KIT VD

SEEDING CONTROL SYSTEM

INSTRUCTIONS FOR USE

EN

NR. 1431-EN
REV. 6

CE

This product meets the EMC requirements as determined by the directives 2004/108/CE ,as amended, and refer to applied standard EN ISO 14982

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MC elettronica S.r.l. *does not assume the obligation to notify any subsequent modifications to the product.*

The descriptions in this manual does not authorize in any way tampered with by unauthorized personnel.
The warranty on equipment decade when such tampering are detected.

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1. Rules and general warnings

1.1 Introduction

This manual provides all the specific information necessary to understanding and correctly operate your unit.

It must be carefully when you purchase the monitor and consult it whenever you have doubts regarding the use or there and before performing maintenance.

The manual should be kept on the machine or, at least, when this is not possible, should be stored in a place known and accessible for easy access.

ALL RIGHTS RESERVED. THIS MANUAL IS DESIGNED FOR USE BY THE CUSTOMER. ANY OTHER USE IS PROHIBITED.

1.2 Warranty conditions

- OBJECT OF THE WARRANTY: the guarantee applies to the product and its parts marked with the serial number or other identification number used by *MC Elettronica;*
- DURATION OF THE WARRANCY: *MC elettronica* guarantees the Kit VD for a period of **18 months** the date of manufacture (indicated on the identification label on the back of monitor) and for accessories too.

  The warranty covers the product and any repairs carried out within the agreed period.

  This guarantee is not applicable in case of:
  - Damage caused by chance;
  - incorrectly;
  - It's not agreed modifications, installation (or development) incorrect;
  - Damage caused by breakage or malfunction of non *MC elettronica* equipment connected mechanically or electrically to our devices;
  - Force majeure (lightning, flood, fire or oher causes of *MC elettronica*.

  The warranty repairs, which are to be carried out at the laboratories of out authorized service centers, are completely free as long as the devices are transported directly to them or post free port. The transport costs and risks arising are the responsibility of the customer.

  The above warranty is valid unless otherwise agreed between electronics and customer *MC elettronica*.

Warnings

MC Elettronica accepts no responsibility for damage or direct expenditure, caused by improper use or the inability of the customer to use the equipment separately and / or in combination with other equipment.

1.3 Assistance service

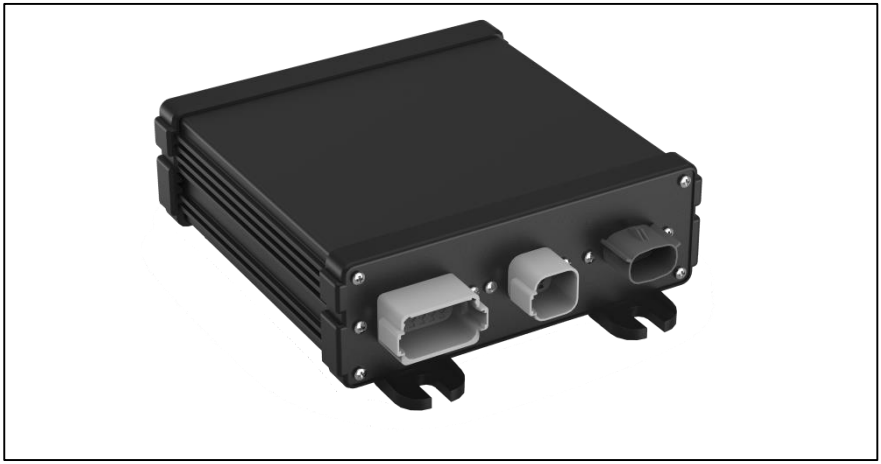
You can get assistance in all countries where the device is officially distributed by e MC (during and after the warranty period).
Any type of intervention required on KIT VD should be performed as reported in this nmanual or by following any agreements made with MC elettronica.
Otherwise the relevant warranty terms will be canceled.

2. General description

The electronic system VT is designed to be installed on positive pression seed drills and serves to:

- Control of the dosing of the product distributed in automatic and manual modes
- Encoder management and its calibration procedure
- Connect to GPS guidance system for automatic adjustment of the product and prescription maps

The computer only functions with the ECU MOTOR:
cod. 10CEN-0003



The system is designed to use the BRIDGE MODULE, which allows to connect external devices, such as GPS navigation devices with RS232 or CAN BUS.
cod. 10CEN-0008

