



ISOBUS user manual for WEED-IT Quadro, V1.18

For WEED-IT users

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Original instructions

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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, an ISOBUS compatible terminal/display can be used to operate the WEED-IT. The user interface is similar to the WEED-IT Quadro user console and supports touch screen functionalities. The ISOBUS application consists of a Universal Terminal (UT) and a Task Controller (TC). The UT enables the operation of the WEED-IT via the terminal and the 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' only explains the functionalities and control of the WEED-IT via ISOBUS. Please refer to the 'WEED-IT Quadro User Manual' for a detailed description about all other parts of the WEED-IT system!

2 WEED-IT Universal Terminal application

All user menu functionalities of the WEED-IT can be controlled via the *Universal Terminal* (UT). The UT functionality needs to be activated on the 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:



3 Switching the WEED-IT On / Off via ISOBUS

3.1 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 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:



If there is no communication with the WEED-IT user console a warning will be displayed. The relay is not switched back directly only after hitting the OK button.



Please wait ...



3.2 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.







4 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 into 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.





4.1 Navigation softkeys

The first group of softkeys is used to navigate through the different menus.

9	Softkey A1	Navigate to the <i>main</i> menu (similar to the main menu of the WEED-IT console).
	Softkey A2	Navigate to the <i>Field data</i> menu (similar to menu 103 of the WEED-IT console).
$\overset{\diamond}{\longrightarrow}$	Softkey A3	Navigate to the <i>Nozzle cleaning</i> menu (similar to menu 102 of the WEED-IT console).
10	Softkey A4	Navigate to the <i>Nozzle selection</i> menu (similar to menu 104 of the WEED-IT console).
° −°	Softkey A5	Navigate to the <i>Settings</i> menu (similar to menu's 150-153 of the WEED-IT console).
i	Softkey A6	Navigate to the Information menu.



4.2 Section control softkeys

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

Softkey B1	Navigate to the <i>Dimensions</i> menu.
	Operate the <i>master switch</i> of the section control. Softkey B2
L Softkey B3	Disable the leftmost enabled section.
L 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.
R Softkey B5	Disable the rightmost enabled section.
R 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.



5 Menu's

5.1 Main menu

If the WEED-IT is started on the ISOBUS application on the terminal of the tractor/SP, the screen below will be visible:

(the screen may look different depending on the settings).



Each cone on the main screen represents one detection sensor. There are different colors that show the status of each detection sensor, spraying, enabled, disabled, etc.

The WEED-IT ISOBUS can manage up to <u>48 detection sensors</u> and 40 sections. When there are more than 40 detection sensors connected to the system, the outer sensors will not have a cone on the main screen. Therefore, the user console of the WEED-IT system needs to be visible to the operator so he can monitor the status of those sensors. The outer detection sensors will be controlled by automatic section control from the terminal and manual section control from the UT, as described above with softkeys B3 to B6.





5.2 Main menu options

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

Margin 100	Margin: WEED-IT uses a certain margin when spraying a target. This margin varies from 100 to 300 mm and specifies the distance <u>before</u> and <u>after</u> 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.
Margin 7.8"	When the <i>distance unit</i> is set to miles in the settings menu, the margin in the main menu will be shown in inches. The margin in inches will be shown with one decimal and with the inches sign behind it.
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 flush button will turn orange when it is activated. The sections that are manually disabled (red cones) are not flushing. The master switch (softkey B2) should be turned ON (green) to use the flush function. The flush function overrules the section control by the terminal. This means that even though the terminal turned sections off, the WEED-IT will still spray. The only way to turn sections off is by using the softkeys, then the cones will turn red.



