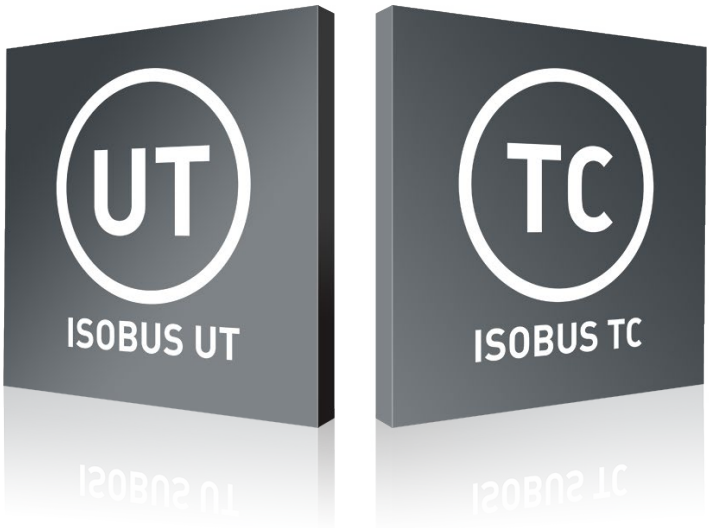
User Manual

PARKER ISOBUS SUITE

Publ. No. MSG17-4830-UM/UK

Edition 02/2021



Contents

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The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

Contents

ISOBUS Universal Terminal (UT)

1. Overview

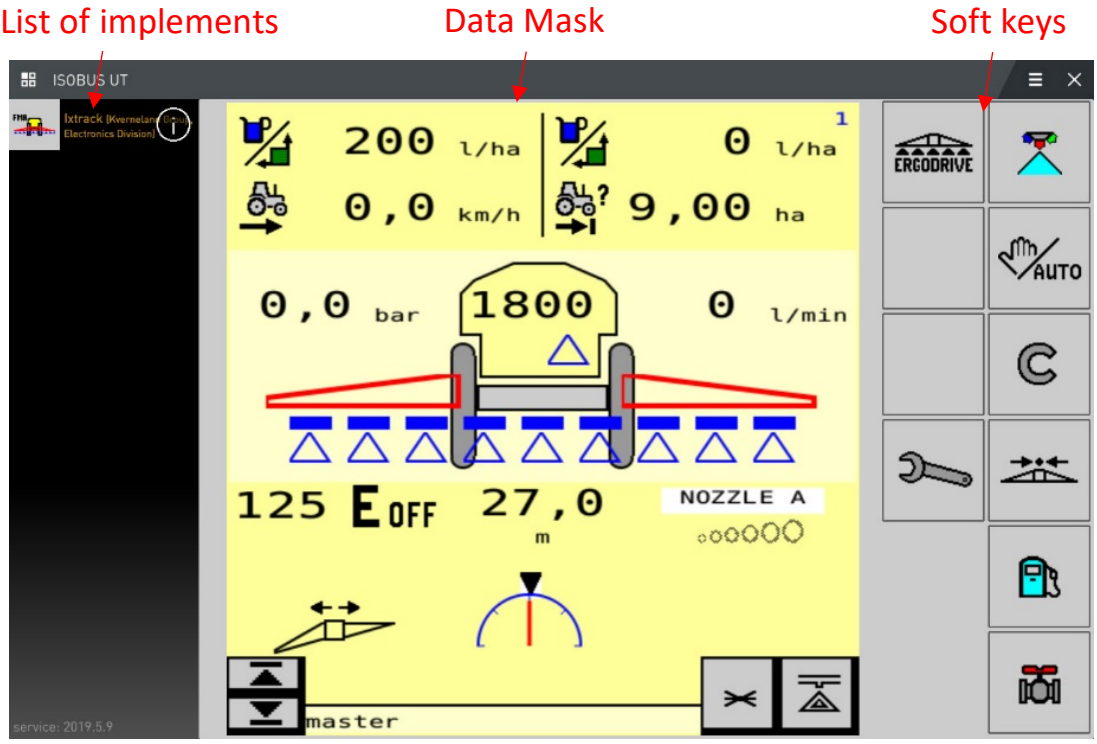


Figure 1. ISOBUS UT overview.

1.1. Settings

VT Number. If tractor has multiple universal terminals (UT) connected, each UT needs to have a unique VT Number defined. The number can be changed in this field.

Localisation. Define language and units of measurements.

Under Settings, the object pools can be also removed.

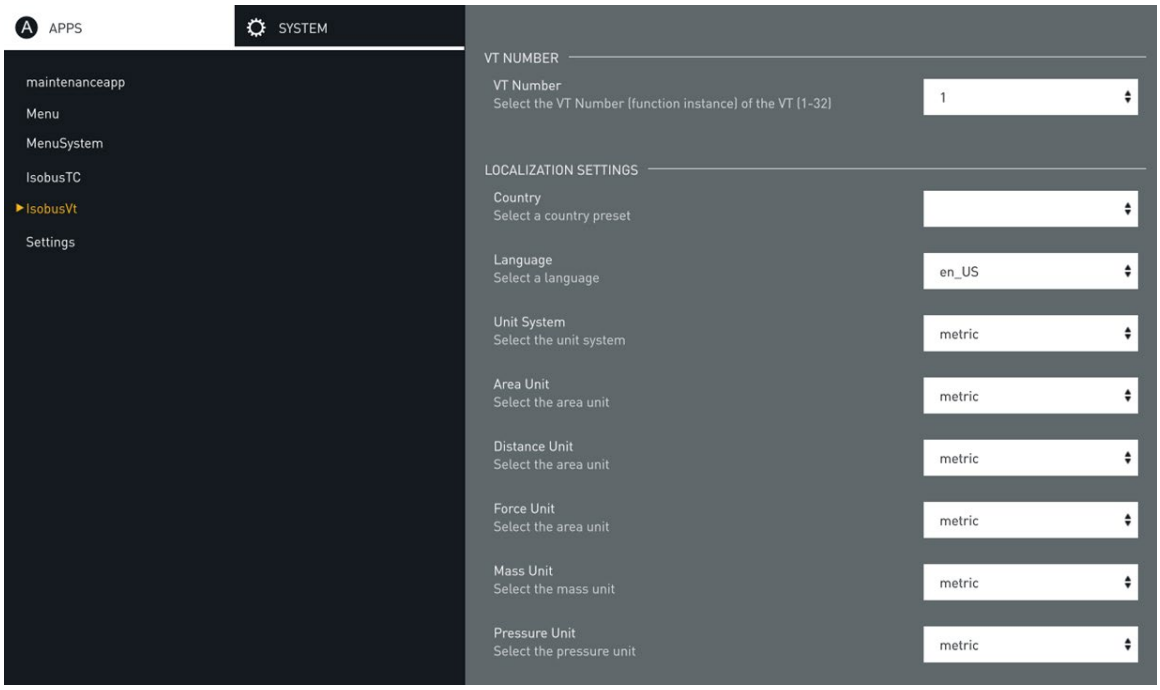


Figure 2. ISOBUS UT settings view.

ISOBUS Task Controller (TC)

1. Getting Started

This section demonstrates how to operate the Pro Display ISOBUS Task Controller (ISOBUS TC) application.

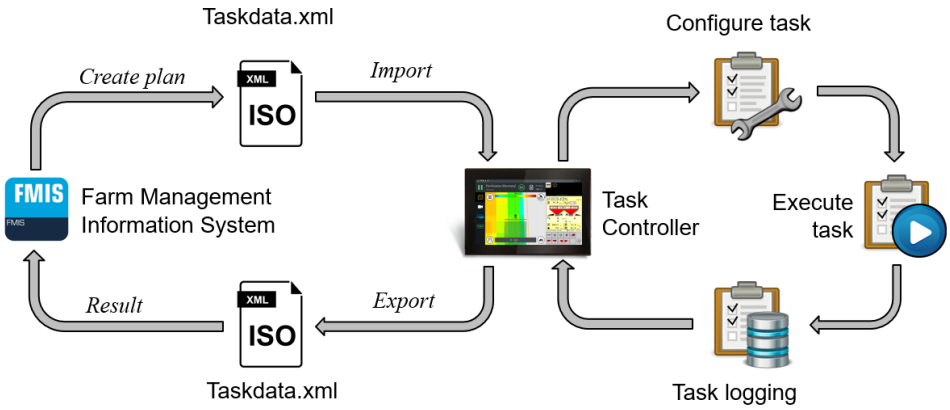


Figure 3. Precision Farming Workflow

1.1. Main Page View

When the ISOBUS Task Controller (TC) app is started, the main page is loaded first. The user settings are also loaded (see chapter on Shutting Down the System for more details). The main page is used for executing a task and selecting different views.

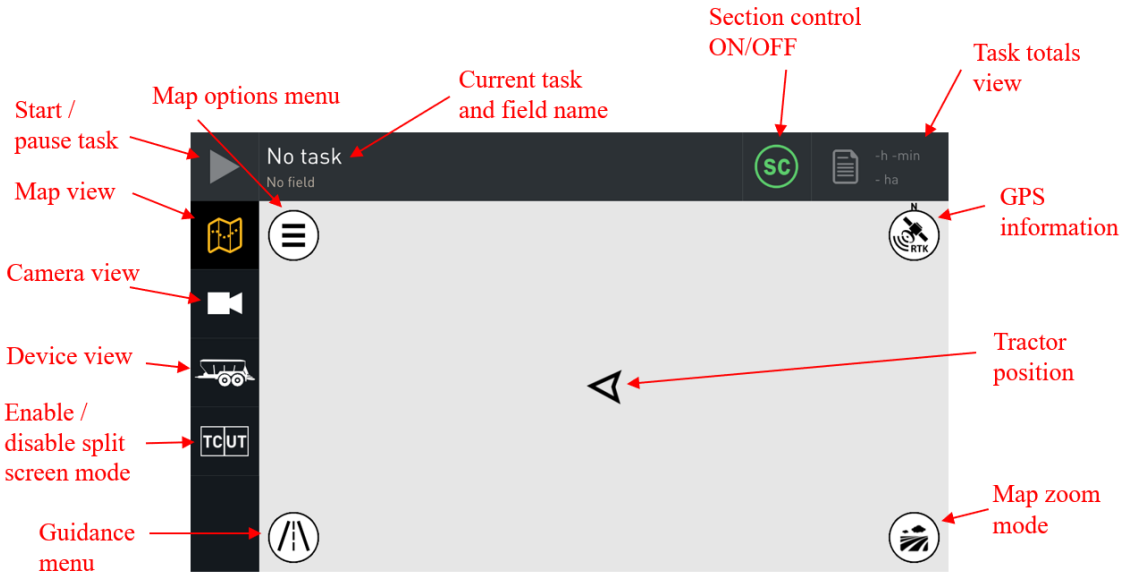


Figure 4. ISOBUS TC main page view and functions

1.2. Task Setup Page

Click the *No task* area to enter the task setup page:

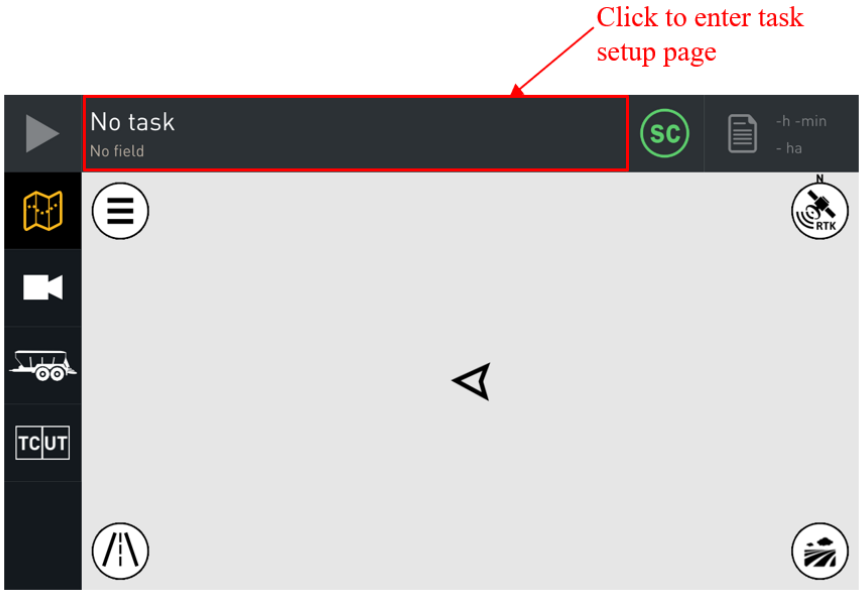


Figure 5. How to enter task setup from ISOBUS TC main page

The task setup page allows user to select the task, see an overview of the task and task totals. The task setup page also provides functionalities to create a new task, clear all taskdata, as well as complete the selected task. From the task page, user can navigate to task configuration and task import and export pages.

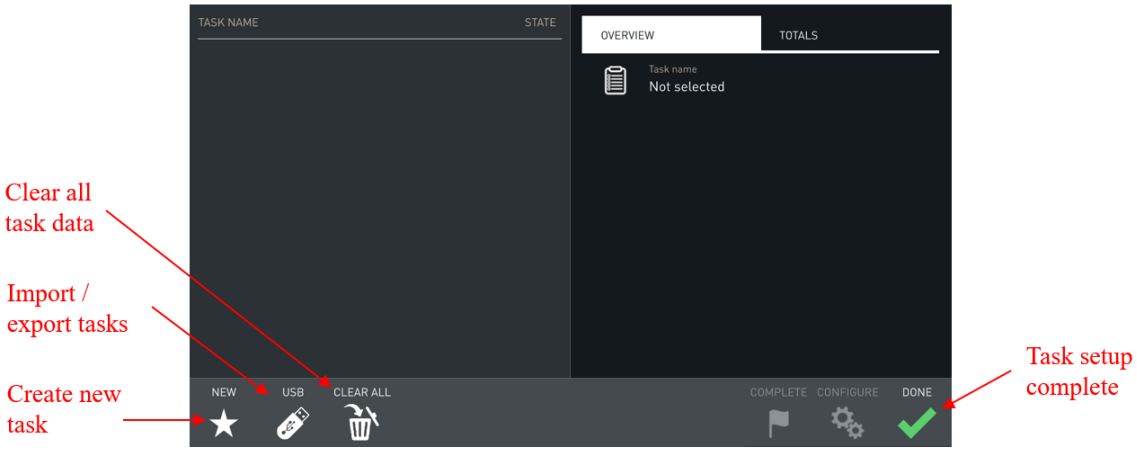


Figure 6. Task setup page view (with no tasks imported or created yet)

2. Perform Tasks

2.1. Import Task

On the task setup page, click the *USB* icon to import tasks. The task import/export page also provides information on the taskdata files as well as the functionality to eject (unmount) USB media.

