DEALER MANUAL
WEED-IT QUADRO

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FOR DEALER / TECH SUPPORT ONLY V4.20

WEED·IT
precision spraying

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Without prejudice.

Original instructions

Subject to change without prior notice. This WEED-IT Quadro USER Manual, Version 2.0, was last updated January 2023.

Table of contents

1. About this manual

This manual is intended for dealers and authorized service engineers of the WEED-IT system.

Please read this dealer manual and the safety instructions carefully before you start to use the WEED-IT system. Manuals for specific options (e.g. ISOBUS) are not included, but referred to in section 15.

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: WEED-IT Installation procedures for all parts of the system.
- Section 5: WEED-IT Procedures for calibration and adjustment after installation of the system.
- Section 6: General instructions for use of the WEED-IT system.
- Section 7: General maintenance instructions.
- Section 8: Instructions for cleaning, storage and transport.
- Section 9: User console reference section, with a description of available menus.
- Section 10: Troubleshooting information.
- Section 11: Specifications.
- Section 12: Menu options overview.
- Section 13: WEED-IT software information.
- Section 14: Calibration settings form.
- Section 15: Other information

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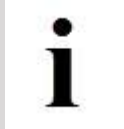
i	Please note that there may be variations in the actual setup of the WEED-IT system. It is up to the dealer to configure the system in such a way that the WEED-IT automatically senses which options are available.

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 or 10" (100 cm/40" per sensor). Depending on the width of the vehicle used for the WEED-IT system, up to 48 sensors may be used (to treat 48 meters or 157 ft in one operation).

WEED-IT Sensor
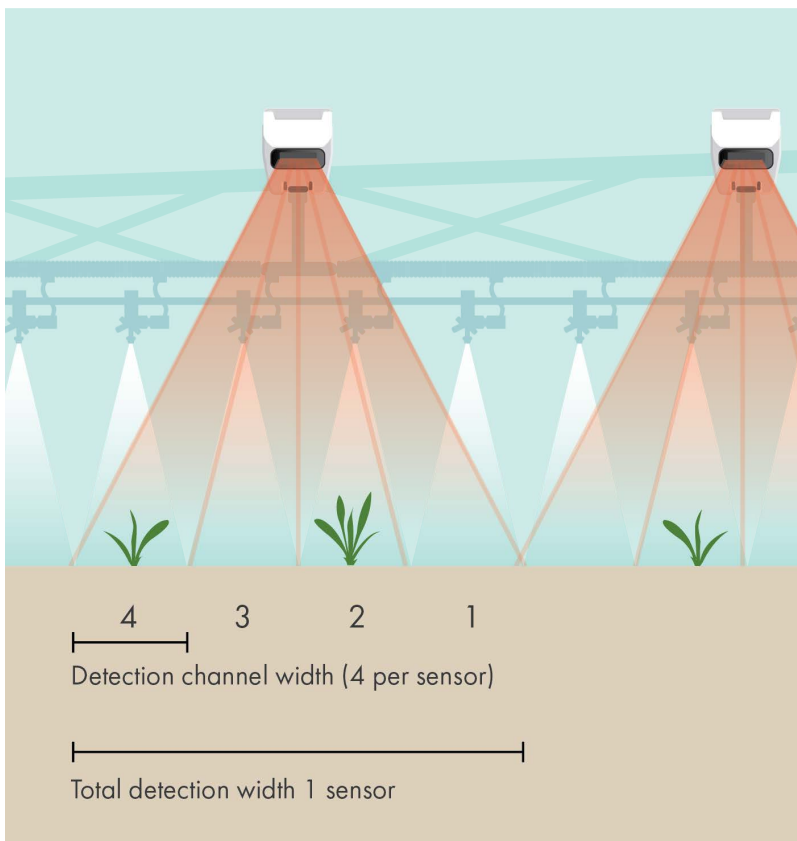
Figure 2-1 Schematic overview of 1 meter (40") working width per sensor, divided in four channels of 25 cm (10") each

A complete WEED-IT system consists of the following electronic components :
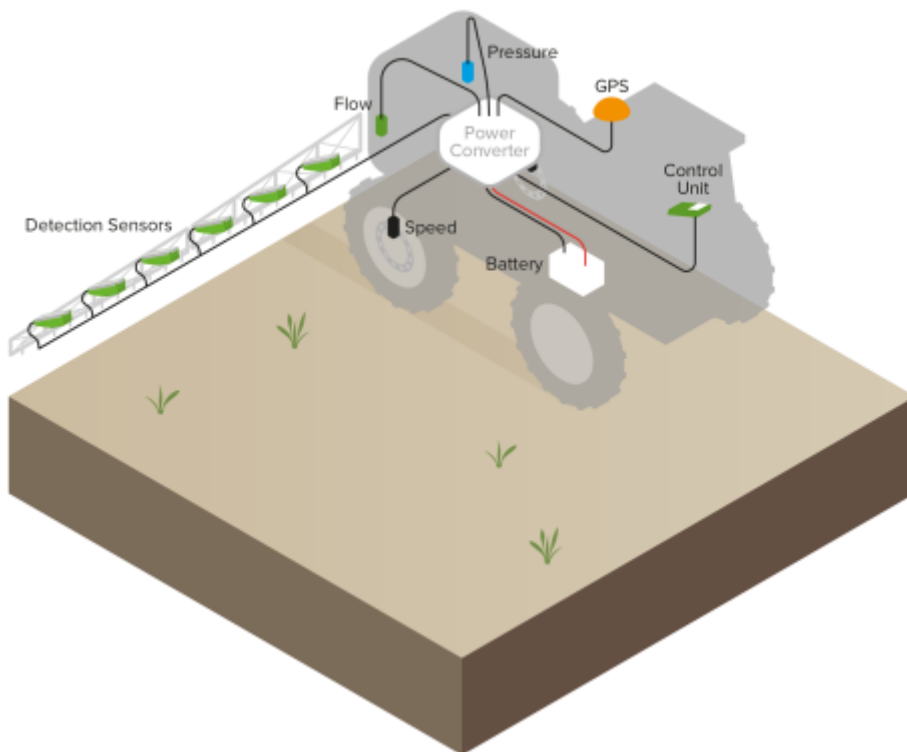
See "System overview" on page 21 for more information on individual components.

⚠️	Please read all instructions before you start working with a WEED-IT system. Refer to "Important safety information" on page 13 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 User console for operating the system. The User console consists of a display and a series of buttons in a waterproof casing:

See "User console" on page 23 for more information on use of the User console.

2.2. Important safety information

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 output of the alternator should be more than 120A. (If necessary, put the vehicle in a lower gear, so the engine runs at a higher rpm, to ensure that the alternator generates more current.)

- 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. Sensor operation

- WARNING: The light emerging from the detection sensors is focused and therefore intense.

- WARNING: The light wavelength can be hazardous

- WARNING: NEVER look into the light source emerging from the WEED-IT detection sensor

- WARNING: Serious eye damage may occur

⚠ WARNING

BEWARE OF THE LIGHT SOURCE
Do not look directly at the WEED-IT Sensor's light
Failure to comply may result in serious eye injury!

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2.2.6.   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 83.

2.3.   Intended use

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

> ⚠️
> - Only use the system for spraying crop protection products.
> - Only use parts that comply with manufacturer specifications.

Warnings when using certain crop protection products

⚠️	• Please note that the use of slow-effective crop protection products (i.e. 20 hours or longer) may cause damage to pump membranes, hoses, solenoid valves, pipes and tanks. • Do not use any unauthorized mixture of two or more different crop protection products. • Do not use crop protection products that have the tendency to stick or coagulate. • Regular cleaning of the spray line and solenoid valves is recommended. • 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

2.4.1. 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 User console connects to the Power Converter and all connected sensors.
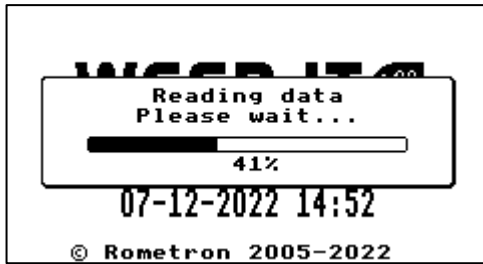
3. After self-test completion, the Main screen opens:
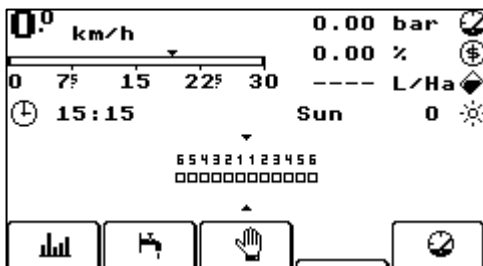
2.4.2. To switch off the WEED-IT:

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.

2.4.3. Forced 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.

2.5. 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 User console shows the Main screen and the (optional) air compressor starts.

3. Check that the pressure in the spray line is 3.0 bar (43.5 psi). If a pressure sensor is installed, the pressure indicated by the user console is binding.
In case a PAV valve is used, the pressure can be adjusted by adjusting the air compressor pressure. Check the pressure at the manometer at the installed air compressor. The pressure indicated on the blue manometer is usually higher than the pressure in the spray line. 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.

> **NOTE**
>
> Re Croplands trailed sprayers - Air supply to Croplands PAV (Pressure Accumulator Valve) is via the trailer suspension air ride system, and moderated to 3 Bar via an air regulator.

Figure 2-2 Air compressor feeding the PAV valve with compressed air

4. Check the system for leakages.

5. Press ⊞ (F2) 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.

7. For more information and settings on pressure, please refer

8. Pressure 1-2 (203 **tab 6-7)** to page 108

3. Identification of parts

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

3.1. System overview

WEED-IT consists of:

- The series of detection sensors, each with four detection channels and solenoid valves

- The user console

- The power converter (PSU)

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 PAV valve (supplied with the system) and a small air compressor (optional), to maintain the pressure to all nozzles AND an air regulator (supplied with the system)

- OR if the sprayer is equipped with a hydraulically driven and regulated centrifugal pump, this could be used to maintain a constant pressure.

- Speed sensors (supplied with the system)

- A pressure sensor (supplied with the system)

Furthermore, the WEED-IT can be equipped with (optional):

- Flow sensor(s) (supplied with the system).

- Height sensors

- Section Control

- ISOBUS with UT, TC-SC and TC-GEO

For more information on these specific topics, refer to "Other manuals" on page 191.
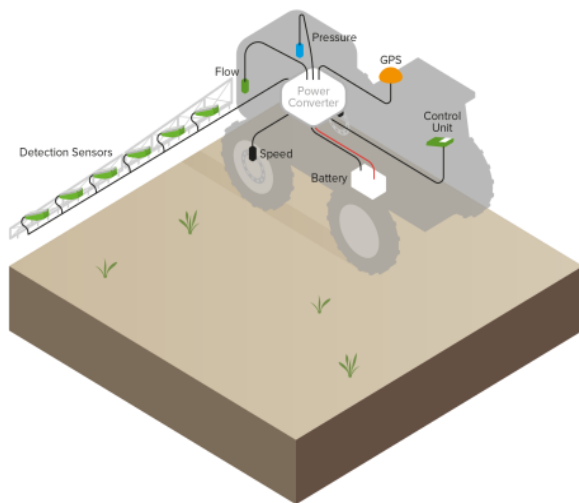
Figure 3-1 Electrical system overview

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 WEED-IT either needs a hydraulic proportional controlled pump at the sprayer or the system needs a PAV valve (pressure accumulator, membrane valve) in the spray line. The air pressure is delivered 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 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 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.
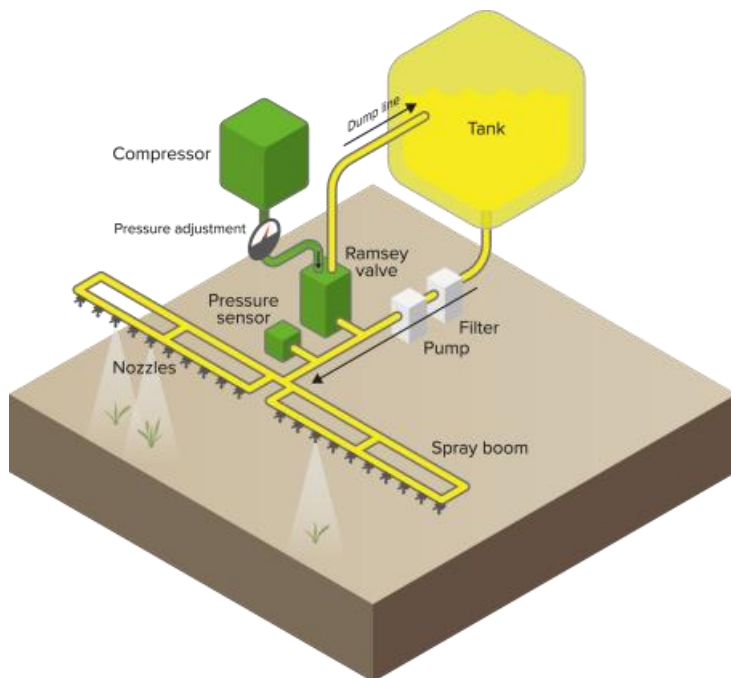
Figure 3-2 Flow in a standard WEED-IT installation

Pressure Accumulator Valve

3.2. User console

⚠️	Make sure that every person who has access to the User console is familiar with all safety information provided in "Important safety information" on page 13
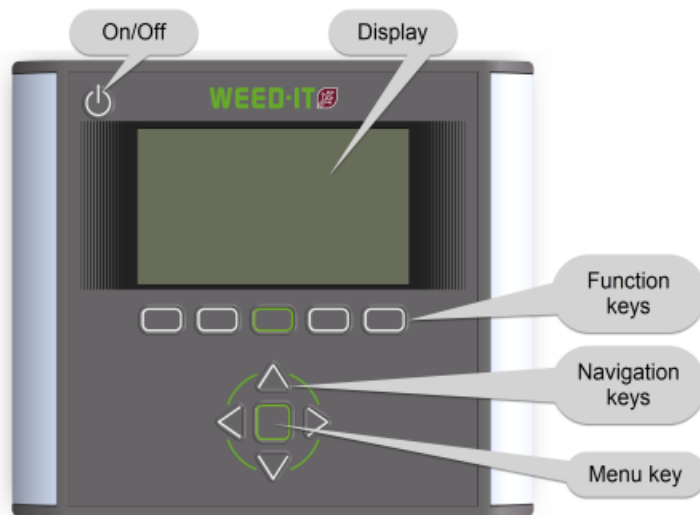
On/Off	Press the On/Off switch to turn the WEED-IT on or off.
Display See "Display" on page 24	At start-up, the display shows the Start-up screen. The display shows the system status and other relevant information such as warnings, errors, driving speed, pressure and several menu items.
Function keys See "Function keys" on page 27	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 27	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 User console.

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

At System startup:

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

It shows:

- User console serial number

- Firmware version number (the software inside the WEED-IT)

- Firmware release date

- Current date and time

2. The system does a self-test and the User console communicates with the Power converter (to which all components are connected).

3. 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:
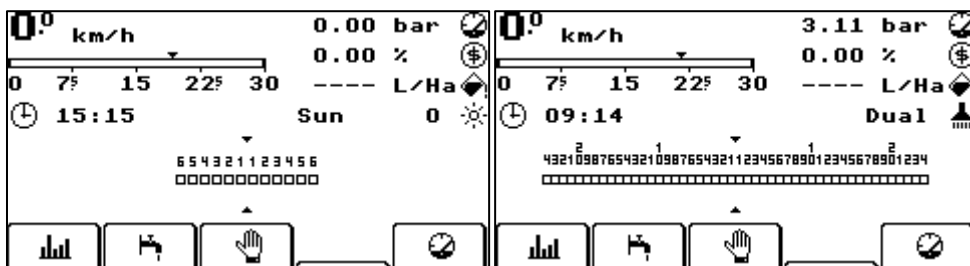
- The screens above show a system that has 12 sensors and a system that has 48 sensors (six on either side, identified as 1 through 6. The other has 24 on either side, identified as 1 through 24).

- The top of the screen shows a number of important values (subject to system settings).
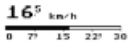
Refer to "Main menu options" on page 85 for information on specific main menu options.

 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:

16^5 km/h 0 7⁵ 15 22⁵ 30	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. In the speed bar, there are speed indicators (refer to the previous page for screenshots): • A vertical stripe within the speed bar indicates the maximum speed for weed detection. It is until this speed that the WEED-IT is capable of detecting and spraying the weed on target. The maximum detection speed is reduced when choosing a higher spray margin. • One or two triangles referring to the ideal speed and maximum speed at which the set application rate (l/ha or gal/ac) can still be reached. The leftmost triangle indicates the ideal speed from menu 104/203. If there are two triangles, the rightmost indicates the maximum speed at which the set application rate (l/ha or gal/ac) can still be achieved. • A square is shown instead of two triangles when the maximum speed is lower than the ideal speed, which means that weeds cannot be sprayed correctly and the application rate cannot be achieved at the ideal speed. To solve, check the following: change the spray settings in menu 104, lower the margin or check the heights and distances in menu 206. • If the speed exceeds one of the indicators, a warning 'Too Fast' will occur. • If there are two speed sensors connected to the power converter, an arrow will be shown that indicates the driving direction. • Refer to "Changing the spray settings" on page 70 and "PWM/Nozzle selection menu (104)" on page 93
Values	Frequently used **Values** are at the top right of the display. Press 🕐 (F5) to navigate to other measurement displays.
⊘	**Pressure:** The pressure of the liquid in the spray boom (in bar or psi). A warning appears if the pressure is too high or too low.
△	**Surface**: The total area that was sprayed (in Ha or Acres) 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 (Spot plain, Spot spraying, Full coverage, Dual function, GoG plain (optional), GoG spot (optional).
◈	**Usage**: If a flow meter is connected, liquid use (in L/Ha or gal/acre) is displayed instead of the uptime clock.
🍃	**Sensitivity**: The currently selected sensitivity preset (default 1-5 available).
🍃	**GoG Sensitivity:** Current selected sensitivity preset for Green on Green (optional) (Default 1-6 available).
◷	**Flow**: The current liquid flow (in L/min or gal/min).
☼	**Sun**: The strength of the sunlight on a scale of 1 to 10. Extremely bright sunshine (9-10) causes noise and reduces system accuracy.
⚑	**Margin:** The margin (mm) preset indicates the distance that is sprayed in front and after a weed that has been detected. Margin preset 1-4 are available.
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 and is identified by a number (starting with 1 for the sensor nearest to the driver seat). Example: six sensors, three on either side of the boom: ▼ 4 3 2 1 1 2 3 4 □ X X · ! □ □ □ ▮▮ ▮▮▮ ▲ • each sensor has four nozzles that spray a corresponding lane of the surface. • in the example above, four sensors show activity: vertical bars indicate nozzle activity. Each nozzle shows a bar: three nozzles of sensor 2 on the right are currently spraying. • an exclamation mark indicates that there is a problem • a dot indicates a disabled sensor • a cross indicates an error • a dash below the sensor number indicates that a height sensor is connected

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 85 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 one message or warning, the message bar changes every few seconds to present messages consecutively. Refer to "Warnings and errors overview" on page 134 for more information.

3.2.3. Function keys

The User console 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.

- **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 [button] to select a menu.

- Press [button] repeatedly to browse through available menus.

- Press and hold [button] for one second to enter the Service mode.

3.3. Components

This section describes the WEED-IT components to be mounted on a vehicle. A full overview of WEED-IT Quadro components and variants is given in the *WEED-IT Quadro PARTS LIST, BT-PMWEEDQ-C*. Ask your distributor or WEED-IT supplier for more information.
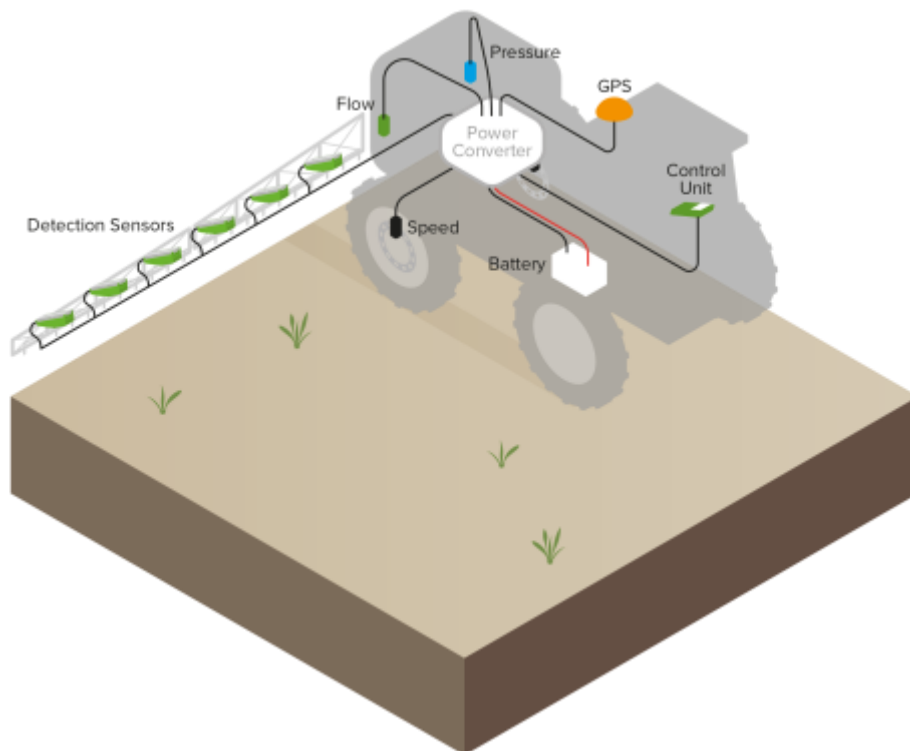
A base kit for each WEED-IT system consists of:

Battery power cable	Power converter

User Console	BQS5.2 Console connection cable
BQS6.3 - Console adapter cable, 5 m	**BQS12.x Left and/or Right adapter cable**
	An adapter cable is always required between the power converter and the first sensor.
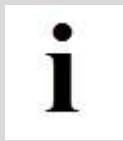
> **i** "\.x" indicates that different lengths are available. For more information, refer to the *WEED-IT Quadro PARTS LIST ENGLISH*, or contact your distributor

Detection sensor WEED-IT Quadro or WEED-IT Quadro Red	Four solenoid valves per detection sensor
	Please note: WEED-IT offers a wide range of solenoid valves that can be fitted to most nozzle bodies on the market (e.g. Arag, TeeJet, Hypro, Wilger). Refer to the *WEED-IT Quadro PARTS LIST* or contact your distributor for more information

The detection sensors are attached via detection sensor **harness cables**, in which three main types are available.

BQS1.x Detection sensor harness for 1 sensor (1 meter), for the left boom (L) or the right boom (R).

Black connectors and covers are for the left boom. Green connectors and covers are for the right boom.

The solenoid connectors are indicated with a number and color. Back view, left to right, always:

#1 @left

#2

#3

#4 @ right

Color codes:

1 = orange

2 = purple

3 = grey

4 = white

BQS2.x Detection sensor harness for 2 sensors (2 meter), for the left boom (L) or the right boom (R)

BQS3.x Detection sensor harness for 3 sensors (3 meter), for the left boom (L) or the right boom (R)

BQS10.x Detection sensor harness extension cable, for the left boom (L) or the right boom (R) 	**Please note:** Several variants of the mentioned types are available, refer to the *WEED-IT Quadro PARTS LIST*.

In case the **speed** is measured at the **wheels** of the machine or with a **GPS speed sensor**, the following parts are needed:

Wheel speed sensor and adapter cable 	BQ8.x speed sensor connection cable
GPS sensor with speed pulse output Arag GPS sensor and BQ8.0 speed sensor cable 	

For **pressure measurement** on the WEED-IT system the following parts are needed:

Pressure sensor 	BQ7.x pressure sensor connection cable

For **flow measurement** on the WEED-IT system, use:

Flow meter	BQ9.x flow sensor connection cable

For the **pressure regulation** on the machine, use:

PAV valve	Air compressor (optional), to supply the PAV valve with air.
	  If the machine already has a compressed air supply (e.g. for brakes), this air can be used with a pressure regulator on the PAV valve.
BQ13.x compressor cable (optional) 	 **NOTE** **Re Croplands trailed sprayers - Air supply to Croplands PAV (Pressure Accumulator Valve) is via the trailer suspension air ride system, and moderated to 3 Bar via an air regulator.**

If necessary, WEED-IT can supply **mounting brackets** for the detection sensors and **wetboom components** as well for the installation on a sprayer:

Stainless steel wetboom for WEED-IT Quadro	Mounting brackets for WEED-IT Quadro detection sensors

For a complete overview of parts, refer to the WEED-IT Quadro parts catalog or contact the WEED-IT distributor. For more information on specific WEED-IT Quadro components, refer to "Other manuals" on page 191.

4. WEED-IT installation

Refer to "Components" on page 28 for a list of parts to be installed.

Always adhere to all safety instructions listed in "Important safety information" on page 13 and the rest of this manual.

After installation of all components, refer to "WEED-IT calibration and adjustments" on page 49 for further instructions. For installation (placement and dimensions) of WEED-IT Quadro components, refer to the installation manual.
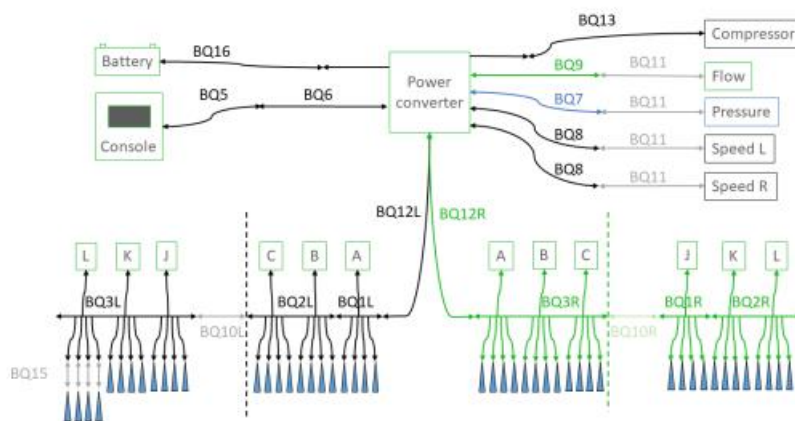
Figure 4-1 WEED-IT Quadro connections overview (a BQS11 is optional, refer to the WEED-IT Quadro parts list for all variants)

4.1. Power converter

Check if the Power Converter is mounted on a shielded location on the sprayer; make sure the front lid and the various connectors are accessible for service and repair.
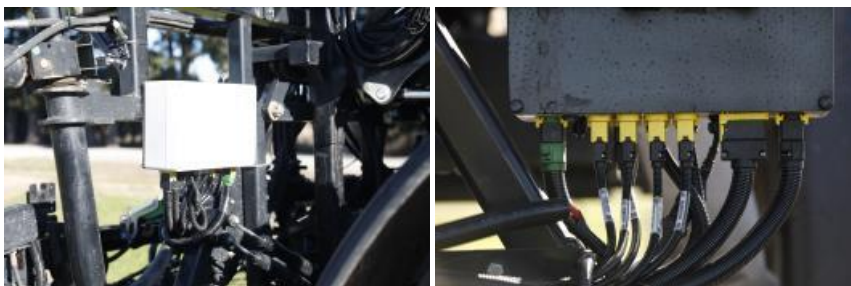
Power converter installation:

1. In case of a trailed sprayer, it is preferred to place the power converter within 4 meters of the hitch point, to reduce the total length of 12 or 24V power cables on the system.

Figure 4-2 Croplands ground glider with power converter (encircled)

⚠️ Do not place the power converter near a heat source such as the radiator from the engine. The power converter develops heat which needs to be conducted away.

On self-propelled sprayers, placement of the power converter can be done in various ways and shorter power cables are usually sufficient.

Figure 4-3 Power converter installed on a sprayer (left) and power connector (right)

2. The power converter is mounted with M8 bolts. Center to center dimensions for the M8 threads are 340 x 220 mm. M8 bolts for mounting are supplied with the Power Converter.

3. The power converter is equipped with a large Nato connector for the 12V power supply. Preferably, position the connector horizontally.

4. Make sure the power cable at the tractor or self-propelled sprayer is attached directly to the battery or directly after the master switch. Directly after the master switch is preferred for safety reasons.

5. Make sure the engine is equipped with an alternator capable of delivering at least 120A as a full size WEED-IT system can draw up to 80A of current, when the Victron is being used in combination with the Power Converter XL for 48 mtr systems, a current of 100A can be drawn.

Power converter connections

Speed sensors	The WEED-IT system uses speed sensors for determining how fast the vehicle is going. If one speed sensor is used, it should always be connected to the 'Speed LEFT' on the power converter. Using two sensors means that the WEED-IT uses turn compensation ; it will adapt the flow via PWM, to make sure that the field is evenly sprayed.
	Either a wheel or GPS speed sensor can be used. A wheel speed sensor is preferred as it more accurate.
	Connect the LEFT sensor to the black 3-pin connector marked **speed left**.
	Connect the RIGHT sensor to the black 3-pin connector marked **speed right**.
Left and right boom	The WEED-IT Sensors are connected to the Power converter using left or right sensor connection harnesses and an adapter cable.
	Left and right harnesses cannot be interchanged or connected directly to each other.
	Always connect a BQS12 cable to the power converter first.
	Connect the left detection sensor adapter cable (BQS12) to the leftmost black 10-pin connector marked Sensors LEFT.
	Connect the right detection sensor adapter cable (BQS12) to the rightmost green 10-pin connector marked Sensors RIGHT.
User console	Connect the User console adapter cable (BQ6.3) to the black 18-pin connector marked **console**.
Air compressor (optional)	Connect the optional compressor using the compressor cable (BQ13) to the 4-pin connector at the end of the short black cable marked **Air compr**.

Flow sensors (optional)	Connect flow sensor 1 (flow in or left boom) to the left green 3-pin connector marked **Flow 1**.
	Connect flow sensor 2 (flow out or right boom) to the right green 3-pin connector marked **Flow 2**.
Pressure sensor	Connect the pressure sensor cable to the blue 3-pin connector marked **Pressure**.

4.2. Speed sensors

The WEED-IT system needs an accurate speed input to make sure that the system timing and spot-on spraying is correct. Wheel speed sensors mounted on the wheels of the vehicle are the preferred solution.

- Use a single wheel speed sensor for an accurate calculation of the forward speed of the vehicle

- Use two wheel speed sensors (recommended) to accurately track the forward speed and turning motion of the vehicle (turn compensation). This allows minor spraying corrections for all individual nozzles to be calculated.

Advice for wheel speed sensor installations

- WEED-IT uses induction sensors as standard. Hall sensors can also be used.

- The bare minimum number of pulses per 100 meter is 250. Fewer pulses can result in underperformance of the WEED-IT system. 400 pulses per hectometer are recommended.

- The wheel speed sensor needs a metal ring with holes or bolts, or bolts mounted on the inside of the wheel. When a piece of metal passes the sensor, the sensor will generate a pulse. The LED on the sensor will blink at every pulse. A ring with holes is the preferred solution.

- The best material to use for the wheel speed ring is iron. Other materials greatly reduce the sensing distance of the inductive sensor as the following graph shows.
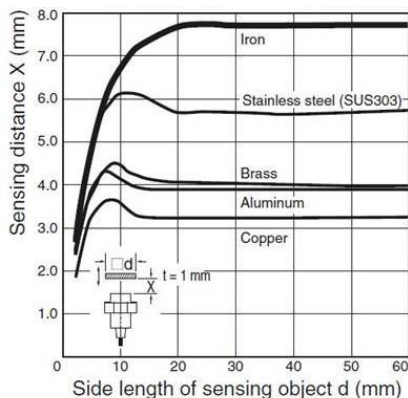
Use a side length of at least 20mm, so that the sensing distance is maximized. Make sure the wheel speed sensor has a distance of 5-8 mm to the ring or bolts and that every metal surface/bolt is counted.

Be aware that the sensor only detects the sensing points, no other metal parts around the wheel.

The wheel speed sensor is connected to the power converter with a BQ8.x speed sensor cable. Refer to the parts manual for all cable options.

The connection on the wheel speed sensor is a 3-way SuperSeal1.5 connector with the following pinning:

- Position 1 = Brown = 12V

- Position 2 = Blue = 0V

- Position 3 = Black = Signal

When using two speed sensors make sure that the sensor on the left is connected to 'speed LEFT' at the power converter and right to 'speed RIGHT'.
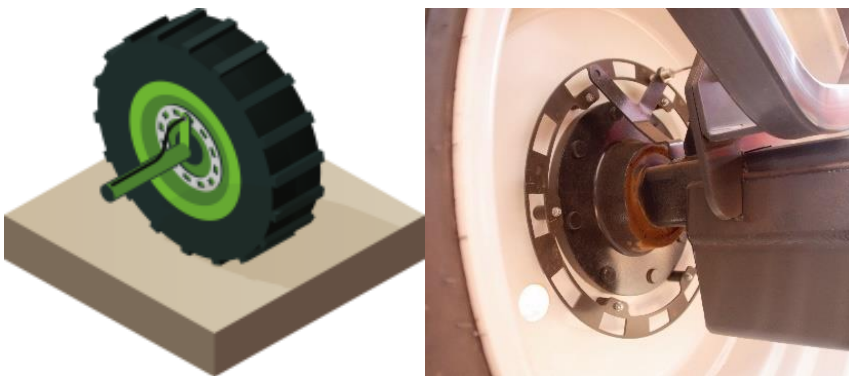
GPS speed sensor

Most self-propelled sprayers nowadays have limited space to install a wheel speed sensor and pulse ring. This makes the installation of a speed sensor to be difficult, time consuming and sometimes nearly impossible. In those cases, a GPS speed sensor can be used as an alternative for the WEED-IT speed input.

GPS speed sensors produce a high number of pulses per hectometer compared to wheel speed sensors. The power converter is limited in the number of pulses it can process meaning that more pulses is not always better. The reason that a GPS speed sensor can be used as alternative is that it can be mounted everywhere on a flat horizon with a clear view to the sky. This means that the GPS speed sensor can be mounted on the spray boom further away from the middle of the sprayer than the wheel speed sensors can, as they must be placed near the wheels. Keep in mind that the extra effort of installing a wheel speed sensor is rewarded by a more accurate and reliable speed measurement.

Figure 4-4 WEED-IT GPS speed sensor

Rometron offers an Accosat GPS speed sensor as WEED-IT branded, see Figure 4-4. After extensive testing it was found that this GPS speed sensor has the most accurate speed measurement of al the GPS speed sensors we evaluated. For more information, refer to the *Whitepaper speed sensors WEED-IT Quadro*. Ask your distributor or WEED-IT supplier for more information.

Speed calculation

The number of wheel bolts or holes detected and the wheel size determine the number of pulses the speed sensor sends for every meter travelled.

More pulses equals a higher accuracy. A pulse should be generated at least every 40 cm (16", corresponds to 250 p/hm), but we recommend one every 25 cm (10", corresponds to 400 p/hm). To determine the number of bolts or holes needed for your system you should divide the wheel circumference in cm (or ") by the desired distance between to pulses. So for example:

$$\text{number of holes in ring} = \frac{\text{wheel circumference (cm)}}{25}$$

Using two wheel speed sensors

Install a second wheel speed sensor to detect curves and corners. For example, when taking a right turn, the right wheel speed sensor detects a lower speed than the left wheel speed sensor. As a result, a detection sensor at the far right of the boom uses less herbicide than the one at the left. So, the extra wheel speed sensor gives a higher system accuracy, ensuring the correct application rate regardless of speed and turning.

Another advantage of the second wheel speed sensor is that it allows continued operation when one of the wheel speed sensors is faulty.

i	If one of the wheel speed sensors fails, the system will issue a warning, but allows operation to be continued. This reduces system down-time. Repair or replace the faulty sensor during the next service stop.

For the calibration of a speed sensor, refer to section 5.1 "Wheel speed sensors calibration" on page 49. Refer to the *WEED-IT Quadro PARTS LIST* for the right cable.

4.3.   User console

Install the User console in a suitable position inside the cabin of the vehicle. You can use the mounting kit, including a suitable RAM mount. The display must be clearly visible from the driver position and all keys must be easily accessible.

Figure 4-5 Use the mounting kit, including the RAM mount, for installing the User console in the cabin

1. The console connection cable (BQ5.2) should be connected to the User console on the middle connector. The console connection cable (BQ5.2) should be connected to the console adapter cable (BQ6.3) on the other end. Another option is to use one direct console cable (BQ5.4). Refer to the WEED-IT parts manual for an overview.

2. When the trailed sprayer is disconnected, the BQ5.2 can be disconnected from the BQ6.3 near the hitch point.

Figure 4-6 User console connection cable

3. Optionally connect a foot switch to the External hold switch port on the left. You can order the external hold cable (BQ14) to do this.

4. Optionally connect another high tech system that uses RS232 serial communication to the External communication port on the right. The WEED-IT system supports the connection of an external device or tracking system that allows live data exchange. It is also possible to control the system remotely and enable/disable sections. In order to allow an external tracking system to be connected to the WEED-IT, the data-exchange has to follow a certain protocol. For more information on the external communication port and the protocol, please refer to the *AppNote* or "Other manuals" on page 191.

Figure 4-7 User console connections

4.4. PAV valve and air compressor

This part is only applicable if a PAV valve is used in the WEED-IT system. The PAV valve ensures the right pressure at the nozzles at all times; it is a big accumulator that is fed by a small air compressor.

The working principle of the PAV valve is based on two pressures: the air pressure and the fluid pressure. If the air pressure, that is set to the desired system pressure, is higher than the fluid pressure, the diaphragm is pushed up and the chemical mix goes straight from the supply line to the nozzles. No fluid will flow through the PAV valve. If the air pressure is lower than the fluid pressure, the chemical mix goes through the valve into the dump line and returns to the tank.

Pressure line (from pump)   Pressure line (to spray nozzles)

Dump line (to tank)

Air pressure (from compr.)
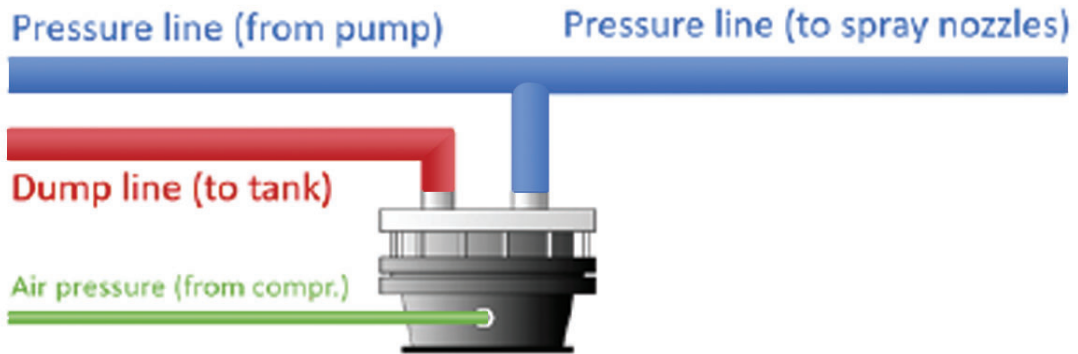
1. Mount the PAV valve in a protected spot in the supply line of the sprayer.

2. Mount the Air compressor in a protected and easily accessible spot close to the PAV valve.

3. Connect the Air compressor to the Power Converter using the air compressor cable (BQ13). Connect the cable to the short black cable coming out of the Power Converter.

4. Connect the supplied air hoses between the air compressor and the PAV valve.

5. Connect the hose to the PAV valve; it has two male thread 2" British Standard Pipe (BSP) fittings (for specifics of the plumbing of the sprayer see "Sprayer connections" on page 41. You can use the PAV valve mounting kit; check the *WEED-IT Quadro PARTS LIST* for the content of this kit.