3. System installation

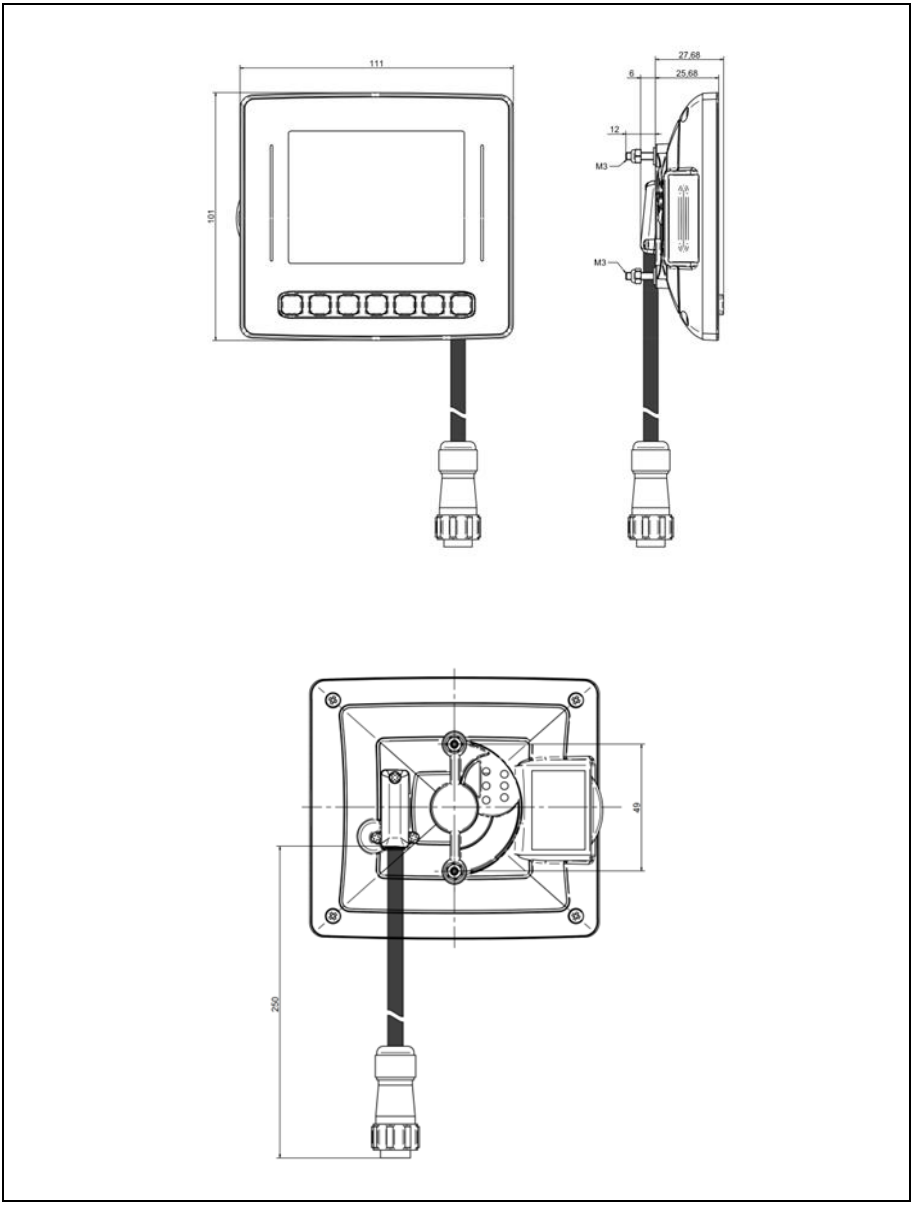


Figure 1 - Virtual Terminal 3.5'' dimensions *code 00MON-0022*

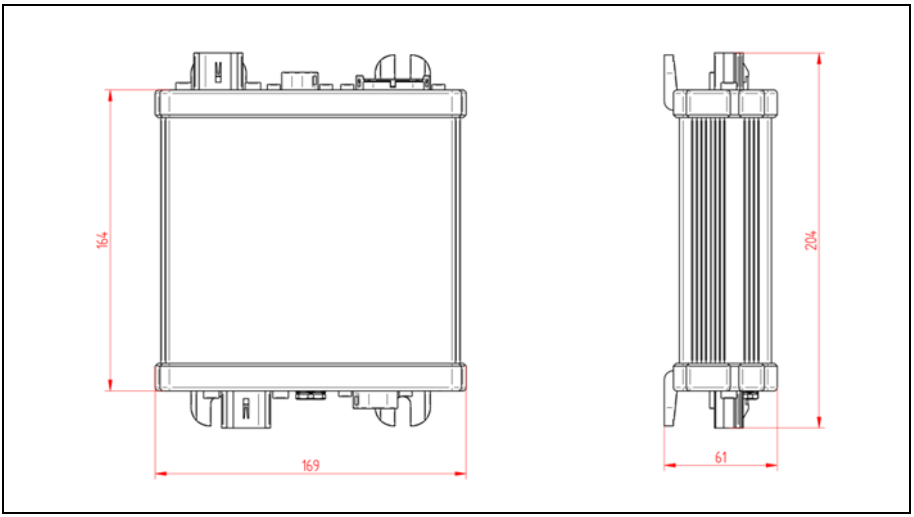


Figure 2 - ECU Motor dimensions *code 10CEN-0003*

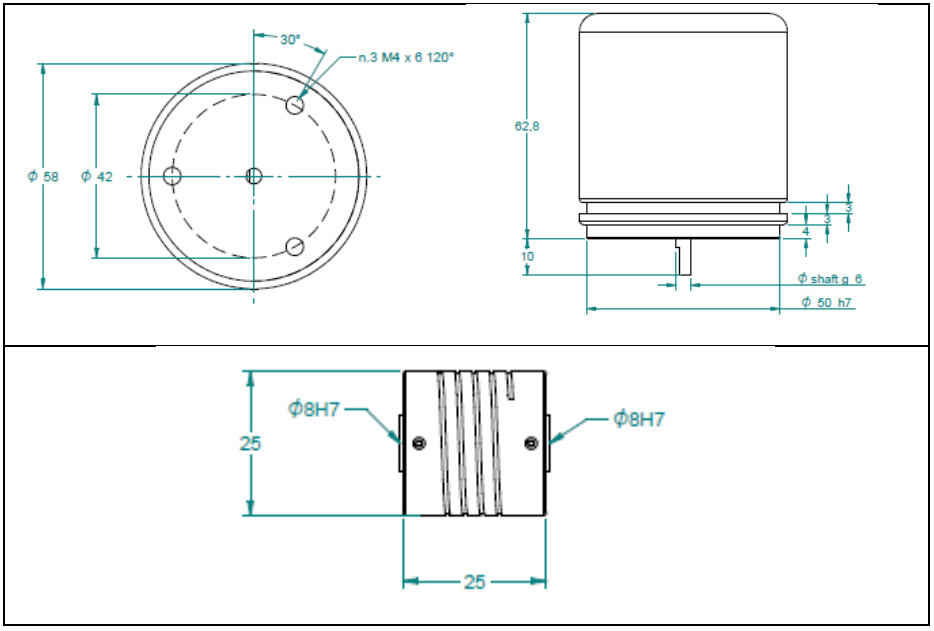


Figure 3 - Encoder sensor dimensions code *00SEN-0023*

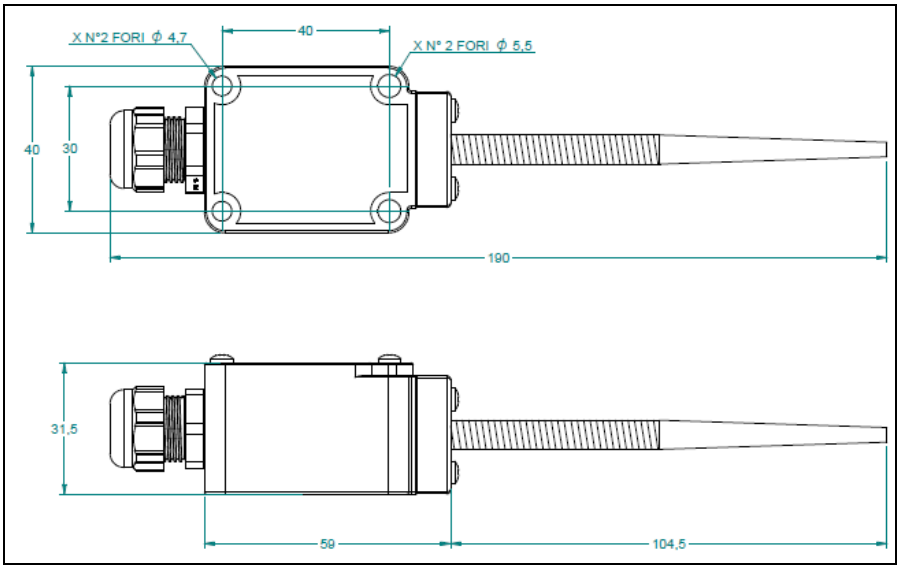


Figure 4 - Work sensor code 1414

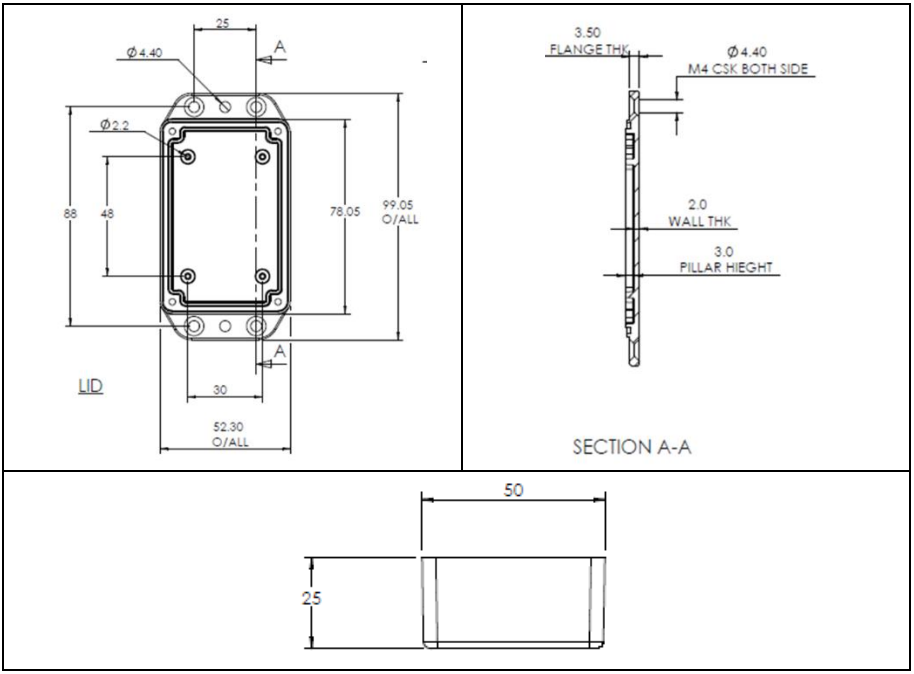


Figure 5 - ECU Bridge Module dimensions code *10CEN-0008*

3.1 Virtual Terminal assembly

To assemble the Virtual Terminal, proceed as follows:

- Screw the suction bracket onto the rear part of the Virtual Terminal using the supplied screws
- Fasten the suction bracket onto a clean flat surface. Otherwise, the Virtual Terminal can detach itself and fall during operations

Note: We recommend installing the Virtual Terminal in front of the operator to make it easier to use during the work cycle.

Figure 6 - Virtual Terminal 3.5” assembly

3.2 Sensor installation

The Full seeding + ESD KIT can be equipped with the following sensors:

- Proximity inductive sensor, NPN, 12V, N.O.
- Normally open limit switch contact

3.2.1 Incremental speed encoder sensor installation

You can install the speed encoder sensor directly or indirectly (through chain and gears) on the wheel of the seed drill (Figure 7).
In the case of a chain with gears, the pulses / 100 metres must be calculated accordingly with the transmission ratio.
Be sure to check that the elements near the encoder sensor do not damage it during transport operations.

The sensor must be installed so as to ensure speed reading with a speed of at least 100 pulses / metre (10000 pulses / 100 metres) in order for the system to work properly.
Change the speed parameter or perform the calibration procedure from the dedicated VT menu.

Warning
The sensor cable should be covered with a rubber sheath.

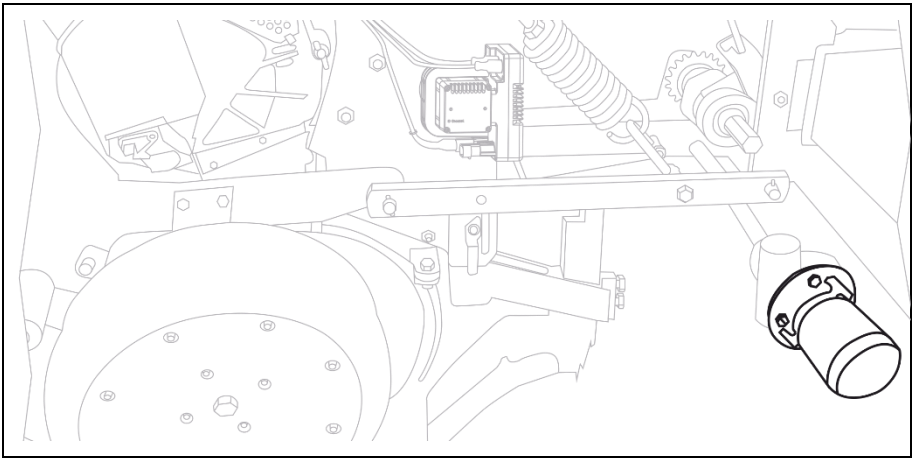


Figure 7 - Encoder sensor installation

3.2.2 Work sensor installation

The work sensor is used to detect when the seed drill is lowered to the ground. It works like a simple switch (closed when turned).
The following figures show an installation example.