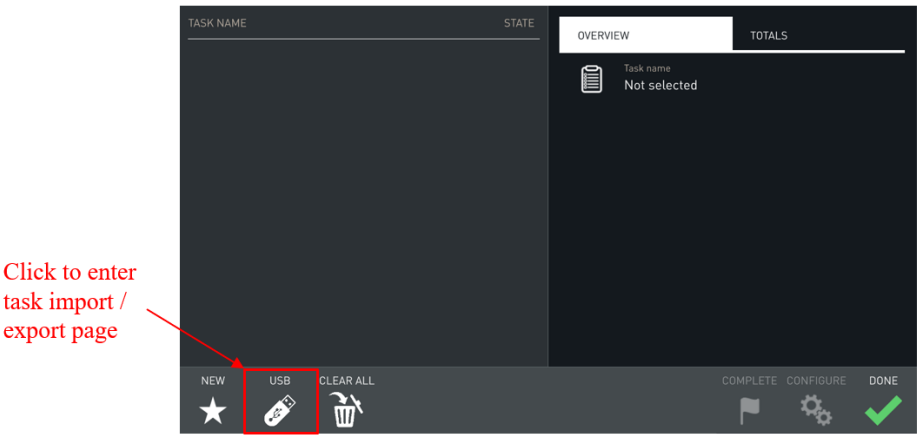


Figure 7. Enter task import / export page

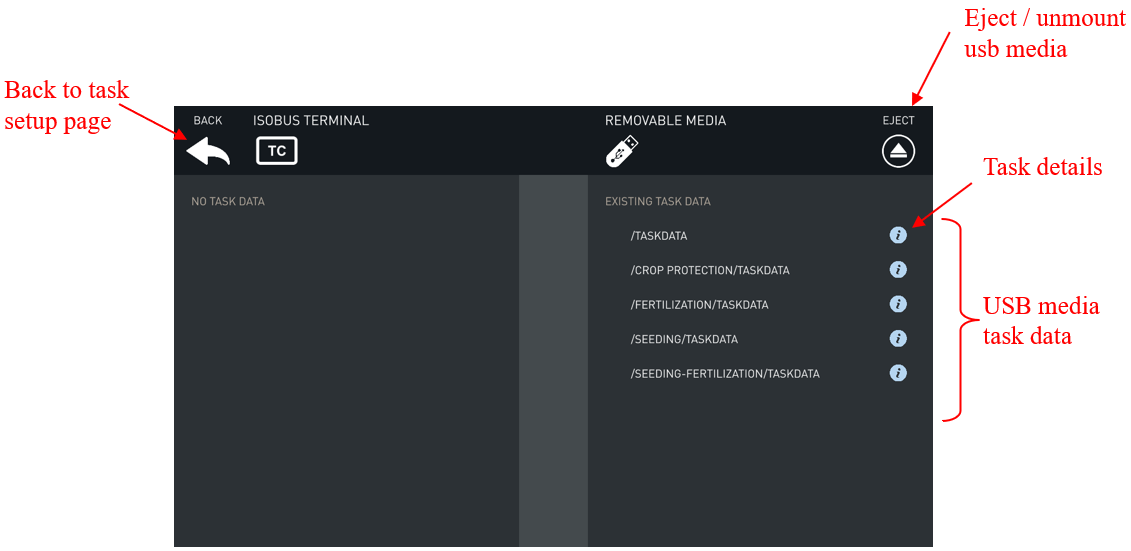


Figure 8. Task import page view

On the right side of the page, the list of existing taskdata files on the USB media is shown. To see the details for each taskdata file, click the *information* icon (task details) next to the taskdata filename.

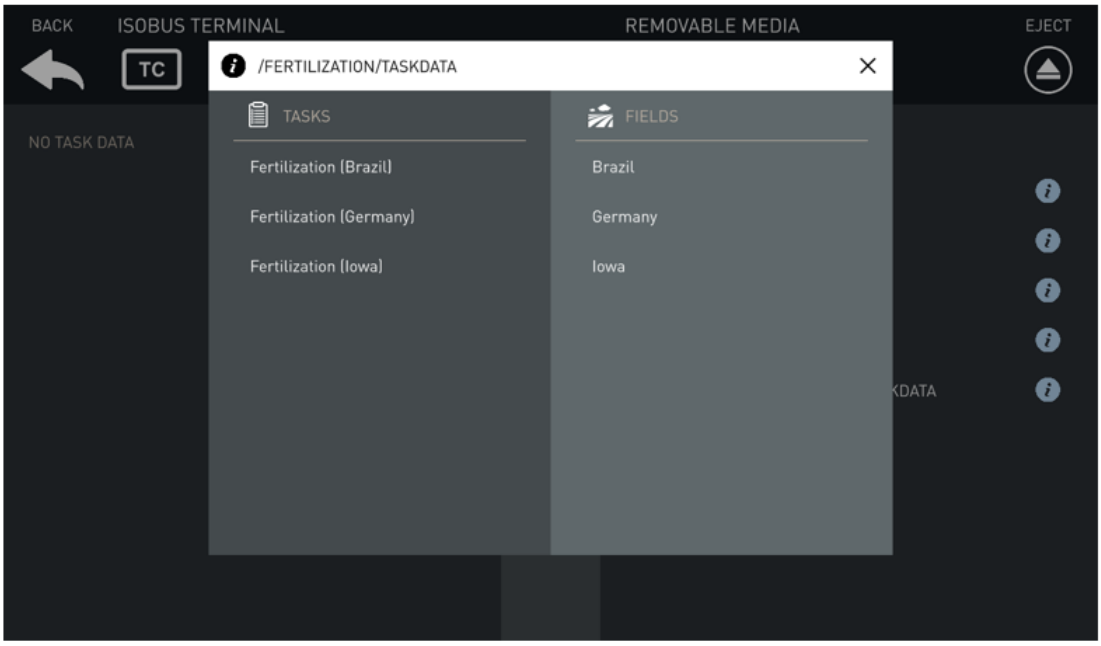


Figure 9. Taskdata file details view

The taskdata file can contain multiple tasks. It is not possible to import a single task from the taskdata file that contains multiple tasks.

The user interface indicates the importing state for the taskdata file with different colors as follows:

- *Importing taskdata file can be proceeded normally*
- *Importing taskdata file will overwrite existing taskdata file (this procedure cannot be undone)*

To import a task, select the taskdata file from the list on the right side, and then click the *Import* icon in the middle of the page.

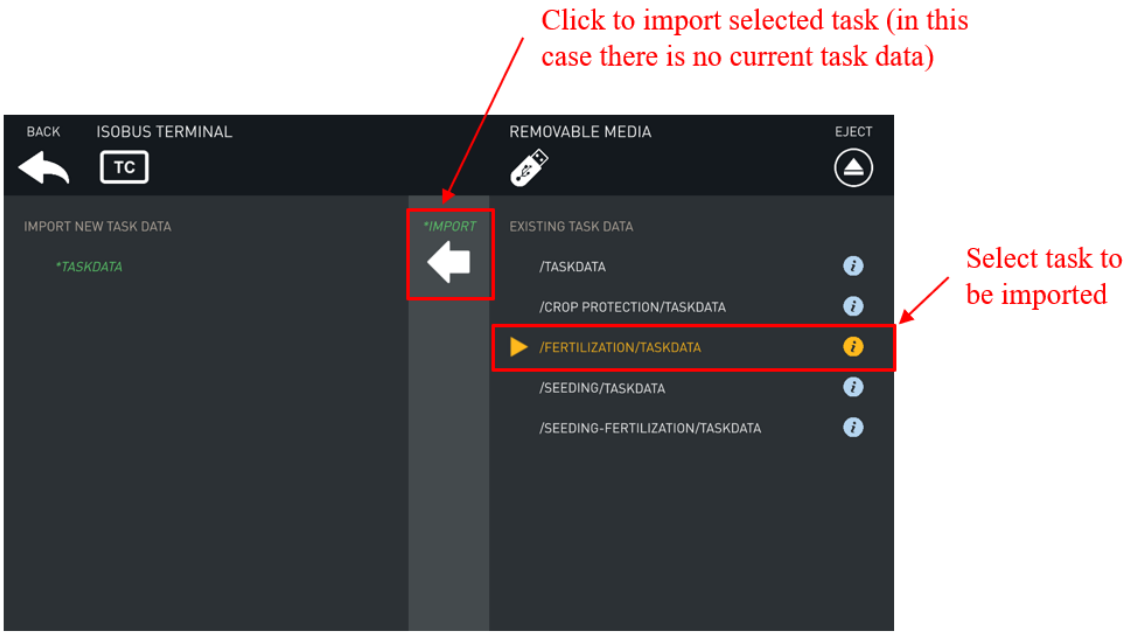


Figure 10. Import task from USB media

A dialogue box pops up giving information about the progress of taskdata import. After a successful completion, the user is returned to the task setup page.

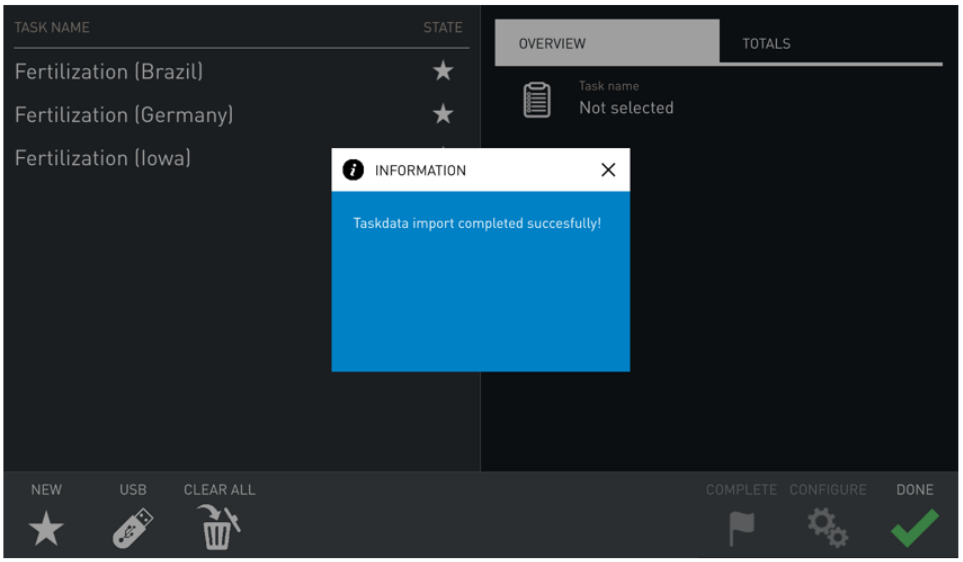


Figure 11. Task import completed

After user has imported or created new tasks, all tasks are shown in the list on the left side. When one of the tasks is selected, user can see the task details, configure the task and complete the task.

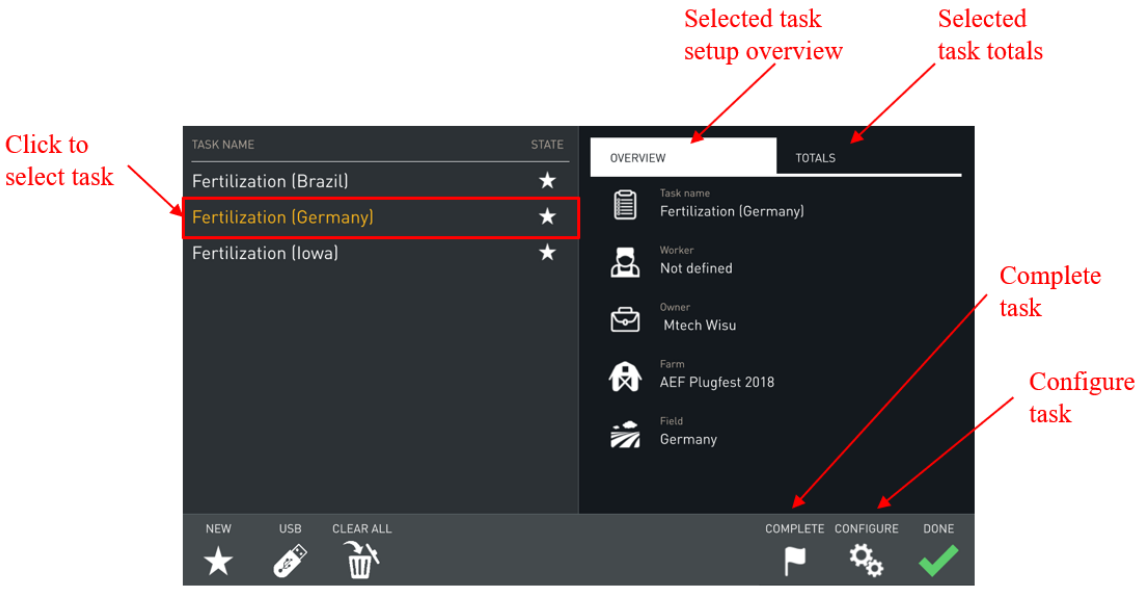


Figure 12. Functions for selected task

To export taskdata file, see chapter Export Task.

2.2. Task States

A small symbol next to each task name shows the current state of the task. There are 4 different states defined: *new task*, *paused task*, *running task* and *task complete*. A symbol for each task is shown in Figure 13.

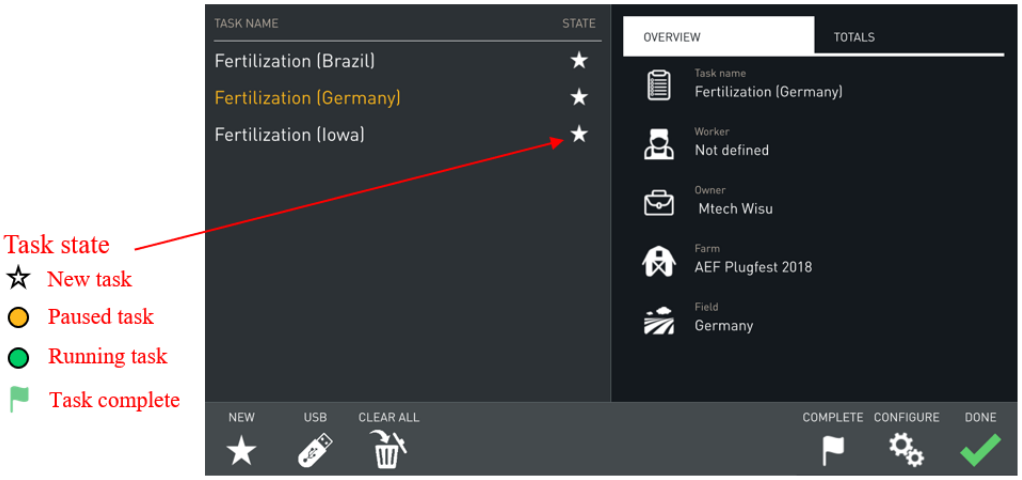


Figure 13. Task states

2.3. Task Configuration

Choose a task from the list and click the *Configure* icon.

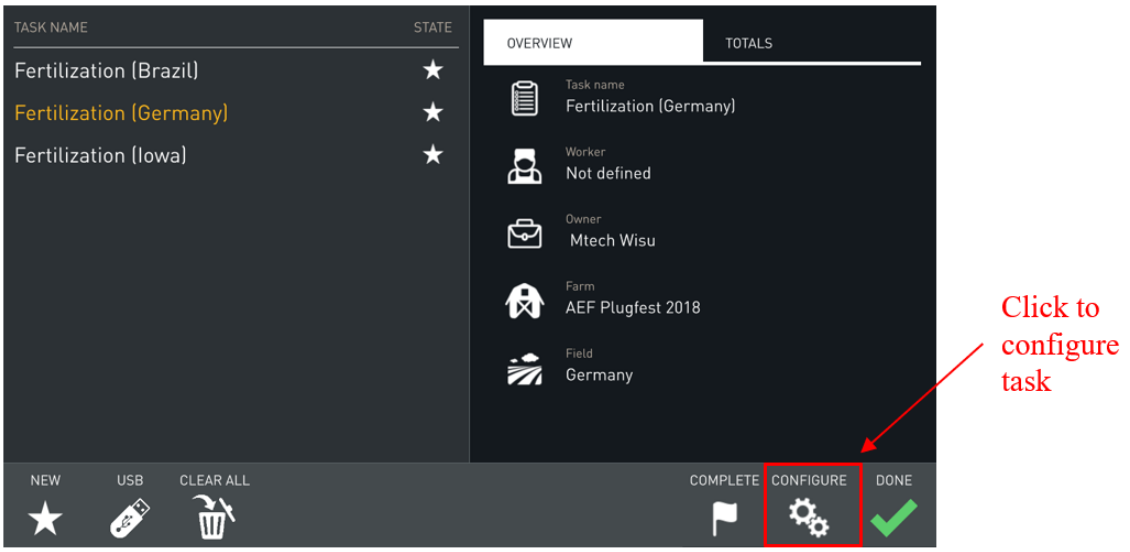


Figure 14. Configure task

> ***The Configure button can also be red, indicating that the configuration requires user attention or action.***

The task configuration page provides functionalities to define task basic information, define system layout and assign device product and rate control.

