CROPLANDS

USER MANUAL
ISOBUS FOR WEED-IT QUADRO

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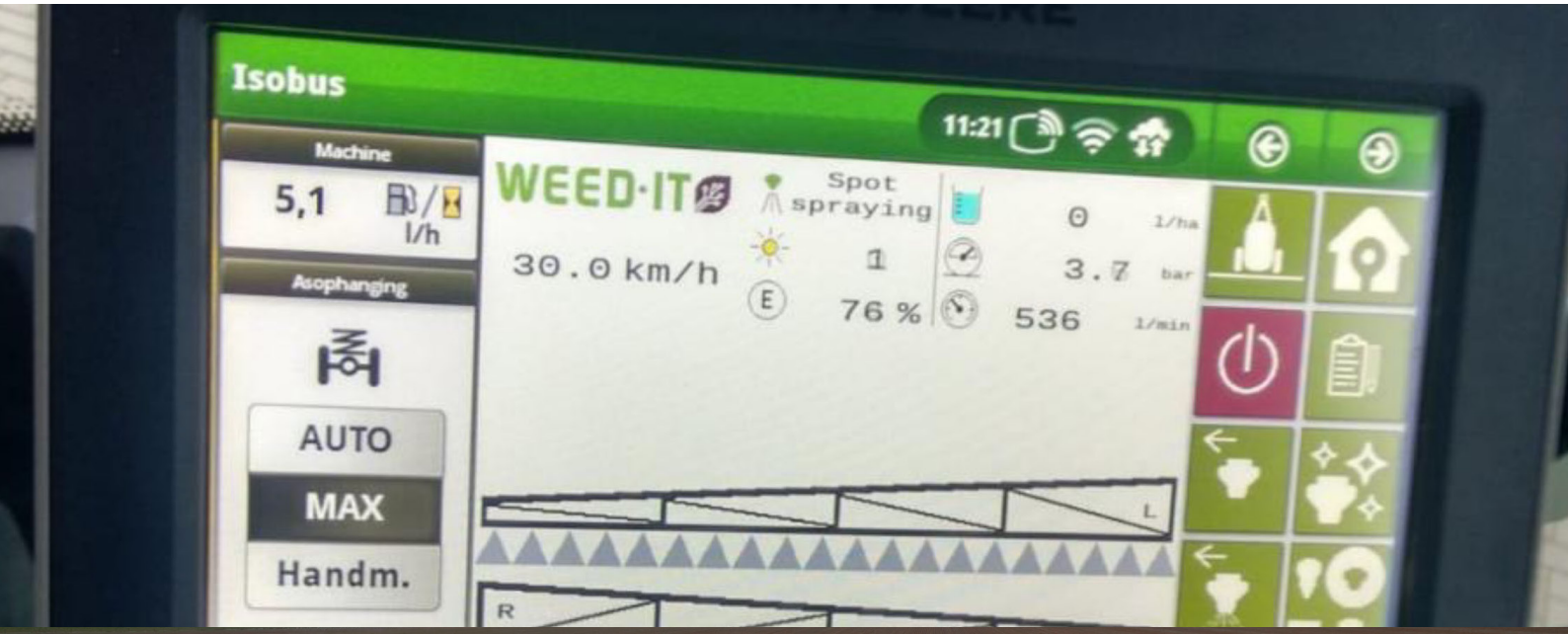
FOR WEED-IT DISTRIBUTORS



BT-OMWEEDQ-ISO

WEED·IT
precision spraying

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Patented and patents pending

Disclaimer

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Without prejudice.

Original instructions
Subject to change without prior notice. This “Rometron ISOBUS user manual for WEED-IT Quadro” was last updated: December 2021

Table of contents

1. Introduction

This document provides information on the user interface of WEED-IT Quadro systems with ISOBUS. Instead of the WEED-IT Quadro user console, your own ISOBUS compatible terminal/display in the cabin can be used to operate the WEED-IT. The user interface is very similar to the WEED-IT Quadro user console and supports touch screen functionalities. The ISOBUS application consists of a Universal Terminal (UT) and Task Controller (TC). The UT enables the operation of the WEED-IT via the terminal in the cab of the tractor or Self-Propelled Sprayer (SP). Task Control (TC) is the function of ISOBUS where data is shared between the terminal in the cab and the WEED-IT to automate tasks, like section control and rate logging.

This 'ISOBUS user manual' is a compact manual in which only the functionalities and control of the WEED-IT via ISOBUS are explained. Please refer to the 'WEED-IT Quadro User Manual' for a detailed description about all parts of the WEED-IT system!

2. Requirements

The minimum firmware requirements to be able to use the WEED-IT in combination with ISOBUS are stated in the following table:

Device	Firmware version	Date version
BodoQuadro detection sensor	V3.46	07-10-2021
GreedoX user console	V4.16	07-10-2021
Orbus power converter	V1.06	07-10-2020

Updating the devices to the described firmware versions need to be done using special updating tools. Please refer to the 'WEED-IT Quadro Update Manual' for more information about the tools and information on the updates!

Besides the firmware, new hardware components are required to enable ISOBUS compatibility with WEED-IT.

Partnumber	Description
Wi47006000	EPEC 3610 Control Unit
Wi47002286	OR10.1, External power switch kit, incl. relay
Wi47006100	IB1, ISOBUS in-cab cable, standard
	OR
Wi47006125	IB2, ISOBUS out-cab cable, standard

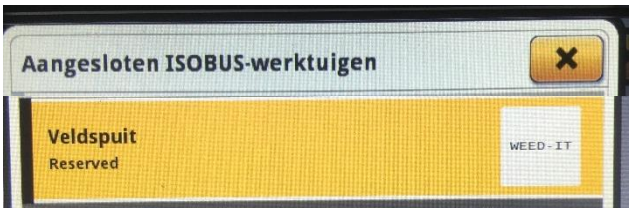
Your WEED-IT distributor or dealer should have installed the required firmware and hardware to enable the ISOBUS functionality.

3. Universal Terminal

All user menu functionalities of the WEED-IT can be controlled via the *Universal Terminal* (UT). The UT needs to be activated on your connected terminal. It differs between terminal brands how the UT is implemented. Some brands made the option to split the screen on the terminal in half for the UT and half for the standard interface.