4.5. Sprayer connections

A pump draws liquid from the tank pushing it into the feed hose running past the PAV valve. After the PAV valve, the feeding line splits into at least two lines, going to several sprayer sections on the left and the right boom of the sprayer. Make sure the main spray line is fed every 6 meters.
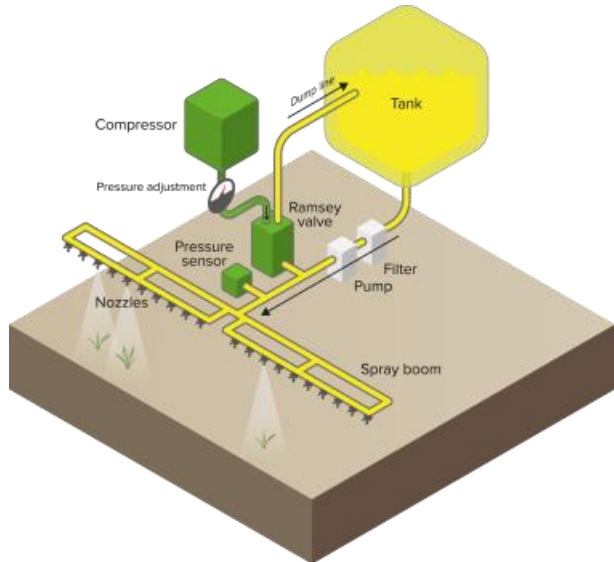
1. Create the nozzle line by connecting the wetboom pipes with the available fittings.
2. Run a 2" pressure hose from the pump and tee this into one side of the PAV valve.
3. Run a 2" hose from the other fitting of the PAV valve back into the tank. This is the so-called dump line.
4. Test the system and check for leaks.
5. Refer to "Pressure sensor calibration" on page 53 for calibration of sensors.

4.6. Pressure sensor

To display the WEED-IT system pressure on the User console, a pressure sensor must be installed.

1. Mount the pressure sensor in one of the T-pieces connecting the wetboom pipes on the spray line. Use an adapter to 1/4" BSP thread to mount the sensor.
2. Connect the pressure sensor cable (BQ7) to the pressure sensor.
3. Connect the blue connector to the Power converter.
4. Check the sensor calibration, see "Pressure sensor calibration" on page 53.

4.7. Flow sensors

To display the WEED-IT system chemical use on the User console, up to three flow sensors can be installed. To use flow compensation a flow sensor is required.

1. If your sprayer uses a recirculation line, it is necessary to use at least two flow sensors. A recirculation line is preferred for spot spraying.

   • Mount one sensor to measure all of the flow to the spray line after the PAV valve.

   • Mount the second flow sensor in a position where it measures all of the returning flow from both the PAV valve dump line and spray line return.

2. If you are not using a return line, one flow sensor is sufficient. In this case, mount the only flow sensor in the fluid line after the PAV valve to measure the flow that is going to the spray line. Alternatively, you can measure the flow to the left and right boom wing independently using two flow sensors.

3. Connect the flow sensor cable(s) (BQ9) to the flow sensor(s).

4. Connect the flow sensor cable(s) (BQ9) to the flow sensor input(s) marked Flow 1 and Flow 2 on the Power converter. Flow 1 is used for the flow going to the spray line and flow 2 is used for the flow returning from the spray line.

5. Check the flow sensor configuration and calibration in the User console (see "

6. Flow 1-2-3 (203 **tab 3-4-5)**" on page 107).
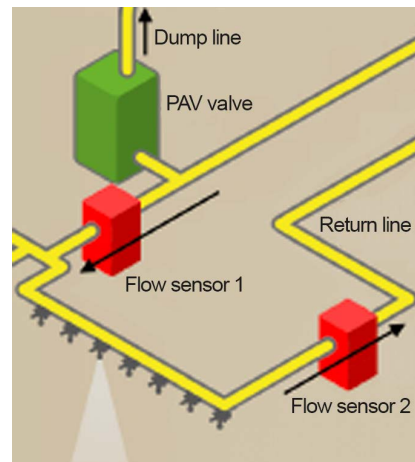
Figure 4-8 Double flow sensor installation example for a spray boom with recirculation.
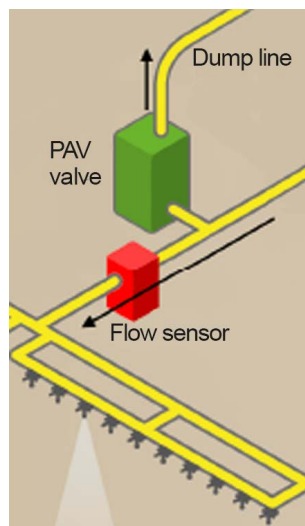
Figure 4-9 Single flow sensor installation example for a spray boom without recirculation

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i	Most flow sensors measure flow within a specified range. This results in inaccurate measurements at low flow rates that can occur during spot spraying. Keep this fact in mind when installing the flow sensor.

4.8. Detection sensors and solenoid valves

Figure 4-10 WEED-IT detection sensor; the sensor window must face down.

Figure 4-11 Nozzle body (left) and WEED-IT solenoid valve (Right)

The sensors that contain the weed detection technology must be mounted on the spray boom. For installation instructions, contact your distributor.

- Sensor spacing: 1000 mm (40 inch = 1016 mm).

- Sensor height: 1100 mm (43.3 inch), measured in a straight line from the sensor window to the detection line on the soil.

- Four solenoid valves per sensor, spaced at 250 mm (1.0 inch). Note the solenoid placement in relation to the sensor placement.
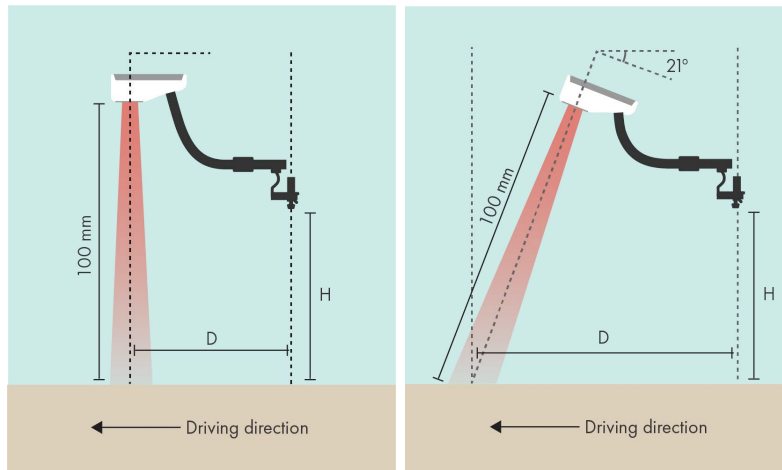
Figure 4-12 Straight detection sensor installation (left) and Angled detection sensor installation (right)

- The distance between the detection line and the nozzle line should be at least 600 mm (23.6 inch).

- The WEED-IT system can be used with a pressure of 2 to 6 bar. (30 to 85 psi). We recommend using a pressure of 3 bar (45 psi).

- The nozzle height for the WEED-IT should be less than 600 mm (23.6 inch). If the nozzle height is higher, a smaller top angle is necessary and the spray is more susceptible to wind. These have negative effects on the spray quality.

- The margin is the distance the WEED-IT will spray in front and behind the detected weed. The maximum margin to be set is 300 mm (11.8 inch). The margin applied has effect on the maximum work speed.

To install the sensors and solenoid valves:

1. Make sure the boom can control the **ground clearance of the sensor** at approximately **1100 mm** (43.3 inch), either by using a well-functioning height control system, or by mounting support wheels on the boom.

2. Make sure the boom is sturdy enough to carry the weight of the sensors and cables. The weight of an individual sensor including cables is approximately 1800 gram per meter.

3. Make sure the boom can still fold if the sensors are mounted as described. Space sensors at 1000 mm (39.4 inch), and mount them at a distance of 1100 mm (43.3 inch) off the ground. If necessary, reposition a sensor in such a way that folding is possible or construct a foldable bracket for the sensor.

4. Mount the sensors on the boom with brackets 1000 mm (39.4 inch) apart.

5. Mount the sensor at a maximum angle of 22° degrees forward

6. Mount the solenoid valves at a height of approx. 600 mm off the ground, and at least 600 mm behind the detection line of the sensors (max. 1500 mm; 59.0 inch).

7. Connect the detection sensor line on each boom to the Power converter using the detection sensor harness adapter cable (BQS12; type to use depends on system configuration). Note the color codes: black plugs for the left boom, green plugs for the right boom.

8. Use a combination of various detection sensor harnesses to link to the detection sensors and solenoids on the boom.
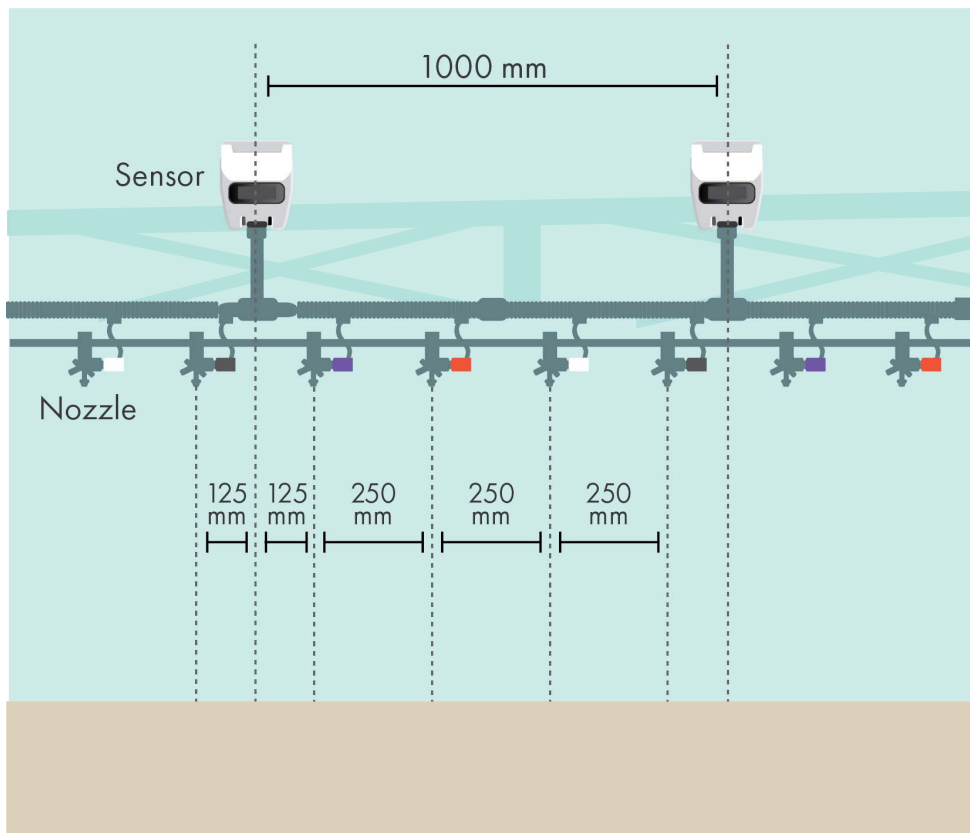
Figure 4-13 Detection sensor harness; distance between spray nozzles is 250 mm (1.0 inch)

Connect the plugs of the detection sensor harness to the solenoid valves. The plug with number 1 (orange color) connects to the leftmost solenoid. Plug number 4 (white color) connects to the

rightmost solenoid. (This is valid for the whole boom: L to R.) Note the color codes (seen from behind the machine, from the outer left to the outer right of the machine):

1 = orange

2 = purple

3 = grey

4 = white

Nozzle bodies 2 (purple) and 3 (grey) must each be mounted 12.5 cm (4.91 inch) off the center of the detection sensor.

Figure 4-14 Sensor harness for the left boom, for 1 detection sensor

4.9. Section control

The WEED-IT can be equipped with a Section Communicator to be able to have section control on the WEED-IT solenoid valves based on the section control of the sprayer itself. By tapping into the section ball valve wiring, the Section Communicator translates the ball valve state to the WEED-IT through the control port at the WEED-IT console. The section communicator can handle up to 14 sections and 40 meters. For the installation and configuration of the Section Communicator, please refer to the *WEED-IT Quadro, Section Communicator installation manual* or "Other manuals" on page 191.

Figure 4-15 Section Communicator box

4.10. Height sensor

The WEED-IT can be equipped with height sensors to ensure that all weeds are sprayed when the spray boom is too high above the ground and the weed detection does not function optimally.

For the installation and configuration of BodoHeight, please refer to the *BodoHeight installation manual, WEED-IT Quadro* or "Other manuals" on page 191.

Figure 4-16 Height sensor

4.11. ISOBUS

WEED-IT is compatible with ISOBUS UT, TC-SC and TC-GEO. Instead of the WEED-IT console, your own ISOBUS compatible terminal/display in the cab can be used to operate the WEED-IT.

For more information on ISOBUS, contact your WEED-IT distributor.

For the installation and configuration of ISOBUS, please refer to *the ISOBUS installation manual, WEED-IT Quadro*.

For information on the user interface of WEED-IT Quadro systems with ISOBUS, please refer to the *ISOBUS user manual, WEED-IT Quadro*.

For instructions and information on updating the ECU (Electric Control Unit) of WEED-IT Quadro systems with ISOBUS, please refer to the *ISOBUS update manual, WEED-IT Quadro.*

For more information on these manuals, please refer to "Other manuals" on page 191.
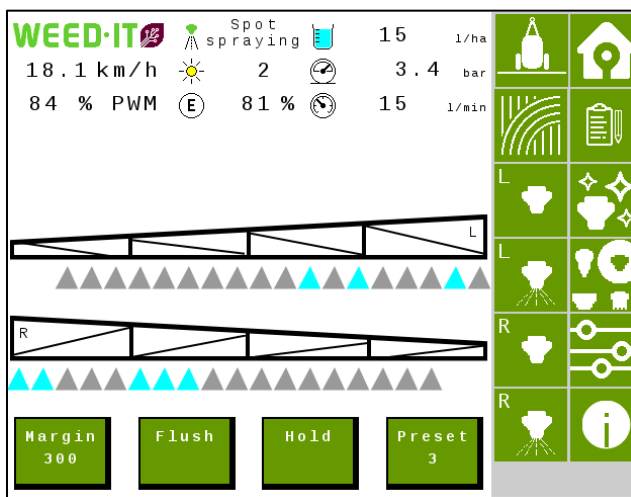
Figure 4-17 ISOBUS Universal terminal

5. WEED-IT calibration and adjustments

This section describes how to set up various sensors. Access Dealer mode to configure the system.

To access Dealer mode:

1. Simultaneously press the menu key [icon] and F3 [icon].

2. Press [icon].

5.1. Speed sensor calibration

The vehicle must have either one or two speed sensors, depending on if turn compensation is desired. Calibrate the wheel speed sensors to make sure that they accurately measure the vehicle speed.

5.1.1. Set up speed sensor
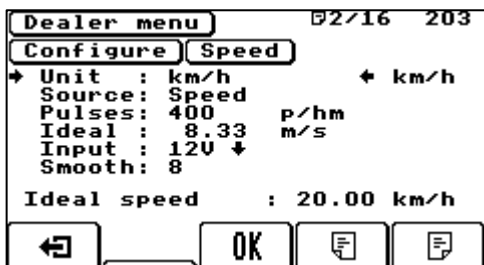
Figure 5-1 Menu 203-2 configure speed

- `Unit` (km/h, mph, m/s) is used to set the units displayed in the Main Menu.

- `Source` (GPS, GPS/10, Speed, Speed/10) sets the input port used (speed or GPS) on the Power Converter. Optionally the number of pulses can be divided by 10 to allow the use of speed sensors that generate high number of pulses (dozens) per meter.

> ⚠️ Beware: the power converter has a separate port for GPS sensors which is currently unused. When using a WEED-IT GPS speed sensor this should always be connected to the standard speed sensor port. Therefore, `GPS` or `GPS/10` should not be selected and select the `Speed/10` when using the WEED-IT GPS speed sensor.

- `Pulses` is the number of pulses received per hectometer (100 meter) traveled. In most cases the speed (wheel speed sensors) or speed/10 (GPS sensor) can be used. Note that if you select 'GPS' or 'GPS/10' the wires must be physically connected to the GPS port on the power converter!

- `Ideal` is the desired driving speed for the system in m/s (6,95 m/s = 25 km/h). This speed is, among other things, used to determine the maximum application rate when using one of the spray modes. It is advised to set ideal speed in such a way that the desired application rate is achieved with 70-80% PWM. If the menu 204 option 'user can set best speed' is enabled, this setting can be adjusted by the user in menu 104.

- `Input` (5↑,5↓,12↑,12↓) determines the voltage and signal type to process. The default for wheel speed sensors is 12↓. Pull down is indicated by a ↓, pull up by a ↑.

- `Smooth` (1, 2, 4, 8, 16, 32) smoothens the speed difference between the left and right speed sensor.. A value of 8 is recommended when using wheel speed sensors and a value of 16 or 32 when using the WEED-IT GPS speed sensor. This value is only used when two speed sensors are used.
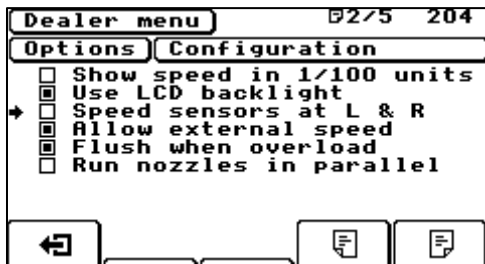
Figure 5-2 Menu 204-2 options configuration

- `Speed sensors at L & R` should be turned on or off corresponding to the set-up used. If this option is disabled (white box) only pulses received on the Speed left input on the Power Converter will be processed.

5.1.2. Verification speed sensor set up

Figure 5-3 Menu 207 speed calibration

1. Go to menu 207

2. Find a suitable straight road with a length of 100 meters. If you can't find a suitable 100 meter road, use a 50 meter road as an alternative. However, using a 50-meter road will slightly reduce the accuracy of the system. Use the function keys to select the distance.

3. Place the vehicle at the starting position and make sure that the steering wheel is straight.

4. Press **OK** (F3) to start the calibration process.

5. Drive the vehicle to a point you have marked 100 meters away. During your trip, the display shows an animated icon of a driving vehicle. The number of detected pulses is also shown.

> **A calibration should result in a minimum of 250 pulses per hectometer.**
>
> **400 pulses per hectometer are recommended** for wheel speed sensors**.**

6. Check that the number of pulses of the two speed sensors are roughly the same. For wheel speed sensors if there is a difference of more than 2%, verify the correct installation of the wheel speed sensors (e.g. the pulses left = 200, right = 210, the difference is more than 2%).

    For GPS speed sensors the procedure is different. If the measured number of pulses during the calibration deviates more than 2% from the specified number by the

manufacturer (<1274 or >1326 for WEED-IT GPS speed sensors), check the installation of the sensors and perform the procedure once again. Enter the specified number by the manufacturer in menu 203 tab 2.

7. Press **OK** (F3) as soon as the destination is reached. The display shows the measured data.

8. Stop the vehicle.

9. If the results are satisfactory, press **OK** (F3) to store the measured data. If the results are not satisfactory, press ⬅ (F1) to leave the menu and restart the calibration procedure.
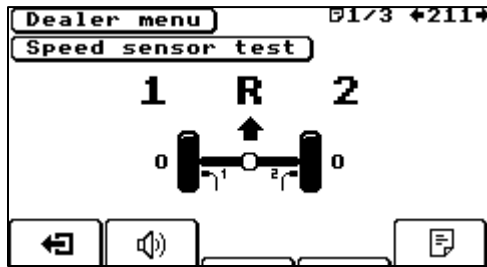
Figure 5-4 Menu 211 speed sensor test

1. Go to Menu 211

2. Check if speed pulses are monitored regularly when driving slowly.

3. Press 🔊 to switch from the left to the right speed sensor.
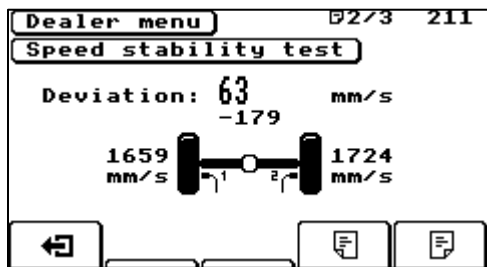
Figure 5-5 Menu 211tab 2 speed stability test

This verification step is only applicable if two speed sensors are installed. Go to menu 211 tab 2 to check if the value of `deviation` does not exceed -100mm/s or 100mm/s when driving in a straight line at operation speed. The top value is the raw speed deviation and the bottom value is the smoothed speed deviation. If so, check the physical installation of the speed sensors.

If the deviation exceeds the specified numbers, increase the value of 'smooth' in menu 203 tab 3 by 1 step and check the deviation again.

5.2. Flow sensor configuration

If flow sensors are used, configure each flow sensor in menu 203. The configuration of flow sensors 2 and 3 is slightly different from flow sensor 1. Check the flow sensor calibration after installation (see "Flow sensor configuration" on page 51).

1. Use 🗐 and 🗐 to navigate to each flow sensor.

2. Use the navigation keys to change a setting.

3. Press **OK** (F3)to confirm a setting.

4. Press ⬅ to go back to the main screen.
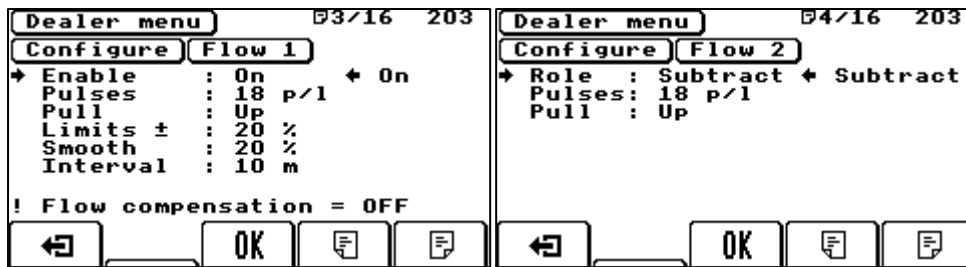
- `Enable` (On, OFF) enables or disables the use of flow sensor 1

- `Role` (Add, Subtract, OFF) sets the role of flow sensors 2 and 3 to calculate the net flow to the nozzles. Subtract should be used if flow sensor 1 is placed in de main spray line and flow sensor 2 is placed in the recirculation line dumping back into the tank.

- `Pulses` is the number of pulses received per liter (indicated at the label of the flow sensor).

- `Pull` (Up, Down) determines the signal type to process. For most flow sensors this is Up.

- `Limits±` represents the lower and upper limit of the flow compensation. See "Options (204)" on page 114 on how to enable flow compensation.

- `Smooth` (10 – 100%) is the proportional factor in the flow compensation. The larger the value, the bigger the correction steps will be.

- `Interval` (5-50 mtr) represents the distance (interval) at which a new correction value will be calculated and executed. A small interval results in quick corrections and can result in a nervous regulation.

Requirements flow compensation

- A flow meter is installed. Behind the PAV valve or when two flow sensors are installed: one between Ramsey valve and the wetboom and the second between the wetboom and tank (set to 'subtract')

- The spray mode is Full Coverage

- The driving speed is constant. During drive off/slow down, the PWM-control is already changing to get to the right application rate, so no constant flow can be measured.

- The is a constant pressure. The pump of the sprayer delivers a fixed amount of l/min and the Ramsey valve regulates the pressure OR the pump of the sprayer regulates a fixed pressure.

- Note: Section control of the WEED-IT is taken into account

5.3. Pressure sensor calibration

If pressure sensors are used, configure each pressure sensor. The configuration of pressure sensor 2 is slightly different from pressure sensor 1. Check the pressure sensor calibration after installation (see "Pressure sensor calibration" on page 53).

```
┌─Dealer menu─┐    ▽6/16   203      ┌─Dealer menu─┐    ▽7/16   203
│Configure││Pressure 1│        │Configure││Pressure 2│
➤ Role    : View      ← View      ➤ Role    : Low       ← Low
  Nominal : 3.00 bar              −       :  3.00 bar
  Limits± : 20 %                  −       : 20 %
  Cal.    : 1225 x                Cal.    : 1225 x
  Offset  : 0                     Offset  : 0
  Smooth  : 50.00 %               Smooth  : 50.00 %
  Type V/I: V                     Type V/I: V

┌───┐     ┌──────┐ ┌──┐ ┌──┐     ┌───┐     ┌──────┐ ┌──┐ ┌──┐
│ ⬅│     │  OK  │ │ ▤│ │ ▤│     │ ⬅│     │  OK  │ │ ▤│ │ ▤│
└───┘     └──────┘ └──┘ └──┘     └───┘     └──────┘ └──┘ └──┘
```
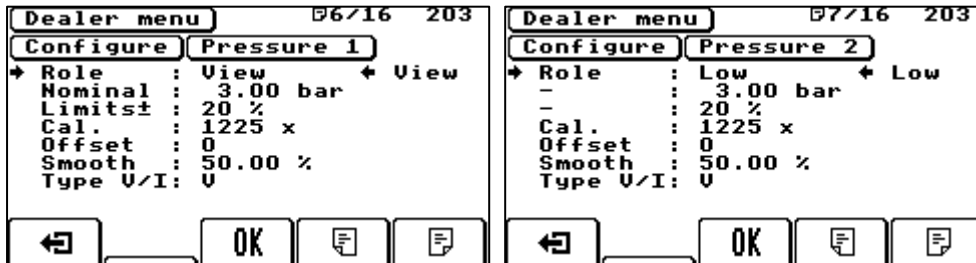
- **Role** pressure 1 (OFF/View/Auto/Adjust) sets the role of pressure sensor 1. For most systems, the role for pressure 1 should be set to View.
  Auto will regulate the PWM-control if the pressure in the spray line changes, so the desired application rate is retained. If Auto is selected, the option 'pressure compensation' in menu 204/4 must be enabled for it to work. *Adjust* is still under development, do not choose.

- **Role** pressure 2 or 3 (OFF/View/Low/High/Avg.) sets the role of pressure sensors 2 and 3. If multiple pressure sensors are used, it is recommended to set them to View. Only OFF or View should be set.

- **Nominal** is the desired pressure in the wetboom and can also be set in menu 104.

- **Limits±** represents the lower and upper limit of the pressure. If the pressure outside of *Nominal ± Limits* is measured (in this case <2.40 and >3.60 bar), a warning message is displayed.

- **Cal.** is the calibration factor. A higher calibration factor causes the value displayed in the user console to be higher when the same pressure is applied to the sensor.
  For WEED-IT pressure sensors the calibration factor is 1225x for 0-6 bar pressure sensors and 2450x for 0-12 bar pressure sensors.

- **Offset** is used when the pressure on screen does not go back to 0.00 bar when there is no pressure. This is because certain pressure sensors give a basic voltage at the signal wire when no pressure is measured. If needed, an offset between 10 and 50 is usually sufficient.

- **Smooth** is an option used to smooth out pressure differences measured by the sensor, this averages more or less measurements. The default value is 50%. A low % means that the pressure reading is more smoothed, a 100% smooth means no smoothing on the pressure reading.

- **Type** V/I (V, I) provides a choice of sensor types: voltage or current signals. Most pressure sensors are voltage signal sensors

To check the settings:

1. Use the **Left/Right** navigation keys to change the calibration factor until the pressure in the main screen matches the actual value on the pressure gauge.
2. Press **OK** to save the calibration factor.
3. Press ⬅ to go back to the main screen.
4. Repeat the previous steps, until you are satisfied with the result.

5.4. Machine configuration options

Once the machine has been calibrated, you need to select installed options in menu 203 tab 15 (Other) and menu 204 (Options). This menu consists of a number of pages, each with a further series of options that can be enabled (▣) or disabled (▢).Other (203 tab 15)

Other settings

```
┌─────────────────────────────────────────┐
│ ┌Dealer menu┐      ▽15/16   203          │
│ ┌Configure┐┌Other┐                       │
│    PWM    : Cover                         │
│    Lane   : 250 mm                        │
│  ➜ Lanes  : 4 @ 25cm    ← 4 @ 25          │
│    RefBox : 5                             │
│    Press.+:  6.00 bar                     │
│                                           │
│  ┌─────┐ ┌───┐ ┌──┐ ┌───┐ ┌───┐           │
│  │ ←🗗 │ │   │ │OK│ │ 🗐│ │ 🗏│           │
│  └─────┘ └───┘ └──┘ └───┘ └───┘           │
└─────────────────────────────────────────┘
```

`PWM`	Active spray mode (see "PWM/Nozzle selection menu (104)" on page 93 for options).
`Lane`	Detection channel width, the default value is 250 mm.
`Lanes`	(1 @ 100cm, 2 @ 50cm, 4 @ 25cm) Can be used to let multiple nozzles spray when a weed is detected by the sensor. 4 @ 25cm is default. 2 @ 50cm: nozzles 1&2 and 3&4 will spray together if either detection channel 1 and/or 2 or 3 and/or 4 has a weed detection. 1 @ 100cm: all four nozzles will spray when the sensor detects a weed.
`RefBox`	Reference sensor to determine the sun indication factor. Sensor# 5 is always selected, because the sensor is most likely not behind the machine (possible shadow). When less than 5 sensors are connected, the system uses another reference sensor. Do not change this value.
`Press.+`	Maximum pressure that can be set in menu 104, the default value is 6.00 bar.

Options (204)

Other settings 203

```
┌─────────────────────────────────────────┐
│ ┌Dealer menu┐      ▽15/16   203          │
│ ┌Configure┐┌Other┐                       │
│    PWM    : Cover                         │
│    Lane   : 250 mm                        │
│  ➜ Lanes  : 4 @ 25cm    ← 4 @ 25          │
│    RefBox : 5                             │
│    Press.+:  6.00 bar                     │
│                                           │
│  ┌─────┐ ┌───┐ ┌──┐ ┌───┐ ┌───┐           │
│  │ ←🗗 │ │   │ │OK│ │ 🗐│ │ 🗏│           │
│  └─────┘ └───┘ └──┘ └───┘ └───┘           │
└─────────────────────────────────────────┘
```
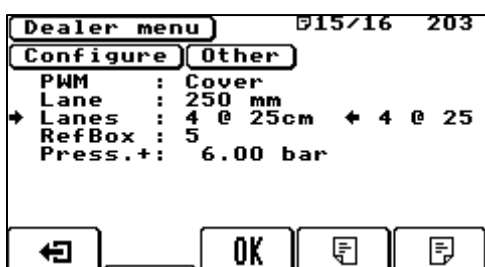
PWM	Active spray mode (see "PWM/Nozzle selection menu (104)" on page 91 for options).

Lane	Detection channel width, the default value is 250 mm.
Lanes	(1 @ 100cm, 2 @ 50cm, 4 @ 25cm) Can be used to let multiple nozzles spray when a weed is detected by the sensor. 4 @ 25cm is default. 2 @ 50cm: nozzles 1&2 and 3&4 will spray together if either detection channel 1 and/or 2 or 3 and/or 4 has a weed detection. 1 @ 100cm: all four nozzles will spray when the sensor detects a weed.
RefBox	Reference sensor to determine the sun indication factor. Sensor# 5 is always selected, because the sensor is most likely not behind the machine (possible shadow). When less than 5 sensors are connected, the system uses another reference sensor. Do not change this value.
Press.+	Maximum pressure that can be set in menu 104, the default value is 6.00 bar.

Options 204

The most important options that can be configured are:

- `Flush when overload` fully opens up all nozzles of any detection sensor that exceeds the maximum speed of the system.

- `Run nozzles in parallel` all nozzles of a sensor will switch on simultaneously if any of the sensor's channels detects a weed

- `Enable PWM mode` lets you choose several nozzle control (PWM) modes for different operating scenarios. This is the default setup. If you want to prevent users from having this ability, disable the function here.

- `User selection PWM` the user can adjust the spray settings in menu 104.

- `PWM smoothing` enables a stepless variation in PWM control because discrete steps are interpolated.

- `Pressure compensation` compensates the PWM control when the pressure differs from the ideal pressure to ensure the desired application rate. This option should not be enabled when the option 'Flow compensation' is enabled. Choose either of the options.

- `Flow compensation` compensates the PWM control when the application rate differs from the desired application rate. This option should not be enabled when the option 'Pressure compensation' is enabled. Choose either of the options.

- `Green on Green` (optional) this option enables two additional spray modes for Green on Green spot spraying. Contact your distributor before enabling this option!

- `User wind/margin setting` the user can toggle between four margin presets in the main menu by using the **F2** button.

> If one of the speed sensors breaks and you have no spare sensor available you can use the system as if it has only one speed sensor. Make sure you disable the option `Speed sensors at L & R` and connect the working sensor to the Speed left input on the Power Converter.

Menu 204 also allows you to adjust the user interface to the personal preferences. For example:

- Set the number of times the buzzer sounds when a warning is generated.

- Specify the behavior of the display back light when a warning is generated.

For more information, please refer to "Options (204)" on page 113 for a description of each option.

5.5. Detection sensor spacing

If all sensors are mounted at equal distance between sensors and sensors 1 are spaced 500 mm from the center of the machine, use dealer menu 212 to set the offset for all sensors automatically. Enter the spacing that is applicable for the machine (e.g. 1000 mm or 40 inches = 1016 mm).
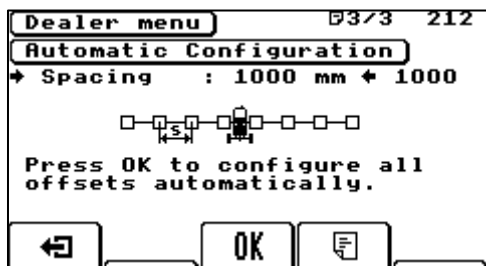
Click **OK** to confirm the new settings.

5.6. Detection sensor positioning

Set the spacing of the sensors individually. If you have used menu 212 to configure all positions at once, check all individual positions. Use Dealer menu 205.

1. Press ⎿↔⌐ to select the required boom (left or right)

2. Press ▤ (F5) to edit settings.

3. Enter values for `Track` width and `Offset`.
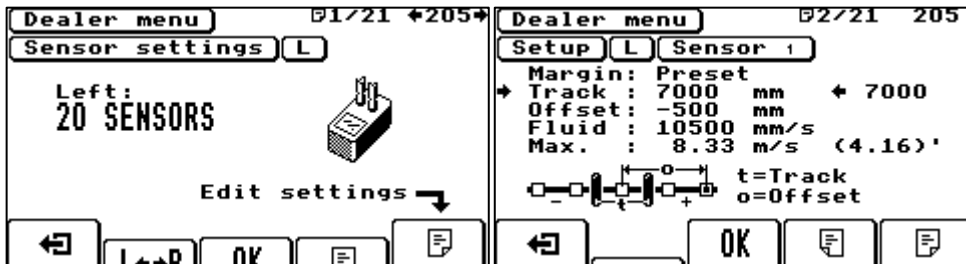
- Use ▤▤ to browse to the required sensor.

- Use the **Up/down** navigation keys to select the parameter you want to adjust.

- Use **Left/right** navigation keys adjust the parameter.

- Press **OK** (F3) to confirm a setting.

`Track`	Defines the **track width** of the vehicle (**t**). This is the distance from the center of the left wheel to the center of the right wheel, in mm.
	This value is the same for all sensors. To confirm the setting: Press and hold **OK** (F3) for two seconds. When you hear a second beep, the setting is sent to all sensors simultaneously.
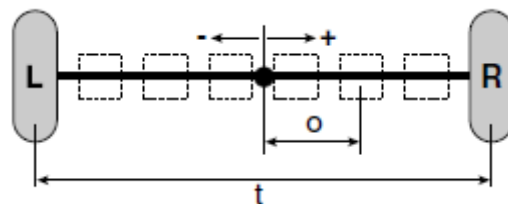
Offset	Defines the offset for each individual sensor (**o**). This is the distance between the central axis of the sprayer and the center of each individual sensor, in mm.

Defines the offset for each individual sensor (**o**). This is the distance between the central axis of the sprayer and the center of each individual sensor, in mm.

The central axis of the sprayer is the reference point from which all offsets are measured. A sensor that is mounted exactly at the center of the sprayer, will have an offset of 0.

- Sensors mounted to the right of the center have a **positive** offset

- Sensors mounted to the left of the center have a **negative** offset.

Measure the offset for each individual sensor as accurately as possible (in mm) and enter this as the Offset value in menu 205. Write down all sensor positions in the section "Calibration settings form" on page 180

Press **OK** briefly to confirm the new value.

Repeat this procedure for each sensor.

Example:

Sensor	Offset
LEFT 3	-2500
LEFT 2	-1500
LEFT 1	-500
RIGHT 1	500
RIGHT 2	1500
RIGHT 3	2500

5.7. Nozzle calibration

> ⚠️ Ensure that all solenoids are installed correctly and tightened. When using WEED-IT never place a blind cap on the nozzle body outlet where the solenoid is attached to. Because the water in the solenoid stands still and heats up because of the modulating solenoid, the solenoid will wear very quickly!

Use Dealer menu 206 to configure the positions of all nozzles.

1. Press **L↔R** (F2) to select the required boom .

2. Use (F5) to select the first sensor left of right.

Height	Enter the **height (h)** of each individual nozzle. This is the distance between the bottom of the nozzle and the soil in mm.
	Measure this distance accurately and enter the value at `Height`. Press **OK** briefly to confirm the value.
Dist.	Enter the horizontal **distance (d)** between the detection line and the nozzle in mm.
	Measure this distance accurately and enter the value at `Dist.` Press **OK** briefly to confirm the value.
Max.	Max. indicates the maximum speed in m/s the WEED-IT system can be used at when spot spraying weeds. The maximum speed is the lowest calculated max. speed amongst all sensors based on:
	• The distance (mm) in menu 206
	• The height (mm) in menu 206
	• The margin (mm) in menu 205
	• The fluid speed (mm/s) in menu 205
	When driving faster than the maximum speed, the correct targeting of the weeds is not possible anymore (for at least one sensor).
	The speed indicated between parentheses is the speed at which the PWM is 100%. When the ideal speed exceeds the maximum speed, an exclamation mark will be shown, the console will beep and the screen will flash once you try to confirm a height or distance in menu 206. The best way to solve this is to decrease the ideal speed in menu 104 or 203.

Programming settings for one sensor

To confirm the distance or height for one sensor, press and hold 🖌 (F2) for one second. The console will beep and the screen will flash through all 4 nozzles. The new value is saved to all individual nozzles belonging to the selected sensor. When confirmed, nozzle 4 of the selected sensor is shown.

Programming all nozzles simultaneously

To confirm the distance for the entire system, press and hold **OK** for two seconds. You will hear a second beep. The new value is saved to all sensors and nozzles connected.

If the height and/or distance is not the same for all nozzles

1. Use 🔲🔲 to browse to the required sensor.

2. Use 🖌 to select the required nozzle.

3. Enter the correct value and press **OK** briefly.

In most cases, the values will be identical for (nearly) all nozzles, with the possible exception of the nozzles at the central boom section, around a folding point or near support wheels. If this is the case, you can still use the above method to set all nozzles simultaneously. Once you've done that, select the nozzle(s) for which the value is not correct and enter the appropriate value. Press **OK** briefly to confirm the new value.

Repeat this procedure for all nozzles and sensors if necessary.
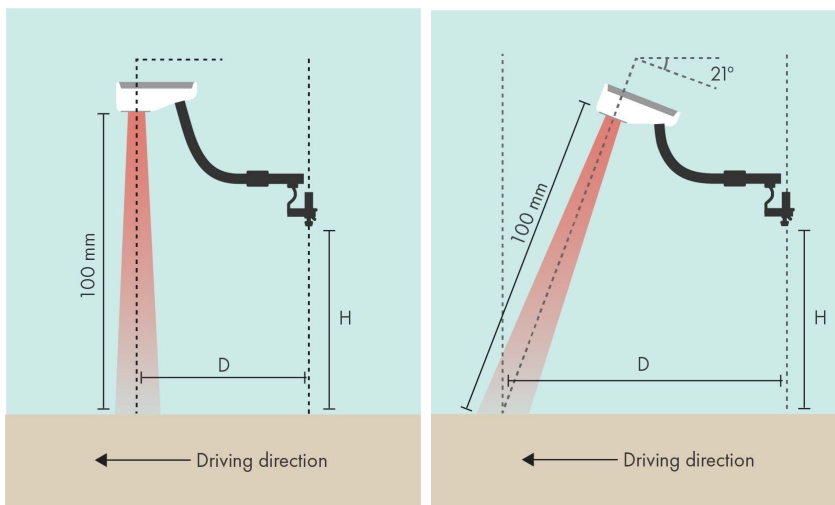

Figure 5-6 Straight installation (left) and Angled installation (right). D=distance, H=height in menu 206.
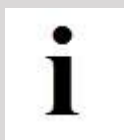
> ℹ The distance from the sensor window to the detection line on the ground should be 1100mm (43.3 inch) in a straight line!

5.8. Detection sensor timing

⚠️ Make sure that the speed measurement is correct, see "Speed sensor calibration" page 49. This is very important for correct detection and targeting of weeds.

The speed readout should be stable when driving at a constant speed. Also check the displayed speed with the speedometer on your vehicle.