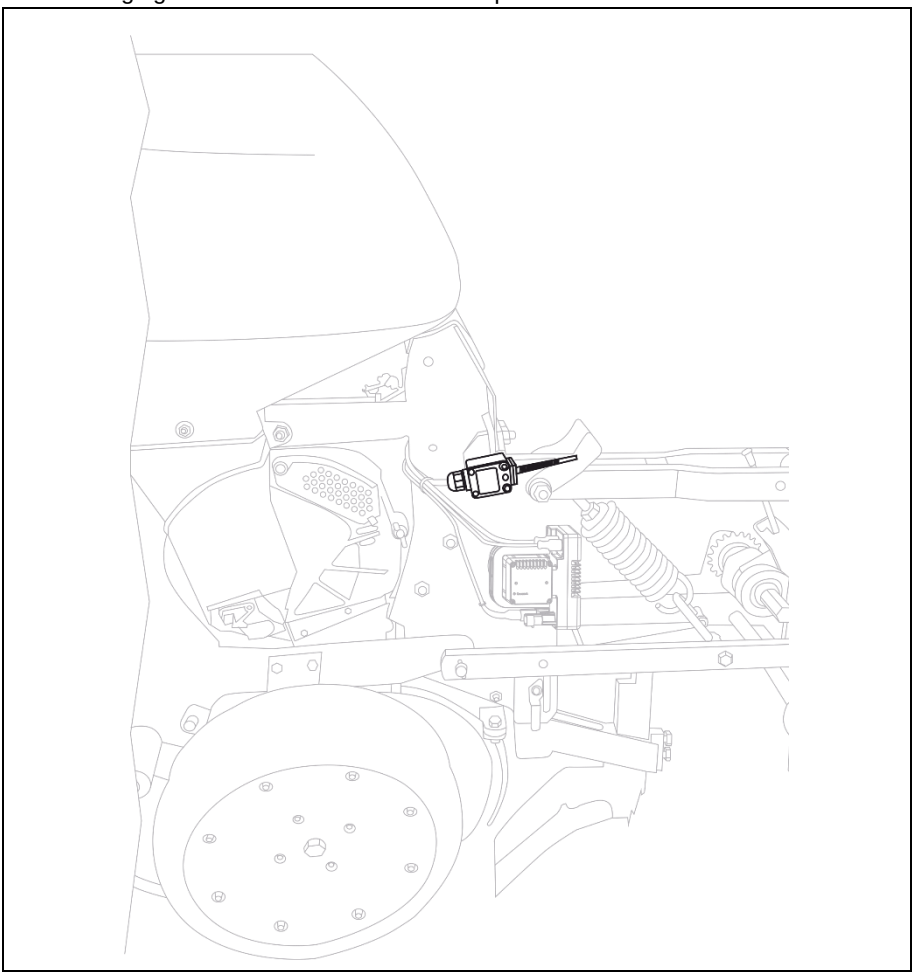


Figure 8 - Work sensor installation

⚠	**Warning** The sensor cable should be covered with a rubber sheath.

Front view - Main screen -

Figure 9

The front panel allows the user to see all the data related to the duty cycle. On the panel you can distinguish the following elements:

1. **ON/OFF system.**
2. **PRE-START**: start of the sowing management system.
3. **Menu**: the single press movers to the next screen; yhe continued pressure for two seconds allows switching to the programming mode.
4. **UP :** increase the selected value.
5. **DOWN:** decrease the selected value.
6. **OK :** it allows you to select the parameter to be changed if the information does not come from the customer GPS navigator.

Front view - Screen Distribution -

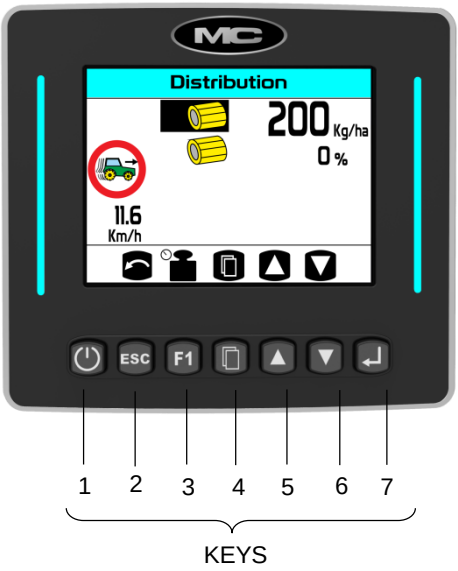


Figure 10

Through the following panel you can configure the amount of product to be distributed on the basis of hectares paths:

1. **ON/OFF system.**
2. **RETURN**: it takes you back to the main screen.
3. **CALIBRATION**: transition to the seeding system calibration menu (to perform every time you change the type of product to be distributed).
4. **Menu**: it allows the passage to the next screen.
5. **UP :** increase the selected value.
6. **DOWN:** decrease the selected value.
7. **OK :** selection and confirmation of the amount of procuct be distributed.

Front view – Information screen -

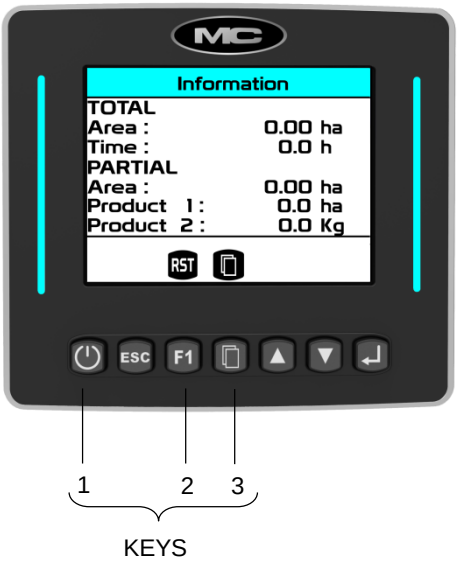


Figure 11

This last window that concludes the initial shift pulse allows the display of contactors use the seeder:

1. **ON/OFF system.**
2. **RESET**: the pressure of this button allows the resetting of all partial counters in a contemporary.
3. **Menu**: It allows you to return to the home screen.

3.4 Working screen drill

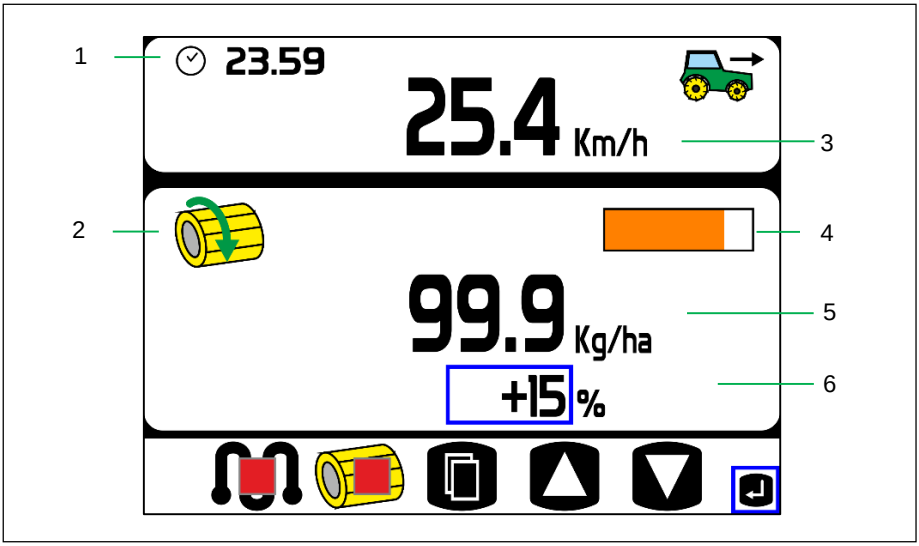


Figure 12

1. **Filling and emptying bar:** displayed in the filling phase restart and during the emptying phase in the process of Pre Stop.

→ PreStart Status → PreStop Status

2. **Clock**
3. **Speed:** if highlighted in orange indicates a user-simulated speed through a setup from the user menu which we discuss delow.

4. **Distributor status:** at the end of emptying or filling of the icon bar will assume a state of inactivity or activities.

→ Disable distributor → Enable distributor

5. **Value of product distributed per hectare in real time.**
6. **Decrease / increase of distributed product:** depending on the value in Kg/Ha defined in the distribution screen.

