's Position** .

   Note: Note that when nudging a curve or pivot, the size of the curve (or radius of the pivot) will change.

15.2. Compensating for GPS drift

GPS Drift may occur over time (when using low accuracy correction sources). When the operator returns to a field, there may be a slight change in the reported vehicle position with respect to fixed objects such as the field boundary or guidelines. This is largely due to changes in the satellite constellation patterns.

Other factors such as having no clear access to the sky (operating near trees or other obstacles) and satellite data errors may also result in a drift.

Note: It is also possible to reposition the vehicle position to a selected flag point, refer to Removing or changing a flag point, page 126.

To compensate for GPS drift:

1. Select **Nudge Menu** / **GPS Drift Compensation** .

The compensation value may be selected by:

Entering a positive or negative value in the **NORTH** and/or **EAST** field and confirming.

Or

Entering the required value in the **GPS DRIFT INCREMENT** field and then selecting the required direction button until the required compensation is achieved.

2. Select **Reset GPS drift** to remove the selected GPS drift compensation.

15.2.1. Compensating correctly for GPS drift

When correcting GPS drift, the vehicle on the map will be moved relative to the other objects on the map (for example, the field boundary, guidelines, flag points and any previous coverage). The easiest way to see this on the map is to switch to a North Up view

 and pan the map so that the vehicle is visible next to the GPS Drift Options window.

To correctly compensate for GPS drift:

1. Drive the vehicle to an identifiable location within the field (for example, next to a gate, the corner of the field or in the previous year's wheel tracks).

2. Use the GPS Drift Options window to position the vehicle on the map relative to these fixed landmarks.

In order to do this more accurately and quickly, you may want to set a flag point at a marked location on the field. Then each time you return to the field, position the vehicle at that marked location, locate the flag point on the map and select it. This will open a window with the option for 'GPS Drift Correction'. Selecting that option will move the vehicle to the location of the flag point.

The GPS drift compensation that is applied is remembered when the console is restarted. However, this compensation may no longer be accurate if conditions have changed. An alarm will be shown shortly after the system starts that will advise the operator that GPS drift compensation is in effect. The operator must then decide if they want to continue using this compensation factor, clear it back to zero or perform the GPS drift compensation procedure again to get a more accurate result for that session.
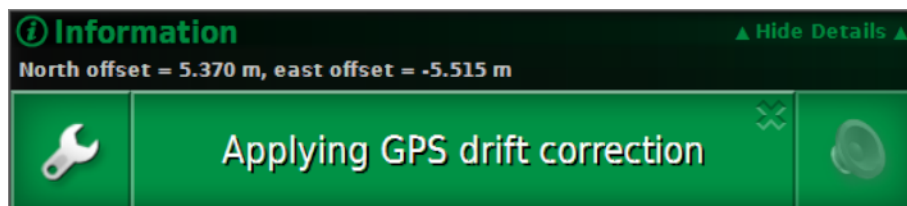
15.2.2. High accuracy correction sources

GPS drift compensation should not be necessary with higher accuracy correction sources (for example, RTK, OmniSTAR HP). If a high accuracy source is being used, the GPS drift compensation should be reset back to zero in the GPS Drift Options window.

15.2. Compensating for GPS drift

Chapter 16 – Enabled Additional Features

This section describes the use of features that may have been enabled in the Setup screen: **System** / **Features**.

The enabled features documented in this section appear on the navigation bar.

16.1. Using auto section control

Auto section control is available when an implement and ECU have been set up and Auto Section Control has been enabled. This feature can be configured through its mini-view. Refer to the Spreader / Sprayer operator manual for more information.

16.2. Using universal terminal (ISOBUS)

This option allows the operator to interact with an ISOBUS ECU.

The universal terminal is similar to the idea of a web browser. It has no context about what is running on it. User interfaces are loaded from the connected clients.

There is no practical limit to how many implements or clients can be accommodated by the universal terminal. Functionality is limited to the implement and controller design.

Universal terminal is enabled via **System** / **Features** / **Console**.

