Agricultural Spray Products

GEOline by Tecomec

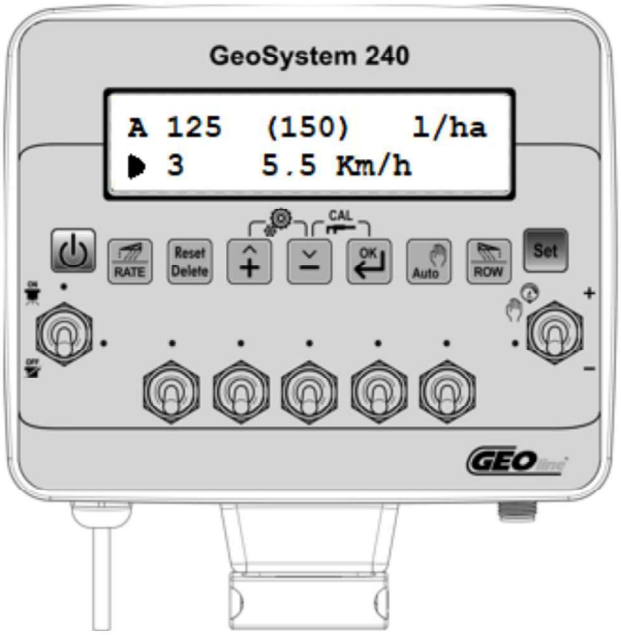
ENG

GEOSYSTEM 240

original instructions

INSTRUCTION MANUAL

Warning: do not use the item before having read the instruction manual



EN

1 INDEX

ENGLISH

2 INTRODUCTION

Dear User,

Congratulations on choosing a TECOMEC S.r.l. product. TECOMEC S.r.l. is a leading company in the development and production of electronic agricultural systems. For years now, the international market has recognized our quality, experience, reliability and above all our technological innovation which results from our advanced and revolutionary know how. This is the cornerstone of our work and it is with this mindset that we offer you our services, providing a simple yet modern, accurate and efficient product that will help make your work easier for many years to come. The purpose of this user manual is to guide you through the different applications of the spraying system, illustrating some new features. From configuration to use, with the various available accessories, to troubleshooting and the safety standards of the equipment, TECOMEC S.r.l. provides you with a comprehensive guide, and can offer you full support and technical assistance.
All that is left to say is that we wish you every success in your work!

The TECOMEC S.r.l. team

3 LEGEND

This user manual uses some conventional symbols to guide the user during the reading of important instructions and warnings. In particular, these concern the setting of the system parameters and therefore its correct operation.

Please take note of the following symbols:

	**Indicates explanatory and additional information.**
	**Maximum care is recommended.**
	**Indicates an operation that can be repeated many times, in a cycle.**
	**Indicates the standards to respect.**

4 INTENDED USE

A crop protection chemical spraying management system designed to work on agricultural machinery for orchard spraying and crop spraying applications.
The accurate control of the operating parameters of the spraying system or sprayer increases the effectiveness and efficiency of the treatments, reducing chemical waste.
This manual refers to the products of the Geosystem 240 family and customizations: Geosystem 240, Kronos.

5 WARNINGS

The power cable must be connected directly to the battery or to a regulated power supply.
The power supply must be protected with a 10A fuse.
If it is not the case, TECOMEC S.r.l. will not be responsible for any damage to the microcomputer.

Disconnect the power cable from the microcomputer when charging the vehicle battery.
If it is not the case, TECOMEC S.r.l. will not be responsible for any damage to the microcomputer.

Disconnect all cables from the Monitor before undertaking welding on the vehicle.
If it is not the case, TECOMEC S.r.l. will not be responsible for any damage to the microcomputer.

To ensure the correct operation, make sure that the battery always has a voltage higher than 10.5 Volt.

This symbol on the product or on its packaging illustrates that this product must not be disposed of with normal household waste.
It is the responsibility of the user to dispose of this equipment through a designated waste electrical and electronic equipment collection site. To find the locations to dispose of such electrical and electronic waste, contact your local waste disposal service or the company you purchased the product from.

Before cleaning the agricultural vehicle with high pressure water jets, protect the equipment from any possible ingress of water. In addition, take care not to subject the devices, cables or connectors to direct jets of water.

If the equipment needs to be cleaned, use a soft, damp, lint-free cloth. Do not use sprays, solvents, abrasives, or sharp or pointed objects that could damage the housing.

6 PACKAGE CONTENTS

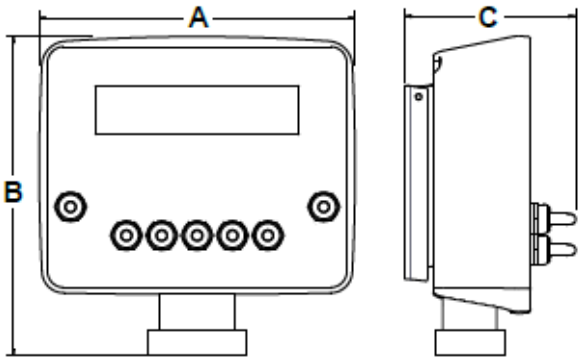
GeoSystem Kit

Description	Qty
GeoSystem Monitor	1
Power cable L=2 m	1
Extension cable L=5 m (if available)	1
Valve and sensor connection cable	1
Speed sensor with cable L=5 m	1
Dovetail bracket	1
Foam Marker adapter cable L=0.4 m*	1
Flowmeter adapter cable L=0.4 m	1
GPS speed sensor*	1

Table 1- Package contents

* Only in kits where applicable

7 DIMENSIONS



AxBxC mm
192x198x97,5

Figure 1 – Monitor Dimensions

8 ACCESSORIES

The GeoSystem can be equipped with the following accessories:

ACCESSORY	DESCRIPTION
Magnetic Flowmeter	Sensor to measure the flow and count the number of liters
Paddle Flowmeter	Sensor to measure the flow and count the number of liters
Pressure Sensor	Sensor to measure the pressure
Level Sensor	Sensor to measure the liquid level in the tank
Suction mount with mini VESA base	Bracket to fix to a glass surface

Table 2 - Accessories

9 TECHNICAL DATA

Monitor Dimensions(mm):	**192 x 157 x 55 (without mounting support)**
Monitor weight (gr):	**~ 1000**
Housing material:	**PA66+GF 30 % native color RAL 9005**
Protection Rating:	**IP 64**
Operating temperature:	**-20 / +65 °C**
Storage temperature:	**-20 / +65 °C**
Power supply:	**9.5 – 14 Vdc (“LOW BATTERY” alarm < 9.5 Vdc) Maximum total power consumption: OS Version: 10A with maximum 2A for each output CS Version: 8A with maximum 1.5A for each output**
Display:	**Alphanumeric display 16 columns x 2 rows area dimensions 123 x 30.4 mm with backlight**
Display visibility:	**> 2 mt**
Types of connection cables:	**Cables to connect the section valves, main valve and proportional valve**
	Cables to connect pressure, tank level, flow and speed sensors (if present)
	No.1 Cable to connect the foam marker (Crop Sprayer)
Power cable:	**2 m**

Table 3 - Technical Data

10 INSTALLATION OF COMPONENTS

10.1 CONFIGURATIONS

10.1.1 GeoSystem Monitor - Orchard Sprayer (OS) and Crop Sprayer (CS)

On the front, there are a series of switches that control the section valves of the sprayer, the main control valve and the switch to increase/decrease the flow rate/pressure.
The flow rate can be adjusted manually or automatically.
The operator sets the dose of liquid to be sprayed (liters per hectare) and the monitor regulates the flow rate/pressure through the regulating valve according to the speed of travel and the active sections.
The operator can use the control switch to increase or decrease the amount of liquid sprayed.

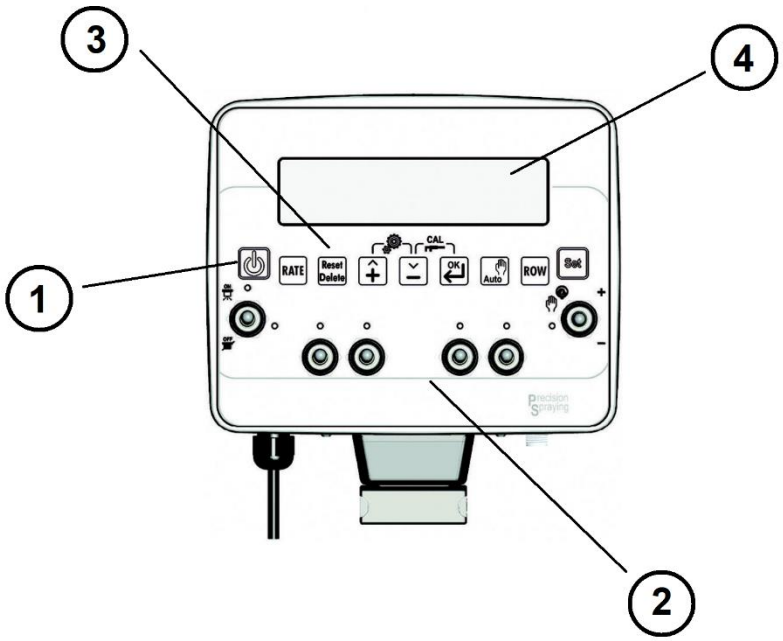


Figure 2 –Orchard Sprayer (OS) Monitor

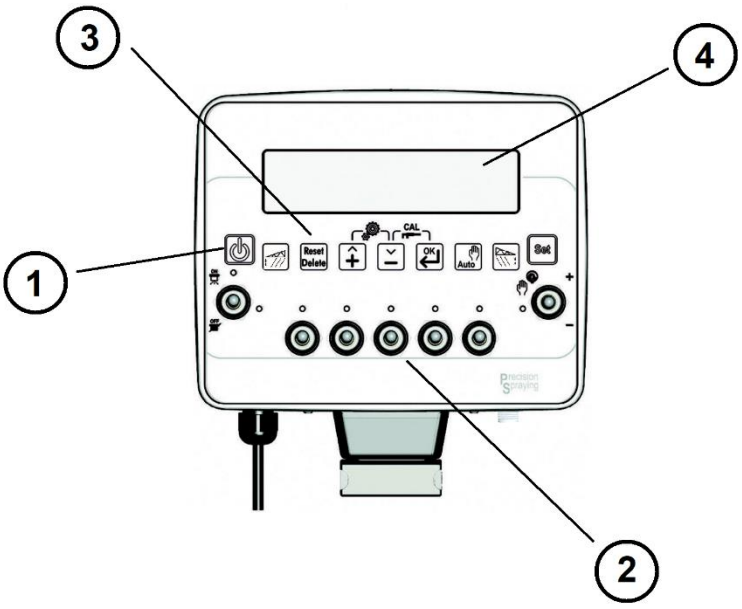


Figure 3 - Crop Sprayer (CS) Monitor

1. **ON / OFF key.**
2. **Series of 2-position switches (ON-OFF) for the main control valve and section valves (5 valves). One 3-position switch (ON-OFF-ON) with spring return in the OFF position for volumetric valve control**
3. **Function and setting keys**
4. **Alphanumeric display - 2 rows of 16 characters with backlight.**

The system is supplied with a pre-drilled mounting bracket. It is provided with an MED fastening system (optional) with dedicated accessories.
The system is able to support a maximum load of 2.5 Kg.

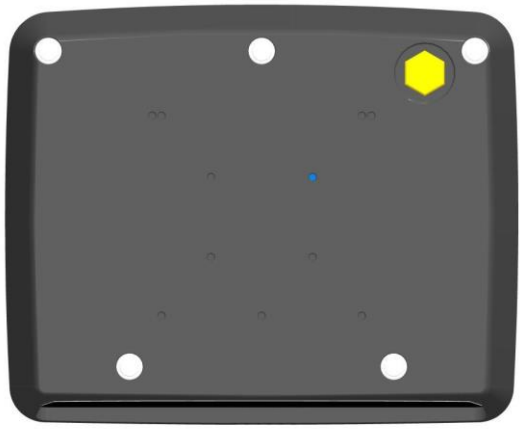


Figure 4 - Rear of the monitor

Application zone for self-adhesive labels with production codes, model and serial number.

10.1.2 Switch layout

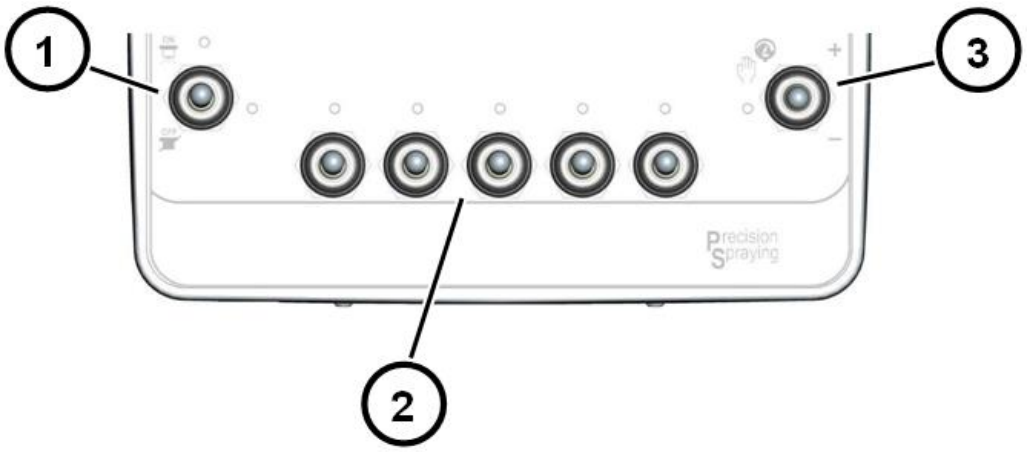


Figure 5 – Switch layout

1. Main valve control switch
2. Section valve control switches
3. Regulating valve control.

10.2 CONNECTION DIAGRAM

10.2.1 GeoSystem Monitor – 5-section Crop Sprayer (CS)

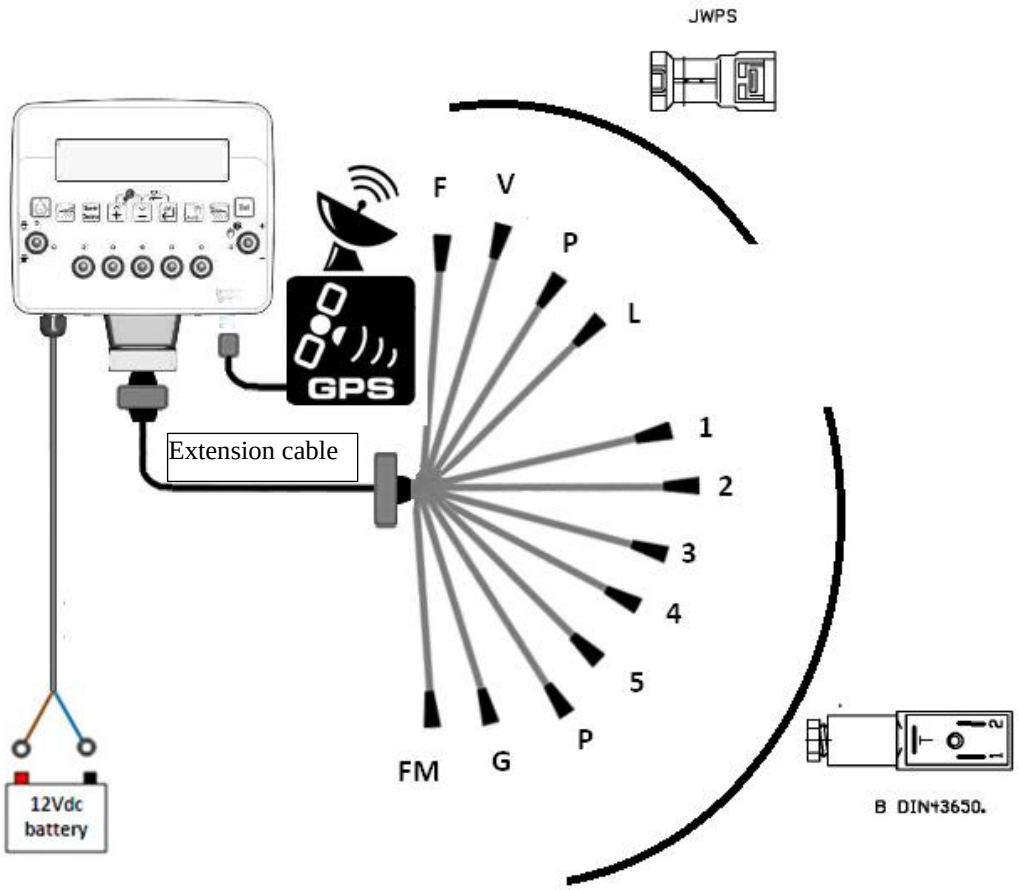


Figure 6 – Diagram for Crop Sprayer Version

DIN43650	Connector for:	JST JWPS	Connector for:
1,2,3,4,5	Section valve	F	Flow sensor
P	Regulating valve	V	Speed sensor

G	Main valve	P	Pressure sensor
FM	Foam marker (Connector: FASTON)	L	Tank level sensor

10.2.1 GeoSystem Monitor - 2/4-section Orchard Sprayer (OS)

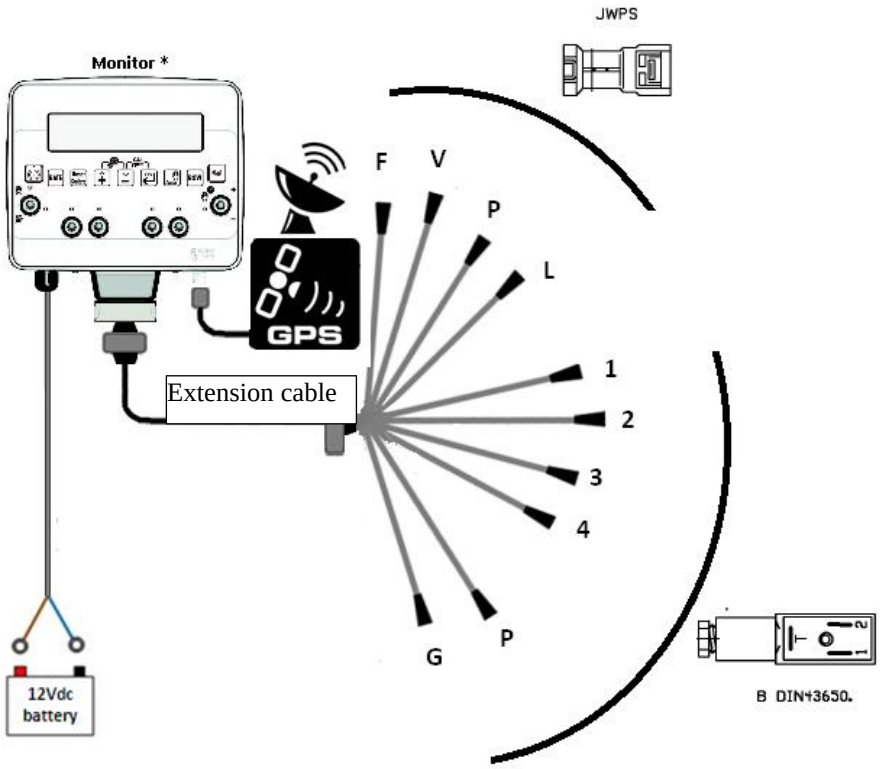


Figure 7 – Diagram for Orchard Sprayer Version

DIN43650	Connector for:	JST JWPS	Connector for:
1,2,3,4,5	Section valve	F	Flow sensor
P	Regulating valve	V	Speed sensor
G	Main valve	P	Pressure sensor
		L	Tank level sensor

