CROPLANDS

USER MANUAL
WEED-IT QUADRO

WWW.CROPLANDS.COM.AU

WEED·IT
precision spraying

BT-UMWEEDQ-B

The WEED-IT Quadro system is sold and supported in Australia and Canada by Croplands Equipment Pty Ltd

50 Cavan Road,

Dry Creek

SA 5094

+61 (0)8 8359 9300

www.croplands.com.au

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Rometron B.V.

Hoge Wesselink 8

7221 CJ Steenderen

+31 (0)575 451111

www.weed-it.com

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Disclaimer

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Without prejudice.

Original instructions

Subject to change without prior notice. This User Manual WEED-IT Quadro, version 2.0, was last updated March 2020.

Table of contents

1. About this manual

This manual is intended for users of the WEED-IT system. It describes how to use the WEED-IT system and how to perform basic maintenance.

Please read this User Manual and the safety instructions carefully before you start to use the WEED-IT system.

This manual contains:

- Section 1: General information about this manual.
- Section 2: General information about the WEED-IT system and important safety information.
- Section 3: Identification of parts in the system. Extensive information about the various parts and controls of the WEED-IT system.
- Section 4: General instructions for use of the WEED-IT system.
- Section 5: General maintenance instructions.
- Section 6: Instructions for cleaning, storage and transport.
- Section 7: Control unit reference section, with a description of available menus.
- Section 8: Troubleshooting information.
- Section 9: Specifications.
- Section 10: Menu options overview.
- Section 11: Calibration settings form.

An index has been added to make finding the required information easier.

1.1 Conventions

bold type	used for emphasis
`monospace type`	for display texts

1.2 Icons

The following icons are used in this manual to point out or to clarify information related to safety and safe use of the WEED-IT:

This sign draws attention to a WARNING or a CAUTION.

WARNING: Personal injury may occur if you do not follow instructions.

CAUTION: Damage to equipment may occur if you do not follow instructions.

This icon draws attention to helpful information and/or tips & tricks for correct use of the WEED-IT system.

2. About WEED-IT

The WEED-IT is a weed control system that recognizes and sprays weeds based on the fluorescent properties of the chlorophyll molecules in the leaves of living plants. The WEED-IT uses highly sensitive and accurate sensors. By spraying exactly on top of living plants only, you will save herbicide while at the same time minimizing environmental load.

i	Please note that there may be variations in the actual setup of the WEED-IT system. It is up to the dealer to configure the system in such a way that the WEED-IT automatically senses which options are available. Contact your dealer if you need more information.

2.1 Operating principle

A series of sensors on the WEED-IT detects where the weeds are and immediately sends a signal to the relevant nozzle to spray the weed with herbicide.

Each sensor has 4 channels; each channel covers 25 cm of 100 cm per sensor or covers 10 inches of 40" per sensor.
Depending on the width of the vehicle used for the WEED-IT system, up to 36 sensors may be used to treat 36 meters (at 1 mtr spacing), or 120 ft (at 40" spacings) in one operation.

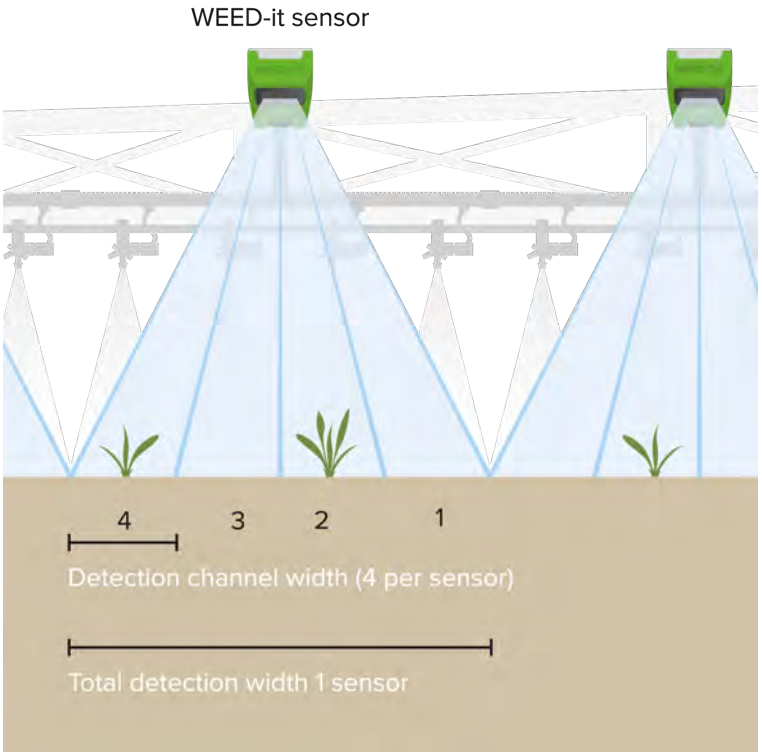
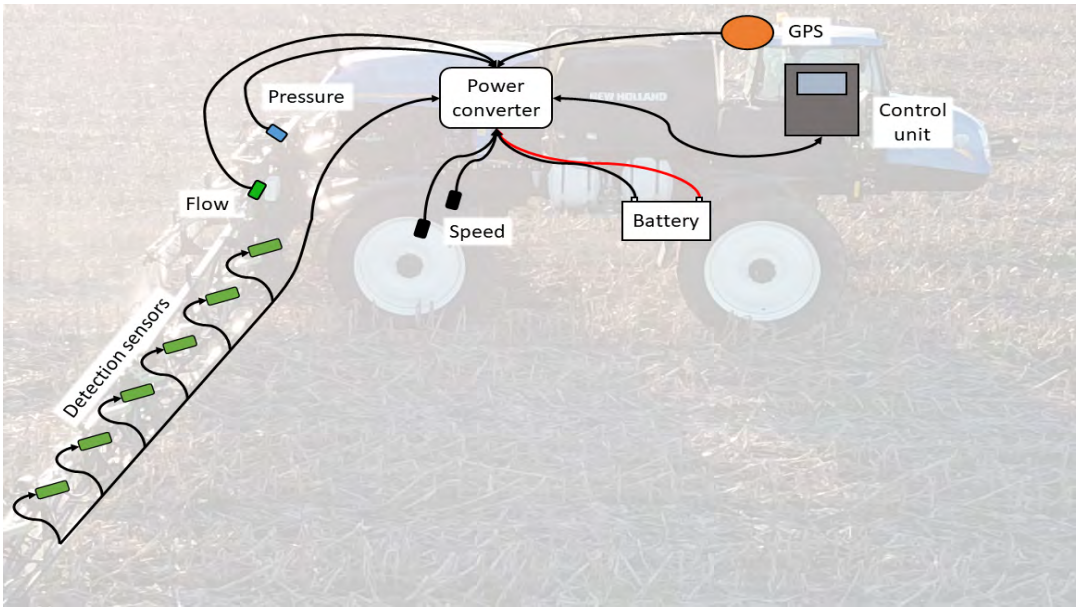


Figure 2-1 Schematic overview of 1 mtr working width per sensor, divided in four channels of 25 cm each

A complete WEED-IT system consists of the following electronic components:



See also "System overview" on page 17 for more information on individual components.

Please read all instructions before you start working with a WEED-IT system. Refer to "Important safety information" below for an overview of safety instructions.

Please make sure that colleagues and/or customers read all safety instructions before they start using a WEED-IT system.

Use the Control unit for operating the system. The Control unit consists of a display and a series of buttons in a waterproof casing:

See "Control unit" on page 18 for more information on use of the Control unit.

2.2 Important safety information

Please read the safety information in this section before you start using the WEED-IT.

Follow the safety information in this section at all times, to prevent personal injury and to prevent damage to the WEED-IT system.

2.2.1 General safety information

Safety icons on the machine are used to mark hazardous areas. Anyone operating the machine must be aware of these warnings and what they entail. Warning symbols on the machine are always accompanied by a safety warning.

Some symbols give information about specific characteristics of the machine and are necessary for a correct operation.

- Always pay attention to any warnings, advice and symbols!
- Pass on all safety instructions to all other users!
- Make sure that the symbols and icons are always clean and legible! Damaged or missing symbols must be replaced immediately and are available from your supplier.

2.2.2 Safety and use of the WEED-IT

- If the machine is not used as instructed in this manual, the manufacturer can never be held responsible for any damage resulting from that use. Any undocumented or unauthorized use is entirely at the user's own risk.
- Documented and authorized use also implies that the operator and safety instructions, as issued by the manufacturer, are followed strictly and that only original WEED-IT parts are used.
- The WEED-IT system may only be operated, maintained and repaired by people with the appropriate level of knowledge about the possible dangers. Any unauthorized changes and/or modifications to the machine are entirely at your own risk. The manufacturer can never be held responsible for any damage arising from such changes and/or modifications.
- All safety instructions, as well as any other commonly applicable safety instructions and instructions with respect to labor circumstances, traffic, etcetera, should always be followed strictly. You should also be aware of (and follow) any instructions and/or legal limitations of the use of certain herbicides. This may be subject to local law.

2.2.3 General safety instructions & how to avoid accidents

General safety rule

Before using the WEED-IT, check the (traffic) safety of the machine and the vehicle. When in doubt, do not use the machine and consult your supplier.

- Pay attention to the safety instructions in this manual and to any other general safety instructions.
- Keep the machine clean to avoid the danger of fire!
- Before starting and using the system, check the area carefully. Make sure that you have clear sight at all times!
- When placing or removing supports, always place them in the prescribed position first (stability)!
- Always pay attention to the maximum weight, axis load and dimensions!
- Always check (and mount if necessary) any transport items, such as lights, safety signs, safety covers, etc.
- Never leave the driver seat while driving the vehicle!
- Note that the behavior of the vehicle, as well as steering and brake characteristics, are influenced by the WEED-IT system and the counterweights. Make sure you have sufficient steering and brake power.
- Only put the machine into service when all safety covers are in place and in the right position.
- Make sure that no people are present inside the virtual circle that the vehicle needs to turn around.
- Never fill the tank above the specified maximum!
- Read and follow the safety instructions of the manual of your sprayer.

2.2.4 Safety - electrical installation

- Only use approved fuses. Fuses that are too large may cause a system overload; this increases the possibility of a fire!
- Always connect the battery in the proper order: first connect the (+) terminal, followed by the (-) terminal. When disconnecting, do the same in reverse order.
- The (+) terminal should have a protective cover to avoid the possibility of a short-circuit (explosion)!
- Avoid sparks and open fire close to the battery.
- Make sure that no cables are trapped when working on the machine. Damage to the cables may cause a short-circuit; this increases the chance of a fire.
- The charging capacity for the battery should be more than 100A. (If necessary, put the vehicle in a lower gear, so that the engine generates more revolutions per minute, to ensure that the alternator generates more power.)
- When using an extra battery on the spraying rig, place the voltage regulating line on the battery of the rig, to ensure that the voltage drop between the vehicle and the rig is compensated by the voltage regulator on the alternator.
- When in doubt, contact your supplier.

2.2.5 Crop Protection Solutions

- Always follow the instructions of the manufacturer of the Crop Protection Solution!
  - Wear protective clothing!
  - Pay attention to any safety instructions and warnings!
  - Follow the guidelines about the application of the solution, the amount to be used, and the cleaning instructions.
- The use of certain herbicides may be subject to local law. Check for such laws and follow them strictly.
- Never open a pipe or hose that is under pressure!
- Repair the machine only after it has been cleaned extensively and always wear a protective mask.
- Never fill the tank above the specified maximum level.
- When handling herbicides or toxic agents, always wear protective clothing, such as protective gloves, protective clothing and protective glasses.
- Check for a possible interaction between the herbicide and certain sensitive parts of the machine.
- Don't use any herbicides that have the tendency to stick or coagulate.
- Crop protection machines may not be filled with surface water, in order to protect humans, animals and the environment.