1. Select **Universal Terminal** from the Navigation bar to open the mini-view.

2. To open universal terminal in full screen, maximize the mini-view.
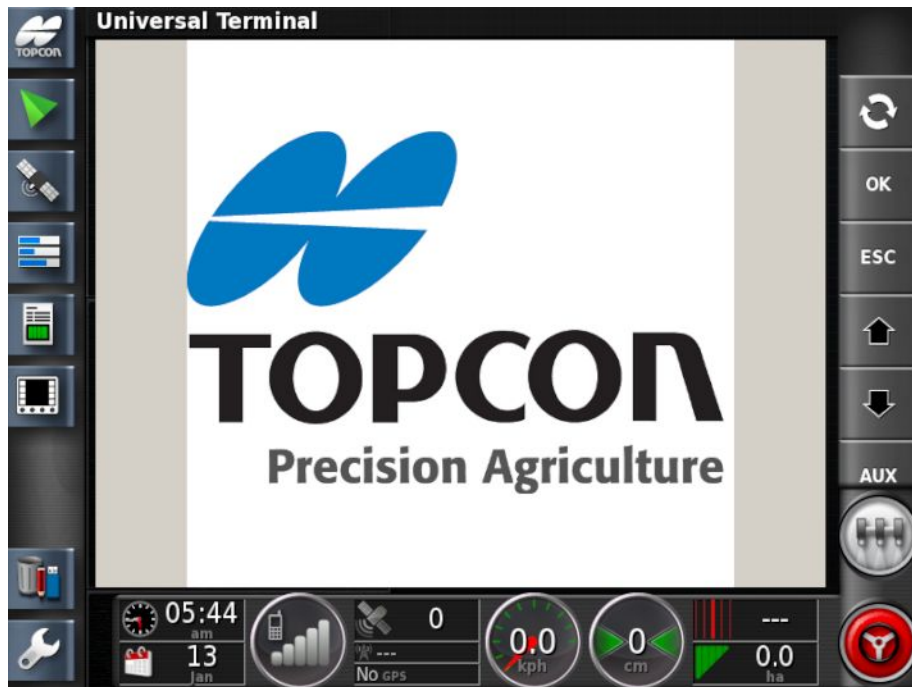
Screens will vary according to the ISOBUS equipment.

16.2. Using universal terminal (ISOBUS)

Chapter 17 – Inventory Manager

The Inventory Manager allows the operator to view details of information files on the system and make changes to that information. Files can be deleted, renamed, transferred to USB or imported from USB.

17.1. Using the manager toolbar

1. Open the Inventory Manager.
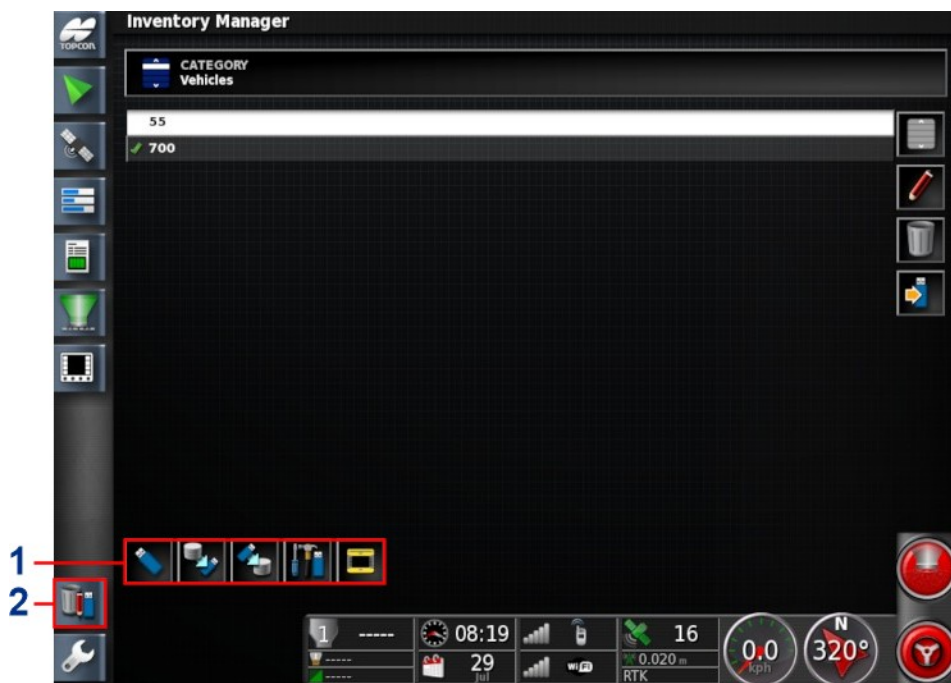
1 Manager toolbar

2 Inventory manager

Use the Manager Toolbar to access USB files, backup and restore and export files.