10.3 INSTALLATION

10.3.1 Positioning advice

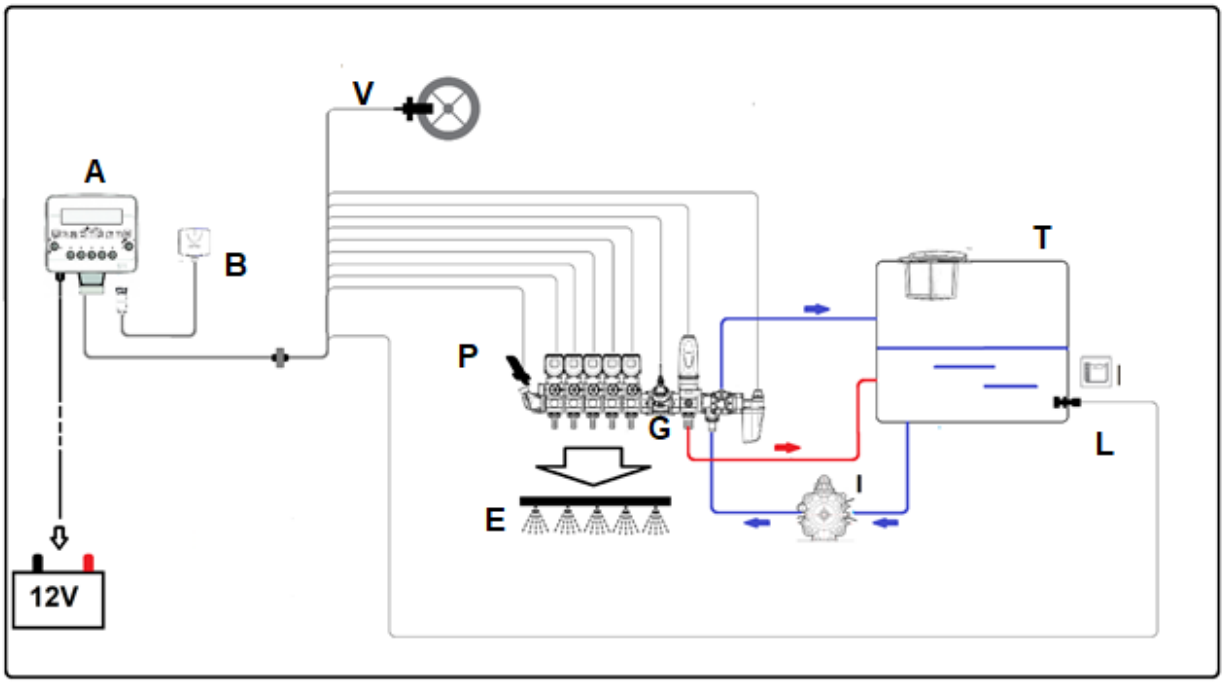


Figure 8 - Installation diagram for Crop Sprayer (CS) Version

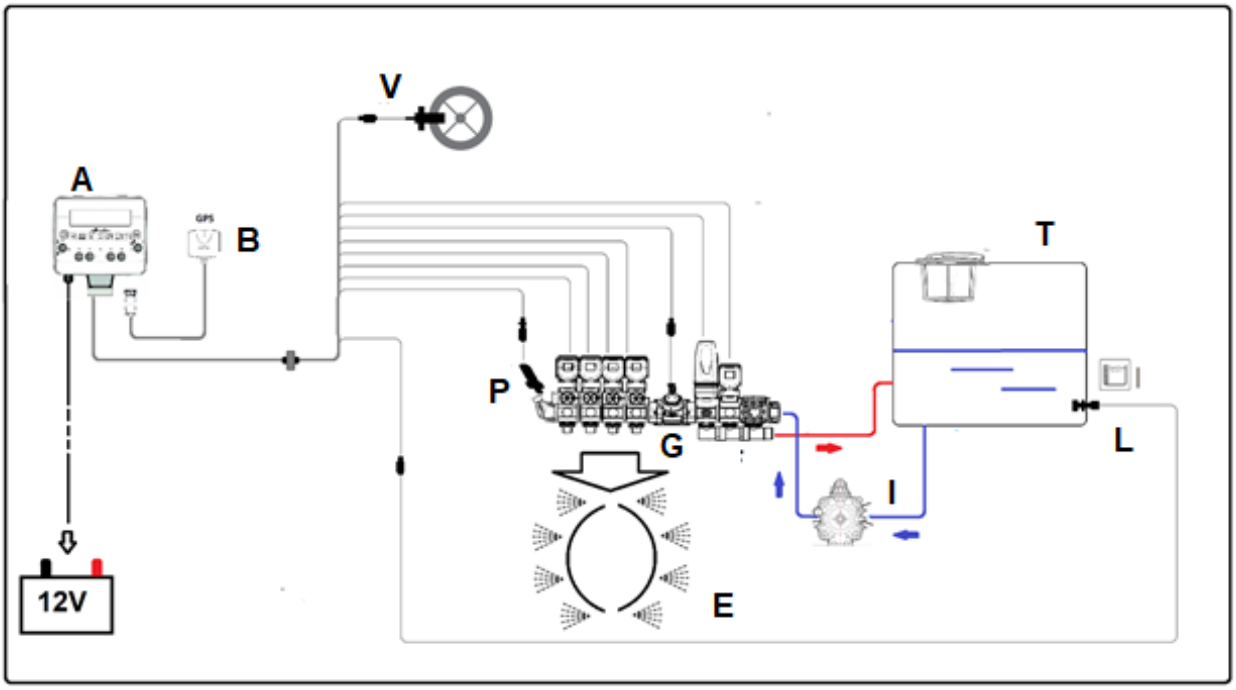


Figure 9 - Installation diagram for Orchard Sprayer (OS) Version

A	Geosystem monitor	L	Tank level sensor (optional)
B	GPS Antenna (optional)	P	Pressure sensor (optional)

E	Spraying boom	V	Wheel speed sensor
G	Flowmeter	T	Tank
I	Pump		

The GeoSystem monitor must be positioned in the cockpit of the farm vehicle, with the following precautions:

- Make sure that the monitor is not positioned in areas subject to vibrations or knocks as this could damage the equipment or activate the keys unintentionally;
- Attach the device in a position that is visible and easy to reach by hand.
- The monitor must not obstruct movement or limit driver visibility.

10.4 GPS ANTENNA INSTALLATION

Connect the 8-pin M12 connector of the GPS antenna cable Tecomec Code #A01100002 or #A01100003 to the metallic M12 connector located at the bottom of the Geosystem monitor

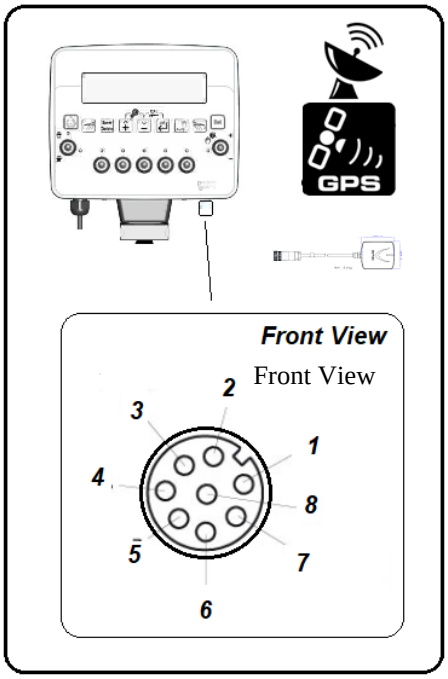
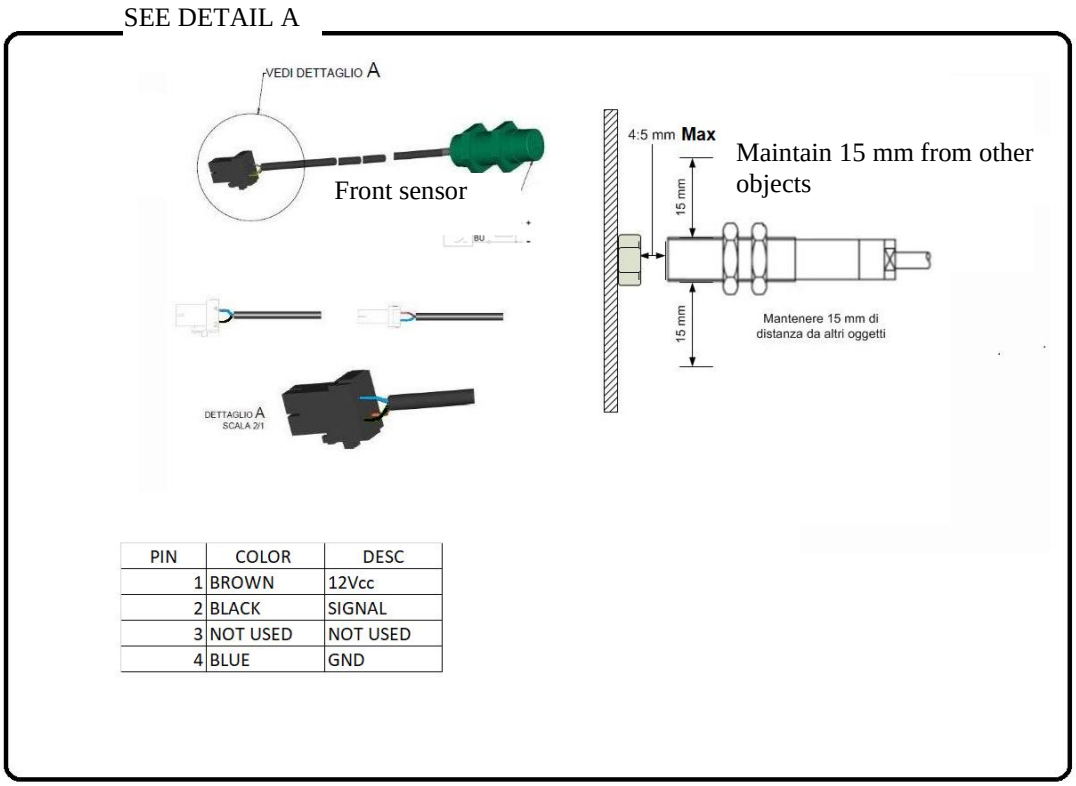


Figure 10 - GPS Connector Pinout

Pin	Description	Notes
1	GND	
2	Vcc (5v)	max 50 mA
3	Reserved	
4	RS232 TX	GPS RX Connector
5	RS232 GND	
6	RS232 RX	GPS TX Connector
7	Reserved	
8	Reserved	

10.5 SPEED SENSOR INSTALLATION



PIN	COLOR	DESC
1	BROWN	12Vcc
2	BLACK	SIGNAL
3	NOT USED	NOT USED
4	BLUE	GND

Figure 11 - Speed Sensor Installation

10.5.1 Positioning advice

The speed sensors must be positioned with the following precautions:

- Install the sensor less than 4-5 mm away from the body to be detected;
- Do not install the sensor body too near to other metal objects that may affect the operation of the detector.

10.6 FOAM MARKER CONNECTION - CROP SPRAYER (CS) VERSION

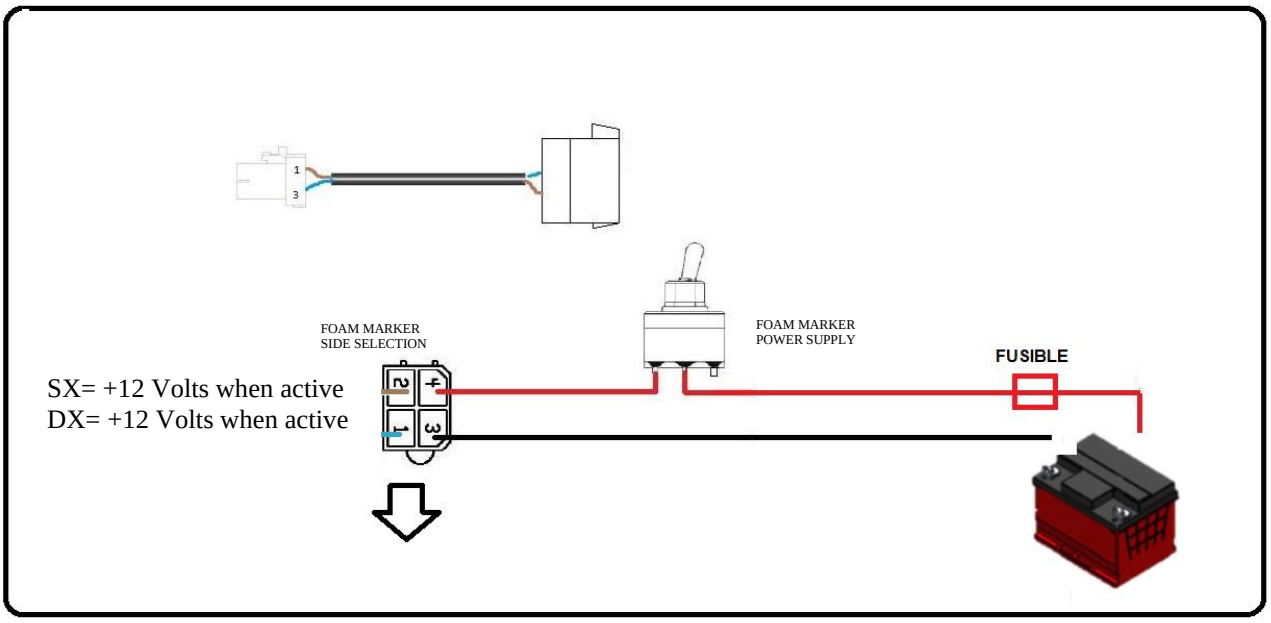


Figure 12 - Connection with the Foam Marker

The Geosystem cannot directly power the foam marker because its power consumption is too high. Use an appropriate adaptor (#8394016).

10.7 FLOWMETER INSTALLATION

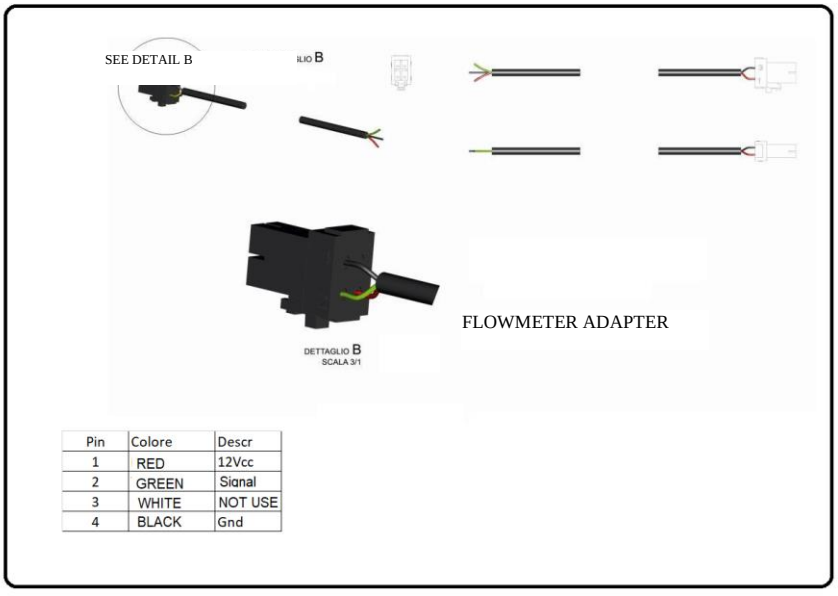


Figure 13 - Flowmeter Installation

The flowmeter adapter allows connection to any flowmeter that provides a 12V pulse output proportional to the flow. The image shows adapter connections.

10.8 HARDWARE INSTALLATION CHECK

Before using the GeoSystem, check the correct installation of each component:
- Check that the connectors are in the right sockets
- Check that the cables are the correct length
- Check that all screws are fully tightened
- Check the polarity and the supply voltage

The GeoSystem must be powered directly from the battery, and must not be connected to a key-operated socket (a 10 A protection fuse must be installed).

When using valve assemblies with calibrated return, the correct functioning of the GeoSystem is guaranteed only by the accurate calibration of all the sensors and the proper calibration of the return flows.

11 DESCRIPTION OF CROP SPRAYER (CS) MONITOR

11.1 LIST OF KEYS AND SWITCHES AND THEIR FUNCTIONS

Monitor with alphanumeric display, keys and control switches

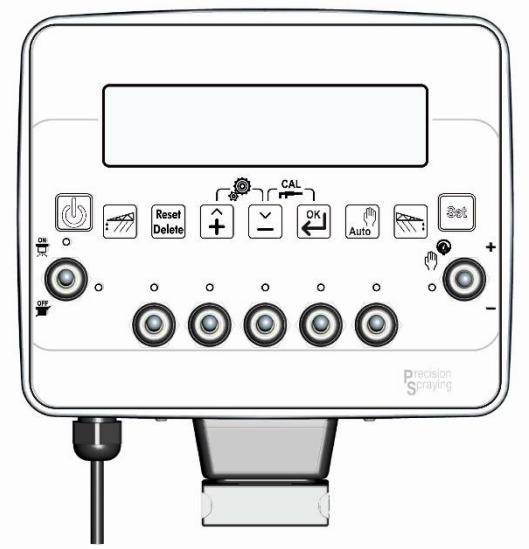


Figure 14 – CS monitor

CONTROL, SELECTION OR MODIFICATION KEYS

ON / OFF key:
Turns the monitor on / off

Foam marker activation key:
Enables / disables the foam marker outputs on the left-hand side of the vehicle during the operating phase (active spraying)

Control key:
- Allows return to the previous menu
- Resets the percentage increase / decrease of the spraying value
- Allows the counters for the current treatment to be reset

UP key:
- Scrolls through the individual items to the previous menu
- Increases the value of the parameter

When modifying parameters, holding down the key allows the input values to be increased quickly

DOWN key:
- Scrolls through the individual items to the next menu
- Decreases the value of the parameter

When modifying parameters, holding down the key allows the input values to be decreased quickly

OK key:
- Confirms access to the selected menu or previously modified parameter value
- Holding down this key for more than 2 seconds displays the values for the stored treatments

Control key:
Enables / disables the automatic adjustment of the spraying

Foam marker activation key
Enables / disables the foam marker outputs on the right-hand side of the vehicle during the operating phase (active spraying)

Control key:
Enables the operating parameter menu.

SWITCHES FOR THE CONTROL OF HYDRAULIC FUNCTIONS

Switch for controlling the main valve:

- to open the main valve, slide the switch upward (LED on)
- to close the main valve, slide the switch downward (LED off)

Switch for controlling the regulating valve:

- to increase the amount of liquid to be sprayed, position the switch upward
  manual function: increases the amount of liquid to be sprayed
  automatic function: increases the amount of liquid to be sprayed at 10% intervals in relation to the set value

- in order to decrease the amount of liquid to be sprayed, position the switch downward
  manual function: decreases the amount of liquid to be sprayed
  automatic function: decreases the amount of liquid to be sprayed at 10% intervals in relation to the set value.

11.2 CONFIGURATION OF GENERAL PARAMETERS

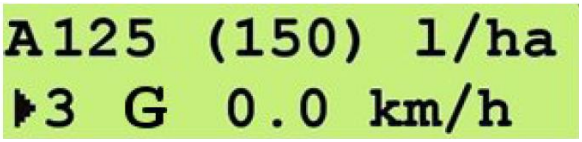
Allows the setting of parameters required for the correct operation of the monitor.

1	Turn on the monitor by pressing  .	
2	First message depends on Geosystem model	GEOLine GeoSystem 240
3	The Firmware version and system name then appear.	Rev. 1.2.4 Crop Sprayer

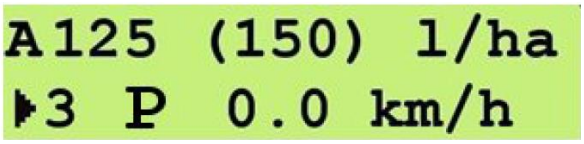
4 Then, the “Please Wait” message is shown.

5 The operating values appear.

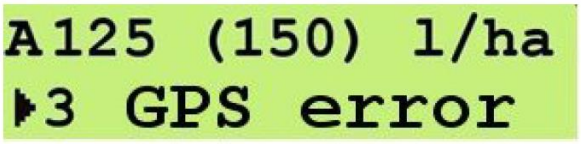
When using a GPS antenna



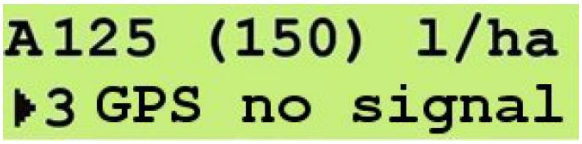
When you automatically switch from GPS to Proximity mode



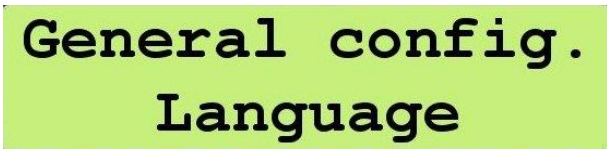
If communication with the GPS any error occurs, appear the message “GPS error”



The GPS antenna is not receiving a signal .



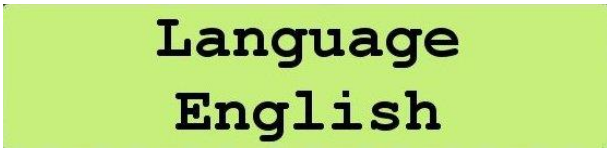
6 Press the  and  keys at the same time to enter the configuration menu.



7 Scroll through the menu items using the  and  keys.

8 Press the 

key to modify the parameter: the choice can be modified or the value changed using the  and  keys.



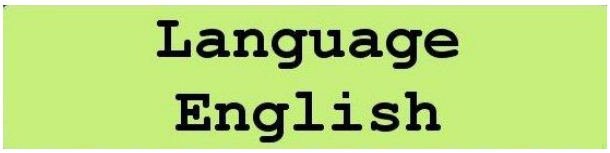
If the parameter has a list of default values or names, these will be displayed by pressing the  and  keys.
If the input value is numeric, it will increase or decrease according to how long the key is pressed with an exponential interval.

It is possible to delete the current selection or return to the previous menu by pressing the 

key.

11.2.1 LIST OF GENERAL CONFIGURATION MENU ITEMS

1 **Language:**
Italian/English/Spanish/French/German /Portuguese/Finnish/ Ukrainian/Russian/Polish.