For **storage** instructions, and instructions for **cleaning** and **transport**, refer to "Cleaning, Storage and Transport" on page 35.

2.3 Intended use

The WEED-IT system is intended to be used as an add-on to a crop spraying system. Use the WEED-IT only as described in this manual.

- Only use the system for spraying liquid herbicides.
- Only use parts that comply with manufacturer specifications.

Warnings when using certain herbicides

- Please note that the use of slow-effective herbicides (i.e. 20 hours or longer) may cause damage to pump membranes, hoses, pipes and tanks.
- Do not use of any unauthorized mixture of two or more different herbicides.
- Do not use herbicides that have the tendency to stick or coagulate.
- The WEED-IT is not suitable for herbicide powders that must be dissolved in water.
- When storing the WEED-IT for a longer period of time, flush the machine with clear water. In addition, clean all hoses carefully to prevent that the herbicide solution degrades the quality of the any hoses when it is not in motion.

2.4 Switching ON/OFF

The On/Off switch is located at the top left of the Control unit:

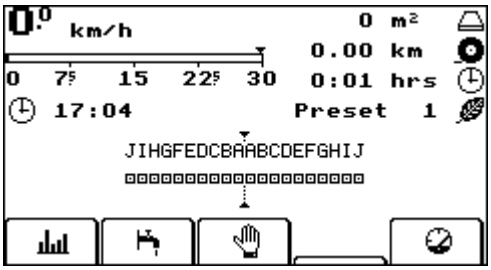
To switch on the WEED-IT:

The WEED-IT system switches on automatically once it receives a sufficient voltage from the battery. So be aware that once the master switch is put on, the WEED-IT will switch on.

1. Press and hold  for 1 second. You will hear a short beep and the display activates. After a couple of moments, the Start-up screen opens:

2. The system performs a self-test; the Control unit connects to the Power Converter and all connected sensors.

3. After self-test completion, the Main screen opens:



To switch off the WEED-IT:

1. Briefly press  . All settings and counters are stored.
2. The screen shows the WEED-IT logo and the text `Shutting down....`
3. The machine switches off after a short delay.

If you accidentally press  , restart the machine by pressing the **F1** key (Restart) within 2 seconds.

2.5 Forced shutdown

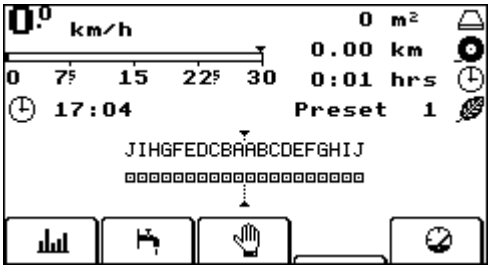
In the rare event of a system failure, use the On/Off switch to force a shutdown:

1. Press  for 5 seconds or longer; the system switches off.
2. Wait for 5 seconds before you switch the WEED-IT on again.

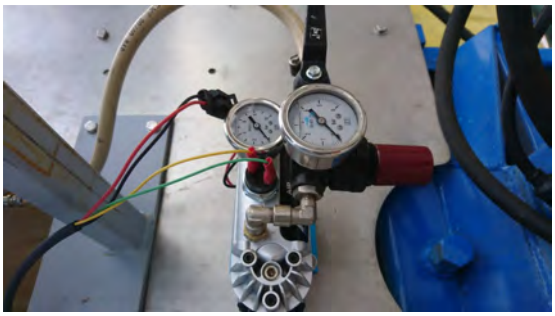
2.6 Before each use

Before use of the WEED-IT on a vehicle:

1. Fill the tank with a sufficient amount of water.
2. Switch on the WEED-IT and the pump. The Control unit shows the Main screen and the (optional) air compressor starts.



3. Check that the pressure in the Ramsay valve is 3.0 bar (43.5 psi). Optional: Check the pressure at the manometer. If the pressure sensor is installed properly, the pressure indicated by the control unit is binding. The pressure on the blue manometer is usually higher at the right pressure than 42 psi to obtain the actual 42 psi. If you need to adjust the pressure, pull and turn the dark red knob. Push the dark red knob when you have adjusted the pressure to a satisfactory level.



4. Check the system for leakages.
5. Press to flush the system with water and check that the pressure remains 3.0 bar (43.5 psi) in the feeding lines.
6. Make sure that the pressure drop in the feeding lines is not too high: check the actual pressure at the nozzle outlet, for example with the help of a nozzle tester.

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3. Identification of parts

This sections describes the parts in the WEED-IT system.

3.1 System overview

WEED-IT consists of:

- a series of Sensors, each with four detection channels
- a Control unit
- a Power converter.

In addition, the WEED-IT needs:

- a Pump (spraying system, to provide the required amount of liquid to all the nozzles on the boom.
- a pressure accumulator valve (Croplands PAV or Ramsay) and a small air compressor (optional) to maintain pressure to the valve
- an Air regulator
- Speed sensors (supplied with the system)
- Pressure sensor (supplied with the system)
- Flow sensor (optional)

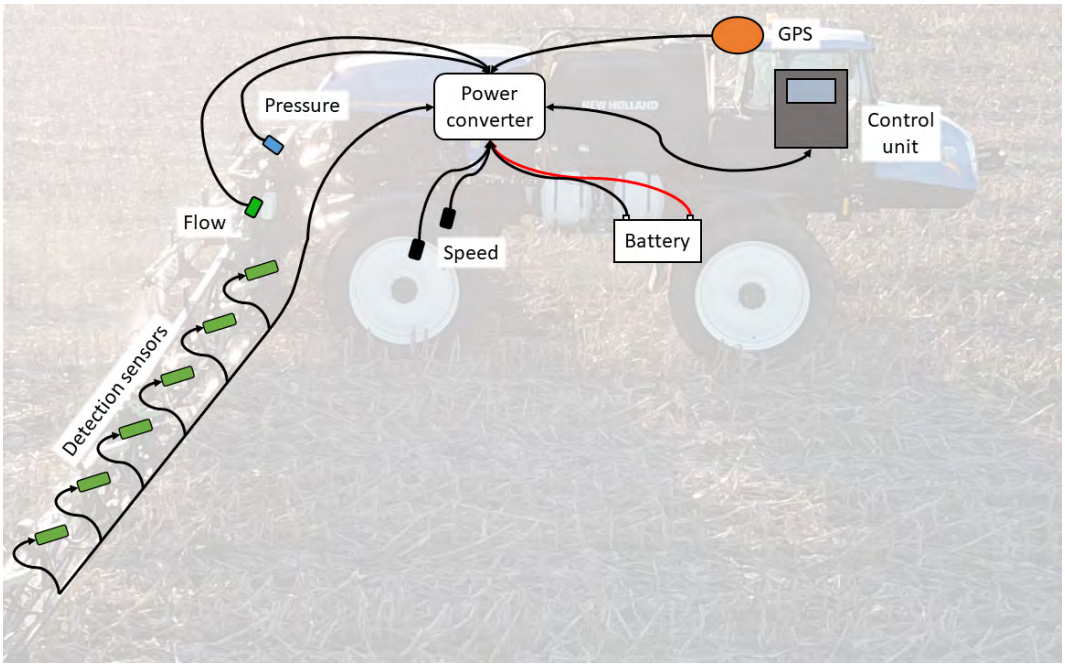


Figure 3-1 System overview

The WEED-IT will work with any type of pump, as long as it provides the required amount of liquid to feed all the nozzles along the boom. To maintain the pressure to all these nozzles, the system needs a PAV / Ramsay valve (pressure accumulator, membrane valve) in the spray line. It is controlled by a small air compressor. If the spraying system already has an air compressor, this can also be used for the WEED-IT system. The PAV / Ramsay valve equals the liquid pressure to the air pressure. To get the desired pressure, an air regulator is installed between the air compressor and the PAV / Ramsay valve. The unused fluid flow goes back into the tank via a return line (dump line).

⚠	Make sure that the primary valve (used to draw the liquid from the tank) and all couplings are absolutely water tight. Even the smallest leak will cause pressure variations or even pump failure. Leakage may also cause 'dripping' from the nozzles, instead of spraying. For all valves and fittings use plastic, stainless steel or chromed brass. Never use galvanized fittings, as the use of herbicides will cause corrosion.

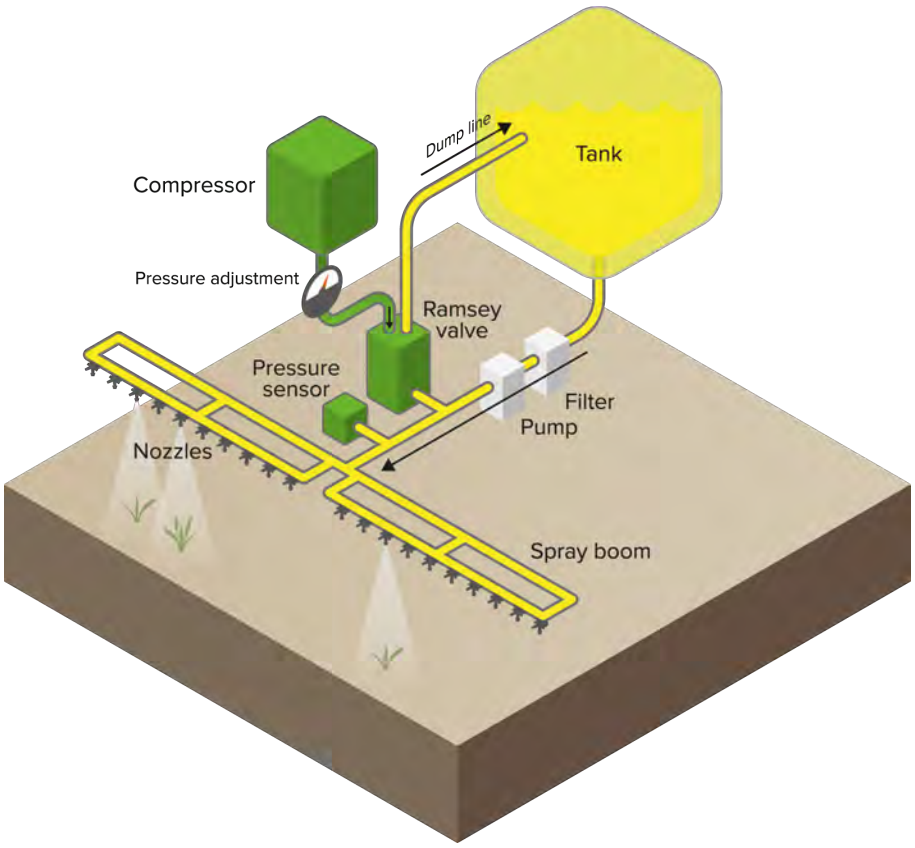
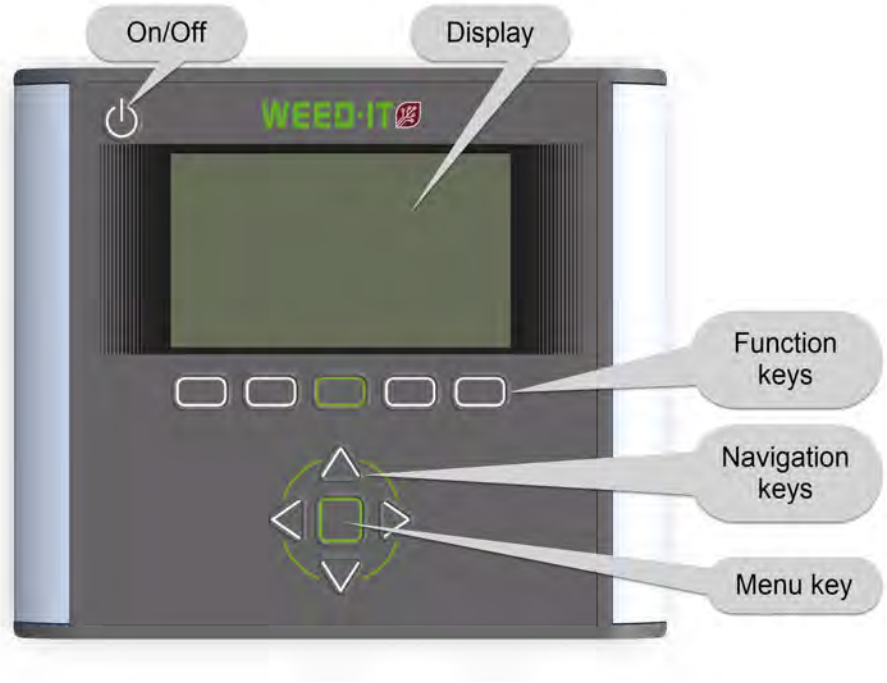


Figure 3-2 Flow in a standard WEED-IT installation

3.2 Control unit

Use the Control unit to control the WEED-IT system.