3.5 Distribution screen

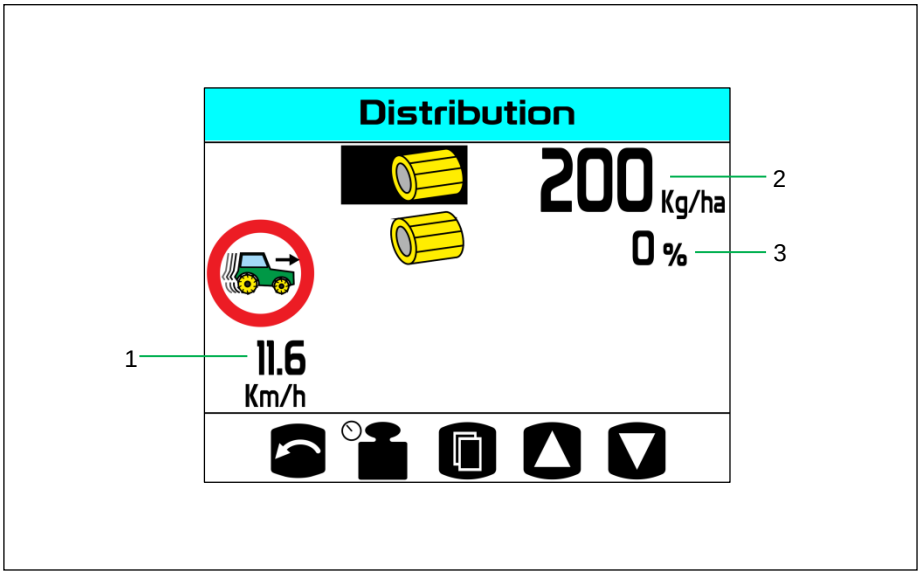


Figure 13

1. **Maximum speed:** it indicates the maximum speed at which you can bring the system while maintaining the proper distribution of the product, taking into account all the parameters currently scheduled.
2. **Nominal quantity of the product to be distributed.**
3. **Decremento / incremento del prodotto distribuito:** a function value in Kg/Ha previously defined. The percentageee change is then displayed on the main screen.

3.6 Viewing system counters

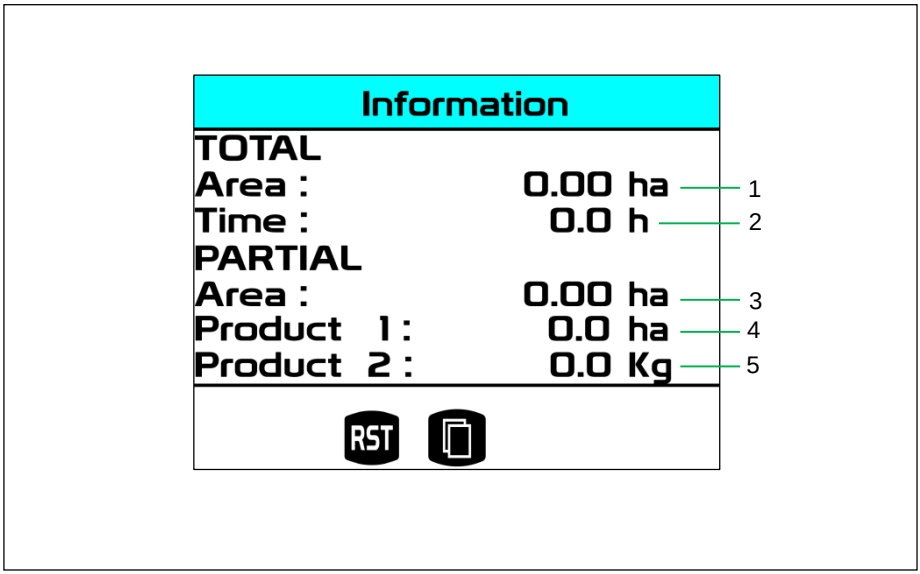


Figure 14

1. **Total hectares path**: total hectare counter paths can not be reset
2. **Total times:** total counter of the hours of work can not be reset.
3. **Partial hectares paths:** hectare counter paths from the previous counter reset function.
4. **Partial product 1:** counter on the quantity of the product distributed type 1 from the previous reset function.
5. **Partial product 2:** counter on the quantity of the product distributed type 2 from the previous reset function.

4. Calibration menu

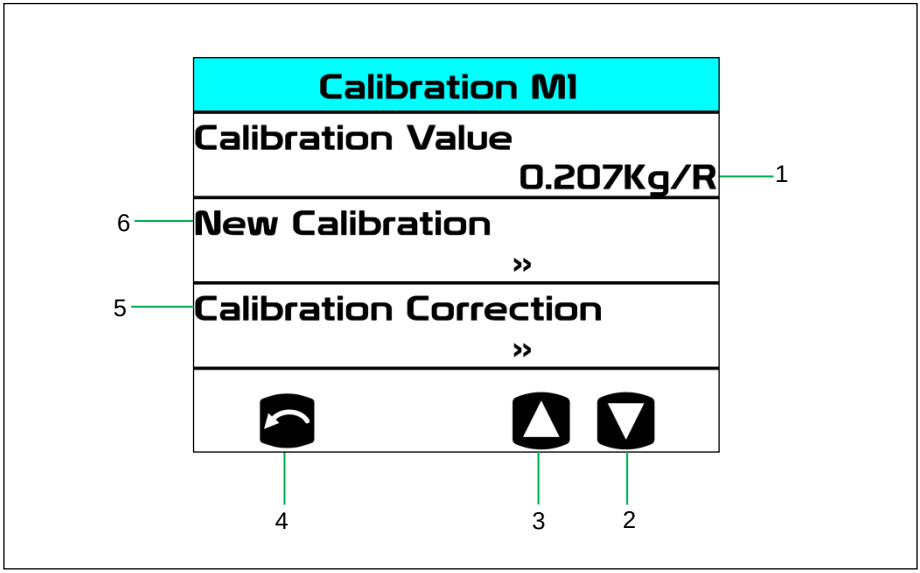


Figure 15

1. **Calibration value:** you can manually enter the calibration value of the distributor.
2. **UP :** increase the selected value.
3. **DOWN:** decrease the selected value.
4. **RETURN:** return to the distribution screen.
5. **New calibration:** perform automatic calibration procedure.
6. **Correzione calibrazione**: this procedure may be performed in the next automatic calibration in order to optimize the theorelical values obtained by the automatic calibration.

4.1 Automatic calibration and correction calibration screen

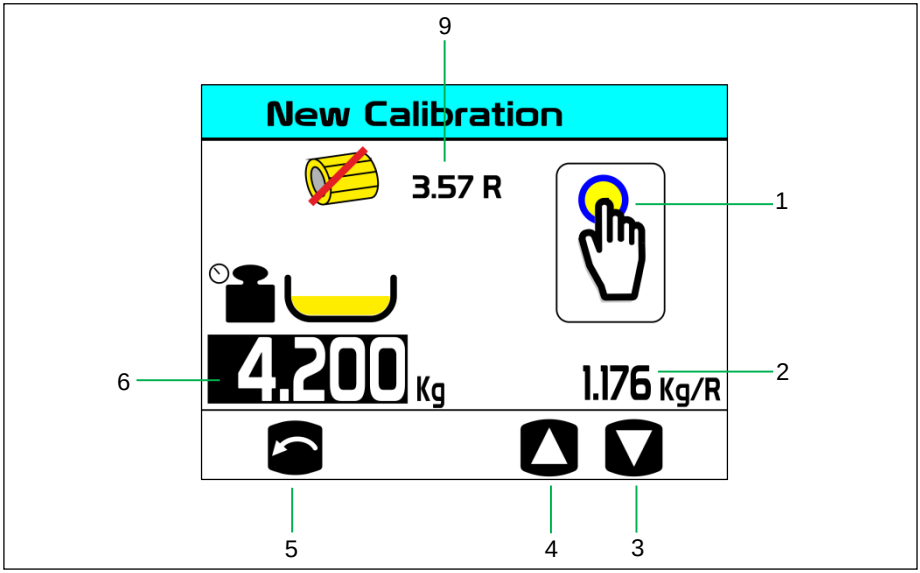


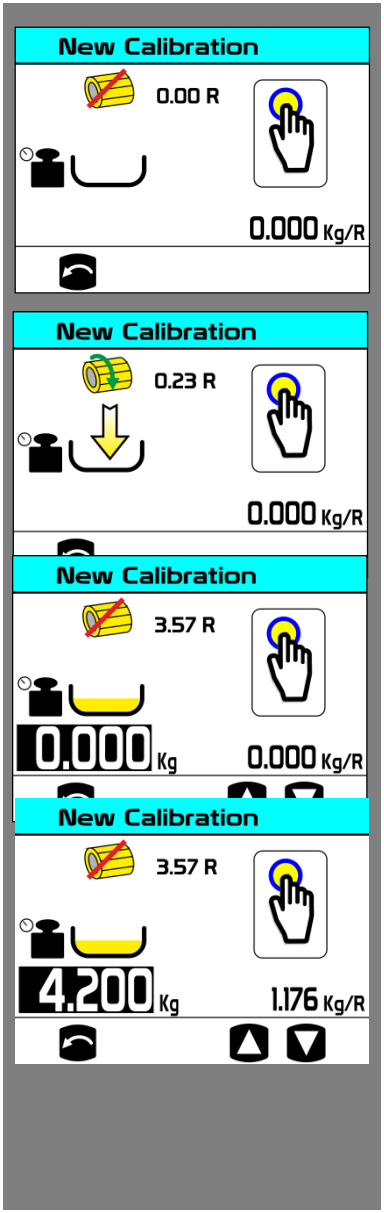
Figure 16

1. **Calibration button:** directs the user to press and hold the calibration button until the end of this operation.
2. **Calibration value:** obtained from the amount of product weighed from the containment pan and the ditributor speed.
3. **DOWN:** decrease the selected value.
4. **UP :** increase the selected value.
5. **RETURN:** return to the calibration screen.
6. **Weighted by the drip tray.**
7. **Motor speed value:** indicates the number of revolutions made by the ditributor by pressing the calibration button on this release.

