MC ELECTRONICS

KIT USC S4 FULL CONFIGURATION

UNIVERSAL SEEDER CONTROL

MONITORING SYSTEM
FOR ROW SEED DRILLS
(Blockage Monitor + Variable Rate\Tram Line)

CE

INSTRUCTIONS FOR USE

O.E.M. VERSION (MANUFACTURERS)

EN

C E

This product meets the EMC standards as determined in the
2004/108/EC directive and subsequent amendments and reference to the applied
EN ISO 14982 standard

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MC Elettronica S.r.l. is not obliged to give notice of any further modifications of the product.

The information given in this manual does not allow unauthorised personnel to tamper with the product in any way.

The warranty on the equipment will no longer be valid if tampering should be detected.

Contents

1. Rules and general warnings

1.1 Introduction

This instruction manual provides all specific information needed to know and correctly use the equipment.

After buying the Monitor, 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.

1.2 **Terms of the warranty**

- SUBJECT OF THE WARRANTY: the warranty 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*;
- DURATION OF THE WARRANTY: *MC elettronica* guarantees the *USC S4 KIT* and its accessories for a period of **1 year** from the date of manufacture (printed on the identification label on the back of the Monitor).

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

  This warranty 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 a equipment not manufactured by *MC elettronica*, which is mechanically or electrically connected to our instruments, breaks or does not function properly;
  - force majeure events (lightning, floods, fire or other causes which do not depend on *MC elettronica*).

  Repairs under warranty, which must be carried out in the laboratories of our authorised centres, are entirely free of charge provided the equipment is directly transported to said laboratories or sent carriage free. Transport costs and ensuing risks are entirely borne by the Customer.

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

⚠️ *Warning*

MC elettronica declines any liability for damages or direct or indirect costs caused by improper use or inability of the Customer to use the equipment separately and/or together with other equipment.

1.3 **Service**

Service is available in all countries where the equipment is officially supplied by *MC elettronica* (during and after the warranty period).

Any kind of operation to be performed on the *USC S4 KIT* 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 the warranty might become null and void.

2. General description

The USC S4 electronic system is the complete solution that incorporates all features related to:

- **Blockage Monitor (BM)** for monitoring the correct seed or granular fertiliser passage inside the photocells;
- **Variable Rate / Tram Line (VRT)** that allows regulating the distribution proportional to the feed-rate (DPA), thanks to the use of an electric motor, and the Tram Line feature used to plot the tracks for subsequent operations. The system is set-up to be interfaced with the main GPS devices on the market, in order to automatically manage closing of the rows, thus avoiding overlapped sowing.

The control units making up the wiring are:

- **ECU DC MOTOR** is an electronic device that, coupled with other specific *MC Elettronica* devices, allows you to control the electric motor connected to a row pneumatic seed drill doser. Each ECU DC MOTOR can drive one 12vdc motor.
  code 10CEN-0003

- **ECU TRAM LINE** control unit is responsible for controlling the exclusion of the sowing rows and also manages all the signals required for the operation of the system and controls the relative devices.
  code CJK-CEN-0001
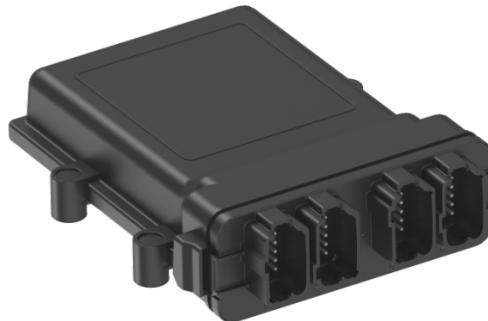
- **ECU GATEWAY** allows you to power and manage the optical "Blockage Sensors" connected in daisy chain in the CAN BUS network. This control unit deals with the automatic numbering of sensors, their diagnostics, configuration and collection of the information received, making them available on the Virtual Terminal. The USC system involves the use of up to two of these control units.