Make sure that every person who has access to the Control unit is familiar with all safety information provided in "Important safety information" on page 8.



On/Off	Press the On/Off switch to turn the WEED-IT on or off.
Display See "Display" on the next page	At start-up, the display shows the Start-up screen. The display shows the system status and other relevant information such as warnings, errors, driving speed, pressure and several menu items.
Function keys See "Function keys" on page 22	The function of these five keys depends on the menu level. Each key corresponds with a function displayed in the screen.
Navigation keys See "Navigation keys" on page 23	Use the navigation keys to select a value or to move through the items in the menu.
Menu key	Use the Menu key to change the menu level, the menu within a level, or to access a different user mode.

3.2.1 On/Off switch

The On/Off switch is located at the top left of the Control unit.

- » Press for 1 second to switch on the WEED-IT system
- » Press briefly to switch off the WEED-IT system.

At System start-up:

1. You will hear a short beep. The Start-up screen opens.

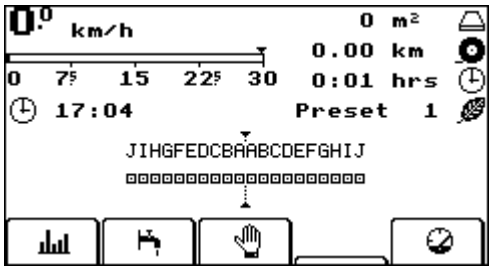
   It shows:

- » Control unit serial number
- » Firmware version number (the software inside the WEED-IT)
- » Firmware release date
- » Current date and time

3. The system does a self-test and the Control unit communicates with the Power converter (to which all components are connected).
4. Once the self-test is completed, the Main screen opens.

3.2.2 Display

When you switch on the WEED-IT system, the Start-up screen opens. Immediately after that, the **Main screen** opens:

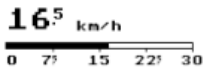
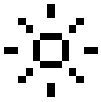


- » The screen above shows a system that has 20 sensors (10 on either side, identified as A through J).
- » The top of the screen shows a number of important values (subject to system settings).

Refer to "Main menu options" on page 37 for information on specific main menu options.

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

Main screen content:

	The current **Speed** of the vehicle. Depending on settings, speed is shown in: » m/s (meters per second) » km/h (kilometers per hour) » mph (miles per hour) The moving bar graphically presents the speed. The maximum speed is 25 km/h, but depends on system set-up and configuration.
Values	Frequently used **Values** are at the top right of the display. Press to navigate to other measurement displays.
	**Pressure** of the liquid in psi or bar. The pressure should be approximately 3.0 bar (43.5 psi). A warning appears if the pressure is too high or too low.
	**Surface**: The total area that was sprayed (in Ha from the moment the machine was turned **On**. The counter automatically resets when the machine is turned **Off**.
	**Trip distance**: The total distance traveled in km (or miles from the moment the machine was turned **On**. The counter automatically resets when the machine is turned **Off**.
	**Uptime**: The time in hours that has passed since the machine was turned on. The counter automatically resets when the machine is turned **Off**.
	Spray mode set (PWM OFF / Sport / Cover
	**Usage**: If a flow meter is connected, liquid use in L/Ha is displayed instead of the uptime clock.
	**Sensitivity**: The currently selected sensitivity preset.
	**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.
	The currently selected **Margin**. Allows you to change the margin of the spraying system during driving. Especially useful if you want to adapt the liquid spray in case of strong winds, or in case of uneven terrain or unstable spray booms.

Sensors	All **Sensors** are shown in the center of the display. Sensors are named from the center outwards, as seen from the back of the sprayer. Each sensor is presented as a small square with a centered dot and is identified by a single letter (starting with A for the sensor nearest to the driver seat). Example: 18 sensors, 9 on either side of the boom:  » each sensor has 4 nozzles that spray a corresponding lane of the surface. » in the example above, 11 sensors show activity. » vertical bars indicate nozzle activity. » an exclamation mark indicates that there is a problem (sensor B on the right boom) » a cross x indicates a disabled sensor
Menu bar	The lower part of the screen shows a menu bar with icons:  These illustrate the function of each **Function key**. Please note that the function of each key changes depending on the selected menu. Refer to "Main menu options" on page 37 for more information.
Warnings and messages	In case of problems, a message appears in the screen, just below the speed bar. If there is more than 1 message or warning, the message bar changes every few seconds to present messages consecutively. Refer to "Warnings and errors overview" on page 52 for more information.

3.2.3 Function keys

The Control unit has 5 function keys:

The function of each of these keys depends on the selected menu and is identified by an icon at the bottom of the screen. For the Main screen, this is:

- If a key is not linked to a particular function in a menu, no icon is displayed.
- Once a menu has been selected, you will be automatically directed to the main menu if no key is pressed for 3 seconds.
-  **F3** functions as the **Hold** key in the main menu. When driving the vehicle and using WEED-IT, press the key to temporarily disable (Hold) the WEED-IT system, for example when turning on the headlands.
- In other menus, the **F3** function key is mostly used to confirm a setting.

3.2.4 Navigation keys

The navigation keys consist of 4 arrow keys (Left, Right, Up, Down) and a Menu key in the middle:

- Use the arrow keys to select a value or to move through items in a menu.
- Press  to select a menu.
- Press  repeatedly to browse through available menus.
- Press and hold  for one second to enter the Service mode.

Refer to "Main menu options" on page 37 for more information.

Refer to "Service mode" on page 40 for more information.

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4. Using WEED-IT

Use the Control unit to control the WEED-IT system. The Control unit offers access to various menus that allow you to monitor and control the system. Please note that some features described in this section may not be available on your WEED-IT system. Contact you supplier for more information on installed options.

This section describes the procedures for regular use of the WEED-IT after installation on a spraying system.

Please refer to "Before each use" on page 15 if this is the first time you work with the WEED-IT.

Make sure that the primary valve (used to draw liquid from the tank) and all couplings are watertight.

- » A leak will result in pressure variations or even complete pump failure.
- » Air in the lines may result in dripping (instead of spraying) from the nozzles.

For all valves and fittings use plastic, stainless steel or chromed brass.

Never use galvanized fittings, because the use of glyphosate (and related substances) will cause corrosion.

The system has narrow fan nozzles for spot spraying. Check the nozzles regularly ("Nozzle cleaning menu (102)" on page 43).

The WEED-IT automatically adapts to changes in circumstances, for example the size of the plants, the soil type, ambient lighting and the weather situation (sun, rain, fog, etc). Nevertheless, the sensitivity of the detectors may have to be adjusted. Several different presets are available from the Preset Menu for that purpose (see "Preset menu options " on page 39).

	Make sure that sensor windows are clean. The cleaner the sensor windows, the more accurate the detection.
	The system can operate at a maximum speed of 25 km/h (15.5 mph). To be able to drive the system at that speed: » the distance between the detection line and the nozzles must be at least 600 mm (24 inch) » the pressure must be 3.0 bar (43.5 psi)(but at least 2.5 bar/36.3 psi) » nozzle height must be less than 600 mm (24 inch) » margin must be between 200 & 300mm
	» Battery voltage must be between 11.7 and 18 V for proper operation. Whenever the battery voltage drops below 11.7 Volt, a warning will be issued; the system switches off when the voltage drops below approx. 11.5 V.
	» The alternator must have a charging capacity of at least 100 Amp. For systems with more than 30 sensors, we recommend at least 150 Amp. For 36-meter systems, we recommend to have a 200 A alternator.
	» Flush the valves (nozzles) regularly with clean water to avoid clogging.
	» Sensitivity of the sensors may have to be adjusted, depending on circumstances. Refer to "Changing sensitivity" on page 31 for more information.
	» We recommend to use at least a 100 mesh pressure filter in your sprayer to prevent solenoid valve clogging or damage due to particles.

4.1 Main menu and Service mode

Two User levels are available:

- Main menu: This is the default mode. With the main screen open, **briefly** press  to navigate through available menus. If no key is pressed for 3 seconds, the system takes you back to the Main screen. Refer to "Main menu options" on page 37 for more information on available options.
- Service mode: Use this mode to check and/or change system settings. Press and hold  **for 1 second** to enter the Service mode. Refer to "Service mode" on page 40 for more information on available options.

4.2 Pressure check

Before each use, check system pressure by briefly flushing the WEED-IT system:

Note this is also a good practice to clear excess dust build-up especially after transporting some distance.

1. Switch on the system.
2. Press **F2** (Flush):

3. Check that the pressure is 3.0 bar (43.5 psi). The top right of the Control Panel shows the pressure.

Please note: If the machine has been in storage for a longer period of time, the pressure may be higher. After flushing the system, the pressure should return to the regular 3.0 bar (43.5 psi).

4.3 Sensors check

Before each use, check functioning of the detection sensors:

1. Make sure there are no plants in the detection line (to prevent the corresponding nozzles from spraying continuously in step 6).
2. Switch on the system.
3. Wait for the Main screen to open.
4. Enter the Service mode.
5. Press  repeatedly until menu 102 opens.
6. Press to activate Detection. As long as Detection is active, the leaf icon will flash.
7. Activate nozzles by supplying chlorophyl (green plant material) in the corresponding sensor channels.
8. Press again to stop.
9. Press to return to the Main screen.

Additionally, use one of the other Service mode options in "Nozzle cleaning menu (102)" on page 43.

Replace a faulty or damaged sensor with a new one.

If no replacement sensor is available, move a functioning sensor from the outside of the boom to the position of the faulty sensor. In this way, you can still spray a complete area (even though it is not as wide as you would like it to be) and communication is not interrupted.

Make sure that the nozzle configuration is correct for this sensor (distance and height). Also adjust the offset, because this changes if the sensor's position on the boom is changed. Please contact your supplier to support you with this step.

4.4 Cleaning nozzles

Flush the nozzles regularly with clean water to avoid clogging.