To open the UT, click on the UT button on the ISO terminal. The design and position of this button is different between brands. Examples:

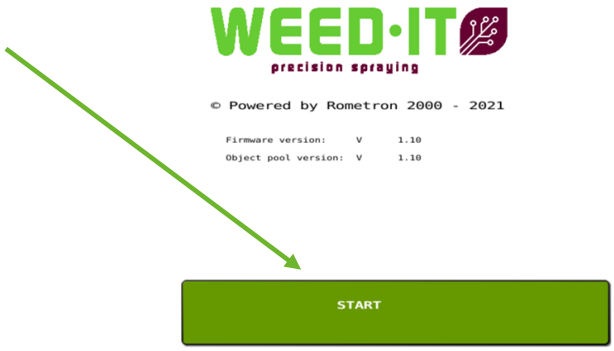
or



4. Switching the WEED-IT On / Off via ISOBUS

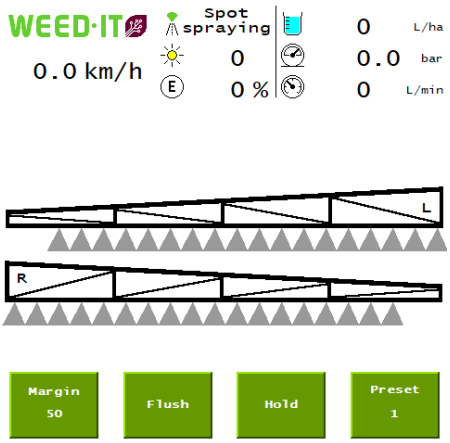
4.1 Start the WEED-IT via ISOBUS

The WEED-IT can be switched on using the Universal Terminal. By clicking on the *START* button, the ECU (Electronic Control Unit) will start sending a 12V power signal to the I/O relay in the Power Converter. On his turn, the relay switches on the power to the power converter and thereby the complete WEED-IT system starts.



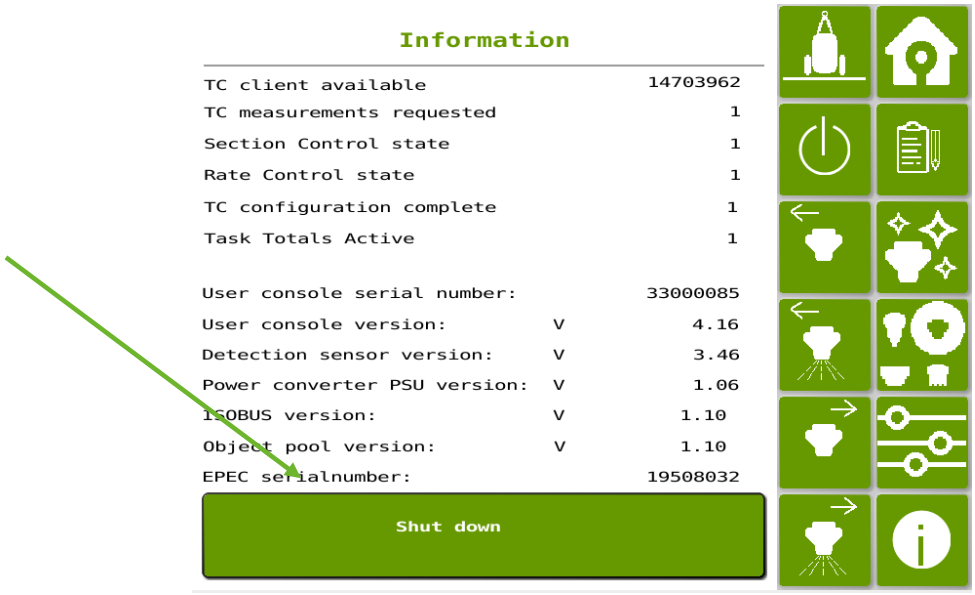
It takes approximately 10 seconds before the WEED-IT console is started. During this time, the WEED-IT ECU and the WEED-IT console exchange data, like the number of connected sensors, the selected spray mode and nozzle, the selected preset and the selected margin.

After the data is exchanged, the main menu of ISOBUS opens:



4.2 Shut down the WEED-IT via ISOBUS

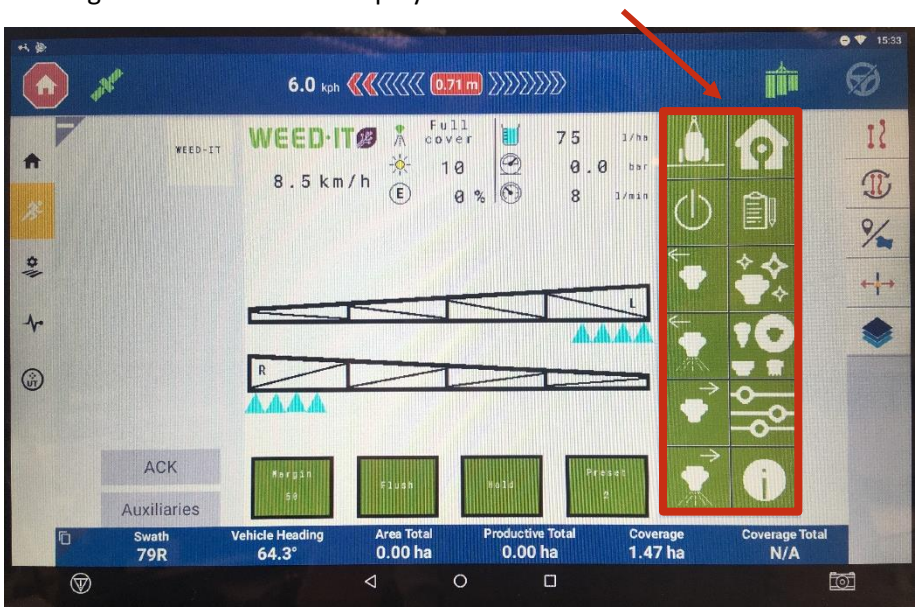
To switch the WEED-IT off, open the *Information* menu by pressing the softkey along the side of the screen and then press the *Shut down* button to switch the WEED-IT off. The *Shut down* button stops the 12V power signal between the ECU and the I/O relay and thereby the WEED-IT turns off.



