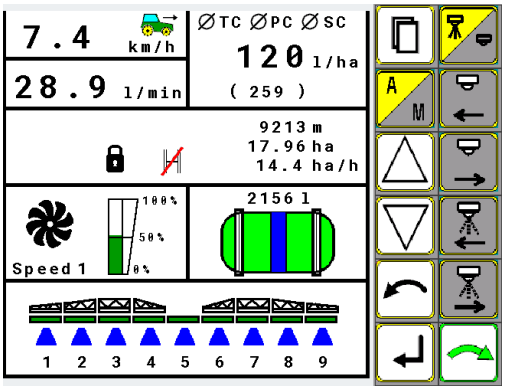


# KIT HYDRA ISOBUS

## COMPUTER FOR SPRAYERS

## INSTRUCTIONS FOR USE

EN

NO. 1901-EN
REV. 1

CE

This product complies with EMC requirements in accordance with Directives 2004/108/EC and subsequent amendments
and reference to Applied Regulation EN ISO 14982

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***MC elettronica S.r.l.*** *is not obliged to give notice of any further modifications to the product.* The Information provided in this manual does not allow unauthorised personnel to tamper with the product in any way. *The guarantee on the equipment will no longer be valid if tampering should be detected.*

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# 1. Rules and general warnings

## 1.1 Introduction

This manual gives all the specific information that you need for a proper use of the equipment.
After buying the instrument, read the manual carefully and refer to it any time you have doubts on how to use the equipment or when you have to carry out maintenance operations.
Keep the manual on the machine. If this is not possible, keep it ready at hand.

ALL RIGHTS RESERVED. THIS MANUAL IS INTENDED FOR CUSTOMERS ONLY. ANY OTHER USE IS FORBIDDEN.

## 1.2 Terms of guarantee

- SUBJECT OF THE GUARANTEE: the guarantee is applied to the product and to those parts which are marked with the serial number or any other identification number used by *MC elettronica;*

  HOW LONG THE GUARANTEE IS EFFECTIVE: *MC elettronica* guarantees the *KIT HYDRA ISOBUS and its accessories* for a period of **18 month** from the manufacturing date (printed on the identification plate on the back of the Monitor).

  The guarantee covers the product and any repair carried out within the agreed terms.

  The guarantee does not apply in the event of:
  - accidental damage;
  - improper use;
  - changes which have not been agreed upon, improper installation (or set-up);
  - damage caused when any equipment manufactured by companies other than *MC elettronica* and mechanically and electrically connected to our instruments, breaks or does not function properly;
  - acts of God (lightning, floods, fire or any other causes which do not depend on *MC elettronica*).

  Repairs under guarantee, which must be carried out in the laboratories of our authorized centres, are entirely free of charge provided the equipment is directly transported to said laboratories or sent free port. Transport charges and risks are entirely borne by the Customer.

  The above-mentioned guarantee is valid unless otherwise stated between *MC elettronica* and the Customer.

> ***Warning***
> *MC elettronica* declines any liability for damage or direct or indirect charges, as a consequence of improper use or inability of the Customer to use the equipment separately and/or together with other instruments.

## 1.3 Service

Service is available in all the countries where the equipment is officially supplied by *MC elettronica* (during and after the guarantee period).
Any kind of operation to be performed on the *KIT HYDRA ISOBUS* must be carried out in accordance with the instructions provided in this manual or as agreed with *MC elettronica*.
If not, the relative terms of guarantee might become void.

## 2. General description

The HYDRA ISOBUS system is designed to be installed on self-propelled or towed sprayers, and is used to:

- Check the product dosing and automatic and manual distribution
- Check the opening and closing of the section valves on the machine, up to 9 sections
- Check the section bar movement, up to 5 usable movements
- Check the air sleeve speed, with 2 user programmable speeds.

The computer only works with an ECU Water/Oil Hydra control unit, code 20CEN-HYDRA-0001.