  code 10CEN-004

3. System installation
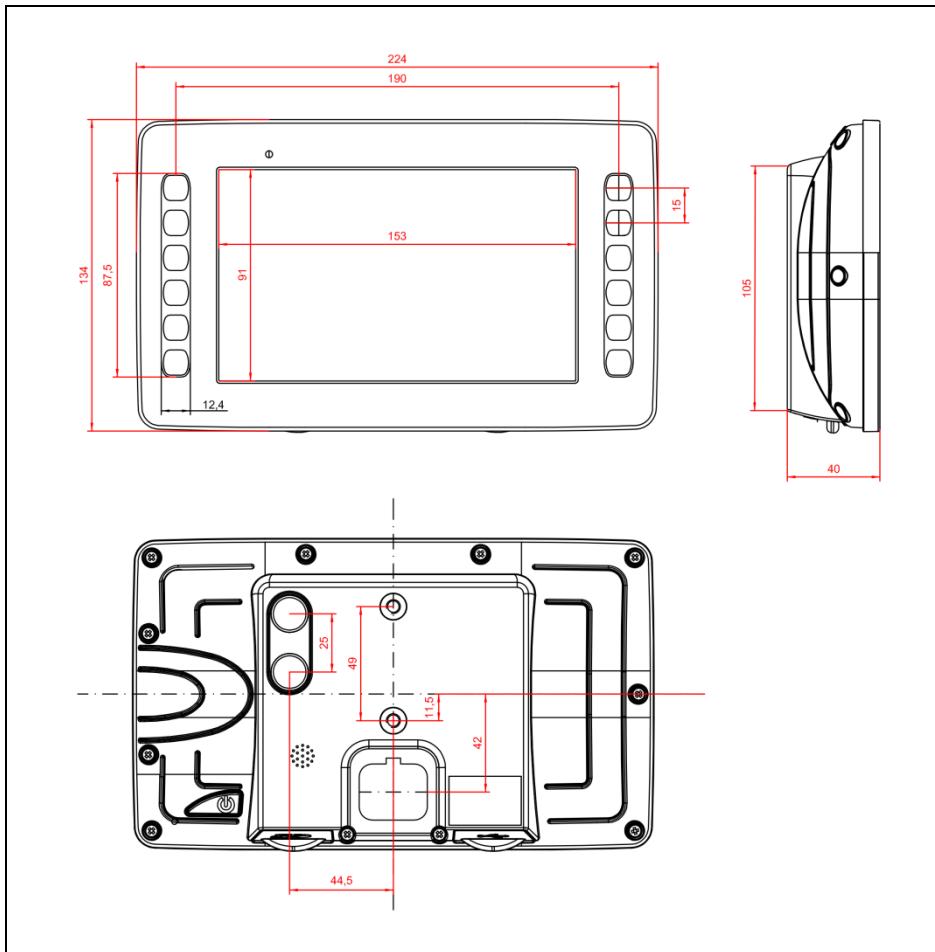
Figure 1 - 7-inch Virtual Terminal dimensions code CJK-MON-0001
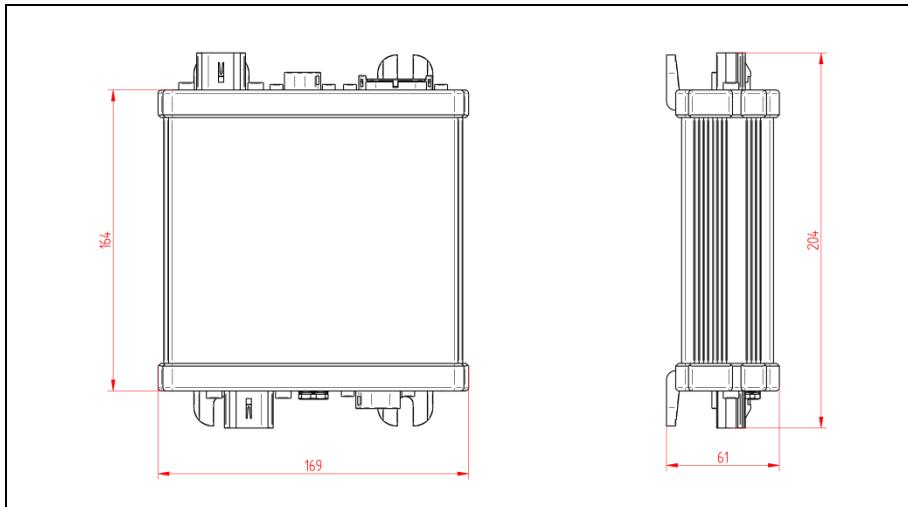
Figure 2 -   Motor ECU dimensions *code 10CEN-0003*