- Use menu 205 to set the margin to **5** for all sensors (press and hold the **OK** key for more than 1 second). If there is no value available for Margin and instead the screen displays Preset, go to menu 213 and set preset 1 to 5 mm. Press **OK** to confirm. Go to the main menu and select margin preset 1. A margin of 5 mm will be used.

```
Dealer menu          ▷2/2  213
Margin presets
   Set 1 :  200   mm
   Set 2 :  235   mm
 ◆ Set 3 :  270   mm     ← 270
   Set 4 :  300   mm

  ←┤           OK    ⬏
```
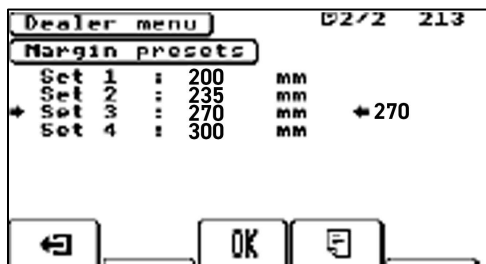
- Use a relatively open spot on the field. Watch the targeting on actual weeds or use some fresh leaves of a tree. To check the timing of the solenoids, use a piece of plastic or cardboard. The spray pattern should be symmetric over the weed.

- Always perform the two tests below in the given sequence.

```
Dealer menu     ▷2/21  205      Dealer menu     ▷2/21  206
Setup  L  Sensor  1             Setup  L  Sensor  1  Nozzle 1
  Margin: Preset              ◆ Height:   550   mm   ← 550
◆ Track : 7000  mm  ← 7000      Dist. :   600   mm
  Offset: -500  mm              Max.  :  8.33  m/s  (4.16)'
  Fluid : 10500 mm/s
  Max.  :  8.33 m/s (4.16)'
       o     t=Track                d  h   h=Height
  ▭─▭ ┃ ▭ ▭  o=Offset            ←    d     d=Dist.
     -  t  +
  ←┤        OK   ⬏   ⬐         ←┤  1⬙  OK   ⬏   ⬐
```
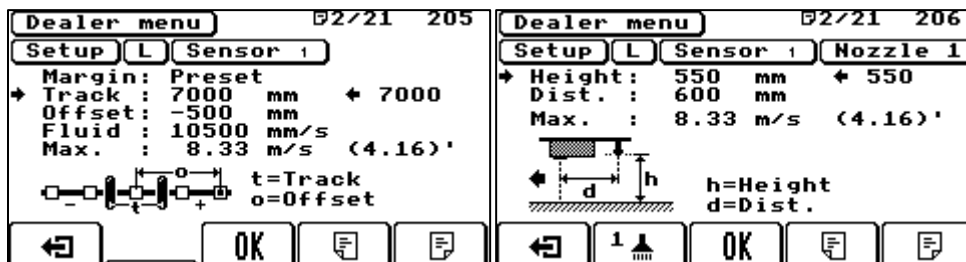
5.8.1. Test 1 - Slow driving

1. Slowly drive over the weeds at a speed of approx. 2 to 3 km/h.

2. Check that the spray pattern is evenly distributed in front and behind the weeds (looking in the driving direction). Normally, if you have measured the distance and height correctly, the spray pattern should be placed evenly around on the weed.

   - If there is a big deviation, check the distance by measuring again.

   - If there is only a deviation on part of the spray boom, check if your spray boom is leveled! If not, adjust the hydraulics to level your spray boom.

   - If the spray pattern is more in front of the weeds, it's spraying too late. Decrease the value for distance.

   - If the spray pattern is more behind the weeds, it's spraying too early. Increase the value for distance.

3. Check the result after adjusting. The distance is set correctly when the length of the spray pattern is evenly distributed in front and behind the weeds. Make sure you set the distance correctly for all sensors and nozzles as described in "Nozzle calibration on page 59"
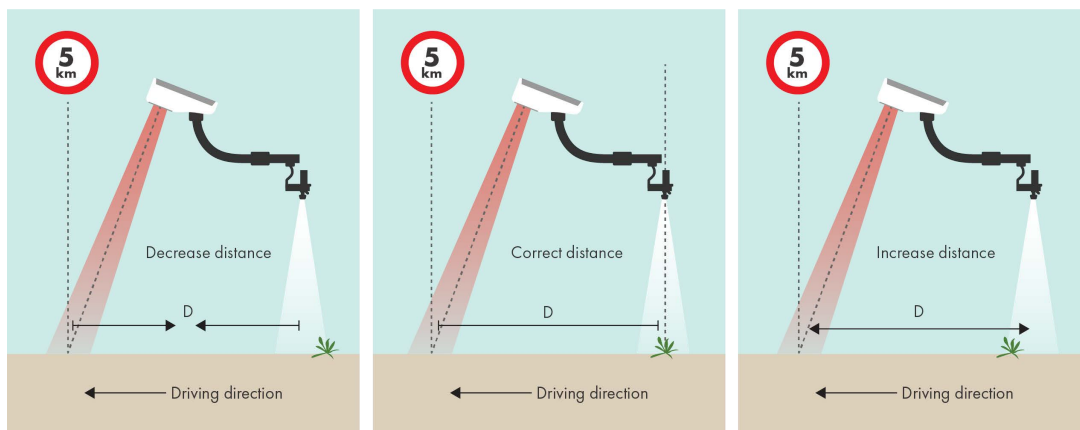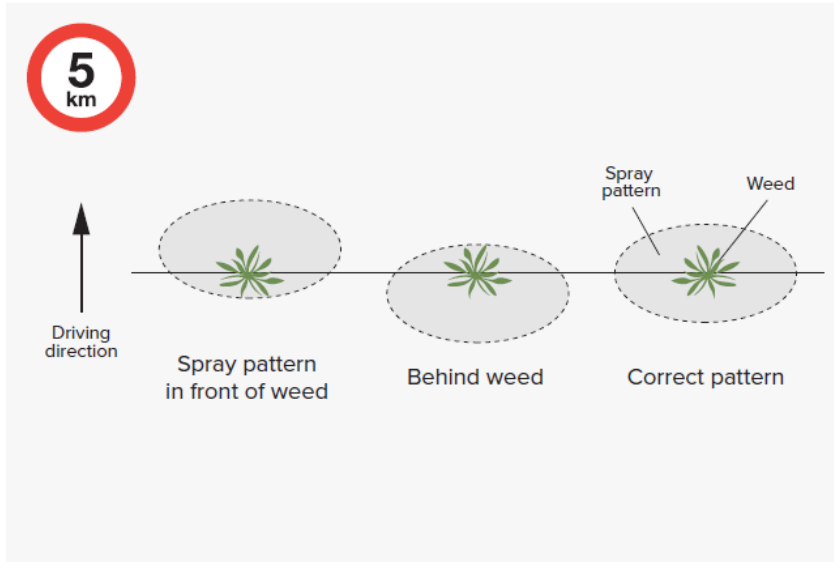
*Figure 5-7 Spray pattern adjusting distance, D=Distance in menu 206. Spray pattern in front of weeds →
decrease distance. Spray pattern behind weeds → increase distance.*

5.8.2. Test 2 - Fast Driving - Adjusting fluid speed

1. Make sure the timing is correct at low driving speeds.

2. Drive over the weeds once more, but now at a higher speed of approx. 12 to 15 km/h. The spray pattern should be evenly distributed in front and behind the weeds.

    -   If the spray is more in front of the weeds, it sprays too late. In that case, decrease the fluid speed.

    -   If the spray is more behind the weeds, it sprays too early. In that case, increase the fluid speed.

3. Adjust the fluid speed settings in small steps of 50 mm/s, then check the results again.

-   Spray pattern behind the weeds → increase fluid speed
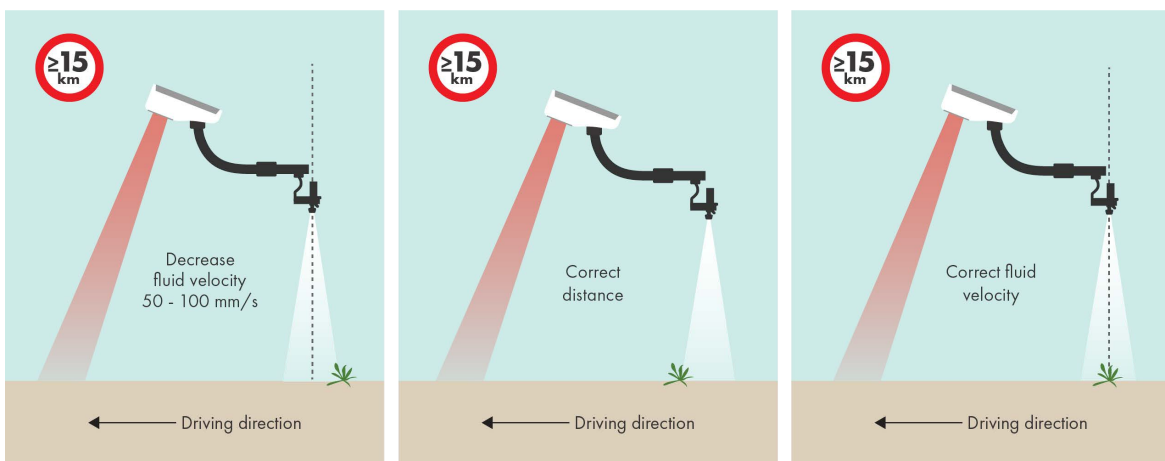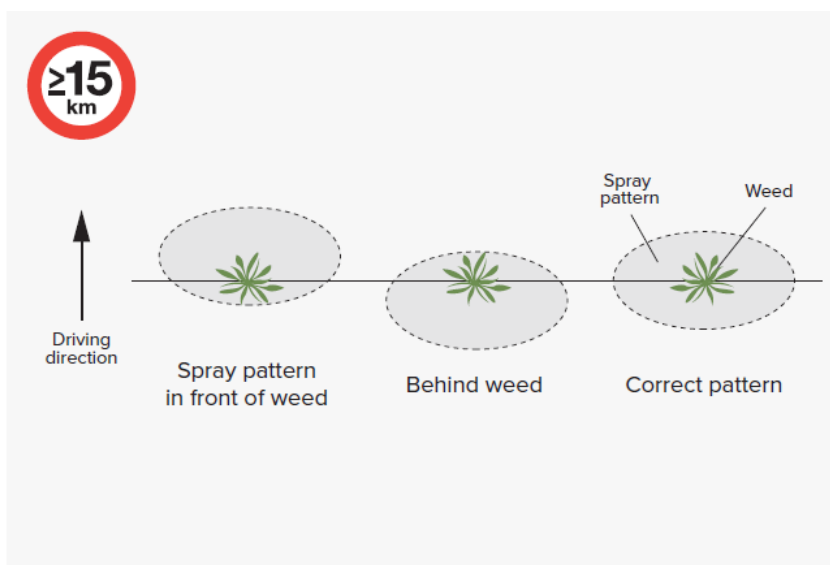
Figure 5-8 Spray pattern adjusting fluid speed. Spray pattern in front of the weeds → decrease fluid speed. Spray pattern behind weeds → increase fluid speed

⚠️ **Important:** Set the margin back to the preferred value in menu 205 or if presets are used, set the preset 1 back to 100 mm in menu 213.

5.9. Margin settings
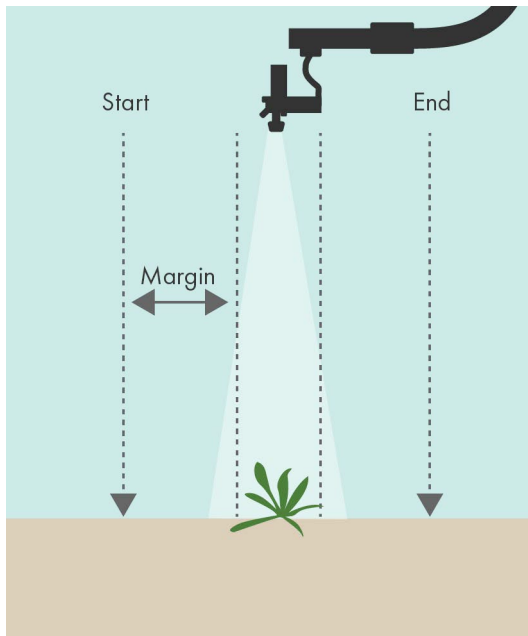
Figure 5-9 Margin settings

5.9.1. Using four preset margin settings

The four preset margin settings are standard enabled on your WEED-IT system. In this case in menu 205, the margin indicates 'preset'.

1. Navigate to menu 213 to set the four preset settings.
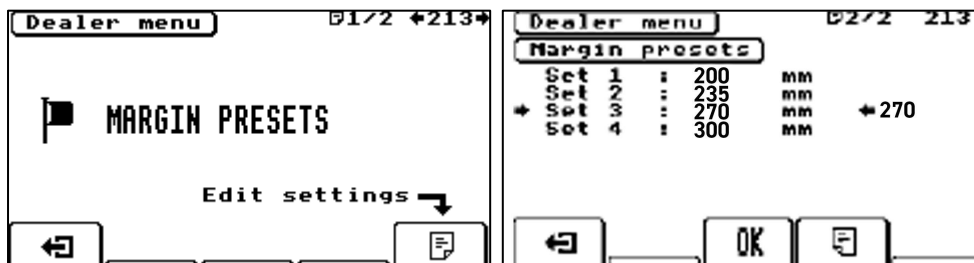
2. Set four usable margin presets for your operation. The advised margin depends on your driving speed, wind conditions and field contours. A higher margin is advised with higher speeds and/or more variable contours.

   - The minimum for practical use is 200 mm on preset 1.

   - The maximum margin to be set is 300 mm.

3. Press **OK** in menu 213 to confirm the value.

4. Next, in the main screen, you can change the margin preset by pressing ⬜; **F2** now shows the margin flag ⚑ .

5. Press ⚑ to change the preset margin. Refer to "Changing the margin during spraying" on page 74

5.9.2. Using a fixed margin

If you set a fixed margin, this applies for the whole system. Set the fixed margin in menu 205.

To enable a fixed margin, the preset margins must be deactivated. To do this:

1. Shut down the WEED-IT console.

2. Press the menu button [ ], the upper arrow button [ ] and the **F3** button [ ], then press the On/Off button [ ].

3. The console will start in a special dealer mode. Next when entering menu 200, a password is required. The dealer or distributor knows the **dealer** password.

4. Go to menu 204 tab5.

5. Disable the option 'wind/user margin'.

6. Set the desired margin in menu 205. The minimum fixed margin is 100 mm for practical use. The maximum margin to be set is 300 mm.

7. Hold the **OK** button for two seconds to confirm the setting for the whole system.

6. Using WEED-IT

Use the user console to control the WEED-IT system. The user console 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 your 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 19 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 91).

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 87).

⚠️	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 inches) • the pressure must be constant and at least 2.0 bar(36.3 psi) • nozzle height must be less than 600 mm (24 inches) • margin must not be larger than 200 mm (8 inches)
	Battery voltage must be between 11.7 and 28V for proper operation. WEED-IT can be connected to a 12V or 24V electrical system. Whenever the battery voltage drops below 11.7V, a warning will be issued; the system switches off when the voltage drops below approx. 11.5V.

	The alternator must have a output of at least 120 A. For systems with more than 30 sensors, we recommend at least 150 A. For 36-meter systems, we recommend having 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 74 for more information.
	We recommend using at least a 100 mesh pressure filter in your sprayer to prevent solenoid valve clogging and or damage due to particles.

6.1. 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.

- 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 88 for more information on available options.

6.2. Pressure check

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

1. Switch on the system.

2. Press (F2):

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

6.3. Sensors check

Before each use, check the 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 chlorophyll (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 91.

Replace a faulty or damaged detection sensor with a new one, refer to "Sensor replacement" on page 78. Examples of detection sensor that needs to be replaced:

- Solenoid is controlled incorrectly.

- Light is flashing.

- Relative humidity (RH) warning.

i	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 continue spraying with the widest boom possible at that moment (even though it is not as wide as you would like it to be).
	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.

6.4. Cleaning nozzles

Flush the nozzles regularly with clean water to avoid clogging.

1. Fill the tank with water or use the fresh water tank on the sprayer.

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 (press ⏻) 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 chlorophyll (green plant material) in the corresponding sensor channel.

7. Press 🍃 again to stop.

8. Press ⬅ to return to the Main screen.

6.5. Reading job productivity

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

1. Enter the Service mode.

2. Press ▢ repeatedly until menu 103 opens.

> Refer to "Job menu (103)" on page 92 for more information.

6.6. Changing the spray settings

WEED-IT can be used in various modes, see PWM/Nozzle selection menu (104) page 93:

- Spot plain

- Spot spraying

- Full coverage

- Dual function

- Spot plain Green on Green (optional)

- Spot spraying Green on Green (optional)

To change the spray settings:

1. Stop the vehicle.

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

```
┌─────────────┬───┬────────┬──────┐
│ Information │ L │ Global │  100 │
├─────────────┴───┴────────┴──────┤
│ Temperature:  23/35      °C     │
│ Battery    :  13.18      V      │
│ Lowest     :  13.15      V      │
│ Uptime     :  10:54      hrs    │
│ Area       :   0.00      Ha     │
│ Total      :   0.04      Ha     │
│ Max speed  :  30.00      km/h   │
│                                 │
│ ┌────┐ ┌─────┐ ┌─────┐    ┌───┐ │
│ │ ⬅ │ │ L↔R │ │ ⚊⚊⚬ │    │ 🗒 │ │
│ └────┘ └─────┘ └─────┘    └───┘ │
└─────────────────────────────────┘
```
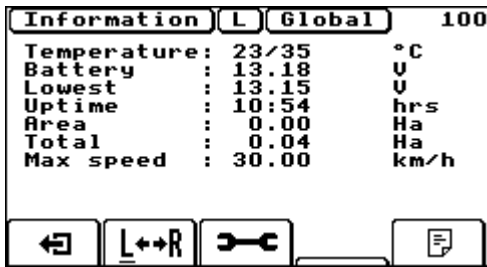
3. Press ⬜ briefly several times, until menu 104 opens:

```
┌──────────────────────┬──────┐
│ PWM/Nozzle selection │  104 │
├──────────────────────┴──────┤
│ ◆Mode  : Spot plain      ◆  │
│                             │
│ Nozzle: TeeJet TP 25-03     │
│ Press.: 3.00 bar            │
│ Spot  : 136.6 L/Ha    100%  │
│ Speed : 20.01 km/h          │
│                             │
│ ┌────┐      ┌─────┐         │
│ │ ⬅ │      │ OK  │         │
│ └────┘      └─────┘         │
└─────────────────────────────┘
```

4. Use the **Up/Down** navigation keys to select the Mode parameter, if necessary.

5. Use the **Left/Right** navigation keys to select the appropriate spray mode.

6. Press the **Down** navigation key to select the Nozzle parameter.

```
┌──────────────────────┬──────┐
│ PWM/Nozzle selection │  104 │
├──────────────────────┴──────┤
│  Mode   : Spot spraying     │
│ ◆Nozzle: Wilger MR 65-03 ◆  │
│                             │
│  Press.: 50.76 psi          │
│  Spot  : 3.66 ga/a    90%   │
│  Speed : 14.00 mph          │
│                             │
│ ┌────┐    ┌────┐┌────┐┌─────┐│
│ │ ⬅ │    │ OK ││50% ││100% ││
│ └────┘    └────┘└────┘└─────┘│
└─────────────────────────────┘
```
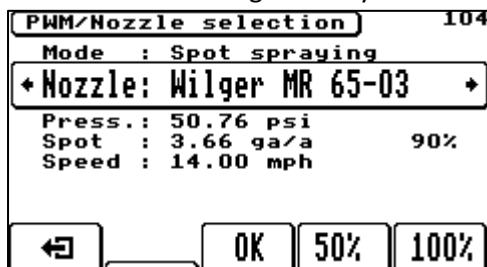
7. Use the **Left/Right** navigation keys to select the preferred nozzle type.

> ⚠️ Only use the nozzle types that you can select in the software. Refer to "Available nozzles" on page 180 for a list of all available nozzles.
>
> Although PWM increases the application rate range with a nozzle, the right nozzle selection is still a crucial factor for a good spray result.
>
> The nozzle type is usually engraved in the top surface of the nozzle. Make sure that you replace the nozzles on the spray boom by the new type!

8. Pressure selection is optional in menu 104. If not available, the pressure is set once by the dealer in menu 203 tab 6.
Press the **Down** navigation key to select the Press. (pressure) parameter.

```
┌─PWM/Nozzle selection─┐    104
  Mode  : Full coverage
  Nozzle: Magnojet APS 30-03
┌────────────────────────────┐
│ ◄ Press.: 3.10 bar      ►  │
└────────────────────────────┘
  Cover : 131.6 l/Ha      99%
  Speed : 21.60 km/h
                 .
┌────┬────┬────┬────┐
│ ←│ | ◷ | OK | 50%│
└────┴────┴────┴────┘
```

9. Use the **Left/Right** navigation keys to select the preferred pressure. If you press the gauge

    icon ◷ (F2), the nominal pressure that belongs to the nozzle will be set. For most nozzle types this is 3.00 bar.

> **i** Note that the pressure set in menu 104 is only used to support the application rate calculation. The pressure setting is not adjusted. The pressure needs to be adjusted manually at the air compressor (when using a PAV valve) or in the spray computer of the sprayer itself. Always check that the pressure sensor reading matches the set pressure in menu 104 before start spraying.

10. Press the **Down** navigation key to select the Spot or Cover parameter.

```
┌─PWM/Nozzle selection─┐    104
  Mode  : Spot spraying
  Nozzle: Magnojet APS 30-03
  Press.: 3.00 bar
┌────────────────────────────┐
│ ◄ Spot  : 96.2 L/Ha    80% ►│
└────────────────────────────┘
  Speed : 20.01 km/h

┌────┬────┬────┬────┬─────┐
│ ←│ |    | OK | 50%| 100%│
└────┴────┴────┴────┴─────┘
```

11. Use the **Left/Right** navigation keys to select the preferred application rate.

> **i** Ideally, the preferred application rate should be achieved with a 70-80% PWM at the ideal speed. This ensures that there is enough control range for the PWM to control the application rate when the vehicle is driving faster or slower or when it turns.
>
> If the application rate percentage is not between 70-80%, try a smaller or larger nozzle type or a different ideal speed.

> ⚠ Never select a spot or cover application rate with a percentage that is lower than 40% in menu 104. If the desired application rate is matching a low percentage, the nozzle should be changed!

**PWM/Nozzle selection parameters explained**

-   The Spot parameter determines the application rate that is applied within the single nozzle spray width on the soil surface. The amount is only applied in the channels where weeds are detected by the system. The application rate is regulated for any speed up to the maximum speed, also while turning (if the WEED-IT has two speed sensors installed).

The spot rate is calculated as a bandwidth application. Refer to "Application rate calculations" on page 187 for more information on the application rate calculations.

- The `Cover` parameter determines the application rate that is applied to the entire field (Full coverage mode and Dual function mode). The Cover rate is calculated as a normal spray application (with overlap between neighboring nozzles). Note that WEED-IT uses 25 cm / 10 inch nozzle spacing. Refer to "Application rate calculations" on page 217 for more information on the application rate.

- Use the **50%**, **75%**, and **100%** (F4 and F5)buttons to quickly select these application rate percentages. If the mode Spot Plain is being used, the application rate percentage is fixed at 100%.

- If the mode Dual function is being used and the Spot parameter is equal to the Cover parameter, a warning will be shown. With these settings, the same application rate will be sprayed on weeds as on the rest of the field, so in this case, it would be better to select the mode Full Coverage. The difference between the application rate percentages of the `Spot` parameter and the `Cover` parameter should be at least 40%.

```
PWM/Nozzle selection        104
┌─────────────────────────────┐
│◆Mode  : Dual function      ◆│
├─────────────────────────────┤
│ Nozzle: Wilger MR 65-03     │
│ Press.: 3.50 bar            │
│ Spot  : 90.5 l/Ha     75%   │
│ Cover : 90.4 l/Ha     75%   │
│ Speed : 24.01 km/h          │
│      WARNING: Spot = Cover  │
├──────┬──────────────────────┤
│ ⬅┤   │   OK                 │
└──────┴──────────────────────┘
```
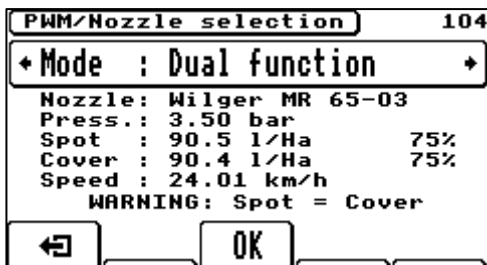
12. Press the **Down** navigation key to select the speed (ideal speed) parameter.

13. Use the **Left/Right** navigation keys to select the desired driving speed.

14. The application rate may change when you adjust the speed parameter.

15. Press **OK** to confirm. All sensors are reconfigured and the system restarts.

ℹ	The maximum application rate and ideal speed are related to each other. If you increase the ideal speed, the maximum application rate will decrease automatically.

For more information, see "PWM/Nozzle selection menu (104)" 93.

6.7. 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

From the Main screen:

1. Press [icon] briefly to open the Preset menu:

   [icon toolbar]

2. Press [flag icon] to change the margin. By default, the margin presets are defined as follows:

   - 1 = 200 mm
   - 2 = 235 mm
   - 3 = 270 mm
   - 4 = 300 mm

3. Press [flag icon] repeatedly until the required margin is displayed.

4. Press [icon] briefly or wait for three seconds to return to the Main screen.

6.8. Changing sensitivity

The sensitivity of the sensors can be adjusted, depending on circumstances. Several different presets are available in the Preset menu to set the sensor sensitivity:

1. From the Main screen, press [icon] once to enter the **Preset** menu.
2. Use [leaf icon] to select the desired preset. This function allows the WEED-IT to be used under different conditions, for example on a wet surface after rain, in bright sunlight, 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 sensitivity:
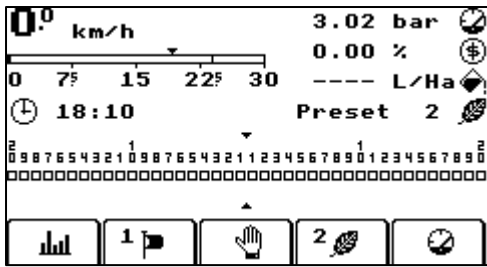
Figure 6-1 Sensitivity preset 2 selected

It might be necessary 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 87 for more information on presets.

6.9. Machine on hold

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

- In the main screen, press the ✋ (F3) function key.

- Press ✋ (F3) once more to resume spraying.

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

7. General maintenance

Make sure you follow the cleaning instructions after each use of the WEED-IT. See "Cleaning, Storage and Transport" on page 83 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 with a too-large current rating may cause a system overload and increase the possibility of 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 output of the alternator should be more than 120A. (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.

7.1. Sensor maintenance

7.1.1. Regular 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 warning will be displayed, including which sensor(s) is suffering from this issue. If the leakage warning is still present when the sensors are at operating temperature, the sensor has a leak. Ignoring the warning can result in corrosion on the sensor PCB which cannot be repaired.

Possible causes:

- Cracked window

- 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.
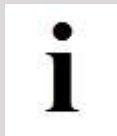
| ℹ️	If no replacement sensor is available, move a functioning sensor from the outside of the boom to the position of the faulty sensor In this way, you can still continue spraying with the widest boom possible at that moment (even though it is not as wide as you would like it to be).
	Make sure that 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.

7.1.2. Sensor replacement

If you need to replace a sensor, you will also have to configure it. Refer to "Detection sensor positioning (mandatory) " on page 57 and " Nozzle calibration" on page 59 for more information.

Nozzle calibrationIt is possible to create a backup of a detection sensor, store the backup on the console and restore this backup after the sensor has been replaced. This ensures that all settings will be restored automatically and saves some time and action.

It is only possible to use the backup function, if the broken sensor is still communicating to the console.

Start the system in Dealer mode to access the backup menu:

1. Simultaneously press the menu key and F3 .

2. Press and hold for one second.

Go to menu 214 tab 5:
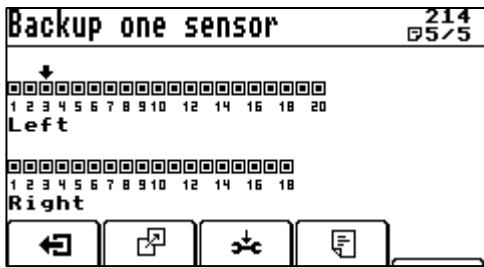
1. Use the navigation arrow keys to select the to-be-replaced sensor.

2. Press ⬚ (F2) to create a backup. A confirmation window opens. Press the right arrow key to confirm.

3. Shut down the WEED-IT console.

4. Replace the sensor. The firmware version on both the new and existing sensors must be the same!

5. Start the system again in Dealer mode and go to menu 214 tab 5.

6. Use the navigation arrow keys to selected the replaced sensor

7. Press ⚙ (F3) to restore the backup. The WEED-IT console shuts down automatically.

8. When restarting the WEED-IT, the replaced sensor is ready to be used.

7.2. Nozzle and solenoid valve maintenance

> ⚠️ We recommend using 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 chemicals 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 69 for more information. Always replace faulty nozzles. To replace a nozzle:

1. Twist the nozzle cap counterclockwise.

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.

> ⚠️ Even if the WEED-IT nozzles have not been used during an application (e.g. when regular nozzle bodies are installed for conventional spray applications on the same spray line as the WEED-IT nozzle bodies).
>
> Make sure that you flush and clean the WEED-IT solenoids afterwards because spray liquid remains inside the solenoid if not cleaned!

A leaking nozzle might be caused by a clogged or worn solenoid. Only open a solenoid when the solenoid or nozzle is leaking. The procedure to check/clean a solenoid is as follows:

1. Make sure that the system is flushed with clean water.

2. Make sure that there is no pressure in the spray line.

3. Disconnect the 2-way SuperSeal connector

4. Turn the nut counterclockwise. Be careful not to damage the plastic nut

5. Check the inside of the solenoid on debris and clogged chemicals/sand. Use water to clean the inside.

6. Open the solenoid by unscrewing the nut of the coil and the plastic body.

7. Clean the disassembled parts with clean water and/or pressurized air.

8. Dry the parts with a clean cloth and assemble the solenoid again. Make sure that there is no water inside the coil! Make sure that the tube operator is properly tightened to the plastic body.

9. Mount the solenoid back on the nozzle body. Tighten it by hand, hand-tight is tight enough!

10. The coil should be able to rotate freely around the tube operator. If that is not the case, Check the tightening of the tube operator to the body and unloosen the coil nut a little.

8. 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 or time:

1. Flush the machine with clean water and if sticky chemicals are used, use a cleaning agent before cleaning 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 ⛲ (F2).

- When the machine is stored for a longer period or 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 user console and store it in a dry warm place:

    o Disconnect the console connection cable from the user console.

    o Put the dust cap on the open user console 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 PAV valve.

General cleaning and transport instructions

- Do not clean the system with a high-pressure nozzle (user console, power box, sensors, etc.).

- Regularly clean the sensor windows with a soft cloth. Note that sand will scratch the windows.

| ⚠️ | Cleaning the system with a high-pressure nozzle will cause serious damage to system components. |

9. User console – reference

Use the keys on the user console 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 which will be described in this chapter:

1. Main menu
2. Service mode

9.1. Main menu

If the Main menu is active, the Main screen is open and the main menu is selected
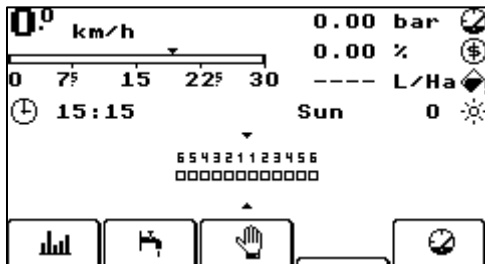
- Press briefly to browse through available menus (Main menu and Preset menu).

For more information about the main menu, refer to "Display" on page 24.

9.1.1. 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. The normal histogram scales automatically: the shown level of activity is relative to the level of activity of all other sensors. 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. • **~3** CDD; the display shows the crop density data **that** the detection sensors measure for each individual channel. **The scale can be adjusted by using the navigation arrow keys.**
🚰	**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 intermittent.
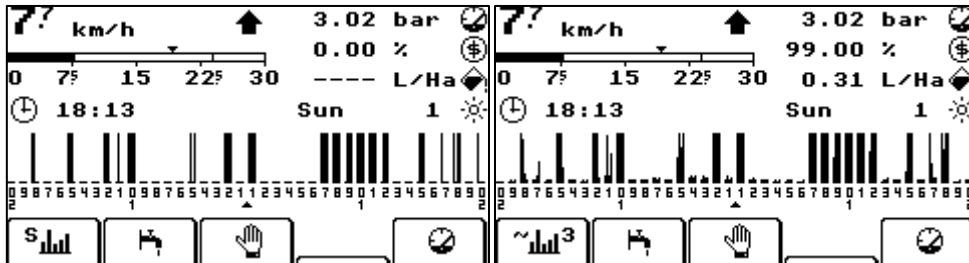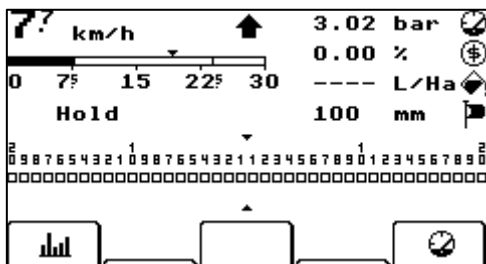
⊘	**Measurement toggle**: Use this key to toggle between various types of measurement displays in the top right corner of the display:

Note that when the default measurement display is selected, the bottom line changes every three seconds.

Press ⬚ briefly to move to the next menu.
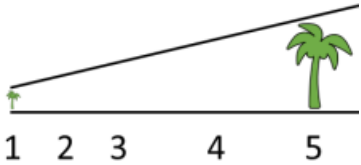
9.1.2. Preset menu options

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

ⅲ	Histogram: see description Main menu.
⚑	**Margin**: WEED-IT uses a certain margin when spraying a target. This margin varies from 50 to 200 mm and specifies the distance before and after the weed that will be sprayed. One of four predefined margins can be selected while driving the vehicle. The number of the selected margin preset 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 = 235 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, 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, depending on the type of detection sensor. Presets are numbered; preset number 1 is the most sensitive:
🍃	**GoG Sensitivity:** Current selected sensitivity preset for Green on Green spray modes (optional) (Default 1-6 available)
◔	**Measurement toggle**: see description Main menu.

Press briefly or wait three seconds to return to the main menu.

9.2. Service mode

Press and hold for 1 second to enter the 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:
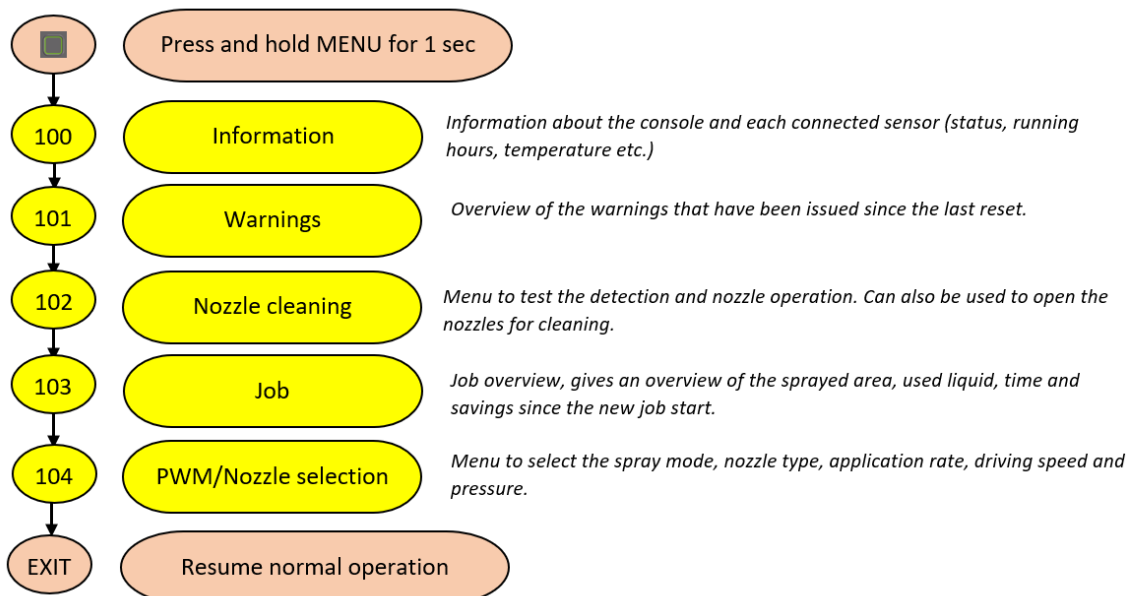
9.2.1. Information menu)

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 ⎿↔⎾ to toggle between information on the left or the right boom.

The first page shows general system information:

Figure 9-1 Global information screen

Temperature	Shows two values. The first one is the temperature measured inside the User console. 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.
L↔R	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
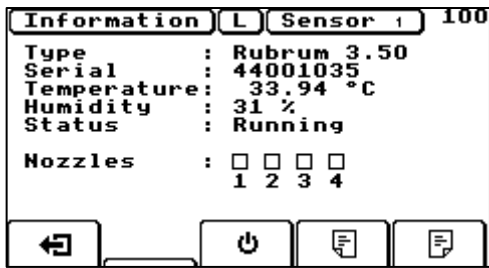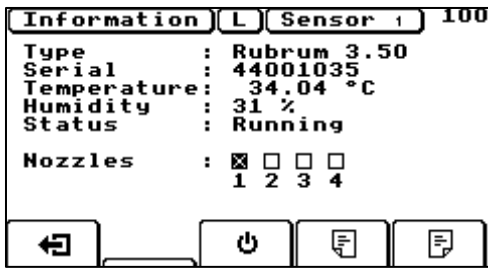
Figure 9-2 Information Left Boom, Sensor 1

Type	Sensor model and firmware version.
Serial	Serial number of the sensor.
Temperature	Temperature inside the sensor.
Humidity	Relative humidity of the air 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
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.

9.2.2. 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:

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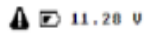
Because the screen is rather small, messages/warnings will be very short. If more than one message is pending, or if multiple errors occur at the same time, each message is shown for a few seconds.
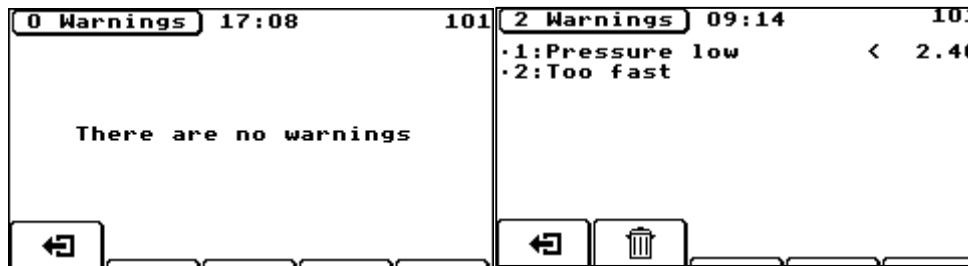

Figure 9-3 Warnings Global screen. Left: no warnings or error messages, right: two warnings

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 (e.g. `Pressure low`).

9.2.3. Nozzle cleaning menu (102)

ℹ	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
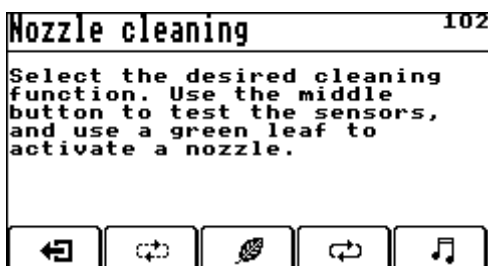
|	
←	Press the **Exit** key to leave the Service mode. The main screen opens.
↻	Press the **Chase** key to activate nozzles one by one with a short burst.
🍃	Press the **Detection** key test nozzles. Holding a leaf under a sensor should activate the corresponding nozzle.
↻	Press the **Sequencing** key 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.

9.2.4. 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, Dose must be correctly set (e.g. 10 % means 10 liters of herbicide per 100 liters of liquid). The Liquid, Usage and Saving parameters are shown if a flow sensor is connected.
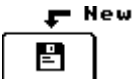
WEED-IT remembers usage parameters of the seven previous jobs (or seven previous days, depending on settings).