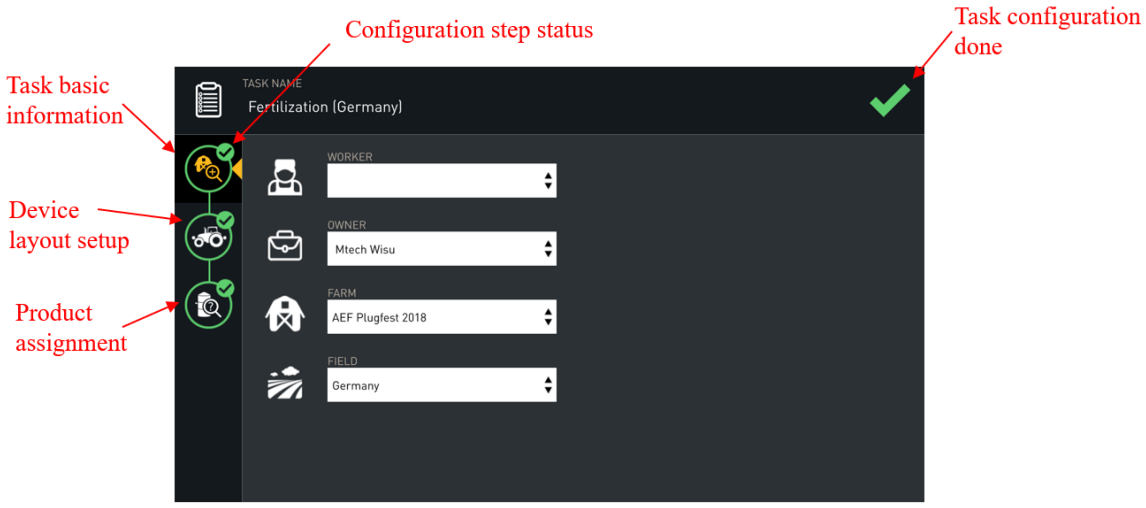


Figure 15. Task configuration page

2.3.1. Device Layout Setup

The purpose of the device layout setup view is to define where the device is connected. The device position can be changed simply by dragging the device to a new position. This however is

only relevant with tractors that have a front ISOBUS connector or when working with multiple devices.

This layout information is used to define the distances from the GPS reference point in order to control the device precisely.

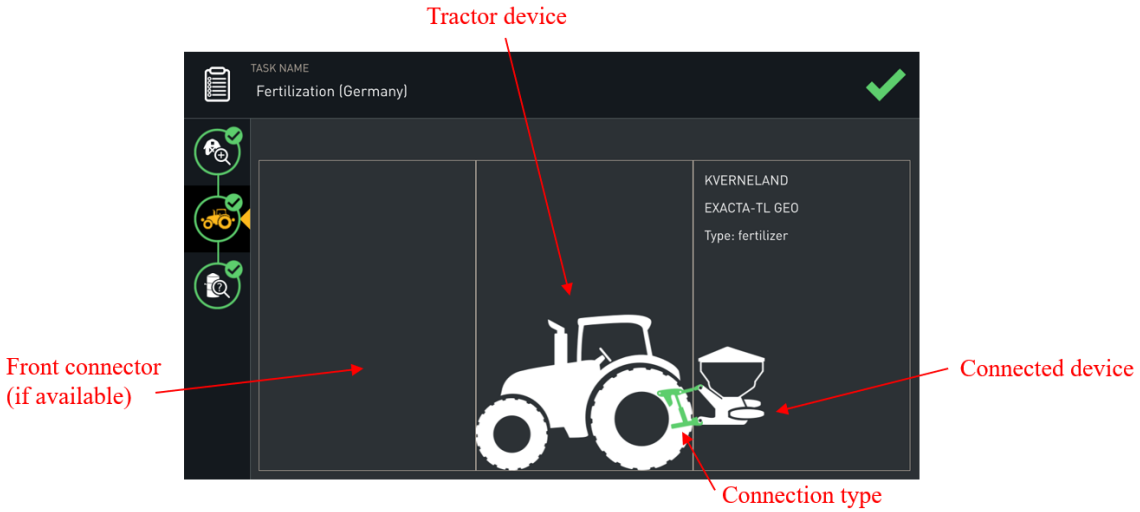


Figure 16. Device layout setup view

If the tractor has a front ISOBUS connector, there is an empty space in front of the tractor and devices can be dragged to this position. When dragging the device, all compatible connectors are shown in the colour **orange.**

The layout view also provides information on the device connector types and their connection compatibilities. In general, the colour **green** indicates a compatible connection.

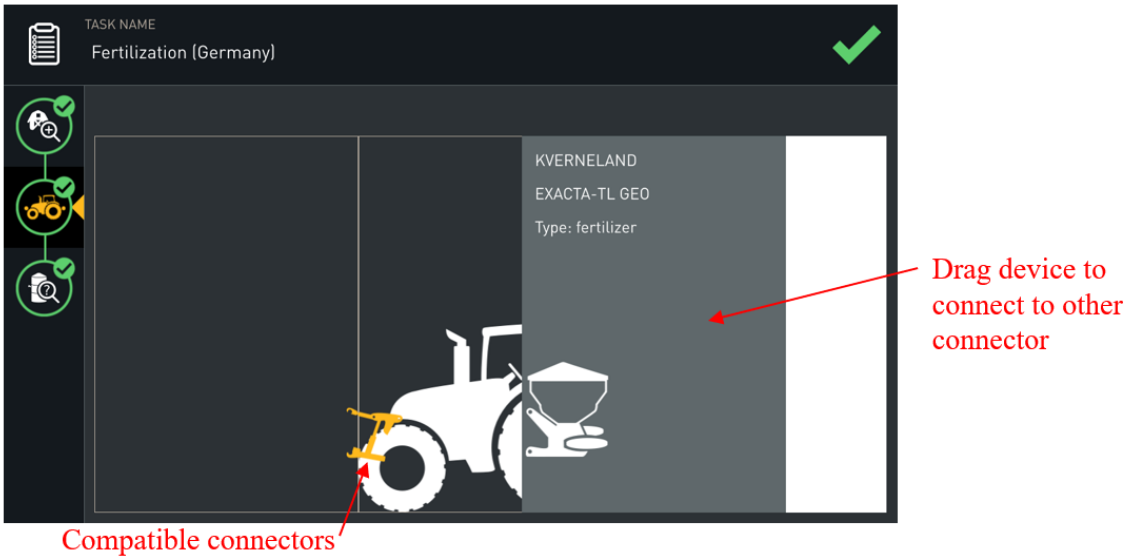


Figure 17. Change device position by dragging the device

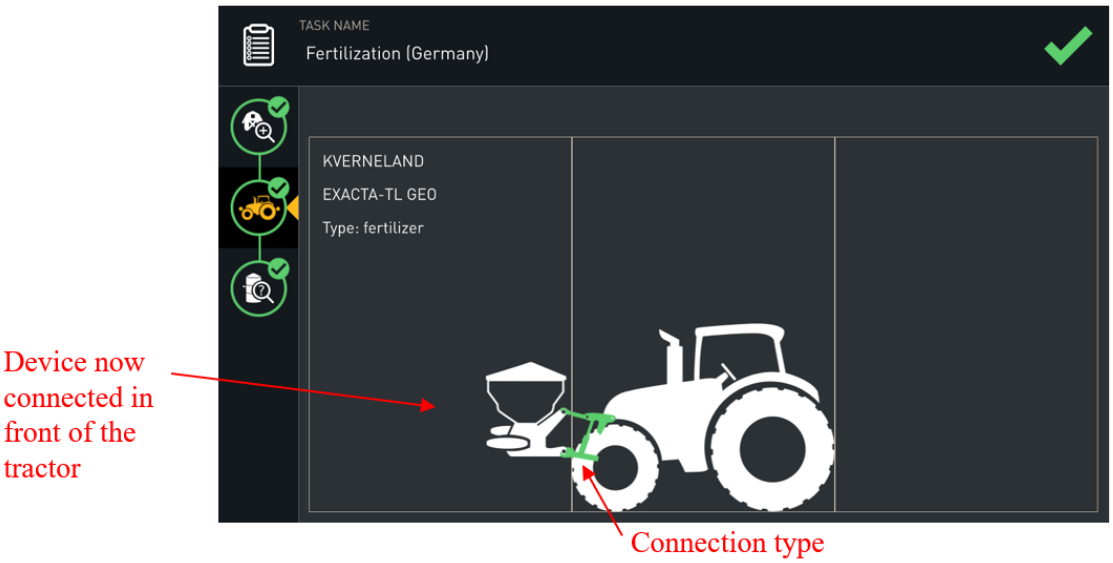


Figure 18. The device connected to a new position

Some devices might not have the connector type defined. In this case the device is highlighted with the colour **red.** This red highlighting doesn't mean that the device will not work, it simply indicates that the connector type is unknown.

Figure 19. The device is displayed in red when the connector type is unknown

2.3.2. Product Assignment

Product assignment view allows user to select a product for each device function. Devices that support multiple products (functions) have tabs for each function. Some devices provide cultural practice names for these functions which are then shown in tabs (otherwise tabs are called 'Function 1').

Each device function has a dropdown selection for product assignment. These products are derived from the task data and the user has to carefully select the right one (make sure that the product quantity is correct, for example kg/ha).

Device function rate control mode can be selected from three options:

- Automatic
- Fixed
- Off

Automatic mode is intended to be used when the product has a variable rate map available. Fixed mode can be used so that the control value is set below (the device will control the whole field with this value). Off mode is intended for the situations where the user wants to adjust the rate manually from the universal terminal UI.

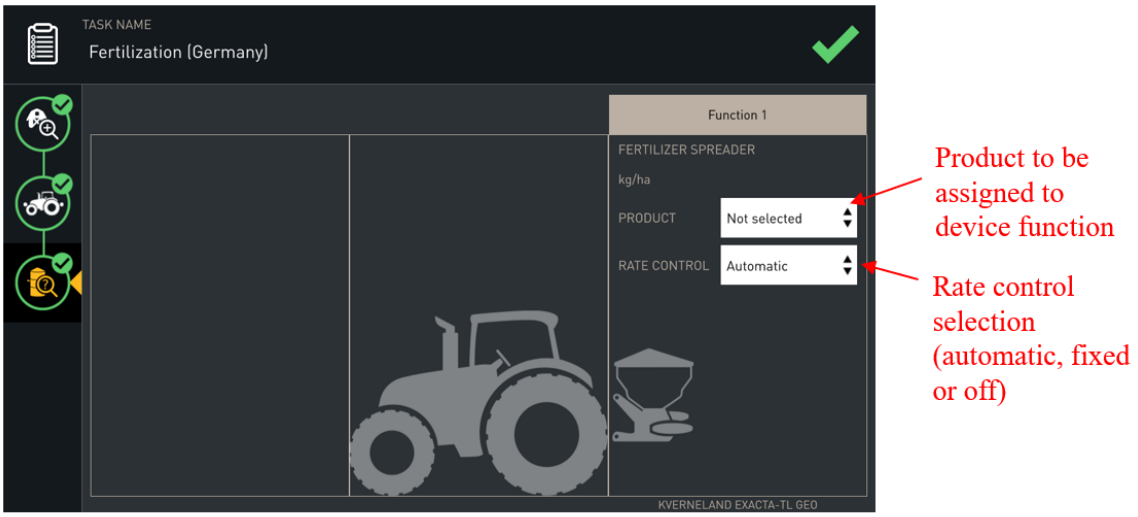


Figure 20. Product assignment view

> ***Auto-assigning map layers.*** *When the product with a variable rate map is selected for device function, and rate control is 'Automatic', map view automatically selects corresponding variable rate map layer. At the same time, the device function coverage map is selected.*

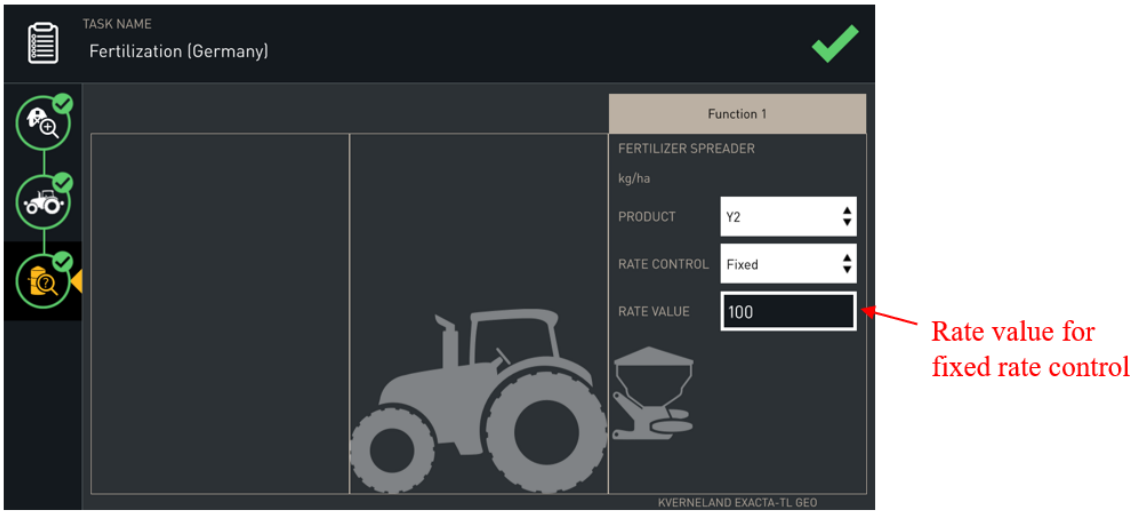


Figure 21. Fixed rate control

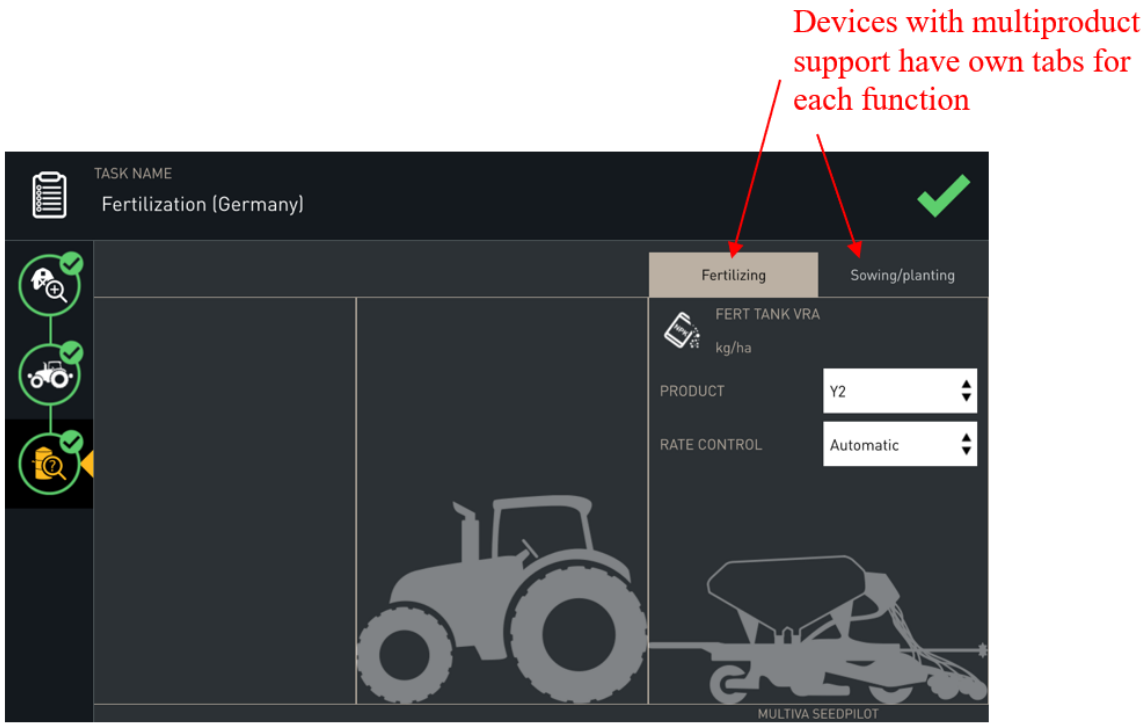


Figure 22. Devices with multiproduct support

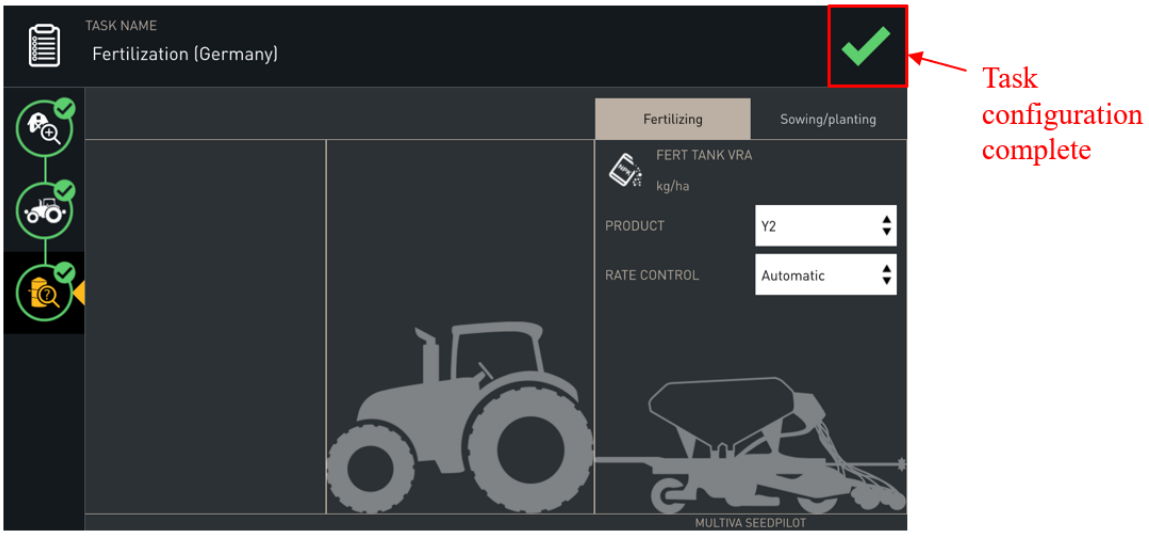


Figure 23. Complete task configuration

2.3.3. Complete Task Setup

After user has finalised the task configuration, the task setup can be completed for the selected task.