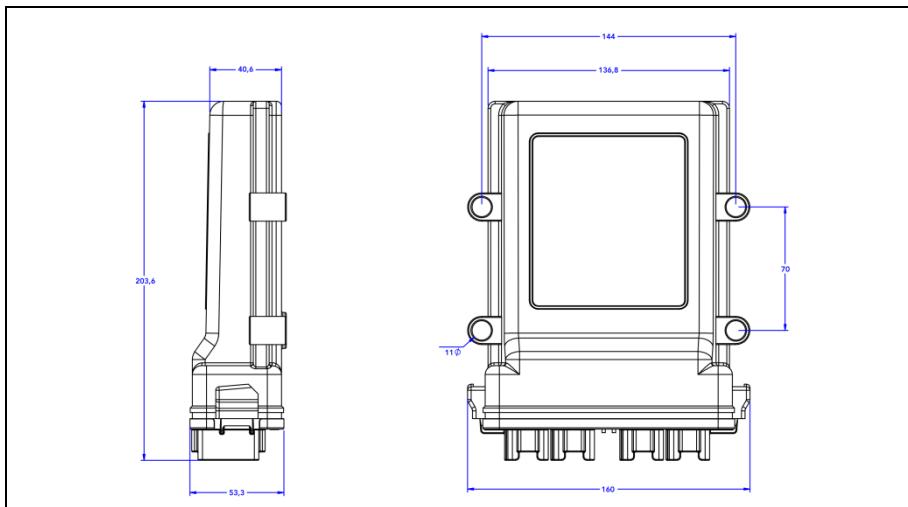
Figure 3 - Tram Line ECU dimensions *code CJK-CEN-0001*
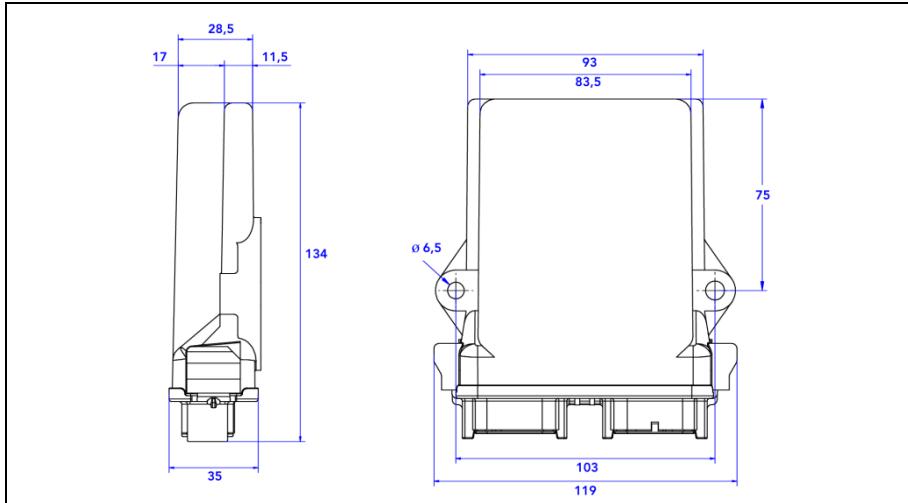
Figure 4 - ECU Gateway Dimensions code 10CEN-004
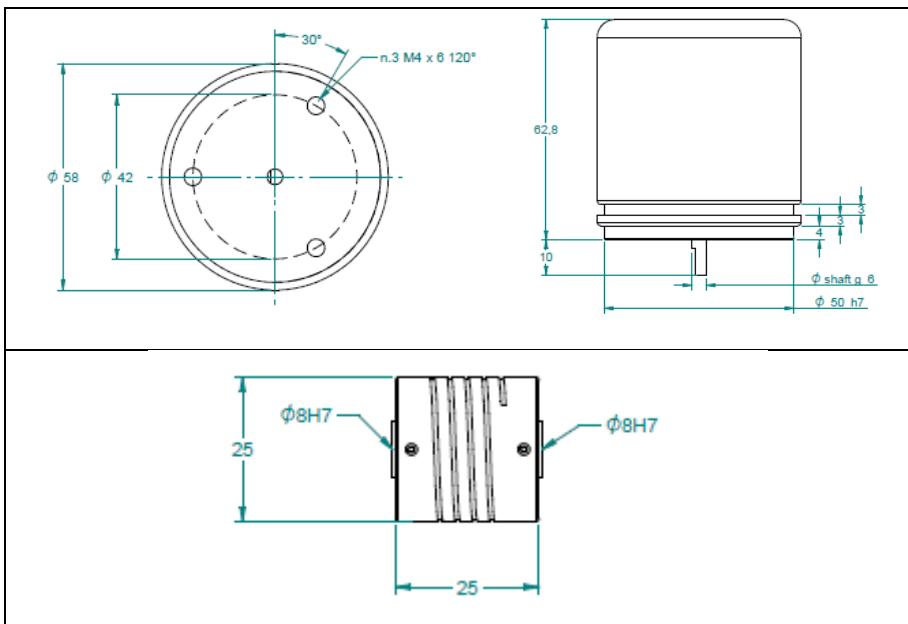
Figure 5 - Encoder Sensor code *00SEN-0023*