4.2 Calibration procedure

The calibration procedure is used to calibrate the quantity of the product corresponding to the rotation of the distributor; this procedure must be performed each different type culture distributed by the drill and in the event of replacement of the distribution roller. The steps for proper calibration are the following:

1. Enter the submenu “New calibration” and place a drip tray underneath the distributor.
2. Press and hold the calibration button on the drill. It will open and once you reach the limit switch will start the rotation of the fixed 1/3 of the maximum rated value o the motor speed distributor. The counter rotations next to the icon of the machine will indicate the actual rotation (reset the button is pressed).
3. Release the calibration button on the drill; will appear the field for the insertion of the weighted.
4. Empty the pan and place them under the distributor; the previous rotation is served to fill the distributor.
5. repeat steps 2 and 3, taking care to release an adequate amount of the product to the weighing .
6. Weigh the contents of the pan and set the value with the ▲▼ keys and confirm with the ENTER key.
7. You will see the calibration coefficient in Kg per revolution distributor; if the calibration is satisfactory exit calibration; if you want to repeat calibration, repeat from step 5.



4.3 Calibration correction procedure

The “calibration correction” submenu has the same screens and operationg processes of the automatic calibration, given in the preceding paragraph.
The only difference is that the deployment engine, rather than being rotated at a fixed speed of 1/3 of the maximum rated value of the motor; is rotated at the speed specifies that takes account of the following parameters:

- Coefficient previously determined or entered calibration
- Request distribution quantity
- Feed speed of 10 Km/h

In this way the calibration is done at a speed of the distributor closest to the one that will be used actually; in this way you will have a more precise calibration. Note also that if the speed of the distributor proves beyond the maximum programmed limit, this submenu will not be accessible.

5. Programming

For get into the VT setting just move on the main screen and hold for a time of 4 seconds, the menu button.

→ Menu Keys

You will see a screen like the following:

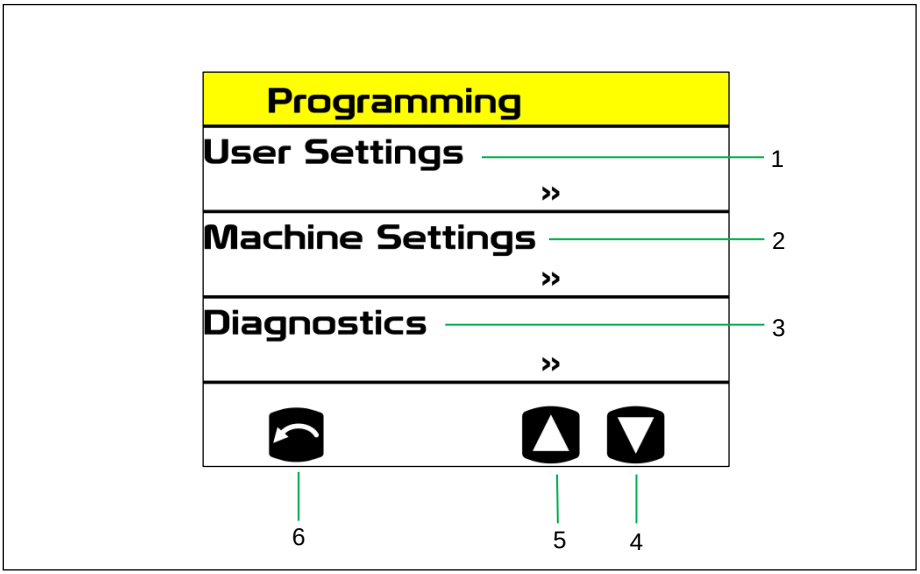


Figure 17

1. **User settings:** the screens of the submenu “user setting” allow you change all the settings required for the job.
2. **Machine setting:** screen shots in this submenu is protected by password that must be entered in a display that will interpose the opening of the latter, as shown graphically in figure 10.
   Once you have entered the password correctly, the settings would we change will be necessary to adapt the system to the machine on which it is installed.
3. **Diagnostics:** through this subsection will enable the operator to execute diagnostic tests and possibly update the system software.
4. **DOWN:** decrease the selected value.
5. **UP :** increase the selected value.
6. **RETURN:** return to the main screen.

Directional arrows menu scrolling

5.1 Access mode to the machine settings

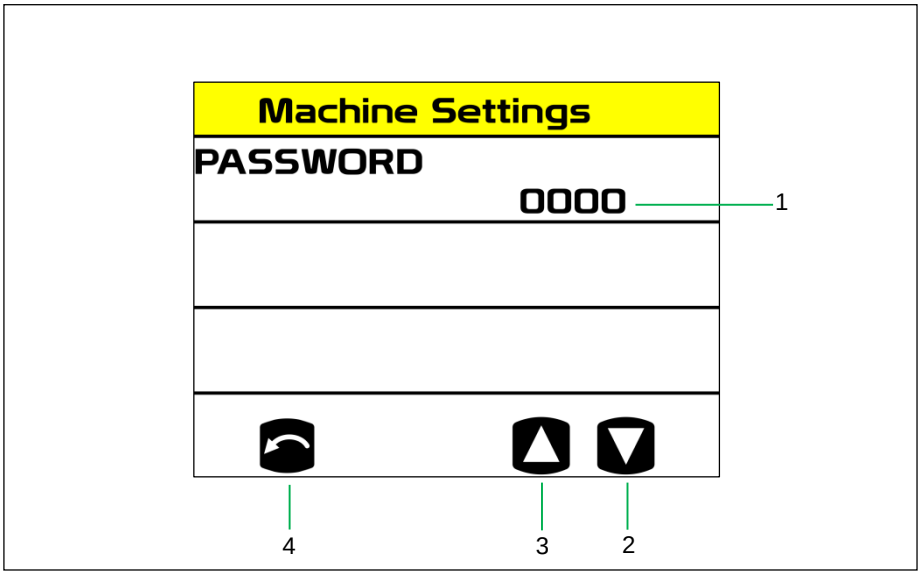


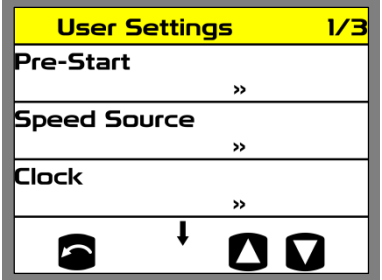
Figure 18

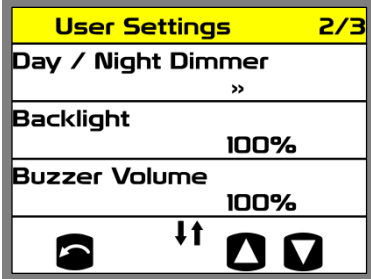
For insert the password you will have to use the ▼▲ keys for the section number from the most significant digit and confirm the desired value using the ENTER key. The process will be repeated for the 4 digits of the password. Pressing the ENTER key on the last digit will involve checking the credential inserted. In the event that that the latter does not prove to be correct automatically you will return to the programming screen.