# 3. System installation

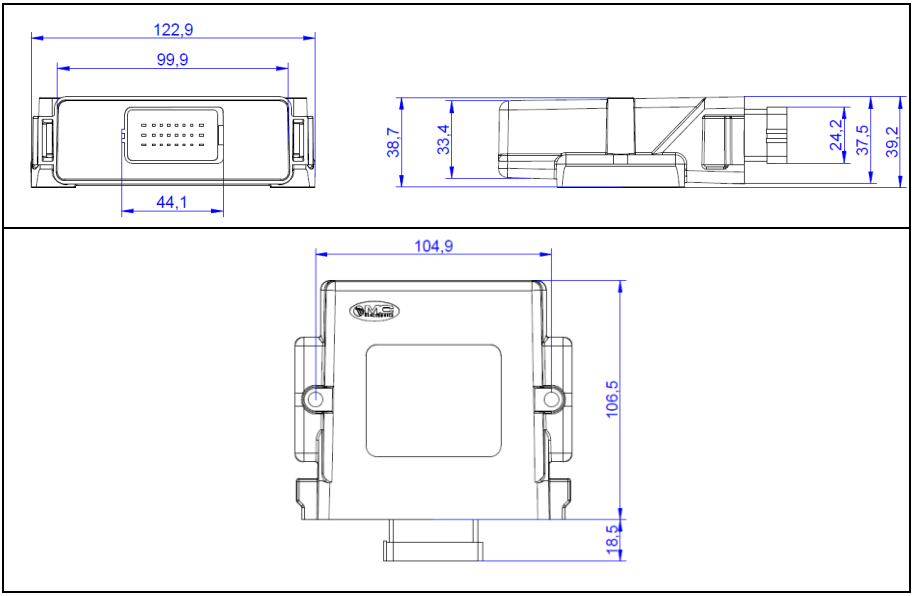



Figura 1.ECU Isobus dimensions, 00CEN-0007 and ECU oil AUX, 20CEN-0006

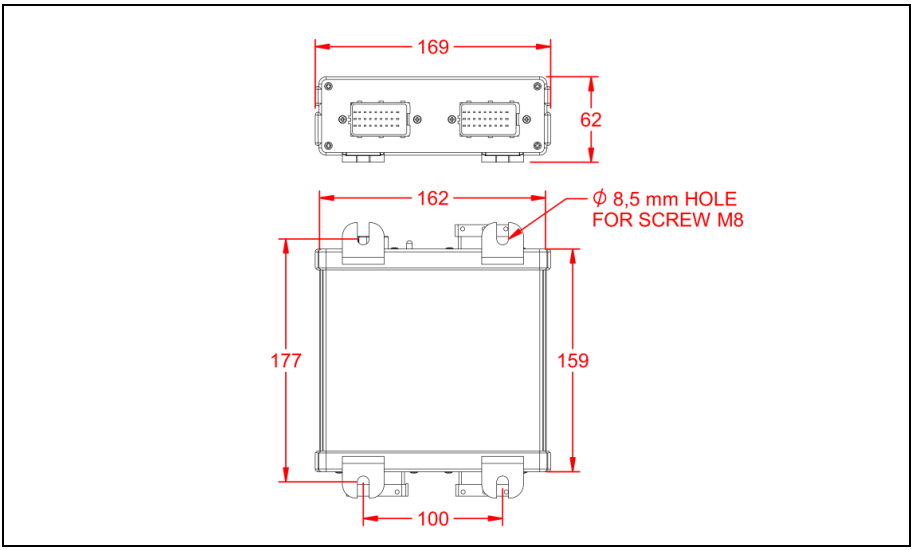



Figura 2. ECU Water/Oil Hydra control unit, 20CEN-HYDRA-0001.

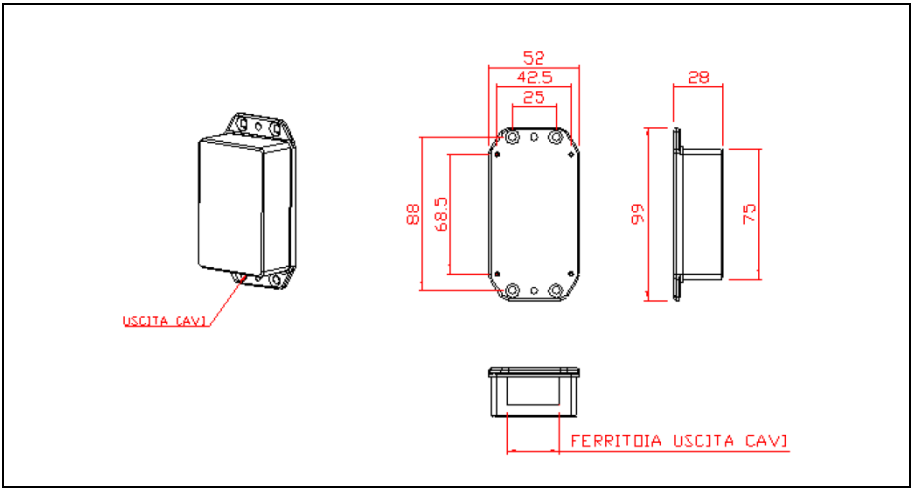



Figura 3. ECU Input, 20CEN-0007

## 3.2 Installation instructions with 7 sections additional module

Proceed with the installation of the Kit HYDRA ISOBUS as described below:

- Secure the main ECU (20CEN-HYDRA-0001) and ECU BRIDGE ISOBUS (00CEN-0007) as close as possible to the water section valves in a vertical position and so that the connectors are arranged on the RH and LH.
- Secure the extra oil ECU (20CEN-0006 / Caffini version CFN-CEN-0001) close to the previous Main ECU in a vertical position with the connector facing downwards
- Connect the ISOBUS control unit (00CEN-0007) to the ISOBUS wiring (00CAB-0023 [7m] - 00CAB-0024 [13m])
- Connect the ISOBUS wiring output cable via the CAN_BUS connector (00CAB-0023 [7m] - 00CAB-0024 [13m] ) to the main ECU
- Connect the grey connector of the cable to the main ECU (CAB-0037 / Caffini version CFN-CAB-0007 x 13m or CAB-0036 / Caffini version CFN-CAB-0006 x 7m), the S. Seal connectors to the relative sensors and the +12 V. power supply connector to the tractor.
- Connect the cable black connector to the main ECU (version for Arag valves: 20CAB-HYDRA570-0009 / 20CAB-HYDRA570-0009 or else version for Bertolini valves: 20CAB-HYDRA570-0003 / 20CAB-HYDRA570-0007), to the relevant section valves, to the main water valve and the pressure valve.
- Connect the brown cable connector to the main ECU (20CAB-HYDRA570-0002 / 20CAB-HYDRA570-0006) to the relative oil EV and to the proportional air sleeve if installed.
- Connect the cable with the black connector of the CAB-0038 / Caffini version CFN-CAB-0001 to the 7-section oil ECU and the variable geometry EV outputs (EV6A-EV6B, for the LH part and EV7A-EV7B part for the RH part)
- The S.Seal 4-way must be connected to the S.Seal connector left free of the CAN_BUS cable coming from the ISOBUS wiring (00CAB-0023 x 7m or 00CAB-0024 x 13m)
- The S.Seal 4-way must be connected to the S.Seal connector left free of the CAN_BUS cable coming from the ISOBUS wiring (CAB-0038)

***Warning***
**Pay particular attention to connect this last described cable to the 7-sections additional oil ECU (20CEN-0006 / CFN-CEN-0001)**

**Notes:** Always check the status LED for the presence of any anomalies in the kit

| LED colour | Meaning |
|---|---|
| Flashing green | System connected and operating |
| Steady green | No CAN communication |
| Steady red | EV outputs short circuit or device not detected |

## 3.3 Connections of the solenoid valves to the cable

The cable 20CAB-HYDRA570-0006 coming from the main ECU and the CAB-0038 / CFN-CAB-0001 cable coming from the 7-section ECU must be connected to the respective EV according to the table below:

| Function | UP button | DOWN button | Notes |
|---|---|---|---|
| LH bar movement | EV2A | EV2B | Standard |
| Mechanical block movement | EV1A | EV1B | Standard |
| Bar height | EV4A | EV4B | Standard |
| Bar levelling | EV5A | EV5B | Standard |
| RH bar movement | EV3A | EV3B | Standard |