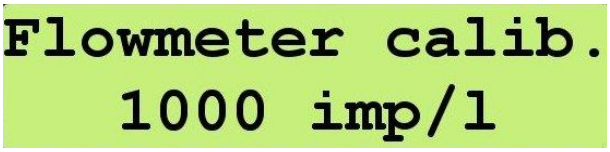
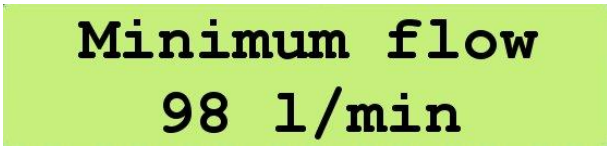
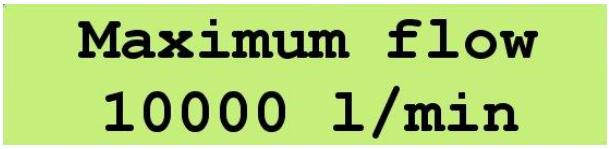
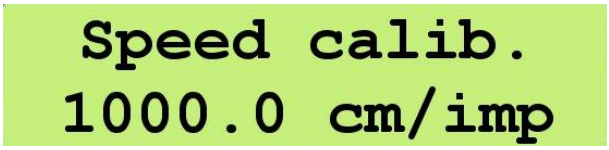


2 **Units of measurement:**
- Metric (l/ha, Km/h, bar):
  PRESSURE = 99.9
  DISTRIBUTION = 99999
- US (GPA, mph, psi):
  PRESSURE = 9999
  DISTRIBUTION = 999.9

3 **Vehicle identification:**

(1-5) This identifies the vehicle on which the system is installed.

* By entering this configuration, the parameters for that particular vehicle will be set (wheel diameter, flowmeter

	calibration….in this example: vehicle 1).	
4	**Flowmeter calibration:** This specifies how many pulses arrive at the flowmeter per unit of liquid sprayed. 1-5000 pulses/liter (Metric) or pulses/USG (gallon) (US). The value is indicated on the plate attached to the housing or by the flowmeter manufacturer.	
5	**Minimum flow alarm threshold:** If the flow falls below this threshold, a message will appear on the display. 0-10000 l/min (Metric) or USGpm (gal/min) (US)	
6	**Maximum flow alarm threshold:** If the flow goes above this threshold, a message will appear on the display. 0-10000 l/min (Metric) or USGpm (gal/min) (US) (l/min).	
7	**Speed sensor calibration:** Indicates the wheel constant = distance traveled (cm or inches) / pulse. NB. There is a procedure for the automatic calculation of the constant over a distance of 100 meters.	
8	**Pressure sensor calibration:** 0-200 full scale value (bar or psi).	
9	**Tank capacity:** 0-10000 liters (Metric) or USG (gal) (US).	

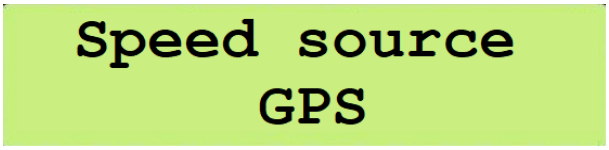
10 **Minimum tank level alarm threshold:**

Below this value, the monitor will indicate the lack of liquid. 0-10000 liters (Metric) or USG (gal) (US).

11 **Speed measurement:**

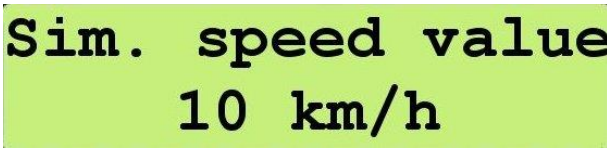
Indicates the type of sensor used to measure speed:

- *Pulse:* electronic pulse input e.g. speedometer
- *Prox:* speed measured through proximity sensor e.g. wheel sensor
- *Simulated:* uses a simulated speed
- *GPS:* uses the GPS antenna signal
- *Auto:* uses the GPS antenna signal if present or, alternatively, the proximity sensor
- *Auto HDOP:* if the GPS signal is lower than the maximum GPS HDOP value parameter, the GPS antenna signal is used, otherwise the proximity signal is used



12 **Simulated speed value:**

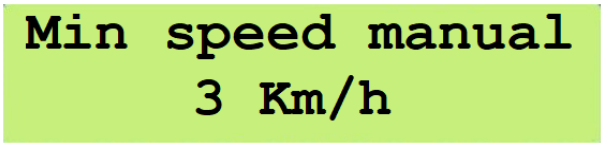
The monitor simulates a travel speed. 0-50 Km/h (metric) or mph (U.S.)



13 **Min manual speed:**

0-50 Km/h (metric) or mph (U.S.)

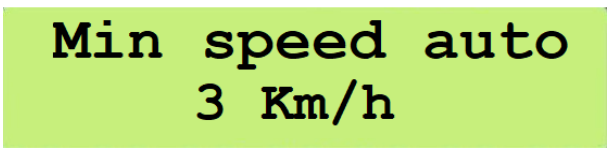
This is value below which, when operating in manual mode, the spraying is stopped by closing the main valve.



14 **Min. autom. speed:**

0-50 Km/h (metric) or mph (U.S.)

This is value below which, when operating in automatic mode, the



spraying is stopped by closing the main valve.

15 **Manual speed threshold:**

0-50 Km/h (metric) or mph (U.S.)

Below this value, the monitor works in manual mode only.

16 **Total boom width:**

0.00- 100.00 mt.

17 **Pressure calculation:**

Enables the pressure calculation based on the type of nozzle installed. The pressure measurement shown on the monitor does not come from a sensor, but from a calculation based on the flow.

Yes/No.

18 **Number of nozzles:**

Total number of nozzles present on the sprayers.

0-1000.

19 **Number of section valves:**

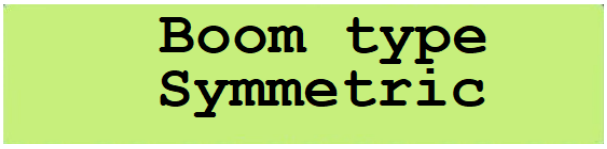
3/4/5 CS version

2/4 OS version

20 **Boom type:**

Definition of the boom type:

- *Symmetric:* the right and left sections are symmetric. In this case, it is possible to define the dimensions of the individual sections based on the number of valves divided by 2. The dimension of the central section is calculated by the difference.
- *Asymmetric:* the right and left sections are asymmetric. In this case, it is possible to define the dimensions of the individual

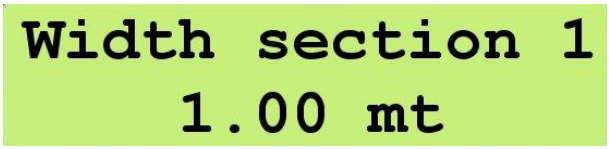


sections based on the total number of the valves defined.

21 **Total width of the spray boom:**

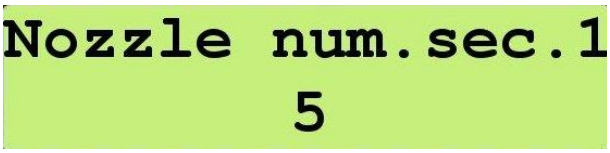
This defines the width of individual sections of the sprayers.

For more information see section 13.4



22 **Number of nozzles section 1 (external):**

0-200



Parameters related to the number of nozzles per section for a symmetric boom:

Number of sections:	Number of nozzles Section 1	Number of nozzles Section 2
3	Required	Not required
4	Required	Required
5	Required	Required

Table 4 – Number of nozzles per section for symmetric boom

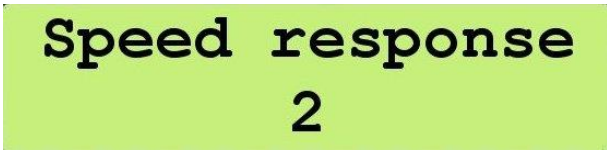
Parameters related to the number of nozzles per section for an asymmetric boom:

Number of sections:	Number of nozzles Section 1	Number of nozzles Section 2	Number of nozzles Section 3	Number of nozzles Section 4	Number of nozzles Section 5
3	Required	Required	Required	Not required	Not required
4	Required	Required	Required	Required	Not required
5	Required	Required	Required	Required	Required

Table 5 – Number of nozzles per section for asymmetric boom

23 **Response to change in speed:**

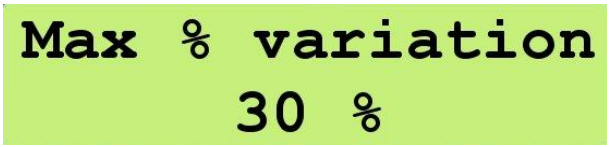
The response time to the adjustment of the flow rate varies according to the speed, from the value 1 (fast) to the value 5 (slow).



By increasing this value, the precision is increased but the speed of variation is reduced.

24 **Maximum percentage variation of increase/decrease of the flow rate:**

10, 20, 30, 40, 50% of the value set on the monitor.



25 **Adjustment response:**

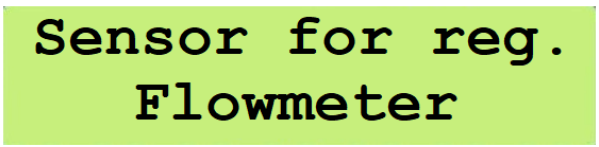
Allows the response time of the automatic adjustment to be changed.

- *Auto:* automatic, the system automatically varies the adjustment time according to the current conditions.
- Low: slow adjustment response time. In this mode, the adjustment is more accurate but slower to respond to changes.
- *Average:* average adjustment response time.
- *High:* long adjustment response time. In this mode the system is faster.
- *Customized:* parameter reserved for the manufacturer. Do not use this setup unless expressly specified.

26 **Adjustment sensor**

Selects the sensor used for adjustment.

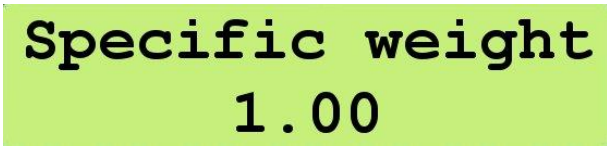
- *Flowmeter:* the system uses the flowmeter to adjust the dose (l/ha)
- *Pressure:* the system uses the pressure sensor to adjust the dose (l/ha)
- *Both:* the system uses the flowmeter or pressure sensor to adjust the dose (l/ha). When the flow rate (l/min) falls below the



value set in point 5 ***Minimum flow rate alarm threshold***.

27 **Liquid tank specific weight:**

Only if the sensor level = YES, this allows the tank level to be calculated as a function of the specific weight of the liquid inside.



28 **Tank level sensor:**

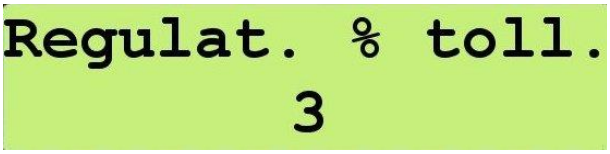
By choosing YES, the measured level is used in the tank refilling procedure. If NO is chosen, the default value is used.

Press the 

key to enter a new value.

29 **Percentage display value tolerance:**

This determines the sensitivity of the display.



30 **Section management:**

- *D*: this is dependent mode, where if the main valve is closed, the open section valves are also closed; the LEDs are turned off with the switches in any position. If the main valve is reactivated, then the other valves are also reactivated with the switches in the ON position
- *I*: this is independent mode, where the section valves stay open even if the main valve is closed.

31 **Regulating valve type:**

Bypass / Throttling

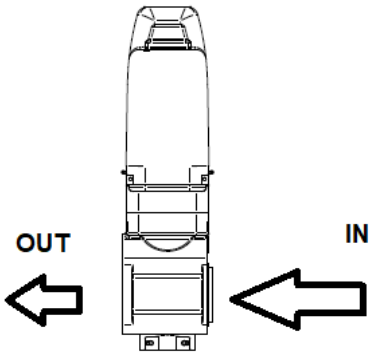


Figure 15 – Throttling valve

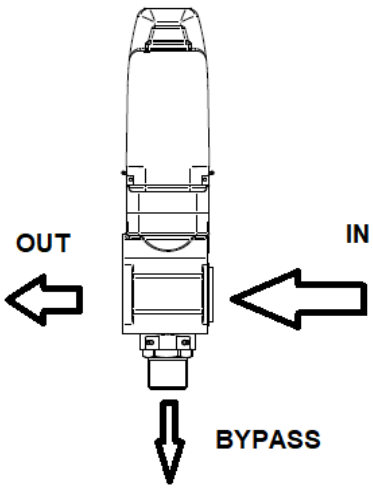


Figure 16 – Bypass valve

32 **Section valve type:**

ON-OFF / Metered

```
Sect.valve type
Metered
```

33 **Main Valve type:**

Bypass / Dump

```
Gen.valve type
Bypass
```

34 **Minimum pressure:**

0-200 bar

If the pressure value is below the minimum for 15 seconds, an alarm is activated.

```
Min. pressure
1bar
```

35 **Viscosity corrective factor:**

Value of the corrective factor of the flow as a function of the viscosity of the liquid.

```
Corr.fact.visco.
10.00
```

37 **Minimum speed for GPS**

0-5 Km/h (metric) or mph (U.S.)

Indicates the minimum speed value to establish the movement status of the vehicle.

```
GPS minim. Speed
0.5 km/h
```

38 **GPS HDOP (Horizontal Dilution Of Precision) maximum value:**

0.0 – 10.0

Above the set value the system will activate an alarm to indicate that the data related to the position and the speed is unreliable.

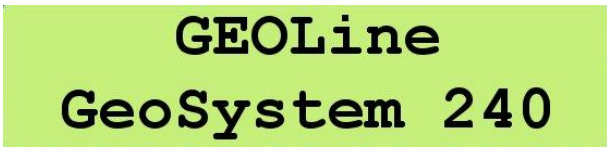
```
GPS HDOP max val
4.0
```

11.3 OPERATING PARAMETER CONFIGURATION

This allows all the operating parameters for each chemical treatment to be set.

1 Turn on the monitor by pressing  .

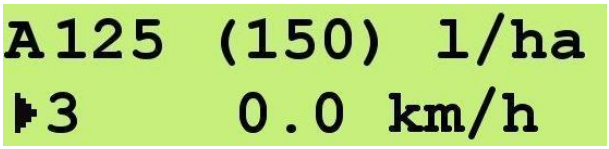
2 First message depends on the Geosystem model.



3 The Firmware version and system name then appear.

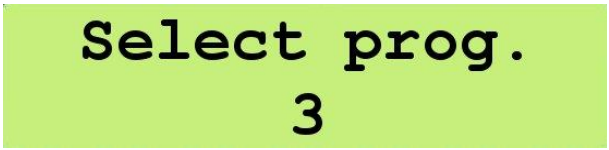
4 Then, the “Please Wait” message is shown.

5 The operating values are then shown.



6 Press the 

key to enter the program selection/configuration menu.



7 Press the  and  keys to choose the type of program and confirm by pressing the 

key.

It is possible to configure and choose up to 10 different types of program.

8 Keep pressing the 

key to pass through the subsequent programs.

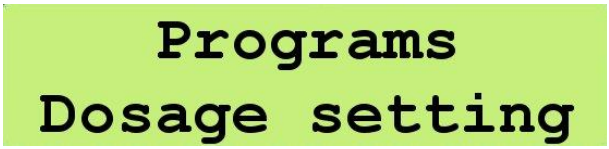
It is possible to delete the current selection by pressing the 

key.

11.3.1 LIST OF OPERATING PARAMETER MENU ITEMS

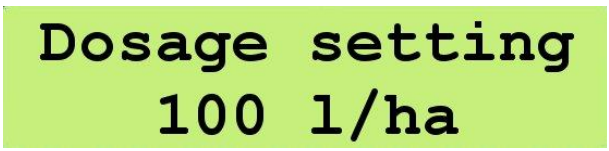
1 **Dosage setting:**

This sets the current value of the quantity of liquid per unit of area (liters per hectare).

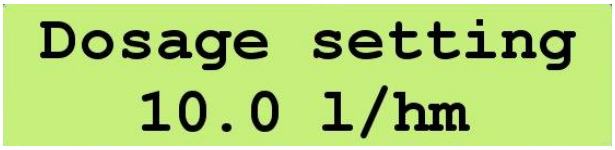


2 Press the 

key to open the parameter and set the value using the  and  keys.



For some models, if the “Distance” value was set in the “Dosage Setting” parameter, the value shown will have a decimal value (if this value is less than 100).



3 **Nozzle ID:**

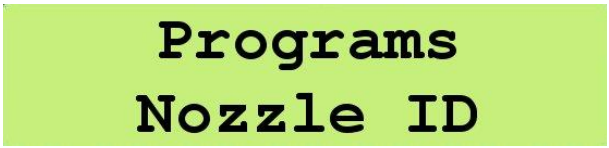
This identifies the current nozzle.

For this parameter, there are a maximum of 20 IDs, divided into:

-ISO: 12 pre-set and

-USER: 8 customized that can be entered by the user, entering the liters per minute and rated pressure values for each one.

See ISO table in section 22



4	Press the  key to select the ISO or USER ID.	Nozzle ID ISO
5	Select the nozzle using the  and  keys.	Nozzle ID ISO-01

12 INTERFACE DESCRIPTION OF ORCHARD SPRAYER (OS) MONITOR

12.1 LIST OF KEYS AND SWITCHES AND THEIR FUNCTIONS

Monitor with alphanumeric display, keys and control switches

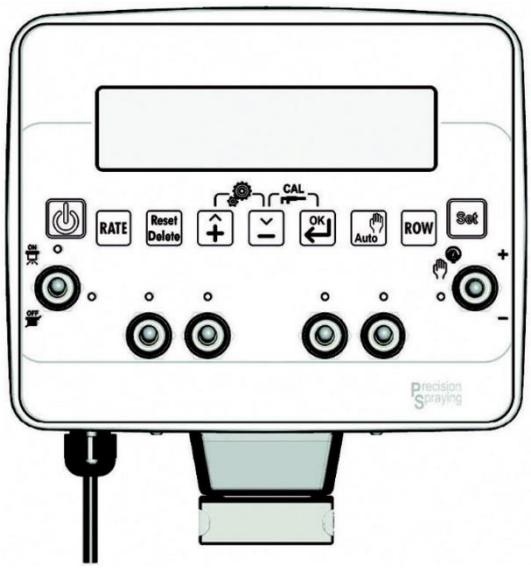


Figure 8 –OS version Monitor

CONTROL, SELECTION OR MODIFICATION KEYS

ON / OFF key:
Turns the monitor on / off

RATE key:
This is used to temporarily change the value of the delivered flow. The value is not stored; if the current job is resumed (Set key) the original value is reset.

Control key:
- Returns to the previous menu
- Resets the percentage increase / decrease of the sprayed value
- Allows the counters for the current treatment to be reset

UP key:
- Scrolls through the individual items to the previous menu
- Increases the value of the parameter

When modifying parameters, holding down the key allows the input values to be increased quickly

DOWN key:
- Scrolls through the individual items through to the next menu
- Decreases the value of the parameter

When modifying parameters, holding down the key allows the input values to be decreased quickly

OK key:
- Confirms access to the selected menu or previously modified parameter value
- Holding down this key for more than 2 seconds displays the values for the stored treatments

Control key:
Enables / disables the automatic adjustment of the spraying

ROW key:
This is used to temporarily change the value of the width between rows. The value is not stored; if the current job is resumed (Set key) the original value is reset.

Control key:
Enables the operating parameter menu.

12.2 GENERAL PARAMETER CONFIGURATION

Sets the parameters required for the proper operation of the monitor.

1	Turn on the monitor by pressing  .	
2	First message depends on Geosystem model.	GEOLine GeoSystem 240
3	The Firmware version and the system name: Orchard Sprayer then appear.	Rev.1.0.4 Orchard sprayer
4	Then, the “Please Wait” message is shown.	Please Wait
5	The operating values are then shown.	A125 (150) l/ha ▶3 0.0 km/h
6	Press the  and  keys at the same time to enter the configuration menu.	General config. Language
7	Scroll through the menu items using the  and  keys.	
8	Press the  key in order to modify the parameter: the choice can be modified or the value changed using the  and  keys.	Language English

If the parameter has a list of default values or names, these will be displayed by pressing  and  keys.
If the input value is numeric, it will increase or decrease according to how long the key is pressed with an exponential interval.

It is possible to delete the current selection or return to the previously menu by pressing the 

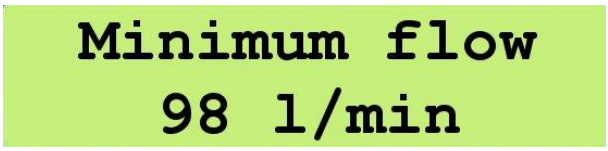
key.

12.2.1 LIST OF GENERAL CONFIGURATION MENU ITEMS

1	**Language:** Italian/English/Spanish/German/French /Portuguese/Finnish/Ukrainian/Russian/ Polish.	Language English
2	**Units of measurement:** Metric (l/ha, Km/h, bar) / US (GPA, mph, psi).	Units Metrics
3	**Vehicle identification:** (1-5) This identifies the vehicle on which the system is installed.  * By entering this configuration, the parameters for that particular vehicle will be set (in this example: vehicle 1).	Vehicle ID 1
4	**Flowmeter calibration:** This specifies how many pulses arrive at the flowmeter per unit of liquid sprayed. 1-5000 pulses/liter (Metric) or pulses/USG (gallon) (US).	Flowmeter calib. 1000 imp/l

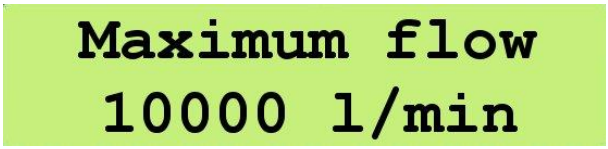
5 **Minimum flow alarm threshold:**

0-10000 l/min (Metric) or USGpm (gal/min) (US)



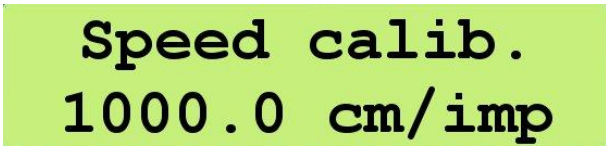
6 **Maximum flow alarm threshold:**

0-10000 l/min (Metric) or USGpm (gal/min) (US).