 Use this to access files from a USB. When browsing for USB files, the display is blue instead of grey.

 This will back up all system data onto a USB.

Restore All. **NOTE**: This overwrites any data on the system and is used to restore content from a backup USB. Normally this is used by service personnel.

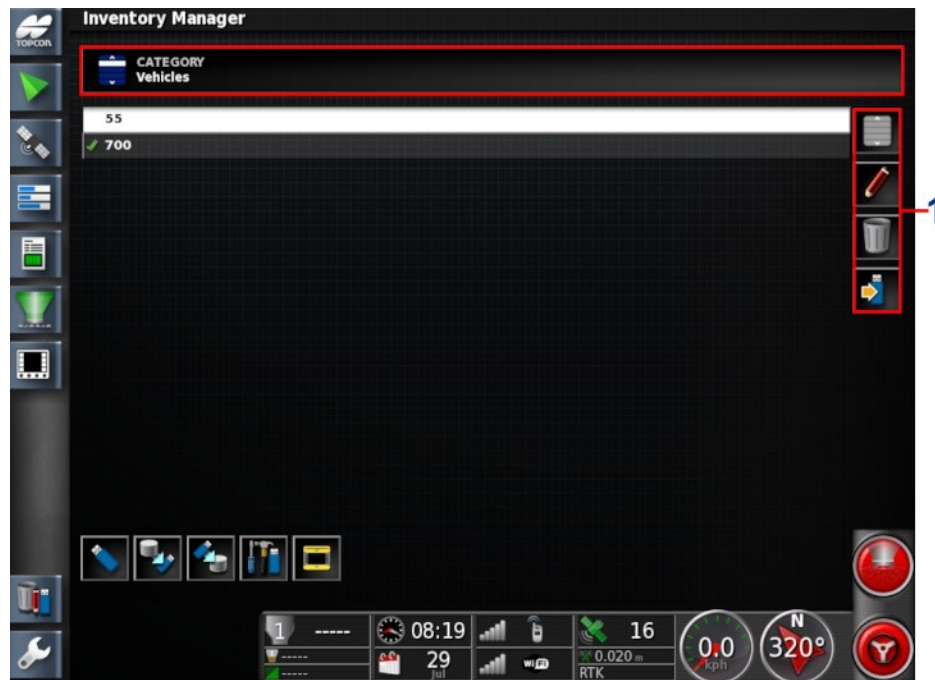This exports diagnostic information. Use this when a dealer asks for it so the data can be assessed.

Use this to be compatible with System 150 files. (Must enable **User** / **Environment** / **System 150 file transfers**.)

17.2. Using categories and item manager

1 Individual item manager

1. Select **CATEGORY** to choose the item type to manage.

2. Choose the type and confirm.
3. Select an item.

Select all items.

Rename selected item.

Delete selected items.

Export selected items to USB.

When browsing files on a USB, the 'Export selected items to USB' icon will change to offer 'Import selected items from USB'.

Note that it is not possible to delete items that are currently active (shown with a green tick).

4. Select the action required. Follow the prompts and confirm.

17.2.1. Exporting jobs and job reports

It is possible to export one or more jobs and/or job reports.

1. Select **Jobs** from the **CATEGORY** drop down list.

2. Click to highlight the job/s required.

3. Select the **Export selected items to USB** button .

   The Job Export Options screen enables the job and/or job report to be exported for the selected jobs.

Chapter 18 – Troubleshooting Guide

18.1. Common error messages

For many errors an error code, or Trouble Code, will display. It is also possible to view errors via the Steering Status screen (see page 153), or the Diagnostics screen, Trouble Codes tab (see page 99).