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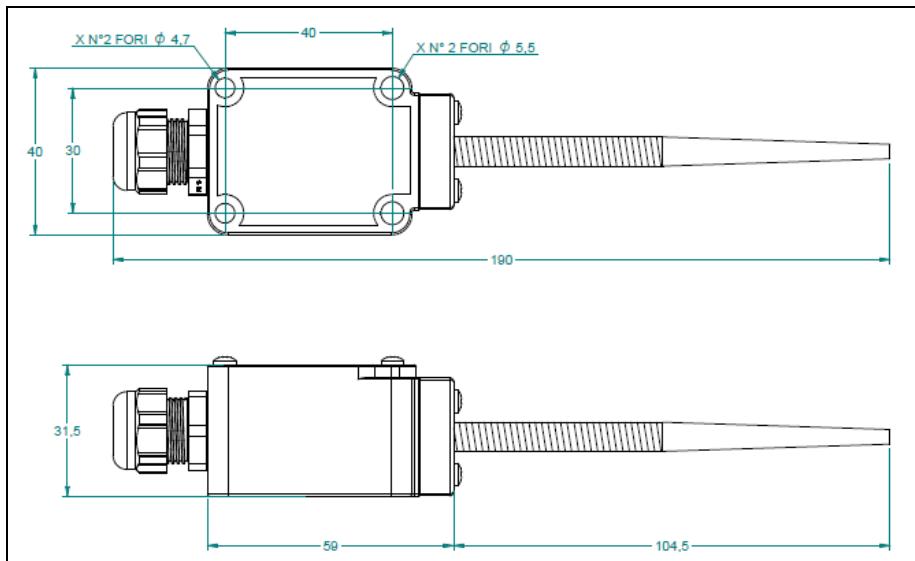
Figure 6 - Work Sensor code 1414