7 **Speed sensor calibration:**

2 modes: wheel constant = distance traveled (cm or inches) / (number of pulses per revolution * wheel speed) or Automatic over a distance of 100 meters, the pulse count is acquired.



8 **Pressure sensor calibration:**

0-200 full scale value (bar or psi).

9 **Tank capacity:**

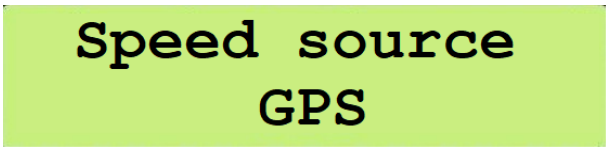
0-10000 liters (Metric) or USG (gal) (US).

10 **Minimum tank level alarm threshold:**

0-10000 liters (Metric) or USG (gal) (US).

11 **Speed measurement:**

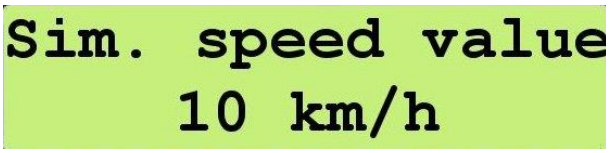
Indicates the type of sensor used to measure speed:



- *Pulse:* electronic pulse input e.g. speedometer
- *Prox:* speed measured through proximity sensor e.g. wheel sensor
- *Simulated:* uses a simulated speed
- *GPS:* uses the GPS antenna signal
- *Auto:* uses the GPS antenna signal if present or, alternatively, the proximity sensor
- *Auto HDOP:* if the GPS signal is lower than the maximum GPS HDOP value parameter, the GPS antenna signal is used, otherwise the proximity signal is used

12 **Simulated speed value:**

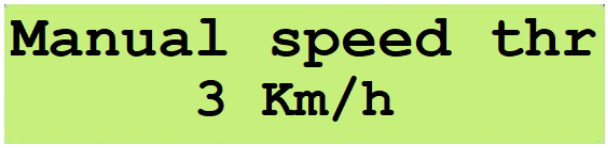
The monitor simulates the travel speed. 0-50 Km/h (metric) or mph (U.S.)



13 **Manual min. speed:**

0-50 Km/h (metric) or mph (U.S.)

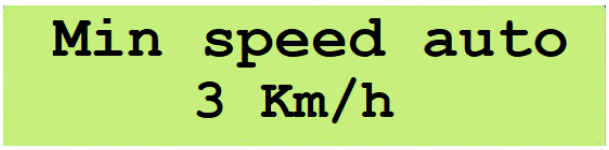
Value below which, in manual mode, the spraying is stopped by closing the main valve.



14 **Autom. min. speed:**

0-50 Km/h (metric) or mph (U.S.)

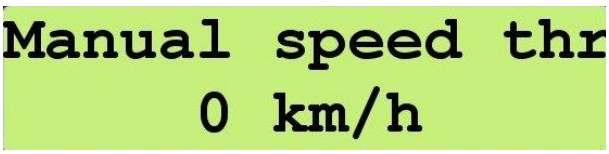
Value below which, when operating in automatic mode, the spraying is stopped by closing the main valve.



15 **Manual speed threshold:**

0-50 Km/h (metric) or mph (U.S.)

Below this value, automatic dose management is not performed. The system changes to manual mode .



16 **Pressure calculation:**

Yes/No.

If the parameter is *No*, the pressure sensor is used.

If the parameter is *Yes*, the operating pressure is calculated as a function of the current flow rate and the characteristics of the nozzles configured on each radial boom.

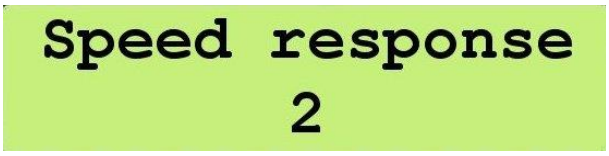
17 **Number of section valves:**

2, 4

18 **Sensitivity to change in speed:**

This changes the response time to the adjustment in flow rate as a function of the speed, from 1 (fast) to 5 (slow).

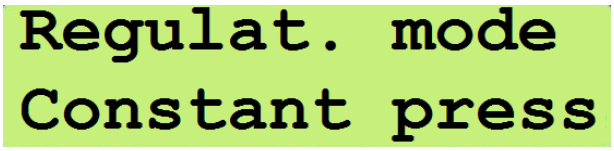
By increasing this value, the precision is increased but the speed variation is reduced.



19 **Adjustment mode:**

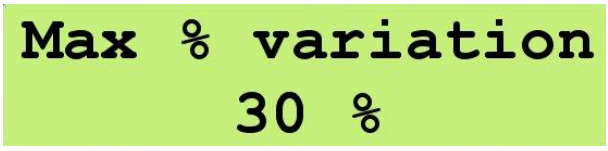
It is possible to change the mode of automatic spraying adjustment: Constant pressure or Constant volume.

For more information see section 13.6



20 **Maximum percentage variation of increase/decrease of the flow rate:**

10, 20, 30, 40, 50% of the value set on the monitor.



21 **Adjustment response:**

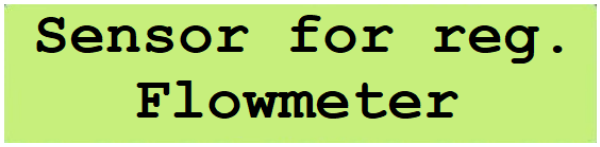
Allows the response time of the automatic adjustment to be changed.

- *Auto:* automatic, the system automatically varies the adjustment time according to the current conditions.
- Low: slow adjustment response time. In this mode, the adjustment is more accurate but slower to respond to changes.
- *Average:* average adjustment response time.
- *High:* long adjustment response time. In this mode the system is faster.
- *Customized:* parameter reserved for the manufacturer. Do not use this setup unless expressly specified.

22 **Adjustment sensor**

Selects the sensor defined for used for adjustment.

- *Flowmeter:* the system uses a flowmeter sensor to adjust the dose (l/ha)
- *Pressure:* the system uses a pressure sensor to adjust the dose (l/ha)

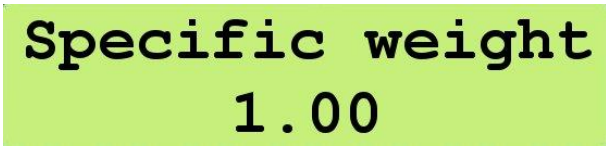


ENGLISH

- *Both:* the system uses the flowmeter or pressure sensor to adjust the dose (l/ha). When the flow rate (l/min) falls below the value set in point 5: ***Minimum flow rate alarm threshold***.

23 **Liquid tank specific weight:**

Only if the sensor level = YES, this allows the tank level to be calculated as a function of the specific weight of the liquid inside.



24 **Tank level sensor:**

By choosing YES, the measured level is used in the tank refilling procedure. If NO is chosen, the default value is used.

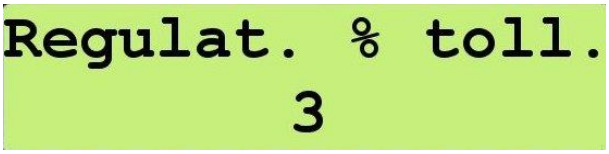
Press the 

key to enter a new value.

25 **Percentage display value tolerance:**

This determines the sensitivity of the display.

0 - 20 %



26 **Section management:**

- *D*: this is dependent mode, where if the main valve is closed, the open section valves are also closed; the LEDs are turned off with the switches in any position. If the main valve is reactivated, then the other valves are also reactivated with the switches in the ON position
- *I*: this is independent mode, where the section valves stay open even if the main valve is closed.

27 **Regulating valve type:**

Bypass / Throttling

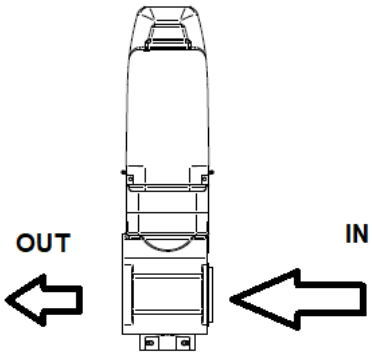


Figure 18 - Throttling valve

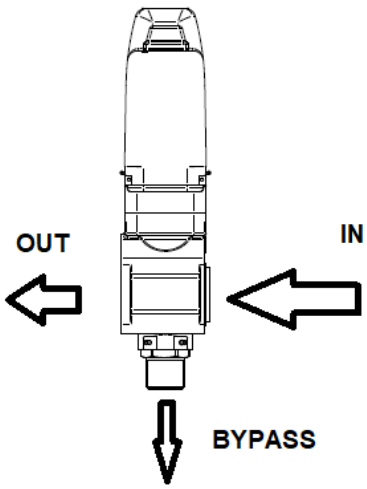


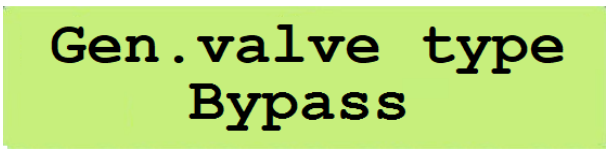
Figure 19 - Bypass valve

28 **Section valve type:**

ON-OFF / Metered

29 **Main Valve type:**

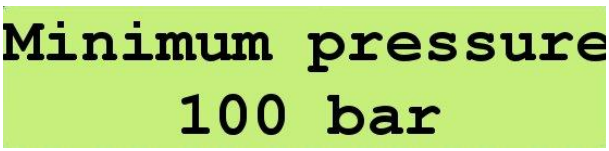
Bypass / Dump



30 **Minimum pressure:**

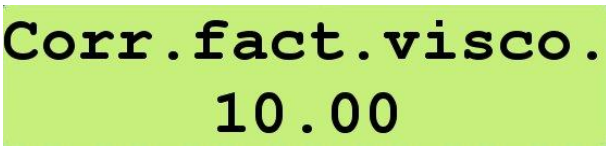
0-200 bar

If the pressure value is below the minimum for 30 seconds, an alarm is activated.



31 **Viscosity corrective factor:**

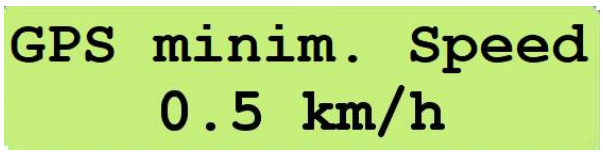
Value of the corrective factor of the flow as a function of the viscosity of the liquid.



32 **Minimum speed for GPS**

0-5 Km/h (metric) or mph (U.S.)

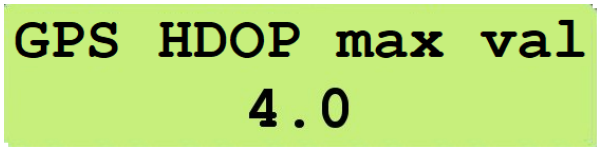
Indicates the minimum speed value to establish the movement status of the vehicle.



33 **GPS HDOP (Horizontal Dilution Of Precision) maximum value:**

1.0 – 10.0

Above the set value the system will activate an alarm to indicate that the



data related to the position and the speed is unreliable.

12.3 OPERATING PARAMETER CONFIGURATION

This allows all the operating parameters for each chemical treatment to be set.

1	Turn on the monitor by pressing  .	
2	First message depends on Geosystem model	GEOLine GeoSystem 240
3	The Firmware version and system name: Orchard Sprayer then appear.	Rev.1.0.4 Orchard sprayer
4	Then, the “Please Wait” message is shown.	Please Wait
5	The operating values are then shown on the display.	A125 (150) l/ha ▶3 0.0 km/h
6	Press the  key to enter the program selection/configuration menu.	Select prog. 3

7 Press the  and  keys to choose the type of program and confirm by pressing the  key.

It is possible to configure and choose up to 10 different types of program.

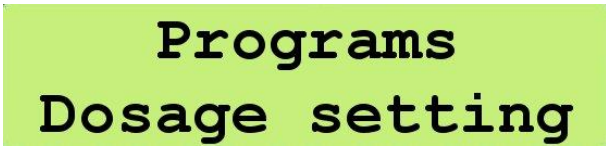
8 Keep pressing again the  key to pass through the subsequent programs.

It is possible to delete the current selection by pressing the  key.

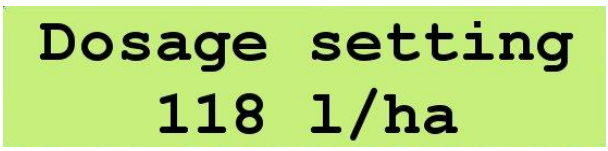
12.3.1 LIST OF OPERATING PROGRAM MENU ITEMS

1 **Dosage setting:**

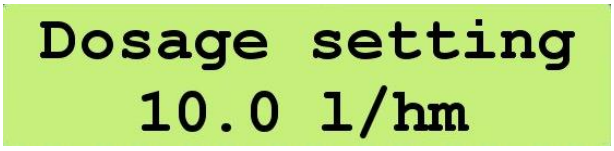
This sets the current value of the quantity of liquid per unit of area (liters per hectare).



2 Press the  key to open the parameter and to set the value using the  and  keys.

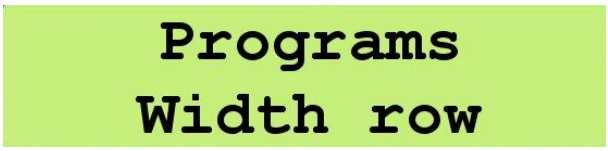


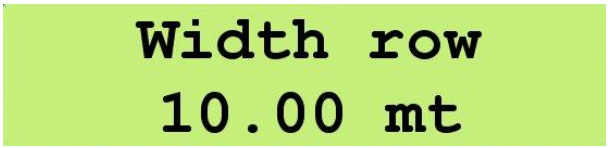
For some models, if the "Distance" value was set in the “Dosage Setting” parameter, the value shown will have a decimal value (if this value is less than 100).



3 **Row Width:**

Sets the row width as a function of corresponding value.

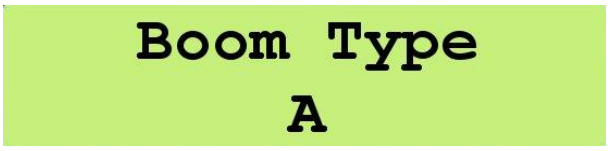




4 **Boom:**

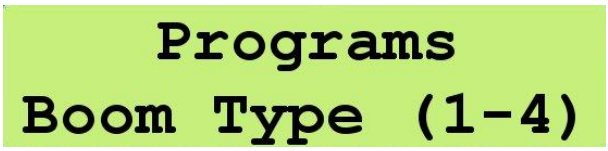
Sets the boom ID.

The possible values range from "A" to "J"



If the "Number of Valves" parameter is equal to 4, there are 2 items relating to the Boom Type:

1. **Boom Type (1-4)**
2. **Boom Type (2-3)**



More information in setion 13.5

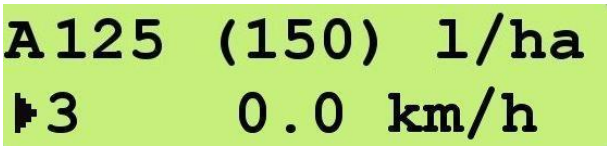
13 SYSTEM USE

13.1 OPERATING CYCLE EXECUTION

Based on the configured parameters, the monitor acquires the measurements from the various sensors and required adjustments.

1 Turn on the monitor by pressing  .

2 The current dosage values appear and, in brackets, the set values. The bottom line shows the speed of travel of the vehicle.



This display is available during operation.

3 

The monitor displays the individual values measured and calculated through the  and  keys.

13.1.1 LIST OF AVAILABLE VALUES IN THE OPERATING CYCLE

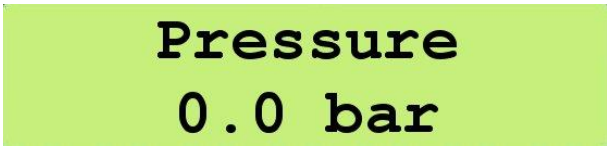
1 **Current pressure**

Only the following parameters are displayed:

- Value of pressure calibration ≠ 0

or

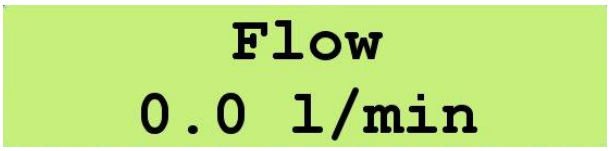
- Pressure calculation = YES

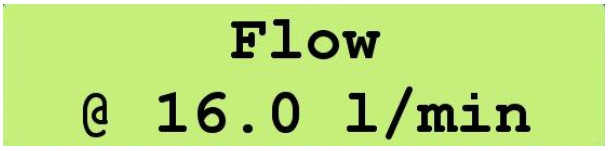


2 **Current speed**

3 **Current flow rate in liters/minute (or gallons/minute)**

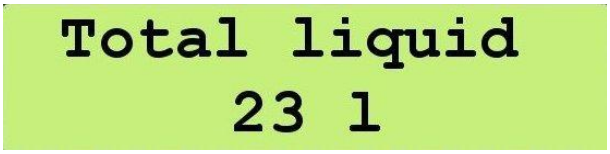
The “@” symbol before the value indicates that the flow rate value has been calculated and not measured by the specific sensor. This happens if and only if the “Section valve type” parameter is set as “Metered”.





4 **Extension of the treated area since the beginning of treatment**

5 **Total liquid sprayed since the beginning of treatment**



6 **Current tank level:**

This parameter allows the following 2 operations to be performed.

Press the 

key to modify the tank value using the  and  keys.

Press the 

key again to confirm the value.

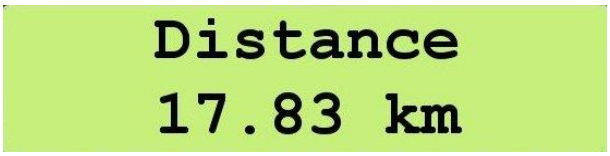
When increasing the value, keep the  key pressed without releasing it, and the value will increase, and then after 30 units it will pass to tens to accelerate the operation.

Keep the Reset Delete key pressed for 5 seconds to set the initial tank capacity (see the Tank Capacity parameter).

If the level sensor parameter is YES, the value set will be the level measured by the sensor. After the 5 seconds, the message: Completed! will appear.

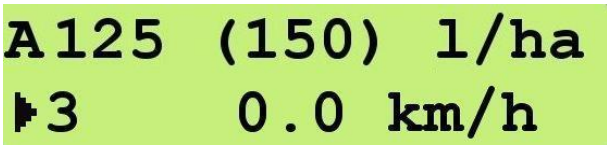
7 **Duration of most recent treatment (hh:mm)**

8 **Distance traveled since the beginning of the most recent treatment (Km)**



9

At the end of the menu, the initial display of the current dosage and the set dosage is restored.



10

Press and hold the Reset Delete key for 5 seconds anytime to reset all the counters related to the ongoing treatment.

After the 5 seconds, the message: Completed! appears.

Release the Reset Delete key before the 5 seconds to cancel the reset.

13.2 CALIBRATION PROCEDURE

These procedures must be carried out when the treatment is not active (in manual mode and with all the switches in the OFF position).

- NOZZLE CALIBRATION:

This allows the characteristics of the nozzle type used to be defined (liter/minute) as a function of the pressure (bar). It is possible to choose from a set of pre-configured (ISO standard) types or to define new ones.

- TANK LEVEL CALIBRATION:

This sets the calibration points related to the tank level sensor.

- SPEED SENSOR CALIBRATION:

This calculates the proximity speed sensor calibration constant based on a known distance to travel (100 m in the EU and 300 feet in the US).

1	Turn on the monitor by pressing 	
2	Keep pressing the  and  keys at the same time. Scroll through the 3 calibration items using the  and  keys.	
3	**NOZZLE CALIBRATION (max 8).**	
4	Press the  key to enter the nozzle configuration.	
5	Press the  key again to set up to 5 pairs of calibration values (Set 1-5) related to the nozzle.	

6 Press the OK key again to set the Pressure and Flow Rate using the + and − keys.

```
Pressure
0.0 bar
```

```
Flow
0.0 l/min
```

7 Press the Reset Delete key to return to the previous menu.

8 **TANK LEVEL CALIBRATION**

```
2 Tank level cal
```

9 Press the OK key to enter the tank configuration and set the calibration points.

```
Tank level
Points number 2
```

It is possible to define a minimum of 2 calibration points up to a maximum of 25.

```
Tank level
Points number 25
```

10 Press the OK key again to enter the tank level in liters using the + and − keys.

```
Tank level 1
75 l
```

Pour clean water into the tank (in the amount previously in the tank) and confirm with the OK key to move to the next value.