The errors listed below are fairly common and may be corrected by the user. For other errors or if a problem persists, **always record the error message** to report to your dealer, including any code displayed.

Code	Fault	Action	Page
U1052	Steering subsystem firmware version is incorrect.	Upgrade the firmware.	47
U1054	Steering subsystem is in fault mode.	Please power cycle steering controller.	
U1055	Steering controller needs to be reset.	Please power cycle steering controller and the vehicle. Wait 20 seconds and restart.	
U1056	Steering controller configuration error.	Please repeat WAS calibration.	112
U1061	Tractor parameter settings not found in steering subsystem.	Return to main setup menu and confirm correct vehicle.	66
U1062	Mounting bias calibration required.	Calibrate mounting bias. This allows the system to compensate if the receiver is not level on the cab roof.	114

Code	Fault	Action	Page
U1065	Wheel angle sensor calibration required.	A change of tires is a common cause but is not the only possible cause. Confirm vehicle measurements and then recalibrate.	70 112
U1066	Compass calibration required.	Calibrate compass.	110
U1067	New vehicle or new steering controller has been detected.	Recalibrate compass.	110
U1068	Vehicle profile does not match steering subsystem settings.	Confirm steering subsystem is turned on. Return to main setup menu and reset vehicle and steering.	67 - 72
U1069	Steering subsystem steering wheel sensor is not configured.	Contact dealer.	
U1071	AES-25 average power is greater than the power limit.	Confirm load on AES-25 motor unit (for example the steering column is too heavy or the bushes or bearings are worn). Contact dealer.	
U1072	AES-25 temperature greater than the temperature limit.	Turn off and allow to cool down. If problem persists contact the dealer.	

Code	Fault	Action	Page
U1074	AES-25 steering controller not initialized.	Manually turn steering wheel by one quarter revolution.	
U1075-U1078	CAN receive or transmit errors.	Confirm connections. Power cycle the junction box. Contact dealer if the problem persists.	
U1079	Wheel angle sensor disconnected.	Check connection or replace faulty sensor. Contact dealer.	
U1080	Wheel angle sensor has short-circuited.	Contact dealer. Sensor may need to be replaced.	
U1082	Compact flash file system has less than 1% space remaining.	Confirm memory usage in the mini-view. It may be necessary to remove or transfer old files using inventory manager.	99 & 173
U3001	Transfer failed.	Try exporting or importing the file from USB again.	173
U4001	Wayline initialization error.	Recreate wayline.	146 - 150
U4006	Valid system calibrations do not exist.	Calibrate compass, wheel angle sensor and mounting bias.	110 - 114

Code	Fault	Action	Page
U5001	Steering subsystem not detected.	Confirm that steering subsystem is turned on. Confirm that 'road lock switch', which prevents engaging while on public roads, is off. Return to main setup menu to confirm correct steering system in setup.	72
U5002	Implement and wayline are not defined.	Confirm correct implement chosen and confirm correct field and job chosen. Create waylines if necessary.	76 122 & 135 146 - 151
U5003	Could not engage due to steering controller lockout.	Confirm road switch is OFF.	
U5004	Implement is not defined.	Confirm correct implement chosen.	76
U5007	Row spacing (implement overlap subtracted from implement width) is too small.	Overlap set is too large. Change overlap in auto section control mini-view. Refer to the controller's manual.	
U6904	Only one of the steering controller type and vehicle type is articulated.	Confirm settings in vehicle setup on the console match settings in the steering controller.	70 - 72

Code	Fault	Action	Page
U6905	Unknown machine type.	Return to main setup menu, and revise vehicle setup.	70
U8505	Factory calibration not present.	Calibrate compass, wheel angle sensor and mounting bias.	110 - 114
TC8	No 12V power supply to inertial sensor and modem.	Confirm connections.	