1. Fill the tank with water.
2. Start the system.
3. Wait until the Main screen opens.
4. Press to flush all nozzles.

Use one of the following methods to clean an individual nozzle more thoroughly:

Service Mode (100):

1. Make sure there are no plants in the detection line.
2. Stop the vehicle.
3. Enter the Service mode.
4. Use the Sensor information menu to switch off the sensors that do not need to activate nozzles.

Use the nozzle cleaning menu (102):

1. Make sure there are no plants in the detection line (to prevent the corresponding nozzles from spraying continuously in step 6).
2. Stop the vehicle.
3. Enter the Service mode.
4. Press  repeatedly until menu 102 opens.
5. Press to activate Detection. As long as Detection is active, the leaf icon will flash.
6. Activate the nozzle by supplying chlorophyl (green plant material) in the corresponding sensor channel.
7. Press again to stop.
8. Press to return to the Main screen.

4.5 Reading job productivity

Several options are available to check job productivity apart from the information given in the Main screen.

1. Enter the Service mode.
2. Press  repeatedly until menu 103 opens.

Refer to "Job menu (103)" on page 44 for more information.

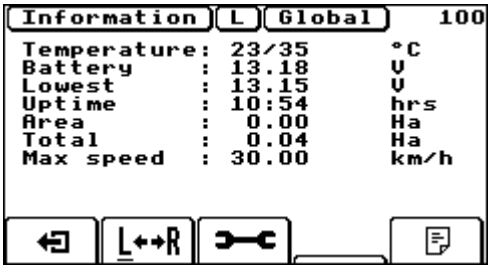
4.6 Changing the PWM mode

WEED-IT can be used in various modes:

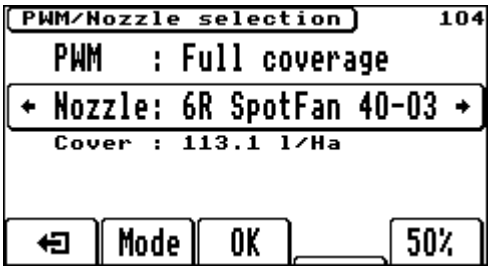
- Spot spraying, see "Spot spraying mode" on page 45
- Full coverage, see "Full coverage mode" on page 46
- Dual function (spot & coverage), see "Dual function" on page 48

To change the spraying mode:

1. Stop the vehicle.
2. Enter the Service mode. The global information screen opens:



3. Press  briefly a number of times, until menu 104 opens:

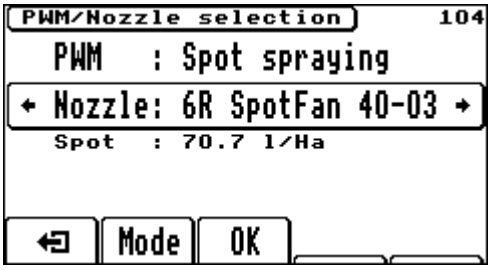


4. Press the **Mode** function key to select the PWM mode you wish to use.
5. Adjust the available parameters to match your nozzle type and preferred spray rates.
6. Press **OK** to confirm. All sensors are reconfigured and the system restarts.

4.7 Setting the nozzle type

Follow the steps below if you have replaced nozzles on the WEED-IT by a new type:

1. Stop the vehicle.
2. Enter the Service mode.
3. Press  briefly a number of times, until menu 104 opens:



4. Use the **Up/Down** navigation keys to select the nozzle parameter, if necessary.
5. Use the **Left/Right** navigation keys to select the appropriate nozzle type.
6. Press **OK** to confirm. All sensors are reconfigured and the system restarts.

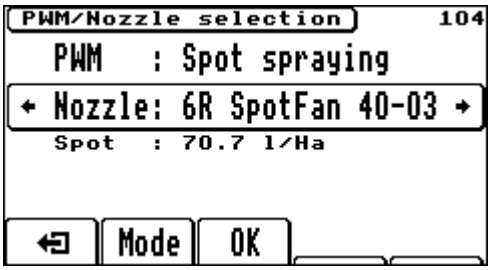
	Only use the nozzle types that you can select in the software. The nozzle type is usually engraved in the top surface of the nozzle.

For more information, see "PWM mode/Nozzle selection menu (104)" on page 45.

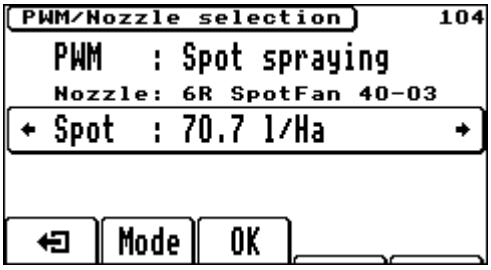
4.8 Changing application rate

Follow the steps below if you want to change the application rate:

1. Stop the vehicle.
2. Enter the Service mode.
3. Press  briefly a number of times, until menu 104 opens:



4. Use the **Up/Down** navigation keys to select the Spot and/or Cover parameter if necessary; use the **Left/Right** navigation keys to change the application rate.
   - » The spot parameter determines the amount of herbicide mix that is applied to the weeds that are detected by the system. The herbicide is applied at the selected application rate for any speed up to 25 km/h and also while turning.
   - » The cover parameter determines the amount of herbicide mix that is applied to the entire field (full coverage mode) or the rest of the field (dual function mode).



5. To correctly calculate how much spraying liquid is applied, WEED-IT needs to know which nozzle type is used. When mounting a different type of nozzle, use menu 104 to select the appropriate type before proceeding. This nozzle is used for all PWM modes and can be adjusted in the same way in all of these modes. See "Setting the nozzle type" on page 29
6. Press **OK** to confirm. All sensors are reconfigured and the system restarts.

4.9 Changing the margin during spraying

The WEED-IT system allows you to make changes to the spraying margin during use of the system, for example to compensate for strong winds.

Please note that spraying during very strong winds is not advised.
Larger margins should be used in rough terrain, with unstable booms or around contour banks.

From the Main screen:

1. Press  briefly to open the Preset menu:

2. Press  to change the margin. By default, the margin presets are defined as follows:
   - 1 = 200 mm
   - 2 = 230 mm
   - 3 = 270 mm
   - 4 = 300 mm - advised for rough terrain / contour banks
3. Press  repeatedly until the required margin is displayed.
4. Press  twice or wait for 3 seconds to return to the Main screen.

4.10 Changing sensitivity

The sensitivity of the sensors may have to be adjusted, depending on circumstances. Several different presets are available in the Preset-menu to define sensor sensitivity:

1. From the Main screen, press  once to enter the **Preset** menu.
2. Use to select the desired preset. This function allows the WEED-IT to be used under different / reflective or changing conditions such as wet surfaces after rain, freshly harvested crops, in bright sunlight, at night or with very small plants. Each preset has a number; the number is displayed on the sensitivity key and in the top right of the screen. A low number means a high sensitivity and a high number means a low

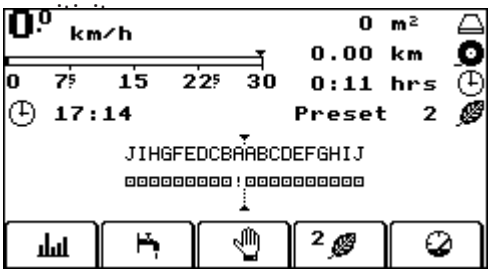


Figure 4-1 Preset number 2 selected

You may have to experiment to find the appropriate setting. Check the display to verify sensor response. A series of vertical bars under the sensor icons indicates the activity of each sensor.

Refer to "Preset menu options " on page 39 for more information on presets.

4.11 Machine on hold

Use the Hold function to temporarily stop spraying, for example when turning on headlands:

» In the main screen, press the function key.

» Press once more to resume spraying.

If you have installed an external hold switch you can use this switch as well as the function key.

5. General maintenance

Make sure you follow the cleaning instructions after each use of the WEED-IT. See "Cleaning, Storage and Transport" on page 35 for more information.

- Service, repair and clean the machine only with the engine turned off!
- Always remove the key from the ignition.
- Check all bolts and nuts regularly and tighten them if necessary.
- When welding on the vehicle or close to it, always remove the cables from the alternator and the battery! Also, disconnect all cables from the WEED-IT sensors.
- When replacing any defective parts, make sure that the replacement parts conform to the specifications of the manufacturer of the WEED-IT system. Original WEED-IT spare parts always conform to these specifications and are available from your supplier. Using non-approved replacement parts voids warranty.

Safety - electrical installation

- Only use approved fuses. Fuses that are too large may cause a system overload and increases the possibility of a fire!
- When servicing the electrical installation, always remove the (-) terminal of the battery.
- Always connect the battery in the proper order: first connect the (+) terminal, followed by the (-) terminal. When disconnecting, do the same in reverse order.
- The (+) terminal should have a protective cover to avoid the possibility of a short-circuit (explosion)!
- Avoid sparks and open fire close to the battery.
- Make sure that no cables are trapped when working on the machine. Damage to the cables may cause a short-circuit and increases the chance of a fire.
- The charging capacity for the battery should be more than 100A. (If necessary, put the vehicle in a lower gear, so that the engine makes more revolutions per minute, to ensure that the alternator generates more power.)
- When using an extra battery on the spraying rig, place the voltage regulating line on the battery of the rig, to ensure that the voltage drop between the vehicle and the rig is compensated by the voltage regulator on the alternator.
- When in doubt, contact your supplier.

5.1 Sensor maintenance

Regularly clean the windows of the sensors with a soft clean cloth.

Make sure you use a clean cloth; sand will scratch the sensor windows.

After system start-up any leaking sensors will be indicated by the system. A leakage error will be displayed, including which sensor(s) is suffering from this issue. Possible causes:

- Sensor housing (seal) damage.
- Damaged breather plug, located behind the sensor connector.
- Missing sensor cable. This cable must be connected to the sensor at all times, and the orange seal in this connector must be intact.

If the sensor cable is removed, place a connector dust cap in the connector on the sensor.

Always return a leaking sensor to your Supplier/Dealer for further diagnosis.

If no replacement sensor is available, move a functioning sensor from the outside of the boom to the position of the faulty sensor. In this way, you can still spray a complete area (even though it is not as wide as you would like it to be) and communication is not interrupted.

Make sure that the nozzle configuration is correct for this sensor (distance and height). Also adjust the offset, because this changes if the sensor's position on the boom is changed. Contact your supplier for support.

5.2 Nozzle maintenance

We recommend to use at least a 100 mesh pressure filter in your sprayer to prevent solenoid valve clogging or damage due to particles.

Do not leave your sprayer with chemical in the spray line. Always rinse the spray line and nozzles with clean water before storing the machine, even if you will use it again the next day.

Regularly flush nozzles to make sure that they are not clogged. Refer to "Cleaning nozzles" on page 28 for more information. Always replace faulty nozzles.

To replace a nozzle:

1. Twist the nozzle cap counter clockwise.
2. Push the nozzle and nozzle seal out of the nozzle cap. Undamaged nozzle caps may be re-used.
3. Fit a new nozzle and nozzle seal into the cap.
4. Twist the cap, nozzle and seal back on clockwise.

6. Cleaning, Storage and Transport

Turn off the engine and remove the key from the ignition before you start cleaning, storage or transport procedures.

When storing the machine for a longer period of time:

1. Flush the machine with clean water.

2. Clean the machine on the outside to prevent that the herbicide solution degrades sensitive materials.

General storage instructions

- Always store the machine in a dry warm place.
- Ensure that all pressure is released from the system before storing it. Stop the pump and press .
- When the machine is stored for a longer period of time, disconnect the system from the battery. The easiest way to do this is to disconnect the main power plug. Use of a master switch is recommended.