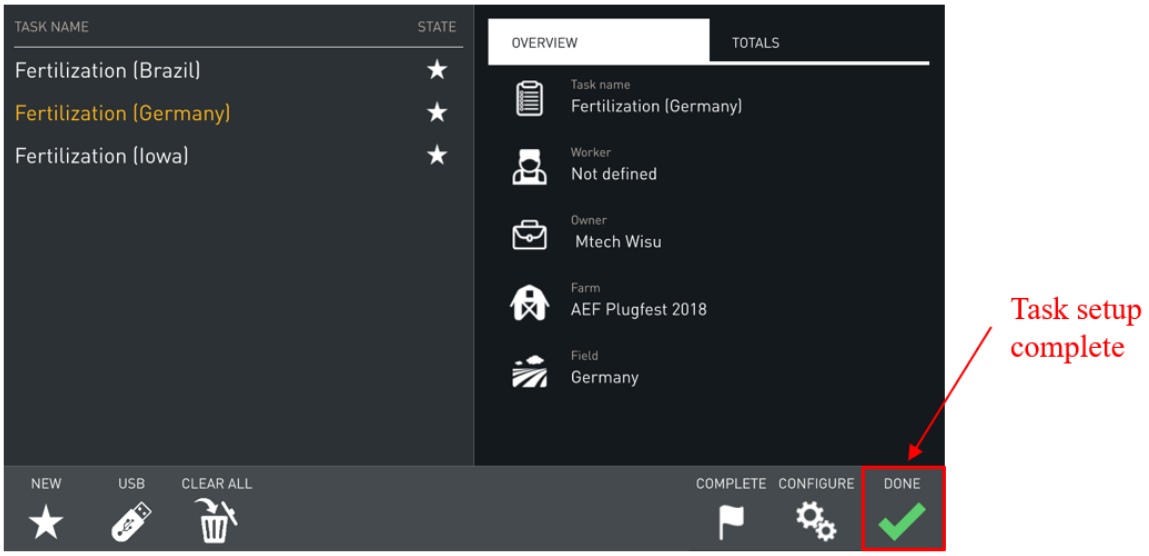


Figure 24. Complete task setup

2.4. Run Task

To run a task, go to task setup page and select a task from the list shown on left side. A previously completed task can also be run again.

The text of the selected task is displayed in yellow. Confirm the selection by clicking the *Done* button at the bottom right, and to return to the main page.

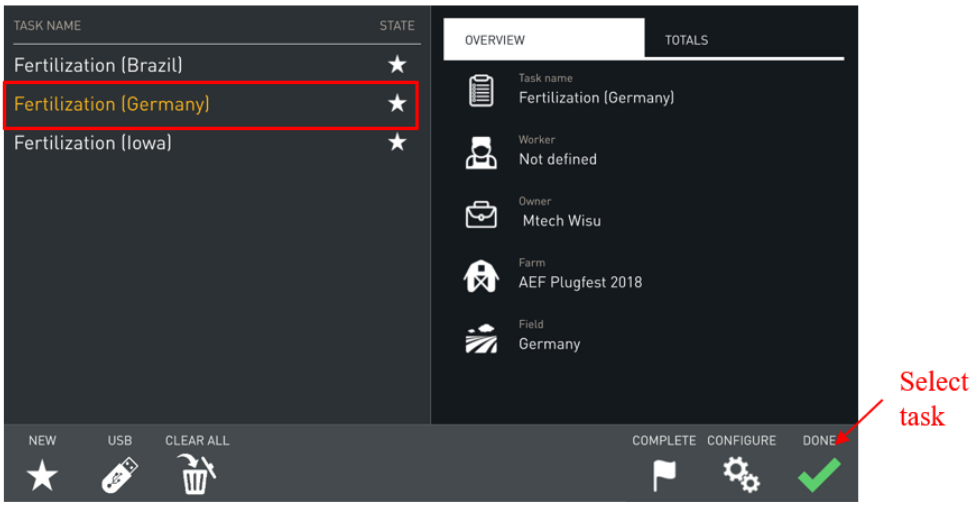
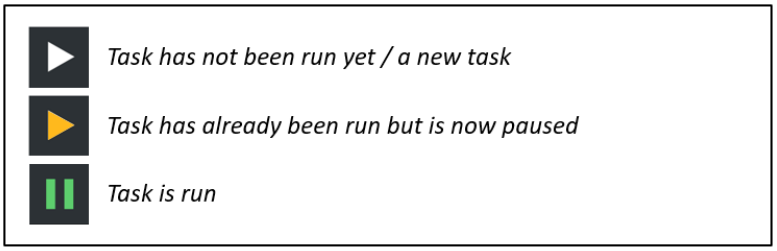


Figure 25. Select a task

The name of the selected task is now displayed at the top. The task can now be run or paused from the button in the upper left corner of the page.



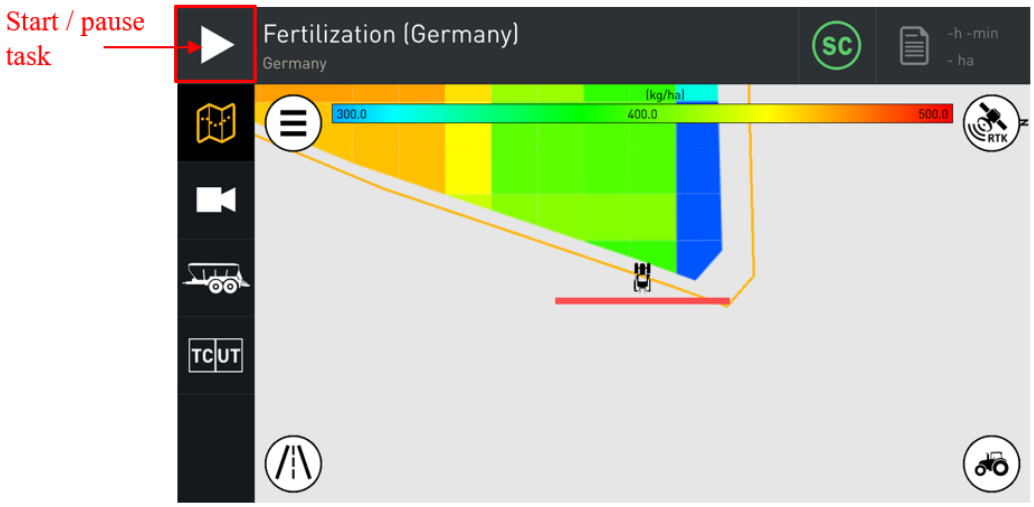


Figure 26. Run or pause a selected task

2.5. Task Totals

Task Controller (TC) collects task totals data when task is running. Task totals can be viewed from the main page by clicking the task totals button, or on the task setup page by clicking the *Totals* tab.

The task totals button shows the two largest task totals: total time and total area. Task totals are grouped for each device function.

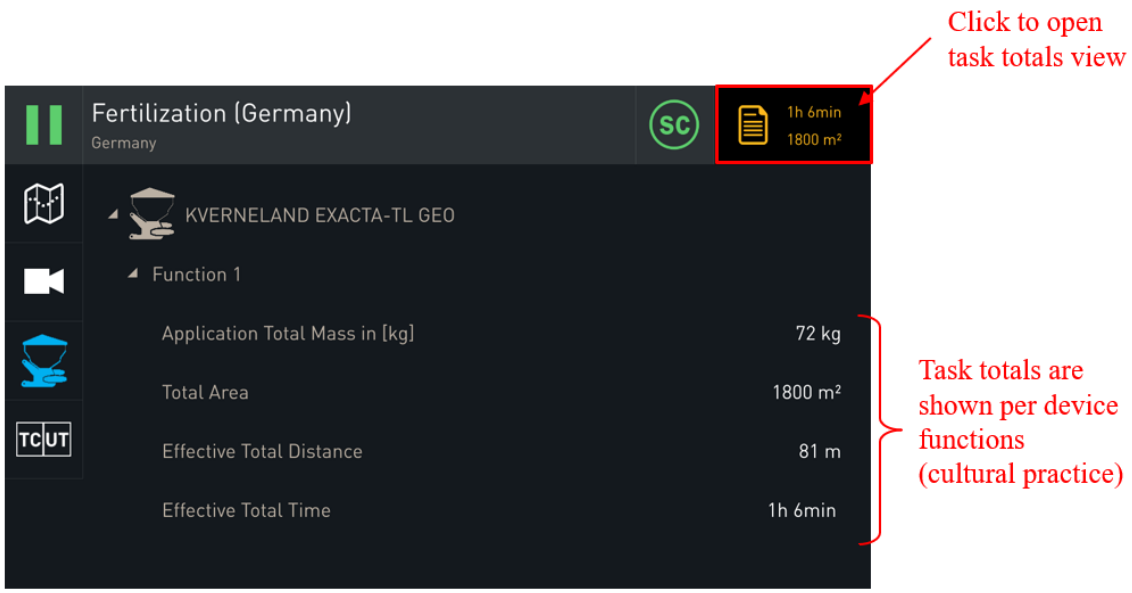


Figure 27. Task totals view from main page

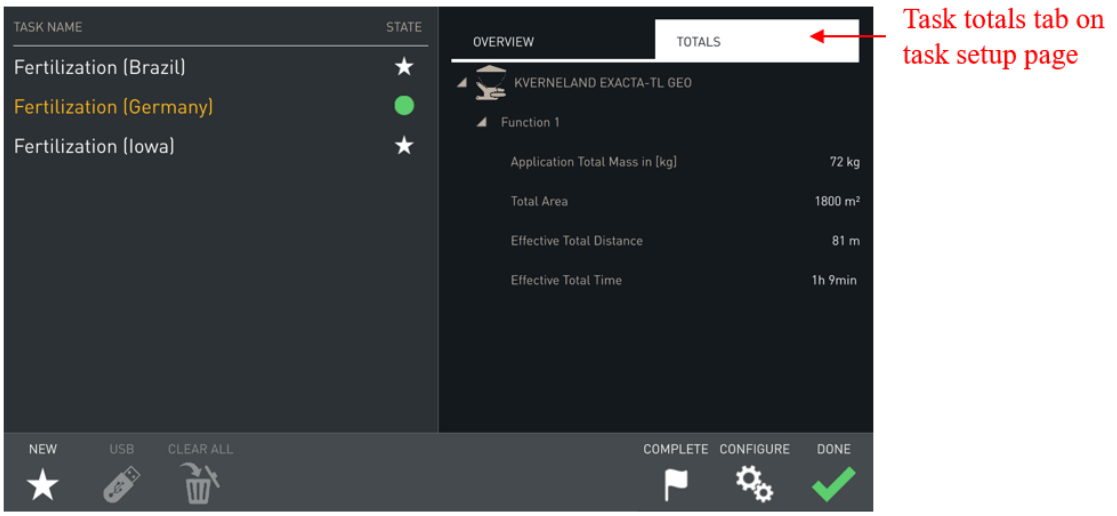


Figure 28. Task totals view on task setup page

2.6. Complete Task

The selected task can be completed on the task setup page (= the status of the task is set to completed).

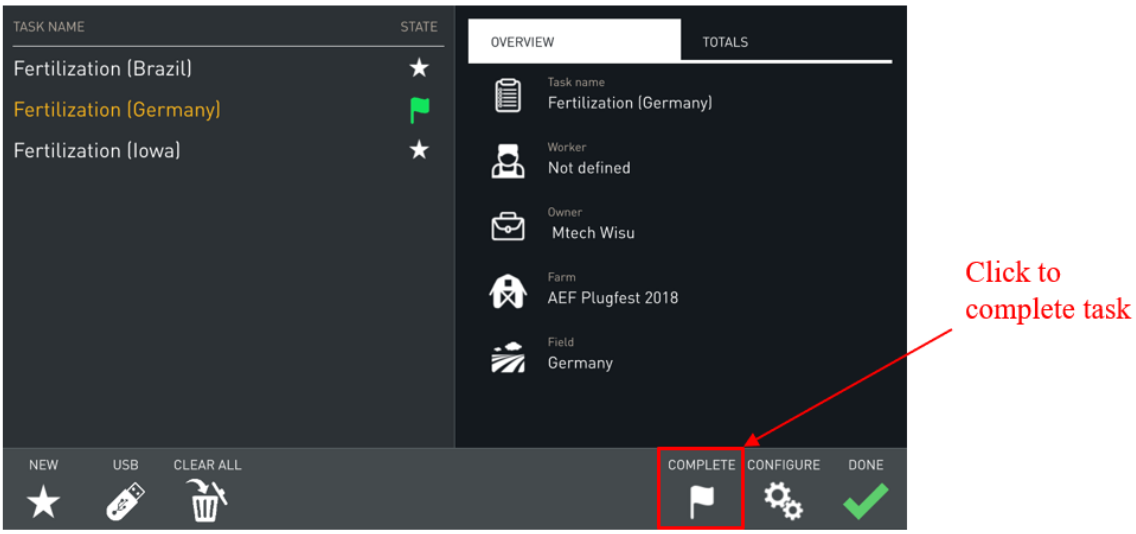


Figure 29. Complete the task

However, the completed tasks can be continued simply by running them again (= the status of the task is set to running).

2.7. Export Task

On the task setup page, click the *USB* icon to export tasks. The task import/export page also provides information on the taskdata files as well as the functionality to eject (unmount) USB media.