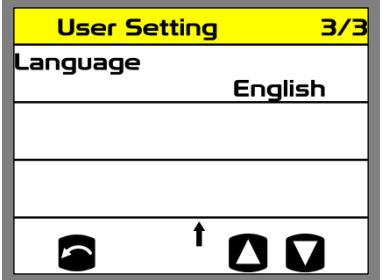
6. User settings

User settings are divided in turn into three more screens. The schematic hierarchy of setting is so given to ensure maximum modularity tool you want to use. The presentation of the items that make up this category of settings is as follows:

- **Pre-Start**: it can manage the parameter for the operation of the engine and connected to it seed supplier.
- **Speed Source**: it allows us to set the origin of the value of the speed of the means and the calculation factor of the latter.
- **Clock**: settin the hour and minute system.
- **Day / Night Dimmer**: it allows you to define the start time and the end of the graphical for the night.
- **Backlight**: is a percentage value related to the brightness of the screen. [0 – 100 %]
- **Buzzer Volume**: is a percentage value to define the sound level of the buzzer in the case of acoustic signals error. [0 – 100 %]
- **Language**: it allows us to select the display language for the use of the system.
  [Italiano - English]







6.1 Pre-Start settings(1)

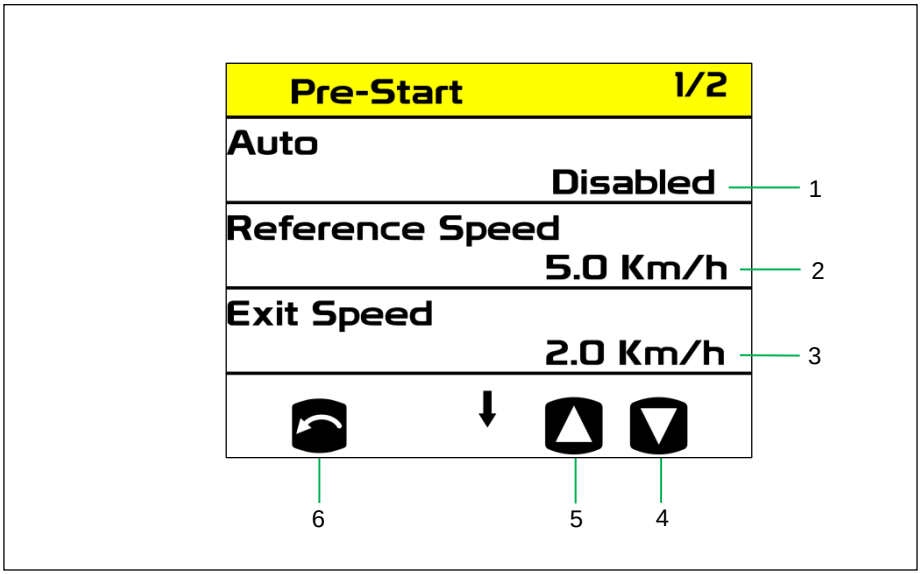


Figure 19

1. **Robotics:** If enabled, the distribution motor starts automatically in the PreStart mode as soon as the seed is placed in the job position although the speed is “0”; if disabled addition to working position serves pressing the corresponding button on the main screen.
   [Enable - Disable]
2. **Reference speed:** This is the “equivalent rate” that the system uses to run the distributor engine PreStart (so no real advancement of drill).
   [0.0 – 25.5 Km/h]
3. **Output speed:** At this speed is reached, the system exits the PreStart mode and proceed with the DPA distribution; thi minimum speed is also used as a threshold to determine the actual movement of the seeder and begin deployment if they are not activated PreStart functions. [0.0 – 10.0 Km/h]
4. **DOWN:** decrease the selected value.
5. **UP :** increase the selected value.
6. **RETURN:** return to the user settings.

6.2 Pre-Start settings(2)

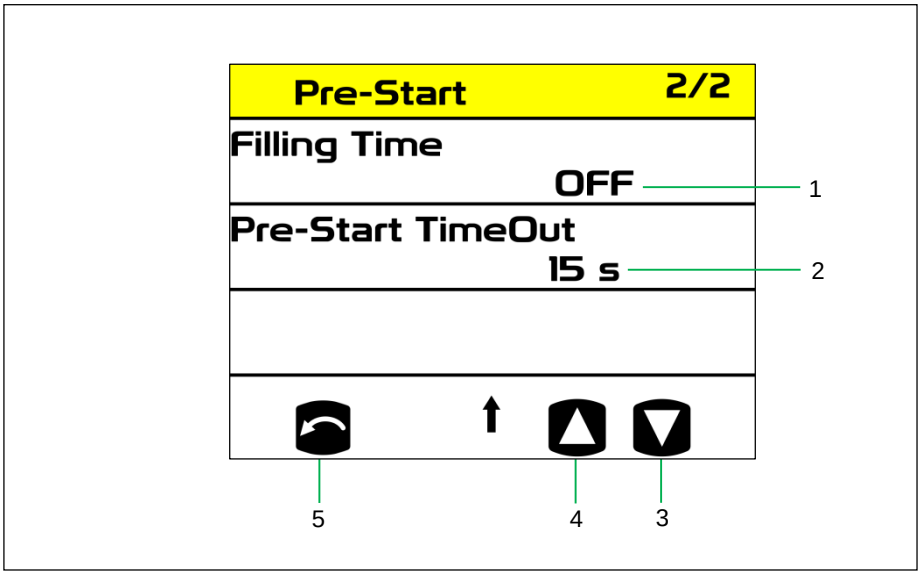


Figure 20

1. **Time Filling:** Used by filling bar / empting into the main screen.
   [OFF - 25.5 s]
2. **TimeOut Pre-Start:** Maximum operating time prestart before returning to "hold" if you pass not "work".
   [0 – 30 s]
3. **DOWN:** decrease the selected value.
4. **UP :** increase the selected value.
5. **RETURN:** return to the user settings.

6.3 Speed source

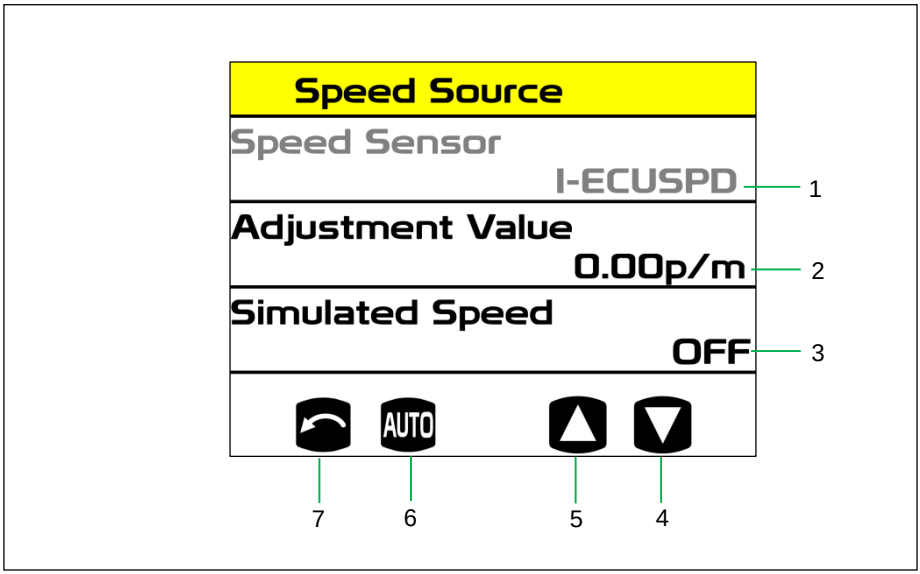


Figure 21

1. **Speed sensor:** This field allows you to select the origin of the given speed.
2. **Calibration value:** This value, the meter pulse is the resolution of the sensor. In order to obtain the product of values distributed congruents with is set in the distribution screen; we recommend the use of high frequency sensors with a minimum of 10 pulses per meter, the optimum conditions of the system are obtained with 100 pulses per meter. When you select this field, with the F1 key you can also access the “self-calibration” of the sensor.
3. **Simulated speed:** When this parameter is at “0” appears OFF and the speed used by the system will be detected by the real souce and the speed used by the system will be the real detected from the program, source; if for some reason, you want to force a screen it will be appropriately indicated that the speed is NOT real.
4. **DOWN:** decrease the selected value.
5. **UP :** increase the selected value.
6. **Automatical calibration.**
7. **RETURN:** return to the user settings.

6.4 Speed sensor calibration

To perform the automatic speed sensor calibration procedure will need to follow the following route planning> User Setting> Speed Source> Calibration value and then press the F1 key. The screen will display it as the one shown in step 1. The steps we should follow in order to obtain a correct calibration are as follows:

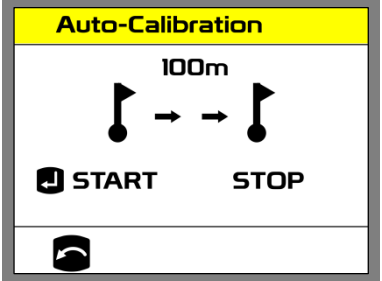
1. We position indicator 2 onm the ground placed at a distance between them 100 meters.
2. Go with the tractor on a previously marked reference point, and press the ENTER key to start the measurement.

Key	Symbol	Function
		Start / Stop the pulse measurement for sensor calibration

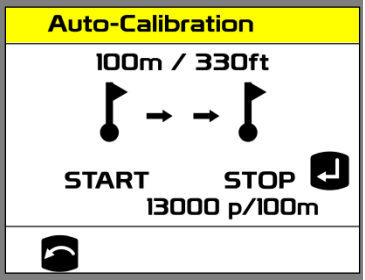
3. Drive the tractor up to the second marked point and press ENTER again to stop the measurement, as in point 2; if the pulse are not in the allowable range, an error message will be displayed as shown in step 3.

4. If the calibration process proceeds whitout errors present in the line below the written START – STOP, we will show the accumulated pulses on the basis of 100 meter.