# 4. Sprayer work screen

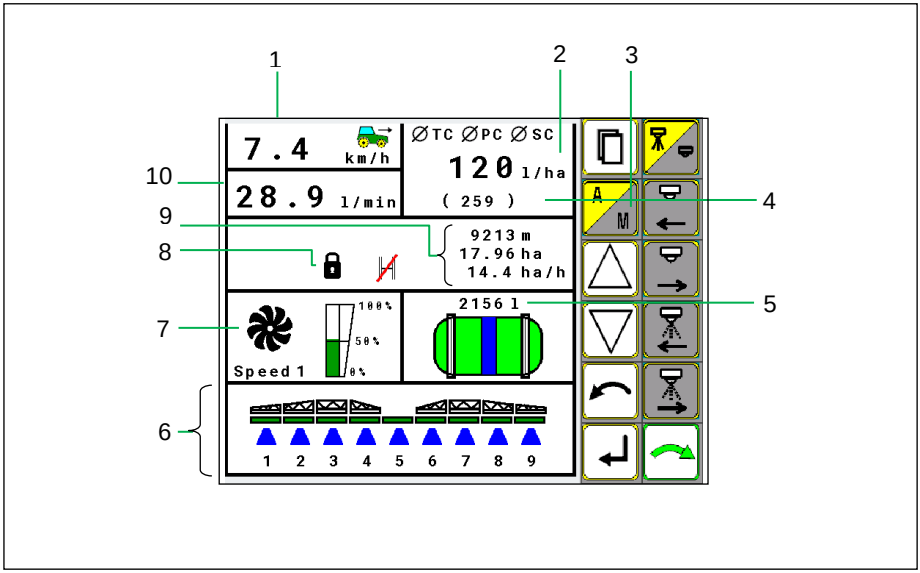



Figura 4.

1. **Speed**
2. **Instantaneous litres / ha, and set litres / ha.**
3. **Mode display**

| | |
|---|---|
| | **Automatic mode ON.** With the UP and DOWN arrow keys, a + / - 10% increase or decrease can be obtained with each press |
| | |
| | **Manual mode**: Pressure can only be adjusted manually via the UP and DOWN arrow keys |

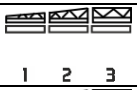
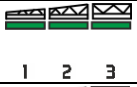
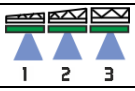
4. **Mode display**

| | |
|---|---|
| | **Sprayer OFF:** Ready for spraying but speed below the minimum speed or stopped. |

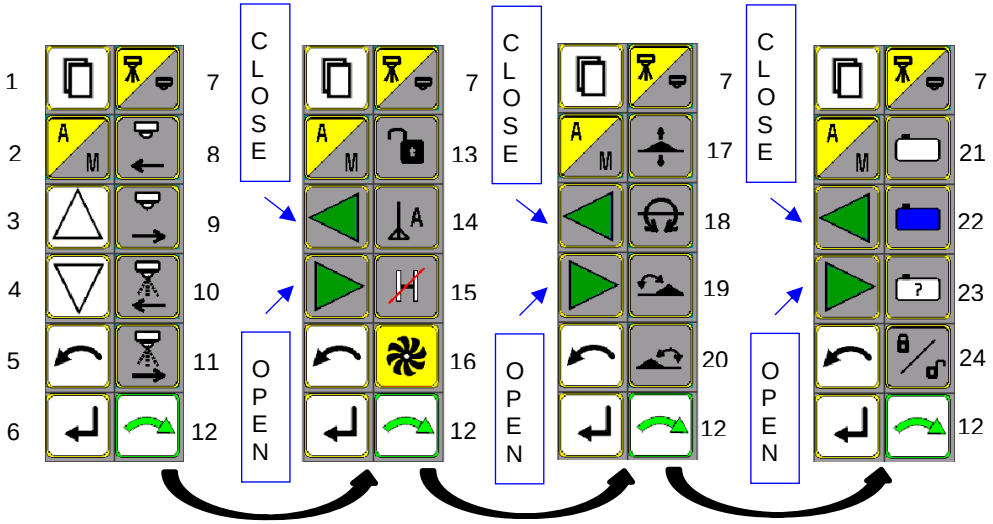
5. **Tank:** Content left in the tank.
6. **Active nozzle graphical bar**.
7. **Air sleeve:** if the icon is visible, the air sleeve is on.

8. **Lock:** if visible, oil sections cannot be enabled.
9. **Various information:** Nozzle being used (visible if pressure mode active), linear metres treated, hectares treated, hectares treatable with the content left, hourly output
10. **Instantaneous litres minute**. (If pressure sensor installed, alternatively also bars)

## 4.1 Bar status display

| | |
|---|---|
|   | Inactive sections. |
|   | Active sections ready for spraying. |
|   | Active sections and spraying under way. |

## 4.2 Function keys




1) **Menu:** access to the menu
2) **A/M**: Automatic / manual dosing key.
3) **Key UP**
4) **Key DOWN**
5) **Return**
6) **OK:** enter key.
7) **General:** spraying start / stop
8) (function in sequence every time you press the key) sequentially enables sections towards the left, starting with the first inactive on the RH
9) (function in sequence every time you press the key) sequentially disables sections towards the right, starting with the first active on the LH
10) (function in sequence every time you press the key) sequentially enables sections towards the right, starting with the first inactive on the LH
11) (function in sequence every time you press the key) sequentially disables sections towards the left, starting with the first active on the RH
12) switches to the next set of icons
13) **Lock**: To lock and unlock hydraulic functions.
14) Automatic / manual mode trailmatic function.
15) Enables or disables Trailmatic function.
16) (function in sequence every time you press the key) air sleeve activation speed1> speed2> air sleeve switch-off.

17) Enables or disables bar lifting lowering double-acting hydraulic valve (active = icon in the negative, inactive = icon in the positive). Opens via > arrow keys, and closes via < arrow keys.
18) Enables or disables tilting bar double-acting hydraulic valve (active = icon in the negative, inactive = icon in the positive). Opens via > arrow keys, and closes via < arrow keys.
19) Enables or disables LH bar double-acting hydraulic valve (active = icon in the negative, inactive = icon in the positive). Opens via > arrow keys, and closes via < arrow keys.
20) Enables or disables RH bar double-acting hydraulic valve (active = icon in the negative, inactive = icon in the positive). Opens via > arrow keys, and closes via < arrow keys.
    N.B. only the (19) and (20) keys can be active simultaneously.
21) with this key, the content of the tank is set as entirely empty
22) with this key, the content of the tank is set as entirely full (value related to the tank capacity entered into the settings menu.)
23) pressing this button, you can manually enter the desired amount by simply acting on the up and down arrow keys. The increase or decrease will be visible inside the tank icon. Press ESC to exit the setting, OK to store the value.
24) Enables or disables mechanical lock double-acting hydraulic valve (active = icon in the negative, inactive = icon in the positive). Opens via > arrow keys, and closes via < arrow keys.

If even just one of the valves is selected by pressing the keys >opens and <closes, the valve EVBYP = BYPASS will also be activated.
When switching between selections, the previous selection is deactivated except for (19) and (20), which can be used simultaneously.

# 5. ECU spray setting menu

To enter the ECU settings menu, simply press menu button when the system is already on. To exit, press the key .