Hold	Hold: Press this b machine on hold, crossing streets, o headlands. The hold button t activated. The tex change from 'hol	button to put the , for example when or when turning on the turns orange when it is xt in the button will d' to 'go'.	WEED-IT@ Spot spraying 0 1/ha 15.0 km/h 1 2 3.4 bar 69 % PWM 0 % 0 1/min Hold I Image: Comparison of the system of the syste
		When the WEED-IT syste it can only go in 'go -mod user console. It is also not advised to u combination with ISOBU signal to the ECU, refer t found. for more informa switch wires to the ECU.	em is put in hold via the user console, de' by pressing the hold button on the use an external hold switch in S. Please connect a master switch o chapter Error! Reference source not tion on how to connect the master
Preset 1	Sensitivity: The V e.g., the size of th situation (sun, ra The operator mar circumstances. Se purpose. Presets	VEED-IT will automatically ne plants, the color of the in, fog, etc.). y have to manually adjust everal pre-programmed so are numbered; preset nu 4 5	v adjust to changes in circumstances, soil, ambient light and the weather the sensitivity of the sensors in some ensitivity presets are available for that mber 1 is the most sensitive:

Main screen content:



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



WEED·ITØ 18.0km/h	 The current Speed of the vehicle. Depending on settings, the speed is shown in: m/s (meters per second) /h • km/h (kilometers per hour) mph (miles per hour) 	
81 % PWM	The current PWM% is an indicator that shows the average PWM% applied by the system. The PWM% is not shown when the mode is 'Spot plain'.	
*	 The current Spray mode of the system. Possible modes: Spot plain (Spot spraying without PWM) Spot spraying (Spot spraying using PWM to control the rate) Dual mode (A base rate and targeting weeds with a higher rate) Full cover (Broadacre spraying using PWM to control the rate) GoG Plain* (Green on Green spraying without PWM) GoG Spraying* (Green on Green spraying using PWM to control the rate) <li* a="" available="" contact="" dealer="" for="" information!<="" li="" more="" on="" only="" selected="" systems,=""> </li*>	
Ø	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.	
E	Savings : This number shows the savings percentage: the rate (I/ha) that was sprayed compared to the entered rate (I/ha) in the nozzle selection menu. The savings is only shown when using a spot modus.	
	Usage : This number shows the current application rate in I/ha or ga/ac.	
5000 L	Tank level: This number is a tank level indicator. When filling the tank, the operator manually enters the number of liters/gallons in the tank. Based on the flow meter readings the tank level indicator will be lowered. A maximum of 20000 liters or 5283 gallons can be entered.	
5.0ha	Remaining area: This number is an indicator that shows the remaining hectares or acres that can be sprayed with the current tank level. This is calculated based on the tank level indicator. When the value is smaller than 10 ha or 40 acres, a decimal is added to the indicator.	
\odot	Flow : The current liquid flow in liters per minute.	









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5.3 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.









5.4 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

Nozzle cleaning Select the desired cleaning function. Use the second button to test the sensors, and use a green leaf to activate a nozzle.



	Press the Chase button to activate nozzles one by one with a short burst.
<u>J</u>	Press the Detection button to test nozzles. Holding a leaf under a sensor should activate the corresponding nozzle.
כבבס	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.



	•		
1	1		
		L	
2			

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



5.5 Nozzle selection menu

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



1. Set the preferred mode and nozzle

Select the preferred *Mode* and *Nozzle* by pressing the arrow buttons until the desired 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.



2. Set the preferred rate, pressure and ideal speed

After 10 seconds, the preferred rate, pressure, and speed can be set. Press on the number to change it: 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!







5.6 Settings menu

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



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 does not depend on whether the WEED-IT detected a weed on that place or not.

Auxiliary output: This setting controls a digital output of 10V (max 3 Amp) on pin 9. The returning wire should be connected to pin 8. The auxiliary output can be used to control for example an electric valve, lamp, or relay.

Note: the value of this output is independent of the WEED-IT. This means that once enabled in this menu, the output will stay on while the WEED-IT can be off in the meantime.



Settings



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



5.7 Information menu

The *Information* menu shows the status of the Task Control. Per topic can be seen if the status is OK: 1 or not connected / not OK: 0. (TC client must be > 0). Section control state must be > 0 for section control to work.



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

In this menu the WEED-IT can be shut down, by pressing the button: 'Shut down'.