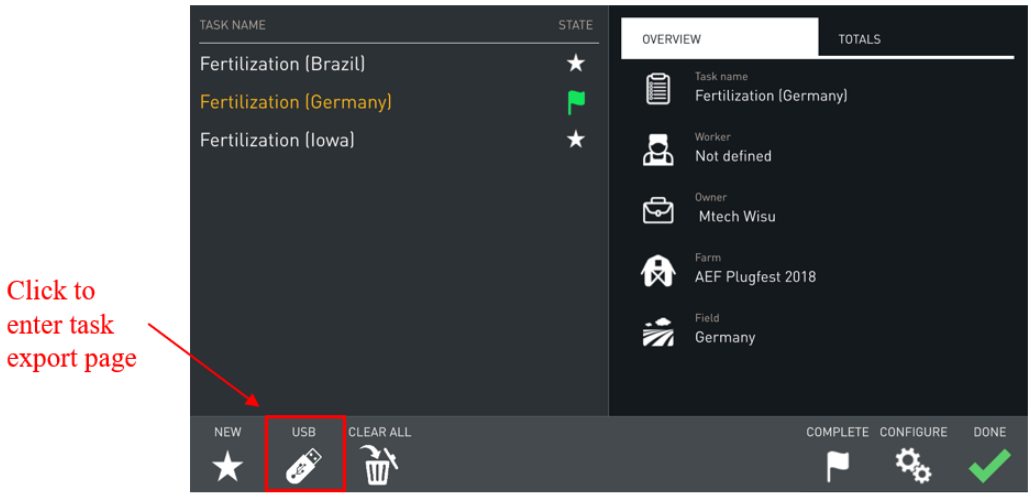


Figure 30. Enter task export page

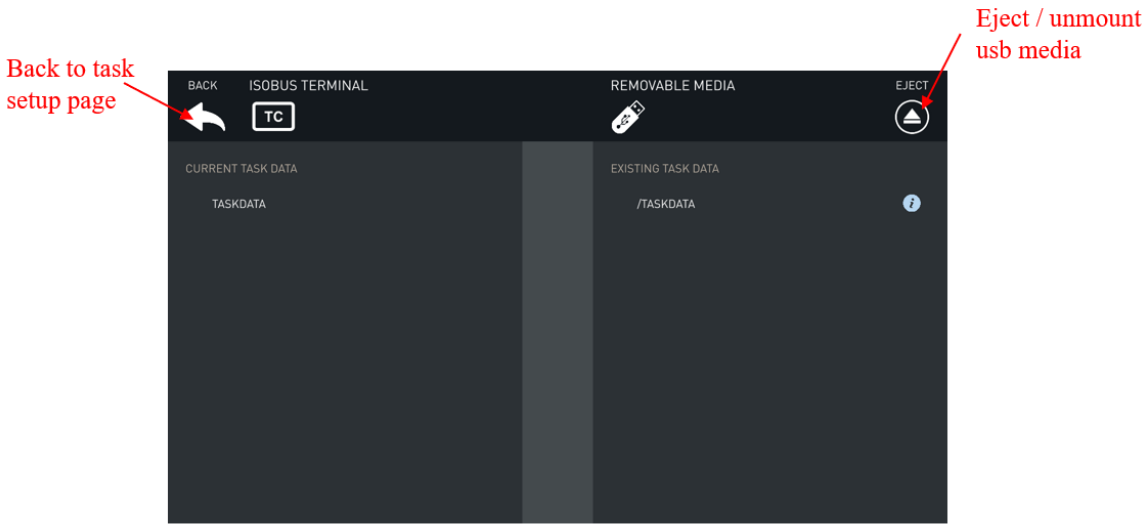


Figure 31. Task export page view

When exporting, the whole taskdata is exported. It is not possible to export an individual task from a taskdata file that contains multiple tasks. The task does not need to be marked complete in order to be exported.

Taskdata file can be exported as **default taskdata**:

- Fixed path: USB\TASKDATA\TASKDATA.xml

Taskdata file can also be exported as **custom taskdata**:

- Unique timestamped path: USB\TASKDATA_20200109_141850\TASKDATA.xml

The user interface indicates the importing or exporting state for the taskdata file with different colours as follows:

- *Exporting taskdata file can be proceeded normally*
- *Exporting taskdata file will overwrite existing taskdata file (this procedure cannot be undone)*
- *Exporting taskdata file will create a new custom file (not default)*

To export the taskdata, follow the steps described in Figure 32 - Figure 35.

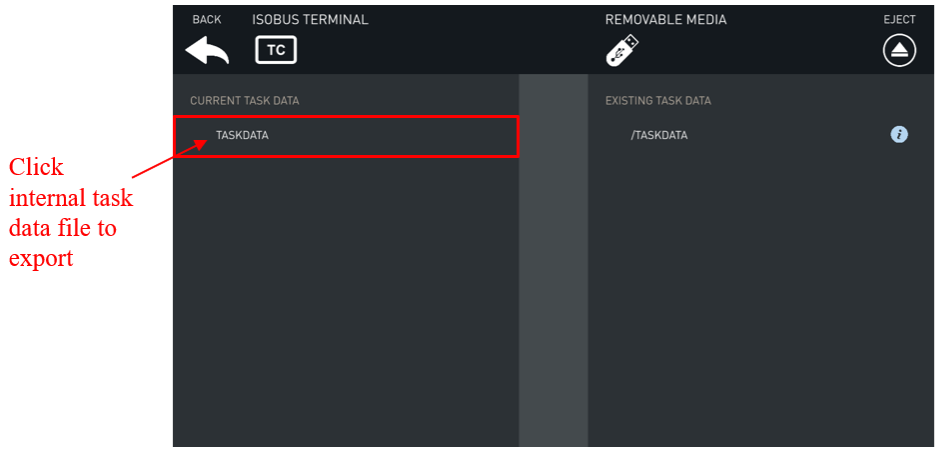


Figure 32. Export task; step 1

Figure 33. Export task; step 2

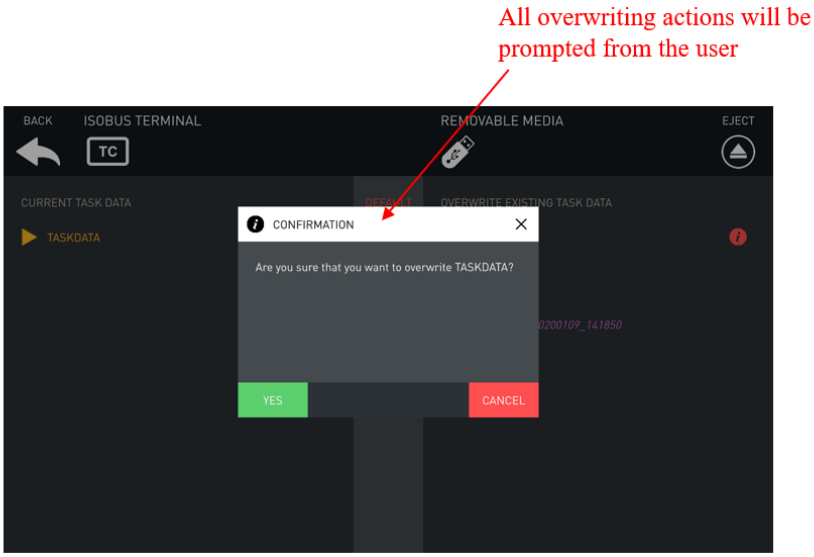


Figure 34. Export task; step 3

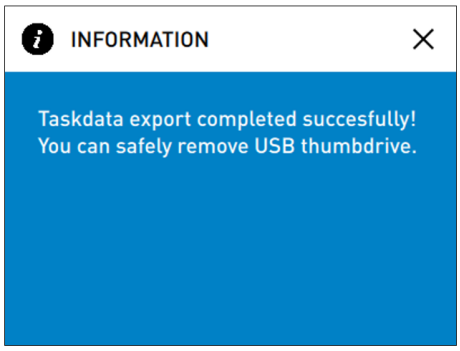


Figure 35. Export task; step 4

2.8. Eject USB Thumbdrive

If you want to eject/unmount USB thumbdrive, follow the next steps:

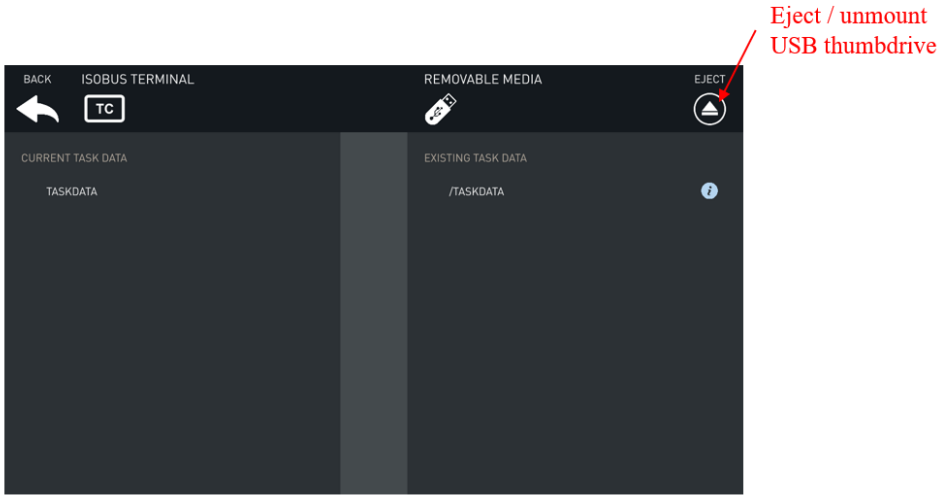


Figure 36. Export task; step 5

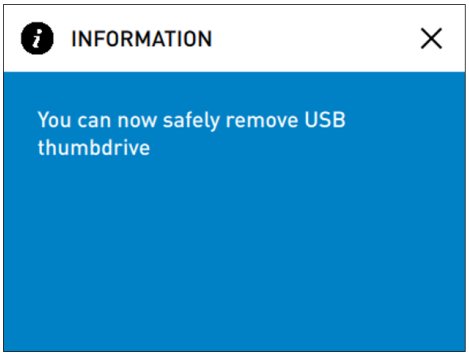


Figure 37. Export task; step 6

3. Map View

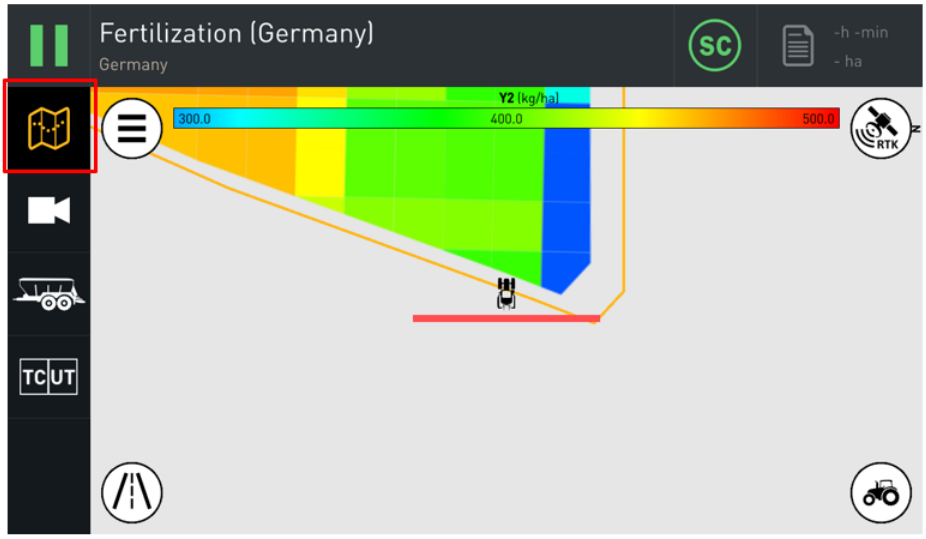


Figure 38. Map view

3.1. Map Zoom Modes

Map view provides two zoom modes that can be toggled with a button. In **field view**, the map zoom level is automatically set to fit the whole field. In field view, zoom level can be changed by using the pinch gesture. In **tractor view**, the map zoom level is fixed to show the tractor and device (including section states), and the map is always facing where the tractor is heading.

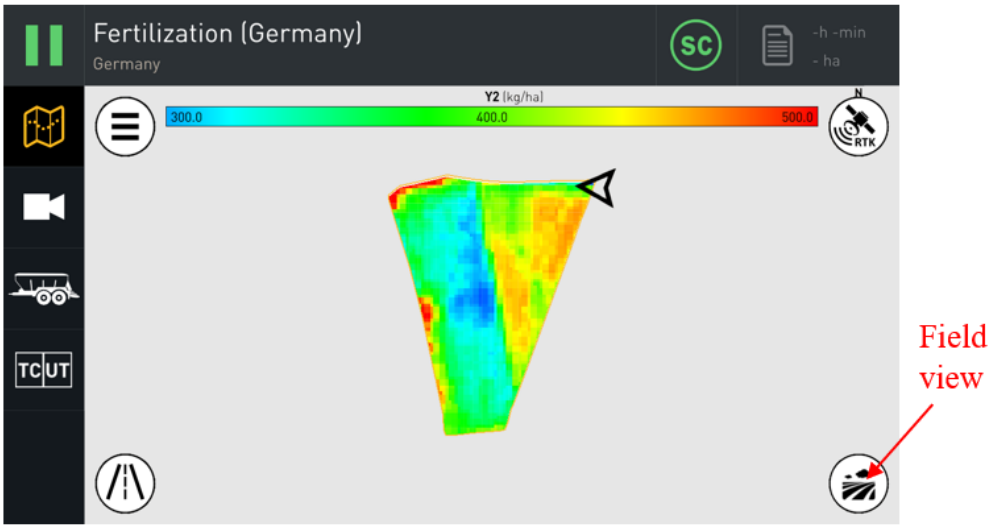


Figure 39. Field view

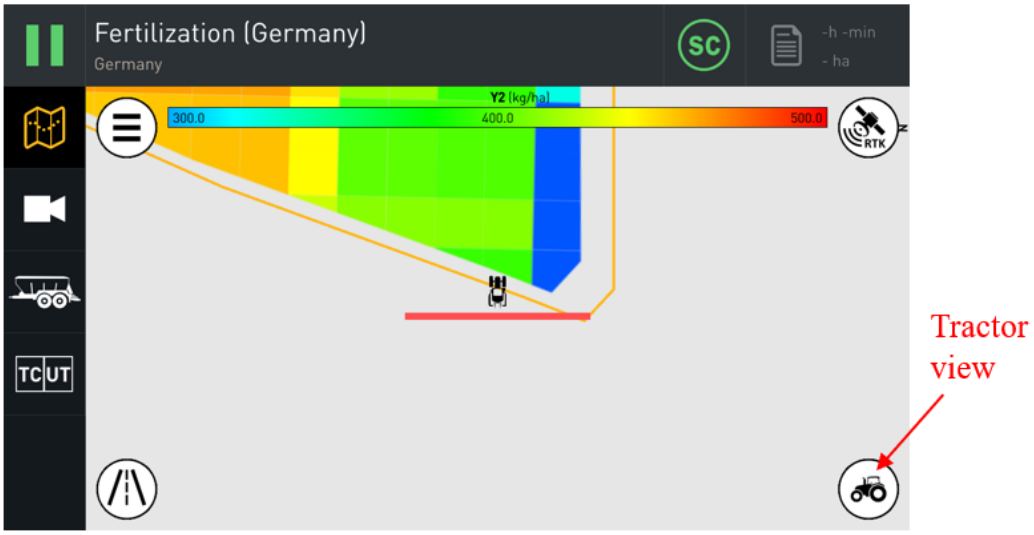


Figure 40. Tractor view

3.2. Steering Guidance

TC application provides steering guidance functionalities as a part of the map view. The guidance provides user steering correction information for a line that is aligned with calibrated A and B points. The system allows user to easily teach A and B points as well as set the working width.