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

```
┌─Current Job─┐        ▭8/8 103   ┌─Current Job─┐        ▭8/8 103
Time      :    0:00    hrs         Time      :   66:31    hrs
Active    :    0.00    km          Active    :  203.01    km
Area      :    0.00    Ha          Area      :   66.56    Ha
Dose      :    9.00    %    ← →    Dose      :    3.00    %    ← →
Liquid    :    0.00    l           Liquid    : 4866.86    L
Usage     :    0.00    l/Ha        Usage     :   73.11    L/Ha
                                   Saving    :    0.00    %
         ┌ New                              ┌ New
┌──┐ ┌──┐ ┌──┐ ┌──┐ ┌──┐          ┌──┐ ┌──┐ ┌──┐ ┌──┐ ┌──┐
│← │ │▤ │ │OK│ │▤ │ │♻ │          │← │ │▤ │ │OK│ │▤ │ │♻ │
└──┘ └──┘ └──┘ └──┘ └──┘          └──┘ └──┘ └──┘ └──┘ └──┘
```

|	
Time	Duration of the current job
Active	Current job covered distanced
Area	Current job covered area
Dose	Volume percentage 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 / Area) for the current job
Saving	Percentage of herbicide saved compared to the selected application rate.
⬅	Use this key to return to the Main menu
⌐ New 💾	Use this key to start a new job. Please note that a maximum of 8 jobs can be 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. To store data per **day, change the appropriate setting in menu 152.**
OK	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.

9.2.5.   PWM/Nozzle selection menu (104)

Use menu 104 to select the spraying mode, nozzle type, pressure, and ideal speed to be used.

- WEED-IT can be used in various modes:
- Spot plain
- Spot spraying
- Full coverage
- Dual function (spot & cover)
- Plain Green/Green (optional)
- Spot Green/Green (optional)

By default, menu 104 looks like this:

```
┌─PWM/Nozzle selection─┐   104
│◄Mode : Spot plain      ►│
│ Nozzle: TeeJet TP 25-03 │
│ Press.: 3.00 bar        │
│ Spot : 136.6 L/Ha  100% │
│ Speed : 20.01 km/h      │
│                         │
│ ⬅      OK               │
└─────────────────────────┘
```

After changing the spray 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 plain mode

Stop the vehicle and navigate to menu 104.

To change settings:

1. Use the **Down** navigation key to select the nozzle (type) parameter. The parameter is highlighted:
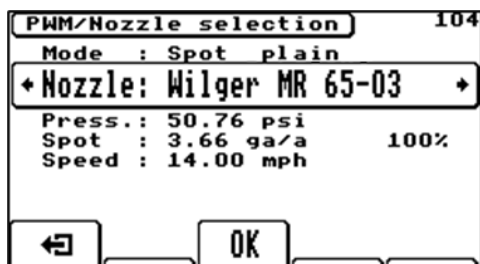
2. To correctly calculate how much spraying liquid is applied, WEED-IT needs to know which nozzle type is used. When mounting a different type of nozzle, use menu 104 to select the appropriate type before proceeding.

3. Use the **Left/Right** navigation keys to select the appropriate 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.

4. Use the **Down** navigation key to select the `Press.` (pressure parameter).

5. Use the **Left/Right** navigation keys to select the preferred pressure. If you press the gauge icon ⏱ (F2), the nominal pressure of the selected nozzle will be set. For most nozzle types this is 3.00 bar (43psi).

| ℹ	The spray mode Spot plain does not use PWM, which means that the application rate can only be adjusted by changing the pressure and ideal speed.
	This also means that the application rate will be higher when the driving speed is lower than the set speed in menu 104.

6. Use the **Down** navigation key to select the `Speed` parameter.

7. Use the **Left/Right** navigation keys to change the ideal speed. The `Spot` parameter changes when the ideal speed is being changed.

8. Press **OK** to confirm. All sensors are reconfigured and the system restarts.

Spot spraying mode

Stop the vehicle and navigate to menu 104. Press the **Right** navigation key to select **Spot spraying**. The screen changes:

```
┌─PWM/Nozzle selection─┐   104
│ ◆Mode  : Spot spraying    ◆ │
│  Nozzle: TeeJet TP 25-03   │
│  Press.: 3.00 bar          │
│  Spot  : 109.3 L/Ha    80% │
│  Speed : 20.01 km/h        │
│                            │
│ ⬅┐       OK  50%  100%     │
└────────────────────────────┘
```

To change settings:

- Use the **Up/Down** navigation keys to select a parameter. Use the **Left/Right** navigation keys to change the value of the parameter.

- The mode Spot spraying uses PWM, so the `Spot` parameter can be changed without changing the pressure or ideal speed. The application rate percentage is shown on the right of the screen. This is the percentage of the maximum application rate at this pressure and speed. 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 Spot rate is calculated as a band with calculation. The herbicide is applied at the same application rate for any speed up to 25km/h and also while turning (if two speed sensors are used and the option `Speed sensors at L & R is enabled`). Use the **F4** and **F5** keys to quickly select the shown application rate percentages.

- Use the **Left/Right** navigation keys to change the ideal speed. The Spot parameter changes when the ideal speed is being changed.

|	
i	Ideally, the preferred application rate should be achieved with a 70-80% PWM at the ideal speed. This ensures that there is enough control range for the PWM to control the application rate when the vehicle is driving faster or slower or when it turns.
	If the application rate percentage is not between 70-80%, try a smaller or larger nozzle type or a different ideal speed.

- Press **OK** to confirm. All sensors are reconfigured and the system restarts.

Full coverage mode

Full coverage mode will spray liquid continuously, like in a regular spraying application. The cover parameter determines the application rate that is applied to the entire field. It is calculated as normal spray application (with overlap between neighboring nozzles).

Stop the vehicle and navigate to menu 104. Press the **Right** navigation key to select **Full coverage.** The screen changes:

```
┌─PWM/Nozzle selection─┐      104
│  Mode  : Full coverage    │
│  Nozzle: Wilger MR 110-04 │
│  Press.: 3.00 bar         │
│  Cover : 200.2 L/Ha    85% │
├─Speed : 15.01 km/h       →┤
│                           │
│                           │
│  ⇤   │    │ OK │ 50% │100%│
└───────────────────────────┘
```

- Use the **Up/Down** navigation keys to select a parameter. Use the **Left/Right** navigation keys to change the value of the parameter.

Dual function

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 larger amount (Spot) is applied. The Spot rate must be higher than the Cover rate.

Stop the vehicle and navigate to menu 104. Press the **Right** navigation key to select **Dual function.** The screen changes:
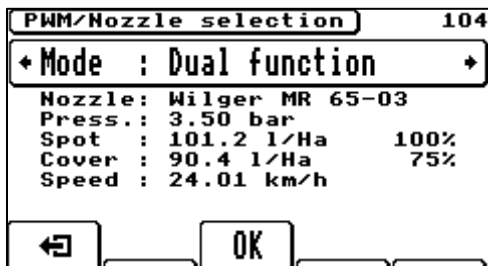
```
┌─PWM/Nozzle selection─┐      104
├←Mode  : Dual function    →┤
│  Nozzle: Wilger MR 65-03  │
│  Press.: 3.50 bar         │
│  Spot  : 101.2 l/Ha   100% │
│  Cover : 90.4 l/Ha     75% │
│  Speed : 24.01 km/h       │
│  ⇤   │    │ OK │    │    │
└───────────────────────────┘
```

- Use the **Up/Down** navigation keys to select a parameter. Use the **Left/Right** navigation keys to change the value of the parameter.

- The difference between the application rate percentages of the Spot parameter and the Cover parameter should be at least 40%. If both application rates are equal, a warning will be shown that the rates are equal. In that case, it would be better to use the mode Full coverage.

```
┌─PWM/Nozzle selection─┐      104
├←Mode  : Dual function    →┤
│  Nozzle: Wilger MR 65-03  │
│  Press.: 3.50 bar         │
│  Spot  : 90.5 l/Ha     75% │
│  Cover : 90.4 l/Ha     75% │
│  Speed : 24.01 km/h       │
│    WARNING: Spot = Cover  │
│  ⇤   │    │ OK │    │    │
└───────────────────────────┘
```
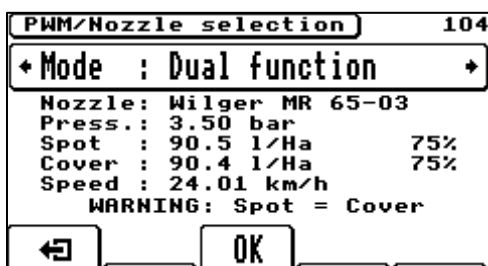
Plain Green on Green (optional)

This spray mode works similar to **Spot plain**, but uses different sensitivity presets.

Stop the vehicle and navigate to menu 104. Press the **Right** navigation key to select **Plain Green on Green.** The screen changes:

```
┌─PWM/Nozzle selection─┐     104
├──────────────────────┘
│◆Mode  : Plain Green/Green ◆
│ Nozzle: TeeJet TP 40-03
│ Press.: 3.00 bar
│ Spot  : 84.8 L/Ha     100%
│ Speed : 20.01 km/h
│
│ ┌──┐     ┌────┐
│ │←┘│     │ OK │
└─┴──┴─────┴────┴─────────
```

- Use the **Up/Down** navigation keys to select a parameter. Use the **Left/Right** navigation keys to change the value of the parameter.

Spot Green on Green (optional)

This spray mode works similar to **Spot spraying**, but uses different sensitivity presets.

Stop the vehicle and navigate to menu 104. Press the **Right** navigation key to select **Spot Green on Green**. The screen changes:

```
┌─PWM/Nozzle selection─┐     104
├──────────────────────┘
│ Mode  : Spot Green/Green
│ Nozzle: TeeJet TP 40-03
│ Press.: 3.50 bar
│◆Spot  : 68.6 L/Ha      75%◆
│ Speed : 20.01 km/h
│
│ ┌──┐     ┌────┐┌────┐┌─────┐
│ │←┘│     │ OK ││ 50%││ 100%│
└─┴──┴─────┴────┴┴────┴┴─────┴
```

- Use the **Up/Down** navigation keys to select a parameter. Use the **Left/Right** navigation keys to change the value of the parameter.

Mode	Spraying mode
Nozzle	Nozzle type on the spray boom. For a list of all available nozzles, refer to "Available nozzles" on page 192.
Press.	Pressure in the spray line
Spot	Spot spraying application rate. Amount of herbicide mix that is applied when a weed is detected by the system.
Cover	Full coverage application rate. Amount of herbicide mix that is applied to the whole field.
Speed	Ideal driving speed. Indicated by a small triangle above the speed bar in the main menu

9.3. 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 ➤━━◖.

9.3.1. Configuration

- 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. The available languages are English, French, German, Dutch, Spanish, Russian, and Portuguese.
Volume	Select the volume for alarms etc. If the value is set to 1, the volume is turned off.
Contrast	Change the display contrast

9.3.2. 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

9.3.3. Options (152)
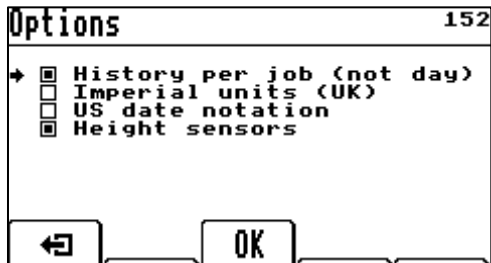
- Use the **Up/Down** navigation keys to select the setting you wish to change.

- 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
Height sensors	Select if you wish to enable the height sensors when the WEED-IT is equipped with BodoHeight

9.3.4. 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.
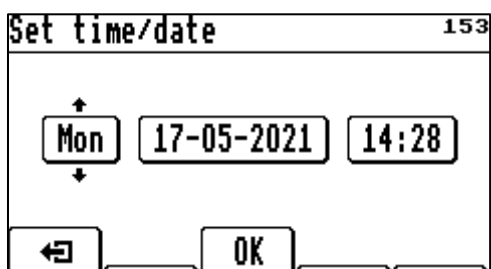
- Use the **Left/Right** navigation keys to select the parameter you wish to change.

- Use the **Up/Down** navigation keys to change the setting.

- Press the **OK** key to confirm settings.
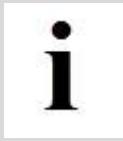
i	If the 153 screen opens immediately after starting WEED-IT, the User-console battery is empty.
	If the 153 screen keeps appearing after a restart, even after setting the clock correctly, the battery is definitely empty.
	Contact your supplier if the battery is empty.

To replace the battery

1. Place the User console on a flat surface.

2. Remove the silver colored aluminum strips by pulling them out.

3. Loosen the four screws under these strips and lift up the User console lid.

4. Be careful with the keypad connection of the console lid.

5. Locate the battery to the right of the LCD screen.

6. Remove the old battery and replace it with a new CR2450 type battery.

7. Perform steps 2 and 3 in reverse order to close the User console.

9.4. Dealer mode

This section describes the menus available in dealer mode.

⏻	Start WEED-IT in Dealer Mode	
▣	Press and hold MENU for 2 sec	
200	Information	*Information about the console and each connected sensor (serial number, firmware version etc.)*
201	Information	*Information about the PSU (serial number, firmware version, temperature etc.)*
202	Warnings	*Overview of the warnings that have been issued since the last reset, even when the suer has cleared them.*
203	Configuration	*Menu used for changing global settings (speed, pressure, flow, protocol, warnings etc.)*
204	Options	*Configurable options regarding sensors, user interface and technical options*
205	Sensor settings	*Configuration of the sensor-specific settings, such as margin, track width, mounting offset and fluid speed*
206	Nozzle settings	*Settings that are specific for each individual nozzle, such as height and distance from the sensor*
207	Speed callibration	*Special menu for a fully automated wheel sensor speed calibration. Needed after mounting the wheel sensors.*
208	Nozzle test	*Special menu to test each nozzle of each sensor individually. Allows each nozzle to be opened manually.*
209	Detector test	*Special menu to detect the weed detection sensors. Enables detection when the vehicle is not driving*
210	Simulation speed	*Special menu to simulate a driving speed when the vehicle is not driving. Needed for some tests.*
211	Speed & flow sensor test	*Special menu to test the working of the speed and flow sensors. Also gives insight in the deviation between L & R speed sensor.*
212	Automatic configuration	*Menu to automatically set the offset position for each detection sensor that is connected.*
213	Margin presets	*Menu to configure the four margin preset values.*
214	Back-up settings	*Special menu that can be used to back-up and restore settings of a detection sensor, the console, and the PSU. Can be used when exchanging or replacing one of them.*
216	Height sensors	*Menu to configure the height sensors (optional)*
EXIT	Resume normal operation	

⚠	Do not reveal how to access Dealer mode to a user!

To access Dealer mode:

1. Make sure that WEED-IT is turned off.

2. Press and hold [ ] (**F3**) and the [ ] Menu key simultaneously.

3. Press and hold [ ] for 1 second.

4. Once the Startup screen opens, release all keys. The Startup screen in Dealer mode opens:

The system starts in the usual way and the Main screen opens.

- You can still access the Service mode: press and hold the Menu key for one second.

- To access Dealer mode: press and hold the Menu key for two seconds.

When you access Dealer mode, the Information menu (200) opens. The current settings from all sensors are read by the system. This may take a few seconds, depending on the number of connected sensors:

Press the **Menu** key to go to the next menu or scroll through the menus with the arrow keys; press ⬅ to return to the main screen.

How to use Dealer mode

- Every menu, with the exception of the Main screen, has a number that is always shown at the top right of the display. Whenever a menu consists of more than one page, a text-icon will appear in front of the menu number, followed by the page number, for example:

  🗇1/6 ✦200➔

  In this case, menu 200 is open and page 1 (of six pages) is displayed.

- If the menu consists of more than one page, use 🗇 (Previous page) or 🗇 (Next page).

- In most menus, function keys are assigned as follows:
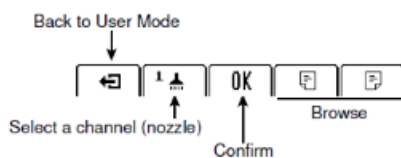
- In the Main screen (Dealer), key assignment is a little different:

- Use **L↔R** to select the left or the right boom. The selected boom is underlined.

- Use 🗇 to go to the first sensor page.

How to enter parameters

Use the menus to enter or change parameters (for example height, width, distance).

- Use the **Up/Down** navigation keys to select the required parameter.

- Use the **Left/Right** navigation keys to change the value of the selected parameter.

- Press **OK** (F3) to confirm a new value.

9.4.1. Information console and sensors (200)

The Information menu contains information about the User console and about each individual sensor. You may need the information in this menu when you contact your supplier in case of problems.

The Information menu has several pages. Page 1:
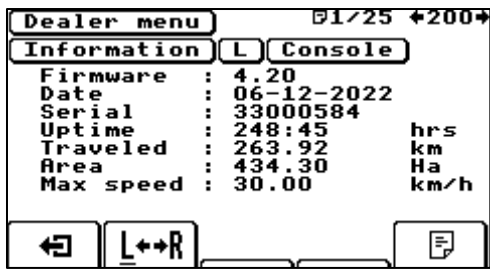
The first page contains information about the User console:

Firmware	Version number of the firmware inside the User console
Date	Firmware release date
Serial	User console serial number
Uptime	Total number of hours the User console has been used (from the installation date)
Traveled	Total traveled distance of the vehicle
Area	Total sprayed area
Max speed	Maximum possible speed with the current system settings

The other pages contain information about each individual sensor.

- The number of pages equals the number of connected sensors on this side (L) plus one for the user console page. In this case 24 sensors are connected to the left side of the system.

- Use ⬐ and ⬎ to browse through available pages with sensor information.

- Press **F2** ⌊↔R to change the spray boom side.

The following information is available for each sensor:
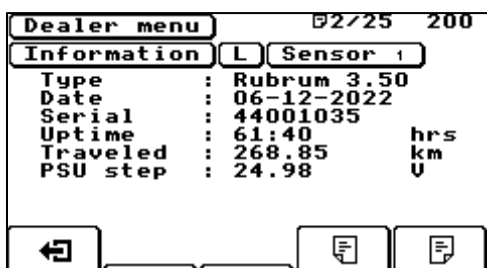
Type	Sensor type and firmware version
Date	Firmware release date
Serial	Sensor serial number

Uptime	Total hours of use of this sensor
Traveled	Total traveled distance of the sensor
PSU step	The measured maximum DC voltage available to the nozzle driver PSU

9.4.2. Information PSU (201)

This page contains information about the processor in the power converter (Power Supply Unit; PSU).

```
Dealer menu          ◆201◆
Information ) PSU )
  Firmware    : 1.06
  Date        : 07-10-2021
  Serial      : 63000005
  Uptime      : 748:23      hrs
  Temperature: 36.34        °C
  CPU         : 33.50        °C
  Humidity    : 20           %

 ⇤
```
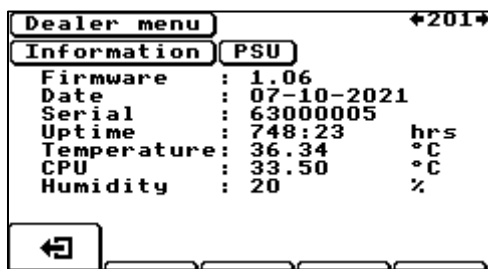
Firmware	PSU firmware version number
Date	PSU firmware release date
Serial	PSU serial number
Uptime	Total number of hours PSU use
Temperature	Temperature measured in the power converter
CPU	CPU (processor print inside PSU) temperature
Humidity	Relative humidity measured in the PSU

9.4.3. Warnings (202)

Use this menu to review all error messages since the last reset, including the ones that were removed in menu 101.

```
Dealer menu          ▯1/2 ◄202►
Warnings  12
1:No PSU
2:☐ Switched off      < 10.80
3:▱ Battery ↓         < 11.40
4:Leak  91% L-T 18062019 1642
5:⌇ COM error
6:Pressure low        <  1.00
7:Sensor order changed
   ⇤      🗑             📝
```
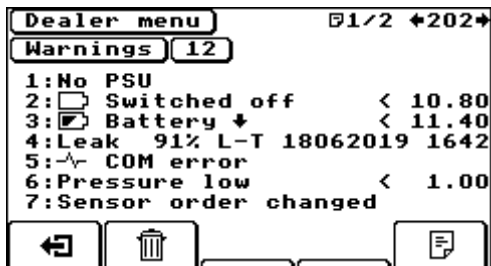
If more than 7 warning messages are available, use ⬒⬔ (F4 and F5) to browse through the messages.

```
Dealer menu          ▯2/2  202
Warnings  12
8:New Sensor found
9:Sensor missing
A:No sensors
B:Battery lost
C:PSU error R-B 19062019 0824


   ⇤      🗑        ⬔
```

See "Warnings and errors overview" on page 134 for an overview of messages that may occur.

⇤	Use this key to return to the Main screen.
🗑	Use this key to delete all currently recorded messages (reset).

9.4.4. Configuration (203)

This menu allows you to configure and calibrate various types of sensors. The menu contains 16 pages.

```
Dealer menu          ▯1/16 ◄203►



 ⊃━c CONFIGURATION


              Edit settings ⤵

   ⇤                         📝
```
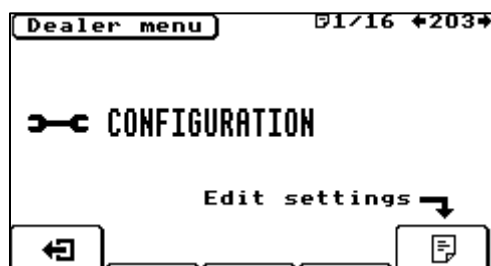
- Press 📝 to enter the menu.

Speed (203 tab 2)
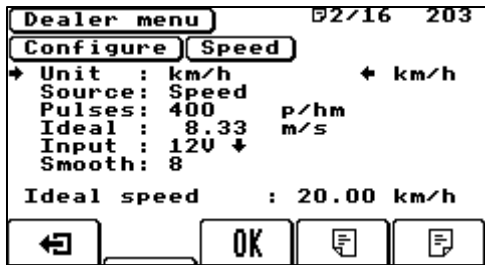
Unit	(`m/s, km/h, mph`) Speed unit used in the display
Source	(`GPS, GPS/10, Speed, Spd/10`) Sensor type. The suffix "/10" indicates that that 10 pulses are processed as one. This should be used when speed sensors generate more than 1500 pulses per hectometer.
Pulses	Number of pulses per 100 m
Ideal	The desired driving speed in m/s. The value is corresponds to the speed parameter in menu 104.
Input	(5↑, 5↓, 12↑, 12↓) Determines the voltage and signal type of the speed sensor to process. The default is 12↓. Pull down is indicated by a ↓, pull up by a ↑.
Smooth	(1, 2, 4, 8, 16, 32) Smoothens the speed difference between the left and right speed sensor. Only applicable if two speed sensors are used.
Ideal speed	The desired driving speed in km/h. Equal to `Ideal`.

Flow 1-2-3 (203 tab 3-4-5)
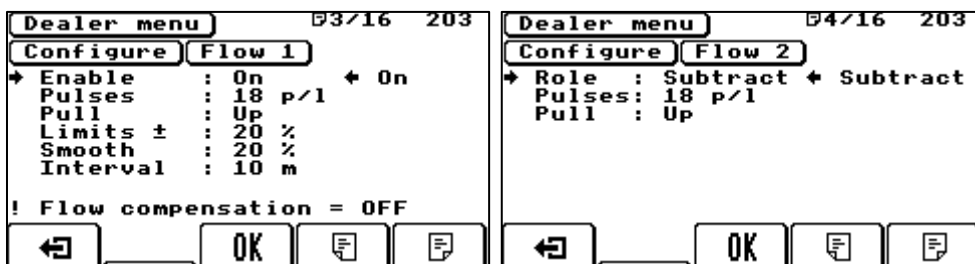
Enable (flow sensor 1)	Use the navigation keys to switch flow sensor 1 on or off
Role (flow sensors 2&3)	(`OFF, Subtract, Add`) The role of flow sensors 2 and 3 are used to calculate the net flow to the nozzles. Flow sensor 2 should use the role *Subtract* if it is placed in the dump line from the PAV valve back to the tank.

Pulses	Adjust the number of pulses received per liter
Pull	(Pull Up, Down) determines which type of pulses should be processed by the system.
Limits±	The lower and upper border of *the amount of flow compensation that can be applied*.
Smooth	The amount of compensation to be applied when the measured application rate is not equal to the desired application rate. The larger the value, the bigger the correction steps will be.
Interval	The distance that must be travelled to calculate a new correction value. The smaller the value, the more often the flow will be adjusted.

Pressure 1-2 (203 tab 6-7)

Role (pressure sensor 1)	(OFF, View, Auto, Adjust) The role of the pressure sensor. If Auto is selected, and the option *Enable flow correction* is enabled, the PWM control will be regulated if the pressure changes, so that the correct application rate is retained. Adjust is still under development and should not be chosen.
Role (pressure sensors 2&3)	(OFF, View, Low, High, Avg.) The role of pressure sensors 2 and 3. If View is selected, the pressure will be shown on the main screen. Only OFF or View should be set.
Nominal	The desired pressure in the wetboom. The value corresponds to the pressure parameter in menu 104.
Limits±	Lower and upper pressure threshold value. If the measured pressure is outside of Nominal ± limits, a warning message is generated.
Cal.	Calibration factor used to translate the measured voltage or current into pressure.
Offset	Offset for the translation if a sensor does not indicate 0V or 0A when there is no measured pressure.

|	
Smooth	Amount of smoothing to apply to the measurements. This prevents the pressure reading from varying too much. 50.00% is the default
Type V/I	(V/I) Type of sensor used: voltage or current transducer. Most pressure sensors are voltage sensors.

Pump ("air compressor")(203 tab 8)

```
Dealer menu    ▯8/16   203
Configure  Pump
→ Enable     : Auto   ← Auto
  Off in HOLD : YES
  Max. on    : 180 s
  Delay      : 20 s


  ⏏         OK    ⬒    ⬓
```
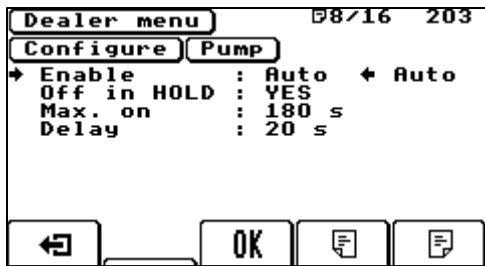
Enable	(OFF, On, Auto) Use the navigation keys to switch the pump on. If Auto is selected, the pump switches off if its tank reaches 6 bar or when Max. on has expired.
Off in HOLD	Switch off when the machine is put on Hold
Max. on	The maximum time the air compressor will be turned on
Delay	The minimum time the air compressor stays switched off when *Max. on* has expired.

Tank (203 tab 9)

```
Dealer menu    ▯9/16   203
Configure  Tank
→ Enable    : OFF    ← OFF
  Size      : 1000 L
  Low       : 0 L
  Cal.      : 100 x
  Offset    : 0
  Smooth    : 15.00 %
  Type V/I: V

  ⏏         OK    ⬒    ⬓
```

Enable	(OFF/On) Use the navigation keys to switch the flow sensor on or off
Size	Size of the tank in liters or gallons
Low	Lower threshold of the tank level for an alarm to appear
Cal.	Calibration factor used to translate the measured voltage or current into a tank level
Offset	Offset for the translation if a sensor does not indicate 0V or 0A when there is no measured tank content
Smooth	Amount of smoothing to apply to the measurements. This prevents the tank level reading from varying too much. 50.00% is the default value

Type V/I	(V/I) Type of sensor used: voltage or current transducer

Height sensors (203 tab 10)

This menu is only applicable if the system is equipped with height sensors. Use this menu to configure the height sensors. Special cabling is required to integrate the height sensors completely with WEED-IT Quadro. For more information on BodoHeight, refer to the BodoHeight installation manual or "Other manuals" on page 191.
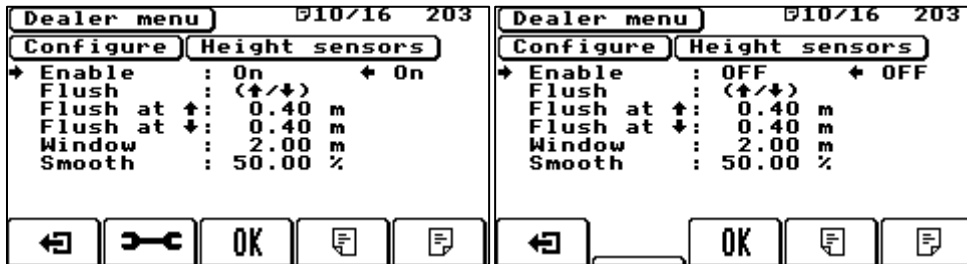
- Press ✎ to navigate to menu 216

Enable	Use the navigation keys to switch the height sensors on or off
Flush	(OFF, ↑, ↓, ↑/↓) Enable the function to flush the nozzles of a sensor when a height of *Flush at* is exceeded.
Flush at ↑	Upper threshold of sensor height to trigger the flushing of nozzles. If Enable is set as OFF, this value cannot be adjusted.
Flush at ↓	Lower threshold of sensor height to trigger the flushing of nozzles. If Enable is OFF, this value cannot be adjusted.
Window	Range that can be measured around the nominal height of the height sensors. Refer to "Other manuals" on page 191 for more information on Nominal.
Smooth	Amount of smoothing to apply to the measurements. The higher the value, the more responsive the displayed height will adjust itself to new measurements. This prevents the reading from varying too much. 50.00% is the default.

Misc analogue (203 tab 11)
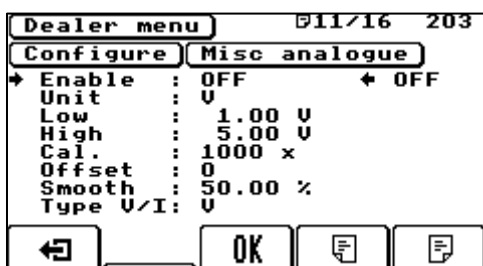
`Enable`	(OFF/On) Use the navigation keys to switch the Misc Analogue sensor on or off.
`Unit`	Measured unit, a wide range of quantities are available such as length, weight, speed and volume.
`Low`	Lower threshold; if a lower value is measured, a warning will be shown.
`High`	Upper threshold; if a higher value is measured, a warning will be shown.
`Cal.`	Calibration factor used to translate the measured voltage or current into a pressure unit.
`Offset`	Offset for the translation if a sensor does not indicate 0V or 0A when there is no measured value.
`Smooth`	Amount of smoothing to apply to the measurements. This prevents the reading from varying too much. 50.00% is the default.
`Type V/I`	(V/I) Type of sensor used: voltage or current transducer.

Misc digital (203 tab 12)
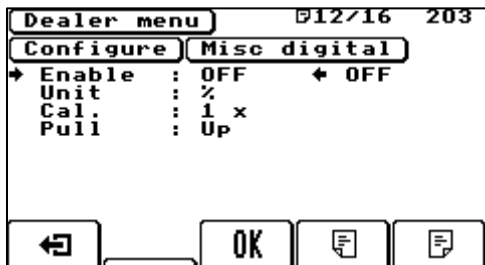
`Enable`	Use the navigation keys to switch the Misc digital sensor on or off
`Unit`	Measured unit, a wide range of quantities are available such as length, weight, speed and volume.
`Cal.`	Calibration factor used to translate the measured voltage or current into the selected unit.
`Pull`	(Up/Down) Pull Up / Down determines which type of pulses should be processed by the system.

Alarm (203 tab 13)

The system calculates the average relative humidity of all sensors to identify leaking sensors. Any sensor that differs too much from this average causes a leakage warning.

```
 Dealer menu    ▯13/16  203
 Configure  Alarm
➡ Humidity ±    : 50 %   ← 50
  Humidity +    : 80 %
  Temperature ± : 21 °C



  ⬅            OK    ▤    ▤
```
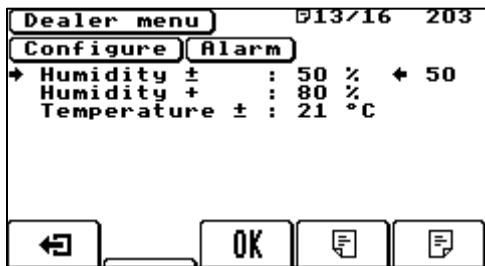
Humidity ±	The maximum percentage of difference from the average relative humidity that is allowed.
Humidity +	The absolute maximum percentage of relative humidity that is allowed.
Temperature ±	Sensor temperature deviation that is allowed from the average temperature from all connected sensors.

Control Port (203 tab 14))

Settings for communication with external systems.

```
 Dealer menu    ▯14/16  203
 Configure  Control port
➡ Baud   : 115200   ← 115200
  Format: Extended



  ⬅            OK    ▤    ▤
```

Baud	(0, 4800, 9600, 19200,38400, 57600, 115200, 250000, 375000) Set Baud rate for communication
Format	(OFF, Tracking, Extended) The communication protocol used. The default protocol used is Extended.

Other (203 tab 15)

Other settings

```
 Dealer menu    ▯15/16  203
 Configure  Other
  PWM     : Cover
  Lane    : 250 mm
➡ Lanes   : 4 @ 25cm  ← 4 @ 25
  RefBox  : 5
  Press.+:  6.00 bar


  ⬅            OK    ▤    ▤
```

`PWM`	Active spray mode (see "PWM/Nozzle selection menu (104)" on page 93 for options).
`Lane`	Detection channel width, the default value is 250 mm.
`Lanes`	(1 @ 100cm, 2 @ 50cm, 4 @ 25cm) Can be used to let multiple nozzles spray when a weed is detected by the sensor. 4 @ 25cm is default. 2 @ 50cm: nozzles 1&2 and 3&4 will spray together if either detection channel 1 and/or 2 or 3 and/or 4 has a weed detection. 1 @ 100cm: all four nozzles will spray when the sensor detects a weed.
`RefBox`	Reference sensor to determine the sun indication factor. Sensor# 5 is always selected, because the sensor is most likely not behind the machine (possible shadow). When less than 5 sensors are connected, the system uses another reference sensor. Do not change this value.
`Press.+`	Maximum pressure that can be set in menu 104, the default value is 6.00 bar.

9.4.5. Options (204)

Use the Options menu to switch available options **on** or **off**. In normal dealer mode there are 3 categories of options; options are spread over 3 categories:

- Configuration
- User interface
- PWM settings
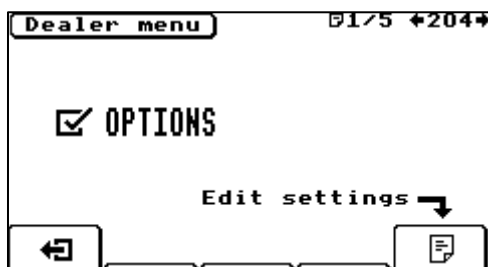
A check box shows the status of an option:

☐ disabled
▣ enabled

- Use the **Up/Down** navigation keys to move to a specific option
- Use the **Left/Right** navigation keys to enable of disable an option.
- Use ⮹⮺ to browse through available pages.

Configuration (204 tab 2)

`Show speed in 1/100 units`	Select this option to show the speed on the main screen with two decimals (e.g. 10.85 km/h)
`Use LCD backlight`	The LCD display has back lighting. Whenever the WEED-IT is used in bright sunlight, the content of the screen will hardly be visible. However, when using the WEED-IT in dark circumstances (in the evening, or during bad weather), the back lighting gives you a clear view of screen content. This option is enabled by default.
`Speed sensors at L & R`	Use the speed sensors to monitor the speed at both sides of the machine. The system will adjust spraying volume when turning corners if this option is enabled. The speed sensors are installed in one wheel at the left of the system and in the opposite wheel at the right. When in use, both speed sensors should produce roughly the same number of pulses on a straight track. The console will generate warnings when the speed of an individual detection sensor is too high.
`Allow external speed`	Instead of speed sensors connected to the power converter, the speed of the machine can be sent to the WEED-IT by means of the external RS232 serial port on the console. When this option is enabled, the WEED-IT will not save information in menu 103. Refer to the *AppNote for ext. RS232 communication, WEED-IT Quadro* or "Other manuals" on page 191 for more information on the implementation of external speed.
`Flush when overload`	WEED-IT can be used reliably at speeds up to 25 km/h. When this option is enabled, WEED-IT will open up all nozzles when the speed exceeds the maximum speed indicated by the vertical stripe in the speed bar at the top left of the main menu. If the speed exceeds the maximum speed, the system cannot open up the nozzles in time to ensure proper targeting.
`User height sensors on/off`	Enable this option to show the option *Height sensors* in menu 152.

User interface (204 tab 3)

Use this option to change user interface settings.

`Buzzer on HOLD`	When this option is enabled, the buzzer will sound intermittently when the machine is on HOLD. During HOLD, the machine cannot spray herbicide. This option is enabled by default.
`Stop buzzer after 10 x`	The buzzer can be annoying, especially when the HOLD feature is frequently used. Select this option to make sure that the buzzer stops after beeping 10 times. This option is enabled by default.
`Flash when error`	When this option is enabled, the back lighting flashes a few times whenever a new error message is generated. After blinking a few times, the back lighting reverts to normal levels. This option is enabled by default.
`Flash when warning`	This option is similar to the previous one. When enabled, the display blinks a few times whenever a warning is generated. For example when the battery voltage or the pressure have dropped too far. This option is disabled by default.
`Flash when message`	This option is similar to the previous one. When enabled, the display blinks a few times whenever a message is generated. For example when the you enter HOLD mode, drive in reverse direction or if you have selected Speed Simulation. This option is disabled by default.
`Menu auto-fallback`	This option affects the use of various menus. When enabled (default), the system automatically returns to the main menu whenever no key has been pressed for 3 seconds. If this option is disabled, the system will not return to the main menu unless toggled manually. This option should be **disabled**!
`Pressure warn persistent`	When this option is enabled, the back lighting keeps flashing and the buzzer keeps beeping when the pressure is too high or low and the machine is driving.

PWM settings (204 tab 4)

Use this option to change PWM settings.

Enable PWM mode	Pulse Width Modulation (or PWM) allows the system to regulate the application rate of the liquid when driving at various speeds (for instance, when driving at speeds lower than the optimum speed set in menu 203/2). It makes the application rate speed-independent. If the option is enabled (default) PWM is activated.
User selection PWM	If this option is enabled, the user can select a spray mode in menu 104. If this option is disabled, there is only one spray mode available in menu 104.
Show PWM in %	Show the set application rate in menu 104 as a percentage of the maximum possible application rate in addition to L/ha or gal/acre.
PWM smoothing	PWM is controlled in discrete steps of the application rate. When smoothing is turned on these steps are interpolated and stepless variation in PWM control is applied.
User can set best speed	The user can set an ideal driving speed in menu 104. Ideally, the desired application rate should be achieved with a 70-80% PWM at the ideal speed.
User can set pressure	The user can set the ideal pressure. The application rate will be calculated for this ideal pressure.
Pressure compensation	If the pressure in the spray boom differs from the ideal pressure that was set in menu 104, the WEED-IT will control the application rate by adjusting the PWM. If disabled and the pressure is higher than desire, the application rate will be higher than desired. This option should be **disabled**!
Flow compensation	If the measured application rate differs from the desired application rate in menu 104, the WEED-IT will control the application rate by adjusting the PWM. For more details on flow compensation and the corresponding settings, see "Flow sensor configuration" on page 51 and "Configuration (203)" on page 106.

9.4.6. Special dealer mode

When the user console is switched on in the special dealer mode, two more dealer menus are available.

Press the menu button [⬚], the upper arrow button [△] and the **F3** button [⬭], then press the On/Off button [⏻]. When menu 200 is entered, a password is required. The distributor knows the **dealer** password.

Specials (203 tab 16)

Presets	Number of sensitivity presets selectable for the driver
Pre. GoG (optional)	Number of green on green sensitivity presets for the driver

Extra (204 tab 5)
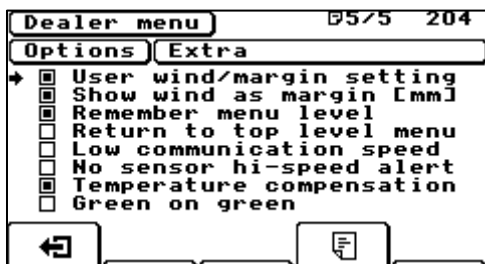
User wind/margin setting	The user can toggle between four margin presets by using the **F2** button in the Preset menu. Refer to "Preset menu options" on page 87.
Show wind/ as margin [mm]	The wind/margin preset will be shown as a distance in mm on the main screen (*150mm*). If disabled, *Wind 2* will be shown.
Remember menu level	When you enter Service mode or Dealer mode, the last visited page will be opened. If disabled, menu 100 will be opened when Service mode is entered and menu 200 is opened when Dealer mode is entered.
Return to top level menu	When you are in tab 2 or higher and press the menu button, tab 1 of that menu will be opened. If disabled, the next menu will be opened.

Low communication speed	Enables low communication speed. Not recommended to enable!
No sensor hi-speed alert	When two speed sensors are used and the sprayer makes a fast turn, so that the outer detection sensor(s) exceed the maximum speed, the warning *Too Fast* is shown. If this option is enabled, the warning will not be shown anymore when a single detection sensor exceeds the maximum speed.
Temperature compensation	This option ensures that solenoids are opened at all circumstances (high and low temperatures). If the pressure in the spray line is above 1.5bar, the system will check by sending a tiny current to the solenoids occasionally.
Green on Green (optional)	This option enables two additional spray modes: *Plain Green on Green* and *Spot Green on Green*.