11 Definition of the second value.

Repeat the operations in step 9.

12 

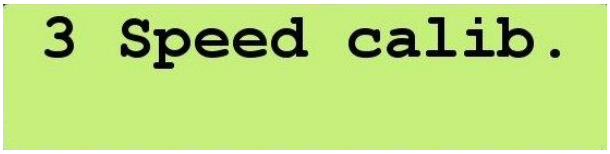
Perform steps 9 and 10 until the definition of all the calibration points to be set (max 25).

13 Press the 

key to finish the calibration.

If everything is successful, the message “Completed!” will appear.

14 **SPEED SENSOR CALIBRATION**



15 Press the 

key to enter the calibration.

16 The message “Counter value” will appear, which will gradually increase as the tractor moves towards the end point.

17 Press the 

key when the tractor gets to the end point (100 m in the EU and 300 feet in the US) in order to complete the calculation of the speed constant.

18 Press the 

key to go back to the calibration.

19	**BOOM CONFIGURATION**	4 Boom Config.
20	Press the key  in order to select the type of boom that identifies with the character from “A” to “J”.	Select Boom Type A
21	Press again the key in order to select the type of nozzle: **ISO, ATR, MGA or USER**	Select Nozzle ISO-15
22	Press again the  key in order to select the number of nozzle in the boom (da 0 a 200) .	Nozzles number 20
23	Press the  key in order to return to the previous menu.	

13.3 SOFTWARE PARAMETERS VALUES

Programmable software parameter limits.

Parameter	Description	Min. / UOM		Max. / UOM		Notes
Language	Message language	ENG/ITA/SPA/DEU/FRA/POL/RUS/FIN/POR				
Unit	Metric or imperial system	l/ha, Km/h, bar or GPA, mph, psi				Metric/ US
Vehicle ID	Vehicle on which the system is installed	1		5		
Flowmeter Calibration	Flowmeter Constant Value	1 imp/l	4 imp/USG	5000 imp/l	18927 imp/USG	Metric/ US
Minimum flow	Minimum flow alarm threshold	0 l/min	0 USGpm	10000 l/min	2642 USGpm	Metric/ US
Maximum flow	Maximum flow alarm threshold	0 l/min	0 USGpm	10000 l/min	2642 USGpm	Metric/ US

Speed Calibration	Speed sensor calibration	0.0 cm/imp	0.0 in/imp	6000.0 cm/imp	2362.2 in/imp	Number of pulses per rev. * wheel speed
Pressure Calibration	Pressure sensor calibration	0 bar	0 PSI	200 bar	2901 PSI	F.S. value
Tank capacity	Value the tank can contain	0 l	0 USG	10000 l	2642 USG	Metric/ US
Minimum Tank level	Minimum level tank alarm threshold	0 l	0 USG	10000 l	2642 USG	Metric/ US
Simulated speed	Simulated speed	No		Yes		
Simulated speed value	Simulated speed value	0 km/h	0 mph	50 km/h	31 mph	Metric/ US
Min speed - manual	Value below which, in manual mode, the spraying stops by closing the main valve	0 km/h	0 mph	50 km/h	31 mph	Metric/ US
Min speed - auto	Value below which, in automatic mode, spraying stops by closing the main valve	0 Km/h	0 mph	50 Km/h	31 mph	Metric/ US
Manual speed threshold	Value below which automatic management is not carried out (manual only)	0 Km/h	0 mph	50 Km/h	31 mph	Metric/ US
Total boom width (CS version)	Total Boom width	0.00 mt	0.00 ft	100.00 mt	328.08 ft	Metric/ US
Pressure calculation	Pressure calculation	No		Yes		
Number of nozzles (CS version)	Number of nozzles	0		1000		
Number of section valves (CS version)	Number of valves	3		5		3, 4, 5
Number of valve (OS version)	Number of valves	2		4		2, 4
Boom type (CS version)	Type of boom installed	Symmetric / Asymmetric				
Section width 1 – 5 (CS version)	Partial width of the boom	0.00 mt	0.00 ft	25.00 mt	82.02 ft	Metrics/ US
Number of nozzles	Number of nozzles, external section	0		200		

sections 1 - 5 (CS version)							
Number of nozzles section 2 (CS)	Number of nozzles, internal section	0		200			
Speed response	Sensitivity to speed variation	1		5		1 fast 5 slow	
Max Variation %	% Max Variation increase/decrease in flow rate	10 %		50 %			
Adjustment response	Response time of the automatic adjustment	Auto / Low / Medium / High / Custom					
Specific weight	Specific weight of tank liquid	0.00		10.00			
Level sensor	Presence of level sensor	NO		Yes			
% adjustment tolerance	% display tolerance	0 %		20 %			
Section management	Section management	Dependent		Independent			
Regulating valve	Type of regulating valve	Bypass		Throttling			
Section valve	Type of section valve	On-Off		Metered			
Main valve type	Type of main valve	Bypass		Dump			
Minimum pressure	Minimum operating pressure	0 bar	0 PSI	200 bar	2901 PSI	Metric/ US	
Corrective viscosity factor	Corrective viscosity factor	0.00		10.00			
Minimum GPS speed	Speed measurement threshold with GPS	0.0 km/h	0.0 mph	5.0 km/h	3.1 mph	Metric/ US	
GPS HDOP max value	Maximum value of GPS accuracy	0.0		10.0			

Table 7 - General Parameters

Parameter	Description	Min. / UOM		Max. / UOM		Notes
Program selection	Type of program	1		10		
Dosage setting	Current value of the quantity of liquid	0 l/ha	0 GPA	10000 l/ha	1069 GPA	Metric/ US
Nozzle ID (CS)	ID of the current nozzle	ISO / ATR / MGA / USER				
Boom type (1-4) (OS)	ID of the current boom	A / B /C / D / E / F / G / H / I / J				

Boom type (2-3) (OS)	ID of the current boom	A / B /C / D / E / F / G / H / I / J		
ISO	ISO nozzle	ISO-01	ISO-20	12 pre-configured
ATR	ATR nozzle	ATR-White	ATR-Blue	10 pre-configured
MGA	MGA nozzle	MGA-White	MGA-Red	8 pre-configured
USER	USER nozzle	User 1	User 8	8 customizable

Table 8 - Operating Parameters

13.4 SECTION WIDTH - CROP SPRAYER (CS) VERSION

For the proper functioning of the GeoSystem , it is not necessary to enter the width of each section, but it is sufficient to enter the total boom width and the width of one side of the individual sections.
The length of the sections will be calculated based on the symmetry of the system.

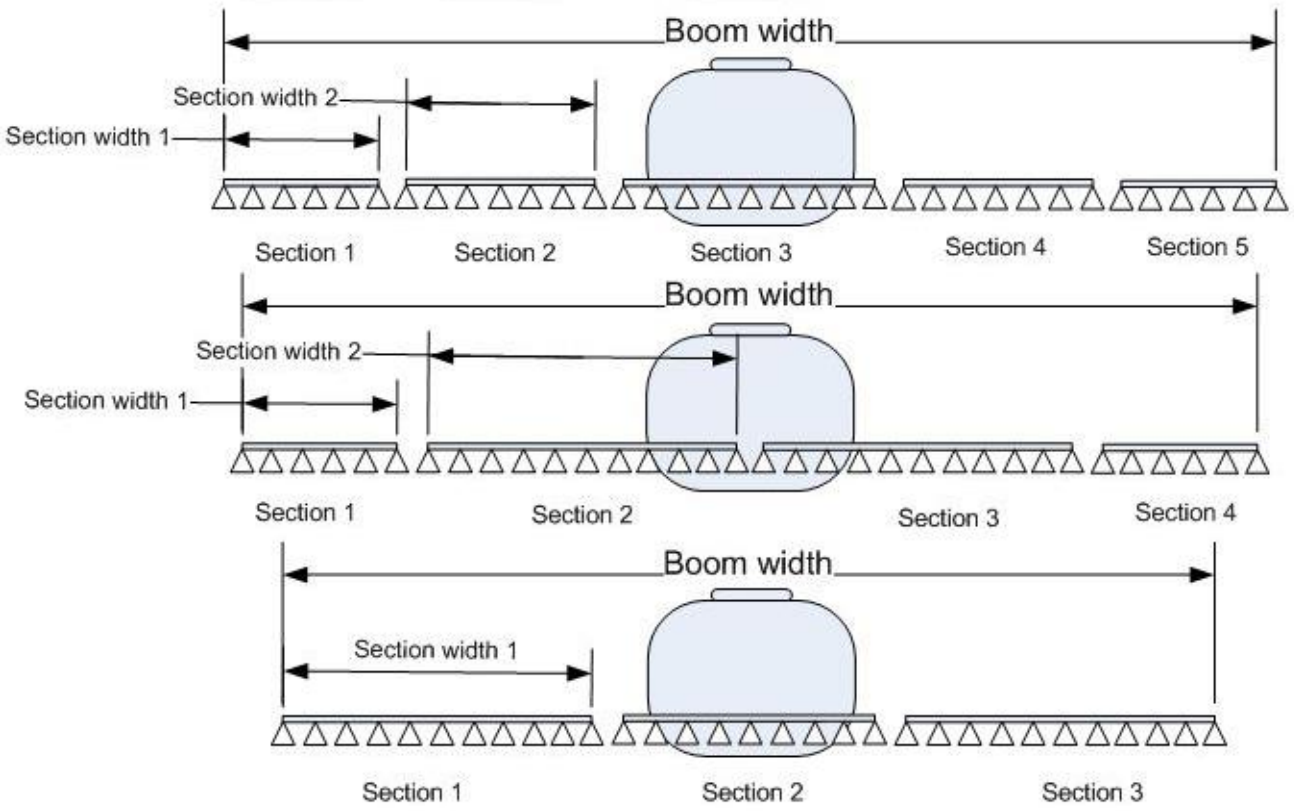
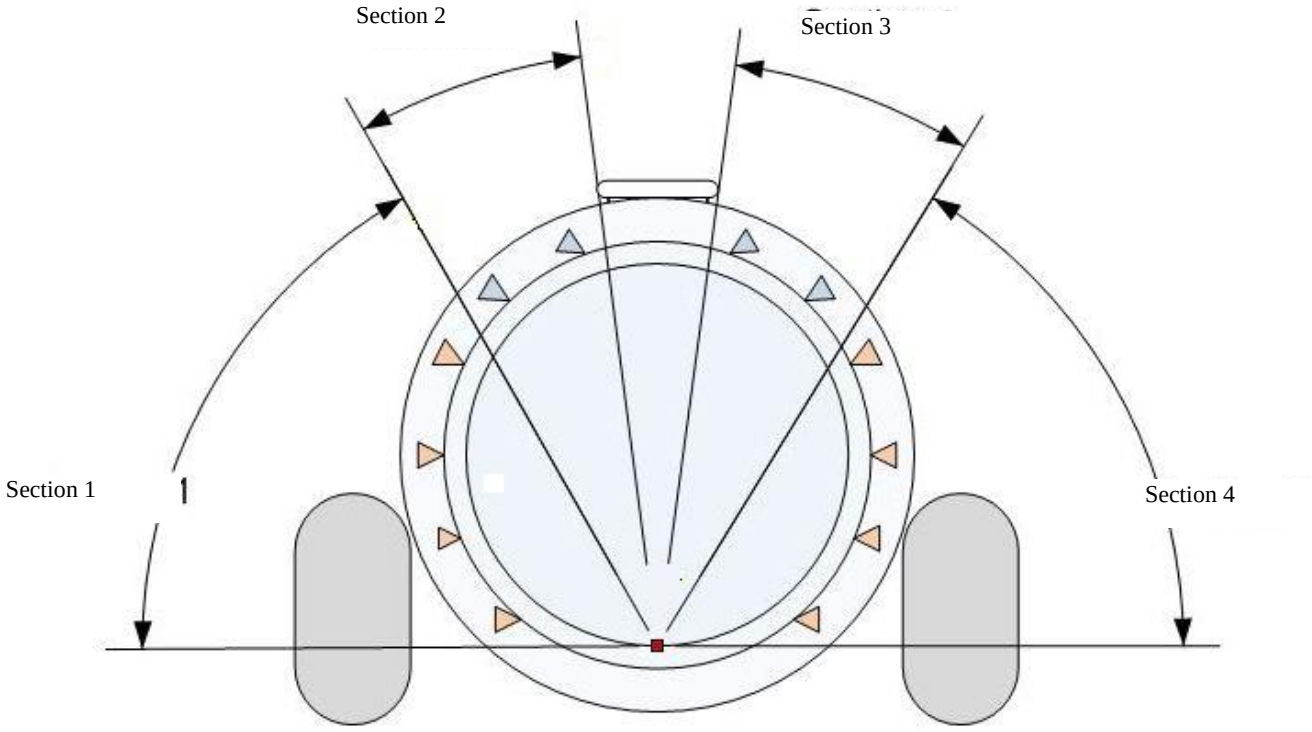


Figure 20 –Section width - Crop Sprayer (CS) version

13.5 BOOM SECTIONS - ORCHARD SPRAYER (OS)



Picture 9 – Boom sections. Distribution with 4 sections

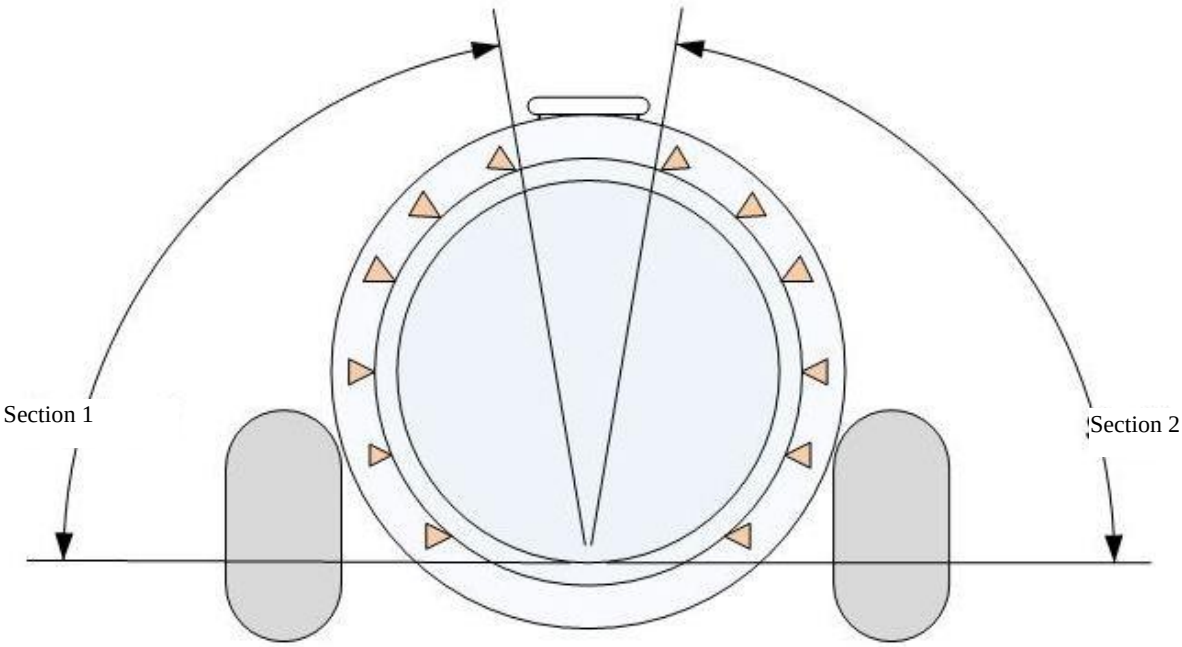


Figure 10 – Boom section. Distribution with 2 sections

13.6 MANAGEMENT OF TREATMENTS WITH 4 SECTIONS (OS)

Below is a description of the difference between an automatic adjustment with constant pressure or constant volume.

13.6.1 ADJUSTMENT IN CONSTANT PRESSURE MODE

During a treatment, in the event of closure of valves of different heights between left and right, the pressure can be kept constant but the quantity of liquid per unit of area will be re-calculated based on the number and type of nozzles activated.

Example: 200 l/ha and 4 bar of pressure

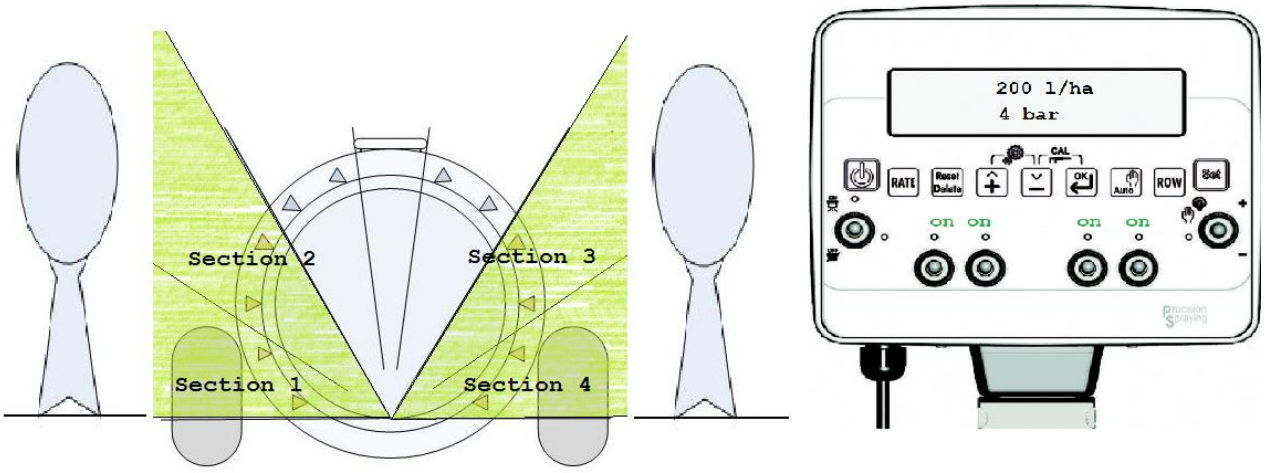


Figure 22 – Example with 4 active sections in constant pressure mode

If section 2 is closed, the pressure will be maintained constant at 4 bar but the distribution value will be reduced to 150 l/ha

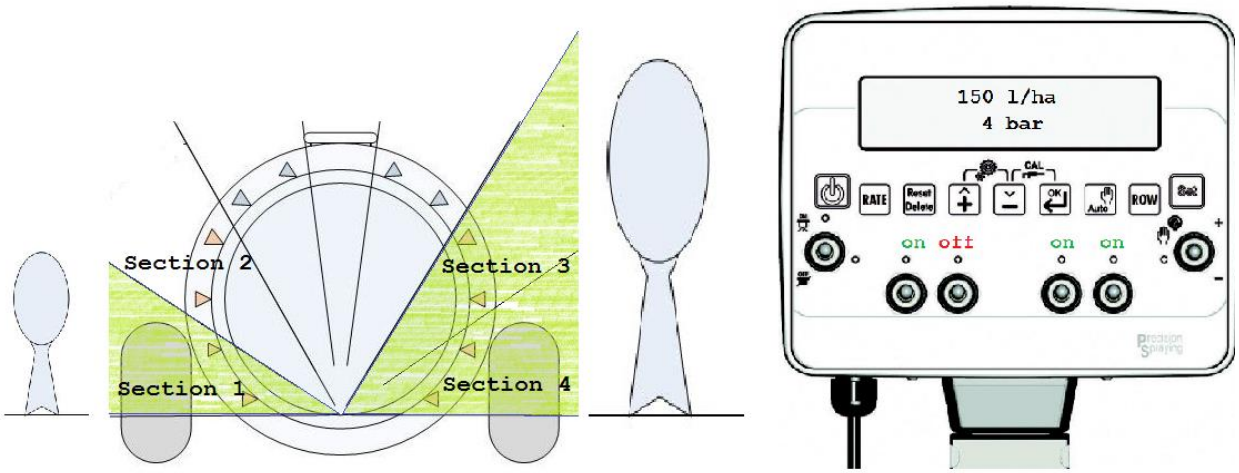


Figure 23 – Example with 3 active sections in constant pressure mode

13.6.2 ADJUSTMENT IN CONSTANT DISTRIBUTION MODE

During a treatment, in the event of the closure of valves of different heights between left and right, it is possible to keep the volume of liquid sprayed constant but the value of pressure will be increased.