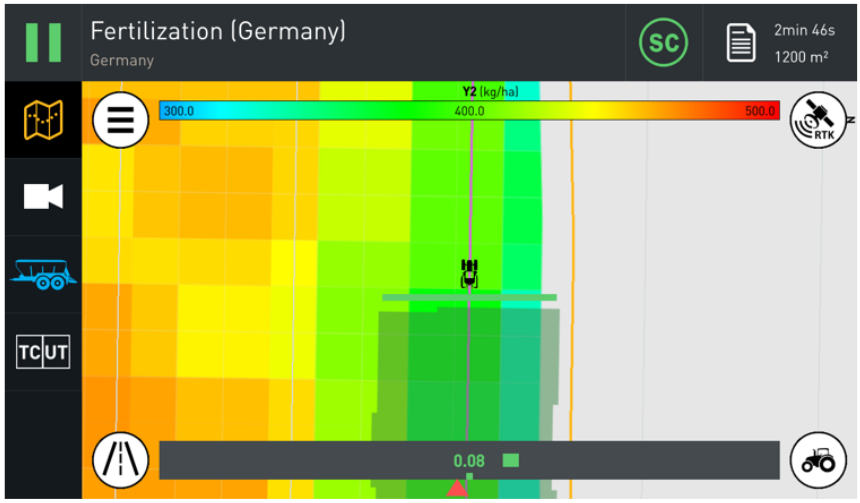


Figure 41. Steering guidance ON

3.2.1. Guidance Line Setup

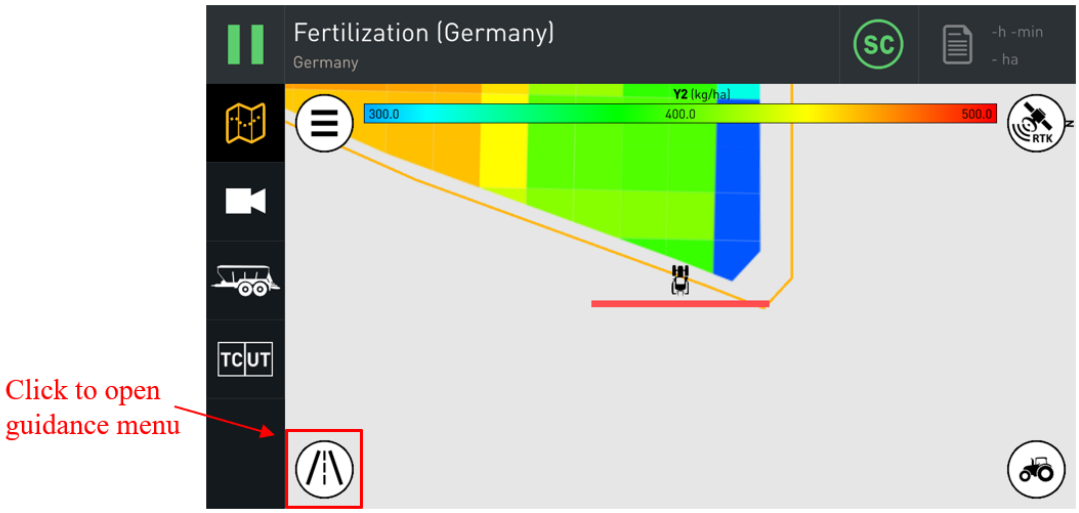
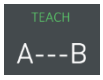


Figure 42. Enter guidance menu

Guidance menu provides the following functionalities:

= Enable / disable guidance

= Working width (distance between parallel guidance lines)



= Enter A/B line teaching

Green button text = indicates that setup is done, and parameters are acceptable

Red button text = indicates invalid or missing parameters

The texts on both buttons, *Width(m)* and *Teach*, must be green for guidance to be switched on.

Working width is automatically set by the widest device and it can be manually adjusted if needed. Working overlap can be achieved by setting the working width to a smaller value. Closing the guidance menu is done by clicking the guidance menu button or the cancel button on the right side of the menu.

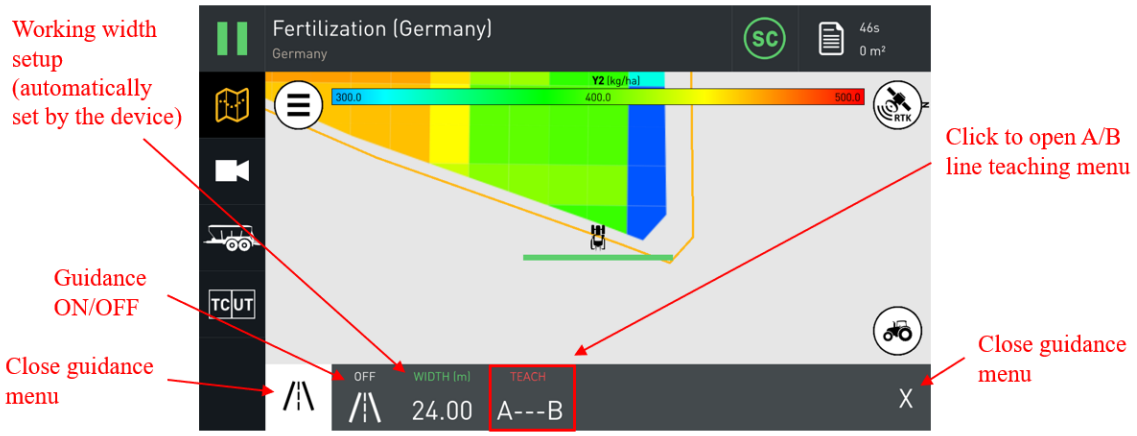


Figure 43. Guidance menu functions

3.2.2. A/B Line Teaching Mode

The guidance teaching menu provides the following functionalities:

- Start teaching (sets A-point)
- Teaching distance in metres
- End teaching (sets B-point and finishes the teaching mode)
- Cancel teaching mode

By starting the teaching all previous A/B points are cleared. The minimum distance between A and B points is 10 metres before the teaching can be completed. After successfully ending the teaching mode (both points are set), the guidance is automatically enabled.

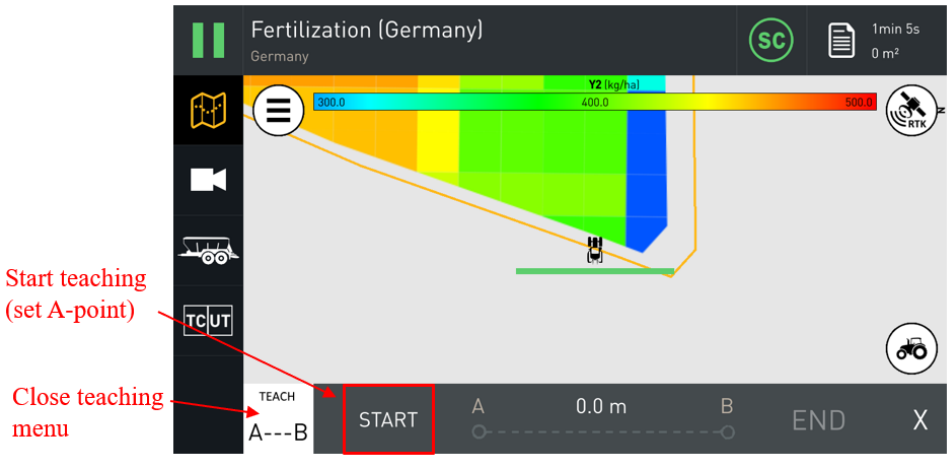


Figure 44. Start teaching

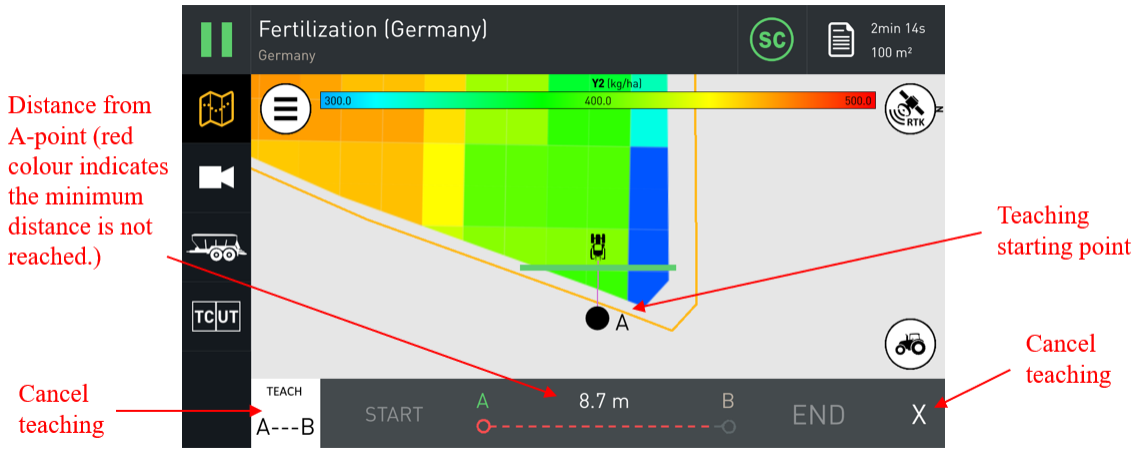


Figure 45. Teaching mode started

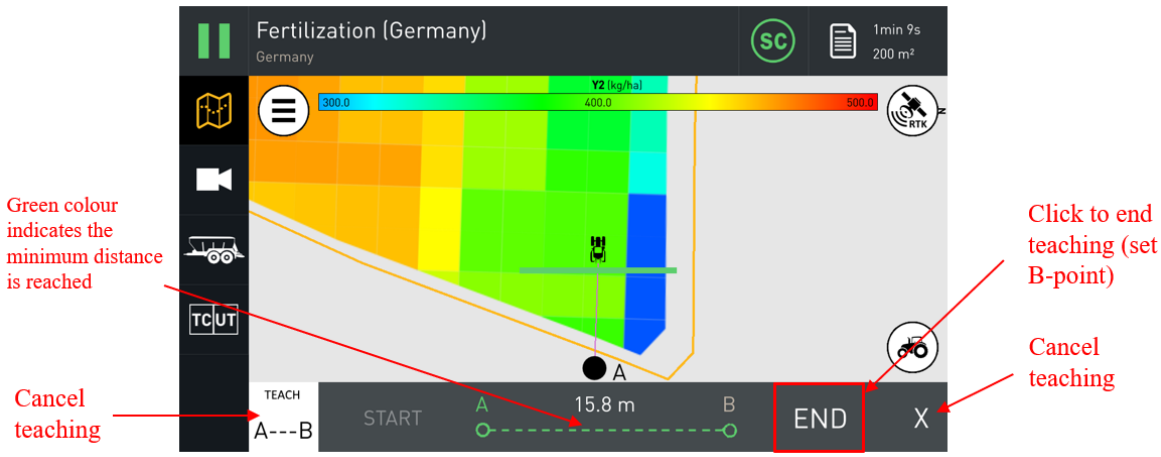


Figure 46. End teaching mode and set B-point when the distance is reached

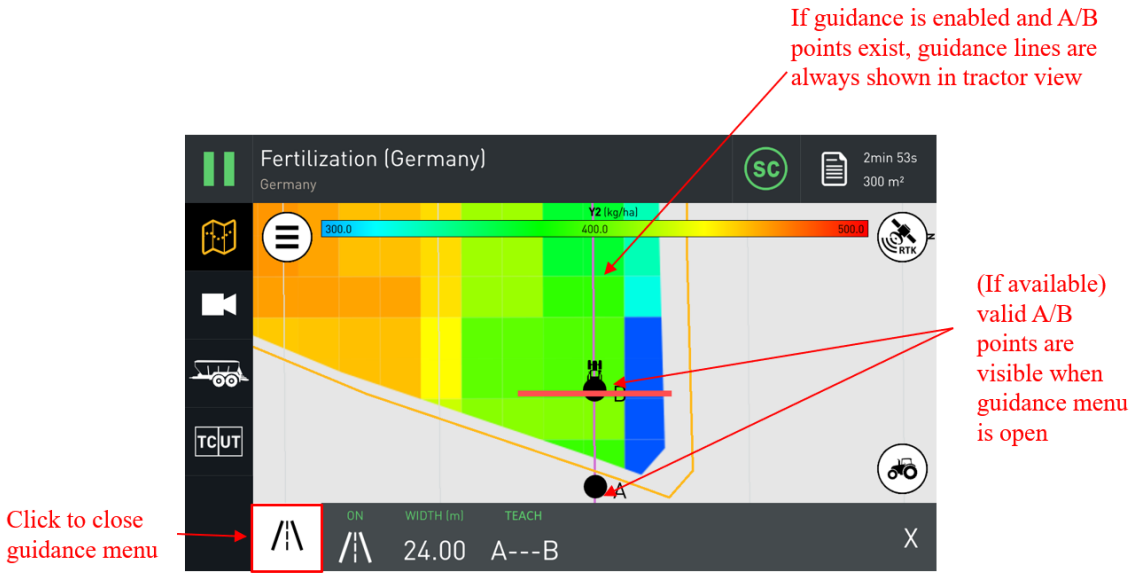


Figure 47. Teaching is completed, and guidance automatically enabled

3.2.3. Guidance Error Indicator

The guidance error indicator bar will appear on the bottom of the map view when guidance is enabled. The system sets the nearest guidance line active. New guidance lines are added laterally if necessary. The guidance error indicator bar provides the following functionalities:

- Distance from the nearest / selected guidance line (for both sides of the line)
- Tractor heading error against guidance line direction (red triangle)

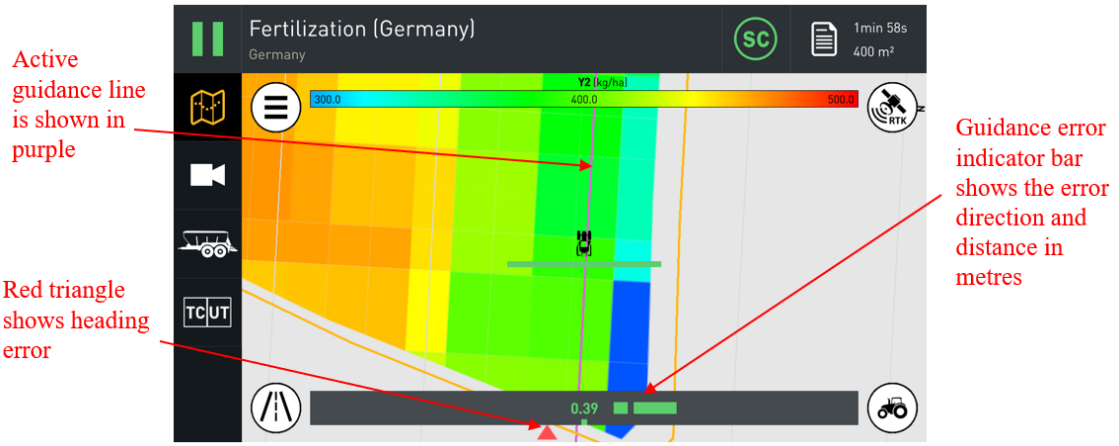


Figure 48. Guidance error indicator bar

3.3. Map Options Menu

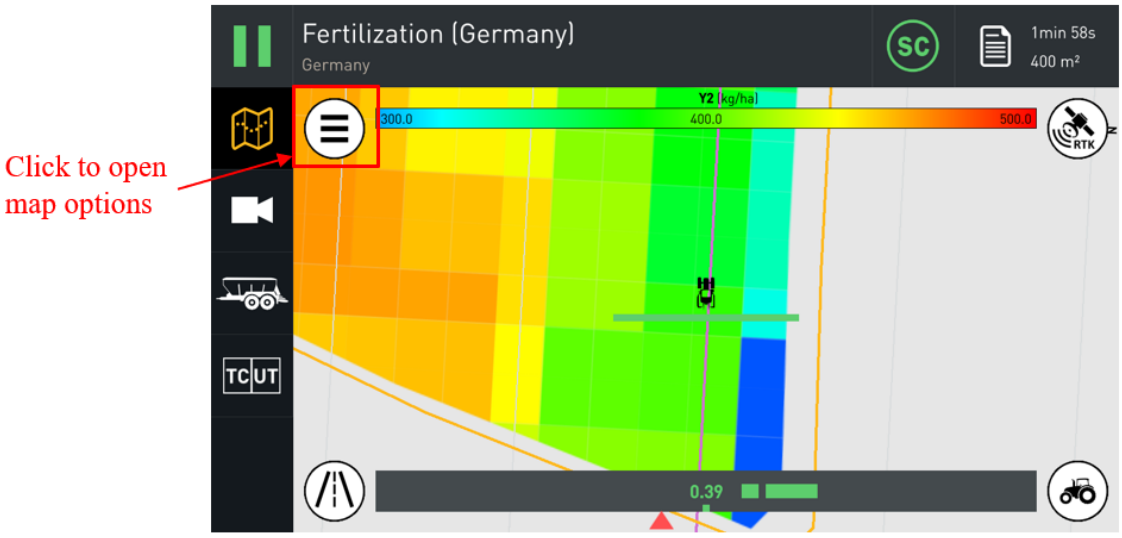


Figure 49. Enter map options menu

Map options menu provides the following functionalities:

Map rotation mode:

Map always facing north

Map facing tractor heading

Set field view focus mode:

Free focus mode = map can be panned freely

Tractor focus mode = map centered to tractor position

Map layer menu:

Show / hide guidance lines in field view (in tractor view the guidance lines are always enabled)

Show / hide field boundaries

Show / hide device function coverage map layer (only one device function coverage map can be selected at a time)

Show / hide variable rate map layer (only one variable rate map layer can be selected at a time)

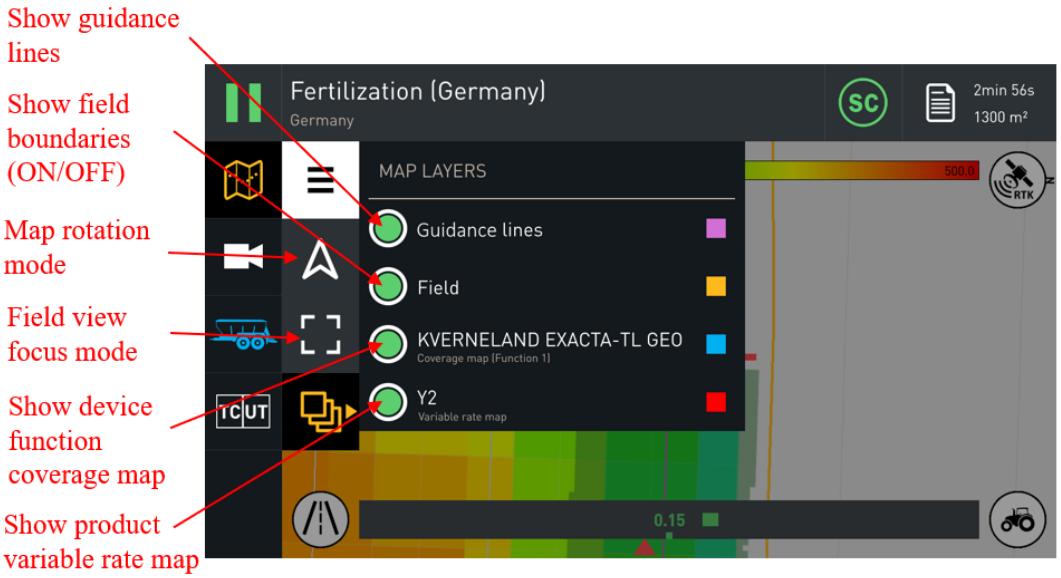


Figure 50. Map layers setup

3.3.1. Variable Rate Map

If the device has multiple functions and product assignments are automatic, all variable rate maps for device functions are shown in the map layers list. User can select which variable rate map is shown in the map view.

Figure 51. Map layers list with multiple variable rate maps

3.3.2. Coverage Map

The coverage map is an area of field that has already been processed by the device. The selected coverage map device is highlighted with colour blue. The device coverage map is rendered with a semi-transparent layer.

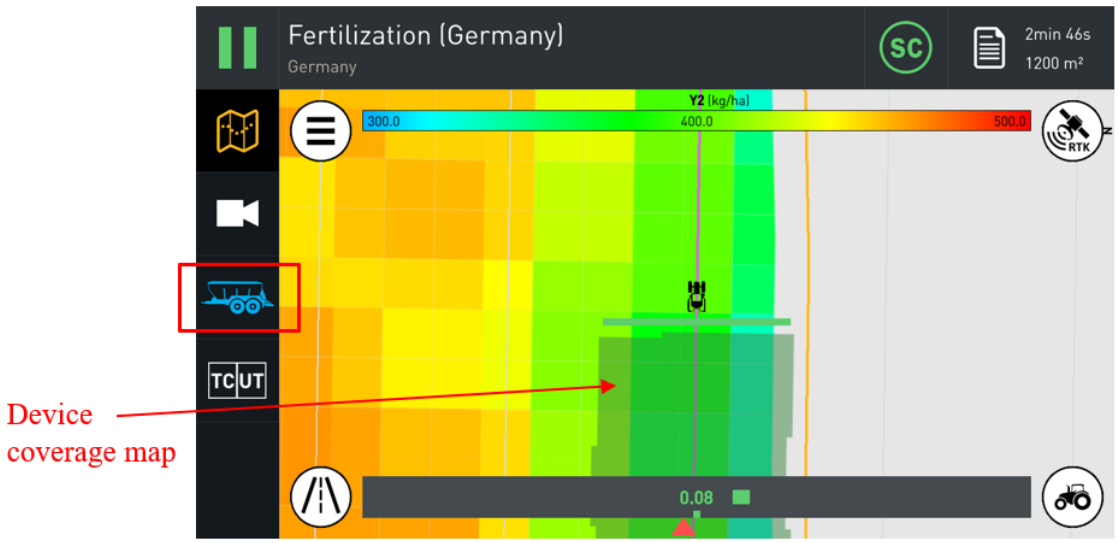


Figure 52. Device coverage map

Each function of the device can have its own coverage map, which can be chosen from the *map options* menu. Only one coverage map can be chosen at a time.

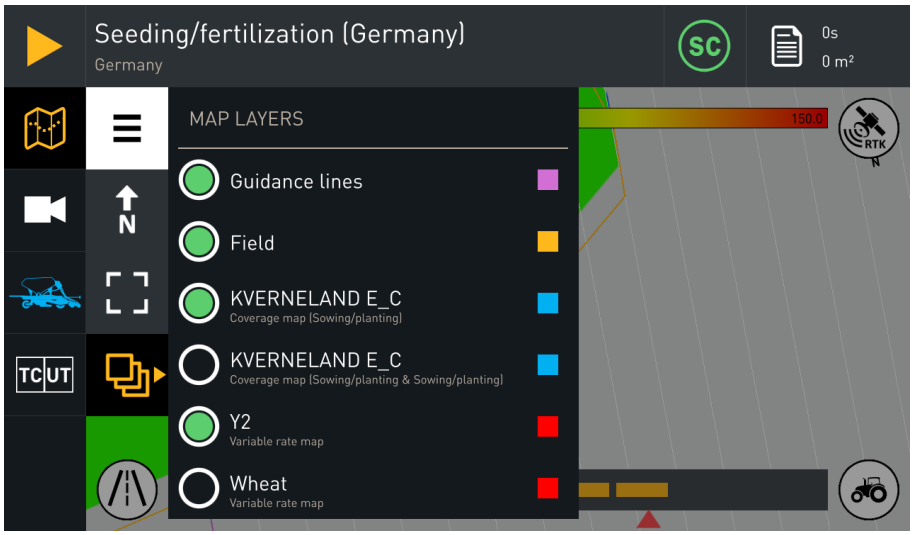


Figure 53. Each function can have its own coverage map

3.4. GPS Information

Figure. GPS information view

The GPS button indicates the map's north direction with an 'N'-character that rotates around the button.

The GPS button icon changes according to correction mode. By clicking the GPS button on the map view, a pop-up window opens with the following information:

- Current coordinates, altitude and heading
- Machine direction and number of satellites
- Accuracy (precision dilution positional/precision dilution horizontal)
- Correction mode: DGPS, GNSS, No GNSS, RTK, RTK+, Precise, Error

	DGPS
	GNSS
	No GNSS / Error
	RTK / RTK+ / Precise

4. Section Control

ISOBUS Task Controller (TC) has an *SC* button in the top bar of the main page to enable or disable Section Control.

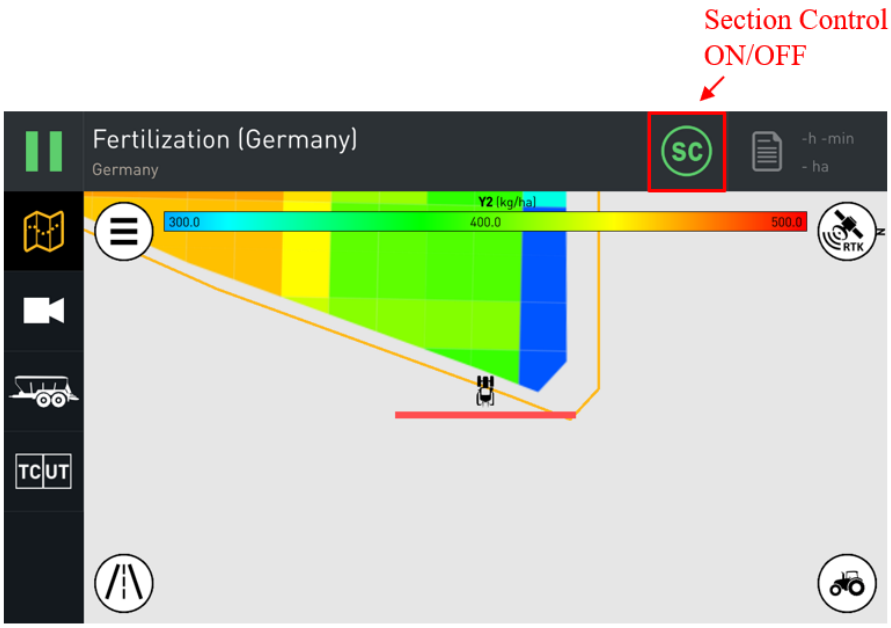


Figure 54. Turn Section Control ON or OFF

In the ISOBUS Task Controller (TC), the field is defined as a polygon. In fact, this field is internally divided into a grid. Each cell in the grid stores data if any work has been done in the cell (if the device has applied product to the cell).

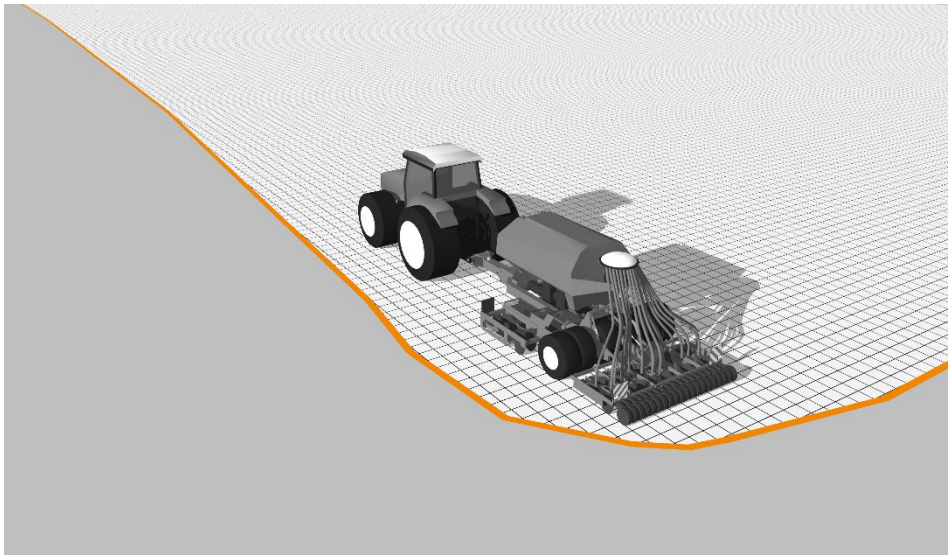


Figure 55. The field is defined as a polygon with a grid inside

The structure of the device can be defined with sections. The size and position related to the implement is defined for each section. A section is typically capable of applying the product independent of other sections. Parker ISOBUS TC supports up to 64 sections per each function.

With accurate position information, ISOBUS Task Controller is capable of computing the positions of each section in relation to the field cells. When a section applies the product, all overlapping field cells are marked as ’product applied’.

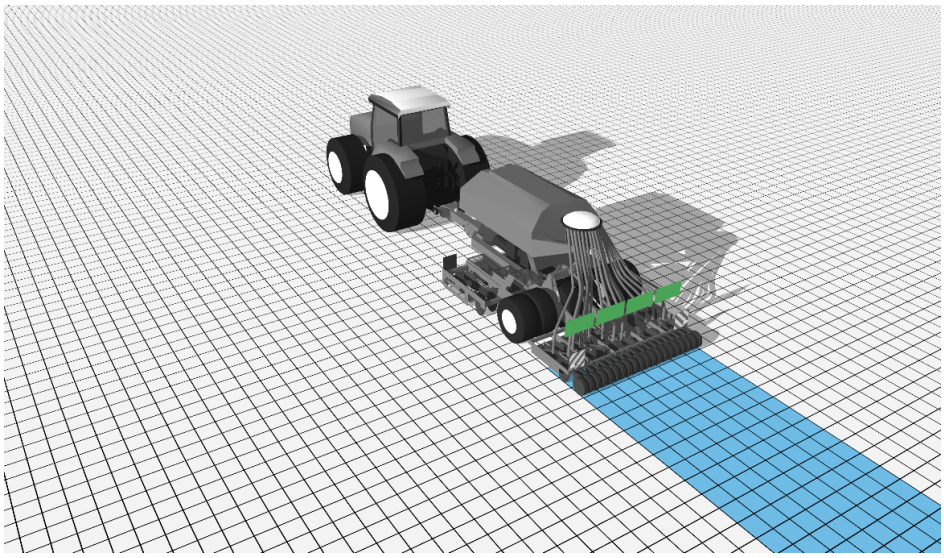


Figure 56. The field cells in the grid are marked when the product is applied

When the device is working on the area where field cells are already marked as ’product applied’, Task Controller will automatically turn overlapping sections off to prevent product being applied twice on the same area.

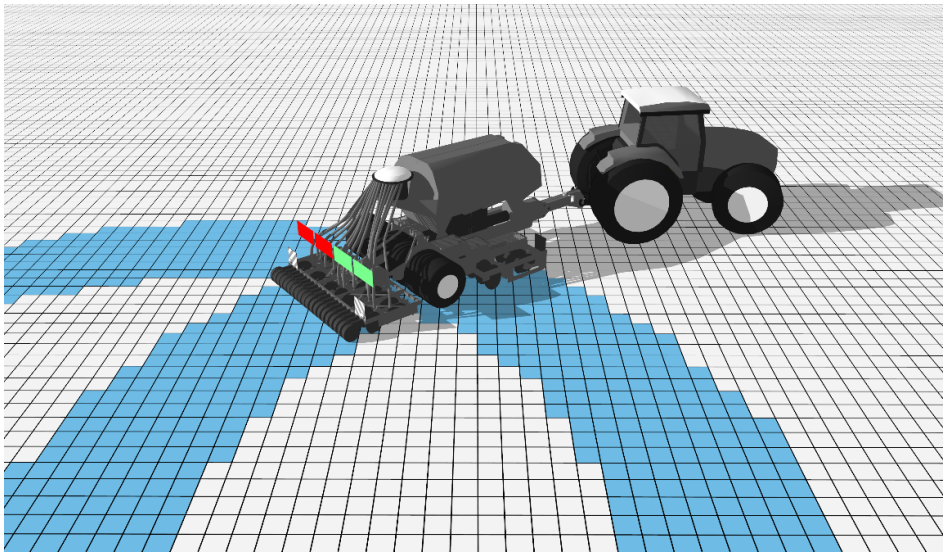
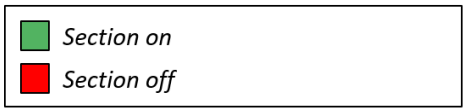


Figure 57. The overlapping device sections are automatically switched off

In the map view and in tractor zoom mode, the state of the device sections is visualized:



Areas or cells where the product is applied are shown in the colour **blue**. These blue cells are called the Coverage Map (see the chapter Coverage Map).