## 5.1 Dosing

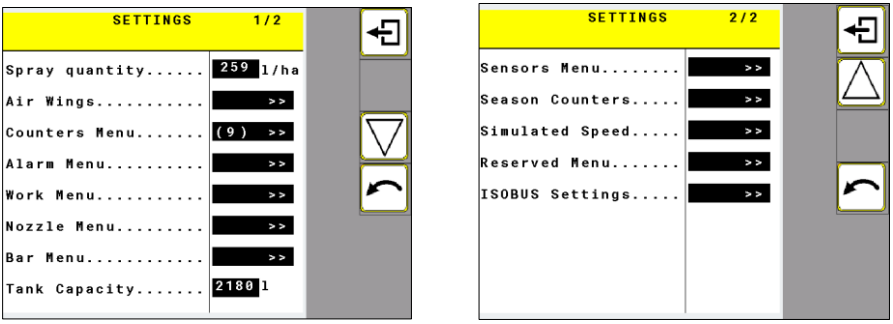



Figura 5.

To select the parameter to be changed, press the black touch areas;

while with the key to exit without making changes.

## 5.2 Air sleeve

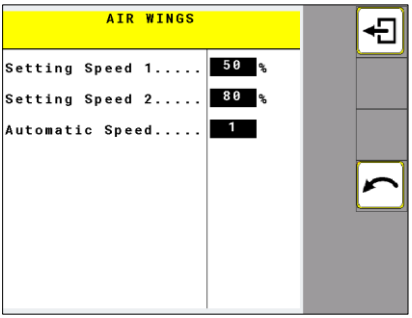



Figura 6.

To select the parameter to be changed, press the black touch areas;

while with the key to exit without making changes.

**Automatic speed:** with this function if you enabled the setting speed one or two when you press the general button in the main menu, the system activate automatically the speed selected of the Air Sleeve.

## 5.3 Counter menu

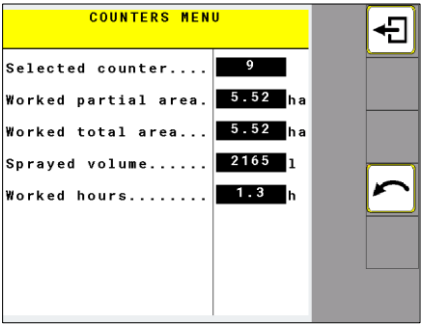



Figura 7.

To select the parameter to be changed, press the black touch areas;

while with the key to exit without making changes.

Procedure:

**Selected counter:** select the counter value to be used, with the key you exit without making changes. In this submenu it is possible to display the data of a maximum of 10 counters; with the reset function, the data of each counter displayed is reset. If the data of a particular counter are not restored, when working with those displayed in the main menu, the data is incremented. In this way, a contractor can suspend a client's work and resume it at a different time, taking into account the counter number associated with a particular client.

## 5.4 Counter reset

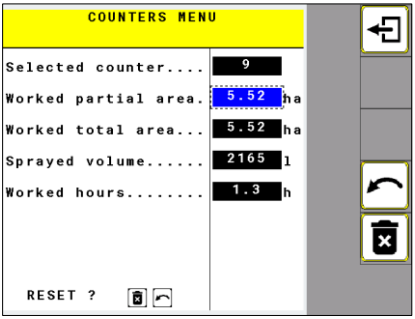



Figura 8.

In the counter menu, after selecting the counter to be modified, it is possible to reset the parameters contained in it by selecting the touch area of the parameter (Partial and total processing area, volume delivered and hours worked). For each parameter it is possible to carry out the reset by confirming with the button, or exit the reset via the button.

# 6. Alarm menu

## 6.1 Dose alarm

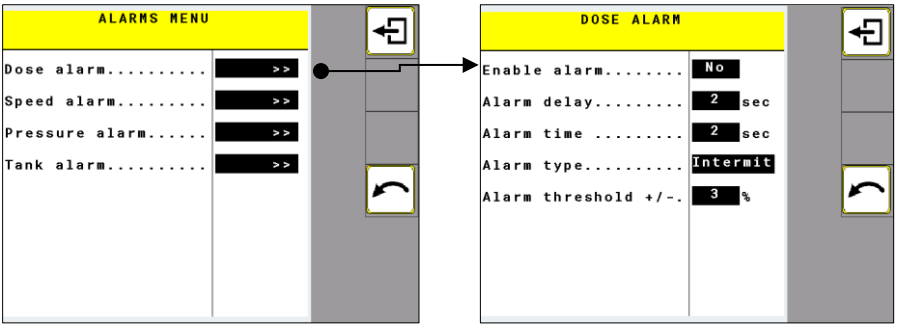



Figura 9.

To select the parameter to be changed, press the black touch areas;

while with the key to exit without making changes.

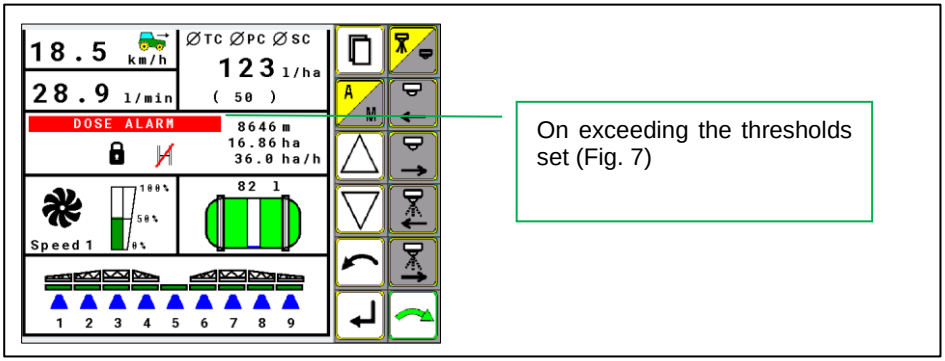



Figura 10.

## 6.2 Speed alarm

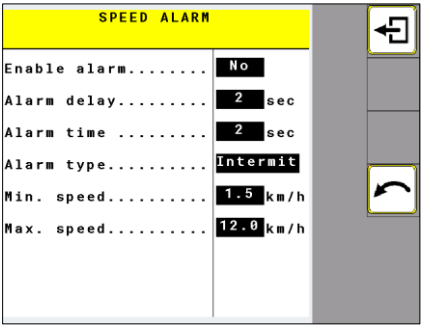



Figura 11.

To select the parameter to be changed, press the black touch areas;

while with the key to exit without making changes.