9.4.7. Sensor settings (205)

Use this menu to change configuration settings of each individual sensor. The settings are important for correct operation of the WEED-IT system. Specify:

- The distance between the left wheel and the right wheel; if your self-propelled sprayer has variable track width, configure the width at which the sprayer will be running with WEED-IT. If your machine uses GPS sensors for speed input, enter the distance between both sensors.

- The position of each sensor on the boom.
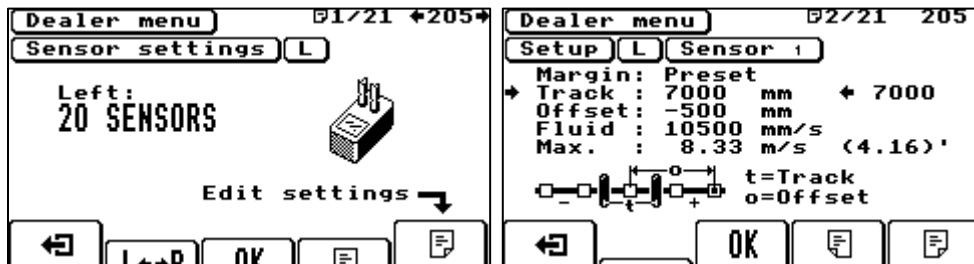
The display shows the number of connected sensors. In the above example, 10 sensors are connected (left boom).

- Use L↔R to select the required boom.

- Use ▤ and ▤ to select the required sensor. The menu header shows which sensor is currently selected.

- Use the **Up/Down** navigation keys to select the parameter you would like to change.

- Use the **Left/Right** navigation keys to change the value.

- Press OK (F3) to confirm settings.

`Margin`	Use this setting to adjust the spraying accuracy of the WEED-IT. If the margin is set to 50 mm, a margin of 50 mm before and after the plant is sprayed apart from the plant. If the user is allowed to use its own presets (default) no margin value will be displayed, instead the word PRESET will be shown.
`Track (t)`	This is the distance between the center of the left wheel and the center of the right wheel in mm. The value of Track should be identical for each connected sensor. Also note that the distance between the left speed sensor and the center of the vehicle should be the same as between the right speed sensor and the center of the vehicle. This applies to both wheel sensors and radar or GPS units. **Press and hold OK for 2 seconds until you hear a second beep to confirm the new value**. A long beep indicates that the new value has been passed to all sensors.
`Offset (o)`	This is the distance between the center of a sensor and the central axis of the vehicle in mm. Consider the middle of the rear axle as the origin (i.e. a distance of 0). Sensors to the right of the center have a **positive** offset Sensors to the left of the center have a **negative** offset. A sensor that is mounted exactly at the center of the rear axle, will have an offset of **0**. Confirm a new value by pressing OK briefly and repeat the procedure for each individual sensor. Alternatively, use menu 212 for automatic configuration. See "Automatic configuration (212)" on page 128
`Fluid`	**Fluid speed** (mm/s) corrects the delay between the droplets leaving the nozzle and the droplets hitting the target. Please note that the fluid speed can vary per nozzle type. Set the fluid speed and press and hold **OK** for 2 seconds until you hear a second beep to confirm settings for all sensors.
`Max.`	The maximum speed for weed detection. It is until this speed that the WEED-IT is capable of detecting and spraying the weed on target. The value between parentheses is the speed where the PWM is 100%.

9.4.8. Nozzle settings (206)

Each sensor has 4 nozzles (channels). Use this menu to change individual nozzle settings

- specify the distance between the detection line and the nozzle
- specify the height of each nozzle.
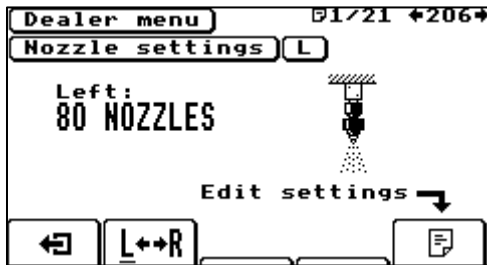
- Press ⬅ to return to the Main screen
- Use L↔R to go to the left boom or the right boom
- Press 📝 to edit settings of the first sensor. The page with the first sensor setting opens:

⬅	Use this key to return to the Main screen
¹⛲	Use this key to select the required Nozzle. The number of the selected sensor and the selected nozzle is displayed in the menu header. The nozzle number is also displayed on this key. Use the **Up/Down** navigation keys to select the parameter you want to change. Use the **Left/Right** navigation keys to adjust a value.
OK	Use this key to confirm a setting.
📄📝	Use these keys to browse other sensor's settings.

Height (h)	Set the height of the nozzle, measured from the bottom of the nozzle to the soil, in mm.
Dist (d)	Set the distance between the detection line and the nozzle, measured from the center of the blue light line and the center of the nozzle head, in mm.
Max.	The maximum speed for weed detection. It is until this speed that the WEED-IT is capable of detecting and spraying the weed on target. The value between parentheses is the speed where the PWM is 100%.
Program all nozzles	In most situations, the height and distance settings will be identical for (nearly) all nozzles. If this is the case, set the value once: press and hold **OK** for 2 seconds until you hear a second beep to save the values to all nozzles simultaneously. The second beep confirms that you have succeeded.
Program all nozzles of one sensor	Program all nozzles of the current sensor. If you want to confirm the current setting for all nozzles of the selected sensor: press and hold ⛟ (F2) for 2 seconds until you hear a series of beeps. The final beep confirms that you have succeeded and nozzle 4 will be shown.

9.4.9. Speed calibration (207)

The speed sensors measure the speed of the vehicle. The WEED-IT uses one speed sensor on the left wheel and one sensor on the right wheel. The speed sensors 'count' the number of "metal" passes, corresponding with revolution speed.

The pulses from the speed sensors are used to determine vehicle speed. As the WEED-IT system can be mounted to a variety of vehicles, the dimensions of the wheels will vary. For that reason, the wheel sensors must be calibrated to your vehicle. If GPS speed sensors are used, this menu is for verification of the installation. Menu 207 allows you to do this:

To test the speed sensors:

1. Select a distance: 50 m or 100 m (100 m is the default).

2. Place the vehicle at the start of the road.

3. Press **OK**.

4. Drive the vehicle to the destination (50 m or 100 m).

5. Press **OK** to confirm that the destination was reached.

6. A minimum of 250 pulses per hectometer (1hm=100m) is required for the speed measurement. For optimal performance, at least 400 pulses per hm are advised. WEED-IT GPS speed sensors have 1300 pulses per hectometer with the setting *Source* set to spd/10 in menu 203 tab 2.

   a. For wheel speed sensors press **OK** to confirm and store calibration.

   b. For GPS speed sensors the procedure is different. If the measured number of pulses during the calibration deviates more than 2% from the specified number by the manufacturer (<1274 or >1326 for WEED-IT GPS speed sensors), check the installation of the sensors and perform the procedure once again. Enter the specified number by the manufacturer in menu 203 tab 2.

7. Press ⬅ to return to the Main menu.

9.4.10. Nozzles testing (208)
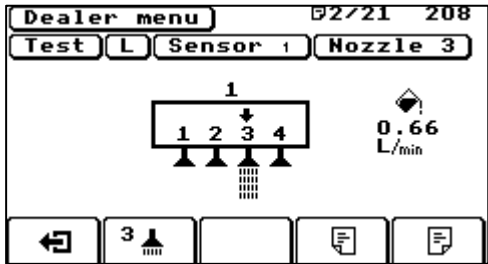
Use this menu to verify functioning of individual nozzles.
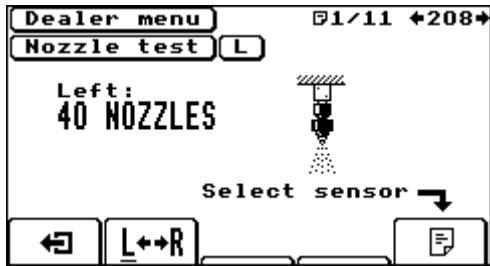
- Use L↔R to select the left or the right boom.
- Use 📄 to select the first sensor.

Once the required nozzle is selected, use ⏻ to turn the nozzle On or Off. While the nozzle is On (spraying), use ⛏ to select another nozzle. The previously selected nozzle automatically switches off. An active (open) nozzle is indicated on the display by an animated spray. While a nozzle is active, the icon on the middle function key will blink.

⬅	Use this key to return to the Main menu.
⛏	Use this key to select the required nozzle. The number of the nozzle is displayed.
⏻	Use this key to turn a nozzle ON or OFF. If a flow meter is connected and configured, the flow rate will be shown on the right side of the screen.
📄📄	Use these keys to browse to the next or the previous sensor. The identifying letter of the selected sensor is displayed.

9.4.11. Detector testing (209)

Use this menu to test individual sensors.
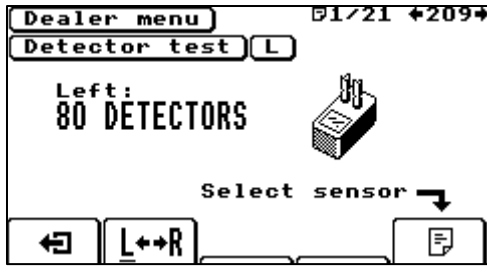
- Use $\underline{\text{L}} \leftrightarrow \text{R}$ to select the left or the right boom.
- Use 🗒 to select the first sensor.
- Use ¹⏚ to select the required detector of that sensor.
- Use ⏻ to turn the channel on.
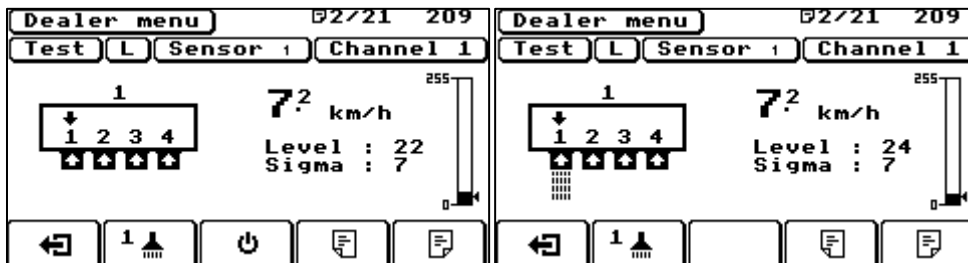
If a channel is turned on the nozzle is activated when a plant is detected.

- The right half of the screen shows the actual values of the channel.
- A vertical bar shows the actual signal level of that channel. As this value is subject to noise and fast changes, the peak level is also displayed. The **Sigma** value is an indication of the noise level, calculated by the sensor.
- The actual values can also be viewed when the detector is not activated. However, in that situation there is no nozzle control.

⏎	Use this key to return to the Main menu as soon as the test is completed.
¹⏚	Use this key to select the required channel.
⏻	Use this key to turn nozzle activation ON or OFF.
🗒🗒	Use these keys to browse to the next or the previous sensor.

9.4.12. Fixed speed simulation (210)

Some tests can only be carried out at a specific speed. Use this menu to simulate a fixed speed, to check or demonstrate functioning of the system. Or to prevent that you will have to drive the system during troubleshooting.

Press ▤ to edit settings.
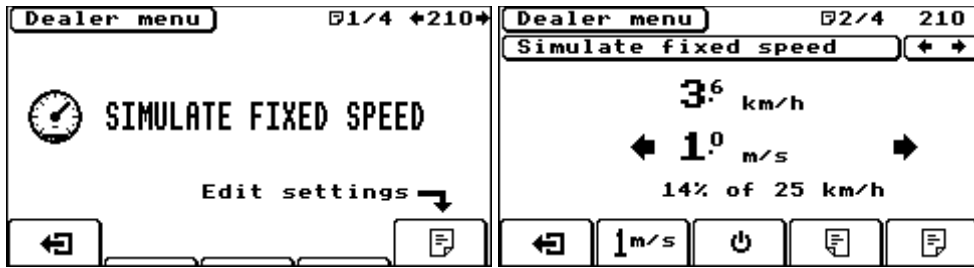
The screen shows the selected simulation speed. Use the **Left/Right** navigation keys to change the speed.

⇤	Use this key to return to the Main screen.
1 m/s	Use this key to toggle the speed to a predetermined value, 1 m/s in this example
⏻	Use this key to turn Speed simulation ON or OFF. The ⏻ icon blinks while speed simulation is active.
▤▤	Use these keys to change the function of the second function key: 1 m/s, 2 m/s or 100% (maximum speed at which the set application rate can still be reached).

As long as Speed simulation is active, the message Simulation is visible in the Main screen:
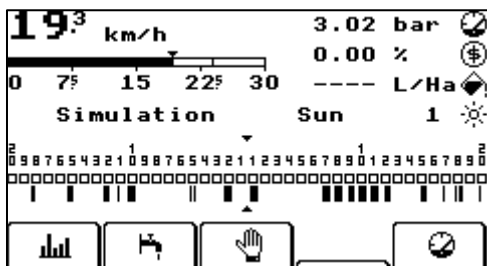
i	Menu 210 can also be used to test nozzles (or to flush the nozzles when they are blocked). As the nozzles can only be tested when the vehicle is driving, menu 210 allows you to simulate a fixed speed. Select a fixed speed of 2 m/s. Hold a green (living) leaf in front of one of the sensors. The corresponding nozzle is activated. (This requires spray mode "Spot spraying" to be selected in menu 104) Nozzle cleaning is also possible in menu 102. See "Nozzle cleaning menu (102)" on page 91.

9.4.13. Speed and flow sensor test (211)
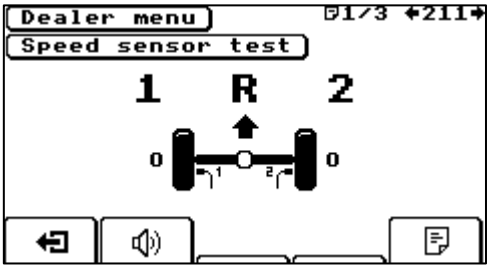
Use this menu to test the speed sensors. The speed sensors are mounted to the left and right wheels or on the boom to measure the current speed and turning angle of the vehicle. See also "Speed sensor calibration" on page 49.

Menu 211 shows a graphical presentation of both wheels and the two speed sensors. The recorded number of pulses for the left l and the right speed sensor is shown.
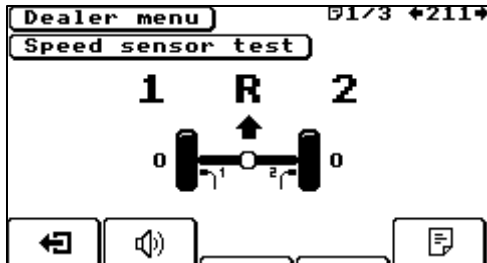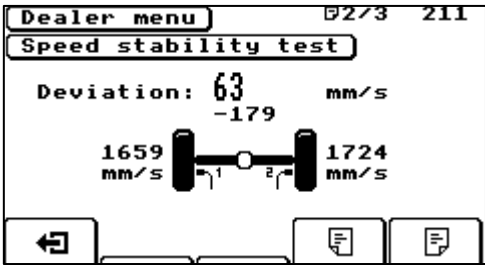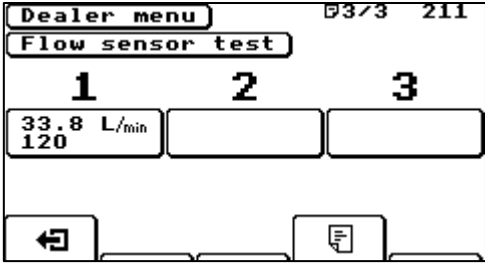
Sensor 1 should be mounted to the left and sensor 2 should be mounted to the right.

Input from both wheels is needed to accurately follow the track of the vehicle (curves). Use this to check that pulses from both sensors are received. When traveling on a straight road, the values for both sensors should increase at the same speed.

⇤	Use this key to return to the Main screen.
◁))	Use this key to switch on acoustic feedback on pulses generated by the speed sensors, making it easier to trace intermittent failures. By default, acoustic feedback is OFF. Press the Speaker-key repeatedly to select any of the speed sensors: 1 = Sensor 1 (left) 2 = Sensor 2 (right) Press the page button (**F5**) to go to 211-2, the speed stability test menu.

⊡⊡	If two speed sensors are connected, the individual speed of both speed sensors is shown. When driving straight, the value of `Deviation` should not exceed 100mm/s. The top value shows the raw deviation, the bottom value shows the smoothened deviation. **Dealer menu** ▣2/3 211 **Speed stability test** Deviation: **63** mm/s -179 1659 mm/s 1724 mm/s See also "Speed sensor calibration" on page 49. Press the page button (**F5**) to go to 211-3, the flow sensor test menu.
⊲⟩	If a flow sensor is enabled in menu 203, it appears in menu 211. Up to three flow sensors can be connected/tested. **Dealer menu** ▣3/3 211 **Flow sensor test** **1** **2** **3** 33.8 L/min 120

9.4.14. Automatic configuration (212)

Use this menu for fast configuration of a new system, to reduce set-up time for a large system, especially with respect to calculating and programming the distance of each sensor to the center of the vehicle.

Assuming that all sensors are evenly distributed, menu 212 will calculate and program all offsets once the distance between two individual sensors (spacing) has been specified.

Please note: The automatic configuration for sensor position is only possible if sensors A are placed 500 mm from the center of the machine!

Dealer menu ▣1/3 ←212→

AUTOMATIC CONFIGURATION

Dealer menu ▣3/3 212
Automatic Configuration
→ Spacing : 1000 mm ← 1000

Press OK to configure all offsets automatically.

OK

⟵	Use this key to return to the Main screen.

OK	Use this key start automatic configuration.
🗐 🗐	Use these keys to go to the next or the previous page

A system beep indicates that automatic configuration is done.
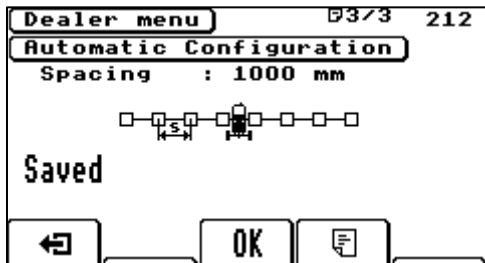
9.4.15. Margin presets (213)

Use this menu set the margin presets.
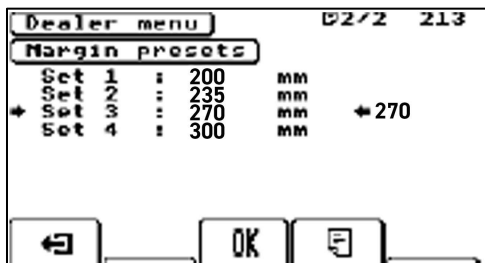
1. Set four usable margin presets for your operation. The advised margin depends on your driving speed, wind conditions and field contours. A higher margin is advised with higher speeds and/or more variable contours.

   - The minimum for practical use is 100 mm on preset 1.

   - The maximum margin to be set is 300 mm.

2. Press **OK** to confirm the value.

3. Next, in the main screen, you can change the margin preset by pressing ⬜; **F2** now shows the margin flag ⚑ .

4. Press **F2** to change the preset margin. Refer to "Changing the margin during spraying on page 74

9.4.16. Backup (214)

This menu is only applicable if the backup functionality is enabled by the manufacturer. Use this menu to create or restore a backup of the power converter (PSU), all detection sensors (sensors), the console, or one detection sensor.

All backups, except for the backup of the console, are stored on the console. The backup of the console contains a backup of the power converter, console and all sensors. This complete backup is stored on the power converter.
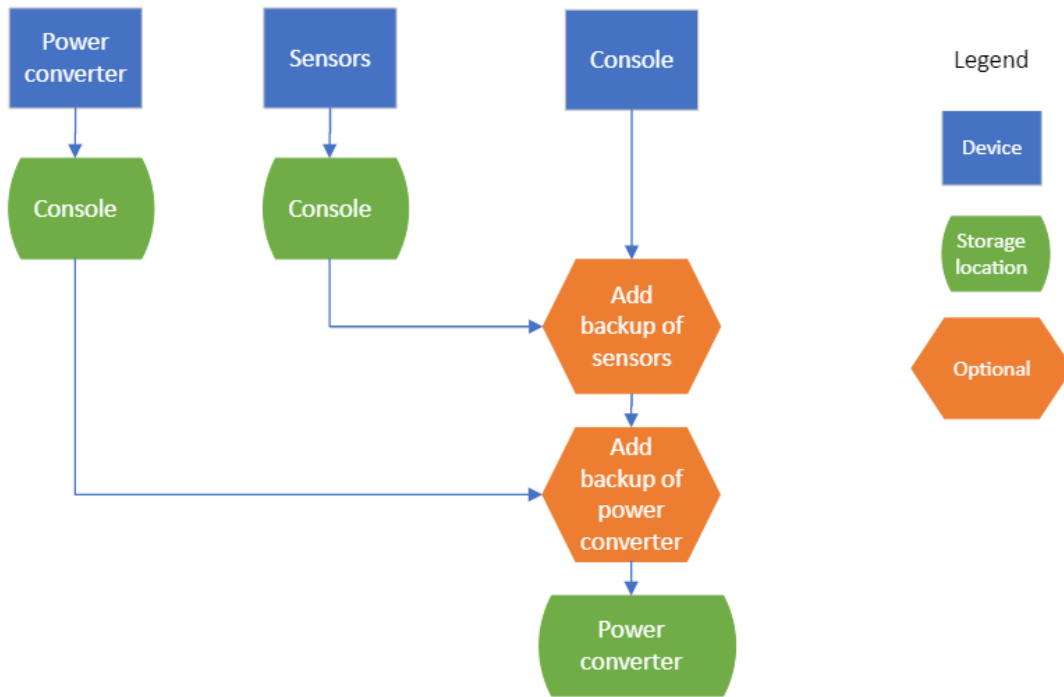
To create a complete backup, first create individual backups of the power converter and the sensors. Then, create a backup of the console, so that it contains the backups of all devices. If individual parts need to be replaced, a single backup of the particular device is sufficient.

> ⚠️ When creating or restoring backups, make sure the WEED-IT has sufficient power, so it will not shut down. Make sure the engine is running or a constant power supply is connected
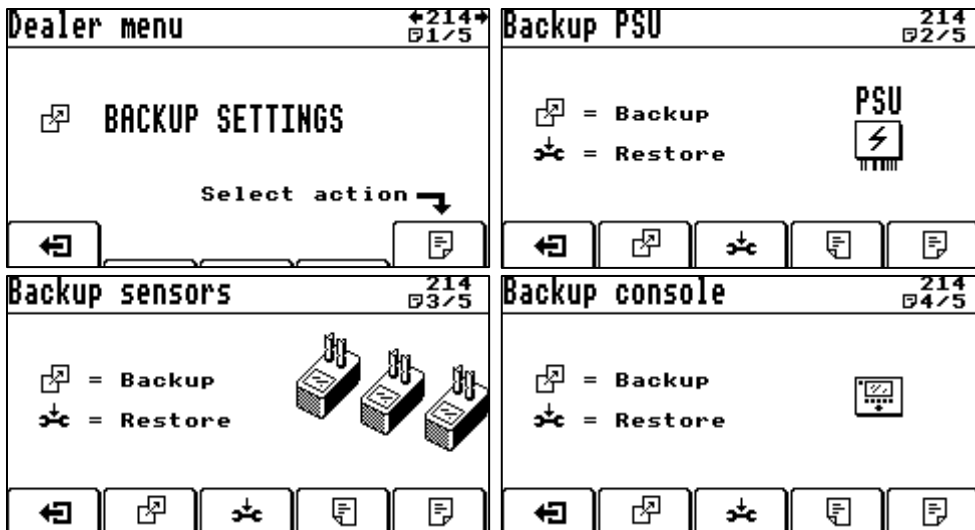
If no backup has been created yet, the ⚡ (F2) button is not available.

⤢	Creates backup. Requires confirmation with the **right** navigation key.
⚡	Restore a backup. Requires confirmation with the **right** navigation key. The console shuts down automatically when the backup has been restored. The firmware version of the new PSU/console/sensor must be the same as on the backed up one.

9.4.17. Height sensors (216)

This menu is only applicable if the system is equipped with height sensors. Use this menu to configure the installed height sensors. For more information on BodoHeight, refer to the *BodoHeight installation manual* or "Other manuals" on page 191.
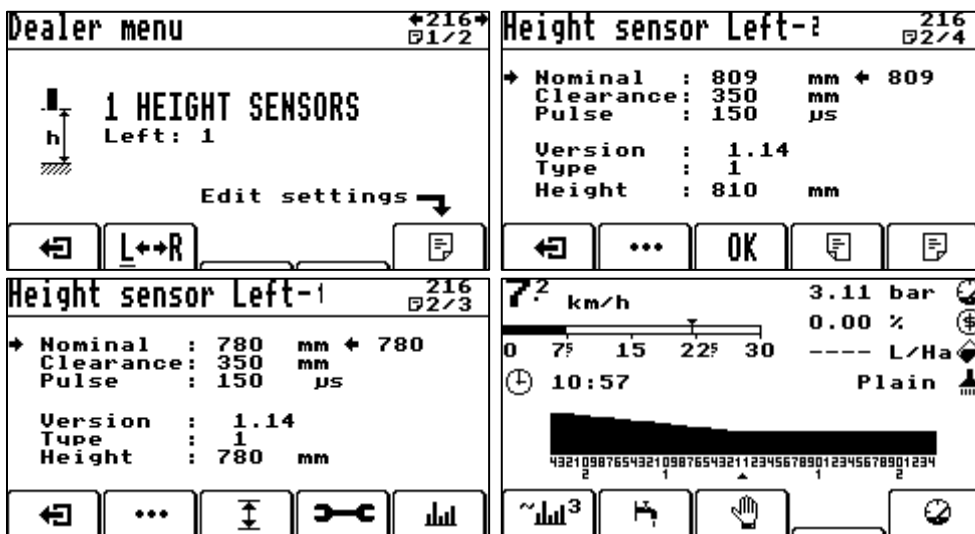
•••	Switch between two options for the function keys in this menu.
↕	Set the current value of *Height* as value for *Nominal*
⚒	Navigate to menu 203/10
▫▪▫	Activate the height histogram on the main screen (right bottom figure above the table)

Nominal	Height of the height sensor when the spray boom is at the operating height for spot spraying
Clearance	Minimum required height of the height sensor to work properly
Pulse	Pulse length sent out by the ultrasonic sensor. BodoHeight firmware V1.14 is required.
Type	Type of ultrasonic sensor used
Height	Actual height of the height sensor

10. Troubleshooting

This section offers information on:

- Errors
- Warnings
- Advanced problem solving

10.1. 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:
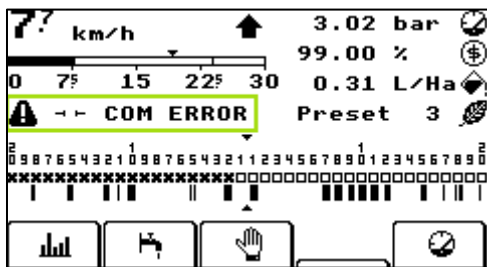
In the Main menu, only one message can be displayed at a time. If more than one message is pending, or if multiple errors occur at the same time, the messages are shown alternately for a few seconds. Use the **Message** menu to check for any other messages. To access the Message menu:

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.

←	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.

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

10.2. Warnings and errors overview

See also "Warnings menu (101)" on page 91.

Errors & Warnings	Details	How to resolve
Nozzle PSU error	- One or multiple sensors have failed to control the solenoid valve. - Each sensor controls four solenoid valves. When the maximum power draw is exceeded, the power supply drops. - The sensor cannot control solenoid valves correctly anymore. Some nozzles will not open correctly or at all. - A cross is shown below the sensor(s) that has the problem	- Switch off the system, wait for 30 seconds and turn the WEED-IT back on. - Check if the problem is solved. - Restart the spray operation and keep a look on the sensor that indicated the Nozzle PSU Error. - If the problem occurs again, check if the solenoid valve is installed properly. - If the problem is persistent, replace the sensor.

Errors & Warnings	Details	How to resolve
ERROR	A serial problem has occurred. This message appears whenever a serious internal malfunction has occurred in the User console'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 PSU | • The power converter does not reply

• If the power converter does not start, the console will beep several times during start-up in order to try to establish communication with the PSU.

• In most cases this is caused by a broken PSU. If the PSU is causing the problem, most of the times the green PWR LED (on the left low PSU PCB) is blinking fast, together with several other LED's on the PSU and smaller CPU PCB's.

• The console itself will start, but is not able to power up the PSU, neither it is able to shut it down. There is no communication with the PSU and sensors (sensor communication runs through the PSU to the sensors). | • Disconnect the main power cable from the battery to the PSU. Wait for 30 seconds and reconnect it. Try to start the system.

• Check if the power supply voltage from the battery is at least 12V while the WEED-IT system is starting.

• Open up the power converter and check the fuses and potential damage (e.g. moisture inside). Also check the LED's on the PCB.

• Check if the CPU is working, mainly by checking the status LED's on top. Refer to "Power converter connections" on page 154.

• Try to start and shut down the power converter with the manual power switch button. Refer to "Power converter connections" on page 154.

• Replace the PSU

• If not solved, check the User console for physical damage. Open up the lid and check for short circuits or moisture inside.

• Replace the console connection cable (BQ5).

• Replace the console adapter cable (BQ6).

• Replace the User console

• If one of these steps fixes the problem keep the replaced component in place and replace all of the original components in reverse order. (For example if replacing the User console fixes your problem, keep the new User console and reinstall the original console connection |

Errors & Warnings	Details	How to resolve
		cable and console adapter cable to see if the system keeps running.)
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 low | 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:

⚠ 🔋 11.20 v | 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:

⚠ 🔋 11.55 v〈11.70

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.

Refer to " Using WEED-IT" on page 67 for alternator requirements. |

Errors & Warnings	Details	How to resolve
Battery too high	Battery voltage too high. As soon as the voltage becomes dangerously high, the unit will turn itself off without warning.	Check or replace the alternator and/or voltage regulator. Typical maximal loading in a 12 VDC system is 14.3 VDC, in a 24VDC this is 28.2VDC
COM error	• A communication failure has occurred in one or more sensors. • On the main screen, sensors with communication problems show up with x's instead of the square box with a dot in it. • The WEED-IT uses serial communication. Each sensor receives communication messages and also passes them on to the next sensor. • With this serial principle it is easy to find the sensor that has problems. It also means that all sensors beyond the broken sensor are not working anymore as long as the broken sensor is in place.	Find the first sensor from the center of the sprayer that shows this issue (for example left 4). Try swapping one sensor closer to the middle (left 3) with the outermost sensor (left 9). If this solves your problem, put sensor I back in place and install a replacement sensor. If this doesn't solve the problem, try swapping the next sensor on the boom (left 4) with this sensor. If this does not solve the problem: • Replace the detection sensor adapter harness (BQS12). • Replace any detection sensor (extension) harnesses leading to the first faulty sensor. When one entire boom side is not working: • Replace the console connection cable (BQ5). • Replace the console adapter cable (BQ6). • Replace the power converter • Replace the console If one of these steps fixes the problem keep the replaced component in place and replace all of the original components in reverse order.

Errors & Warnings	Details	How to resolve
Sync error	• Synchronization failure between sensors • On the main screen, sensors with synchronization problems show up with x's instead of the square box with a dot in it. • The sync signal is needed for proper operation of the active LED light source in each sensor. The power converter creates the sync signal and each sensor receives it and passes it on. • A sensor with a sync error is visual recognizable on a low light intensity or flickering blue LED's.	Find the first sensor from the center of the sprayer that shows this issue (for example left 4). Try swapping one sensor closer to the middle (left 3) with the outermost sensor (left 9). If this solves your problem, put sensor I back in place and install a replacement sensor. 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: Replace the detection sensor adapter harness (BQS12). Replace any detection sensor (extension) harnesses leading to the first faulty sensor. Replace the power converter If one of these steps fixes the problem keep the replaced component in place and replace all of the original components in reverse order.

Errors & Warnings	Details	How to resolve
PSU ERROR	The Power Converter has reported a serious problem.	• Switch the WEED-IT off, wait for 30 seconds and turn it on again. • Check the Power converter for physical damage. Open up the lid and check for short circuits or moisture inside. • Check the fuses and LED's in the power converter. • Check all the cabling between power converter and console. • If all OK, replace the Power converter. • Replace the console connection cable (BQ5). • Replace the console adapter cable (BQ6). • Replace the User console. If one of these steps fixes the problem keep the replaced component in place and replace all of the original components in reverse order.
ERROR Max sensor 20	• The maximum number of sensors has been exceeded. • This message also occurs when there is an issue with the RS232 communication to the external device. In that case, the message 'control comms' will be shown at the same time.	• This setting can only be changed by the manufacturer. Please contact us. • Also check 'control comms'.

Errors & Warnings	Details	How to resolve
Control comms	• There is a problem with the RS232 communication port that is connected to the external device. • The WEED-IT sends messages to the external device when to start and stop communicating. If those messages are not respected by the external device, often the warning 'control comms' occurs. • The message 'control comms' usually occurs simultaneously with the message 'ERROR Max sensor 20'.	• Disconnect the external device by unplugging the 8-way Souriau connector at the WEED-IT console. • Try to restart the WEED-IT system and check if the messages are not showing up anymore. • Contact the supplier of the external device and indicate that the communication protocol for the WEED-IT is not implemented correctly. Contact your distributor and Rometron and report the problem. • See also the *AppNote for ext. RS232 communication, WEED-IT Quadro* or "Other manuals" on page 191
Serial # invalid	The User console does not have a valid serial number	Replace the User console and return the faulty one to your supplier.
Sensor firmware too old	The version of the firmware inside the sensor is too old	Update the sensor firmware using the image upload cable. You may need to ship the sensor to the head office or your importer to be able to perform this update. Refer to the *Firmware upgrade manual, WEED-IT Quadro* or "Other manuals" on page 191
Sensor serial number	One of the sensors does not have a valid serial number	Return the sensor to your supplier.
Configure	Restored to factory default	Check and adjust all the calibration values that you provided when the machine was delivered to the customer.

Errors & Warnings	Details	How to resolve
Pressure too low	Fluid pressure below lower limit	• Check the pressure settings in menu 203 tab 6 and 7. • Adjust the settings if necessary. • Check the pressure sensor installation and wiring.
Pressure too high	Fluid pressure above upper limit	• Check the pressure settings in menu 203 tab 6 and 7. • Adjust the settings if necessary. • Check the pressure sensor installation and wiring.
Too fast	One or more detection sensors exceed the maximum speed. The desired application rate is not achieved or the speed is exceeding the maximum weed detection speed.	• Slow down! • Check the spray settings in menu 104. • If regular occurs, check the option 'no sensor hi-speed alert' is **enabled** in menu 204. • Check the speed sensor install.

Errors & Warnings	Details	How to resolve
Wheel sensor	• One of the wheel sensors have not passed on a signal for a while. • One wheel sensor is broken. • The GPS speed sensor is broken.	• Restart the WEED-IT console and drive in a straight line. • Check if the error occurs again. • Use dealer menu 211 tabs 2 and 3 to check if all speed pulses are counted regularly and if the deviation is < 100 mm/s while driving in a straight line. • Check the speed sensor installation • Check the cabling from the speed sensor to the power converter • Replace the wheel speed sensor and perform a 100 m calibration run (see "Speed calibration (207) on page 122). • If this is not possible drive straight and check if the direction arrow on screen stays straight. • Note: if there is no spare speed sensor available, the WEED-IT can operate with one speed sensor. In that case, the single speed sensor must be connected to the LEFT speed sensor at the PSU AND the RIGHT speed sensor must be disconnected at the PSU.

Errors & Warnings	Details	How to resolve
Sensor order changed	The sequence of the sensors has been altered.	Reconfigure the new sensor with the values from the previously used sensor. If a sensor is replaced permanently, the back-up functionality in dealer menu 214 could be used. Refer to "Sensor replacement" on page 78.
New sensor found	A new sensor has been detected.	Reconfigure the new sensor with the values from the previously used sensor. If a sensor is replaced, the back-up functionality in dealer menu 214 could be used. Refer to "Sensor replacement" on page 78.
Sensor missing	A sensor that was previously there, is now missing	If this occurs after a sensor replacement, confirm the message and reconfigure the new sensor with the values from the previously used sensor.

Errors & Warnings	Details	How to resolve
No sensors	No sensors have been found	• Check if a BQS12 is installed as first sensor harness to the power converter. • Check the User console for physical damage. Open up the lid and check for short circuits or moisture inside. • Check the Power converter for physical damage. Open up the lid and check for short circuits or moisture inside. • Replace the console connection cable (BQ5). • Replace the console adapter cable (BQ6). • Replace the User console. • Replace the Power converter. If one of these steps fixes the problem keep the replaced component in place and replace all of the original components in reverse order.
Direction arrow does not point upwards while driving on a straight track. Direction arrow wiggles while driving on a straight track	The speed sensors are faulty, or the speed sensors are not correctly configured.	Install a new speed sensor

Errors & Warnings	Details	How to resolve
Leakage	• One or more detection sensors have detected a high humidity. • Each detection sensor is equipped with a Temperature and Relative Humidity sensor to indicate leakages. • A warning is shown in the main screen with the sensor and RH value. • The leakage warning is based on the alarm settings in menu 203 tab 14.	• Go to menu 100 and check the T and RH value for the indicated sensor. Wait until the sensor is at operating temperature. • Compare the T and RH with other sensors. • If deviating much, check the sensor visually on condense at the window or moisture. Also check if the window is not broken. • If the window is broken, ask the dealer to replace the cover. This should be done in a clean and dry environment. • Check the orange seal around the 26-way connector. If it is not neatly around the connector, replace the seal. • Replace the sensor if it is leaking or has collected water.
HOLD	WEED-IT is in HOLD mode	Press function key 3, refer to "Function keys" page 27.
Flushing	The nozzles are being flushed	Press function key 2, refer to "Function keys" page 27.
Simulation	Speed simulation is active	Deactivate the speed simulation in dealer menu 211 or restart the WEED-IT.

10.3. Advanced problem solving

Refer to this section if you need to solve more complex problems. If the problem you encountered is not in this list, or if the provided solution doesn't work for you, please contact your supplier.

- Most problems have to do with the:
    - Spraying mechanism
    - Machine does not spray at all
    - One nozzle keeps spraying continuously
    - One or more nozzles do not spray
    - The machine sprays too early or too late
- Compressor/pump mechanism
    - Compressor/pump does not start
    - Pressure is not stable
    - The pump had difficulty building pressure
- Electrical installation
    - General points to check
    - The display does not show anything after start-up
    - Speed detection is not correct
    - Key on the User console does not respond
    - The sensors do not work (properly)

10.3.1. Spraying mechanism problems

Machine does not spray at all

Possible cause	Solution
The machine is on hold	Press 🖐 (F3) to re-activate the system.
The nozzles (valves) are not connected properly.	Check all electrical connections to the nozzles for broken wires. Check the connections to the Power converter.
Speed is not measured	Check the connections to the wheel/GPS speed sensors for broken wires, and check the connections of the wheel/GPS speed sensors to the Power Converter. Check the distance between the wheel speed sensors and the holes. The distance must be between 5 - 8 mm. Refer to "Speed sensor calibration" on page 49 for information about the alignment of the wheel speed sensors.

Possible cause	Solution
The sensors do not work at all	There may be a problem with one or more sensors. Refer to "Electrical problems" on page 151 . Check if pulses are measured using menu 211.

One nozzle/valve keeps spraying continuously

Possible cause	Solution
Nozzle is blocked by dirt	Clean the nozzle by flushing the machine. If this doesn't work, remove the black nozzle cap holding the nozzle and nozzle seal in place. Clean the nozzle and re-fit all parts.
The signal level of the corresponding channel is above 150 (see possible causes below).	Use menu 209 to read the actual signal level. Use a plant free surface and place the sensors at the normal height (facing the surface). The detection level should be between 10 and 120 (provided the sensor doesn't 'see' any green leaves).
The sensor window is dirty	Clean the window.
Optical defect	If one of the optical filters or lenses are not in place or damaged, the signal may be disturbed. If this is the case, replace the entire sensor.
Electronic defect	Replace the sensor.

One or more nozzles do not spray

Possible cause	Solution
The sensor is inactive	Make sure the sensor is enabled in the Sensor Menu (100). If the sensor is disabled, all nozzles of that sensor will also be disabled.
The nozzle is blocked	Remove the black nozzle cap holding the nozzle and nozzle seal in place. Clean the nozzle and re-fit all parts.
Nozzle connections are damaged	Check the wires to the solenoid valves . Two wires are used to connect each solenoid valve to the system. If one of the terminals is disconnected from the solenoid valve, the screen should show a cross. The same is true if any of the wires are broken.
The corresponding sensor is not configured correctly	Use menu 206 to verify the signal level of the detection sensor.