- Once the spraying season is over, remove the control panel and store it in a dry warm place:
    1. Disconnect the console connection cable from the control unit.
    2. Put the dust cap on the open control unit connector.
- Always clean the filters of your sprayer before storage. Refer to your sprayer's manual.
- Storage in freezing circumstances requires adding anti-freeze fluid to the fluid system. Make sure the anti-freeze fluid is appropriate for the circumstances and that it is well distributed through your sprayer's fluid system. This includes the added WEED-IT spray-related parts such as the solenoid valves and the ramsey valve.

General cleaning and transport instructions

- Do not clean the system with a high pressure nozzle (control panel, power box, sensors, etc.).
- Regularly clean the sensor windows with a soft cloth. Note that sand will scratch the windows.

7. Control unit - reference

Use the keys on the Control unit to control the WEED-IT. All options are grouped in menus.

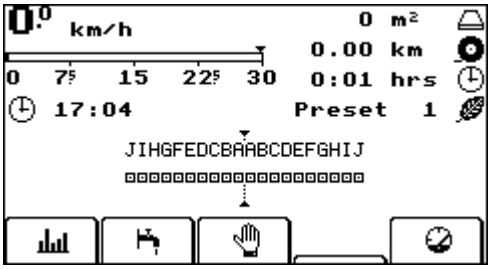
Please note that available menu options depend on the options installed on the system.

Two menu levels are available:

1. Main menu (refer to "Main menu options" below).
2. Service mode (refer to "Service mode" on page 40).

7.1 Main menu

If the Main menu is active, the Main screen is open and the main menu is selected:

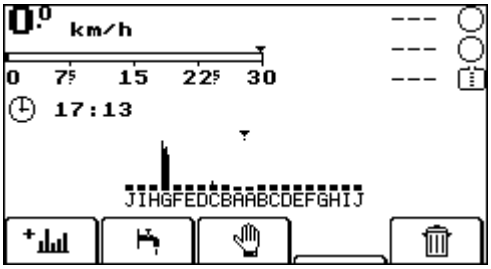
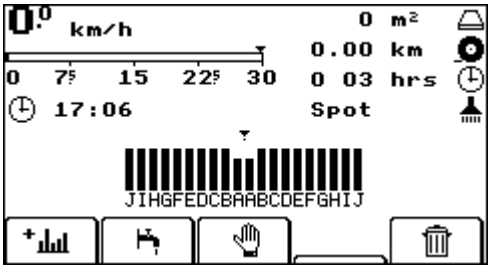
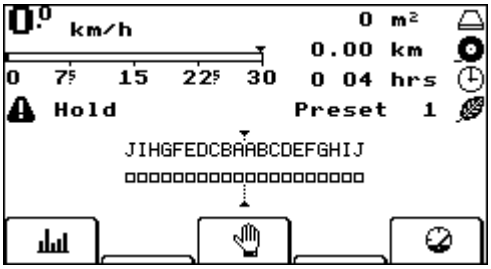


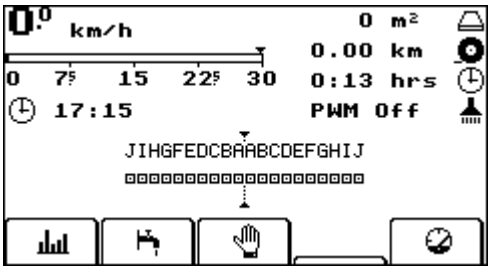
» Press  briefly to browse through available menus (Main menu and Preset menu).

» If no key is pressed for 3 seconds, the system will take you back to the Main screen.

7.1.1 Main menu options

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

	**Activity (histogram)**: Use this key to toggle between the standard activity display and three different types of usage histograms. The standard usage display shows the activity of each individual sensor in small vertical bars under the sensor. Histograms can be used to display the level of activity over time and per nozzle:   Repeatedly press to select a different histogram level: » **F** fast; the display shows the short-term activity in a histogram » **S** slow; the display shows the long-term activity in a histogram » **+** All; the display shows all activity from the moment the machine was switched on.
	**Flush**: Use this key 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.
	**Hold**: Use this key to temporarily put the machine on hold, for example when you cross a street, or when turning on the headlands. The buzzer will sound intermittently. 

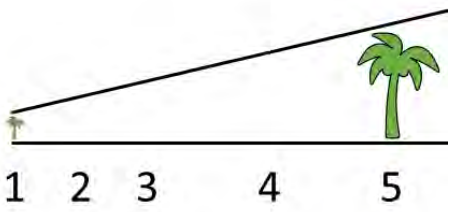
	**Measurement toggle**: Use this key to toggle between various types of measurement displays in the top right corner of the display: 
	Note that in the Main screen, the bottom line changes every three seconds.

Press  briefly to move to the next menu.

7.1.2 Preset menu options

Use the Preset menu to change the spraying margin and sensitivity of the WEED-IT.

	**Histogram**: see description Main menu.
	**Margin**: WEED-IT uses a certain margin when spraying a target. This margin varies from 200 ~ 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. The number of the selected margin is displayed to the left of the icon. 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 2.230 mm 3.270 mm 4.300 mm
	**Hold**: see description Main menu

	Sensitivity: The WEED-IT will automatically adjust to changes in circumstances, e.g. the size of the plants, recently harvested / reflective stubble, 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 
	Measurement toggle: see description Main menu.

Press  briefly to move to the next menu.

7.2 Service mode

Press and hold  for 1 second to enter Service mode. A long beep confirms that you are in Service mode. The global information screen opens.

Press  briefly a number of times to browse through the available menus.

Service mode offers the following menus:

- **100 Information**: Offers general information about various WEED-IT components
- **101 Warnings**: Shows warnings issued by the system
- **102 Nozzle cleaning**: Tests sensor and nozzle activity
- **103 Job menu**: Displays productivity status of individual jobs
- **104 PWM mode and Nozzle selection**: Allows you to change the PWM mode and to set nozzle cap type.

7.2.1 Information menu (100)

The Information menu offers general information about the WEED-IT system, plus information about each sensor. The information is spread over several pages/screens.

- Use L↔R to toggle between information on the left or the right boom.

The first page shows general system information:

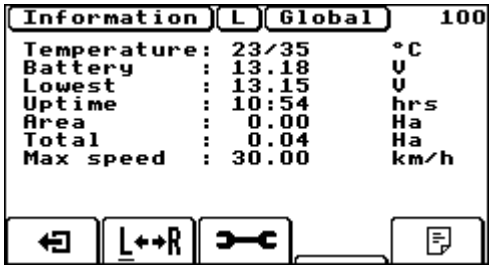
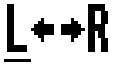


Figure 7-1 Global information screen

Temperature	Shows two values. The first one is the temperature measured inside the Control unit. The second one is the temperature measured in the Power converter.
Battery	Shows the current battery voltage.
Lowest	Shows the lowest battery voltage measured during this session.
Uptime	Total hours of use of this unit
Area	Sprayed area during this session.
Total	Total sprayed area (during machine life).
Max speed	Maximum speed that is possible with current machine settings.

	Press this key to leave the Service mode and to return to the Main screen.
	Press this key to select the Left boom (L) or the Right boom (R). The underlined one is the selected one.
	Press this key to enter the user configuration menu.
	First sensor. Press this key to open information on the first sensor. Note that the Function keys change when you access the **Sensor information** menu!

The Sensor information menu

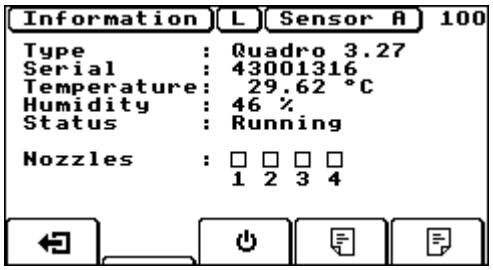
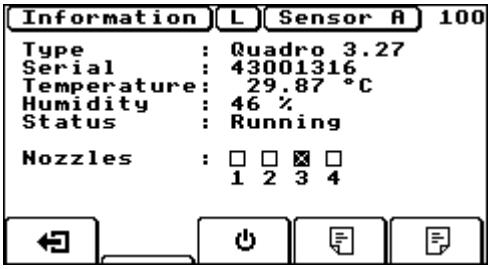


Figure 7-2 Information Left Boom, Sensor A

The following information is available on each sensor:

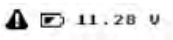
Type	Sensor model and firmware version.
Serial	Serial number of the sensor.
Temperature	Temperature inside the sensor.
Humidity	Humidity inside the sensor. If the value is too high, a message opens in the screen. Have the sensor replaced by your supplier.
Status	Current status of the sensor (e.g. Running, Error, Off, ...).
Nozzle	Status of the individual nozzles. Nozzle failures are indicated with a cross (see nozzle number 3): 

Function keys in the **Sensor Information** menu have the following meaning:

	Press this key to **leave the Service mode** and to return to the Main screen.
	Press this key to turn the selected sensor **on** or **off**.
	Press this key to go to the **Previous** sensor.
	Press this key to go to the **Next** sensor.

7.2.2 Warnings menu (101)

In the Main screen, warnings are displayed directly below the speed bar. If there are no warnings or messages to display, a clock is shown. Only one message at a time can be shown here:



Because the screen is rather small, messages/warnings will be very short. If more than one message is pending, or if multiple errors occur at the same time, each message is shown for a few seconds.

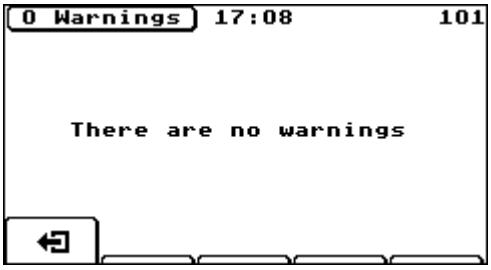


Figure 7-3 Warnings Global screen - no warnings or error messages

Warnings are shown in a list. If the list is too long to fit the screen, use the and keys to access the rest of the list.

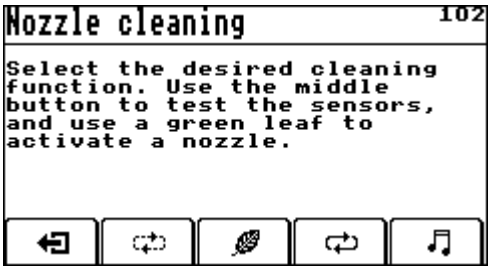
- All warnings and error messages are stored when the WEED-IT is switched off. To clear the list of warnings, press the key.
- Errors or warnings that are persistent will re-appear.

7.2.3 Nozzle cleaning menu (102)

The Nozzle cleaning menu is only available when the vehicle is **not** moving.

Use the Nozzle cleaning menu to:

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



	Press the **Exit** key to leave the Service mode. The main screen opens.
	Press the **Chase** key to activate nozzles one by one with a short burst.
	Press the **Detection** key test nozzles. Holding a leaf under a sensor should activate the corresponding nozzle.
	Press the **Sequencing** key to activate nozzles one by one with a long burst.
	Press the **Melody** key to activate nozzle cleaning at a variety of frequencies, simulating PWM control.

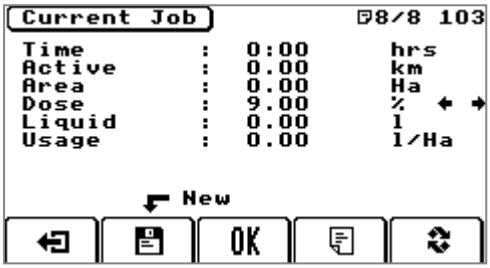
7.2.4 Job menu (103)

Use the Current job menu to view the recorded data of the current job.