- Speed Alarm: Signaled with a pop-up as in the case of dosing (Fig. 7)

## 6.3 Pressure alarm

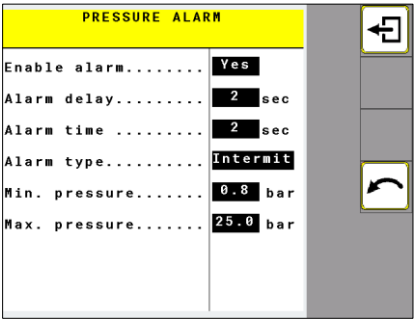



Figura 12.

To select the parameter to be changed, press the black touch areas;

while with the key to exit without making changes.

- Pressure alarm: With minimum and maximum pressure signalled with a pop-up as in the case of dosing (Fig. 7)

## 6.4 Tank alarm

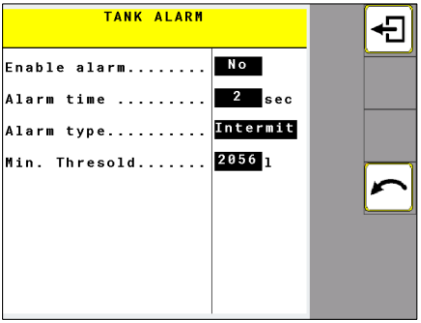



Figura 13.

To select the parameter to be changed, press the black touch areas;

while with the key to exit without making changes.

- Tank alarm: Signalled with a pop-up as in the case of a dose alarm (fig.7)

# 7. Work menu

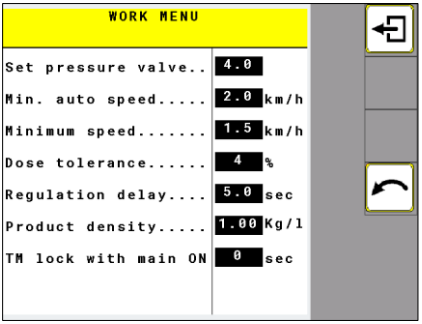



Figura 14.

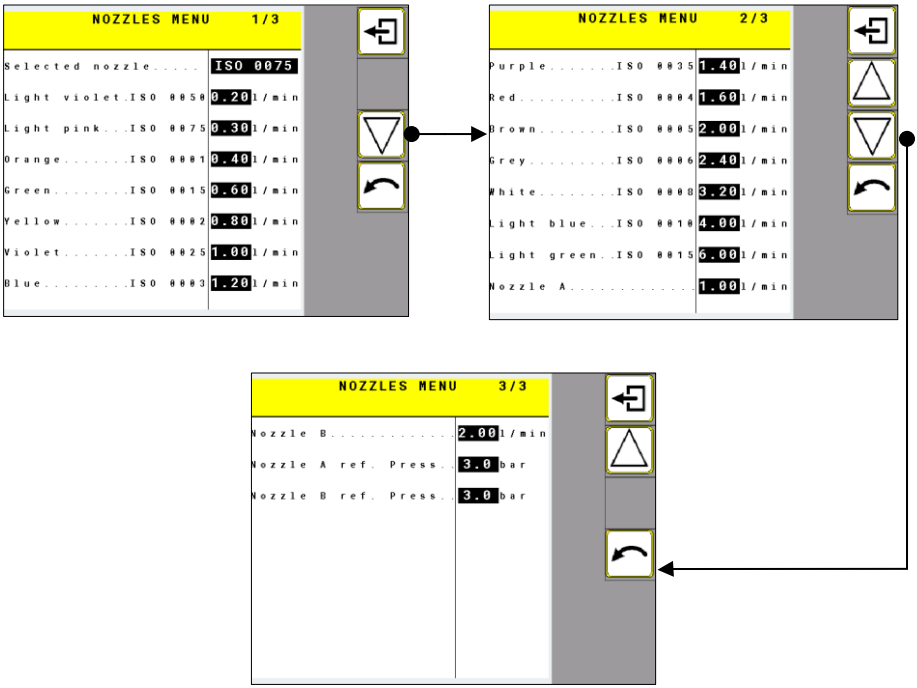
To select the parameter to be changed, press the black touch areas;

while with the key to exit without making changes.

- **Set pressure valve**: By varying this parameter, the speed at which the valve adjusts to bring the pressure back within the parameters set in Automatic Mode is varied as the vehicle speed varies.

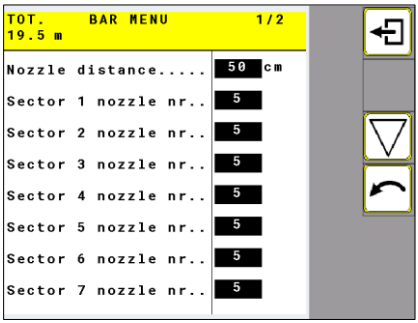
- **Min. auto speed**: This is the speed below which automatic mode is disabled (icon A/crossed out), distribution continues but the dose can only be modified manually via the Up and Down arrow keys. When the vehicle speed returns above the set limit, automatic mode ("A" icon) is resumed. This helps the operator to keep the spreading speed as constant as possible.
- **Minimum speed**: This is the speed below which distribution stops and the section valves close, along with the main valve. (crossed out nozzle icon). The type of alarm can be set in the alarm menu > speed
- **Dose tolerance**: This value determines the set dose deviation percentage for which the pressure valve is actuated.
- **Regulation delay**: Wait time in sec. before pressure adjustment is actuated in automatic mode.
- **Product density**: The density of the product used expressed in Kg/l.
- **TM lock with main ON:** Trailmatic function block time with active system

## 8. Nozzle menu




The flow rate refers to a 3-bar pressure; for nozzles A and B, the reference pressure can be changed.

# 9. Bar menu



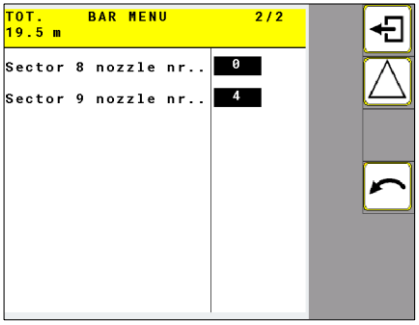




Figura 15.