5. Softkeys

Softkeys are on-screen buttons which are visible at the sides of the UT by default, but the positioning can be configured in the settings of the terminal. They are divided in two groups: one column for the navigation between menu's and one column for the operation of the TC. The softkeys are visible in all menu's, except for the *Start menu*.

The image below shows the *main* menu on a terminal that uses a layout with two columns of softkeys on the right-hand side on the display.



5.1 Navigation softkeys

The first group of softkeys is used to navigate through the different menu's.

	**Softkey A1**	Navigate to the *main* menu (similar to the main menu of the WEED-IT console).
	**Softkey A2**	Navigate to the *Field data* menu (similar to menu 103 of the WEED-IT console).
	**Softkey A3**	Navigate to the *Nozzle cleaning* menu (similar to menu 102 of the WEED-IT console).
	**Softkey A4**	Navigate to the *Nozzle selection* menu (similar to menu 104 of the WEED-IT console).
	**Softkey A5**	Navigate to the *Settings* menu (similar to menu's 150-153 of the WEED-IT console).
	**Softkey A6**	Navigate to the *Information* menu.

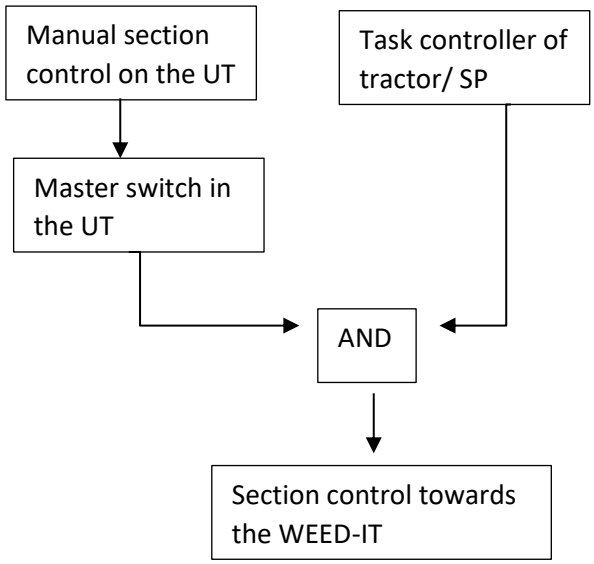
5.2 Section control softkeys

The second group of softkeys is used to operate the section control.

 **Softkey B1**	Navigate to the *Dimensions* menu.
	Operate the *master switch* of the section control. **Softkey B2**
 **Softkey B3**	Disable the leftmost enabled section.
 **Softkey B4**	Press: Enable the rightmost disabled section, starting from the left-hand side. Press and hold: Enable all sections that were disabled on the left-hand side.
 **Softkey B5**	Disable the rightmost enabled section.
 **Softkey B6**	Press: Enable the leftmost disabled section, starting from the right-hand side. Press and hold: Enable all sections that were disabled from the right-hand side.

If the *master switch* is OFF (red), all sections (read: solenoids) remain closed, no matter the circumstances. Sections can manually be disabled/enabled by **softkey B3 – B6**, but the sections remain closed.

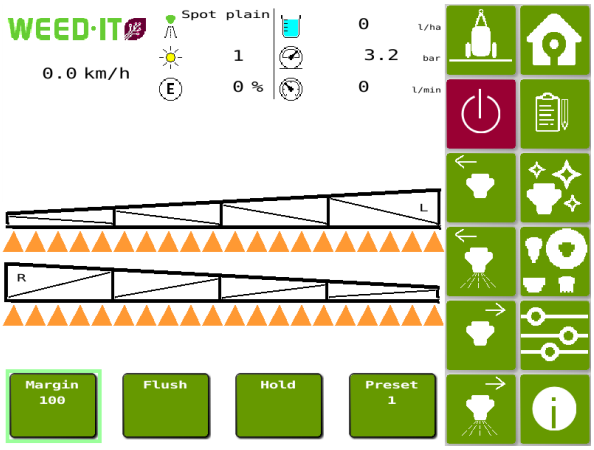
If the *master switch* is ON (green), sections can automatically be opened/closed by the Task Controller of the tractor / SP (based on the GPS location of the machine) or by manually disabling/enabling sections with **softkey B3 – B6**. WEED-IT ISOBUS has no influence on the task controller of the tractor/SP to determine which sections should be open and which should be closed. If there is no Task Controller on the tractor/SP, only the manual section control and master switch on the UT have influence on the section control towards the WEED-IT.



6. Menu’s

6.1 Main menu

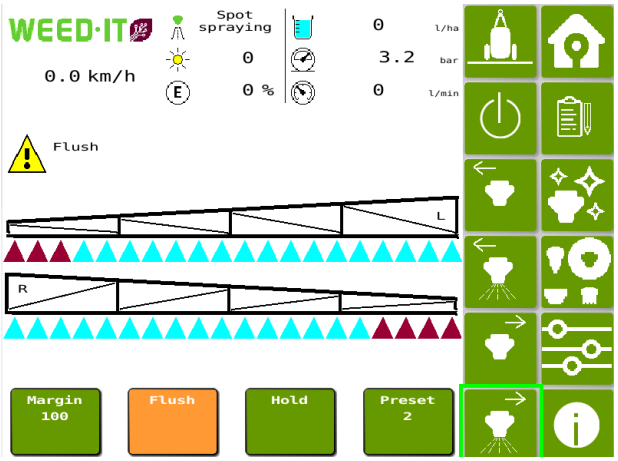
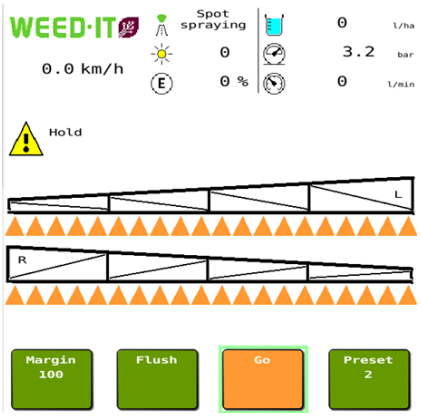
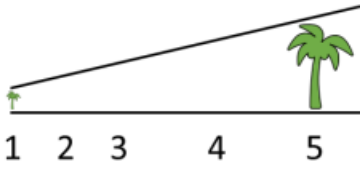
If the WEED-IT is started on the ISOBUS application on the terminal of the tractor/SP, the following screen will be visible: (depending on your settings)



6.1.1 Main menu options

The main menu offers the options for regular use of the WEED-IT system.