5. Device Information

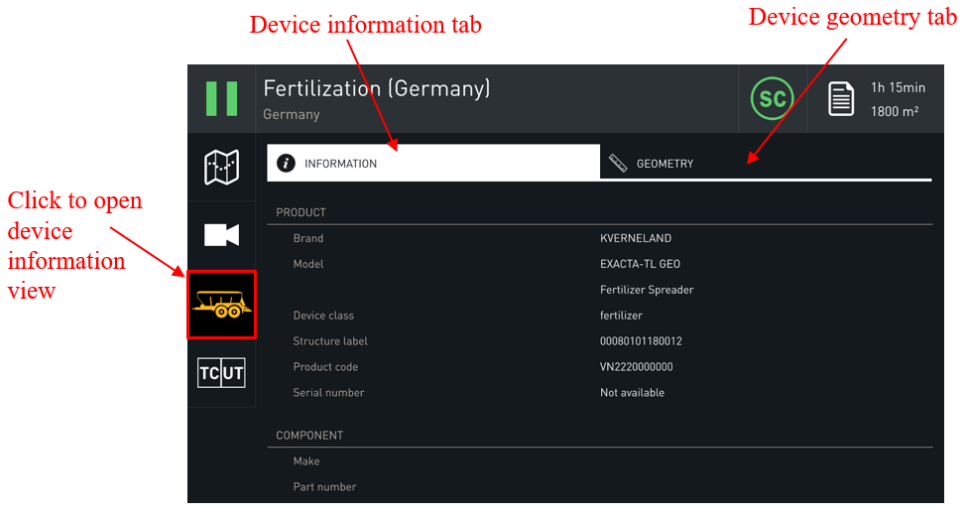


Figure 58. Device information view

Each connected device will have a button on the main page controls bar. By clicking the button, the device information view opens, including two tabs: *Information* and *Geometry*.

Device information shows the details for the product, component, ECU and software information.

Device geometry shows total width and length, connector and sections distance from navigation reference point, and sections state.

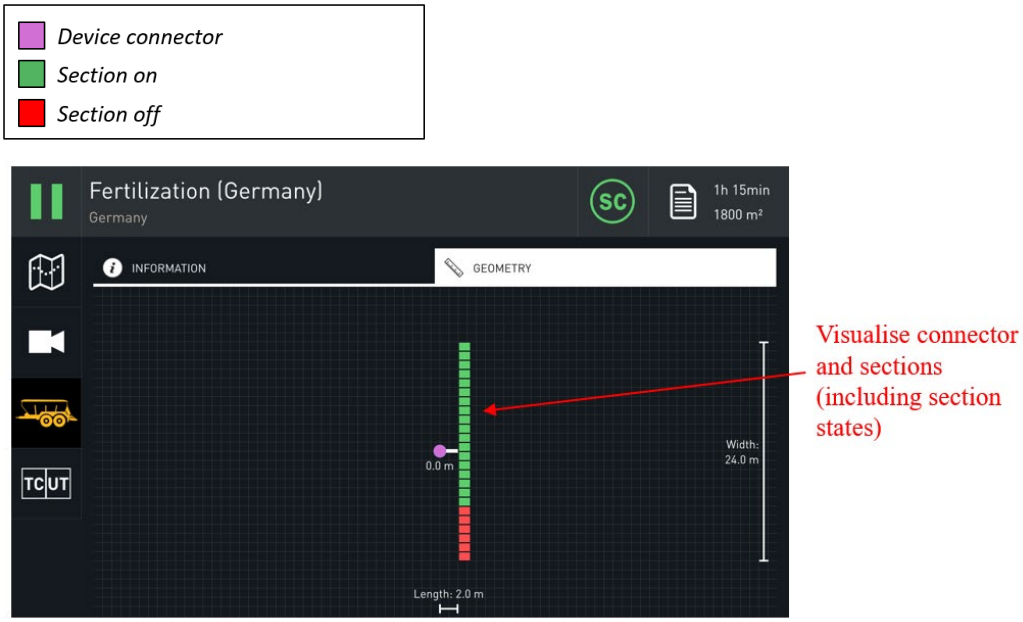


Figure 59. Device geometry view

6. Camera View

Figure 60. Camera view

The Task Controller (TC) provides an integrated camera view which can be accessed by clicking the camera button on the main page controls bar.

The camera view provides the following functionalities:

- camera channel selection
- automatic reverse camera mode, which means that camera view is automatically shown on the screen when tractor is reversing.

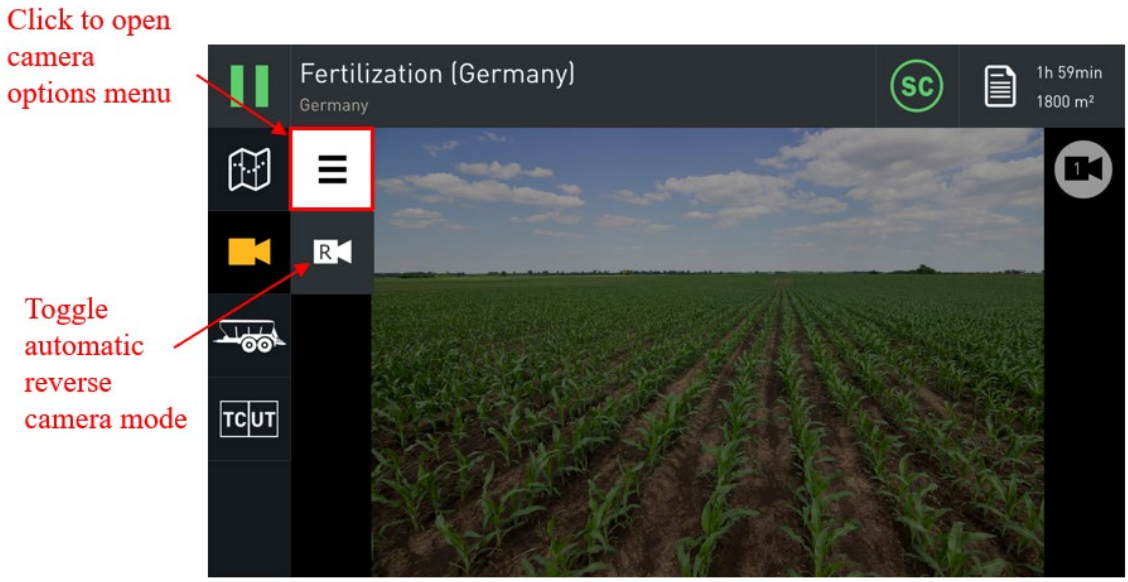


Figure 61. Camera options menu

7. View Options for Pro Display

7.1. Split Screen

The screen view can be split between Task Controller (TC) and Universal Terminal (UT) by clicking the split screen button on the main page.

The split ratio is 2/3 for TC and 1/3 for UT, but the split ratio can be optionally adjusted from another app.

The split screen button icon indicates the state with color (green = split is active).

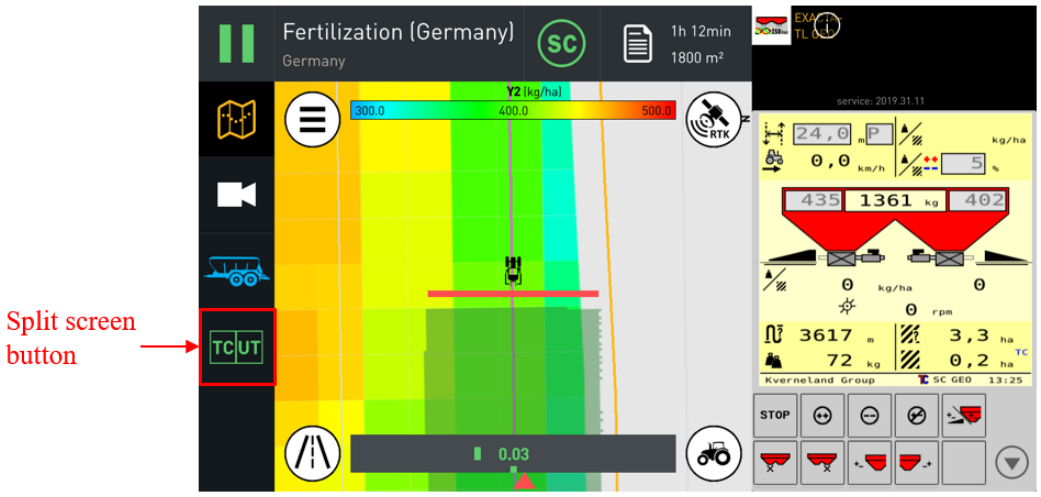


Figure 62. Split screen view with TC and UT

7.2. Portrait Mode

Pro Display can be used in both landscape and portrait mode. Portrait mode is also supported by ISOBUS Task Controller (TC) and Universal Terminal (UT) applications.

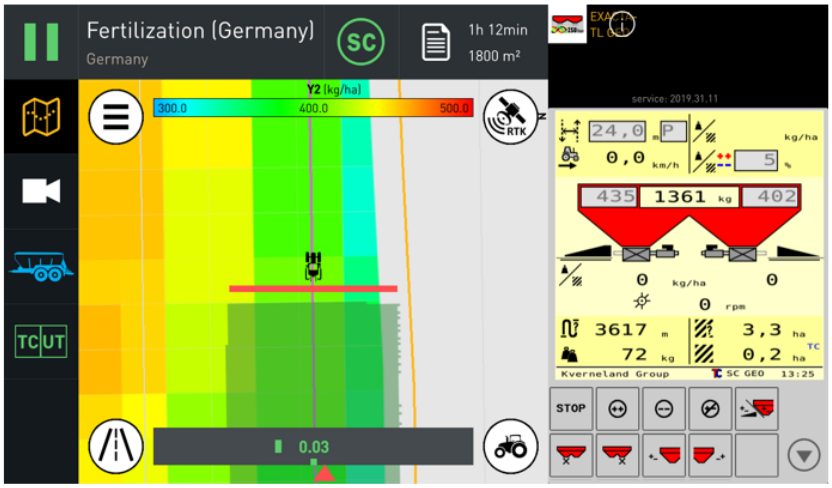


Figure 63. Split screen view with TC and UT in landscape mode

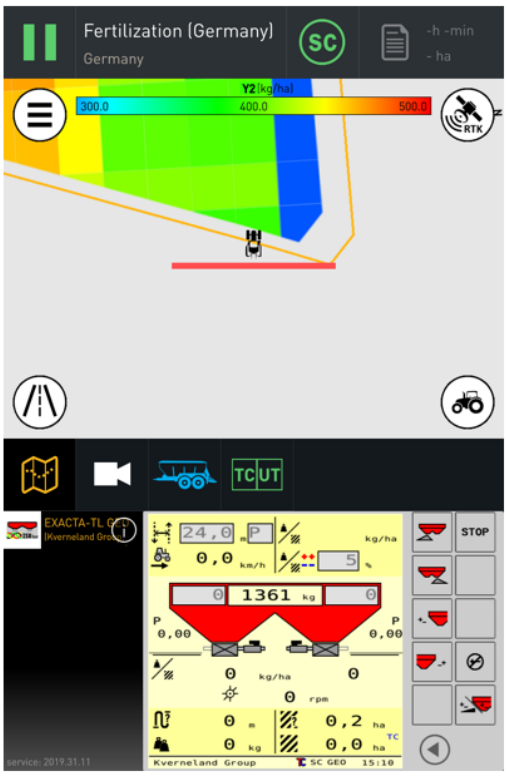


Figure 64. Split screen view with TC and UT in portrait mode

8. Power and Shutting Down the System

The Pro Display Settings app provides the system power control functionality and this needs to be enabled (see below).

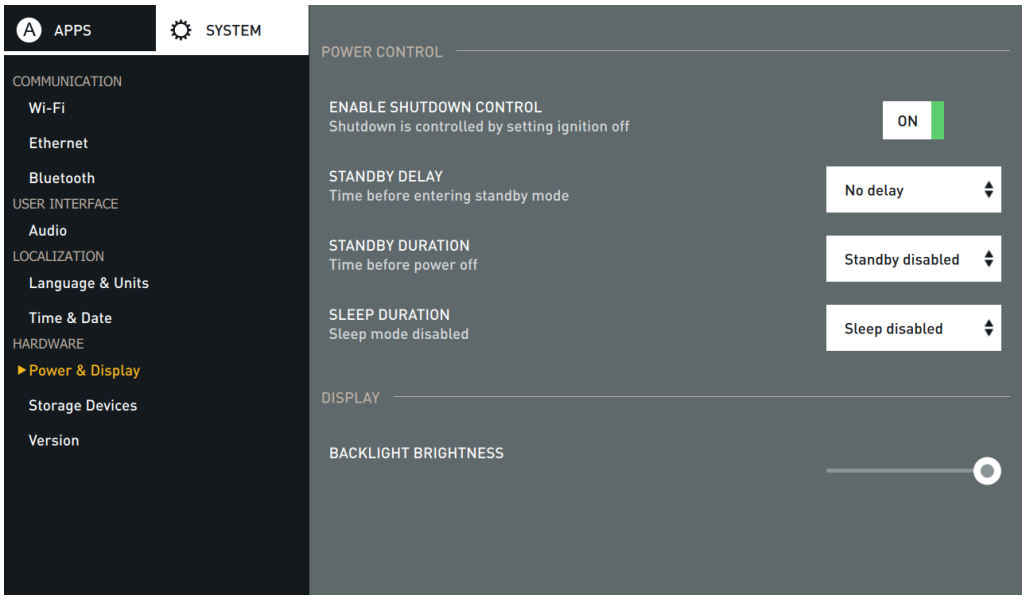


Figure 65. Pro Display power control settings

The Pro Display / ISOBUS Suite app is intended to be connected to an ISOBUS machine compatible tractor with 9-pin in-cab harness. An ISOBUS compatible tractor typically has this connector available in the cabin.

The Pro Display wire harness for the 9-pin in-cab connector should include an extra power switch. The 9-pin in-cab connector ECU power pin (controlled by Tractor ECU) should be routed to Pro Display C1-connector C1:12 pin (+VBATT) as well as through an extra power switch to C1:6 pin (ignition input).

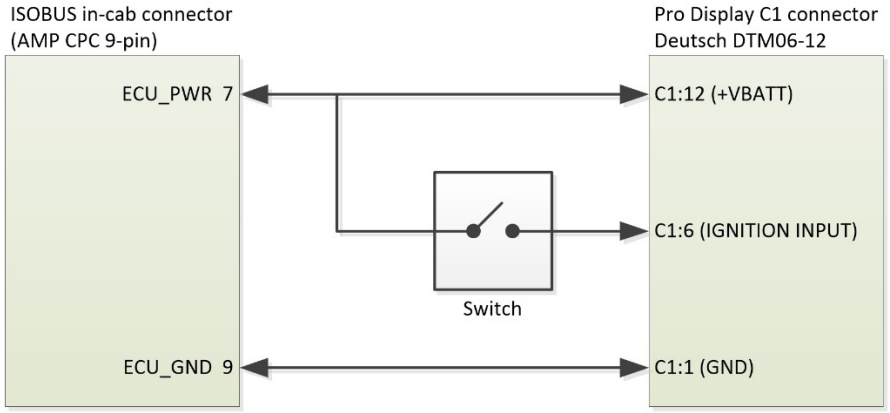


Figure 66. Pro Display wire harness for ISOBUS in-cab connector

The Pro Display ISOBUS Suite supports ISOBUS power management commands. ISOBUS compatible tractor ECU provides ignition key state on ISOBUS and if the ignition key is switched off, the ISOBUS power is shutdown in 2 seconds unless an some ISOBUS device requests for the power to remain ON for another 2 seconds. Pro Display will send this request to maintain power until it is shut down manually from the in-cab harness ignition key switch. Note that sleep mode is not supported with ISOBUS compatible tractors.

For other machines (for example combine harvester) Pro Display should be connected normally as defined in Pro Display instruction book (*Document ref.: Pro Display 10" MSG17-4020IB/UK, Pro Display 12" MSG17-4022IB/UK*).

When ISOBUS Task Controller (TC) is shutting down, the following user settings are saved to persistent memory:

- Section control state
- Camera channel and automatic reverse camera mode
- Split screen mode
- Map layer (guidance lines and field boundaries)
- Selected task
- Guidance A/B points, working width and guidance enabled.