On entering the distance between the nozzles and the number for each sector, the bar total width will be displayed at the top (Fig. 12). This menu is not visible in pressure mode

# 10. Sensor menu

## 10.1 Speed sensor

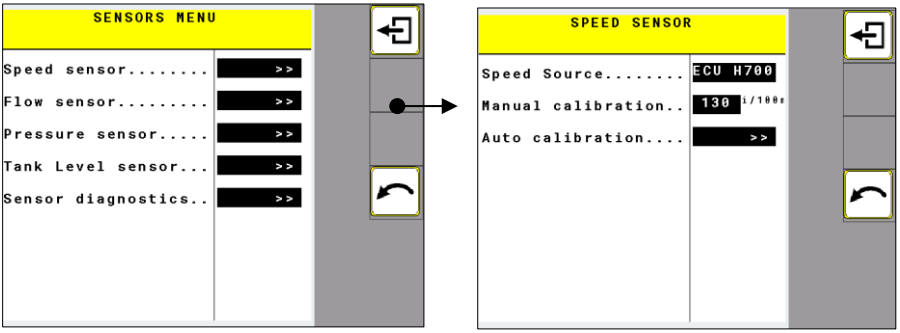



Figura 16.

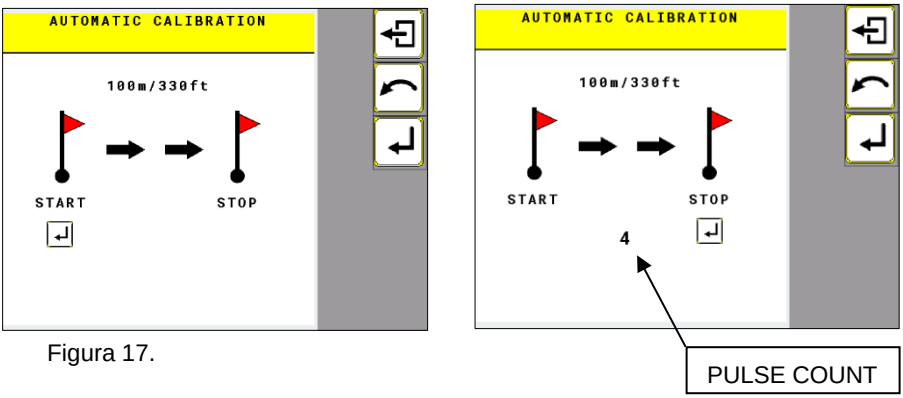
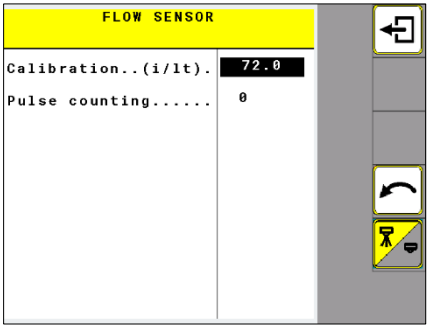



Figura 17.

The calibration of the speed sensor can be: Manual by entering the wheel pulse number for 100 metres. Or automatic by selecting Start; covering 100 metres and giving the Stop, the counted wheel pulses will be automatically transferred to the pulses/100 m field. (Fig. 14)

## 10.2 Flow meter sensor



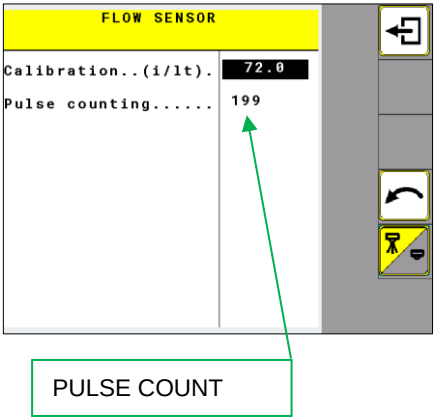




Figura 18.

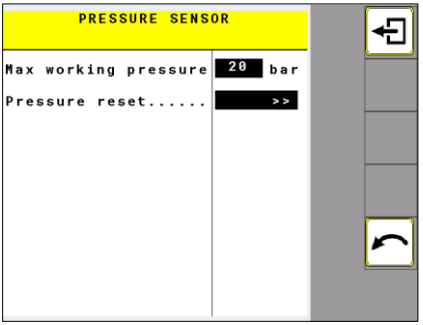
Calibration: Can be manual by entering the number of i/l specified on the characteristics of the flow meter, or with a system suitable for quantities with the appropriate graduated gauge. (Fig. 15)
Have a suitable sized container available.
Procedure:

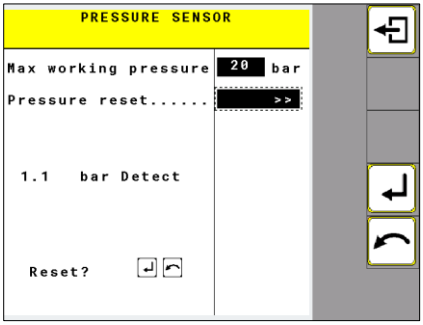
manual mode
closed sections except that for liquid collection
select **pulse counting**
Start spraying
Fill the container with the desired quantity (e.g. 10 l)
Stop spraying
Measure the quantity delivered
Count **i/l = counted pulses / litres delivered**
Report the results in the calibration field

Example: 720 i/10 l = 72 i/l

**N.B. Do the test solely with water in the tank**

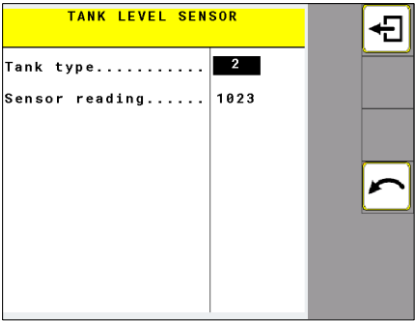
## 10.3 Pressure sensor




With this menu, you can enter the max. working pressure and reset the sensor for perfect calibration.

## 10.4 Tank level sensor




In this menu, you can select the type of tank installed and read the level sensor for preparing conversion tables in litres of the various tanks. The table must be sent to MC Electronics to be uploaded into the SW. Menu not visible if the sensor is not installed and activated on the reserved menu.

Table example:

| Tank numbering and model | |
|---|---|
| **Read value** | **Loaded litres** |
| 250 | 100 |
| 300 | 500 |
| 400 | 1000 |
| 500 | 1500 |
| 600 | 2000 |
| 700 | 2500 |

The more readings there are, the more precise the system is

## 10.5 Sensor diagnostics

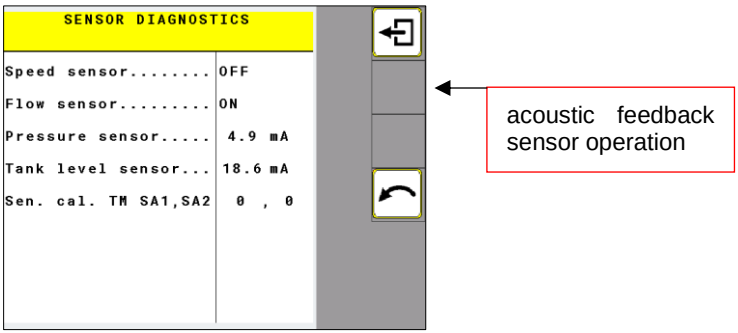



Figura 19.