The solenoid valve is not properly fitted to the nozzle	Check that the solenoid valve is properly and tightly fitted to the nozzle.
The tube is not fitted properly onto the body of the solenoid valve	Remove the solenoid. Be aware of the O-rings (2x). Check if the stainless-steel tube is properly fitted onto the plastic part. It should not be possible to loosen it by hand.
The plunger seal is damaged or the orifice is damaged	Remove the entire valve from the machine. Take the solenoid valve apart. Remove the solenoid. Be aware of the O-rings (2x). Also remove the stainless-steel tube. Be aware of the O-ring (1x). Check if the frontal seal inside the plunger (blue or white) is clean and not damaged. If damaged, replace the plunger of the entire valve. The plunger seals onto an orifice (plastic or stainless steel). Check if the orifice is not damaged. If damaged, replace the body or the entire valve. Refer to the *WEED-IT Quadro PARTS LIST* how the solenoid valve is assembled. Plunger and orifice damages are generally caused by the contaminated fluids containing larger particles or hard solvable chemicals. This can be prevented by installing proper filtering. The minimum required filtering is 100 mesh (suction and press filters). Recommended size is 200 mesh.

The machine sprays too early or too late

Possible cause	Solution
The machine is not placed at the proper height	Check the height of the nozzles. The height should be approximately the same as the height value set in menu 206.
The pressure is not correctly set	Check the system pressure and make sure that there is no leakage. Check the plumbing on the pressure system Check the correct operation of the PAV Valve.
The speed is not determined correctly, because the speed sensors have not been calibrated properly	Use menu 207 to calibrate the speed sensors.

The height or distance of the nozzle(s) has not been set correctly	Use menu 206 to set the correct values. See " Nozzle calibration" on page 59
The sensor offset has not been set properly	Use menu 205 to set the position of the detection sensors on the axis of the vehicle. When using an odd number of sensors, the middle one should always have an Offset of 0. The sensor to the left of it, should have an Offset of -1000 mm, while the sensor to the right of the middle should have an offset of +1000 mm. These values are suitable for a standard vehicle. Also check that Track (the distance between the center of the left wheel and the center of the right wheel) has been configured correctly. See " Detection sensor positioning" on page 57.

10.3.2. Compressor/pump mechanism problems

Air compressor doesn't start

Possible cause	Solution
The air compressor is not connected properly	Check whether the connector is fitted properly and check each individual wire. Use a voltmeter to verify the voltage on the air compressor.
The pump fuse is broken	Replace the pump fuse in the Power Converter. See "Power converter connections" on page 154" for more information.
The system is on hold	Press 🖐 to activate the system.
The air compressor is broken	Replace the pump.
The air compressor cable is damaged	Check the air compressor cable for broken wires; replace if necessary. Use the connection table (see "Power converter connections" on page 154) for reference.

The connector is not properly wired	Check connector wiring. The 4-pin connector should have the following pinning: 1 = red, 2 = black, 3 = green, 4 = yellow.
	The green and yellow wires are interchangeable.
	On the other side of the cable are two slide contacts on the green and yellow cable which have to be connected to the pressure switch at the top of the air compressor. There is also a 2-pin connector on this side with 1 = red, 2 = black.

Pressure is unstable

Possible cause	Solution
Air leakage	Check the system for leaks.
	Check the plumbing to the pump and the PAV Valve.
	Replace a leaking part, if necessary.

The pump has difficulties building pressure

Possible cause	Solution
Air in the system	Release any surplus air from the system by flushing it. See "Main menu options" on page 85, Flush option.
Suction or pressure is blocked	Check the filters and clean the filters if necessary.
	Check the system for leaks. Check the plumbing to the pump and the PAV valve. Replace a leaking part, if necessary.

10.3.3. Electrical problems

General checks

Possible cause	Solution
Check that all nozzles are correctly driven	Make sure that all sensors are enabled (menu 100).
	Press ⛽ and check that all nozzles are flushed; if some nozzles are not working, check the nozzle connections (connector).

Check that wheel speed sensors are functioning correctly	Turn the machine on.
	Check that the distance between the wheel ring holes and the wheel speed sensors is 5 to 8 mm.
	Whenever the wheel speed sensor 'sees' a metal part (wheel ring or bolt), a yellow LED should light up.
	Check the voltage supplied to the sensors inside the Power converter.
	Check whether the pulses are received by the system; a small green LED should light up with every pulse. Refer to the "Power converter connections" on page 154 to see where this LED is located.
	If all of the above items have been verified and the speed still isn't properly determined, contact your supplier.
Check that sensors are functioning correctly	Make sure that the lenses of the optical parts of each sensor are clean. Check that all sensors are (properly) connected.
	Turn the system on. Check that the display shows each sensor as a square with a centered dot.
	If one or more sensors are missing, first turn the system off (no restart), wait a few seconds and turn the system on again. It is possible that one of the sensors didn't start properly.
	All sensors should now radiate a beam of blue light (if Full Coverage Spraying is selected in menu 104, the blue lights will flash 3 times directly after start-up and then turn off). If a sensor doesn't do that, it's broken. If none of the sensors radiate a blue beam, check the battery voltage and the fuses inside the Power converter.
	Use menu 210 to simulate a fixed speed.
	Use a large living green leaf to force a detection. The corresponding nozzles should now be driven.
	Also check functioning of the nozzles themselves.
	If a sensor doesn't respond well, replace it. Return the defective sensor to your supplier.

The display does not show anything after start-up

Possible cause	Solution
The processor has not started correctly	Force a shutdown: Press and hold ⏻ for 5 seconds. Release the key. Wait a few seconds and restart the system in the usual manner.
The User console is broken	Replace the User console.

Speed detection is not correct

Possible cause	Solution
The connector for the wheel speed sensors isn't (properly) connected.	Check the connector and the wires.
One of the wheel speed sensors is broken.	Check the power supply to the wheel speed sensor. If power is applied correctly, the green LED at the rear of the wheel speed sensor should be ON. The yellow LED should come on whenever a wheel ring hole passes by. Replace the defective wheel speed sensor, if necessary. Use menu 211 to check if pulses are counted.
The cable between the Power Converter and the user console is broken.	Check the cable for broken wires or contacts; replace the cable, if necessary.

The keys on the User console do not respond

Possible cause	Solution
All keys are dead	The processor error (inside the User console). Press and hold for at least 5 seconds to force a shutdown. Release the key, wait a few seconds and then restart the machine.
Only one key is failing	The contact foil of the User console is worn-out or broken. Replace the User console.
The User console is broken	Replace the User console.

The sensors do not work (properly)

Use menu 209 to verify functioning of the sensors.

Possible cause	Solution
Optical part of the sensor is dirty	Clean the window of the optical sensor with a soft damp cloth.
Speed is not measured correctly	The sensors will only work when the vehicle is driving or when speed is simulated.
The sensors are not properly connected	Check all connectors to and from the sensors.
The sensor cable is broken	Check the cables to and from the sensors for broken wires. Replace the cable(s) if necessary.

10.3.4. Power converter connections

Only open the Power converter if you have to replace cables, or for troubleshooting.

	ATTENTION: Dangerously high currents! Always disconnect the battery before opening the Power converter housing.

1. Remove the 4 bolts from the lid of the Power converter.

2. Remove the lid. You now have access to the PCB of the Power converter.

Activity LEDs

The PCB of the Power Converter has a number of LEDs that can be used to check its operation:
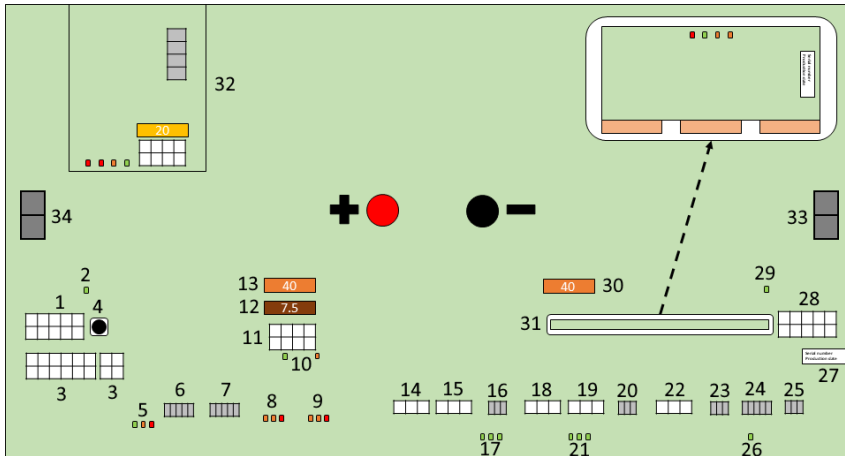
Figure 10-1 Connections to the PCB of the Power converter

- 2 green LEDs (2 and 29) should be permanently on. If one of them fails, the power unit for that boom side is failing.

- 1 out of 3 LEDs at the bottom left (5) burns continuously. When one of these LEDs is blinking, there could be a problem with the power converter.

- 4 LEDs on the Orbus Brains processing PCB (31), CPU:

  o Heartbeat: Green, should flash once very second

  o Orange blink or burn often indicates that there is communication between the processor and the user console

Legend Figure 10-1 Connections to the PCB of the Power converter

1. Left boom detection sensor connector (OR2L)
2. Left boom power status LED
3. Console connectors (OR1)
4. Manual main power switch
5. Power supply status LEDs (left to right)
    a. Power
    b. Panic
    c. Fail
6. GPS#1 connector
7. GPS#2 connector
8. GPS#1 status LEDs (left to right)
    a. Transmit
    b. Receive
    c. Error
9. GPS#2 status LEDs (left to right)
    a. Transmit
    b. Receive
    c. Error
10. Pump status LEDs (left to right)
    a. Pump run
    b. Switch on
11. Pump controller connector (OR6)
12. Console and external sensors fuse (7.5A)
13. Detection sensors fuse left boom (40A)
14. Speed left connector (OR3)
15. Speed right connector (OR4)

16. Speed direction connector
17. Speed pulse status LEDs
    a. Speed left
    b. Speed right
    c. Speed direction
18. Flow 1 connector (OR4)
19. Flow 2 connector (OR4)
20. Flow 3 connector
21. Flow pulse status LEDs
    a. Flow 1
    b. Flow 2
    c. Flow 3
22. Pressure 1 connector (OR5)
23. Pressure 2 connector
24. Miscellaneous analogue connector
25. Miscellaneous digital connector
26. Miscellaneous analogue pulse status LED
27. Serial number sticker
28. Right boom detection sensors connector (OR2R)
29. Right boom power status LED
30. Right boom fuse (40A)
31. Orbus brains processing PCB
32. Pump controller PCB (optional)
33. Right boom detection sensors OR2R for 1200 XL
34. Left boom detection sensorsOR2L for 1200 XL

Legend Figure 10-2 Power converter brains	
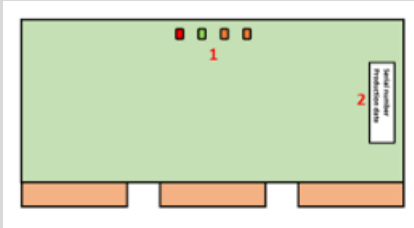
Figure 10-2 Power converter brains
	1. Orbus Brains status LEDs (left to right):
	   a. Fail CVF
	   b. Watchdog
	   c. Orbus receive
	   d. Orbus transmit
	2. Serial number sticker

Legend Figure 10-3 Compressor PCB connections	
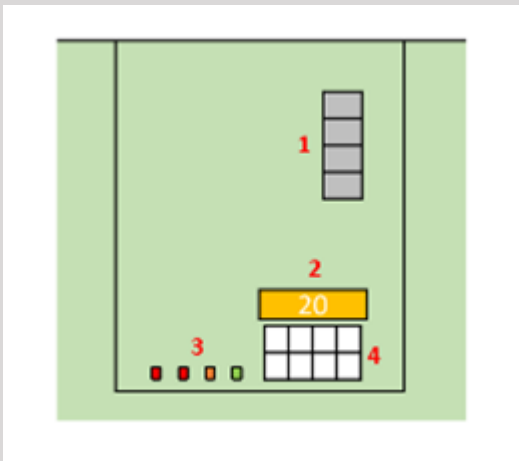
Figure 10-3 Compressor PCB connections
	1. Compressor cable (OR7) (top to bottom):
	   a. Switch
	   b. Switch
	   c. 12V compressor
	   d. GND compressor
	2. Air compressor / pump fuse (20A)
	3. Status LEDs (left to right):
	   a. Temperature error
	   b. Load error
	   c. Switch on
	   d. Pump run
	4. Power converter connector (OR6)

Connections

Speed sensors	The WEED-IT system uses wheel or GPS speed sensors for determining how fast the vehicle is going. Using two sensors means that the WEED-IT can track curves; it will adapt liquid flow to make sure that the field is evenly sprayed.
	
	The wheel sensors also increase system accuracy.
	
	Connect the LEFT sensor to input 14
	
	Connect the RIGHT sensor to input 15.
	
	Connect the third sensor to input 16 (direction).
	
	``
	┌──────────┐ 02/16 203
	│Dealer menu│
	┌────────┐┌─────┐
	│Configure││Speed│
	→ Unit : km/h ← km/h
	  Source: Speed
	  Pulses: 400 p/hm
	  Ideal : 8.33 m/s
	  Input : 12V ↓
	  Smooth: 8
	
	  Ideal speed : 20.00 km/h
	
	 ⇤ OK ⊟ ⊟
	``

Left and right boom	The PCB has two connectors (one on either side of the board) for connecting the left and right boom. The 10-pin sockets (1 and 28) provide power and communication to the boom. Connect the Left boom on the left side of the PCB Connect the Right boom on the right side of the PCB
User console	Connect the User console to the 2 white connectors labeled 'Console'(3).
Pump	Connect the pump to the 4 connections on the optional pump controller board. 4 wires can be attached: 2 for the power (+ and -) 2 for the switch Look at the print to connect each wire at the correct position.

Flows sensors Pressure sensor	The power converter has two standard connections for the flow meters (18 & 19). A third flow meter can be connected on connection 20. The pressure sensor is standard connected to 22. A second pressure sensor can be connected to (23). Look at the print to connect each wire to the connect position. WEED-IT generally uses the following colors for external sensor functions: Brown = 12V Blue = 0V Black = Signal
Battery power	The main 12V battery power input is at the center of the board (the two large sockets). Connect the plus wire (red) connected to the socket on the left Connect the minus wire (black) to the socket on the right. ⚠️ Do not make mistakes here. Reversing the input power will cause permanent damage to the Power Converter!

11. Specifications

WEED-IT Quadro detection sensor is able to detect living plants of at least 2 cm^2 containing a certain amount of chlorophyll (depending on the environmental conditions and plant type and - health) The sensing principle is based on chlorophyll fluorescence.

The system scans lanes of 250 mm / 10-inch width. A measurement is made every millimeter in the driving direction. When living chlorophyll is detected the sensor will open the corresponding solenoid that trails the sensor. As this valve passes over the plant it is opened and the nozzle will spray onto the plant.

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WEED-IT Quadro sensor specifications

Sensor electronic specifications	
Supply voltage	48 VDC
Typical Sensor Power Consumption for blue or red LED's and PCB	8,50 W per sensor (excl. solenoid control)
Typical Sensor Power Consumption for controlling solenoid valves	0,3 – 2,5W per solenoid
Operating Temp. Range	- 30 ~ + 60 °C
Ingress Protection (IP)[1]	IP69k (when sensor is connected to BQ sensor harness)
Weight	+- 700 gr
LED colour sensor	475 +- 10 nm (blue) +655 +- 10 nm (red)
Typical light insensity (luminous flux)	+- 160 lm

[1]) Tested by Eurofins Maser, test report issued on 09 December 2022 according to ISO 20653. Report available on request.

Sensor housing and mounting specifications	
Sensor connection	TE SuperSeal 1.0 26-way PCB mount with pin contacts
Sealing sensor housing	1x in alu base part, 1x around connector
Pressure equalization	Breather plug, High Airflow
Mounting nuts (inside sensor housing) and bolt size	M6 (4x)
Mounting bolt length	8 mm + steel plate thickness
⚠️	Do not exceed bolt length of 8 mm in the sensor part! Longer bolt lengths will damage the sensor housing.
Mounting angle sensor	Horizontal up to 22 forward
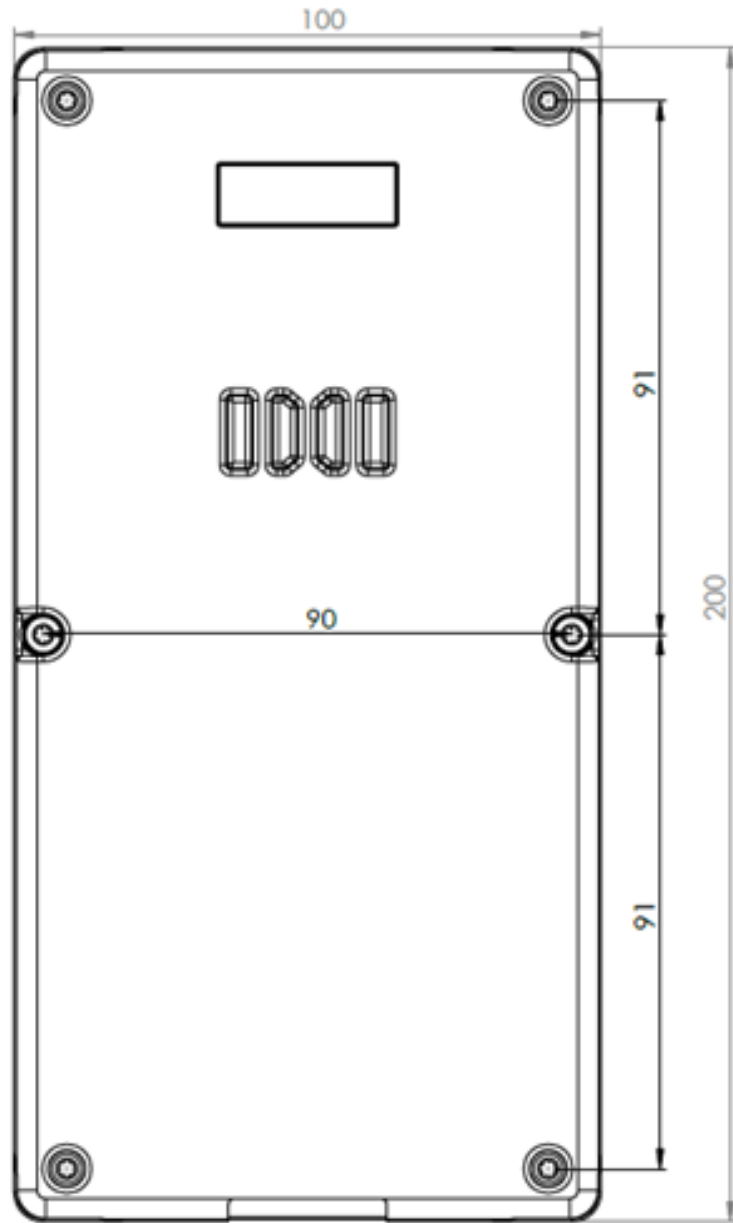
Figure 11-1 Sensor back housing dimensions [mm]

Sensor detection and solenoid control specifications	
Detection channels	4 per sensor
Optimal sensor detection height	1100 mm / 43-inch
Detection width at optimal height	1000 mm / 40-inch
Number of solenoid valves	4 per sensor
Nozzle spacing	250 mm / 10-inch
Max. nozzle size	06 nozzle (Grey ISO 16025)
Operating pressure	2-6 bar / 30-87 psi
PWM used frequency control range	20 - 55 Hz
PWM used Duty Cycle control range	~ 20 – 100 %

WEED-IT Quadro solenoid valve specifications

Solenoid valve specifications	
Valve type	2/2 NC
Compatible with / retrofittable to	ARAG, Hypro, TeeJet, Wilger (various types) Check the *WEED-IT Quadro PARTS LIST* for the right Part Number
Nominal constant operating voltage	6V = 5W
Typical resistance	7.2Ω
Connection	TE SuperSeal 1.5 2-way tab with pin contacts
Ingress protection (IP)	67
Advised filtering	200 mesh / 74 (suction and press filter)
Minimum required filtering	100 mesh / 149 micron (suction and press filter)
⚠	Use hard solvable chemicals and/or mixes with care! Use clean, properly filtered water to prevent damage!

WEED-IT Quadro Power converter (PSU) specifications

Converter type	400W, S	800W, M	1200W, L	1200W, XL
Max. detection sensors to be connected	18	36	40	48
Battery supply voltage (to PSU)	12-24 VDC	12-24 VDC	12-24 VDC	24 VDC or 12 VDC + Victron 12-24V
Wire diameter battery power cable	10 mm^2	35 mm^2	35 mm^2	35 mm^2
Fuse battery power cable @ 12 VDC input	40 A	80 A	80 A	125 A
Fuse battery power cable @ 24 VDC input	20 A	40 A	50 A	60 A
Absolute max current input	80 A	80 A	80 A	80 A
Converter type	DC/DC	DC/DC	DC/DC	DC/DC
Peak power consumption (input)	490 W	960 W	1430 W	1430 W
Nominal power constant output	400 W	800 W	1100 W	1100 W
Supply voltage from PSU to det. sensors	48 VDC regulated (1x Left & 1x Right boom)			
Fuses on primary side converter PCB @ 12 VDC	2 x 20 A	2 x 40 A	2 x 40 A	2 x 40 A
Supply voltage from PSU to external sensors (speed, flow, pressure)	12 VDC regulated			
Fuse on PCB for external sensors and console	7,5 A			
Converter efficiency	~85%			

Converter type	400W, S	800W, M	1200W, L	1200W, XL
Standby-Current	~40mA			
Operating Temperature Range	~ - 30 - + 75 °C			
Ingress protection (IP)	67			
Housing dimensions (L x W x H) [mm]	240 x 360 x 120	240 x 360 x 120	240 x 360 x 120	240 x 360 x 160
Weight	~ 6,2 kg	~ 9,0 kg	~ 9,0 kg	~ 12 kg
Mounting	4x M8 x 30 mm SS	4x M8 x 30 mm SS	4x M8 x 30 mm SS	4x M8 x 90 mm SS + Polyamide spacer 44 mm
⚠	It is recommended to put some grease on the bolts before mounting the PSU, as the bolts are stainless steel and the housing aluminum.			

⚠ The Power Converter 1200W XL requires a few extra attention points, especially on machines with a 12V electrical system as this requires the Victron 12-24V converter to be installed. For more information see, power converter manual "Other manuals" on page 191.

⚠ The optional air compressor which can be controlled by the power converter will only work if the power converter is supplied with ~12VDC.
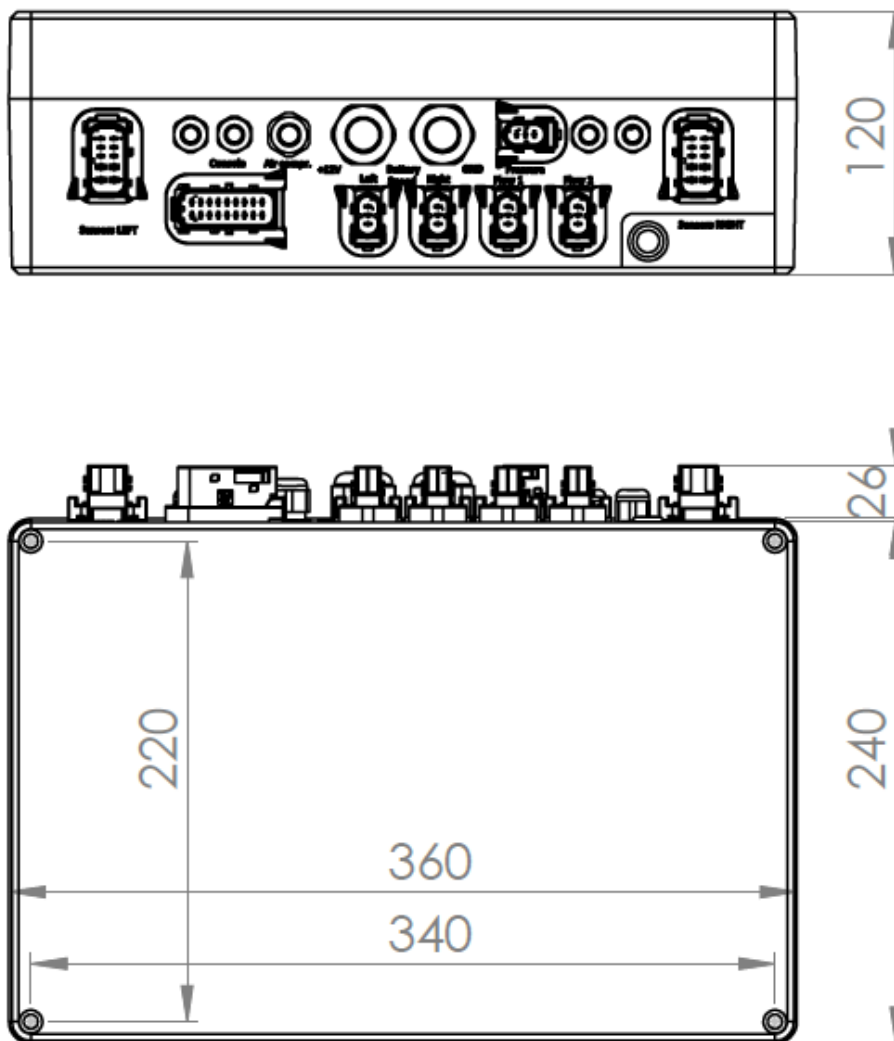
Figure 11-2 PSU dimensions for more information see Other manuals page 191 [mm]

User console specifications	
Supply voltage	11,8 – 24 VDC
Power consumption	330 mA @ 12 V = 4W nominal
Peak Power consumption	<= 6W
Operating Temperature Range	~ 10 ~ 50 °C
Ingress Protection (IP)	67
Dimensions (L x W x H)	150 x 180 x 60 mm
Time-Date Back Up Battery	3V Lithium CR2450

On/Off	Digital over communication
Reset	Hold on/off for 5 seconds

12. Menu options overview

Main menu				
📊	🚰	✋		◴
Histogram	Flush	Hold	---	Measurement toggle

Preset menu				
📊	🚰	✋	🍃	◴
Histogram	Flush	Hold	Preset	Measurement toggle

12.1. Service mode

▢   Press and hold MENU for 1 sec

100   **Information**   *Information about the console and each connected sensor (status, running hours, temperature etc.)*

101   **Warnings**   *Overview of the warnings that have been issued since the last reset.*

102   **Nozzle cleaning**   *Menu to test the detection and nozzle operation. Can also be used to open the nozzles for cleaning.*

103   **Job**   *Job overview, gives an overview of the sprayed area, used liquid, time and savings since the new job start.*

104   **PWM/Nozzle selection**   *Menu to select the spray mode, nozzle type, application rate, driving speed and pressure.*

EXIT   Resume normal operation

Information (100)				
⇤	L↔R	⚊c		🗒
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)				
⬅	New 💾	OK	🗎	♻
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 (104)				
⬅	🕐	OK	50%	100%
Back to the main screen	Set nominal pressure	Confirm setting	Set application rate percentage	Set application rate percentage

12.2. 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		

12.3. Dealer menus

Start WEED-IT in Dealer Mode

Press and hold MENU for 2 sec

200 — Information
Information about the console and each connected sensor (serial number, firmware version etc.)

201 — Information
Information about the PSU (serial number, firmware version, temperature etc.)

202 — Warnings
Overview of the warnings that have been issued since the last reset, even when the suer has cleared them.

203 — Configuration
Menu used for changing global settings (speed, pressure, flow, protocol, warnings etc.)

204 — Options
Configurable options regarding sensors, user interface and technical options

205 — Sensor settings
Configuration of the sensor-specific settings, such as margin, track width, mounting offset and fluid speed

206 — Nozzle settings
Settings that are specific for each individual nozzle, such as height and distance from the sensor

207 — Speed callibration
Special menu for a fully automated wheel sensor speed calibration. Needed after mounting the wheel sensors.

208 — Nozzle test
Special menu to test each nozzle of each sensor individually. Allows each nozzle to be opened manually.

209 — Detector test
Special menu to detect the weed detection sensors. Enables detection when the vehicle is not driving

210 — Simulation speed
Special menu to simulate a driving speed when the vehicle is not driving. Needed for some tests.

211 — Speed & flow sensor test
Special menu to test the working of the speed and flow sensors. Also gives insight in the deviation between L & R speed sensor.

212 — Automatic configuration
Menu to automatically set the offset position for each detection sensor that is connected.

213 — Margin presets
Menu to configure the four margin preset values.

214 — Back-up settings
Special menu that can be used to back-up and restore settings of a detection sensor, the console, and the PSU. Can be used when exchanging or replacing one of them.

216 — Height sensors
Menu to configure the height sensors (optional)

EXIT — Resume normal operation

Information (200)				
⬅	L↔R			📝
Back to the main screen	Select Left or Right boom	---	---	First sensor

⬇

Information (200) - sensor selected				
⬅			📑	📝
Back to the main screen	---	---	Go to the previous sensor	Go to the next sensor

Information PSU (201)				
⬅				
Back to the main screen	---	---	---	---

Warnings (202)				
⬅	🗑			
Back to the main screen	Clear warnings	---	---	---

Configure (203)				
⬅				📝
Back to the main screen	---	---	---	Edit settings

Configure Speed, Flow 1, Flow 2, Flow 3, Pressure 1, Pressure 2, Pump, Tank, Height sensors, Misc Analogue, Misc Digital, Alarm, Control port, Other, Specials.

Options (204)				
⬅				🗐
Back to the main screen	---	---	---	Edit settings

Sensor settings (205)				
⬅	L↔R			🗐
Back to the main screen	Select Left or Right boom	---	---	Go to the first sensor

Sensor settings (205) - Sensor selected				
⬅		OK	🗐	🗐
Back to the main screen	---	Conform setting	Go to the previous sensor	Go to the next sensor

Nozzle settings (206)				
⬅	L↔R			🗐
Back to the main screen	Select Left or Right boom	--	--	Go to first sensor, first nozzle

Nozzle settings (206) - Sensor selected				

⬅	🖌	OK	📄	📄
Back to the main screen	Select the nozzle	Confirm setting	Go to the previous sensor	Go to the next sensor

Speed calibration (207)				
⬅		OK	50m	100m
Back to the main screen	---	Confirm setting	Calibrate speed over 50m	Calibrate speed over 100m

Nozzle test (208)				
⬅	L↔R			📄
Back to the main screen	Select Left or Right boom	---	---	Go the first sensor

Nozzle test (208) - Sensor selected				
⬅	🖌	⏻	📄	📄
Back to the main screen	Next nozzle	Switch nozzle on or off	Go to the previous sensor	Go to the next sensor

Detector test (209)				
⬅	L↔R			📄
Back to the main screen	Select Left or Right boom	---	---	First sensor

Detector test (209) - Sensor selected				
⬅	🖌	⏻	▤	▤
Back to the main screen	Go to the next nozzle	Switch nozzle on or off	Go to the previous sensor	Go to the next sensor

Simulate fixed speed (210)				
⬅	1⬛	⏻	▤	▤
Back to the main screen	1m/s, 2m/s, 100% speed	Start / Stop fixed speed	Set smaller speed shortcut on F2 button	Set larger speed shortcut on F2 button

Speed sensor test (211)				
⬅	🔊			▤
Back to the main screen	Beep at pulse (left/right/ direction)	---	---	Next

Automatic configuration (212)				
⬅		OK	▤	▤
Back to the main screen	---	Confirm setting	Previous	Next

Margin presets (213)				
⬅		OK	▤	▤
Back to the main screen	---	Confirm setting	Back	Edit settings

Backup settings (214)				
←	⧉	⚙	▤	▤
Back to the main screen	Restore backup	Create backup	Previous	Next

Height sensors (216)				
←	L↔R			▤
Back to the main screen	Select Left or Right boom	---	---	Edit settings

Height sensors (216) – Sensor selected				
←	•••	OK	▤	▤
Back to the main screen	Switch functions of F3, F4 and F5 button	Confirm setting	Back	Next

Height sensors (216) – Sensor selected				
←	•••	↕	🔧	📊

Back to the main screen	Switch functions of F3 and F4 button	Set current height as nominal	Go to menu 203 tab 10	Activate the height histogram on the main screen

13. WEED-IT software information (User Manual)

This form needs to be filled in in every user manual to keep track of the firmware versions used.

First installation

Detection sensors	User console	Power Converter

Installation date   _____

Dealer   _____

Update

Detection sensors	User console	Power Converter

Installation date   _____

Dealer   _____

Update

Detection sensors	User console	Power Converter

Installation date   _____

Dealer   _____

14. Calibration settings form (User manual)

This section should be filled in after installation of the machine in the User manual of the customer.

14.1. 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   _____

14.2. Dealer menu configuration settings

14.2.1. Menu 200 Console and sensor information

Menu 200 Console and sensor information

Console serial _____

Sensor serial numbers:

Left Boom		Right boom	
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	

Left Boom		Right boom	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
16		16	
17		17	
18		18	
19		19	
20		20	
21		21	
22		22	
23		23	
24		24	

14.2.2. Menu 201 Power Supply Unit (PSU)

PSU serial _____

Orbus Brains CPU serial _____

14.2.3. Menu 203 Configuration

Speed

Unit   _____

Source   _____

Pulses   _____

Ideal   _____

Input   _____

Smooth   _____

```
┌─Dealer menu─┐        ⊡2/16  203
┌─Configure─┐┌─Speed─┐
→ Unit   : km/h        ← km/h
  Source: Speed
  Pulses: 400     p/hm
  Ideal :   8.33  m/s
  Input : 12V ↓
  Smooth: 8

  Ideal speed     : 29.99 km/h

  [←]  [___]  [ OK ]  [⬜] [⬜]
```
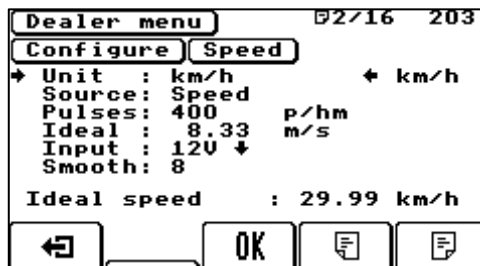
Check speed sensor functioning in menu 211.

Flow 1

Enable   _____

Pulses   _____

Pull   _____

Limits   _____

Smooth   _____

Interval   _____

```
┌─Dealer menu─┐        ⊡3/16  203
┌─Configure─┐┌─Flow 1─┐
→ Enable    : On       ← On
  Pulses    : 18 p/l
  Pull      : Up
  Limits ±  : 20 %
  Smooth    : 20 %
  Interval  : 10 m

  ! Flow compensation = OFF

  [←]  [___]  [ OK ]  [⬜] [⬜]
```

Flow 2/3

Role   _____

Pulses   _____

Pull   _____

```
┌─Dealer menu─┐        ⊡4/16  203
┌─Configure─┐┌─Flow 2─┐
→ Role   : Subtract  ← Subtract
  Pulses : 18 p/l
  Pull   : Up




  [←]  [___]  [ OK ]  [⬜] [⬜]
```
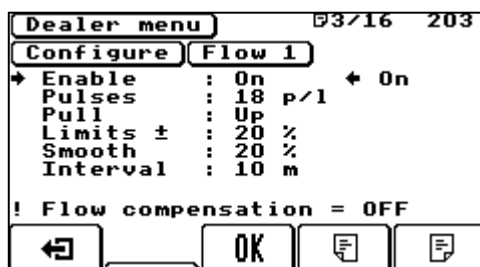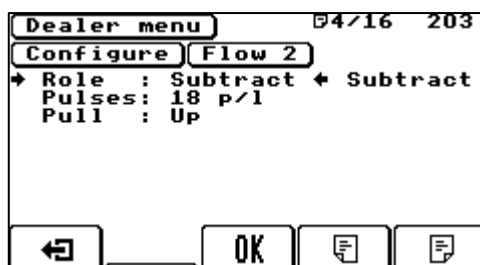
The setting 'Role' can be programmed as: OFF / On / Add / Subtract.

 'Add' means Flow 2 will be added to Flow 1

 'Subtract' 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 th 103 Job menu

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

Pressure 1

Role   _____

Nominal   _____

Limits±   _____

Cal.   _____

Offset   _____
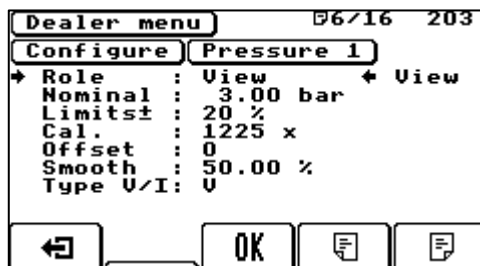
Smooth   _____

Type V/I   _____

Mostly, a pressure sensor is a voltage sensor (V), not a current sensor (I). Smooth is 50.00% by default.

Pressure 2

Role   _____

Nominal   _____

Limits±   _____

Cal.   _____

Offset   _____

Smooth   _____

Type V/I   _____
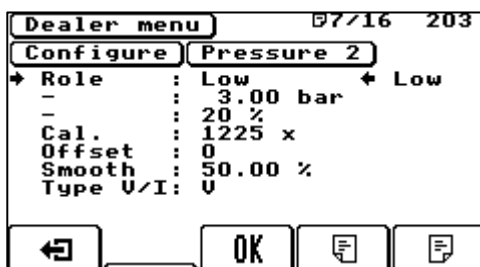
If the *Role* of Pressure 2 is *Low*, *High*, or *avg.*, then *Nominal* and *Cal.* cannot be adjusted. Their values are equal to those of Pressure 1. It is recommended to only use *OFF* or *View* as a role for pressure sensor 2.

Pump

Pump refers to the small ARB air compressor to supply air to the PAV valve. This

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

Enable   _____

Off in Hold   _____

Max on   _____

Delay   _____

```
┌─────────────────────────────────────┐
│ ┌─Dealer menu─┐      ▷8/16   203     │
│ ┌─Configure─┐┌─Pump─┐                │
│ →  Enable     : Auto   ← Auto        │
│    Off in HOLD : YES                 │
│    Max. on    : 180 s                │
│    Delay      : 20 s                 │
│                                      │
│                                      │
│   ┌───┐    ┌─────┐ ┌───┐ ┌───┐       │
│   │←┐ │    │ OK  │ │ ☰ │ │ ☰ │       │
│   └───┘    └─────┘ └───┘ └───┘       │
└─────────────────────────────────────┘
```
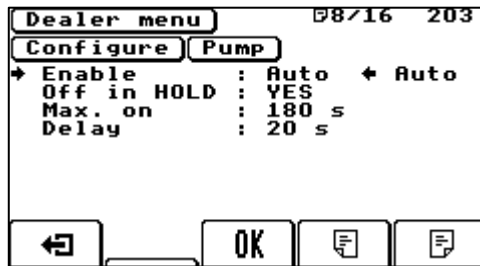
Height sensors

This menu is only applicable when the system has height sensors.