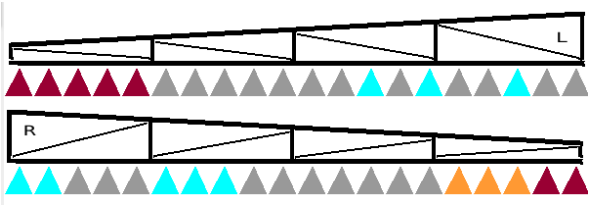
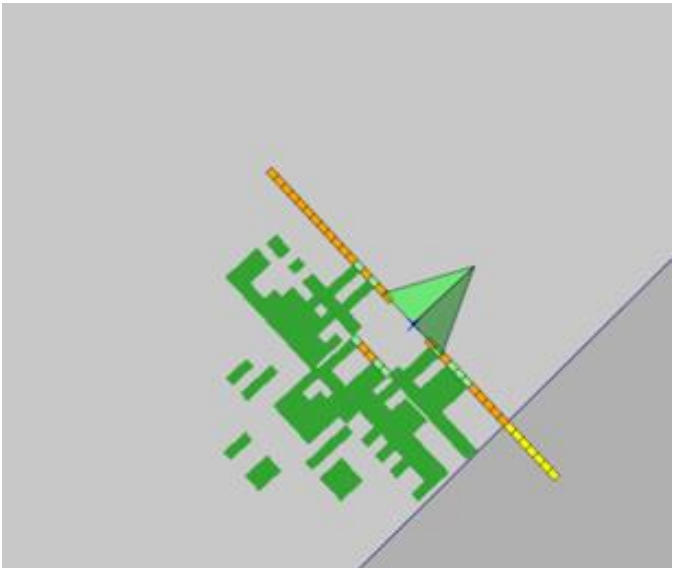
	**Margin**: WEED-IT uses a certain margin when spraying a target. This margin varies from 200 to 300 mm and specifies the distance before and after the weed to be sprayed. One of four predefined margins can be selected while driving the vehicle, by pressing the ‘Margin’ button. The current margin in mm is displayed in the button. The margin-setting is often used to compensate for the spray displacement caused by heavy winds, or uneven terrain / strong variation in terrain. By default, the margin presets are defined as follows: 1. 200 mm 2. 235 mm 3. 270 mm 4. 300 mm

Flush	**Flush**: Use this button to flush the system. During flushing, all nozzles are opened simultaneously. Use this option for cleaning the system, or for checking that all nozzles are functioning. The *master switch* (softkey B2) should be turned ON (green) to use the flush function. 
Hold	**Hold**: Use this button to temporarily put the machine on hold, for example when you cross a street, or when turning on the headlands. 
Preset 1	**Sensitivity**: The WEED-IT will automatically adjust to changes in circumstances, e.g. the size of the plants, the color of the soil, ambient light and the weather situation (sun, rain, fog, etc.). You may have to manually adjust the sensitivity of the sensors under special circumstances. Several pre-programmed sensitivity presets are available for that purpose. Presets are numbered; preset number 1 is the most sensitive: 

Main screen content:

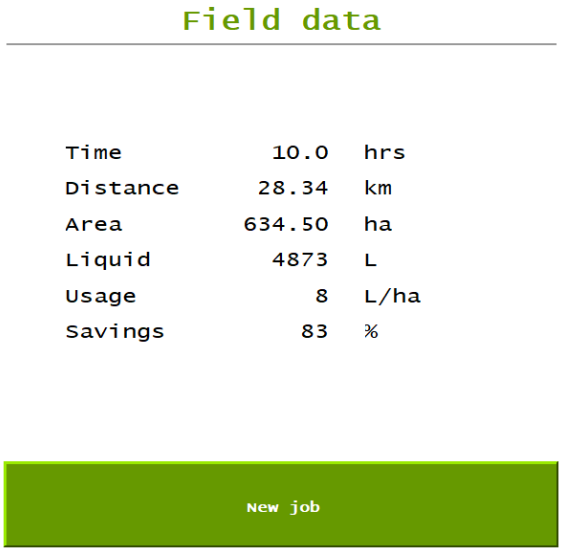
	Please note that Main screen content depends on the number of connected detection sensors and the current settings.

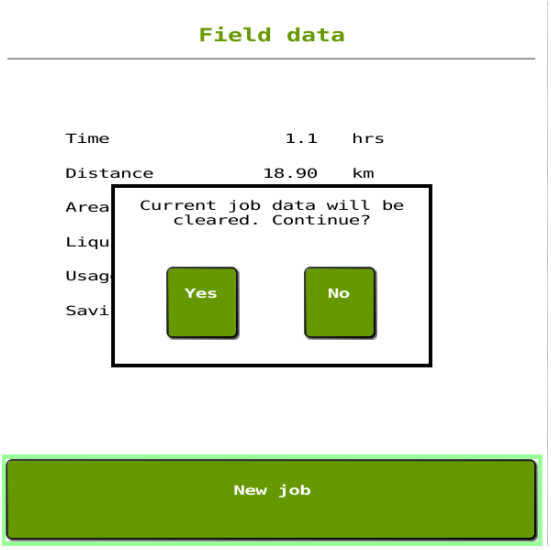
	The current **Speed** of the vehicle. Depending on settings, the speed is shown in: • m/s (meters per second) • km/h (kilometers per hour) • mph (miles per hour)
	The current **Spray mode** of the system. Possible modes are: • Spot plain (Spot spraying without PWM) • Spot spraying • Dual mode (A base rate and targeting weeds with a higher rate) • Full cover (Broadacre spraying using PWM to control the rate)
	**Pressure:** This number shows the current pressure of the liquid in psi or bar. The pressure should be approximately 3 bar (43.5 psi). A warning appears if the pressure is too high or too low.
	**Savings**: This number shows the savings percentage: the rate (l/ha) that was sprayed compared to the entered rate (l/ha) in the nozzle selection menu
	**Usage**: This number shows the current application rate in l/ha or ga/ac.
	**Flow**: The current liquid flow in liters per minute.
	**Sun**: The strength of the sunlight on a scale of 1 to 10. Extremely bright sunshine (9-10) causes noise and reduces system accuracy.