3.1 Electrical connections

CALIBRATION BUTTON 1

MOTOR 1
MTR-0003

MOTOR 2
MTR-0003

CAV-0208 L=2m

SHAFT SPEED
MOTOR 1

CALIBRATION BUTTON 2

CAV-0208 L=2m

SHAFT SPEED
MOTOR 2

L=3.5m

L=2m

L=2m

CJK-CAB-0006

L=3.5m

L=2m

CJK-CAB-0006

CJK-CAB-0007

L=2m

ECU MOTOR 1
10CEN-0003

ECU MOTOR 2
10CEN-0003

POWER SUPPLY

10CAB-0012 L=8m

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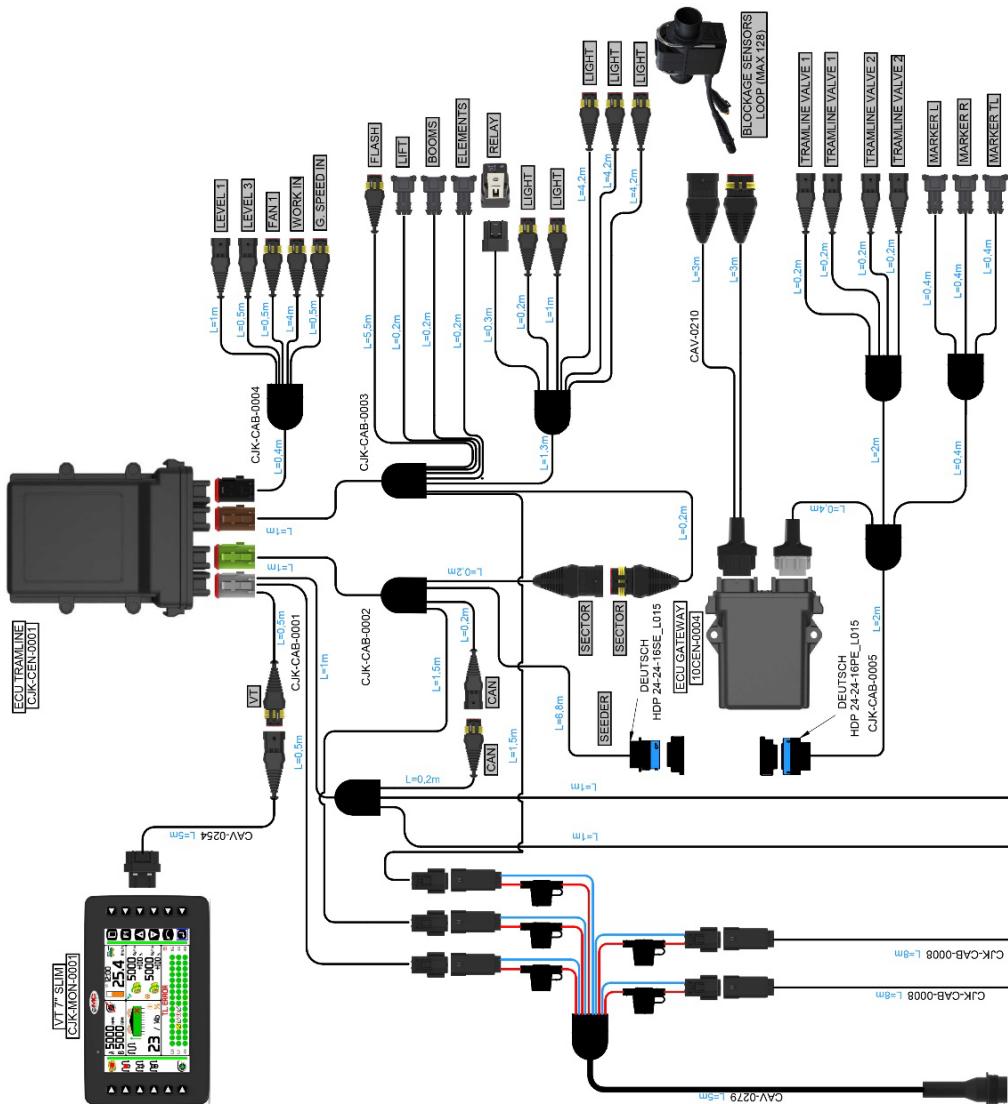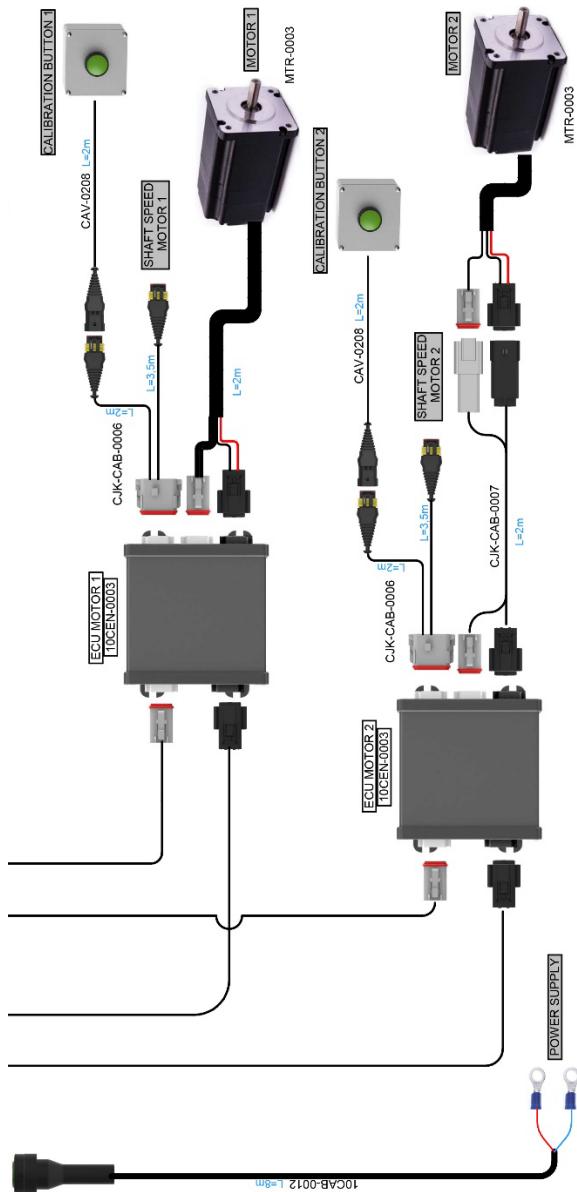
3.2 **Virtual Terminal assembly**