Example: 200 l/ha and 4 bar of pressure

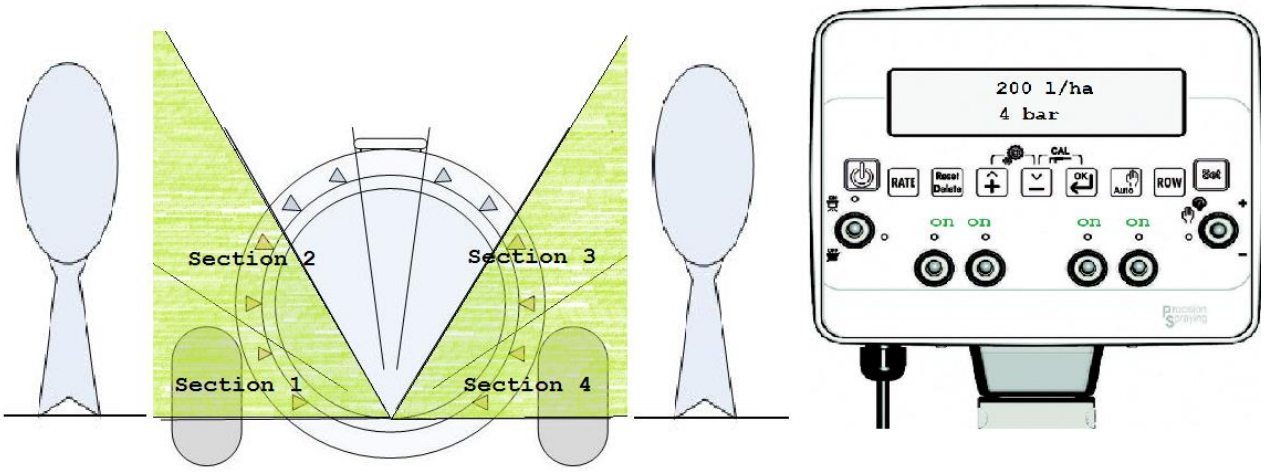


Figure 24 – Example with 4 active sections in constant distribution mode

If section 2 is closed, the distribution value will be maintained but the pressure will be increased to 6 bar.

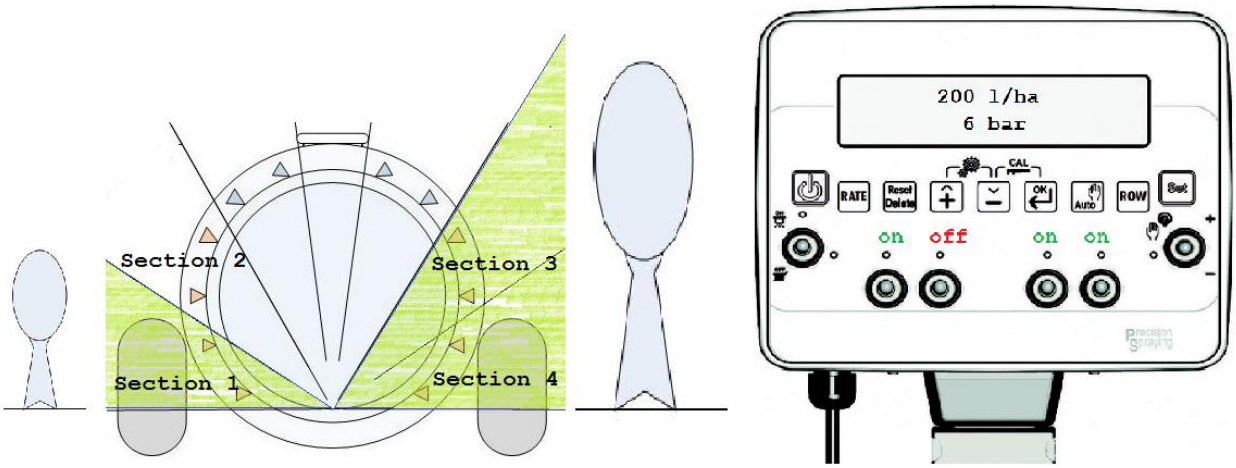


Figure 25 – Example with 3 active sections in constant pressure mode

14 HARDWARE TEST

This allows a hardware test of the monitor to be carried out to check that the switches and sensor inputs are working.

This test can be carried out only at start-up.

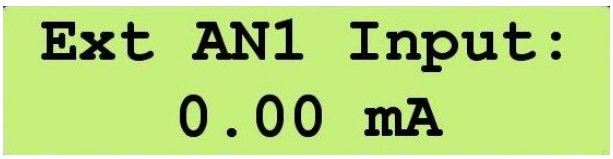
1 Turn on the monitor by pressing  .

2 After viewing the Firmware version, when the “Please Wait” message appears, press the  and  keys at the same time.

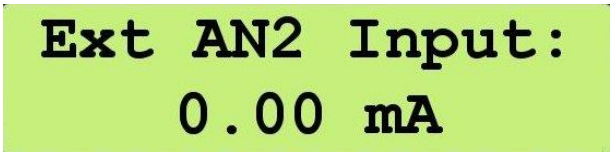
3 The “Test HW” message will appear.

4 The Voltage value will then be shown and it is possible to scroll through the values using  and  keys.

5 The next value is the analog input 1 value for the Switch Box board corresponding to the pressure sensor.

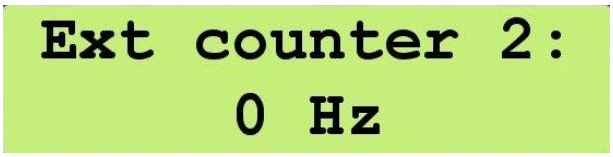


6 The next value is the analog input 2 value for the Switch Box board corresponding to the tank level sensor.



7 The next value is the external counter 1 value corresponding to the flowmeter input 

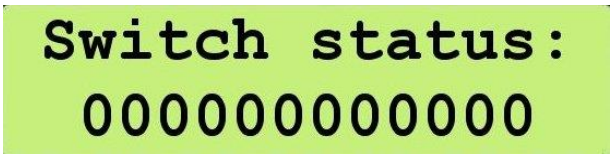
8 The next value is the external counter 2 value corresponding to the speed sensor input.

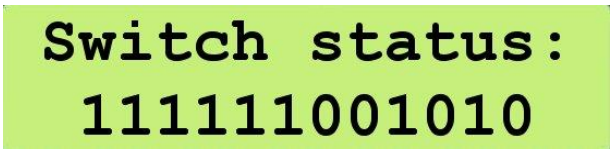


9 The next value indicates the status of the switches.

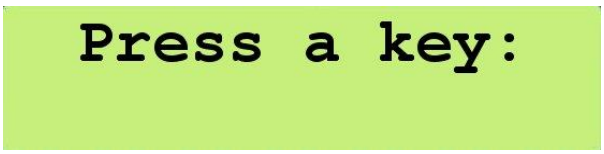
0 = OFF
1 = ON

By turning on the switches, the status will change from 0 to 1 and turning them off will return the value to 0.





10 This step allows the correct functioning of the keys to be checked. The “Press a key” message will be displayed.



11 By keeping the specific key pressed down, the name of the key appears temporarily on the display.

By pressing the Reset key, first the “RESET KEY” message appears, then the monitor moves on to the buzzer test.

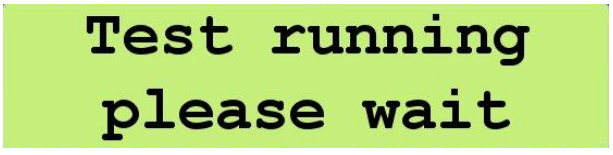
12 Buzzer test.

During this step, an acoustic signal will be activated, confirming the correct functioning of the buzzer.

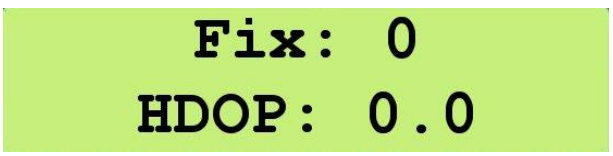
13 GPS Check

Press the OK key to run the test to check the correct functioning of the GPS.

14 The following message will be shown on the display:



15 During the test, the monitor will show the following data received from the GPS:



	Latitude (LAT) and longitude (LON) of the current position, number of satellites used to detect the position (SAT), degree of accuracy of the GPS tracking (HDOP) and the type of calculation used to detect the position (FIX). The FIX value can be 0 (no detected position), 1 (position detected by GPS) and 2 (position detected by DGPS).	Fix: 1 HDOP: 1.3 Lat: 44.12345678 Lon: 11.87654321
16	Press any key to return to the key test; press the  key to return to the normal operation of the monitor.	
17	 To repeat the “TEST HW”, switch the monitor off and on again.	

15 USE OF GEOSYSTEM

15.1 CROP SPRAYER (CS) DISPLAY

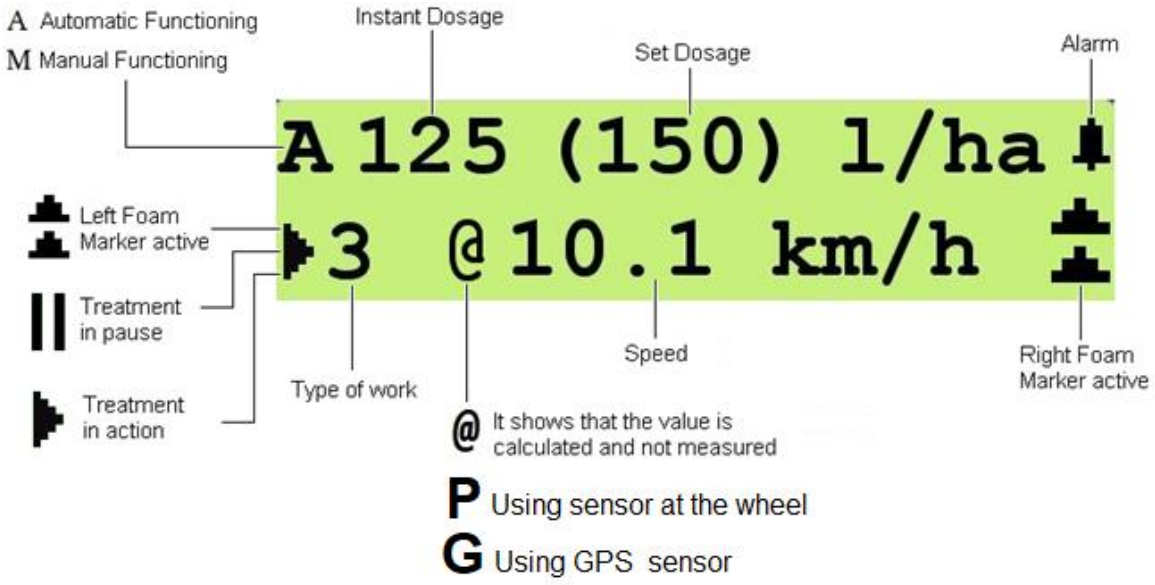


Figure 26 –Crop Sprayer Display

15.2 ORCHARD SPRAYER (OS) DISPLAY

Section 4

Automtic functioning

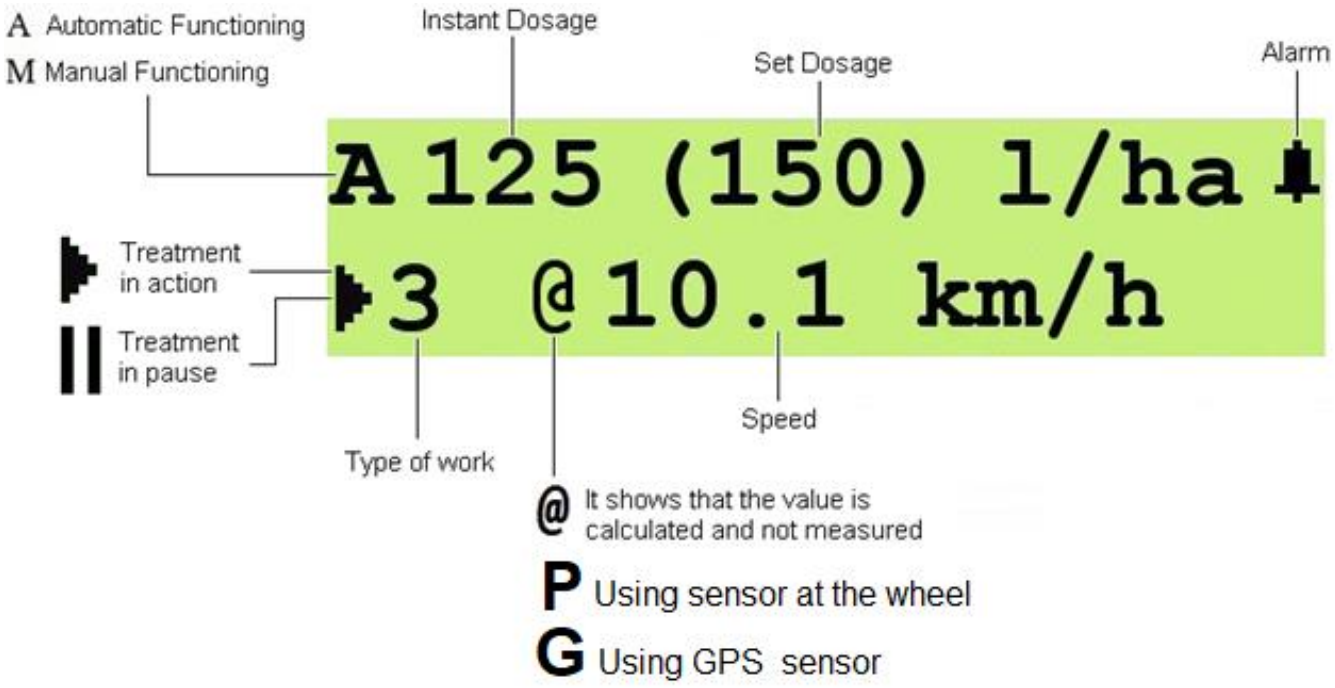


Figura 27 –Orchard Sprayer Display

15.3 TREATMENT DEFINITION

The term treatment refers to the set of data recorded during a spraying activity. The operating parameters recorded by GeoSystem are stored in a list. The treatment list can store up to 20 treatments.
The data relating to each treatment can be viewed using the appropriate keys.
Every time a new treatment is started, the data from the current treatment is added to the list.
Treatment number 1 is the most recent treatment saved.
Treatment number 2 is the second last treatment saved and so on.
Each time a treatment is saved, all the other treatments on the list shift one position.
When the list is full, the recording of a new treatment results in the deletion of the oldest treatment (i.e., the one in twentieth position).
After treatment n° 20, the “Total” value appears, which refers to the historical data related to all the treatments.

This value cannot be reset, not even through the memory RESET procedure.

15.4 NEW TREATMENT

1 To start the recording of data for a new treatment, select any operating cycle parameter, with the exception of the parameter: "Tank Level".”

2 Press the 

key for 5 seconds.

3 At this point, all the counters are reset.

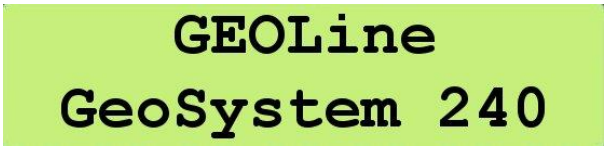
The “Tank level” parameter is a special parameter:

Pressing this key for 5 seconds DOES NOT prepare the system for a new treatment but for the refilling of the tank.

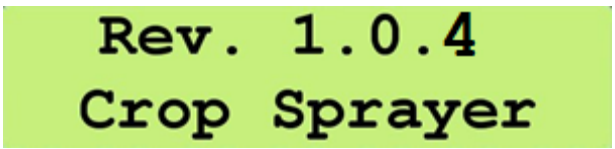
15.5 TURNING ON GeoSystem

1 Turn on the monitor by pressing 

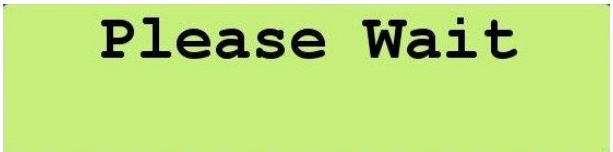
2 First message depends on Geosystem model



3 The Firmware version and the system name then appear.



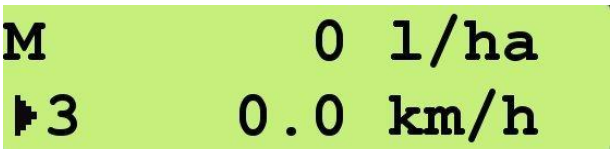
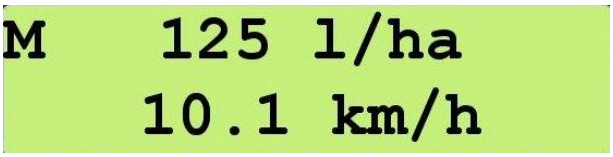
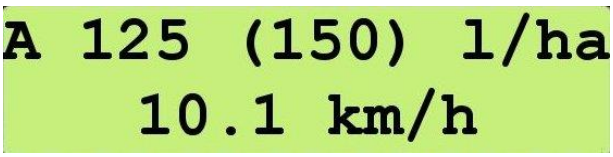
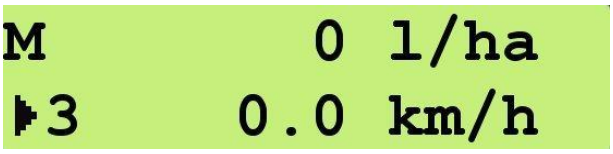
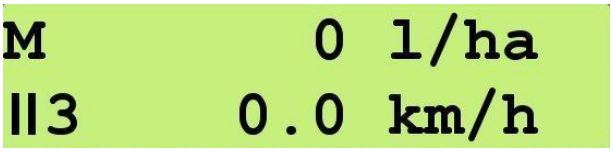
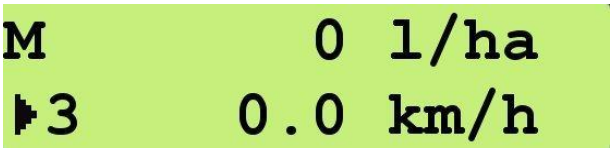
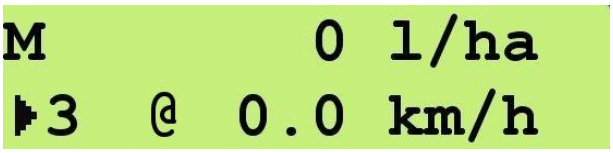
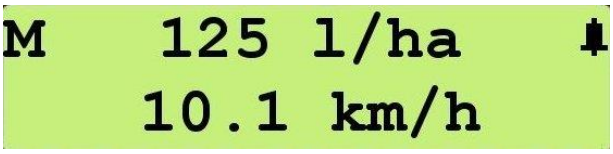
4 Then the “Please wait” message is shown.



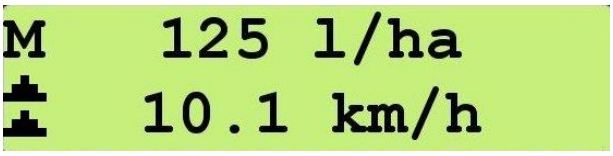
5 

If the main valve is on (switch in the ON position), when the monitor is turned on, a warning message will appear and a buzzer will sound.

Disable the switch to stop the alarm.

6	The operating values then appear on the display and, if necessary, additional information such as:	
7	• **the character "M" before the current distribution value "M 125 l/ha":** this indicates that the monitor is in manual mode;	
8	• **the character "A" before the current distribution value** **"A 125 l/ha":** this indicates that the monitor is in automatic mode.	
9	• **the "►" symbol in the bottom left:** this indicates that the treatment is running**.**	
10	• **the "▌▐" symbol in the bottom left:** this indicates that the treatment has been paused.	
11	• **the number "3" in the bottom left:** this identifies the type of program being performed.	
12	• **the "@" symbol:** this indicates that the data shown on the right has been calculated or simulated and has not originated from the reading of a specific sensor. E.g. the speed shown is a simulated value.	
13	• **The symbol  symbol in the upper right:** this indicates the presence of an alarm.	

14 **CROP SPRAYER (CS) VERSION:**



- **The  symbol in the bottom left / right:** this indicates that the foam marker is active.

It is possible to enable this option by pressing the  and  keys. Press again to turn off.

15 **MEMORY RESET:**

On start-up, press the 

keys at the same time to reset all the monitor parameters to the initial values.

ORCHARD VERSION (OS) SPRAYER:

On-start-up, press the 

keys at the same time to reset all the monitor parameters to the initial values.

15.6 TURNING OFF the GeoSystem

1	Press the  key for 2 seconds in order to turn off the system.	
2	Wait for the data of the last treatment to be saved.	

During the turning off procedure, do not press any key and do not cut off the power, until the monitor turns off.

Always use the appropriate key to turn off the system, otherwise all the data relating to treatments and programs will be lost.

15.7 PREPARATION

1	Make sure all the switches are in the OFF position.	
2	Turn on the monitor by pressing the  key.	
3	Set the amount of liquid that is in the tank in GeoSystem.	
4	To start the data recording for a new treatment, select any operating cycle parameter, except the ”tank level” parameter.	
5	The system stores the treatment data in a list of 20 elements.	
6	Press the  key for 5 seconds to save the most recent data stored in the list and reset all the counters, preparing to record the data relating to the new treatment to be performed. N.B. if there is no level sensor, by pressing the key, all the operating data will be reset, except the tank level,	

which is reset to the value set during the configuration phase.

15.8 AUTOMATIC OPERATION

Automatic operation is indicated by the letter A on the left-hand side of the display. The value in brackets is the dosage set by the user; GeoSystem will control the regulating valve to keep the dosage constant as the vehicle speed varies.

15.9 MANUAL OPERATION

Manual operation is indicated by the letter M on the left-hand side of the display. GeoSystem will record the operating data shown during the operation.