Sensors	All **Sensors** are shown in the center of the display, each cone represents one sensor. Example: 40 sensors, 20 on each side:  • Orange: disabled by the master switch on the VT or by the terminal (overlap control or outside boundaries). • Gray: enabled, but not spraying • Cyan: enabled and spraying (The cone turns cyan if one of the four nozzles of that sensor is spraying) • Red: manually disabled by the driver 

6.2 Field data menu

The field data menu is like menu 103 of the WEED-IT user console. It shows usage totals of several parameters. The preferred units can be set in the *Settings* menu. When the option 'flow meter' is disabled in the settings menu, the liquid, usage and savings are not shown in this menu. By pressing the *New job* button, and pressing *Yes* all values are reset to zero.



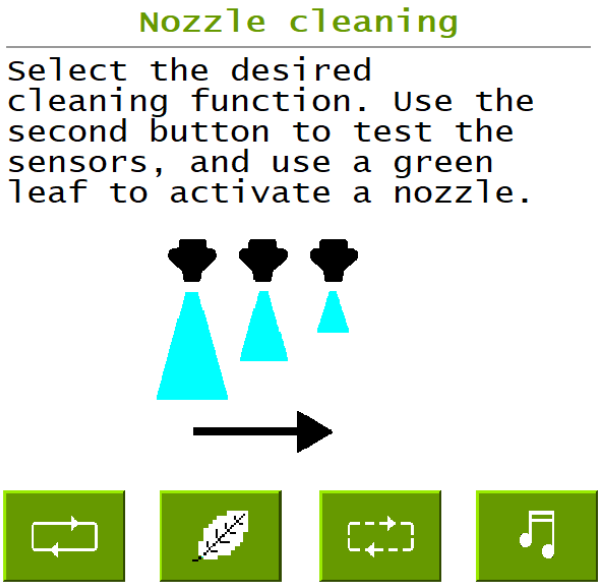


6.3 Nozzle cleaning menu

	Only use the Nozzle cleaning functions when the vehicle is **not** moving! When the machine starts moving during the nozzle cleaning, the cleaning action is automatically stopped. The *master switch* (softkey B2) must be **ON** to use the nozzle cleaning functions!

Use the Nozzle cleaning menu to:

- flush nozzles
- test detection
- test solenoid valves
- check nozzles



	Press the **Chase** button to activate nozzles one by one with a short burst.
	Press the **Detection** button test nozzles. Holding a leaf under a sensor should activate the corresponding nozzle.
	Press the **Sequencing** button to activate nozzles one by one with a long burst.
	Press the **Melody** button to activate nozzle cleaning at a variety of frequencies, applied by PWM control.

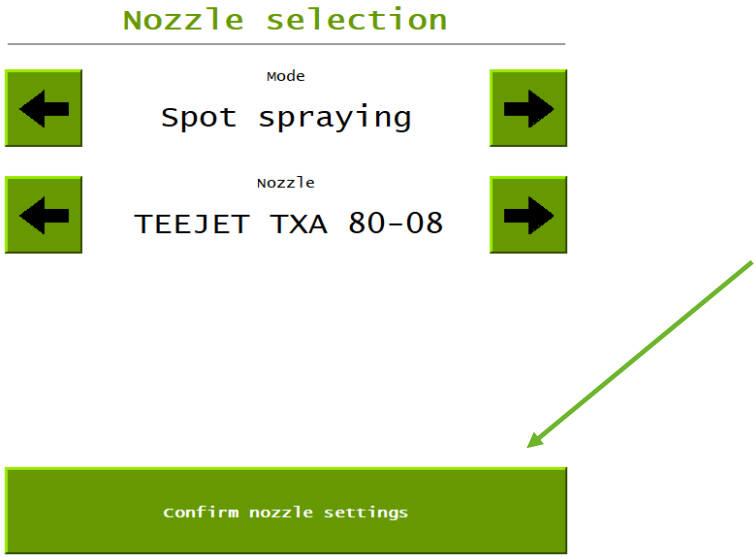
	If the spray mode is *Spot Plain*, all the four buttons will activate the **flush** function, as PWM functionality is not available in the *Spot Plain* spray mode.

6.4 Nozzle selection menu

The *Nozzle selection* menu is similar to menu 104 of the user console, but the usage is somewhat different. When you enter the menu, the currently set parameters are displayed. The process of setting new parameters has changed, as it is split in two parts.

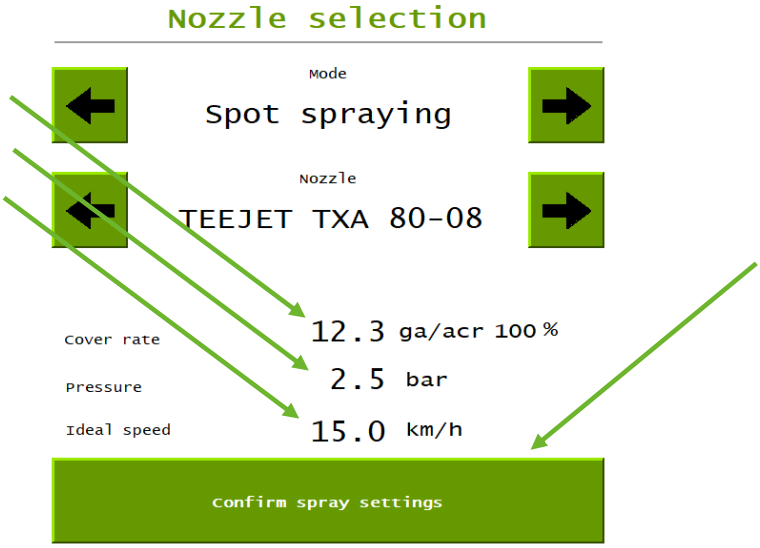
6.4.1 Set the preferred mode and nozzle

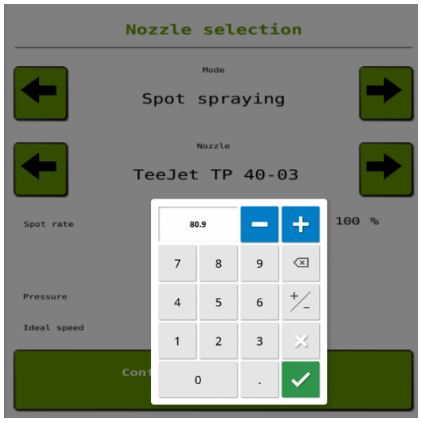
Select the preferred *Mode* and *Nozzle* by pressing the arrow buttons until your mode and nozzle are reached. Then press the button *Confirm nozzle settings,* the WEED-IT will now activate this mode and nozzle and restarts itself. Wait for approximately 10 seconds to start the second part.