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 7 - 7" Virtual Terminal assembly

3.3 **Sensor installation**

The USC S4 KIT can be equipped with the following sensors:

- Proximity inductive sensor, NPN, 12V, N.O. (always present)
- Capacitive sensor, NPN, 12V, N.A.
- Blockage sensor
- Magnetic sensor
- Level sensor
- Normally open limit switch contact

3.3.1 **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.
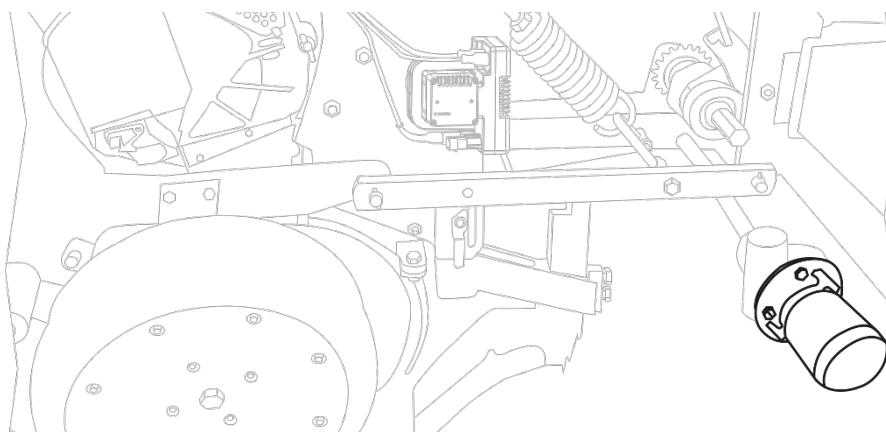
Figure 8 - Incremental speed Encoder Sensor installation

3.3.2 Speed sensor installation

You can install the speed sensor anywhere there is mechanical movement, applying a metal reference protruding by at least 7 mm (Figure 66 - ref. <**C**>).
Set the gap between the sensor and the bolts at about 2/3 m (Figure 6 – ref. <**B**>).
Fasten the sensor supporting bracket (supplied) securely to a fixed part of the vehicle structure. Fasten the sensor to the bracket using the nut and the lock nut.

The sensor must be installed so as to ensure speed reading with a speed of at least 10 pulses / meter (1000 pulses / 100 metres) in order for the system to work properly.

> ⚠️ ***Warning***
> The sensor cable should be covered with a rubber sheath.
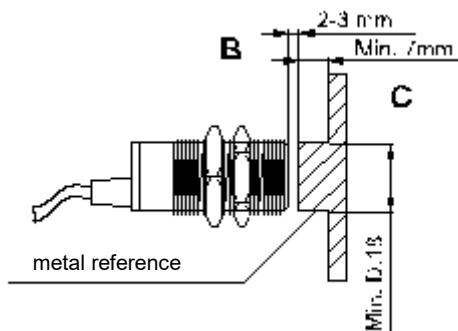
Figure 9 - How to install the speed sensor