15.10 TANK REFILLING DURING A TREATMENT

1	If the field being treated requires an greater amount of liquid than the amount in the tank, it will be necessary to refill the tank one or several times.	
2	Each time there is a refill, the tank level must be updated (parameter: “Tank Level”)	
3	Select the parameter: “Tank Level”	
4	Press the  key for 5 seconds.	
5	Press the  key to manually set the quantity of liquid put into the tank.	
6	The parameter is automatically updated with the maximum tank capacity value (parameter: “Tank capacity”).	

The “Tank level” parameter is a special parameter:

If the “Tank level” parameter is NOT selected, pressing the key for 5 seconds will prepare the system for a new treatment, resetting all the counters.

7	To modify the value, enter the modifying phase by pressing the OK key and using the  and 	

keys to increase or decrease the value.

15.11 TOTALIZERS

These allow the counters related to jobs to be checked.

15.11.1 READING THE TOTALIZERS

1 Turn on the monitor by pressing  .

2 Press and hold the  key for 3 seconds to access the statistics from the operating mode.

3 The name of the totalizer is shown and, on the bottom line, the total duration of the treatment.

4 Scroll through the last 20 treatments using the  and  keys.

Totalizer N° 1 relates to the most recent treatment while totalizer N° 20 refers to the oldest one.

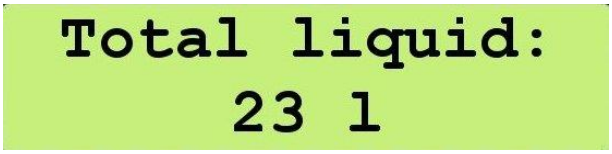
5 After treatment n° 20, the total value relating to the historical treatment data is shown.

6 Press the  key to verify the individual counts of each totalizer.

Use the  and  keys to display the values relating to the treatment carried out, including:

- **The treated area (ha)**

- **The total liquid sprayed (l)**

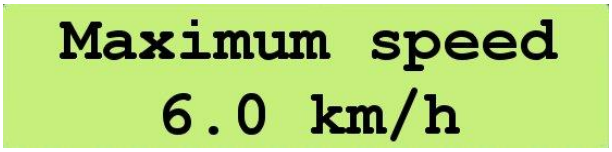


- **The distance traveled (Km)**

- **The treatment duration (hh:mm).**

- **Average speed (km/h)**

- **Maximum speed (km/h)**



15.11.2 RESETTING THE TOTALIZERS

1 The monitor stores the treatment data in a list of 20 elements.

2 Press and hold the Reset Delete key for 5 seconds to save the most recent data stored on the list and reset all the counters, preparing to record the data related to the new treatment to be performed.

Press the OK key to confirm the reset or Reset Delete key to cancel.

If there is no level sensor, by pressing the reset key, all the operating data will be reset, except the tank level, which is reset to the value set during configuration.

15.12 RETRIEVE TREATMENT DATA

1 Press the OK key for 3 seconds to access the menu that displays the list of the last 20 treatments performed.

2 Use the  and  keys to scroll through the list of treatments. Press the  key to access the content.

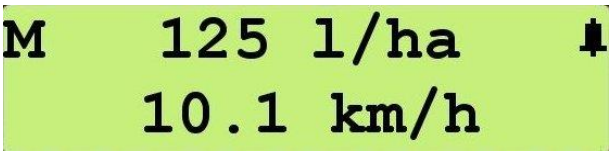
16 ALARMS

16.1 WARNING AND ALARMS

There are warnings and alarms to indicate specific operating faults.
When an alarm goes off, a buzzer sound will be heard.

Press  key to disable the buzzer.

An active alarm is indicated by the  symbol to the right of the first line of the display.



16.2 LIST OF POSSIBLE ALARMS

1. Flow adjustment alarm:

The monitor must reach a flow set point value (l/ha); if it does not reach this value, the alarm will go off after one minute.

2. Empty tank alarm:

This alarm is activated when the minimum level of liquid in the tank is reached, as set with the parameter: **Minimum tank level alarm threshold**

3. Minimum flow alarm:

The amount of liquid sprayed (l/min) is lower than the parameter: **Minimum flow alarm threshold**

4. Maximum flow alarm:

The amount of liquid sprayed (l/min) is higher than the parameter: **Maximum flow alarm threshold**

5. Low battery level alarm:

The battery level is lower than 9.0 Volts

6. Low pressure alarm**:**
The alarm is activated after 15 seconds with a pressure less than the parameter:
Minimum pressure

7

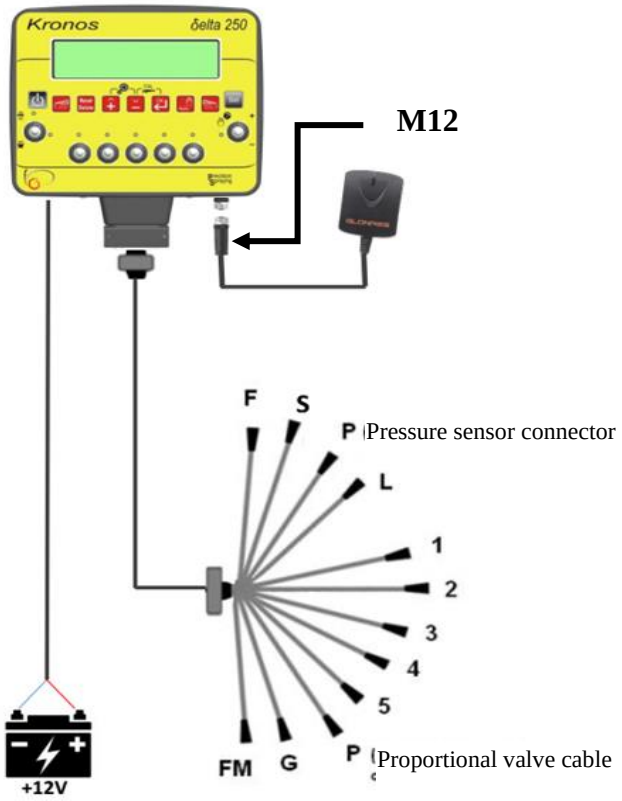
17 GPS RECEIVER TEST

17.1 GPS FUNCTIONALITY TEST FOR GEOSYSTEM

The GPS antenna or receiver is a device that is capable of receiving information from GPS satellites and then calculating the device's geographical position using suitable software**.**
Time To First Fix (**TTFF**) is a measure of the time required for a GPS receiver to acquire satellite signals and navigation data, and calculate the correct position (called FIX).
TTFF can take a few seconds up to a few minutes. After the first Fix, the GPS receiver saves the satellite information in the internal memory and consequently the time to fix will be shorter the next time. If the GPS receiver is not used for a long time, the internal satellite information will be deleted, and the Time to First Fix will be longer because the receiver will have to identify the current satellite positions again.

Follow the procedure below to check the correct functionality of the antenna

- **a)** Check the correct installation of the hardware devices. In particular, check that the GPS antenna connector (M12) is property inserted.
- **b)** Switch on the Geosystem and verify that the computer has turned on correctly. If the display lights up, everything is ok.



F: FLOW SENSOR

S: SPEED SENSOR

P: PRESSURE SENSOR

L: LEVEL SENSOR

1 ÷ 5: SECTION VALVE CABLES

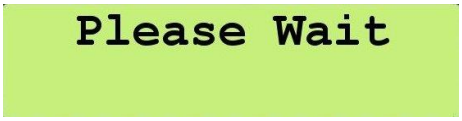
P: PROPORTIONAL VALVE CABLE

G: MAIN VALVE CABLE

FM: FOAM MARKER CABLE

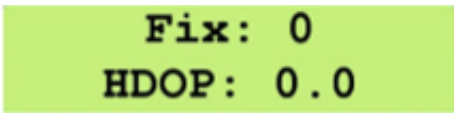
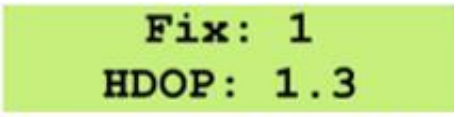
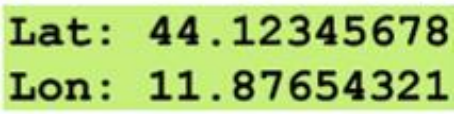
- **c)** Switch off the Geosystem and follow the instructions below

Switch on the Geosystem by pressing  .

When the "**Please Wait**" message appears, press the  and  keys at the same time.	
The Geosystem is now in hardware test mode.	
The Voltage value will appear and it is possible to scroll through the values using the  and  keys.	
Select the "**Check GPS**" menu Press the  key to run a test to check the correct functioning of the GPS	

During the test, Geosystem will show the data received from the GPS:

- Latitude (LAT)
- Longitude (LON)
- Degree of accuracy of the GPS tracking (HDOP)
- Type of calculation used to detect position (FIX)

At the beginning, the fix value may be 0 (no detected position).	
After a few minutes, the fix value will be: 1 (**position detected by GPS**) 2 (**position detected by DGPS**):	 

After 30 minutes, if the "**Fix**" value is still 0, go to the troubleshooting menu

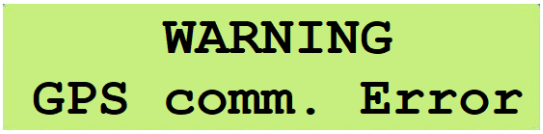
TROUBLESHOOTING

- **GPS CANNOT FIX POSITION, FIX=0**

Check if the GPS signal is available. Make sure that the antenna is placed in an open space far from any walls or trees. It is also recommended to switch off the computer. All hardware connections must be checked, especially the M12 connector. Finally repeat the hardware test.

- **CHECK ANTENNA CONNECTION**

If the antenna is not connected, the computer will not receive any signal and the "**GPS comm. Error**" message will appear on the display.



In this case, the antenna connection may be wrong. It is recommended to switch off the computer. All hardware connections must be checked, especially the M12 connector. Finally repeat the hardware test.

If the fault is still present, please contact the manufacturer.

18 TROUBLESHOOTING

DISPLAY	CAUSE	SOLUTION
The display does not turn on	There is no power.	Check the power cable connections.
	The monitor is turned off.	Press the ON button.
The valves cannot be controlled	The valves are not connected.	Connect the connectors
A valve does not open	There is no power going to the valve.	Check the electric connection and the functioning of the valve
The counting of the distance traveled shown on the Geosystem is different from the actual distance.	Incorrect programming	Check the connection with the speed sensor.
	The totalizer has not been reset	Reset the totalizer
The counting of the treated area shown on the Geosystem is different from the actual area.	Incorrect programming	Check the boom width programming
	The totalizer has not been reset	Reset the totalizer
The instant pressure is not shown.	The monitor is not receiving a signal from the pressure sensor	Check the connections with the pressure sensor
	Incorrect installation of the pressure sensor	Check the connections with the pressure sensor
The displayed instant pressure is inaccurate.	Incorrect programming	Check the full scale programming for the pressure sensor
	The pressure sensor has not been calibrated	Perform the calibration
	Incorrect installation of the pressure sensor	Check the connections with the pressure sensor
The displayed tank level is inaccurate.	The level sensor has not been calibrated.	Perform the calibration. Repeat the level sensor calibration.
	Incorrect installation of the level sensor.	Check the connection with the level sensor

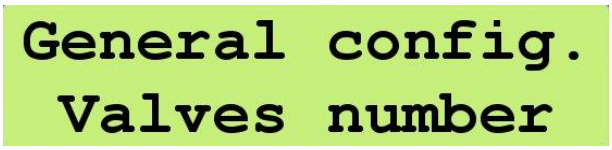
Table 9 - Troubleshooting

19 OTHER CONFIGURATIONS - CROP SPRAYER (CS)

19.1 EXAMPLE OF GeoSystem 5W CS INSTALLATION ON 4-SECTION SPRAYING SYSTEMS

1	Make sure the system is connected exactly as on Figure 5.	
2	In this step, the connection of the sensors is not important but the valve cable connections and the GeoSystem driver box output connection are.	
3	Make sure all the switches are in the OFF position and turn on the monitor by pressing the  key.	
4	First message depends on Geosystem model	GEOLine GeoSystem 240
5	The Firmware version and system name are then shown.	Rev. 1.0.4 Crop Sprayer
6	The message “please wait” then appears.	Please Wait
7	The operating values are shown.	A125 (150) l/ha ▶3 0.0 km/h
8	Press the  and  keys at the same time to enter the configuration menu.	
9	Scroll up and down the menu entries using the  and  keys until the “number of valves” parameter is reached.	General config. Valves number
10	Press the  key to enter the configuration.	

Go to the next step to verify the operation of the valves, otherwise skip to step number 15.

11	Set the number 5 and press the  key to confirm.	
12	The new message “ General configuration Number of valves” is then displayed.	
13	Press the  key to exit and to restart the monitor.	
14	When the monitor is in operating mode, activate switch number 1 (ON position) and check that valve number 1 is working. Then, disable switch 1 (OFF position) and try with switch number 2. Repeat the test for all valves.	

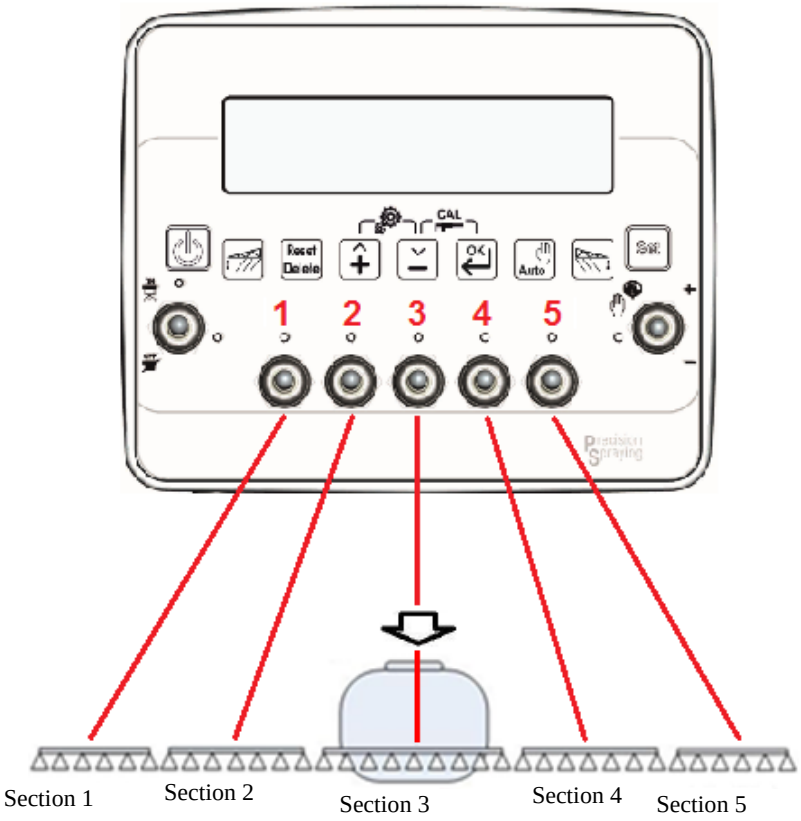


Figure 28 - Use of 5 sections

15 If all the connected valves are working, enter the configuration menu again and set the valve number to 4.

16 At this point the monitor is working with only 4 switches as shown on the Figure below:

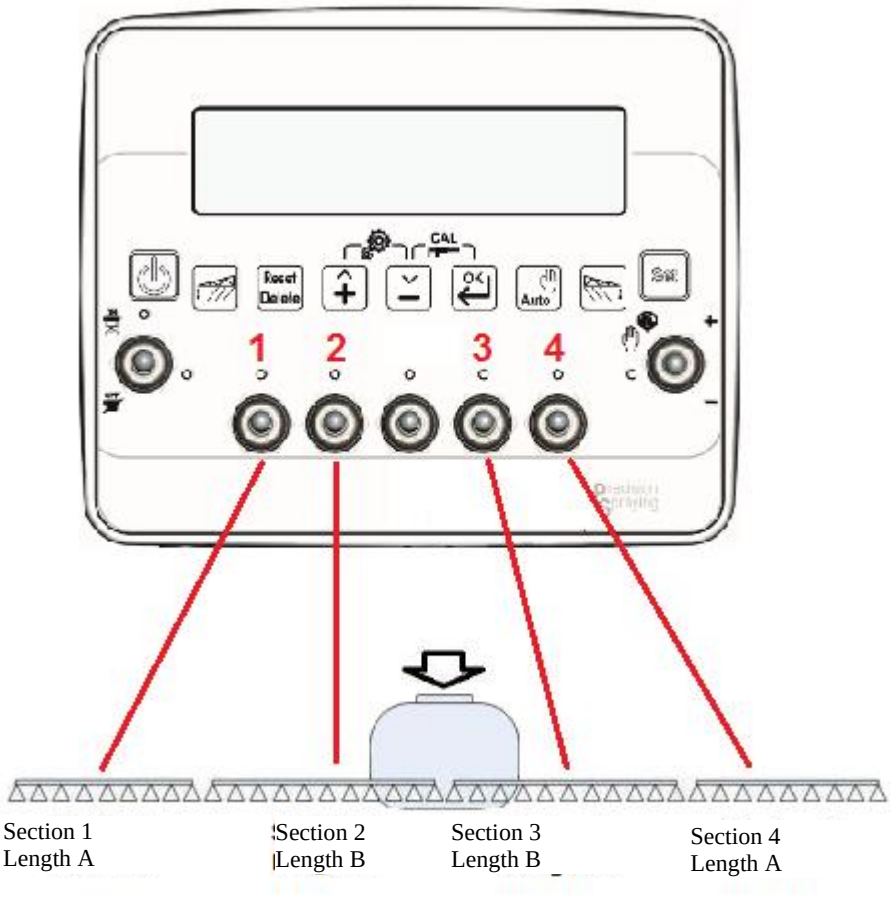


Figure 29 – Use of 4 sections for CS version

The links to the sections will be numbered as follows:

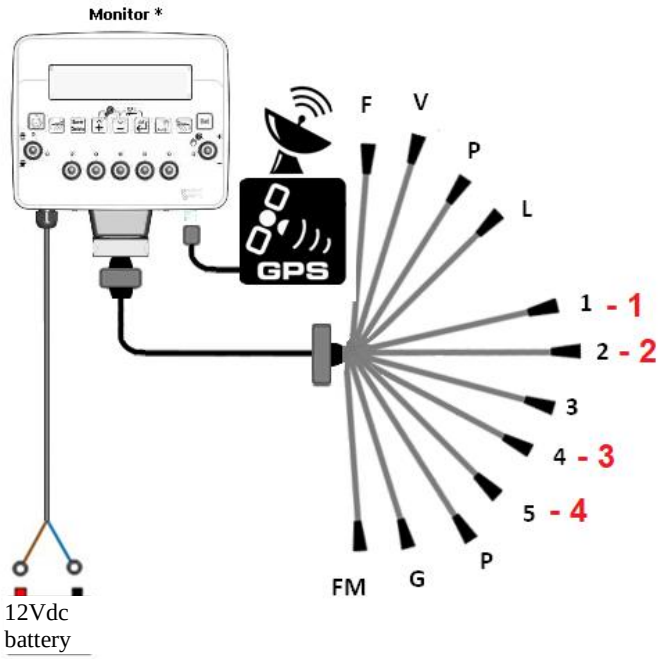
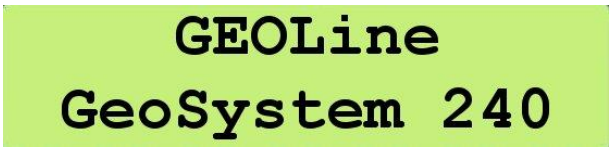
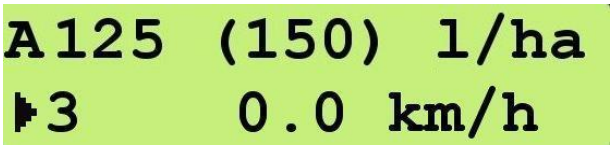
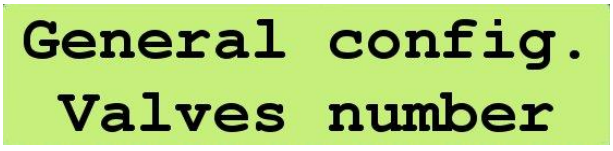
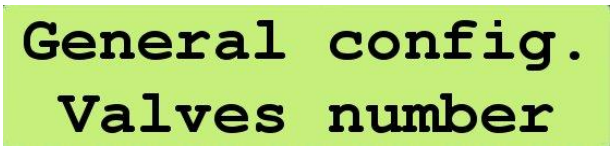


Figure 30 - Connection for 4 sections

19.2 EXAMPLE OF GeoSystem 5W CS INSTALLATION ON 3-SECTION SPRAYING SYSTEMS

1	Make sure the system is connected exactly as on Figure 5.	
2	In this step, the connection of the sensors is not important but the valve cable connections and the GeoSystem driver box output connection are.	
3	Make sure all the switches are in the OFF position and turn on the monitor by pressing the  key.	
4	First message depends on Geosystem model	
5	The Firmware version and system name are then shown.	
6	The “please wait” message then appears.	
7	The operating values are then shown.	
8	Press the  and  keys at the same time to enter the configuration menu.	
9	Scroll up and down the menu entries using the  and  keys until the “number of valves” parameter is reached.	
10	Press the  key to enter the configuration.	