6.4.2 Set the preferred rate, pressure and ideal speed

Now you can set your preferred rate, pressure, and speed. You can change those numbers by pressing on the number: an input window will open (this layout differs per terminal brand). When finished, press the button *Confirm spray settings* and wait until the VT shows that the process is completed. The WEED-IT is ready to spray!





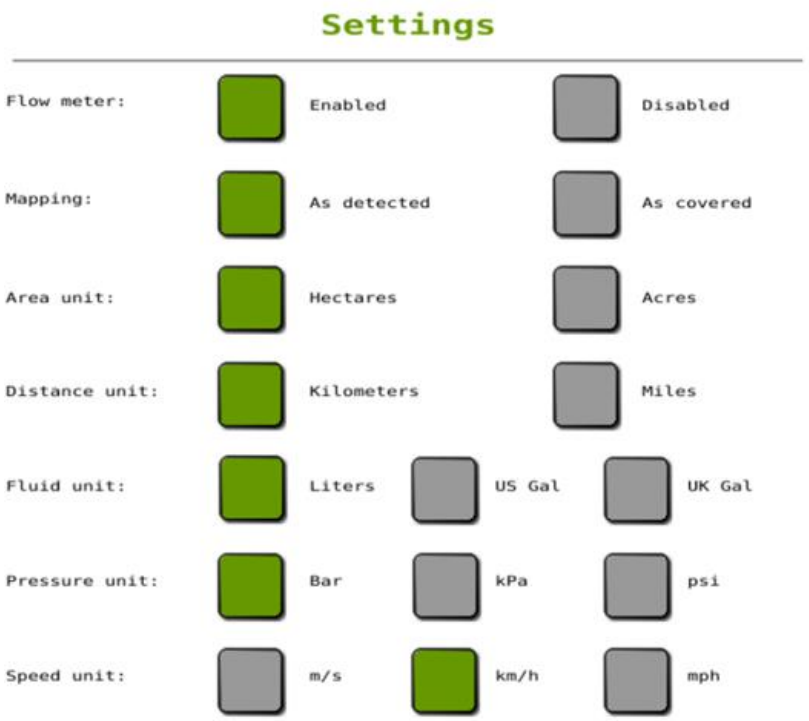
6.5 Settings menu

The *Settings* menu comprises menu's 150-153 of the console. When a specific unit is changed in this menu, it will adjust this unit throughout all other menu's.

Flow meter: This setting only has effect when the mode of the WEED-IT is set to full cover spraying or dual spraying. When spraying with spot plain or spot spraying, the rate reported to the terminal is the set spot rate in the nozzle selection menu.

When the mode is Full cover or Dual and the option 'flow meter' is enabled, the rate from the flow meter is reported directly to the terminal. When the option 'flow meter' is disabled, the selected cover rate from the nozzle selection menu is reported to the terminal.

Mapping: With this setting the user can choose between making a weed-map or a coverage map. When the option 'as detected' is selected, the sections where a weed was detected are reported as true to the terminal and will be drawn on the screen. When the option 'as covered' is selected, the places where a section has been enabled are reported back to the terminal and will be drawn on the screen. With the latter option, the reported value is not depending on whether the weed-it detected a weed on that place.



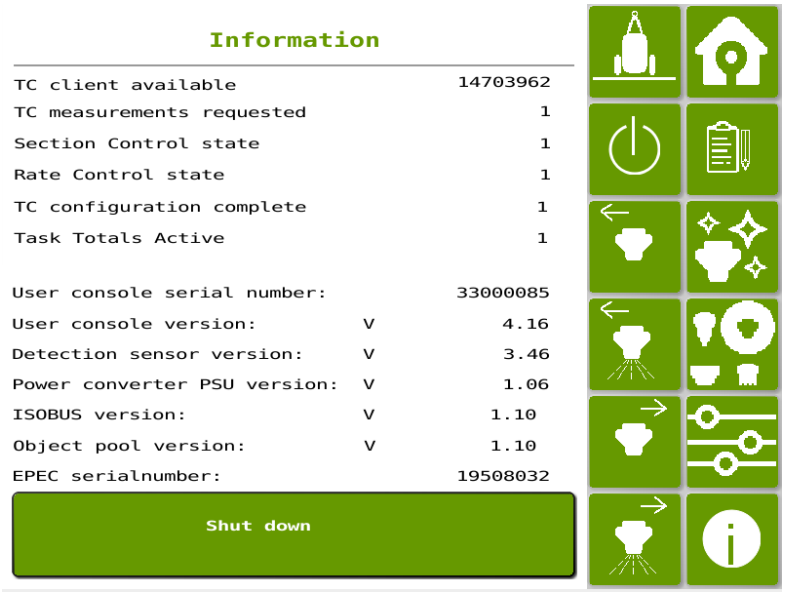
The ISOBUS UT of WEED-IT is only available in English.

6.6 Information menu

The *Information* menu shows in the top of the screen the status of the Task Control. You can see per line if the status is OK: 1 or not connected / not OK: 0. (TC client should be > 0).

In the bottom part of the screen, the serial numbers of the user console and Control Unit, as well as the firmware versions of the user console, detection sensor, power converter, and Control Unit are shown.

In this menu you can also shut the WEED-IT down, by pressing the button: ‘Shut down’.