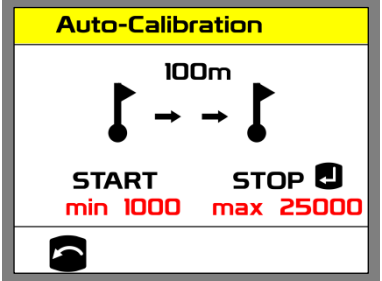
1



2



3



6.5 Clock settings

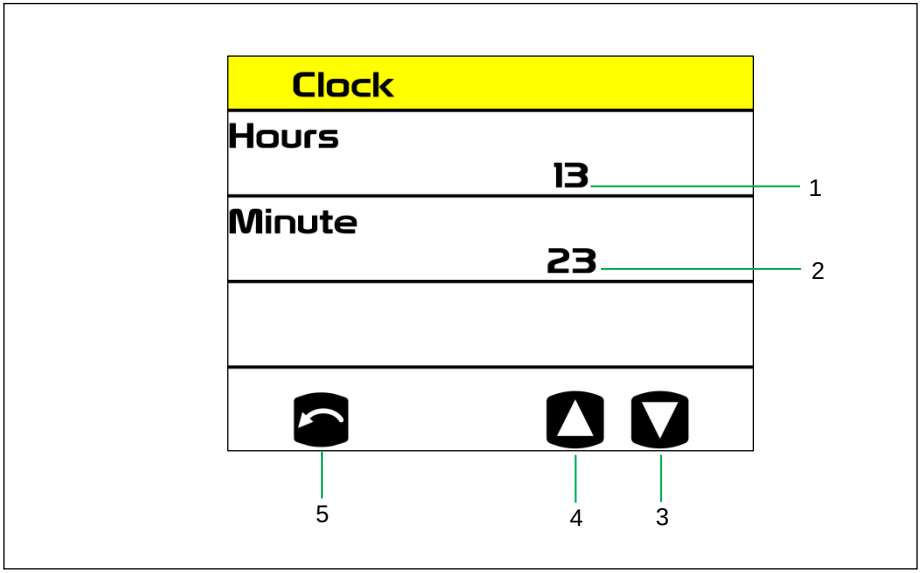


Figure 22

1. **Value hours.**
2. **Value minutes.**
3. **DOWN:** decrease the selected value.
4. **UP :** increase the selected value.
5. **RETURN:** return to the user settings.

6.6 Configuration dimming day / night

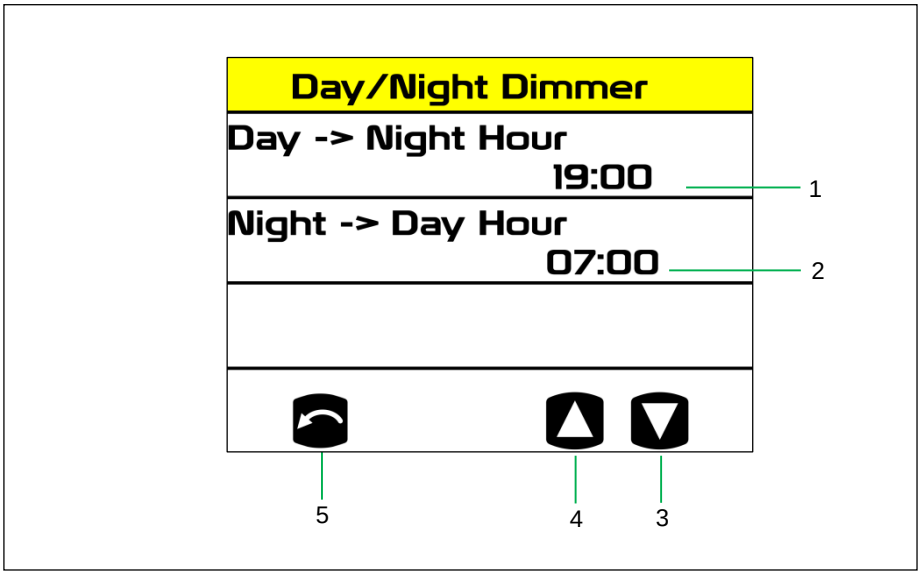


Figure 23

1. **Passing time value from day to night mode**
2. **Passing time value from night to day mode**
3. **DOWN:** decrease the selected value.
4. **UP :** increase the selected value.
5. **RETURN:** return to the user settings.

7. Machine settings

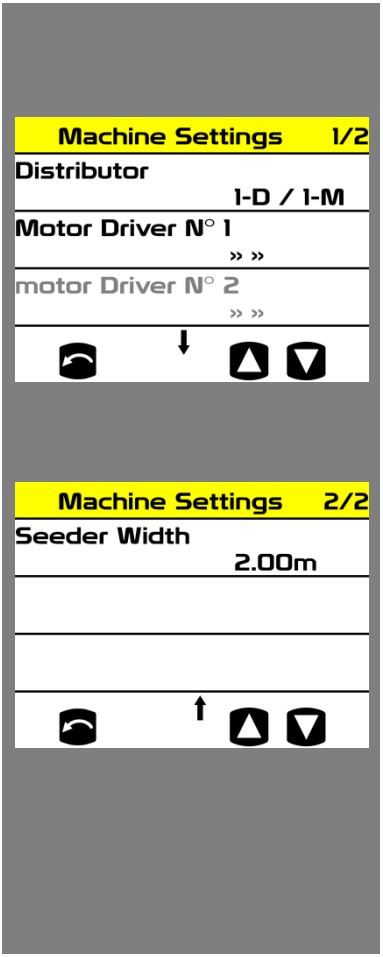
After you enter your numeric password, you enter the submenu screens “machine settings” that allow the installer to change all the settings required to adapt the system to the machine on which it is installed.

Selecting with ▲▼ and ENTER submenu to which you want to access or the field you want to edit.

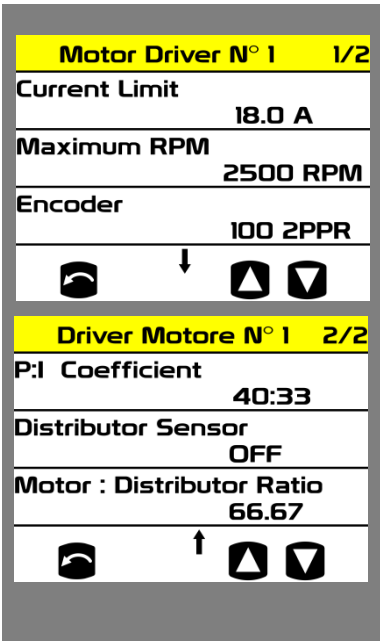
If the machine is configured without two engines, the submenu “motor 2” driver is grayed out and not selectable.

Going to present the modified parameters in this menu you will find:

- **Distributor:** through this setting you will indicate to the configuration system to be used::
  - **1-D / 1-M** = N°1 Distributor, N°1 Motor
  - **2-D / 1-M** = N°2 Distributors, N°1 Motor
  - **2-D / 2-M** = N°2 Distributors, N°2 Motors
- **Engine Driver:** accessing this submenu you can manage the related to engine operating parameters. From the exemplary screen shown here at the side, the word “motor driver N°2” willappear dimmer to indicate the failure possibility to manage the second motor, as not connected to the engine ECU.
- **Seed drill width:** The width of the seeder set here is used for both the area of machined calculations, which for the distribution calculations in Kg/Ha, that for the calculation of the sparying bar width in Tram Line.



7.1 Distributor settings



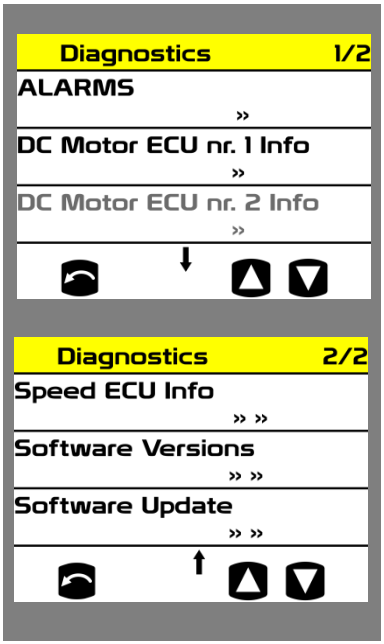
In this screen you set the configuration parameters of the respective motor driver, it's provided N°2 identical screens for setting the parameters of the second driver (if any). These parameters are saved directly in the driver's memory so you do not have to be sent to every submission.