Go to the next step to verify the operation of the valves otherwise skip to step number 15.

11	Set the number 5 and press the  key to confirm.	
12	The new message “ General configuration Number of valves” is then displayed.	
13	Press the  key to exit and to relaunch the monitor.	
14	When the monitor is in operating mode, activate switch number 1 (ON position) and check that valve number 1 is working. Then, disable switch 1 (OFF position) and try with switch number 2. Repeat the test for all valves.	

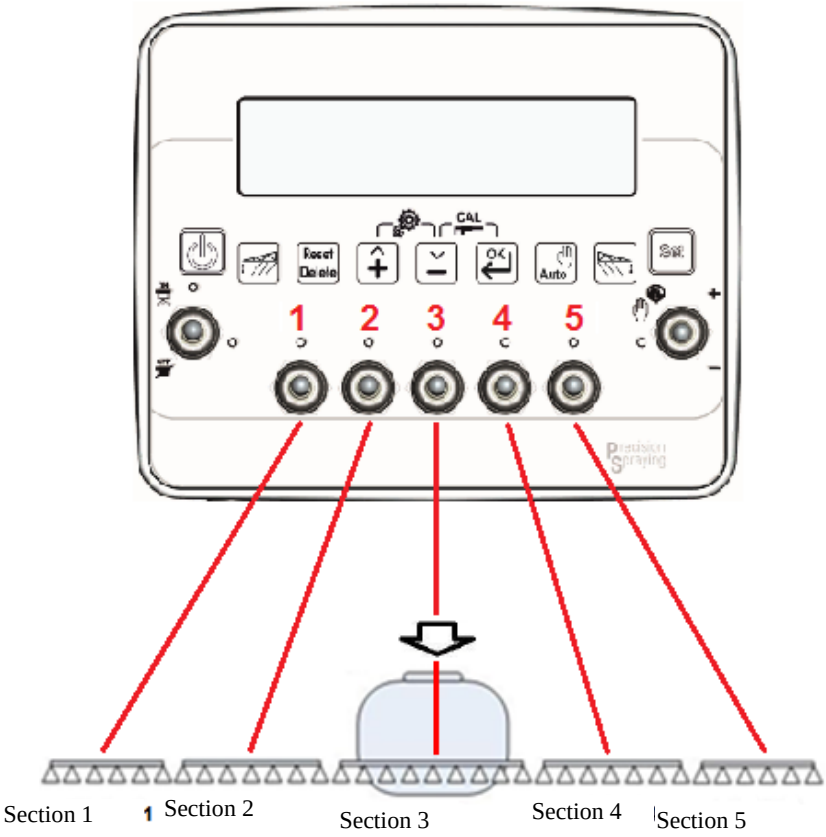


Figure 11 - Use of 5 sections

15 If all the connected valves are working, enter the configuration menu again and set the valve number to 3.

16 At this point the monitor is working with only 3 switches as shown on the Figure below:

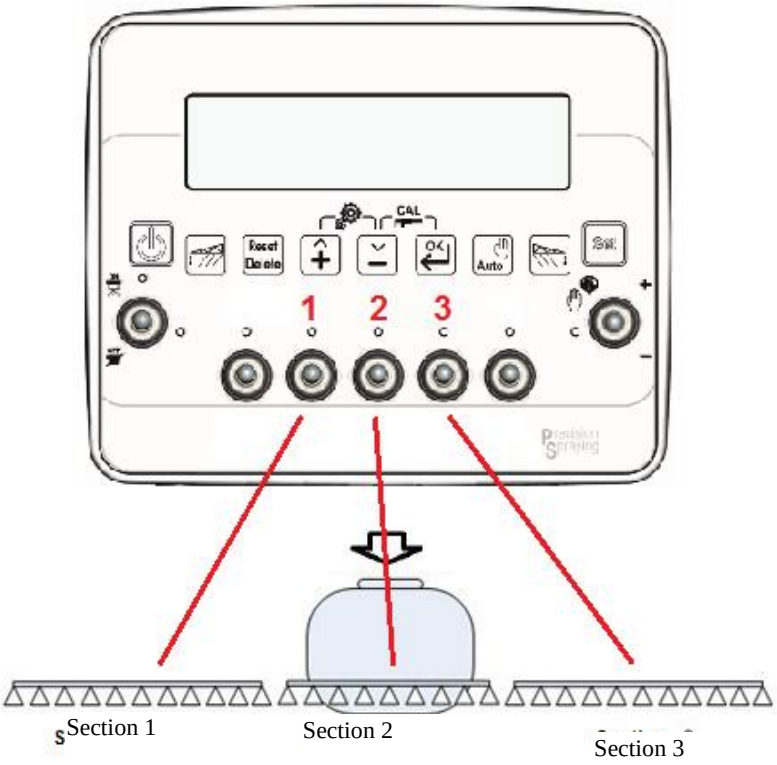


Figure 12 - Use of 3 sections

The connections to the sections will be numbered as follows:

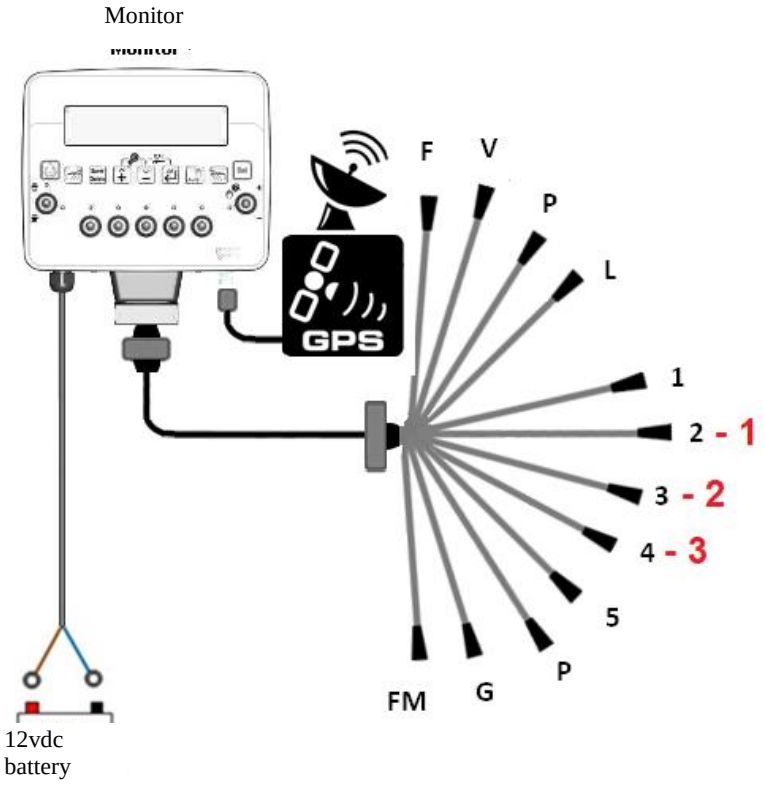
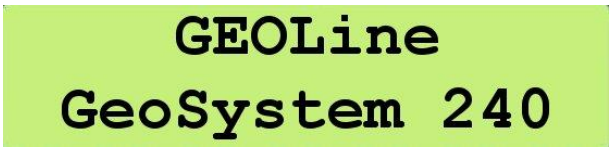
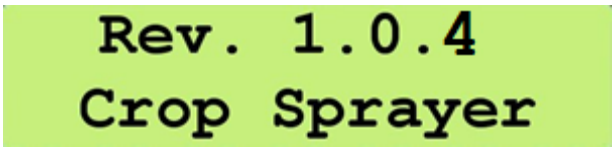
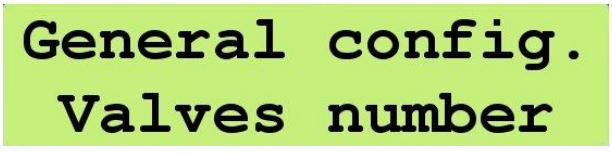


Figure 29 - Connection for 3 sections

20 OTHER CONFIGURATIONS - ORCHARD SPRAYER (OS)

20.1 GeoSystem 4OS INSTALLATION ON 2-SECTION SPRAYING SYSTEMS

ENGLISH

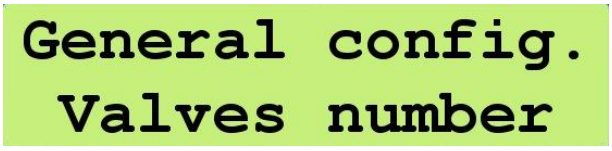
1	Make sure the system is connected exactly as on Figure 8.	
2	In this step, the connection of the sensors is not important but the valve cable connections and the GeoSystem driver box output connection are.	
3	Make sure all the switches are in the OFF position and turn on the monitor by pressing the  key.	
4	The message “GEOLine GeoSystem ” appears on the display.	
5	The Firmware version and system name: Orchard Sprayer are then shown.	
6	The “please wait” message then appears.	
7	The operating values are then shown.	
8	Press the  and  keys at the same time to enter the configuration menu.	
9	Scroll up and down the menu entries using the  and  keys until the “number of valves” parameter is reached.	

10 Press the OK key to enter the configuration.

Go to the next step to verify the operation of the valves otherwise skip to step number 15.

11 Set the number 4 and press the OK key to confirm.

12 The new message “General config. Number of valves” is then displayed.



13 Press the Reset Delete key to exit and to relaunch the monitor.

14 When the monitor is in operating mode, activate switch number 1 (ON position) and check that valve number 1 is working.
Then, disable switch 1 (OFF position) and try with switch number 2. Repeat the test for all valves.

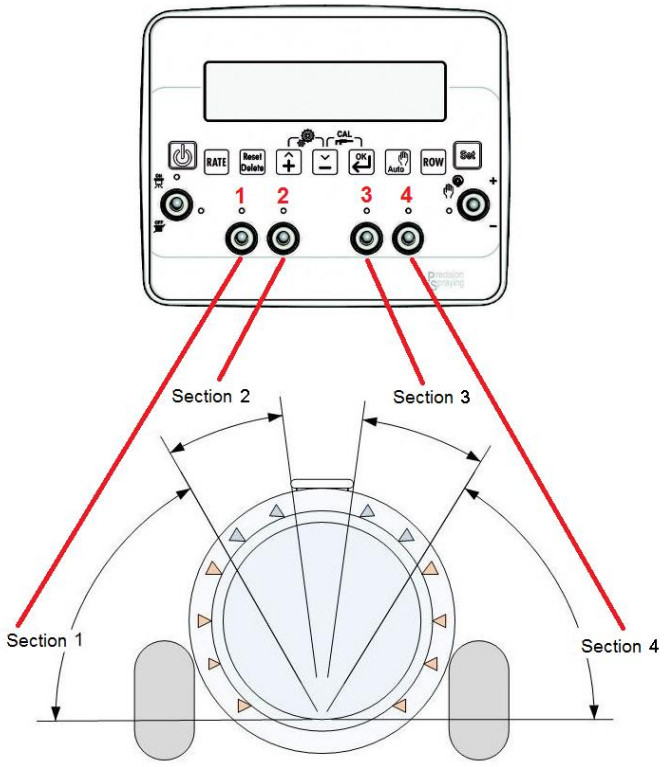


Figure 30 - Use of 4 sections

15 If all the connected valves are working, enter the configuration menu again and set the valve number to 2.

16 At this point the monitor is working with only 2 switches as shown on the Figure below:

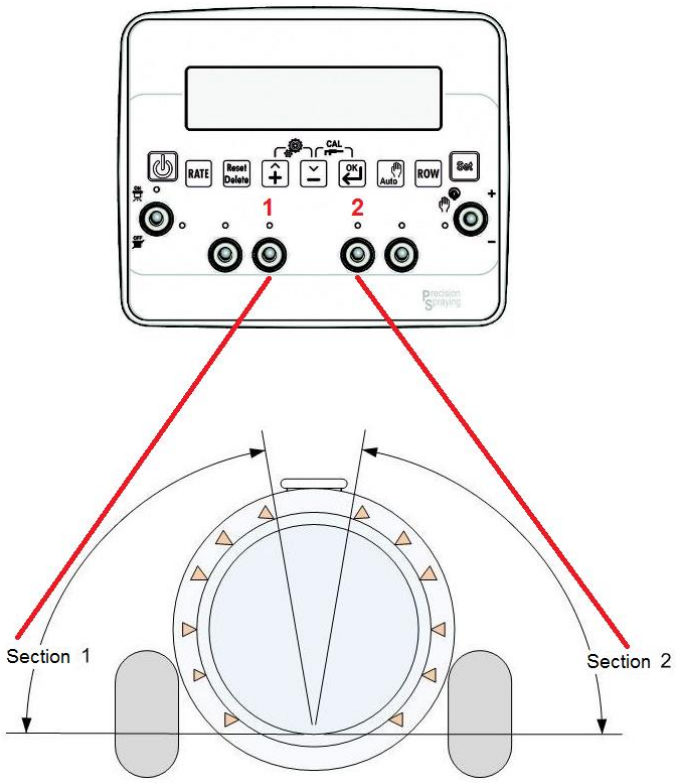


Figure 31 - Use of 2 sections

NOTE: The valve outputs are associated with connector n° 2 for section 1 and with n° 3 for section 2.

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22 GUARANTEE

The supplier guarantees, for 24 months from the delivery date, the good quality of the materials used, the excellent construction and the proper functioning of the equipment it has manufactured and that bears the trademark or the production serial number. During the guarantee period, the supplier undertakes to repair or replace, for free at the supplier's premises, any defective parts due to poor materials or faulty construction, provided that these parts are delivered carriage paid to the supplier's premises.
Faults and defects due to the incorrect use of the equipment, inadequate maintenance, modifications carried out without the supplier's approval, and normal wear and tear are not covered this guarantee.
Liability and compensation on the part of the supplier due to direct or indirect harm or damage to persons, objects or production, even as a consequence of the defective functioning of the supplied equipment or of material or construction defects, are not covered by this guarantee.

NOTES:

23 ISO TABLE

NOZZLE TYPE [l/min]					
bar	**2**	**2.5**	**3**	**3.5**	**4**
ISO-01	0.32	0.36	0.39	0.42	0.45
ISO-015	0.48	0.54	0.59	0.64	0.68
ISO-02	0.65	0.72	0.79	0.85	0.91
ISO-025	0.82	0.90	1.00	1.07	1.15
ISO-03	0.96	1.08	1.18	1.27	1.36
ISO-04	1.29	1.44	1.58	1.71	1.82
ISO-05	1.61	1.80	1.97	2.13	2.27
ISO-06	1.94	2.16	2.37	2.56	2.74
ISO-08	2.58	2.88	3.16	3.41	3.65
ISO-10	3.23	3.59	3.95	4.26	4.56
ISO-15	4.83	5.33	5.92	6.38	6.84
ISO-20	6.44	7.17	7.89	8.50	9.11

Table 10 - ISO table

24 ATR TABLE

NOZZLE TYPE [l/min]					
bar	**3**	**9**	**15**	**20**	**25**
ATR-White	0.22	0.38	0.45	0.52	0.58
ATR-Lilac	0.28	0.48	0.61	0.70	0.77
ATR-Brown	0.38	0.64	0.81	0.93	1.04
ATR-Yellow	0.57	0.97	1.25	1.44	1.61
ATR-Orange	0.77	1.32	1.69	1.94	2.16
ATR-Red	1.08	1.83	2.33	2.67	2.97
ATR-Grey	1.18	1.98	2.51	2.88	3.20
ATR-Green	1.40	2.35	2.99	3.42	3.80
ATR-Black	1.57	2.64	3.36	3.85	4.28
ATR-Blue	1.92	3.24	4.12	4.72	5.25

Table 11 - ATR table

25 MGA TABLE

NOZZLE TYPE [l/min]					
bar	**4.83**	**6.89**	**10.34**	**13.79**	**20.68**
MGA-White	0.25	0.29	0.34	0.40	0.50
MGA-Golden	0.33	0.39	0.46	0.56	0.63
MGA-Orange	0.50	0.59	0.68	0.82	0.88
MGA-Green	0.75	0.90	1.05	1.25	1.53
MGA-Yellow	1.00	1.20	1.42	1.65	2.03
MGA-Lilac	1.25	1.50	1.81	2.07	2.51
MGA-Blue	1.50	1.80	2.20	2.50	3.00
MGA-Red	2.10	2.55	3.10	3.50	4.30

Table 12 - MGA table

GeoSystem "QUICK REFERENCE"

TREATMENT PREPARATION

1 To start the data recording for a new treatment, select any operating cycle parameter, except the "level tank" parameter.

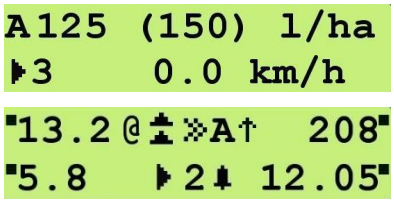
2 The system stores the treatment data in a list of 20 elements.

3 Press the Reset Delete key for 5 seconds to save the most recent data stored on the list and reset all the counters, preparing to record the data relating to the new treatment to be performed.

N.B: if there is no level sensor, by pressing this key, all the operating data will be reset, except for the tank level, which is reset to a value set during the configuration phase.

USE

1 Automatic functioning of the system: the GeoSystem shows and records the speed, flow, distance traveled, treated area, quantity of sprayed product values and operates in an active way on the proportional valve. Moreover, it keeps the dosage value constant as the vehicle speed and the number of the active sections changes.



2 Press the Auto key to activate the automatic functioning until the letter A appears on display, and then activate the appropriate section valves.

3 Press the Set key to select the operating parameters, if necessary.

4 Open the main valve and power up the tractor.

5 Position the switch upward to increase the quantity of sprayed liquid, and downward to decrease it.

TANK REFILLING

1 If the treatment requires a higher quantity of chemicals than the vehicle tank can hold, the operator can refill the tank with liquid and modify the quantity added, if required.

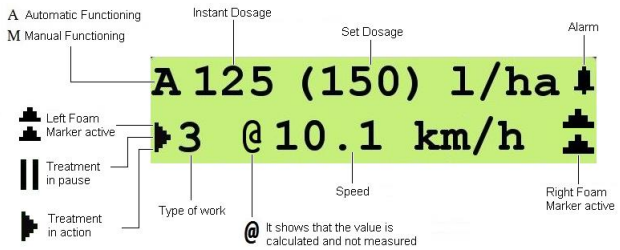
2 If there is no level sensor, the tank level information must be set manually.
In this case, select the "level tank" value and, only in this case, press the Reset Delete key to modify the value which is reset to the value set in the configuration phase.

TREATMENT DISPLAY

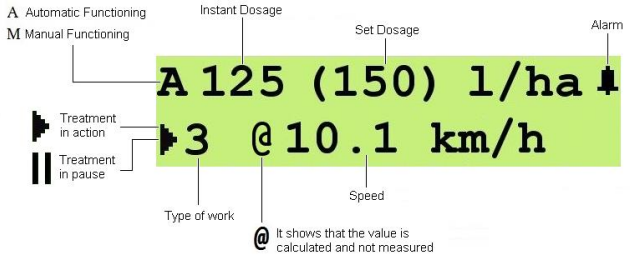
1 Press the OK key for 3 seconds to enter the menu that shows the list of the last 20 treatments.

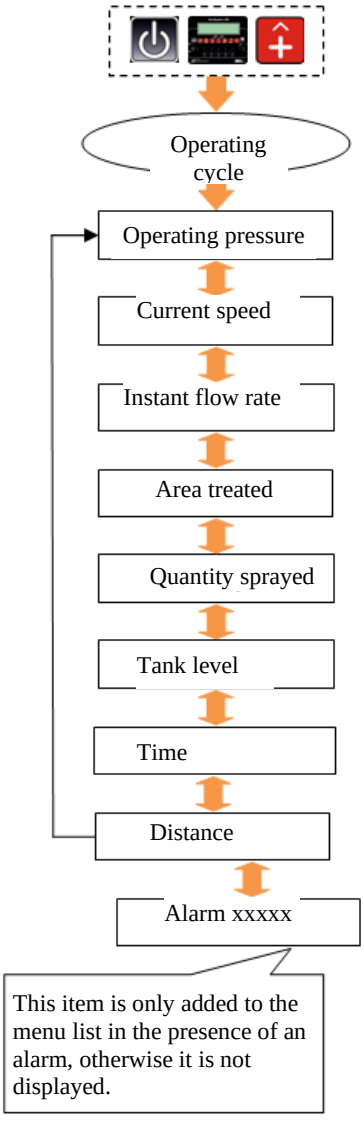
2 Using the + and − keys, it is possible to scroll up and down the treatment list. Press OK to access the content.

CROP SPRAYER (CS) DISPLAY



ORCHARD SPRAYER (OS) DISPLAY





ALARMS

If an alarm goes off, you will hear a buzzer.

Press Reset Delete to disable it.

The active alarm status is shown by the 🔔 symbol to the right of the first line of the display.

1. Flow regulation alarm	Alarm 🔔 flow regulation
2. Empty tank alarm	Alarm 🔔 tank empty
3. Minimum flow alarm	Alarm 🔔 minimum flow
4. Maximum flow alarm	Alarm 🔔 maximum flow
5. Low battery alarm	Alarm: 🔔 LOW BATTERY!
6. Low pressure alarm	Alarm: 🔔 low pressure

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