3.3.3 Magnetic sensor installation

The inductive sensor to detect turbine RPM must be positioned in front of metal references with a diameter at least equal to the corresponding sensor and protruding from any other metal mass by at least 7mm. The distance between the sensor and its metal reference varies from 2 to 3mm.
The figures below show two different installation examples.
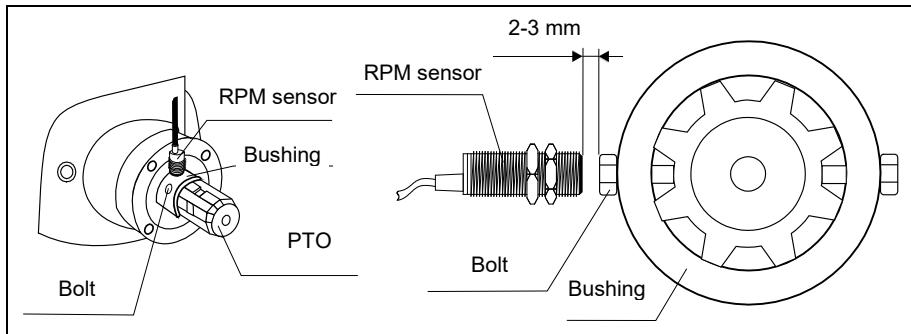
Figure 10 -   Installation of the inductive sensor D.18 on the PTO.
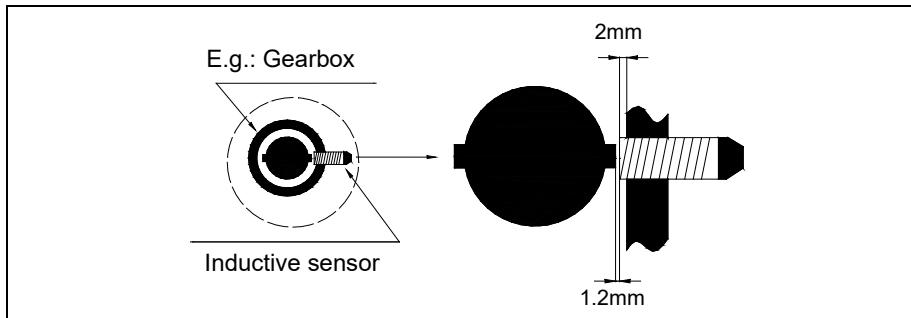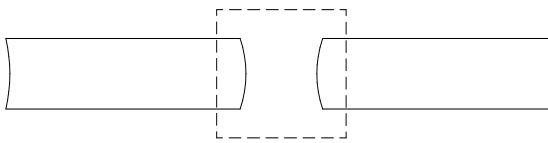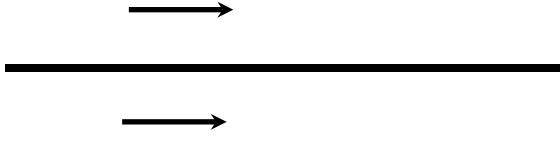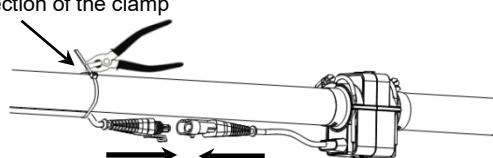
Figure 11 -   Installation of the inductive sensor D.12 on the gearbox.
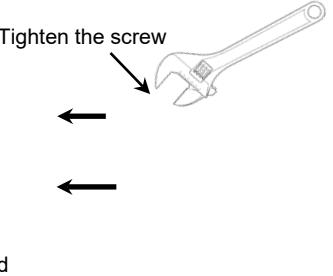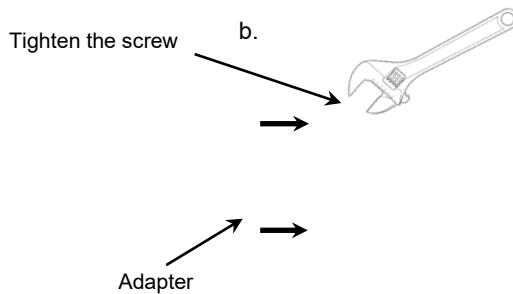
⚠	**Warning** The sensor cable should be covered with a rubber sheath.

3.3.4 Installation of the Blockage Sensors

① Cut the pipe like a dotted rectangle or remove the existing sensor from the pipe.	
② Place the obstruction sensor between the two pipes and push the sensor fittings inside them all the way in.	
③ Insert the terminals, as shown in the figure, and tighten until the pipes are fixed to the sensor.	
④ Connect the sensor connector to the system and then secure the connection with a clamp, placing it at 10 cm from the connector. Cut the protruding section of the clamp.	Remove the excess section of the clamp

3.3.5 Installation of the MCV300 valves

① Position the MCV300 valve on the distribution head. There are two ways of doing this: a. Position the valve directly on the distribution head and fix it by tightening the screw at the top of the valve; b. Insert the adapter for the MCV300 inside the pipe and secure it with a clamp as shown in the Figure. Then insert the adapter into the MCV300 in the correct hole and tighten the screw at the top to fasten the valve to the pipe.	a. Tighten the screw Distribution head b. Tighten the screw Adapter
② Insert the other two valve fittings inside the pipes.	
③ Secure the pipes to the valve with two terminals.	