Information TC client available 1 TC measurements requested 1 Section Control state 1 Rate Control state 1 TC configuration complete 1 Task Totals Active 1 User console serial number: 33000040 User console version: V 4.22 Detection sensor version: V 3.52 Power converter PSU version: V 1.06 ISOBUS version: V 1.18 Object pool version: V 1.18 EPEC serialnumber: 19508032 Shut down



6 **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 ECU contains default values, which are loaded when the implement is connected for the first time. The dimensions should be adjusted according to the WEED-IT system geometry and are set once upon



commissioning of the WEED-IT system. The dimensions menu consists of two pages. On page 1 the implement dimensions, like the rear offset

axle and rear offset boom can be entered. Page 2, the section dimensions, like the rear offset section and disabled solenoids can be entered.



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

6.1.1 Implement dimensions

Rear offset axle	5000	mm		
Right offset axle	0	mm		
Rear offset boom	1000	mm		
Right offset boom	0	mm		
On latency	100	ms		
Off latency	100	ms		
Implement Self Propelled				
Page 1/2				
Confirm dimensions				

Implement dimensions





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 15m.

The right 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 the 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: -15m to +15m.



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.
Page 1/2	Page button. By pressing this button, the 2 nd page of the dimension's menu will open. In the second menu, the section dimensions can be entered.



6.1.2 Section dimensions

In this menu, the values can be set for each section independently. The sections can be selected by using the arrow keys to scroll through the sections. The number of sections depend on three things:

- Number of detection sensors in the system.
- Number of sections the terminal can control.
- Number of sections entered underneath 'use limited sections' and whether this option is enabled.



See the images attached to each of the parts below for more clarification:

Section 20 of 40	In the top of the page, between the arrows, the current section and total nr of sections is shown. The maximum number of sections depends on the number of connected sensors (1 sensor is 1 section) and on the capabilities of the terminal. If the terminal has the capacity to control max 16 sections, the maximum number of sections will also be 16 in this menu. The maximum number of sections can also be limited by using the button 'use limited sections'.
Sensor 40 of 40 1 2 3 4	This indicates which sensors are connected to a section. Also, individual solenoids can be disabled per sensor if not all solenoids are connected to a nozzle body on the machine. If the terminal supports enough capacity, there will be one section for each detection sensor.
← →	Use the arrows to scroll through the sections.





The **rear offset** of the 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.

In the image below an example is given of a system that has its 2 center sections shifted 5000mm behind the





Connected sensors: In case the terminal can control all detection sensors connected, this value will be 1 and cannot be changed. This means that each section consists of 1 sensor and the section width is 1 meter or 40 inches.

In case the maximum number of sections is limited by the <u>terminal</u>, this value must be changed. See, "*use limited sections*" underneath for more information.

A warning will pop-up when the *page 2/2* or *confirm dimensions* button is pressed, while the total number of connected sensors does not match the real number of connected sensors.

!! Please change the number of connected sensor values in this menu, until it corresponds with the real number of connected sensors.!!

The number of connected sensors in this configuration does not match the real number of connected sensors to the system. Please adjust to match them!	
Entered:	23
Real connected:	24
	ок

Section dimensions





Nozzle 1 ,2 ,3, 4: For systems that have one or more sensors that do not use all 4 solenoids, the specific nozzles can be disabled. The red color indicates that a nozzle is disabled. When one or more nozzles are checked, the section and boom width change. The section width is lowered by 250 mm (or 254 when *miles* is selected in the settings menu) times the number of disabled solenoids.





6.2 Warnings and errors

In the unlikely event of a warning or error with the WEED-IT system, the ISOBUS VT shows the warning/error on the main screen. When an error occurs *"Stop!!"* is displayed in front of the warning message. In case of an error the WEED-IT cannot work in a normal operation and the machine needs to stop! The errors are shown persistently until the WEED-IT and ECU are restarted manually.

A specific error is <u>Section control failed</u>. 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 to send 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'.

Refer to the WEED-IT Quadro user manual V4.22 for all warnings and errors and the corresponding actions to solve them.