- **Current limit**: Maximum current delivered by continuous driver; to continuing this value is exceeded the driver enters current limit and must receive the corresponding alarm. For example if we use a motor 400W you will have to set a restriction of 25 current.
- **Maximum RPM:** theoretical maximum speed of the motor with power supply within the specified range; it serves mainly to determine the maximum speed of the drill progress.
- **Encoder:** Number of pulses per revolution of the encoder mounted on the motor; settable range from a minimum of 100 and maximum 500 PPR for the encoder / single output sensors, to overcome the 500 PPR you pass to set up the encoder to the encoder 2 signals (AB) which will be indicated by the acronym 2PPR; range is always 0-500. It is advisable to maintain the value 100 2PPR.
- **Coefficient P:I:** are the driver feedback coefficients; the two values are separated by ":". These values do not have to ever be set in a way to aìexact, because an incorrect setting of these factors could result in an incorrect adjustment of the engine.
- **Distribution sensor:** set the number of pulses per revolution of the distributor shaft sensors; 2 decimals are used in case a sensor was place before a reducer; setting this value to 0 (OFF displayed) the failure on the distributor shaft rotation alarm will be disabled directly ffrom the driver. This sensor is optional to the Kits will therefore remain OFF.
- **Motor : distributor report:** set the ratio between the motor shaft and the distributor shaft (including the motor reducer). For example suppose you have a motor with ratio 30.00 if we were to connect it directly to the shaft of the distribution we are going to program the value 30 to the system. But supposing instead to interpose between the engine and the distribution tree with a chain ratio for example of 2:1; the number that we will have to go to program in msto case will be 60.00 .

8. Diagnostics

The screens of the submenu “Diagnostics” which allow the user to perform diagnostic tests and possible update of the system software.
Note also that there is no “ALARMS” screen; selectiong this item from menu diagnostics will return to the main screen and reactivate the display of all alarms still present previously “silenced”. While attraversila voice:

- **DC Motor ECU nr. 1 Info**: you can view the details of the motor 400W in use;



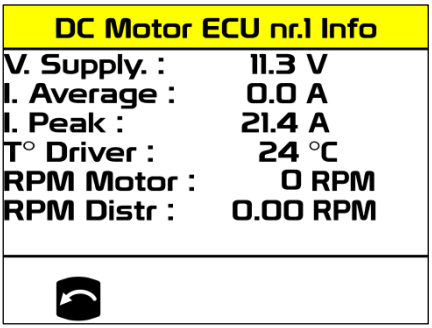


Figure 24

- **Speed ECU Info:** you can view the operating voltage of the speed ECU;

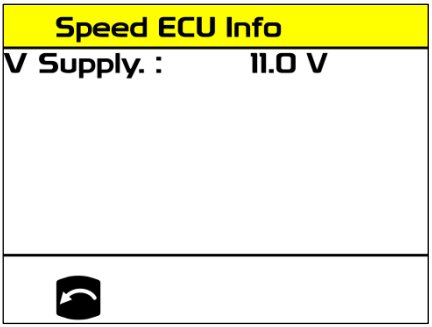


Figure 25

- **Software Versions**: it allows us to view all the software versions of all related items;

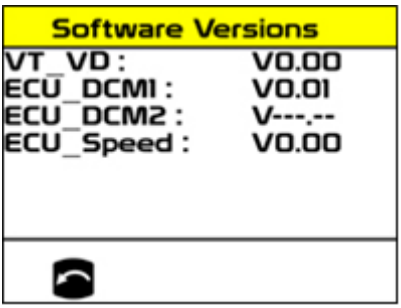


Figure 26

- **Software Update**

9. CAN BUS message

For et the doses of the product through the GPS system you can implement the following message within the CAN bus network of the VD system:

Description	CAN message to set the dose (kg/Ha) from device
Cycle time	< 5 s
Identifier	0x18F01121
Data length code	5

Data		Unit	Scale
Byte 1	Dose value for distributor N°1 (LSB)	Kg/Ha	0.1
Byte 2	Dose value for distributor N°1 (MSB)		
Byte 3	Dose value for distributor N°2 (LSB)	Kg/Ha	0.1
Byte 4	Dose value for distributor N°2 (MSB)		
Byte 5	Bit 1(LSB): if 1 dose from device, if 0 dose from VT Bit 2-8: not used	-	-

If timeout of 5 s no receipt of such a message will result dosage management through virtual terminal. An example of message, may be the following:

Example of CAN message values		Notes
Byte 1	0xE8	100.0 Kg/Ha
Byte 2	0x03	
Byte 3	0xCF	225.5 Kg/Ha
Byte 4	0x08	
Byte 5	0x01	Use the dose from device

If set about VT a dosage of 100.0 Kg/Ha, the CAN message value should be in 1000.

10. Update virtual terminal software

Figure 27

1) Update the Virtual Terminal you will use the SD card with following characteristics:
   - Micro SD card;
   - Maximum capacity 2GB;
   - Not HC, not XC;
   - Formatted FAT16 (not FAT32).

Figure 28

2) Then proceed to insert the SD card into the slot on the left side of the VR not push it all the way. At this stage to take carethat the screen is turned off and pay attention during insertion of not damage the card slot card.

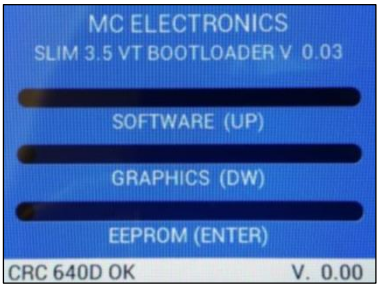


Figure 29

3) Turn on the virtual terminal through the ENTER keys, ESC and ON / OFF pressed simultaneously, until you see a screen as in figure 18. Now insert the card by inserting it all the way.

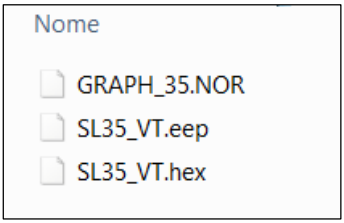


Figure 30

4) We will now upload the files previously inserted in the VT board.
As also shown in figure 18, pressing the button:
- **UP**: it involves the operation of the software loading (file SL35_VT.hex);
- **DOWN:** it involves loading the file relating to graphics (file GRAPH_35.NOR);
- **ENTER:** it involves the loading of files on the settings in EEPROM (file SL35_VT.eep)

11. ECU software updrade

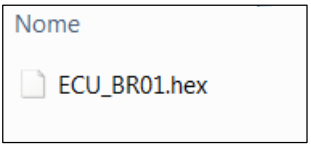


Figure 31

1) Insert the SD card in the VD kit ECU_BR01.hex file if for example we want to upgrade the bridge module firmware. Note that at this stage there must be no other files.

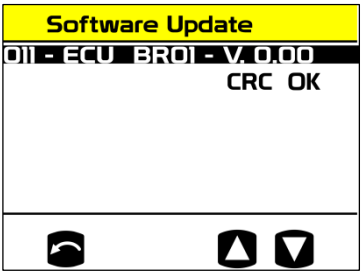


Figure 32

2) With virtual terminale lit we should access the diagnostic menu as seen above and insert the SD card into the slot. Then select the item “Software Update” to display a screen as in figure 24.

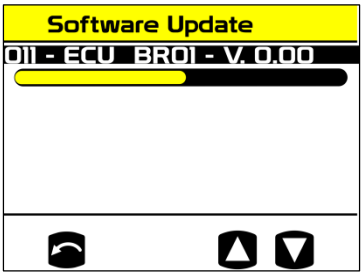


Figure 33

3) Press the ENTER button to begin the update; it will present a loading bar as shown in the side. Wait for the complete loading of the br. Then proceed in the power cyle the VT.

12. Allarms

The alarms are always displayed as a function of the priority of the message. They followed by a continuous red flashing of the side led bars to display and by an acoustic signal, modulated to obtain the operation attention to the program that will appear on the display. You can always “buy off” an error message by pressing the ESC key. With this procedure, the system will stop the display on the display program an acoustically but active will keep flashing bars bars indicate that the problem persists. There are mainly two categories of errors, those due to faulty communication and those generated by the engine driver.

ERRORS:

Communication errors:

- The communication errors are always active control during operation of the system. The devices that can generate this error may be related to the ECU ENGINE 1, 2 and standstill, the system will present outputs off, while if it were in the operationg state, the system would not be usable.

DC errors MOTOR 1 / 2:

- Faults due to DC MOTOR 1, 2 are always active control, and causes that can invoke this error are due FAULT DRIVER, LIMIT VOLTAGE MAXIMUM LIMIT, LIMIT MINIMUM VOLTAGE and TEMPERATURE MAXIMUM LIMIT. The system for any of these problems involves the non-use of the system due to the stationary distributor.

WARNINGS:

DC MOTOR 1 / 2 warnings:

- The ECU DC MOTOR 1 / 2, ECU DISTRIBUTOR 1 / 2 wanrings, like the error messages, are always active and differ from the previous ones to keep the system running. Here below are their possible causes and effects they generate on the system.

DC MOTOR 1 / 2:

Description	State/Action
CURRENT LIMIT	Probable incoherent distribution
SPEED ADJUSTMENT	Probable incoherent distribution
TEMPERATURE	Distributor immediate stop

DISTRIBUTOR 1 / 2:

Description	State/Action
SHAFT ROTATION	Probable absence of the distributor

- There are also warnings related to the ADVANCEMENT SPEED, verified by the system in PRE_START and WORK phase, here below is the description of possible cases:

ADVANCEMENT SPEED:

Description	State/Action
MAXIMUM	Operation; probable incorrect distribution of the product dose

CAUTION!!

DO NOT WASH WITH PRESSURE WASHER JET PRESSURE.

Electronic equipment for agriculture

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