18.1. Common error messages

Chapter 19 – Appendices

19.1. Appendix A – Glossary

Base Station	A GNSS receiver that supplies differential corrections to receivers equipped with GNSS. Also called a base or a reference station.
Baud Rate	This is the speed of data transfer, measured in bits per second.
Differential GPS	A method that uses correction data from satellite services or fixed reference stations to increase GPS accuracy. The satellites or local reference stations send correction data to vehicles equipped with GNSS receivers.
Easting/ Northing	Eastings and Northings show the Universal Transverse Mercator (UTM) position and zone of the vehicle. They are measured in meters. The grid numbers on the east-west (horizontal) axis are called Eastings, and the grid numbers on the north-south (vertical) axis are called Northings.
EGNOS	(European Geostationary Navigation Overlay Service) This is a European SBAS developed to supplement GPS, GLONASS and Galileo systems by reporting on the reliability and accuracy of the signals.
EMC	Electromagnetic Compatibility is the science that studies impact of electromagnetic interference. EMC aims to ensure that equipment items or systems will not interfere with each other or prevent correct operation through emissions.

Fallback	Satellites and correction sources require specific position accuracy when computing the position of the vehicle. If the system is not receiving enough data to compute the vehicle's position with the required accuracy, auto steering will not be enabled. The fallback feature allows the system to bypass the position accuracy requirement so that auto steering can be engaged. This is useful in situations where a high degree of position accuracy is not required.
Field	Defined working area of the tractor.
Field Boundary	The edge of the field.
Firmware	A computer program that is permanently embedded in the hardware of a device.
GDOP	(Geometric Dilution of Precision) GDOP is a metric used to quantify the accuracy of GNSS satellite geometry.
GLONASS	Global Navigation Satellite System (Russian GNSS)
GNSS	Global Navigation Satellite System
GPS	Global Positioning System (US GNSS)
Guideline	The virtual line between two way points in a field. The guideline is used as reference for further field runs (also Wayline).
HDOP	(Horizontal Dilution of Precision) HDOP is a metric for quantifying the accuracy of the horizontal (latitude/longitude) position information received from the GNSS satellites.
HRMS	The HRMS (Horizontal Root Mean Squared) calculates an average horizontal position from the source information from the satellites

Latitude	The distance of a position north or south of the equator measured in degrees. One minute latitude is equal to one nautical mile (1852 m). The equator has a latitude of zero.
Longitude	The distance of a position east or west from the prime meridian measured in degrees. The prime meridian runs through Greenwich, England and is zero longitude.
Mobile Base Station	A base station that can be easily moved and can independently determine its new position so that it can then continue working with the DGPS system.
Mounting Bias	Mounting bias refers to whether the receiver is exactly level, when installed.
MSAS	(Multi-functional Satellite Augmentation System) This is a Japanese SBAS which supplements the GPS by reporting and improving on the reliability and accuracy of the GPS signals.
NMEA	(National Marine Electronics Association) This is a standard protocol used by electronic devices to receive and transmit data.
OmniSTAR	A commercial service that receives GPS signals from NAVSTAR, checks them for errors and then uploads the error correction data to the OmniSTAR satellites.
Reference Station	A GNSS receiver that supplies differential corrections to receivers equipped with GNSS. Also called a base station.

RTK Network	Association of base stations that transmit their position data to a server via the internet (NTRIP). The vehicles in the RTK network (rovers) also transmit their position to the server via mobile radio. The server uses the position data from the base stations and vehicles to calculate the correction data for each vehicle and transmits it to the vehicle via mobile radio. This allows position determination to be carried out with an accuracy of 1-2 cm in real time.
SBAS	(Satellite-Based Augmentation System) This is a system which supports wide area or regional augmentation through the use of additional satellite broadcast messages. SBAS correction sources are commonly composed of multiple ground stations which take the measurements of one or more GNSS satellites, and the satellite signals and environmental factors that may impact the signal.
Shapefile	A shapefile stores non-topological geometry and attribute information for the spatial features in a data set. The geometry for a feature is stored as a shape comprising a set of vector coordinates. It is in the form: abcd.shp
WAAS	(Wide Area Augmentation System) This US SBAS was developed by the US Federal Aviation Administration to serve as an air navigation aid by improving the accuracy and availability of the GPS signals.
WAS	Wheel angle sensor
Wayline	The virtual line between two way points in a field. The wayline is used as reference for further field runs (also Guideline).

Chapter 20 – Index