Liquid can be determined if at least one flow meter has been installed that registers the liquid flow to the nozzles. To determine the amount of herbicide, the **Dose** variable must be correctly set (e.g. 10 % means 10 liters of herbicide per 100 liters of liquid).

WEED-IT remembers usage parameters of the 7 previous jobs (or 7 previous days, depending on settings).

When you enter menu 103, the screen shows the current job totals (or the current day totals), indicated as page 8/8:



Time	Duration of the current job
Active	Current job covered distanced
Area	Current job covered area
Dose	% of the herbicide used in the mixture. Use the **Left/Right** navigation keys to adapt the value. Press OK to confirm.
Liquid	Total volume of liquid sprayed for the current job
Usage	Total volume of liquid used per Ha (Liquid divided by Area) for the current job

	Use this key to return to the Main menu
	Use this key to start a new job. Please note that a maximum of 8 jobs can bed saved. If you start a new job, the data for the first job is deleted. By default, the details in menu 103 are stored per **job**. If you save data per job, you can monitor multiple jobs on a single day. However, your Supplier/Dealer can change this to storing data per **day**.
	Use this key to confirm a setting
	The first screen shows the current job . However, you can also view totals of the previous 7 jobs on which the WEED-IT was used. Press and to scroll through the screens. The top of each screen shows the date on which the data was recorded.
	When viewing the current job, the screen is not refreshed to make sure that you can read the values. Press at any time to refresh the screen.

7.2.5 PWM mode/Nozzle selection menu (104)

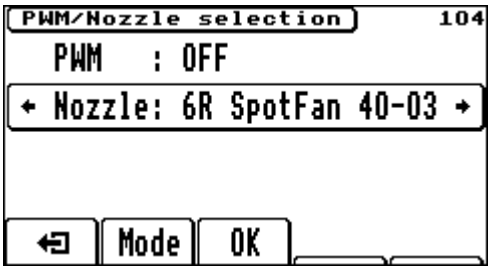
This menu is **not** available while driving the vehicle. This means that you will have to stop the vehicle before you can select a different nozzle cap or set the application rate.

Use menu 104 to select the spraying mode and the nozzle type to be used.

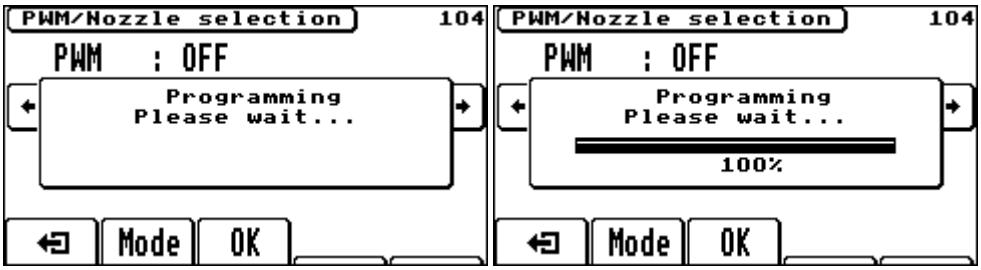
WEED-IT can be used in various modes:

- Spot spraying
- Full coverage
- Dual (spot & cover)

By default, PWM (Pulse Width Modulation) is disabled. If PWM is disabled, menu 104 looks like this:



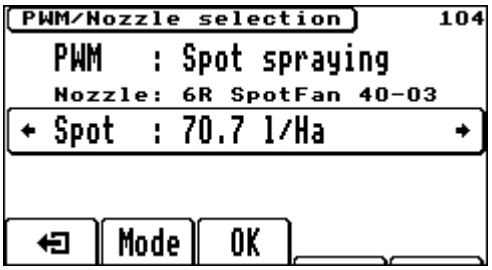
After changing the PWM mode or the application rate, all sensors must be reconfigured. Press the **OK** key to confirm the new settings and update all sensors. This may take a couple of seconds:



The system automatically restarts.

Spot spraying mode

Press the **Mode** key to enable **Spot spraying mode** . The screen changes:

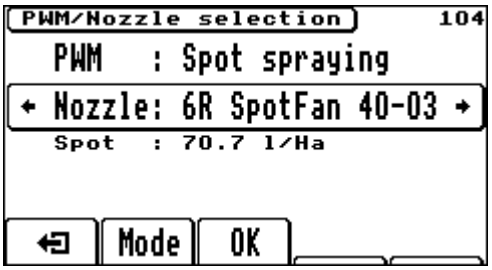


Two extra parameters are now available for selection:

- the nozzle type
- the application rate

To change settings:

1. Stop the vehicle.
2. Use the **Left/Right** navigation keys to change the application rate. This amount of herbicide mix is only applied to the weeds that are detected by the system. The herbicide is applied at the same application rate for any speed up to the optimum speed and also while turning.
3. Use the **Up** navigation key to change the nozzle type. The first parameter is highlighted:



4. To correctly calculate how much spraying liquid is applied, WEED-IT needs to know which nozzle type is used. When mounting a different type of nozzle, use menu 104 to select the appropriate type before proceeding. This nozzle is used for all PWM modes. Use the **Left/Right** navigation keys to select the appropriate nozzle type.
5. Press **OK** to confirm. All sensors are reconfigured and the system restarts.

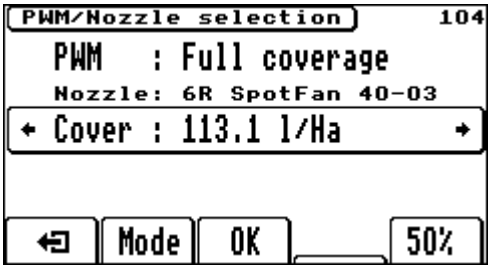
Only use the nozzle types that you can select in the software.

The nozzle type is usually engraved in the top surface of the nozzle.

Full coverage mode

Full coverage mode will spray liquid continuously, like in a regular spraying application. The sprayed amount is independent of the driving speed, turning and detection.

- Press the **Mode** key to enter Full coverage mode.
- Set the Cover parameter to adjust the amount of liquid used (application rate).



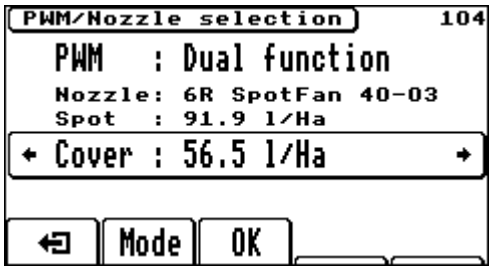
» Use the **Up** navigation key if you need to change the Nozzle type).

	Only use the nozzle types that you can select in the software. The nozzle type is usually engraved in the top surface of the nozzle.

Press the **OK** key to confirm the new settings and update all sensors. The system automatically restarts.

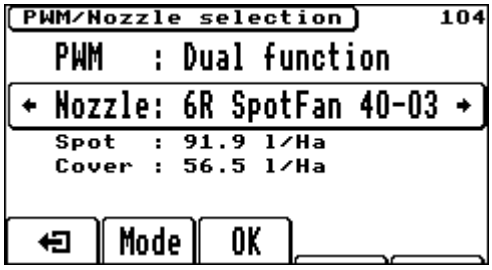
Dual function

Press the **Mode** key until the Dual function screen opens:



The Dual function combines Spot spraying and Full Coverage; it applies a fixed amount of herbicide to the whole field (Cover). When a weed is detected, a different amount (Spot) is applied. The spot application rate must be higher than the Full coverage rate.

This mode also offers a nozzle setting parameter:



Only use the nozzle types that you can select in the software.

The nozzle type is usually engraved in the top surface of the nozzle.

Press the **OK** key to confirm the new settings and update all sensors. The system automatically restarts.

7.3 User settings menu

The User settings menu allows you to set basic configurations for your WEED-IT system.

To access the User settings menu:

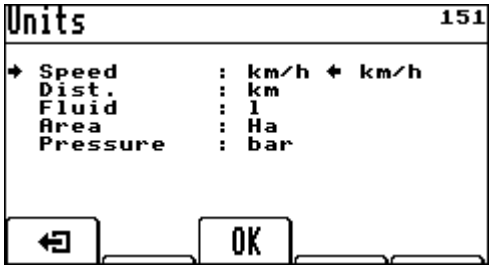
1. Enter Service mode.
2. Press .

7.3.1 Configuration (150)

- Use the **Up/Down** navigation keys to select the parameter you wish to change.
- Use the **Left/Right** navigation keys to change the setting.
- Press the **OK** key to confirm settings.

Lang	Select the display language you would like to use
Volume	Select the volume for alarms etc
Contrast	Change the display contrast

7.3.2 Units (151)



- Use the **Up/Down** navigation keys to select the parameter you wish to change.
- Use the **Left/Right** navigation keys to change the setting.
- Press the **OK** key to confirm settings.

Speed	Select the unit for speed that you would like to use
Dist.	Select the unit for distance that you would like to use
Fluid	Select the unit for Fluid that you would like to use
Pressure	Select the unit for Pressure that you would like to use

7.3.3 Options (152)

» Use the **Up/Down** navigation keys to select the parameter you wish to change.

» Use the **Left/Right** navigation keys to change the setting.

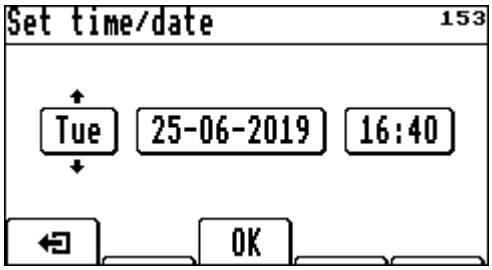
» Press the **OK** key to confirm settings.

History per job (not day)	Select if you wish to show the history per job instead of per day.
Imperial Units (UK)	Select if you wish to use UK Imperial units
US date notation	Select if you wish to use US date notation

7.3.4 Set time/date (153)

WEED-IT has an internal clock that keeps track of the current date and time, even when the system is turned off or when the battery is disconnected for a longer period of time. The clock is powered by its own lithium battery that will keep the clock running for approximately one year.

When the battery has been replaced, you will have to set the clock to the current date and time. If WEED-IT detects an impossible date when it is turned on, menu 153 will automatically open.



» Use the **Up/Down** navigation keys to select the parameter you wish to change.

» Use the **Left/Right** navigation keys to change the setting.

» Press the **OK** key to confirm settings.

If the 153 screen opens immediately after starting WEED-IT, the battery is probably empty.

If the 153 screen keeps appearing after a restart, even after setting the clock correctly, the battery is definitely empty.

Contact your supplier if the battery is empty.

8. Troubleshooting

This section offers information on:

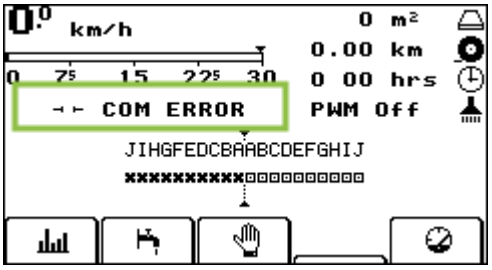
- Errors
- Warnings

8.1 Messages

WEED-IT identifies the following types of messages (highest priority first):

1. Errors
2. Warnings
3. Messages

In case of problems or errors, a message appears on the screen. In the Main menu, a message is displayed immediately below the speed bar:



In the Main menu, only one message can be displayed at a time. If more than one message is pending, or if multiple errors occur at the same time, each message is shown for a few seconds. Use the **Message** menu to check for any other messages. To access the Message menu:

1. Press  for 1 second to enter the Service mode.
2. Repeatedly press  until menu 101 opens.
3. The header indicates the number of warnings that has occurred. Each line in the display shows one message:

4. An error is automatically removed from the Main screen when a problem is solved. The error will still be visible in this screen (101) as a non-persistent error.