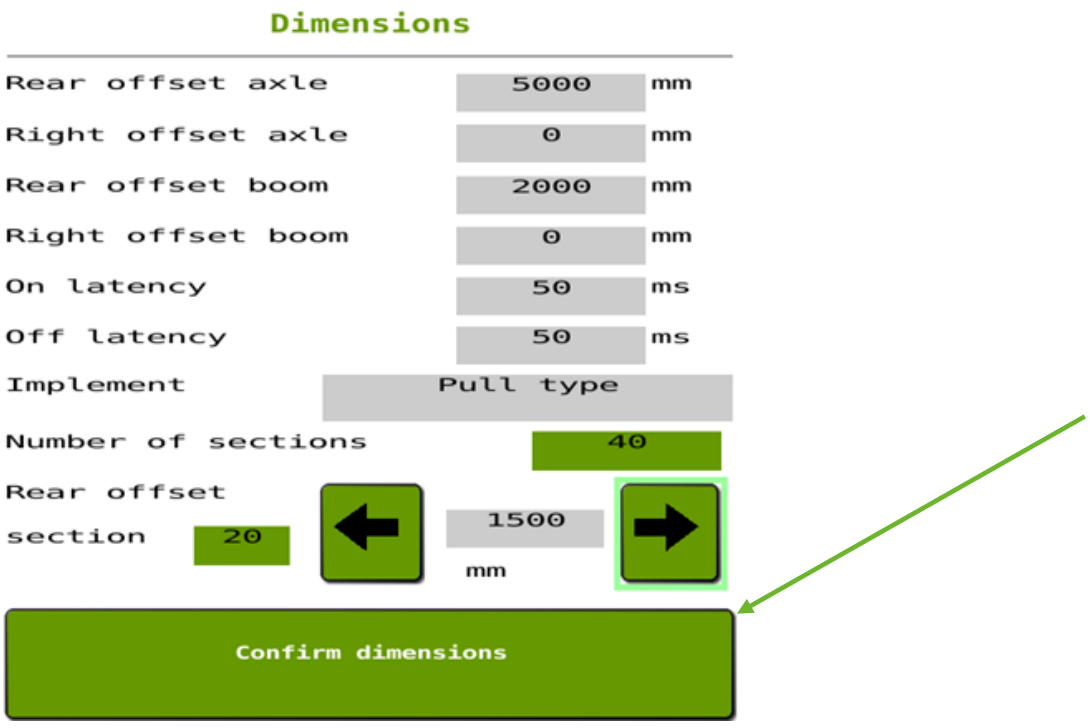


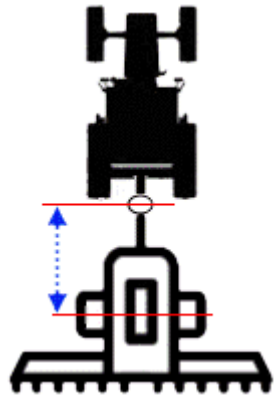
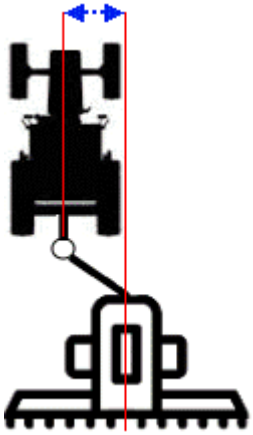
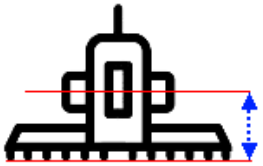
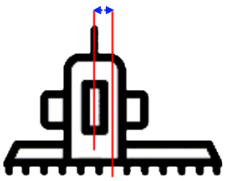
6.7 Dimensions

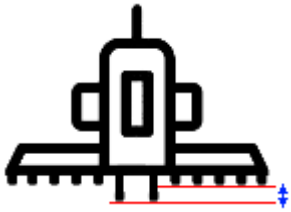
The *Dimensions* menu is used to configure the implement geometry and controller setup for the Task Controller, if this is supported by the terminal. The Control Unit contains default values, which are loaded when the implement is connected for the first time. The dimensions should be adjusted to suit your WEED-IT system. Once these are correctly set, there is no need to adjust them anymore, unless the geometry changes. Not even if you attach the sprayer to a different tractor, because these settings belong to the geometry of the implement. For more details, refer to the ISOBUS installation manual.

The 'rear offset section' can be set for each section independently by using the arrow keys to switch between the sections. This offset can be used on sprayers where, for example the middle part of the boom is not in one line with the right and left side of the boom.

After entering the correct dimensions of your connected machine, press **'Confirm dimensions'.** The EPEC control unit will restart and the right dimensions of your machine are communicated with the Task Controller of the tractor/SP.



	The **rear offset axle** is the in-line distance (driving direction) between the connection point (drawbar, ball, clevis) and the axle of the sprayer. In case of a self-propelled sprayer or 3 point linkage sprayer, this distance will not be used. The range for the rear offset axle is: 0 to 10m.
	The r**ight offset axle** is the lateral (sideways) distance between the center of the connection point (drawbar, ball, clevis) and the center of the sprayer. In case of a self-propelled sprayer or 3 point linkage sprayer, this distance will not be used. The range for the right offset axle is: -5m to +5m.
	The **rear offset boom** is the distance between the axle of the sprayer and the center of the spray boom. In case of a self-propelled sprayer, the **rear offset boom** is the distance between the rear-axle of the sprayer and the center of the spray boom. In case of a 3 point linkage sprayer, the **rear offset boom** is the distance between the linkage and the spray boom. The range for the rear offset boom is: -10m to +10m.
	The **right offset boom** is the lateral distance between the center of the sprayer and the center of the boom. This holds for both a self-propelled, 3 point linkage and pull type sprayer. The range for the right offset boom is: -5m to +5m.
	The **on latency** is the time between the moment that an ON command is sent by the Task Controller and the moment that the spray liquid hits the ground/crop. This time is used by the Task Controller to compensate for the mechanical delay; the compensation is achieved by sending the ON command earlier.