In this menu, the correct operation of the sensors is tested. Pressure sensor and tank level data is in mA.

## 11. Season counters

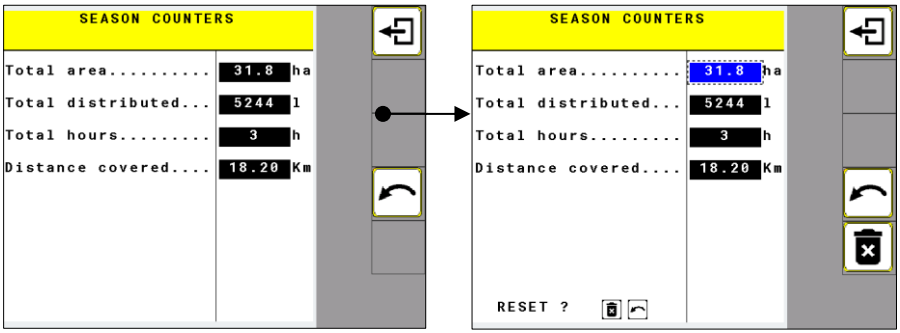



Figura 20.

At the end of the season, the counters can be reset individually by selecting them and confirming with the key.

## 12. Simulated speed

By selecting "simulated speed" from the settings menu, the main working screen is displayed. In the speed indication field, an orange background with the number underneath represents a travel simulation. The speed can vary with the UP and DOWN arrow keys. Use this function to test the system when the machine is stopped. All functions can be activated. To return to normal mode, press return.

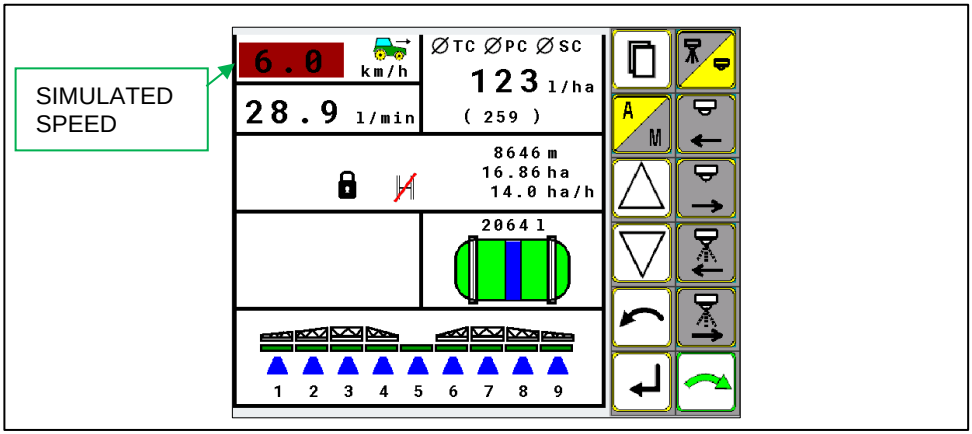



Figura 21.

## 13. Pressure working method

The computer is shipped with the flow meter operating method as the default parameter. If instead a pressure working method is installed with the relative sensor (mode selectable in the reserved menu), pressing the "Menu" button once, it is possible to access the pressure working simulation mode.

Select the parameters to be modified; to memorize; to exit without making changes or to return to the main work menu.

- If you change the dosage, only the speed is adjusted
- If you change all the other variables, only the dosage is adjusted

The working width and the number of nozzles cannot be changed, but are provided only as a reminder. These can only be changed in the settings menu during system installation. (Fig. 19) During the simulation, it is not possible to memorize parameters; it serves only as a calculator.

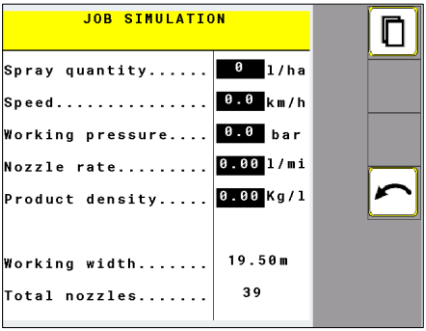



Figura 22.

## 14. Reserved menu

To enter this menu, a **PASSWORD** is required. It is reserved to the assistance service only.

# 15. ISOBUS Setting

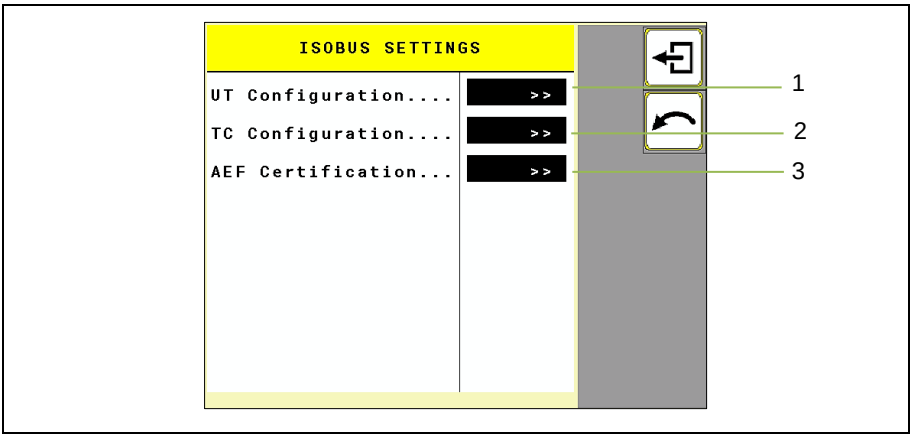



Figura 23. ISOBUSsettings screen

1. **UT CONFIGURATION:** access to the settings of the Isobus Universal Terminal
2. **TC CONFIGURATION:** access to the settings of the Isobus Task Control
3. **AEF CERTIFICATION:** access to the certification of the AEF