» When, for example, the pressure is low because the pump was not running, the error message will disappear from the Main screen when the pump is turned on and the pressure is above the lower limit.

» The **dot** in front of an error indicates that the error is persistent.

	Press this key to return to the Main screen.
	Press this key to clear any temporary errors and messages. In case of a permanent error, the message for that error will re-appear immediately.
	These keys are available if the list is too long for the screen. Use the keys to access the rest of the list.

If more than one warning has been issued, they appear consecutively in the Main screen: You will see each message for a few seconds before the next one is displayed. To see all messages simultaneously, use menu 101.

When WEED-IT is turned off, all messages are deleted. Only the dealer can then retrieve 'old' messages from a special dealer menu.

8.2 Warnings and errors overview

See also "Warnings menu (101)" on page 42.

Errors & Warnings	Details	How to resolve
ERROR	A serial problem has occurred. This message appears whenever a serious internal malfunction has occurred in the Control unit's firmware.	Contact your supplier immediately and report when and how the error occurred. Also make a note of the circumstances under which the error occurred, as well as the precise text in the error report (Messages menu - 101)
No ORBUS	The Power Converter does not reply	Check the Control unit connection cables (between the Power converter and the Control unit) for physical damage. Contact your supplier and report when and how the error occurred. Also make a note of the circumstances under which the error occurred.

Power off	Sensors have been switched off due to low voltage	Check the machine's battery supply voltage when the WEED-IT is turned on. Preferably also switch on flush mode to simulate the system's power consumption under normal operating conditions. Check that the WEED-IT power cables are connected directly to the battery! In some cases it may help to install 2 battery's at your machine to provide extra buffer in the power supply. If the voltage drops under the lower limit (also described below), recharge or replace the battery. Also check the alternator capacity.
Battery	Battery voltage too low. Appears whenever battery voltage drops below a certain (pre-determined) value. The message reports the lowest voltage measured during this session. For example: 	Even though the battery voltage seems to be sufficient, it is possible that the voltage sometimes briefly drops below the lower limit. Check the lowest battery voltage in the Message menu (101). The lower limit is displayed to the right of the message. The lower limit is preset by the manufacturer and cannot be changed. A typical message in menu 101:  This means that the lowest measured battery voltage is 11.28 Volt, while the lower limit is for example 11.50 Volt. This may be an indication that the battery is running low; recharge or replace the battery. Also check the alternator capacity.

COM error	A communication failure has occurred	On the main screen, sensors with communication problems show up with x's instead of the square box with a dot in it. Find the first sensor from the center of the sprayer that shows this issue (for example left D). Try swapping one sensor closer to the middle (left C) with the outermost sensor (left I). If this solves your problem, put sensor I back in place and order a replacement sensor from your supplier and have them install it. If this doesn't solve the problem, try swapping the next sensor on the boom (left D) with this sensor. If this does not solve the problem: » Check the Control unit connection cables (between the Power converter and the Control unit) for physical damage. » Do the same for all of the cables running from the power converter to the detection sensors. » Check the sensors themselves for physical damage. If all of this does not solve the problem contact your supplier immediately.

Sync error	Synchronization failure between sensors	On the main screen, sensors with communication problems show up with x's instead of the square box with a dot in it. Find the first sensor from the center of the sprayer that shows this issue (for example left D). Try swapping one sensor closer to the middle (left C) with the outermost sensor (left I). If this solves your problem, put sensor I back in place and order a replacement sensor from your supplier and have them install it. If this doesn't solve the problem, try swapping the next sensor on the boom (left D) with this sensor. If this does not solve the problem: » Check the Control unit connection cables (between the Power converter and the Control unit) for physical damage. » Do the same for all of the cables running from the power converter to the detection sensors. » Check the sensors themselves for physical damage. If all of this does not solve the problem contact your supplier immediately.

ORBUS ERROR	The Power Converter has reported a problem	Check the Control unit connection cables (between the Power converter and the Control unit) for physical damage. Check the Power converter for any damage. Open the lid and check for any signs of short circuits or moisture inside. Contact your supplier immediately and report any findings.
Max sensor	The maximum number of sensors has been exceeded	This setting can only be changed by the manufacturer. Please contact us.
Serial # invalid	The Control unit does not have a valid serial number	Contact your supplier immediately and have them replace the Control unit.
Sensor firmware too old	The version of the firmware inside the sensor is too old	If the error occurs after a sensor replacement, your supplier must update the sensor firmware. If this problem occurs without changing the sensors, there is a communication problem between one of the sensors and the Control unit. Follow the same procedure as you would in case of a COM error. The sensor with the communication issue is in this case not the one with the x, but the sensor that shows a software version 0.00 in the sensor information menu (100).

Sensor serial number	One of the sensors does not have a valid serial number	If the error occurs after a sensor replacement, your supplier will need to replace this sensor. If this problem occurs without changing the sensors, there is a communication problem between one of the sensors and the Control unit. Follow the same procedure as you would in case of a COM error. The sensor with the communication issue is in this case not the one with the x, but the sensor that shows an unusual serial number in the sensor information menu (100).
Configure	Restored to factory default	Contact your supplier immediately.

Pressure too low	Fluid pressure below lower limit	Check the pressure in your spray line, using the sprayer's Control unit or a pressure gauge. Preferably mounted as close as possible to the WEED-IT pressure sensor. Confirm that the WEED-IT displays the correct pressure. If this is the case check all fittings and hoses for leakages. Also check this for the pneumatic hoses and fittings connecting the compressor to the PAV / Ramsay valve. Check the supply pressure on the pressure regulator to the PAV / Ramsay valve (this should be within 0.5-1 bar of the pressure on the spray line). Increase the pump flow. Increase the PAV / Ramsay valve air pressure. Check the mounted nozzle type and make sure they have a flow of less than 0.6 gallon/min at 3 bar pressure. If none of the above steps solve your problem, please contact your supplier.

Pressure too high	Fluid pressure above upper limit	Check the pressure in your spray line, using the sprayer's Control unit or a pressure gauge. Preferably mounted as close as possible to the WEED-IT pressure sensor. Confirm that the WEED-IT displays the correct pressure. If this is the case check all fittings and hoses for leakages. Also check this for the pneumatic hoses and fittings connecting the compressor to the Ramsay valve. Check the supply pressure on the pressure regulator to the PAV / Ramsay valve (this should be within 0.5-1 bar of the pressure on the spray line). Decrease the pump flow. Decrease the PAV / Ramsay valve air pressure. Check the return line from your PAV / Ramsay valve and make sure this is free of obstructions and unclogged. If none of the above steps solve your problem, please contact your supplier.
Wheel sensor	One (or more) wheel sensor(s) broken	Contact your supplier to let them replace the broken wheel speed sensor.

Sensor order changed	The sequence of the sensors has been altered.	If this occurs after a sensor replacement, your supplier will need to confirm this message and set up the new sensor. If this problem occurs without changing the sensors this indicates a communication problem between one of the sensors and the Control unit. Follow the same procedure as you would in case of a COM error. The sensor with the communication issue can be hard to track down. Browse through the sensor screens in menu 100 and check sensor firmware version and status for any anomalies.
New sensor found	A new sensor has been detected.	If this occurs after a sensor replacement, your supplier will need to confirm this message and set up the new sensor. If this problem occurs without changing the sensors this indicates a communication problem between one of the sensors and the Control unit. Follow the same procedure as you would in case of a COM error. The sensor with the communication issue can be hard to track down. Browse through the sensor screens in menu 100 and check sensor firmware version and status for any anomalies.

Sensor missing	A sensor that was previously there, is now missing	If this occurs after a sensor replacement, your supplier will need to confirm this message and set up the new sensor. If this problem occurs without changing the sensors this indicates a communication problem between one of the sensors and the Control unit. Follow the same procedure as you would in case of a COM error. The sensor with the communication issue can be hard to track down. Browse through the sensor screens in menu 100 and check sensor firmware version and status for any anomalies.
No sensors	No sensors have been found	Check the Control unit connection cables (between the Power converter and the Control unit) for physical damage. Check the Power converter for any damage. Open the lid and check for any signs of short circuits or moisture inside. Contact your supplier immediately and report any findings.
Direction arrow in main screen does not point upwards while I drive on a straight track. Direction arrow wiggles while I drive on a straight track	The speed sensors are faulty, or the speed sensors are not correctly configured.	Check functioning of the speed sensors. A LED light on the back of the sensor should flash on and off in a regular pattern when driving at a fixed speed (indicating detection pulses). Check this on both sensors separately. Be careful when performing this check. Always have at least one other person present to properly perform this check. If the LED lights do not flash, the sensor is faulty. Contact your supplier.

Messages	Details
HOLD	WEED-IT is in HOLD mode
Manual	The nozzles are being controlled manually
Flushing	The nozzles are being flushed

9. Specifications

The WEED-IT Quadro system detects living plant material using fluorescence. The system treats 250 millimeter wide lanes. A measurement is made every millimeter in the driving direction. When chlorophyll is detected the sensor will open the corresponding magnetic valve that trails the sensor. As this valve passes over the plant it is opened and it will spray a chemical agent onto the plant. Depending on environmental conditions and the condition and type of the detected plant, the minimum leaf area detected is approximately 2 cm^2.

Electronic specifications	
Supply voltage	12 VDC
Power consumption	10 to 20 W per sensor
Current protection	80 A fuse
System voltage	48 VDC

Detection specifications	
Detection channels	4
Detection distance	1100 mm / 43"
Channel width	250 mm / 10"
LED wavelength	475 nm
Light intensity	160 lm
Sensitivity	2 cm^2 minimum
Sample frequency	28000 Hz

Fluid specifications	
Main supply pressure	7 bar / 100 psi maximum
Spray line pressure	2-6 bar / 30-87 psi
Maximum flow	06 size nozzle (= 0.6 gal/min @ 40 psi)

Operating conditions	
Speed	0 to 25 km/h
Temperature	-30 to 60 °C / -22 to 140 °F
Ingress protection	IP67

Mounting specifications	
Detection sensor fasteners 	4 x M6 bolt Thread length = 8 mm + bracket thickness (Do not use longer bolts to prevent damage to the detection sensors)
Detection sensor angle	Maximum 22° forward
Wheel speed sensors	Max. 8 mm from wheel ring holes

10. Menu options overview

Main menu				
				
Histogram	Flush	Hold	---	Counter

Preset menu				
				
Histogram	Flush	Hold	Preset	Counter

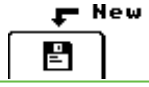
10.1 Service mode

Information (100)				
				
Back to the main screen	Select the Left or right boom	Configure	---	First sensor

Information (100) - sensor selected				
				
Back to the main screen		Turn the selected Sensor on or off	Go to the previous sensor	Go to the next sensor

Warnings (101)				
				
Back to the main screen	Clear warnings	---	---	---

Nozzle cleaning (102)				
				
Back to the main screen	Nozzles activated one by one (short)	Activate detection	Nozzles activated one after the other	Activate nozzles in random order, simulating PWM control

Job (103)				
				
Back to the main screen	New job / Reset	Confirm	Go to the previous job	Refresh information

Job (103) - Previous Jobs				
				
Back to the main screen	---	---	Go to the previous job	Go to the next job

PWM / Nozzle selection (105)				
				
Back to the main screen	PWM mode	Confirm setting	---	Cover

10.2 User Settings

Configuration (150)				
		OK		
Back to the main screen		Confirm setting		

Units (151)				
		OK		
Back to the main screen		Confirm setting		

Options (152)				
		OK		
Back to the main screen		Confirm setting		

Set time/date (153)				
		OK		
Back to the main screen		Confirm setting		

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11. WEED-IT software information

First installation

Detection sensors	Control unit	Power Converter

Installation date _____

Dealer _____

Update

Detection sensors	Control unit	Power Converter

Installation date _____

Dealer _____

Update

Detection sensors	Control unit	Power Converter

Installation date _____

Dealer _____

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12. Calibration settings form

12.1 General Machine Information

Your dealer uses this page to write down the current settings of your WEED-IT system. You may need these settings when replacing a sensor or after resetting the system to factory defaults.