	The **off latency** is the time between the moment that an OFF command is sent by the Task Controller and the moment that the solenoid valves close. Again, this time is used in the Task Controller to compensate for the delay. The on latency and off latency will be in the order of 500 – 800 milliseconds.
	The **implement type** is the type of sprayer (pull type, 3 point linkage or self-propelled) that is being used.
	The **number of sections** is information about the number of sections that are currently controlled by the Task Controller. As all new Task Controller can handle more than 40 sections, the number of sections will equal the number of sensors, i.e. one section is 1 meter.
	The **rear offset section** is the distance between the section and the rest of the boom in mm. This can be used when the sections are not in one line. The value needs to be set for each section independently. The range for the rear offset section is: -15m to +15m.

7. Warnings and errors

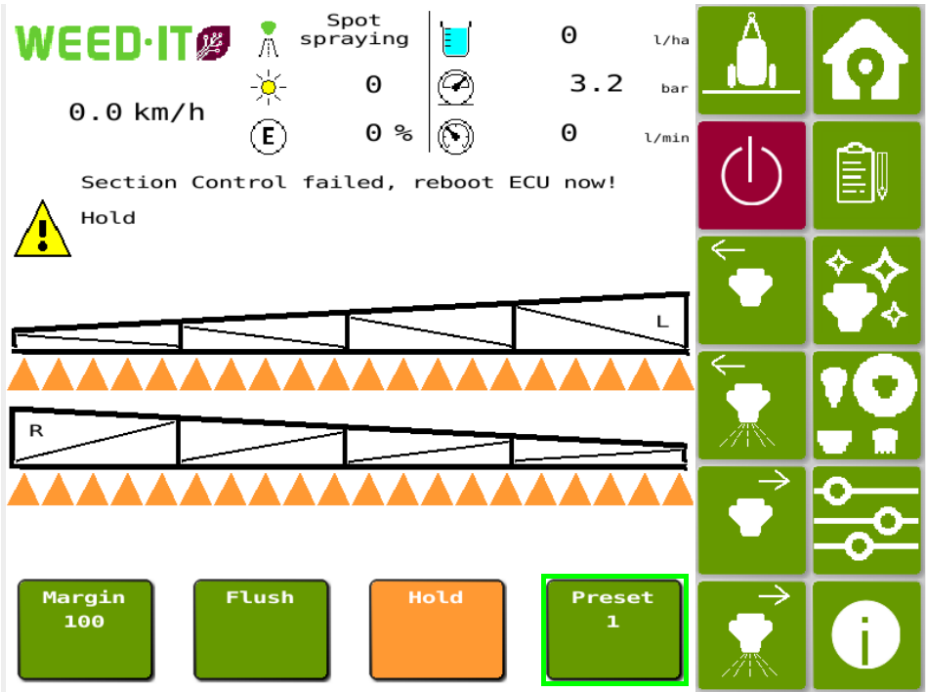
In the unlikely case of a warning or error, these messages are shown on the main screen of the WEED-IT ISOBUS VT. When an error occurs, the WEED-IT cannot work in a normal operation and the machine needs to stop! The errors are shown persistently until the WEED-IT is restarted manually.

A specific error is: **Section control failed**. This happens when a sensor is added or removed from the WEED-IT system. The number of sensors on the system determines the number of sections on the system. When the number of sensors is changed, the section configuration does not match with configuration sent to the terminal during start-up. The ECU needs to be rebooted in order to sent the right section configuration to the terminal. Rebooting can be done by turning the ECU off and on again, or by pressing 'confirm dimensions' in the Dimensions menu.

Warnings are self-clearing and are shown next to the yellow exclamation mark.

An example of a warning is 'HOLD'.

See the WEED-IT user manual for all warnings and errors and the corresponding actions to solve them.



8. Demo mode (for distributers only)

In the WEED-IT ISOBUS application a new feature is added: the demo mode.

8.1 Activating the demo mode

This mode can be activated by pressing and holding the start button for 6 seconds. The screen automatically goes to the main menu and fixed numbers are shown in this screen. There should be **NO** communication with the WEED-IT system, as it messes up the screen of the VT. The RS232 communication cable should be disconnected from the WEED-IT user console.

8.2 Using the demo mode

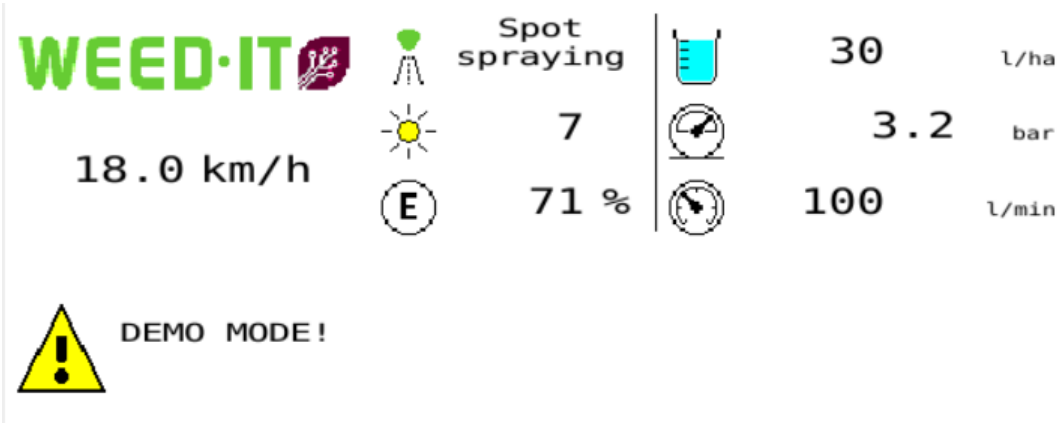
The demo mode can be used on farm shows to show how the VT of the WEED-IT looks like. You can change the settings and use the manual section control like in a normal operation.

The demo mode can also be used to check the Task Control functionalities without the need to connect a weed-it system. This can be helpful to test the mapping and section control functionalities on new terminals or terminals with problems.

8.3 Deactivating the demo mode

The demo mode can be deactivated on 2 ways:

1. Restart the ECU. By restarting the EPEC, the demo mode is automatically disabled and the WEED-IT ISOBUS will work normally again.
2. Press and hold the start button for 6 seconds again. This will also deactivate the demo mode. Only when the demo mode is deactivated, the WEED-IT can be connected to the ECU again, by connecting the RS232 cable into the WEED-IT user console.



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