*UT Configuration*

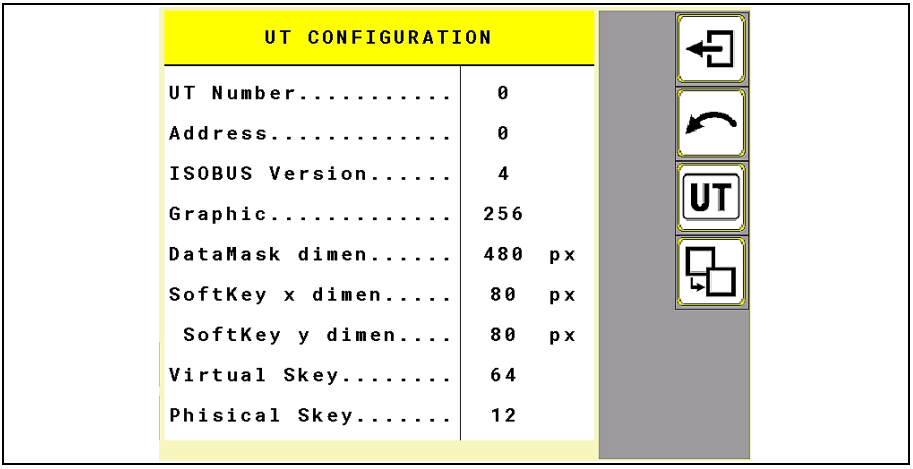



Figura 24. UT configuration screen

Shows all the information related to the Isobus Universal Terminal.

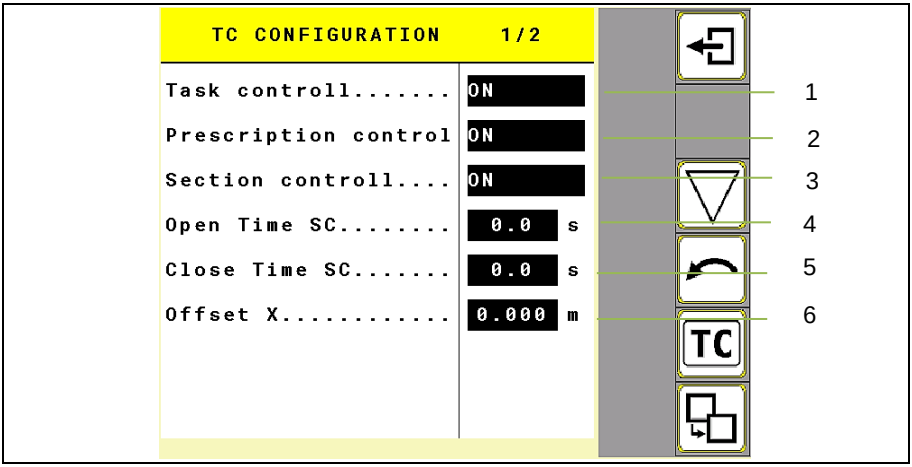



Figura 25. TC configuration page 1

1- **TASK CONTROLL:** enable the task control function
2- **PRESCRIPTION CONTROL:** enable the prescription control function
3- **SECTION CONTROLL:** enable the section control function
4- **OPEN TIME SC:** set the advance time to the opening of the sections
5- **CLOSE TIME SC:** set the delay time to the closing of the sections
6- **OFFSET X:** set the distance between the GPS antenna and the position of the sections

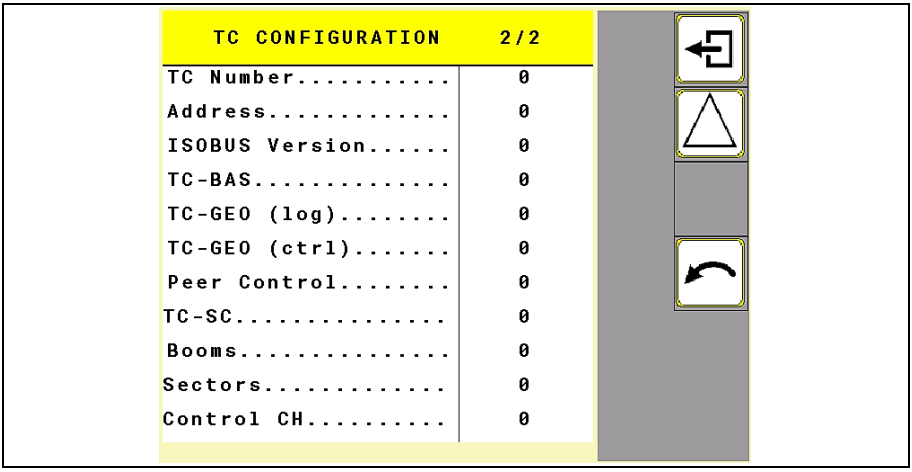



Figura 26. TC configuration page 2

Shows all the information related to the Isobus Task Control.

*AEF Certification*

Figura 27. AEF Certification Screen

Show all the information related to the Isobus AEF certification.

# 16.Troubleshooting

| PROBLEM | CAUSE | ACTION |
|---|---|---|
| No ignition | Reverse polarity of supply voltage | Check the connection to the battery |
| | Supply voltage interruption | Check cables, fuse and battery terminals |
| | No communication between VT and ECU | Check CAN-BUS cable for connection to VT-ECU |
| | Total failure | Send to assistance |
| Speed is not displayed | There are no wheel sensor pulses | Sensor cable interruption wheel |
| | | Wheel sensor with incorrect distance from magnet, calibrate |
| | | The red part of the magnet must be facing the sensor |
| | Faulty sensor | Replace sensor |
| The surface is not correctly displayed | Incorrect bar parameters | Enter number of nozzles and distance between them |
| | Speed calibration | Re-calibrate wheel pulses |
| The delivered dose is not displayed | Flow meter connection interrupted | Restore cable |
| | Blades blocked | Open flow meter and clean or replace blades |

# 17. Technical data

| Technical features: | |
|---|---|
| Nominal power supply voltage | 12Vdc +4/-2Vdc |
| Max. current consumption | 15A (including solenoid valve limited by SW) |
| Analogue inputs | 2 for analogue sensors 4-20mA |
| Digital inputs | 3 for NPN sensors with internal pull-up |
| Outputs | 10+1 oil solenoid valve + bypass max 2.5A,<br>9 with reversed polarity for sections, max 2.5A,<br>1 with reversed polarity for general, max 2.5A<br>1 with reversed polarity for pressure adjustment max 5A |
| PWM outputs | 1 for proportional air sleeve solenoid valve control, max 2.5A |
| IP Protection degree | IP65 |
| Dimensions | 190x170x60 |
| Weight | 400g |

**CAUTION!!**
DO NOT WASH USING A POWER WASHER WITH PRESSURE JET

**Electronic equipment for agriculture**

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