This form is intended to be filled in during setup and testing at the customer; this form must be kept with the machine.

Machine type _____

Boom width _____

Serial _____

Dealer _____

Customer _____

12.2 Dealer menu configuration settings

12.2.1 Menu 200 Console and sensor information

Menu 200 Console and sensor information

Console serial _____

Sensor serial numbers:

Left boom		Right boom	
A		A	
B		B	
C		C	
D		D	
E		E	
F		F	
G		G	
H		H	
I		I	

Left boom		Right boom	
J		J	
K		K	
L		L	
M		M	
N		N	
O		O	
P		P	
Q		Q	
R		R	
S		S	

12.2.2 Menu 201 Power Supply Unit (PSU)

PSU serial _____

12.2.3 Menu 203 Configuration

Speed

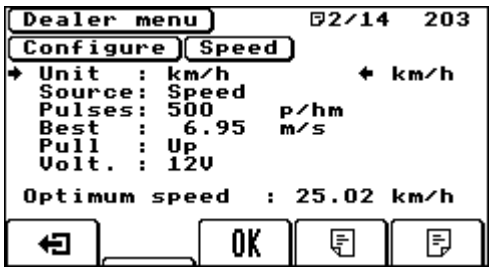
Unit _____

Source _____

Pulses _____

Pull _____

Volt _____



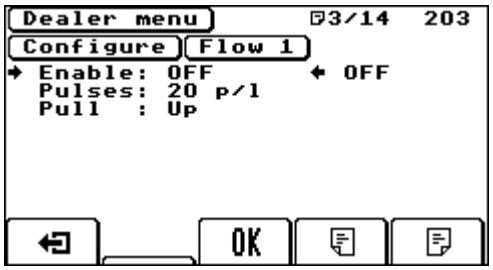
Check speed sensor functioning in menu 211.

Flow

Enable _____

Pulses _____

Pull _____

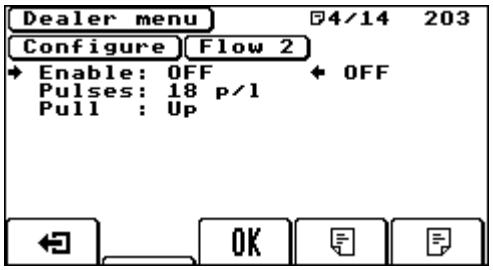


Flow

Enable _____

Pulses _____

Pull _____



The setting 'Enable' can be programmed as: ON / Add / Substract.

- 'Add' means Flow 2 will be added to Flow 1
- 'Substract' means Flow 2 will be subtracted from Flow 1

Flows per sensor are indicated in the main screen. Total flow (e.g. Flow 1 – Flow 2) is indicated in the 103 Job menu.

If Flow 3 is enabled at 'Add' or 'Substract' it will be added or subtracted from Flow 1 as well. Flow meter functioning can be checked in menu 211.

Pressure 1

Enable _____

Low _____

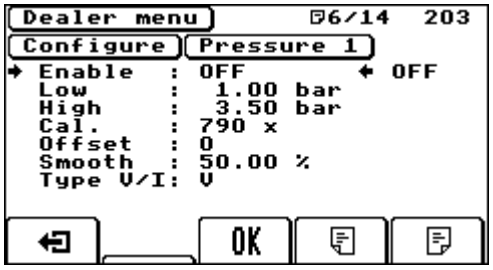
High _____

Cal. _____

Offset _____

Smooth _____

Type V/I _____



Mostly, a pressure sensor is a voltage sensor (V), not a current sensor (I). Smooth can stay at 50.00%.

Pump

Pump refers to the small ARB air compressor to supply air to the Ramsey valve.

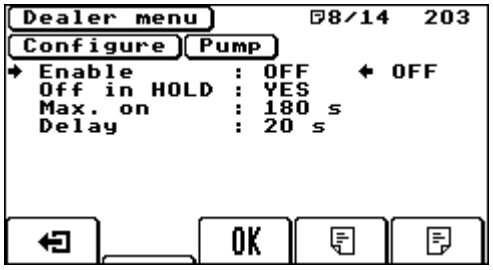
This menu is only applicable when the system has a PSU with compressor switch.

Enable _____

Off in Hold _____

Max on _____

Delay _____



Alarm

This menu indicates temperature and humidity tolerances accepted in the sensor. It is designed to track sensors with problems (e.g. cracked window) in an early stage to prevent excessive damage on the electronics.

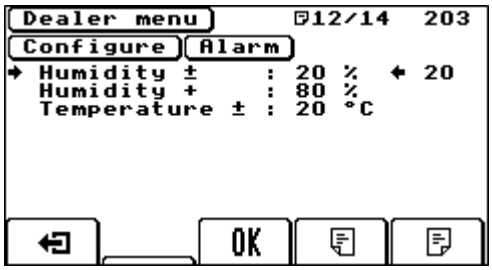
Humidity +- refers to the relative humidity inside a sensor compared to the average of all sensors.

Humidity + is the maximum accepted relative humidity in each individual sensor.

Humidity +- _____

Humidity+ _____

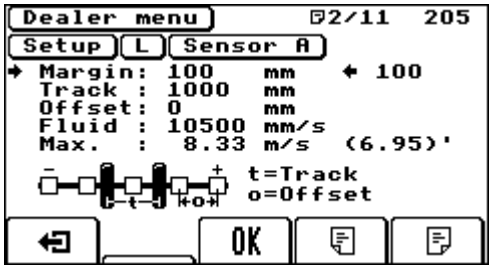
Temperature+ _____



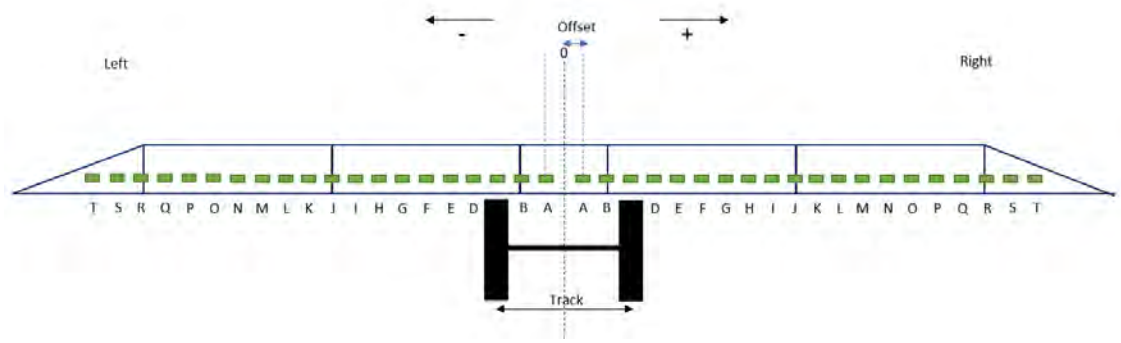
12.2.4 Menu 205 Sensor settings

Configure the menu 205 position of each sensor; Configure the track for the whole system.

Margin	_____	(same for each sensor, 'Preset' is indicated if 4 margin presets are enabled')
Track	_____	(make sure you press **OK** for 2 seconds to confirm for all sensors)
Fluid	_____	(make sure you press **OK** for 2 seconds to confirm for all sensors)



For offset per sensor, see below.



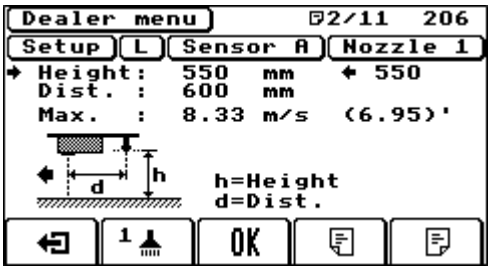
Menu 205 Offset settings (all in mm)

Left boom		Right boom	
A	-	A	+
B	-	B	+
C	-	C	+
D	-	D	+
E	-	E	+
F	-	F	+
G	-	G	+
H	-	H	+
I	-	I	+
J	-	J	+
K	-	K	+
L	-	L	+
M	-	M	+
N	-	N	+
O	-	O	+
P	-	P	+
Q	-	Q	+
R	-	R	+
S	-	S	+

12.2.5 Menu 206 Sensor Setup

Program the correct nozzle height (h) and distance (d) from the detection line to the nozzle line.

The 'Max.' indicates the maximum speed that is possible with the WEED-IT; it is based on the smallest distance and highest height set amongst all sensors. The speed that is shown in between the arrows is the optimum speed (programmed in menu 203).



Left boom	Height (H)	Distance (D)	Right boom	Height (H)	Distance (D)
A			A		
B			B		
C			C		
D			D		
E			E		
F			F		
G			G		
H			H		
I			I		
J			J		
K			K		
L			L		
M			M		
N			N		
O			O		
P			P		
Q			Q		
R			R		
S			S		

12.2.6 Menu 214 Margin presets

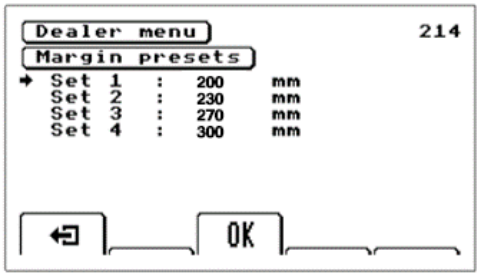
Only applicable when menu 204/5 option ‘user/wind margin’ is enabled.

Preset 1 _____

Preset 2 _____

Preset 3 _____

Preset 4 _____



This WEED-IT Quadro system was configured and tested.

Date confirmed _____

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CROPLANDS

Croplands

AUSTRALIA
Croplands Equipment Pty Ltd
ACN 006 450 184

PO Box 2441
Dry Creek
50 Cavan Road
Dry Creek SA 5094
Australia

Freecall: 1800 999 162
Freefax: 1800 623 778
Email: sales@croplands.com.au
Website: www.croplands.com.au

NEW ZEALAND
Croplands Equipment Ltd
PO Box 2004,
Stortford Lodge, Hastings 4120

Location:
1422 Omahu Road,
Hastings 4120
New Zealand

Freecall: 0800 106 898
Freefax: 0800 117 711
Email: sales@croplands.co.nz
Website: www.croplands.co.nz

CANADA
Croplands Equipment Pty Ltd
PO Box 2441
Dry Creek, SA 5094
Australia

Phone +1403-831-3913
Email address: sales@croplandsequipment.com
www.croplands.com.au

Your nearest Croplands Dealer can be found in the dealer section on the Croplands website