Enable   _____

Flush   _____

Flush at +   _____

Flush at -   _____

Window   _____

Smooth   _____

```
┌─────────────────────────────────┐
│ Dealer menu      🗎10/16  203    │
│ ┌Configure┐┌Height sensors┐      │
│ → Enable    : On       ← On      │
│   Flush     : (↑/↓)              │
│   Flush at ↑:  0.40  m           │
│   Flush at ↓:  0.40  m           │
│   Window    :  2.00  m           │
│   Smooth    : 50.00 %            │
│                                  │
│  ⏎    ⌐c    OK    🗐    🗐        │
└─────────────────────────────────┘
```
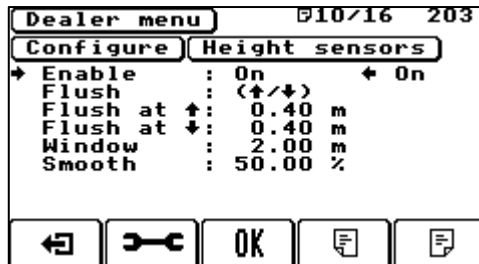
Alarm

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 ±   _____

```
┌─────────────────────────────────┐
│ Dealer menu      🗎13/16  203    │
│ ┌Configure┐┌Alarm┐               │
│ → Humidity ±    : 50 %   ← 50    │
│   Humidity +    : 80 %           │
│   Temperature ± : 21 °C          │
│                                  │
│                                  │
│  ⏎          OK    🗐    🗐        │
└─────────────────────────────────┘
```
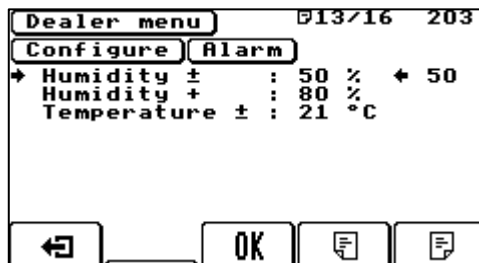
14.2.4. Menu 205 Sensor settings

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)
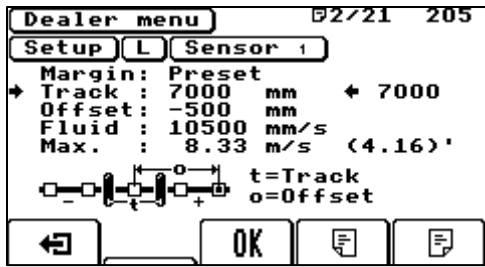
For offset per sensor, see below.
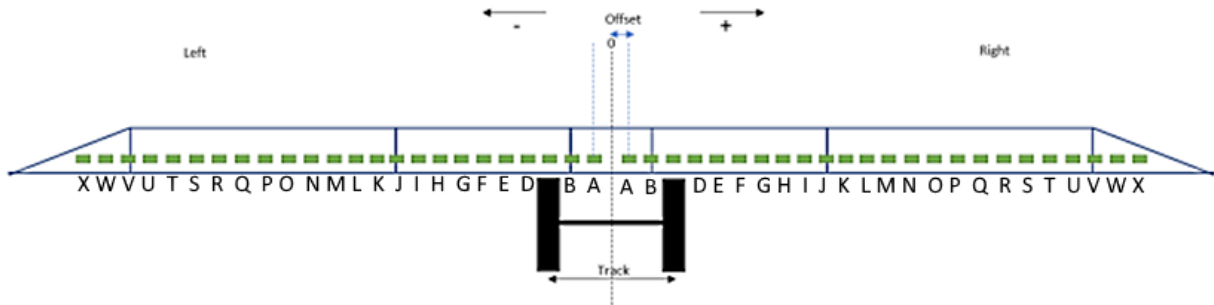
Menu 205 Offset settings (all in mm)

Left Boom		Right boom	
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	

Left Boom		Right boom	
14		14	
15		15	
16		16	
17		17	
18		18	
19		19	
20		20	
21		21	
22		22	
23		23	
24		24	

14.2.5. 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 parentheses is the ideal speed (programmed in menu's 104 and 203).

```
 Dealer menu)      2/21  206
 Setup)(L)(Sensor 1)(Nozzle 1)
 Height:   550  mm   ← 550
 Dist. :   600  mm
 Max.  :   8.33 m/s  (4.16)'

        ←  d  →  h   h=Height
                     d=Dist.
 ←|  1⊥  OK   □   □
```
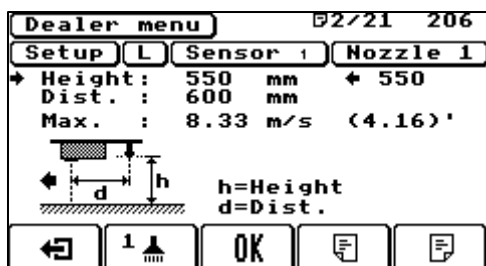
Left boom	Height [mm]	Distance [mm]	Right boom	Height [mm]	Distance [mm]
1			1		
2			2		
3			3		
4			4		

Left boom	Height [mm]	Distance [mm]	Right boom	Height [mm]	Distance [mm]
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		
13			13		
14			14		
15			15		
16			16		
17			17		
18			18		
19			19		
20			20		
21			21		
22			22		
23			23		
24			24		

14.2.6. Menu 213 Margin presets

Only applicable when menu 204-5 option 'user/wind margin' is enabled.

Preset 1 _____

Preset 2 _____

Preset 3 _____

Preset 4 _____

```
 Dealer menu        D2/2  213
 Margin presets
   Set 1 :  200    mm
   Set 2 :  235    mm
 + Set 3 :  270    mm      +270
   Set 4 :  300    mm

  [←]         [OK]  [▤]
```
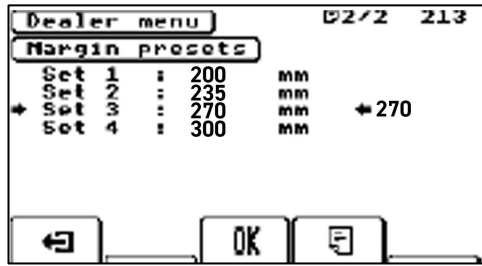
14.2.7. Menu 216 Height sensors

Only applicable when the system has height sensors. The maximum allowed number of height sensors is currently five.

Nominal Left-1   _____

Clearance Left-1   _____

Pulse Left 1   _____

Nominal Left-2   _____

Clearance Left-2   _____

Pulse Left 2   _____

Nominal Right-1   _____

Clearance Right-1   _____

Pulse Right 1   _____

Nominal Right-2   _____

Clearance Right-2   _____

Pulse Right 2   _____

Nominal Left-3   _____

Clearance Left-3   _____

Pulse Right 3   _____

```
Height sensor Right-22
→ Nominal   : 809    mm ←
  Clearance: 350    mm
  Pulse    : 150    µs
  Version  :  1.13
  Type     :  1
  Height   : 780    mm
 [←|]  [•••]  [OK]  [⊟]
```
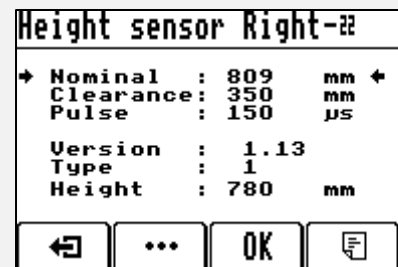
This WEED-IT Quadro system was configured and tested.

Date confirmed

15. Other manuals

15.1. Other manuals

Next to this dealer manual, there are other (technical) documents available.

Table 1 ISOBUS manuals

Part number	Description
47020060	ISOBUS manual set, WEED-IT Quadro
47020040	ISOBUS installation manual, WEED-IT Quadro
47020045	ISOBUS user manual, WEED-IT Quadro
47020050	ISOBUS update manual, WEED-IT Quadro
47020055	External I/O switch installation manual, WEED-IT Quadro

The ISOBUS manual set, WEED-IT Quadro (47020060) contains the four individual ISOBUS manuals.

Table 2 Other manuals

Part number	Description
47020065	Firmware upgrade manual, WEED-IT Quadro
47020070	BodoHeight installation manual, WEED-IT Quadro
47020075	AppNote for ext. RS232 communication, WEED-IT Quadro
47020030	WEED-IT Quadro PARTS LIST ENGLISH
Teams	WEED-IT Quadro Power Converter manual

For manuals and information that is not listed in this manual, please contact your supplier.

15.2. Available nozzles

Nozzle	100% Flow (l/min)	Pressure (bar)	Min flow (l/min)	Recommended spray mode	Available from	Nozzle body	Filler plug
Agrotop SF 40-03	1,18	3,00	0,28	Spot Spraying	4.00	Arag	No
Wilger SR 35-015	0,60	3,00	0,15	Spot Spraying	4.10	Wilger	No
Wilger SR 65-015	0,60	3,00	0,15	Dual Function / Full Coverage [1]	4.10	Wilger	No
Wilger MR 35-015	0,58	3,00	0,15	Spot Spraying	4.10	Wilger	No
Wilger MR 35-03	1,12	3,00	0,228	Spot Spraying	4.10	Wilger	No
Wilger MR 65-015	0,58	3,00	0,15	Dual Function / Full Coverage [1]	4.10	Wilger	No
Wilger MR 65-03	1,12	3,00	0,28	Dual Function / Full Coverage [1]	4.10	Wilger	No
Wilger SR 110-02	0,80	3,00	0,22	Full Coverage	4.10	Wilger	No
Wilger SR 110-025	1,02	3,00	0,25	Full Coverage	4.10	Wilger	No
Wilger SR 110-03	1,23	3,00	0,34	Full Coverage	4.10	Wilger	No
Wilger SR 110-04	1,51	3,00	0,38	Full Coverage	4.10	Wilger	No
Wilger SR 110-05	1,76	3,00	0,42	Full Coverage	4.10	Wilger	No

Nozzle	100% Flow (l/min)	Pressure (bar)	Min flow (l/min)	Recommended spray mode	Available from	Nozzle body	Filler plug
Wilger MR 110-02	0,78	3,00	0,21	Full Coverage	4.10	Wilger	No
Wilger MR 110-025	1,02	3,00	0,25	Full Coverage	4.10	Wilger	No
Wilger MR 110-03	1,12	3,00	0,30	Full Coverage	4.10	Wilger	No
Wilger MR 110-04	1,48	3,00	0,36	Full Coverage	4.10	Wilger	No
Wilger MR 110-05	1,86	3,00	0,48	Full Coverage	4.10	Wilger	No
TeeJet TP 25-02	0,76	3,00	0,18	Spot Spraying	4.12	Arag	Yes
TJ TP 25-02 HP	1,40	10,00	0,37	Spot Spraying	4.12	Arag	Yes
TeeJet TP 25-03	1,11	3,00	0,27	Spot Spraying	4.12	Arag	Yes
TJ TP 25-03 HP	2,02	10,00	0,55	Spot Spraying	4.12	Arag	Yes
TeeJet TP 25-04	1,46	3,00	0,34	Spot Spraying	4.12	Arag	Yes
TJ TP 25-04 HP	2,70	10,00	0,68	Spot Spraying	4.12	Arag	Yes
TeeJet TXA 80-015	0,56	3,00	0,15	Full Coverage [2]	4.12	Arag	Yes
TJ TXA 80-015 HP	1,00	10,00	0,25	Full Coverage [2]	4.12	Arag	Yes
TeeJet TXA 80-02	0,75	3,00	0,27	Full Coverage [2]	4.12	Arag	Yes

Nozzle	100% Flow (l/min)	Pressure (bar)	Min flow (l/min)	Recommended spray mode	Available from	Nozzle body	Filler plug
TJ TXA 80-02 HP	1,33	10,00	0,35	Full Coverage [2]	4.12	Arag	Yes
MagnoJet APS 60-03	1,18	3,00	0,29	Spot Spraying / Dual Function [3]	4.14	Arag	Yes
MagnoJet APS 30-03	1,14	3,00	0,30	Spot Spraying	4.14	Arag	Yes
TeeJet TP 40-03	1,13	3,00	0,29	Spot Spraying	4.14	Arag	Yes
TeeJet TP 40-04	1,46	3,00	0,36	Spot Spraying	4.14	Arag	Yes
TeeJet TP 80-08[4]	2,20	2,00	0,50	Full Coverage / Dual Function [4]	4.14	Special	No
Lechler IDK 80-02	0,75	3,00	0,21	Full Coverage / Dual Function [5]	4.14	Arag	Yes
Lechler IDK 80-03	1,12	3,00	0,26	Full Coverage / Dual Function [5]	4.14	Arag	Yes
BfS PulZar 100-03	1,20	3,00	0,31	Full Coverage / Dual Function	4.14	Wilger	No
TeeJet DG 65-055	1,98	3,00	0,50	Spot Spraying	4.15	Arag	Yes
TeeJet TG 3.5[6]	2,04	3,00	**1,00**	Spot Spraying	4.15	Arag	Yes
MagnoJet APS 30-02	0,77	3,00	0,20	Spot Spraying	4.15	Arag	Yes

Nozzle	100% Flow (l/min)	Pressure (bar)	Min flow (l/min)	Recommended spray mode	Available from	Nozzle body	Filler plug
TeeJet TP 40-02	0,77	3,00	0,20	Spot Spraying	4.16	Arag	No
TeeJet TXA 80-03	1,04	3,00	0,28	Full Coverage	4.16	Arag	Yes
TJ TTI 110-025	0,96	3,00	0,24	Full Coverage	4.16	Arag	No
Agrotop SF 40-04	1,49	3,00	0,39	Spot Spraying	4.16	Arag	No
Conventional[7]	1,15	3,00	-	FC - 100% open - No PWM	4.18	Arag	No
Magnojet MGA 40-01 NP[8]	0,39	3,00	0,10	Spot Spraying	4.18	Arag	No
Magnojet MGA 40-015 NP[8]	0,59	3,00	0,15	Spot Spraying	4.18	Arag	No
Magnojet APS 30-02 NP[8]	0,77	3,00	0,20	Spot Spraying	4.18	Arag	No

[1]) Be aware of sufficient overlap for Full coverage . This depends on boom height. Check the WEED-IT Quadro application rate calculations for full coverage for sufficient overlap or calculate/check it yourself.

[2]) Be aware that 80 degrees cones cannot be used with standard WEED-IT Quadro nozzle spacing of 25 cm. In that case, the cones will interfere, and a poor spray distribution will be the result. In cases this nozzle is used, the nozzle distance is decreased to 50 cm and the other solenoid valves are disabled. This can be done via the RS232 protocol with Section Control messages or physical by disconnecting half of the solenoid valves.

[3]) Be aware of sufficient overlap for Dual Function . This depends on boom height. Check the WEED-IT Quadro application rate calculations for full coverage for sufficient overlap or calculate/check it yourself.

[4]) **TeeJet TP 80-08** Special, high flow nozzle only for hot water weed applications with WEED-IT. A lower pressure is used and special solenoid valves. This nozzle should **NOT** be selected for Ag sprayers or other applications!

[5]) Added for the use of Full Coverage and Spot Spraying in orchard sprayers.

[6]) The TeeJet TG3.5 is not suitable to be used with PWM duty cycles < 50%. Low duty cycles result in a bad build-up of the spray cone. Be aware of this when using this nozzle.

[7]) Conventional nozzle is added to spray in Full Coverage mode like a traditional sprayer without PWM. Note that the flow and application rate indicated is based on an 03 nozzle as a nozzle size must be chosen to display l/ha.

[8]) 'NP' nozzles are specials added for PWM trials in South America

15.3. Nozzle flow rate charts

This paragraph contains nozzle flow charts of the following series:

Spot spraying nozzle series

- Agrotop SpotFan 40
- TeeJet TP 25
- TeeJet TP 40
- Magnojet APS 30
- Magnojet APS 60
- Magnojet MGA 40 (both with and without *NP* addition)
- Wilger SR 35
- Wilger SR 65
- Wilger MR 35
- Wilger MR 65
- TeeJet DG 55
- TeeJet TG

Full coverage nozzle series

- TeeJet TXA 80
- Wilger SR 110
- Wilger MR 110
- Lechler IDK 80
- BfS PulZar
- TeeJet TTI 110

Because of PWM technology, the flow rate charts contain application rate ranges from 25% duty cycle (DC) up to 100% DC. Ideally the set application rate percentage in menu 104 is 70-80%! The ranges are given for a series of different pressures (2-4 bar) and a series of driving speeds (5-25 km/h).

The nozzle flow rate charts for spot spraying nozzles contain application rate ranges for two or three different nozzle heights. As the spot spraying application rate is calculated as a band application, this gives a quick insight in the effect of nozzle height on the application rate. Many other combinations of settings are possible. To calculate the application rate with a different combination of settings, please refer to "Application rate calculations" page 217. The droplet size cells for nozzle types of which the droplet sizes were not available are left blank.

Indicated droplet sizes were provided by the nozzle manufacturer. The effect of PWM on droplet sizes and drift is not incorporated here.

Note: Dual function combines the cover and spot functionality and affect each other.

Agrotop SpotFan 40 series

NOTE: WEED-IT uses 25 cm nozzle spacing!

Application Rate Range (liters/hectare)
@ Speed (km/h)

Nozzle type	Pressure (bar)	Droplet size	Nozzle height (cm)	Flow (l/min) @ 100% DC	5	10	15	20	25	5 Full cover	10 Full cover	15 Full cover	20 Full cover	25 Full cover
SF 40-03	2		40	0,91	94 - 375	47 - 188	31 - 125	23 - 94	19 - 75	109 - 437	55 - 219	36 - 146	27 - 109	22 - 87
	2		50	0,91	75 - 300	38 - 150	25 - 100	19 - 75	15 - 60					
	2		60	0,91	63 - 250	31 - 125	21 - 83	16 - 63	13 - 50					
	2,5		40	1,02	105 - 420	52 - 210	35 - 140	26 - 105	21 - 84	122 - 489	61 - 244	41 - 163	31 - 122	24 - 98
	2,5		50	1,02	84 - 336	42 - 168	28 - 112	21 - 84	17 - 67					
	2,5		60	1,02	70 - 280	35 - 140	23 - 93	17 - 70	14 - 56					
	3		40	1,12	115 - 460	57 - 230	38 - 153	29 - 115	23 - 92	134 - 536	67 - 268	45 - 179	33 - 134	27 - 107
	3		50	1,12	92 - 368	46 - 184	31 - 123	23 - 92	18 - 74					
	3		60	1,12	77 - 307	38 - 153	26 - 102	19 - 77	15 - 61					
	3,5		40	1,21	124 - 497	62 - 248	41 - 166	31 - 124	25 - 99	145 - 578	72 - 289	48 - 193	36 - 145	29 - 116
	3,5		50	1,21	99 - 397	50 - 199	33 - 132	25 - 99	20 - 79					
	3,5		60	1,21	83 - 331	41 - 166	28 - 110	21 - 83	17 - 66					
	4		40	1,29	133 - 531	66 - 265	44 - 177	33 - 133	27 - 106	155 - 618	77 - 309	52 - 206	39 - 155	31 - 124
	4		50	1,29	106 - 425	53 - 212	35 - 142	27 - 106	21 - 85					
	4		60	1,29	88 - 354	44 - 177	29 - 118	22 - 88	18 - 71					
SF 40-04	2		40	1,22	125 - 501	63 - 251	42 - 167	31 - 125	25 - 100	146 - 584	73 - 292	49 - 195	36 - 146	29 - 117
	2		50	1,22	100 - 401	50 - 201	33 - 134	25 - 100	20 - 80					
	2		60	1,22	84 - 334	42 - 167	28 - 111	21 - 84	17 - 67					
	2,5		40	1,36	140 - 561	70 - 280	47 - 187	35 - 140	28 - 112	163 - 653	82 - 326	54 - 218	41 - 163	33 - 131
	2,5		50	1,36	112 - 448	56 - 224	37 - 149	28 - 112	22 - 90					
	2,5		60	1,36	93 - 374	47 - 187	31 - 125	23 - 93	19 - 75					
	3		40	1,49	154 - 614	77 - 307	51 - 205	38 - 154	31 - 123	179 - 715	89 - 358	60 - 238	45 - 179	36 - 143
	3		50	1,49	123 - 491	61 - 246	41 - 164	31 - 123	25 - 98					
	3		60	1,49	102 - 409	51 - 205	34 - 136	26 - 102	20 - 82					
	3,5		40	1,61	166 - 663	83 - 332	55 - 221	41 - 166	33 - 133	199 - 773	97 - 386	64 - 258	48 - 193	39 - 155
	3,5		50	1,61	133 - 531	66 - 265	44 - 177	33 - 133	27 - 106					
	3,5		60	1,61	111 - 442	55 - 221	37 - 147	28 - 111	22 - 88					
	4		40	1,72	177 - 709	89 - 355	59 - 236	44 - 177	35 - 142	206 - 826	103 - 413	69 - 275	52 - 206	41 - 165
	4		50	1,72	142 - 567	71 - 284	47 - 189	35 - 142	28 - 113					
	4		60	1,72	118 - 473	59 - 236	39 - 158	30 - 118	24 - 95					

TP 25 series

NOTE: WEED-IT uses 25 cm nozzle spacing!

Application Rate Range (liters/hectare)
@ Speed (km/h)

Nozzle type	Pressure (bar)	Droplet size	Nozzle height (cm)	Flow (l/min) @ 100% DC	5	10	15	20	25	5 Full cover	10 Full cover	15 Full cover	20 Full cover	25 Full cover
TP 25-02	2	F	60	0,63	71 - 283	35 - 141	24 - 94	18 - 71	14 - 57	75 - 301	38 - 150	25 - 100	19 - 75	15 - 60
	2	F	70	0,63	61 - 242	30 - 121	20 - 81	15 - 61	12 - 48					
	2	F	80	0,63	53 - 212	27 - 106	18 - 71	13 - 53	11 - 42					
	2,5	F	60	0,70	79 - 316	40 - 158	26 - 105	20 - 79	16 - 63	84 - 337	42 - 168	28 - 112	21 - 84	17 - 67
	2,5	F	70	0,70	68 - 271	34 - 136	23 - 90	17 - 68	14 - 54					
	2,5	F	80	0,70	59 - 237	30 - 119	20 - 79	15 - 59	12 - 47					
	3	F	60	0,77	87 - 346	43 - 173	29 - 115	22 - 87	17 - 69	92 - 369	46 - 184	31 - 123	23 - 92	18 - 74
	3	F	70	0,77	74 - 297	37 - 148	25 - 99	19 - 74	15 - 59					
	3	F	80	0,77	65 - 260	32 - 130	22 - 87	16 - 65	13 - 52					
	3,5	F	60	0,83	94 - 374	47 - 187	31 - 125	23 - 94	19 - 75	100 - 398	50 - 199	33 - 133	25 - 100	20 - 80
	3,5	F	70	0,83	80 - 321	40 - 160	27 - 107	20 - 80	16 - 64					
	3,5	F	80	0,83	70 - 281	35 - 140	23 - 94	18 - 70	14 - 56					
	4	F	60	0,89	100 - 400	50 - 200	33 - 133	25 - 100	20 - 80	106 - 426	53 - 213	35 - 142	27 - 106	21 - 85
	4	F	70	0,89	86 - 343	43 - 171	29 - 114	21 - 86	17 - 69					
	4	F	80	0,89	75 - 300	38 - 150	25 - 100	19 - 75	15 - 60					
TP 25-03	2	F	60	0,91	102 - 408	51 - 204	34 - 136	26 - 102	20 - 82	109 - 435	54 - 217	36 - 145	27 - 109	22 - 87
	2	F	70	0,91	88 - 350	44 - 175	29 - 117	22 - 88	18 - 70					
	2	F	80	0,91	77 - 306	38 - 153	26 - 102	19 - 77	15 - 61					
	2,5	F	60	1,01	114 - 457	57 - 228	38 - 152	29 - 114	23 - 91	121 - 486	61 - 243	40 - 162	30 - 121	24 - 97
	2,5	F	70	1,01	98 - 391	49 - 196	33 - 130	24 - 98	20 - 78					
	2,5	F	80	1,01	86 - 342	43 - 171	29 - 114	21 - 86	17 - 68					
	3	F	60	1,11	125 - 500	63 - 250	42 - 167	31 - 125	25 - 100	133 - 532	67 - 266	44 - 177	33 - 133	27 - 106
	3	F	70	1,11	107 - 429	54 - 214	36 - 143	27 - 107	21 - 86					
	3	F	80	1,11	94 - 375	47 - 188	31 - 125	23 - 94	19 - 75					
	3,5	F	60	1,20	135 - 540	68 - 270	45 - 180	34 - 135	27 - 108	144 - 575	72 - 287	48 - 192	36 - 144	29 - 115
	3,5	F	70	1,20	116 - 463	58 - 232	39 - 154	29 - 116	23 - 93					
	3,5	F	80	1,20	101 - 405	51 - 203	34 - 135	25 - 101	20 - 81					
	4	F	60	1,28	144 - 578	72 - 289	48 - 193	36 - 144	29 - 116	154 - 615	77 - 307	51 - 205	38 - 154	31 - 123
	4	F	70	1,28	124 - 495	62 - 248	41 - 165	31 - 124	25 - 99					
	4	F	80	1,28	108 - 433	54 - 217	36 - 144	27 - 108	22 - 87					

NOTE: WEED-IT uses 25 cm nozzle spacing!

Application Rate Range (liters/hectare)

@ Speed (km/h)

Nozzle type	Pressure (bar)	Droplet size	height (cm)	Flow (l/min) @ 100% DC	5	10	15	20	25	5 Full cover	10 Full cover	15 Full cover	20 Full cover	25 Full cover
TP 25-04	2	M	60	1,20	135 - 540	67 - 270	45 - 180	34 - 135	27 - 108	144 - 574	72 - 287	48 - 191	36 - 144	29 - 115
	2	M	70	1,20	116 - 462	58 - 231	39 - 154	29 - 116	23 - 92					
	2	M	80	1,20	101 - 405	51 - 202	34 - 135	25 - 101	20 - 81					
	2,5	M	60	1,34	151 - 603	75 - 302	50 - 201	38 - 151	30 - 121	160 - 642	80 - 321	53 - 214	40 - 160	32 - 128
	2,5	M	70	1,34	129 - 517	65 - 259	43 - 172	32 - 129	26 - 103					
	2,5	M	80	1,34	113 - 452	57 - 226	38 - 151	28 - 113	23 - 90					
	3	M	60	1,47	165 - 661	83 - 330	55 - 220	41 - 165	33 - 132	176 - 703	88 - 352	59 - 234	44 - 176	35 - 141
	3	M	70	1,47	142 - 566	71 - 283	47 - 189	35 - 142	28 - 113					
	3	M	80	1,47	124 - 496	62 - 248	41 - 165	31 - 124	25 - 99					
	3,5	F	60	1,20	178 - 714	89 - 357	59 - 238	45 - 178	36 - 143	190 - 760	95 - 380	63 - 253	47 - 190	38 - 152
	3,5	F	70	1,58	153 - 612	76 - 306	51 - 204	38 - 153	31 - 122					
	3,5	F	80	1,58	134 - 535	67 - 268	45 - 178	33 - 134	27 - 107					
	4	F	60	1,69	191 - 763	95 - 382	64 - 254	48 - 191	38 - 153	203 - 812	101 - 406	68 - 271	51 - 203	41 - 162
	4	F	70	1,69	164 - 654	82 - 327	55 - 218	41 - 164	33 - 131					
	4	F	80	1,69	143 - 572	72 - 286	48 - 191	36 - 143	29 - 114					

TP 40 series

NOTE: WEED-IT uses 25 cm nozzle spacing!

Application Rate Range (liters/hectare)

Nozzle type	Pressure (bar)	Droplet size	Nozzle height (cm)	Flow (l/min) @ 100% DC	@ Speed (km/h) 5	10	15	20	25	5 Full cover	10 Full cover	15 Full cover	20 Full cover	25 Full cover
TP 40-02	2	F	40	0,63	65 - 259	32 - 130	22 - 86	16 - 65	13 - 52					
	2	F	50	0,63	52 - 208	26 - 104	17 - 69	13 - 52	10 - 42	76-302	38-151	25-101	19-76	15-60
	2	F	60	0,63	43 - 173	22 - 86	14 - 58	11 - 43	9 - 35					
	2,5	F	40	0,70	73 - 290	36 - 145	24 - 97	18 - 73	15 - 58					
	2,5	F	50	0,70	58 - 232	29 - 116	19 - 77	15 - 58	12 - 46	84-338	42-169	28-113	21-84	17-68
	2,5	F	60	0,70	48 - 193	24 - 97	16 - 64	12 - 48	10 - 39					
	3	F	40	0,77	79 - 318	40 - 159	26 - 106	20 - 79	16 - 64					
	3	F	50	0,77	64 - 254	32 - 127	21 - 85	16 - 64	13 - 51	93-370	46-185	31-123	23-93	19-74
	3	F	60	0,77	53 - 212	26 - 106	18 - 71	13 - 53	11 - 42					
	3,5	F	40	0,83	86 - 343	43 - 172	29 - 114	21 - 86	17 - 69					
	3,5	F	50	0,83	69 - 275	34 - 137	23 - 92	17 - 69	14 - 55	100-400	50-200	33-133	25-100	20-80
	3,5	F	60	0,83	57 - 229	29 - 114	19 - 76	14 - 57	11 - 46					
	4	F	40	0,89	92 - 367	46 - 183	31 - 122	23 - 92	18 - 73					
	4	F	50	0,89	73 - 294	37 - 147	24 - 98	18 - 73	15 - 59	107-427	53-214	36-142	27-107	21-85
	4	F	60	0,89	61 - 245	31 - 122	20 - 82	15 - 61	12 - 49					
TP 40-03	2	F	40	0,92	95 - 380	48 - 190	32 - 127	24 - 95	19 - 76					
	2	F	50	0,92	76 - 304	38 - 152	25 - 101	19 - 76	15 - 61	111-443	55-221	37-148	28-111	22-89
	2	F	60	0,92	63 - 253	32 - 127	21 - 84	16 - 63	13 - 51					
	2,5	F	40	1,03	106 - 425	53 - 213	35 - 142	27 - 106	21 - 85					
	2,5	F	50	1,03	85 - 340	43 - 170	28 - 113	21 - 85	17 - 68	124-495	62-248	41-165	31-124	25-99
	2,5	F	60	1,03	71 - 283	35 - 142	24 - 94	18 - 71	14 - 57					
	3	F	40	1,13	116 - 466	58 - 233	39 - 155	29 - 116	23 - 93					
	3	F	50	1,13	93 - 373	47 - 186	31 - 124	23 - 93	19 - 75	136-542	68-271	45-181	34-136	27-108
	3	F	60	1,13	78 - 310	39 - 155	26 - 103	19 - 78	16 - 62					
	3,5	F	40	1,22	126 - 503	63 - 252	42 - 168	31 - 126	25 - 101					
	3,5	F	50	1,22	101 - 402	50 - 201	34 - 134	25 - 101	20 - 80	146-586	73-293	49-195	37-146	29-117
	3,5	F	60	1,22	84 - 335	42 - 168	28 - 112	21 - 84	17 - 67					
	4	F	40	1,30	134 - 538	67 - 269	45 - 179	34 - 134	27 - 108					
	4	F	50	1,30	108 - 430	54 - 215	36 - 143	27 - 108	22 - 86	157-626	78-313	52-209	39-157	31-125
	4	F	60	1,30	90 - 358	45 - 179	30 - 119	22 - 90	18 - 72					

NOTE: WEED-IT uses 25 cm nozzle spacing!   **Application Rate Range (liters/hectare)**

@ Speed (km/h)

Nozzle type	Pressure (bar)	Droplet size	Nozzle height (cm)	Flow (l/min) @ 100% DC	5	10	15	20	25	5 Full cover	10 Full cover	15 Full cover	20 Full cover	25 Full cover
TP 40-04	2	M	40	1,19	123 - 491	61 - 245	41 - 164	31 - 123	25 - 98	148 - 571	71 - 286	48 - 190	36 - 143	29 - 114
	2	M	50	1,19	98 - 392	49 - 196	33 - 131	25 - 98	20 - 78					
	2	M	60	1,19	82 - 327	41 - 164	27 - 109	20 - 82	16 - 65					
	2,5	M	40	1,33	137 - 549	69 - 274	46 - 183	34 - 137	27 - 110	160 - 639	80 - 319	53 - 213	40 - 160	32 - 128
	2,5	M	50	1,33	110 - 439	55 - 219	37 - 146	27 - 110	22 - 88					
	2,5	M	60	1,33	91 - 366	46 - 183	30 - 122	23 - 91	18 - 73					
	3	M	40	1,46	150 - 601	75 - 300	50 - 200	38 - 150	30 - 120	175 - 700	87 - 350	58 - 233	44 - 175	35 - 140
	3	M	50	1,46	120 - 481	60 - 240	40 - 160	30 - 120	24 - 96					
	3	M	60	1,46	100 - 401	50 - 200	33 - 134	25 - 100	20 - 80					
	3,5	F	40	1,57	162 - 649	81 - 325	54 - 216	41 - 162	32 - 130	189 - 756	94 - 378	63 - 252	47 - 189	38 - 151
	3,5	F	50	1,57	130 - 519	65 - 260	43 - 173	32 - 130	26 - 104					
	3,5	F	60	1,57	108 - 433	54 - 216	36 - 144	27 - 108	22 - 87					
	4	F	40	1,68	173 - 694	87 - 347	58 - 231	43 - 173	35 - 139	202 - 808	101 - 404	67 - 269	51 - 202	40 - 162
	4	F	50	1,68	139 - 555	69 - 278	46 - 185	35 - 139	28 - 111					
	4	F	60	1,68	116 - 463	58 - 231	39 - 154	29 - 116	23 - 93					

Magnojet APS 30 series

NOTE: WEED-IT uses 25 cm nozzle spacing!

Application Rate Range (liters/hectare)

Nozzle type	Pressure (bar)	Droplet size	Nozzle height (cm)	Flow (l/min) @ 100% DC	@ Speed (km/h) 5	10	15	20	25	5 Full cover	10 Full cover	15 Full cover	20 Full cover	25 Full cover
APS 30-02	2	F	50	0,63	71 - 283	35 - 142	24 - 94	18 - 71	14 - 57					
	2	F	60	0,63	59 - 236	29 - 118	20 - 79	15 - 59	12 - 47	76 - 303	38 - 152	25 - 101	19 - 76	15 - 61
	2	F	70	0,63	51 - 202	25 - 101	17 - 67	13 - 51	10 - 40					
	2,5	F	50	0,71	79 - 316	40 - 158	26 - 105	20 - 79	16 - 63					
	2,5	F	60	0,71	66 - 264	33 - 132	22 - 88	16 - 66	13 - 53	85 - 339	42 - 170	28 - 113	21 - 85	17 - 68
	2,5	F	70	0,71	57 - 226	28 - 113	19 - 75	14 - 57	11 - 45					
	3	F	50	0,77	87 - 347	43 - 173	29 - 116	22 - 87	17 - 69					
	3	F	60	0,77	72 - 289	36 - 144	24 - 96	18 - 72	14 - 58	93 - 372	46 - 186	31 - 124	23 - 93	19 - 74
	3	F	70	0,77	62 - 248	31 - 124	21 - 83	15 - 62	12 - 50					
	3,5	F	50	0,84	94 - 374	47 - 187	31 - 125	23 - 94	19 - 75					
	3,5	F	60	0,84	78 - 312	39 - 156	26 - 104	20 - 78	16 - 62	100 - 401	50 - 201	33 - 134	25 - 100	20 - 80
	3,5	F	70	0,84	67 - 267	33 - 134	22 - 89	17 - 67	13 - 53					
	4	F	50	0,89	100 - 400	50 - 200	33 - 133	25 - 100	20 - 80					
	4	F	60	0,89	83 - 334	42 - 167	28 - 111	21 - 83	17 - 67	107 - 429	54 - 214	36 - 143	27 - 107	21 - 86
	4	F	70	0,89	71 - 286	36 - 143	24 - 95	18 - 71	14 - 57					
APS 30-03	2	M	50	0,96	108 - 431	54 - 216	36 - 144	27 - 108	22 - 86					
	2	M	60	0,96	90 - 359	45 - 180	30 - 120	22 - 90	18 - 72	116 - 462	58 - 231	39 - 154	29 - 116	23 - 92
	2	M	70	0,96	77 - 308	38 - 154	26 - 103	19 - 77	15 - 62					
	2,5	M	50	1,08	121 - 482	60 - 241	40 - 161	30 - 121	24 - 96					
	2,5	M	60	1,08	100 - 402	50 - 201	33 - 134	25 - 100	20 - 80	129 - 517	65 - 258	43 - 172	32 - 129	26 - 103
	2,5	M	70	1,08	86 - 344	43 - 172	29 - 115	22 - 86	17 - 69					
	3	F	50	1,18	132 - 528	66 - 264	44 - 176	33 - 132	26 - 106					
	3	F	60	1,18	110 - 440	55 - 220	37 - 147	28 - 110	22 - 88	141 - 566	71 - 283	47 - 189	35 - 141	28 - 113
	3	F	70	1,18	94 - 377	47 - 189	31 - 126	24 - 94	19 - 75					
	3,5	F	50	1,27	143 - 570	71 - 285	48 - 190	36 - 143	29 - 114					
	3,5	F	60	1,27	119 - 475	59 - 238	40 - 158	30 - 119	24 - 95	153 - 611	76 - 306	51 - 204	38 - 153	31 - 122
	3,5	F	70	1,27	102 - 407	51 - 204	34 - 136	25 - 102	20 - 81					
	4	F	50	1,36	152 - 610	76 - 305	51 - 203	38 - 152	30 - 122					
	4	F	60	1,36	127 - 508	64 - 254	42 - 169	32 - 127	25 - 102	163 - 653	82 - 327	54 - 218	41 - 163	33 - 131
	4	F	70	1,36	109 - 435	54 - 218	36 - 145	27 - 109	22 - 87					

Magnojet APS 60 series

NOTE: WEED-IT uses 25 cm nozzle spacing!

Application Rate Range (liters/hectare)
@ Speed (km/h)

Nozzle type	Pressure (bar)	Droplet size	Nozzle height (cm)	Flow (l/min) @ 100% DC	5	10	15	20	25	5 Full cover	10 Full cover	15 Full cover	20 Full cover	25 Full cover
APS 60-03	2	M	30	0,91	79 - 315	39 - 158	26 - 105	20 - 79	16 - 63	109 - 437	55 - 218	36 - 146	27 - 109	22 - 87
	2	M	40	0,91	59 - 236	30 - 118	20 - 79	15 - 59	12 - 47					
	2,5	M	30	1,02	88 - 352	44 - 176	29 - 117	22 - 88	18 - 70	122 - 488	61 - 244	41 - 163	31 - 122	24 - 98
	2,5	M	40	1,02	66 - 264	33 - 132	22 - 88	17 - 66	13 - 53					
	3	F	30	1,11	96 - 386	48 - 193	32 - 129	24 - 96	19 - 77	134 - 535	67 - 267	45 - 178	33 - 134	27 - 107
	3	F	40	1,11	72 - 289	36 - 145	24 - 96	18 - 72	14 - 58					
	3,5	F	30	1,20	104 - 417	52 - 208	35 - 139	26 - 104	21 - 83	144 - 578	72 - 289	48 - 193	36 - 144	29 - 116
	3,5	F	40	1,20	78 - 313	39 - 156	26 - 104	20 - 78	16 - 63					
	4	F	30	1,29	111 - 446	56 - 223	37 - 149	28 - 111	22 - 89	154 - 617	77 - 309	51 - 206	39 - 154	31 - 123
	4	F	40	1,29	84 - 334	42 - 167	28 - 111	21 - 84	17 - 67					

Wilger SR 35 series

NOTE: WEED-IT uses 25 cm nozzle spacing!

Application Rate Range (liters/hectare)

@ Speed (km/h)

Nozzle type	Pressure (bar)	Droplet size	Nozzle height (cm)	Flow (l/min) @ 100% DC	5	10	15	20	25	5 Full cover	10 Full cover	15 Full cover	20 Full cover	25 Full cover
SR 35-015	2	M	40	0,49	58 - 233	29 - 117	19 - 78	15 - 58	12 - 47	59 - 236	29 - 118	20 - 79	15 - 59	12 - 47
	2	M	50	0,49	47 - 187	23 - 93	16 - 62	12 - 47	9 - 37					
	2	M	60	0,49	39 - 156	19 - 78	13 - 52	10 - 39	8 - 31					
	2,5	F	40	0,55	65 - 261	33 - 131	22 - 87	16 - 65	13 - 52	66 - 263	33 - 132	22 - 88	16 - 66	13 - 53
	2,5	F	50	0,55	52 - 209	26 - 104	17 - 70	13 - 52	10 - 42					
	2,5	F	60	0,55	44 - 174	22 - 87	15 - 58	11 - 44	9 - 35					
	3	F	40	0,60	71 - 286	36 - 143	24 - 95	18 - 71	14 - 57	72 - 288	36 - 144	24 - 96	18 - 72	14 - 58
	3	F	50	0,60	57 - 229	29 - 114	19 - 76	14 - 57	11 - 46					
	3	F	60	0,60	48 - 191	24 - 95	16 - 64	12 - 48	10 - 38					
	3,5	F	40	0,65	77 - 309	39 - 154	26 - 103	19 - 77	15 - 62	78 - 312	39 - 156	26 - 104	19 - 78	16 - 62
	3,5	F	50	0,65	62 - 247	31 - 124	21 - 82	15 - 62	12 - 49					
	3,5	F	60	0,65	51 - 206	26 - 103	17 - 69	13 - 51	10 - 41					
	4	F	40	0,69	83 - 330	41 - 165	28 - 110	21 - 83	17 - 66	83 - 333	42 - 167	28 - 111	21 - 83	17 - 67
	4	F	50	0,69	66 - 264	33 - 132	22 - 88	17 - 66	13 - 53					
	4	F	60	0,69	55 - 220	28 - 110	18 - 73	14 - 55	11 - 44					

Wilger SR 65 series

NOTE: WEED-IT uses 25 cm nozzle spacing!

Application Rate Range (liters/hectare)

@ Speed (km/h)

Nozzle type	Pressure (bar)	Droplet size	Nozzle height (cm)	Flow (l/min) @ 100% DC	5	10	15	20	25	5 Full cover	10 Full cover	15 Full cover	20 Full cover	25 Full cover
SR 65-015	2	M	20	0,49	58 - 231	29 - 116	19 - 77	14 - 58	12 - 46	59 - 236	29 - 118	20 - 79	15 - 59	12 - 47
	2	M	30	0,49	39 - 154	19 - 77	13 - 51	10 - 39	8 - 31					
	2	M	40	0,49	29 - 116	14 - 58	10 - 39	7 - 29	6 - 23					
	2,5	F	20	0,55	65 - 258	32 - 129	22 - 86	16 - 65	13 - 52	66 - 263	33 - 132	22 - 88	16 - 66	13 - 53
	2,5	F	30	0,55	43 - 172	22 - 86	14 - 57	11 - 43	9 - 34					
	2,5	F	40	0,55	32 - 129	16 - 65	11 - 43	8 - 32	6 - 26					
	3	F	20	0,60	71 - 283	35 - 142	24 - 94	18 - 71	14 - 57	72 - 288	36 - 144	24 - 96	18 - 72	14 - 58
	3	F	30	0,60	47 - 189	24 - 94	16 - 63	12 - 47	9 - 38					
	3	F	40	0,60	35 - 142	18 - 71	12 - 47	9 - 35	7 - 28					
	3,5	F	20	0,65	76 - 306	38 - 153	25 - 102	19 - 76	15 - 61	78 - 312	39 - 156	26 - 104	19 - 78	16 - 62
	3,5	F	30	0,65	51 - 204	25 - 102	17 - 68	13 - 51	10 - 41					
	3,5	F	40	0,65	38 - 153	19 - 76	13 - 51	10 - 38	8 - 31					
	4	F	20	0,69	82 - 327	41 - 163	27 - 109	20 - 82	16 - 65	83 - 333	42 - 167	28 - 111	21 - 83	17 - 67
	4	F	30	0,69	54 - 218	27 - 109	18 - 73	14 - 54	11 - 44					
	4	F	40	0,69	41 - 163	20 - 82	14 - 54	10 - 41	8 - 33					

Wilger MR 35 series

NOTE: WEED-IT uses 25 cm nozzle spacing!

Application Rate Range (liters/hectare)

Nozzle type	Pressure (bar)	Droplet size	Nozzle height (cm)	Flow (l/min) @ 100% DC	5	10	15	20	25	5 Full cover	10 Full cover	15 Full cover	20 Full cover	25 Full cover
MR 35-015	2	C	40	0,48	57 - 226	28 - 113	19 - 75	14 - 57	11 - 45	57 - 228	29 - 114	19 - 76	14 - 57	11 - 46
	2	C	50	0,48	45 - 181	23 - 90	15 - 60	11 - 45	9 - 36					
	2	C	60	0,48	38 - 151	19 - 75	13 - 50	9 - 38	8 - 30					
	2,5	C	40	0,53	63 - 253	32 - 126	21 - 84	16 - 63	13 - 51	64 - 255	32 - 128	21 - 85	16 - 64	13 - 51
	2,5	C	50	0,53	51 - 202	25 - 101	17 - 67	13 - 51	10 - 40					
	2,5	C	60	0,53	42 - 169	21 - 84	14 - 56	11 - 42	8 - 34					
	3	C	40	0,58	69 - 277	35 - 138	23 - 92	17 - 69	14 - 55	70 - 279	35 - 140	23 - 93	17 - 70	14 - 56
	3	M	50	0,58	55 - 222	28 - 111	18 - 74	14 - 55	11 - 44					
	3	M	60	0,58	46 - 185	23 - 92	15 - 62	12 - 46	9 - 37					
	3,5	M	40	0,63	75 - 299	37 - 150	25 - 100	19 - 75	15 - 60	75 - 302	38 - 151	25 - 101	19 - 75	15 - 60
	3,5	M	50	0,63	60 - 239	30 - 120	20 - 80	15 - 60	12 - 48					
	3,5	M	60	0,63	50 - 199	25 - 100	17 - 66	12 - 50	10 - 40					
	4	M	40	0,67	80 - 320	40 - 160	27 - 107	20 - 80	16 - 64	81 - 323	40 - 161	27 - 108	20 - 81	16 - 65
	4	M	50	0,67	64 - 256	32 - 128	21 - 85	16 - 64	13 - 51					
	4	M	60	0,67	53 - 213	27 - 107	18 - 71	13 - 53	11 - 43					
MR 35-03	2	VC	40	0,91	109 - 435	54 - 218	36 - 145	27 - 109	22 - 87	110 - 439	55 - 219	37 - 146	27 - 110	22 - 88
	2	VC	50	0,91	87 - 348	44 - 174	29 - 116	22 - 87	17 - 70					
	2	VC	60	0,91	73 - 290	36 - 145	24 - 97	18 - 73	15 - 58					
	2,5	VC	40	1,02	122 - 486	61 - 243	41 - 162	30 - 122	24 - 97	123 - 491	61 - 245	41 - 164	31 - 123	25 - 98
	2,5	VC	50	1,02	97 - 389	49 - 195	32 - 130	24 - 97	19 - 78					
	2,5	VC	60	1,02	81 - 324	41 - 162	27 - 108	20 - 81	16 - 65					
	3	C	40	1,12	133 - 533	67 - 266	44 - 178	33 - 133	27 - 107	134 - 538	67 - 269	45 - 179	34 - 134	27 - 108
	3	C	50	1,12	107 - 426	53 - 213	36 - 142	27 - 107	21 - 85					
	3	C	60	1,12	89 - 355	44 - 178	30 - 118	22 - 89	18 - 71					
	3,5	C	40	1,21	144 - 576	72 - 288	48 - 192	36 - 144	29 - 115	145 - 581	73 - 290	48 - 194	36 - 145	29 - 116
	3,5	C	50	1,21	115 - 460	58 - 230	38 - 153	29 - 115	23 - 92					
	3,5	C	60	1,21	96 - 384	48 - 192	32 - 128	24 - 96	19 - 77					
	4	C	40	1,29	154 - 615	77 - 308	51 - 205	38 - 154	31 - 123	155 - 621	78 - 310	52 - 207	39 - 155	31 - 124
	4	C	50	1,29	123 - 492	62 - 246	41 - 164	31 - 123	25 - 98					
	4	C	60	1,29	103 - 410	51 - 205	34 - 137	26 - 103	21 - 82					

Wilger MR 65 series

NOTE: WEED-IT uses 25 cm nozzle spacing!

Application Rate Range (liters/hectare)
@ Speed (km/h)

Nozzle type	Pressure (bar)	Droplet size	Nozzle height (cm)	Flow (l/min) @ 100% DC	5	10	15	20	25	5 Full cover	10 Full cover	15 Full cover	20 Full cover	25 Full cover
MR 65-015	2	C	40	0,47	28 - 112	14 - 56	9 - 37	7 - 28	6 - 22	57 - 227	28 - 114	19 - 76	14 - 57	11 - 45
	2	C	50	0,47	22 - 89	11 - 45	7 - 30	6 - 22	4 - 18					
	2	C	60	0,47	19 - 74	9 - 37	6 - 25	5 - 19	4 - 15					
	2,5	C	40	0,53	31 - 125	16 - 62	10 - 42	8 - 31	6 - 25	64 - 254	32 - 127	21 - 85	16 - 64	13 - 51
	2,5	C	50	0,53	25 - 100	12 - 50	8 - 33	6 - 25	5 - 20					
	2,5	C	60	0,53	21 - 83	10 - 42	7 - 28	5 - 21	4 - 17					
	3	C	40	0,58	34 - 137	17 - 68	11 - 46	9 - 34	7 - 27	70 - 278	35 - 139	23 - 93	17 - 70	14 - 56
	3	M	50	0,58	27 - 109	14 - 55	9 - 36	7 - 27	5 - 22					
	3	M	60	0,58	23 - 91	11 - 46	8 - 30	6 - 23	5 - 18					
	3,5	M	40	0,63	37 - 148	18 - 74	12 - 49	9 - 37	7 - 30	75 - 301	38 - 150	25 - 100	19 - 75	15 - 60
	3,5	M	50	0,63	30 - 118	15 - 59	10 - 39	7 - 30	6 - 24					
	3,5	M	60	0,63	25 - 98	12 - 49	8 - 33	6 - 25	5 - 20					
	4	M	40	0,67	39 - 158	20 - 79	13 - 53	10 - 39	8 - 32	80 - 321	40 - 161	27 - 107	20 - 80	16 - 64
	4	M	50	0,67	32 - 126	16 - 63	11 - 42	8 - 32	6 - 25					
	4	M	60	0,67	26 - 105	13 - 53	9 - 35	7 - 26	5 - 21					
MR 65-03	2	VC	40	0,91	54 - 215	27 - 108	18 - 72	13 - 54	11 - 43	110 - 439	55 - 219	37 - 146	27 - 110	22 - 88
	2	VC	50	0,91	43 - 172	22 - 86	14 - 57	11 - 43	9 - 34					
	2	VC	60	0,91	36 - 143	18 - 72	12 - 48	9 - 36	7 - 29					
	2,5	VC	40	1,02	60 - 241	30 - 120	20 - 80	15 - 60	12 - 48	123 - 490	61 - 245	41 - 163	31 - 123	25 - 98
	2,5	VC	50	1,02	48 - 192	24 - 96	16 - 64	12 - 48	10 - 38					
	2,5	VC	60	1,02	40 - 160	20 - 80	13 - 53	10 - 40	8 - 32					
	3	C	40	1,12	66 - 263	33 - 132	22 - 88	16 - 66	13 - 53	134 - 537	67 - 269	45 - 179	34 - 134	27 - 107
	3	C	50	1,12	53 - 211	26 - 105	18 - 70	13 - 53	11 - 42					
	3	C	60	1,12	44 - 176	22 - 88	15 - 59	11 - 44	9 - 35					
	3,5	C	40	1,21	71 - 285	36 - 142	24 - 95	18 - 71	14 - 57	145 - 580	73 - 290	48 - 193	36 - 145	29 - 116
	3,5	C	50	1,21	57 - 228	28 - 114	19 - 76	14 - 57	11 - 46					
	3,5	C	60	1,21	47 - 190	24 - 95	16 - 63	12 - 47	9 - 38					
	4	C	40	1,29	76 - 304	38 - 152	25 - 101	19 - 76	15 - 61	155 - 620	78 - 310	52 - 207	39 - 155	31 - 124
	4	C	50	1,29	61 - 243	30 - 122	20 - 81	15 - 61	12 - 49					
	4	C	60	1,29	51 - 203	25 - 101	17 - 68	13 - 51	10 - 41					

TeeJet DG 65 series

NOTE: WEED-IT uses 25 cm nozzle spacing!

Application Rate Range (liters/hectare)

Nozzle type	Pressure (bar)	Droplet size	Nozzle height (cm)	Flow (l/min) @ 100% DC	5	10	15	20	25	5 Full cover	10 Full cover	15 Full cover	20 Full cover	25 Full cover
DG 65-055	2	C	40	1,62	95 - 381	48 - 191	32 - 127	24 - 95	19 - 76	194 - 778	97 - 389	65 - 259	49 - 194	39 - 156
	2	C	50	1,62	76 - 305	38 - 153	25 - 102	19 - 76	15 - 61					
	2	C	60	1,62	64 - 254	32 - 127	21 - 85	16 - 64	13 - 51					
	2,5	C	40	1,81	107 - 426	53 - 213	36 - 142	27 - 107	21 - 85	217 - 869	109 - 435	72 - 290	54 - 217	43 - 174
	2,5	C	50	1,81	85 - 341	43 - 171	28 - 114	21 - 85	17 - 68					
	2,5	C	60	1,81	71 - 284	36 - 142	24 - 95	18 - 71	14 - 57					
	3	C	40	1,98	117 - 467	58 - 234	39 - 156	29 - 117	23 - 93	238 - 952	119 - 476	79 - 317	60 - 238	48 - 190
	3	C	50	1,98	93 - 374	47 - 187	31 - 125	23 - 93	19 - 75					
	3	C	60	1,98	78 - 311	39 - 156	26 - 104	19 - 78	16 - 62					
	3,5	M	40	2,14	126 - 505	63 - 252	42 - 168	32 - 126	25 - 101	257 - 1029	129 - 514	86 - 343	64 - 257	51 - 206
	3,5	M	50	2,14	101 - 404	50 - 202	34 - 135	25 - 101	20 - 81					
	3,5	M	60	2,14	84 - 336	42 - 168	28 - 112	21 - 84	17 - 67					
	4	M	40	2,29	135 - 539	67 - 270	45 - 180	34 - 135	27 - 108	275 - 1100	137 - 550	92 - 367	69 - 275	55 - 220
	4	M	50	2,29	108 - 432	54 - 216	36 - 144	27 - 108	22 - 86					
	4	M	60	2,29	90 - 360	45 - 180	30 - 120	22 - 90	18 - 72					

@ Speed (km/h)

TeeJet TG series

NOTE: WEED-IT uses 25 cm nozzle spacing!

Application Rate Range (liters/hectare)

Nozzle type	Pressure (bar)	Droplet size	Nozzle height (cm)	Flow (l/min) @ 100% DC	5	10	15	20	25	5 Full cover	10 Full cover	15 Full cover	20 Full cover	25 Full cover
							@ Speed (km/h)							
TG 3.5	2		30	1,67	357 - 714	179 - 357	119 - 238	89 - 179	71 - 143	400 - 800	200 - 400	133 - 267	100 - 200	80 - 160
	2		40	1,67	268 - 536	134 - 268	89 - 179	67 - 134	54 - 107					
	2		50	1,67	214 - 429	107 - 214	71 - 143	54 - 107	43 - 86					
	2,5		30	1,86	399 - 799	200 - 399	133 - 266	100 - 200	80 - 160	447 - 894	223 - 447	149 - 298	112 - 223	89 - 179
	2,5		40	1,86	300 - 599	150 - 300	100 - 200	75 - 150	60 - 120					
	2,5		50	1,86	240 - 479	120 - 240	80 - 160	60 - 120	48 - 96					
	3		30	2,04	437 - 875	219 - 437	146 - 292	109 - 219	87 - 175	490 - 979	245 - 490	163 - 326	122 - 245	98 - 196
	3		40	2,04	328 - 656	164 - 328	109 - 219	82 - 164	66 - 131					
	3		50	2,04	262 - 525	131 - 262	87 - 175	66 - 131	52 - 105					
	3,5		30	2,20	473 - 945	236 - 473	158 - 315	118 - 236	95 - 189	529 - 1058	264 - 529	176 - 353	132 - 264	106 - 212
	3,5		40	2,20	354 - 709	177 - 354	118 - 236	89 - 177	71 - 142					
	3,5		50	2,20	284 - 567	142 - 284	95 - 189	71 - 142	57 - 113					
	4		30	2,36	505 - 1010	253 - 505	168 - 337	126 - 253	101 - 202	565 - 1131	288 - 565	188 - 377	141 - 283	113 - 226
	4		40	2,36	379 - 758	189 - 379	126 - 253	95 - 189	76 - 152					
	4		50	2,36	303 - 606	152 - 303	101 - 202	76 - 152	61 - 121					

NOTE: WEED-IT uses 25 cm nozzle spacing!

Application Rate Range (liters/hectare)

Nozzle type	Pressure (bar)	Droplet size	Nozzle height (cm)	Flow (l/min) @ 100% DC	@ Speed (km/h)					5 Full cover	10 Full cover	15 Full cover	20 Full cover	25 Full cover
					5	10	15	20	25					
MGA 40-01 NP	2	MF	40	0,32	32 - 131	16 - 65	11 - 44	8 - 33	6 - 26	38 - 152	19 - 76	13 - 51	9 - 38	8 - 30
	2	MF	50	0,32	26 - 105	13 - 52	9 - 35	6 - 26	5 - 21					
	2	MF	60	0,32	22 - 87	11 - 44	7 - 29	5 - 22	4 - 17					
	2,5	MF	40	0,36	36 - 146	18 - 73	12 - 49	9 - 37	7 - 29	42 - 170	21 - 85	14 - 57	11 - 43	8 - 34
	2,5	MF	50	0,36	29 - 117	14 - 59	10 - 39	7 - 29	6 - 23					
	2,5	MF	60	0,36	24 - 98	12 - 49	8 - 33	6 - 24	5 - 20					
	3	MF	40	0,39	40 - 160	20 - 80	13 - 53	10 - 40	8 - 32	46 - 187	23 - 93	15 - 62	12 - 47	9 - 37
	3	MF	50	0,39	32 - 128	16 - 64	11 - 43	8 - 32	6 - 26					
	3	MF	60	0,39	26 - 107	13 - 53	9 - 36	7 - 27	5 - 21					
	3,5	MF	40	0,42	43 - 173	21 - 87	14 - 58	11 - 43	9 - 35	50 - 202	25 - 101	17 - 67	12 - 50	10 - 40
	3,5	MF	50	0,42	34 - 139	17 - 69	11 - 46	9 - 35	7 - 28					
	3,5	MF	60	0,42	28 - 115	14 - 58	9 - 38	7 - 29	6 - 23					
	4	MF	40	0,45	46 - 185	23 - 93	15 - 62	11 - 46	9 - 37	53 - 216	27 - 108	18 - 72	13 - 54	11 - 43
	4	MF	50	0,45	37 - 148	18 - 74	12 - 49	9 - 37	7 - 30					
	4	MF	60	0,45	30 - 123	15 - 62	10 - 41	8 - 31	6 - 25					
MGA 40-015 NP	2	MF	40	0,48	49 - 198	25 - 99	16 - 66	12 - 50	10 - 40	57 - 231	29 - 115	19 - 77	14 - 58	11 - 46
	2	MF	50	0,48	39 - 159	20 - 79	13 - 53	10 - 40	8 - 32					
	2	MF	60	0,48	33 - 132	16 - 66	11 - 44	8 - 33	7 - 26					
	2,5	MF	40	0,54	55 - 222	27 - 111	18 - 74	14 - 55	11 - 44	64 - 258	32 - 129	21 - 86	16 - 65	13 - 52
	2,5	MF	50	0,54	44 - 177	22 - 89	15 - 59	11 - 44	9 - 35					
	2,5	MF	60	0,54	37 - 148	18 - 74	12 - 49	9 - 37	7 - 30					
	3	MF	40	0,59	60 - 243	30 - 121	20 - 81	15 - 61	12 - 49	70 - 283	35 - 141	23 - 94	18 - 71	14 - 57
	3	MF	50	0,59	48 - 194	24 - 97	16 - 65	12 - 49	10 - 39					
	3	MF	60	0,59	40 - 162	20 - 81	13 - 54	10 - 40	8 - 32					
	3,5	MF	40	0,64	65 - 262	32 - 131	22 - 87	16 - 66	13 - 52	76 - 305	38 - 153	25 - 102	19 - 76	15 - 61
	3,5	MF	50	0,64	52 - 210	26 - 105	17 - 70	13 - 52	10 - 42					
	3,5	MF	60	0,64	43 - 175	22 - 87	14 - 58	11 - 44	9 - 35					
	4	MF	40	0,68	69 - 280	35 - 140	23 - 93	17 - 70	14 - 56	81 - 326	40 - 163	27 - 109	20 - 82	16 - 65
	4	MF	50	0,68	56 - 224	28 - 112	19 - 75	14 - 56	11 - 45					
	4	MF	60	0,68	46 - 187	23 - 93	15 - 62	12 - 47	9 - 37					

Full cover nozzle flow rate charts

TeeJet TXA 80 series

Nozzle type	Pressure (bar)	Droplet size	Flow (l/min) @ 100% DC	5	10	15	20	25
TXA 80-15	2		0,46	55 - 219	27 - 110	18 - 73	14 - 55	11 - 44
	2,5		0,51	61 - 245	31 - 123	20 - 82	15 - 61	12 - 49
	3		0,56	67 - 269	34 - 134	22 - 90	17 - 67	13 - 54
	3,5		0,60	73 - 290	36 - 145	24 - 97	18 - 73	15 - 58
	4		0,65	78 - 310	39 - 155	26 - 103	19 - 78	16 - 62
TXA 80-02	2		0,61	74 - 295	37 - 148	25 - 98	18 - 74	15 - 59
	2,5		0,69	82 - 330	41 - 165	27 - 110	21 - 82	16 - 66
	3		0,75	90 - 361	45 - 181	30 - 120	23 - 90	18 - 72
	3,5		0,81	98 - 390	49 - 195	33 - 130	24 - 98	20 - 78
	4		0,87	104 - 417	52 - 209	35 - 139	26 - 104	21 - 83
TXA 80-03	2		0,85	74 - 295	37 - 148	25 - 98	18 - 74	15 - 59
	2,5		0,95	82 - 330	41 - 165	27 - 110	21 - 82	16 - 66
	3		1,04	90 - 361	45 - 181	30 - 120	23 - 90	18 - 72
	3,5		1,12	98 - 390	49 - 195	33 - 130	24 - 98	20 - 78
	4		1,20	104 - 417	52 - 209	35 - 139	26 - 104	21 - 83

Wilger SR 110 series

Nozzle type	Pressure (bar)	Droplet size	Flow (l/min) @ 100% DC	5	10	15	20	25
SR 110-02	2	M	0,66	79 - 317	40 - 158	26 - 106	20 - 79	16 - 63
	2,5	F	0,74	89 - 354	44 - 177	30 - 118	22 - 89	18 - 71
	3	F	0,81	97 - 388	48 - 194	32 - 129	24 - 97	19 - 78
	3,5	F	0,87	105 - 419	52 - 209	35 - 140	26 - 105	21 - 84
	4	F	0,93	112 - 448	56 - 224	37 - 149	28 - 112	22 - 90
SR 110-025	2	M	0,83	100 - 399	50 - 199	33 - 133	25 - 100	20 - 80
	2,5	M	0,93	112 - 446	56 - 223	37 - 149	28 - 112	22 - 89
	3	M	1,02	122 - 489	61 - 244	41 - 163	31 - 122	24 - 98
	3,5	F	1,10	132 - 528	66 - 264	44 - 176	33 - 132	26 - 106
	4	F	1,18	141 - 564	71 - 282	47 - 188	35 - 141	28 - 113
SR 110-03	2	C	1,00	120 - 482	60 - 241	40 - 161	30 - 120	24 - 96
	2,5	C	1,12	135 - 539	67 - 269	45 - 180	34 - 135	27 - 108
	3	C	1,23	147 - 590	74 - 295	49 - 197	37 - 147	29 - 118
	3,5	M	1,33	159 - 637	80 - 319	53 - 212	40 - 159	32 - 127
	4	M	1,42	170 - 681	85 - 341	57 - 227	43 - 170	34 - 136
SR 110-04	2	C	1,23	148 - 593	74 - 296	49 - 198	37 - 148	30 - 119
	2,5	C	1,38	166 - 663	83 - 331	55 - 221	41 - 166	33 - 133
	3	C	1,51	181 - 726	91 - 363	60 - 242	45 - 181	36 - 145
	3,5	M	1,63	196 - 784	98 - 392	65 - 261	49 - 196	39 - 157
	4	M	1,75	210 - 838	105 - 419	70 - 279	52 - 210	42 - 168
SR 110-05	2	C	1,44	172 - 689	86 - 345	57 - 230	43 - 172	34 - 138
	2,5	C	1,61	193 - 771	96 - 385	64 - 257	48 - 193	39 - 154
	3	C	1,76	211 - 844	106 - 422	70 - 281	53 - 211	42 - 169
	3,5	C	1,90	228 - 912	114 - 456	76 - 304	57 - 228	46 - 182
	4	C	2,03	244 - 975	122 - 487	81 - 325	61 - 244	49 - 195

Wilger MR 110 series

Nozzle type	Pressure (bar)	Droplet size	Flow (l/min) @ 100% DC	5	10	15	20	25
MR 110-02	2	C	0,64	77 - 306	38 - 153	26 - 102	19 - 77	15 - 61
	2,5	C	0,71	86 - 342	43 - 171	29 - 114	21 - 86	17 - 68
	3	C	0,78	94 - 375	47 - 187	31 - 125	23 - 94	19 - 75
	3,5	M	0,84	101 - 405	51 - 202	34 - 135	25 - 101	20 - 81
	4	M	0,90	108 - 433	54 - 216	36 - 144	27 - 108	22 - 87
MR 110-025	2	C	0,83	100 - 400	50 - 200	33 - 133	25 - 100	20 - 80
	2,5	C	0,93	112 - 447	56 - 223	37 - 149	28 - 112	22 - 89
	3	C	1,02	122 - 490	61 - 245	41 - 163	31 - 122	24 - 98
	3,5	C	1,10	132 - 529	66 - 264	44 - 176	33 - 132	26 - 106
	4	C	1,18	141 - 565	71 - 283	47 - 188	35 - 141	28 - 113
MR 110-03	2	VC	1,00	110 - 439	55 - 219	37 - 146	27 - 110	22 - 88
	2,5	C	1,12	123 - 491	61 - 245	41 - 164	31 - 123	25 - 98
	3	C	1,23	134 - 538	67 - 269	45 - 179	34 - 134	27 - 108
	3,5	C	1,33	145 - 581	73 - 290	48 - 194	36 - 145	29 - 116
	4	C	1,42	155 - 621	78 - 310	52 - 207	39 - 155	31 - 124
MR 110-04	2	VC	1,21	145 - 578	72 - 289	48 - 193	36 - 145	29 - 116
	2,5	VC	1,35	162 - 647	81 - 323	54 - 216	40 - 162	32 - 129
	3	C	1,48	177 - 708	89 - 354	59 - 236	44 - 177	35 - 142
	3,5	C	1,59	191 - 765	96 - 383	64 - 255	48 - 191	38 - 153
	4	C	1,70	205 - 818	102 - 409	68 - 273	51 - 205	41 - 164
MR 110-05	2	XC	1,52	183 - 730	91 - 365	61 - 243	46 - 183	37 - 146
	2,5	VC	1,70	204 - 816	102 - 408	68 - 272	51 - 204	41 - 163
	3	VC	1,86	224 - 894	112 - 447	75 - 298	56 - 224	45 - 179
	3,5	VC	2,01	241 - 966	121 - 483	80 - 322	60 - 241	48 - 193
	4	C	2,15	258 - 1033	129 - 516	86 - 344	65 - 258	52 - 207

Lechler IDK 80 series

Nozzle type	Pressure (bar)	Droplet size	Flow (l/min) @ 100% DC	5	10	15	20	25
IDK 80-02	2	VC	0,61	73 - 294	37 - 147	24 - 98	18 - 73	15 - 59
	2,5	VC	0,68	82 - 329	41 - 164	27 - 110	21 - 82	16 - 66
	3	VC	0,75	90 - 360	45 - 180	30 - 120	23 - 90	18 - 72
	3,5	C	0,81	97 - 389	49 - 194	32 - 130	24 - 97	19 - 78
	4	C	0,87	104 - 416	52 - 208	35 - 139	26 - 104	21 - 83
IDK 80-03	2	VC	0,91	110 - 439	55 - 219	37 - 146	27 - 110	22 - 88
	2,5	VC	1,02	123 - 491	61 - 245	41 - 164	31 - 123	25 - 98
	3	VC	1,12	134 - 538	67 - 269	45 - 179	34 - 134	27 - 108
	3,5	C	1,21	145 - 581	73 - 290	48 - 194	36 - 145	29 - 116
	4	C	1,29	155 - 621	78 - 310	52 - 207	39 - 155	31 - 124

BfS PulZar series

Nozzle type	Pressure (bar)	Droplet size	Flow (l/min) @ 100% DC	5	10	15	20	25
PulZar 03	2	C	0,98	117 - 468	59 - 234	39 - 156	29 - 117	23 - 94
	2,5	C	1,09	131 - 524	65 - 262	44 - 175	33 - 131	26 - 105
	3	C	1,20	143 - 574	72 - 287	48 - 191	36 - 143	29 - 115
	3,5	C	1,29	155 - 620	77 - 310	52 - 207	39 - 155	31 - 124
	4	M	1,38	166 - 662	83 - 331	55 - 221	41 - 166	33 - 132

TTI 110 series

Nozzle type	Pressure (bar)	Droplet size	Flow (l/min) @ 100% DC	5	10	15	20	25
TTI 110-025	2	UC	0,78	94 - 376	47 - 188	31 - 125	23 - 94	19 - 75
	2,5	UC	0,88	105 - 420	53 - 210	35 - 140	26 - 105	21 - 84
	3	UC	0,96	115 - 460	58 - 230	38 - 153	29 - 115	23 - 92
	3,5	UC	1,04	124 - 497	62 - 249	41 - 166	31 - 124	25 - 99
	4	UC	1,11	133 - 532	66 - 266	44 - 177	33 - 133	27 - 106

15.4. Application rate calculations

Spot Spraying formulas (1)
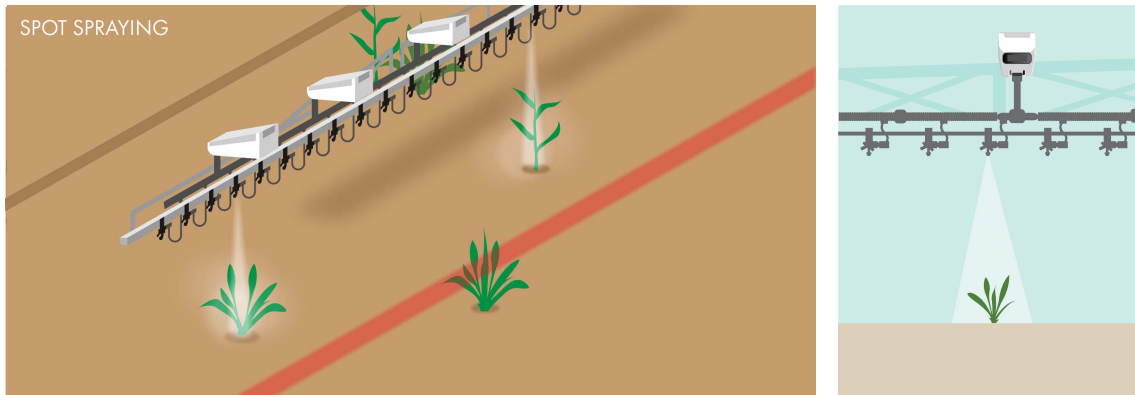
In Spot Spraying, the WEED-IT Quadro only sprays the green plants that are detected with the chlorophyll fluorescence principle. WEED-IT regulates the application rate via PWM, considering a constant pressure. The spot spraying application can be seen as a band application with a single nozzle. Therefor the spot spraying application rate is calculated as:

$$Spot\ rate = \frac{60000 * Flow}{Speed * W}$$

With:
- Spot rate the application rate in l/ha for spot spraying
- Flow in l/min
- Speed in km/h
- W the spray width of the nozzle in cm (readable in the table at the next page)

The flow is calculated as:

$$Flow = \frac{\%\ Spot}{100} * Max.\ flow$$

With:
- Flow in l/min
- The max. flow is the flow of the chosen nozzle at a constant pressure
- The % Spot is the control % for the PWM in the WEED-IT

The % Spot is calculated as:

$$\%\ Spot = \frac{Spot\ rate\ * Speed\ * W}{Max.\ flow\ * 600} * 100\%$$

The % Spot is also the value for the spot application rate that is used in the WEED-IT communication protocol for the connection with external devices.

The maximum spot rate is calculated as:

$$Max.\ spot\ rate\ = \frac{Max.\ flow\ * 100\ \% * 600}{Ideal\ Speed\ * W}$$

With:
- Max. spot rate the maximum application rate in spot spraying
- 100% is the maximum % Spot
- The Ideal Speed is the desired driving speed, as set in menu 104 and/or menu 203 tab 2

Spot Spraying formulas (2)

The spray width nozzle is the spray width of one nozzle at the soil surface, and is important for an optimal spot spray result. The following table indicates in green what configurations are best suitable for spot spraying.
Each detection channel is 25 cm wide, and so the spray width must be at least 25 cm.
Note that the nozzle height is configured in the WEED-IT by your dealer and that the spray boom must stay at this nozzle height to ensure the weed is detected and hit with herbicide optimally.
In the table spray widths up to 45 cm (so with 10 cm overlap at both sides) are indicated as suitable. However, rough conditions, such as uneven terrain or unstable spray booms may require a larger spray width.
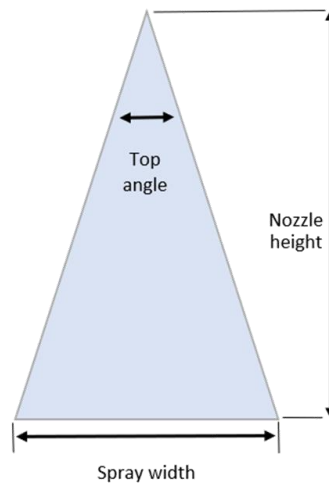
Top angle (°)	Spray width with diverse nozzle heights (cm)													
	20	30	40	50	55	60	65	70	75	80	85	90	95	100
15	5	8	11	13	14	16	17	18	20	21	22	24	25	26
20	7	11	14	18	19	21	23	25	26	28	30	32	34	35
25	9	13	18	22	24	27	29	31	33	35	38	40	42	44
30	11	16	21	27	29	32	35	38	40	43	46	48	51	54
35	13	19	25	32	35	38	41	44	47	50	54	57	60	63
40	15	22	29	36	40	44	47	51	55	58	62	66	69	73
45	17	25	33	41	46	50	54	58	62	66	70	75	79	83
50	19	28	37	47	51	56	61	65	70	75	79	84	89	93
55	21	31	42	52	57	62	68	73	78	83	88	94	99	104
60	23	35	46	58	64	69	75	81	87	92	98	104	110	115
65	25	38	51	64	70	76	83	89	96	102	108	115	121	127
73	30	44	59	74	81	89	96	104	111	118	126	133	141	148
80	34	50	67	84	92	101	109	117	126	134	143	151	159	168
85	37	55	73	92	101	110	119	128	137	147	156	165	174	183
90	40	60	80	100	110	120	130	140	150	160	170	180	190	200
95	44	65	87	109	120	131	142	153	164	175	186	196	207	218
100	48	72	95	119	131	143	155	167	179	191	203	215	226	238
110	57	86	114	143	157	171	186	200	214	229	243	257	271	286
120	69	104	139	173	191	208	225	242	260	277	294	312	329	346
130	86	129	172	214	236	257	279	300	322	343	365	386	407	429
140	110	165	220	275	302	330	357	385	412	440	467	495	522	549
150	149	224	299	373	411	448	485	522	560	597	634	672	709	746

Full Coverage Spraying formulas
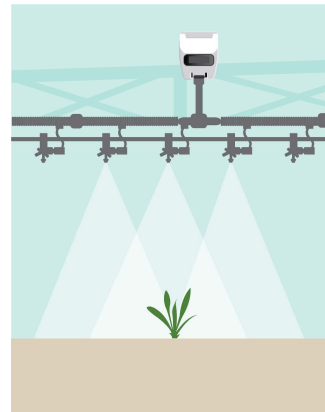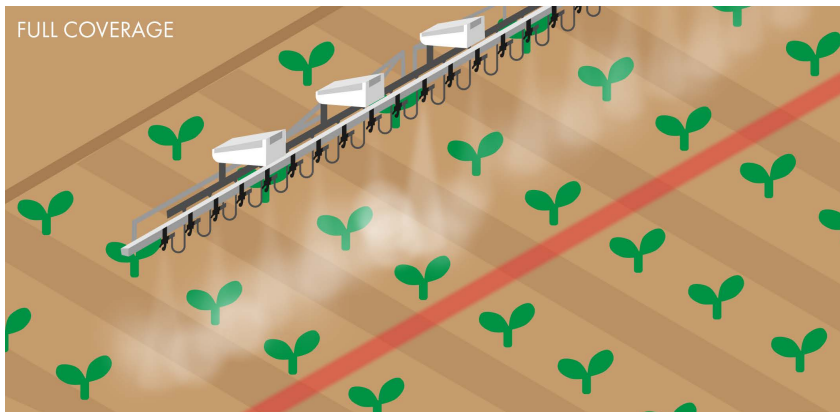
In Full Coverage spraying mode, the WEED-IT Quadro operates like a normal sprayer. The only difference is that the WEED-IT Quadro regulates the application rate via PWM, considering a constant spray pressure.
The cover application rate is calculated as:

$$Cover\ rate = \frac{60000 * Flow}{Speed * S}$$

With:
- Cover rate the application rate in l/ha
- Flow in l/min
- Speed in km/h
- S the nozzle spacing in cm, which is always 25 cm with WEED-IT

The nozzle flow (l/min) is calculated as:

$$Flow = \frac{\%\ Cover}{100} * Max.\ flow$$

With:
- Flow in l/min
- The max. flow is the flow of the chosen nozzle at a constant pressure
- The % Cover is the control % for the PWM in the WEED-IT

The % Cover is calculated as:

$$\%\ Cover = \frac{Cover\ rate * Speed * S}{Max.\ flow * 600} * 100\%$$

The % Cover is also the value for the spot application rate that is used in the WEED-IT communication protocol for the connection with external devices.

The maximum cover rate is calculated as:

$$Max.\ cover\ rate = \frac{Max.\ flow * 100\ \% * 600}{Ideal\ Speed * S}$$

With:
- Max. cover rate the maximum application rate in cover spraying
- 100% is the maximum % Cover
- The Ideal Speed is the desired driving speed, as set in menu 104 and/or menu 203 tab 2.

Dual Spraying formulas
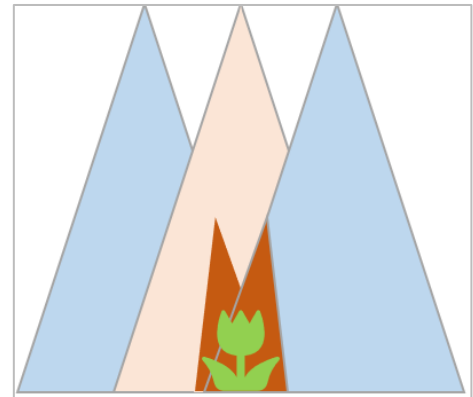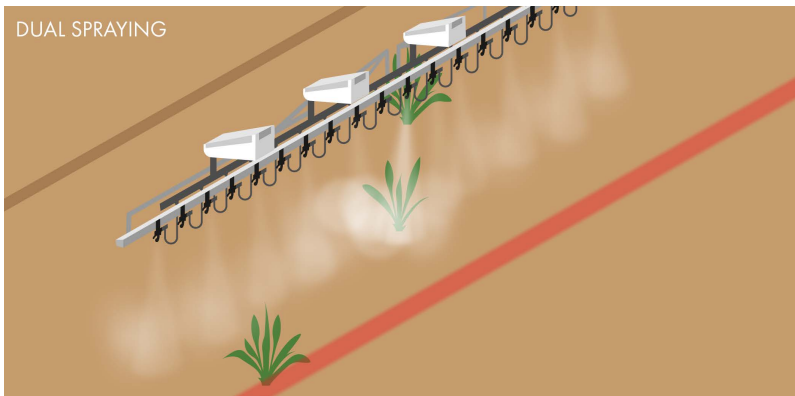
The Dual Spraying mode is an unique spray tech feature. It combines full coverage spraying with spot spraying by applying a low cover application rate, like 30 l/ha, followed by a spot application rate, like 100 l/ha, when a plant is detected. Unique is that both cover and spot application rates are regulated via PWM.

For the Dual Spraying mode the calculations from the Spot Spraying and Full Coverage mode are used.

The only thing that is different is the Spot Spraying rate, as the weed receives an add up of the cover application rate and spot application rate, called the effective spot application rate.

The Effective Spot rate (l/ha) is calculated as:

$$Effective\ Spot\ rate\ = Spot\ rate + \frac{Cover\ rate * (W - C)}{W}$$

With:
- Spot rate the application rate for spot spraying in l/ha
- Cover rate the application rate for cover spraying in l/ha
- W the spray width of the nozzle in cm (readable in the table in the Spot Spraying formulas)
- C the channel width of the detection sensor, which is fixed at 25 cm

In this way the fluid from neighbouring nozzles ending up in the detection channel area are summed up to the spot spray rate resulting in the effective spot rate. This effective spot rate is set in the WEED-IT user console.

The % Spot for Dual Mode is calculated as:

$$\%\ Spot\_Dual\ = \frac{Spot\ rate * Speed * W}{Max.\ flow * 600}$$

With:
- The % Spot_Dual is the value that is passed on the communication protocol.
- The Spot rate the application rate in spot spraying without reckoning overlap. This can be calculated with the effective spot rate formula.
- The speed in km/h
- The max. flow in l/min
- W the spray width in cm

Index

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