Instructions for use

3.3.6 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.
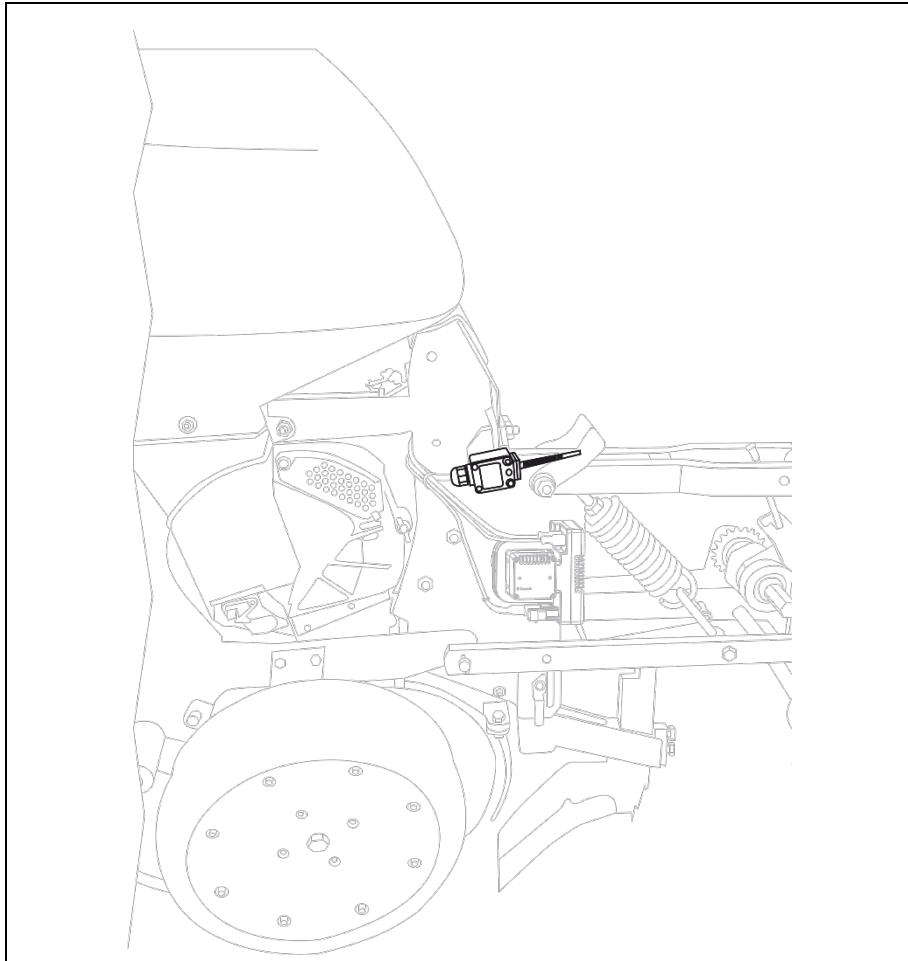
Figure 12 - Work Sensor Installation

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

3.3.7 Magnetic sensor installation

Type 1 installation: The row marker magnetic sensor can be installed on the seed drill on one of the articulated joints of a row marker disc arm, while the magnet (supplied with the sensor) can be placed on the row marker disc arm so that the magnet is opposite the sensor when the arm is raised (Figure 9 ref. **<a>**); when the arm is lowered the magnet moves away from the sensor (Figure 9 ref. **<b>**)

Place the sensor so that when the row marker disc arm is completely raised the magnet is parallel to the sensor head, with a gap of 4/5 mm.

Fasten the supporting bracket (not supplied) securely to a fixed part of the seed drill structure.

Fix the sensor to the bracket with the nut and the lock nut.

N.B. The reference element should be as close as possible to the row tracer disc arm in order to avoid the arm's oscillations causing false readings when the reference comes close to the sensor during operations.

Type 2 installation: This is the same as above, except that the sensor and the magnet come opposite each other only when the machine is raised or lowered. Figure 9 shows an example in which the sensor and the magnet are opposite each other when the machine is raised;
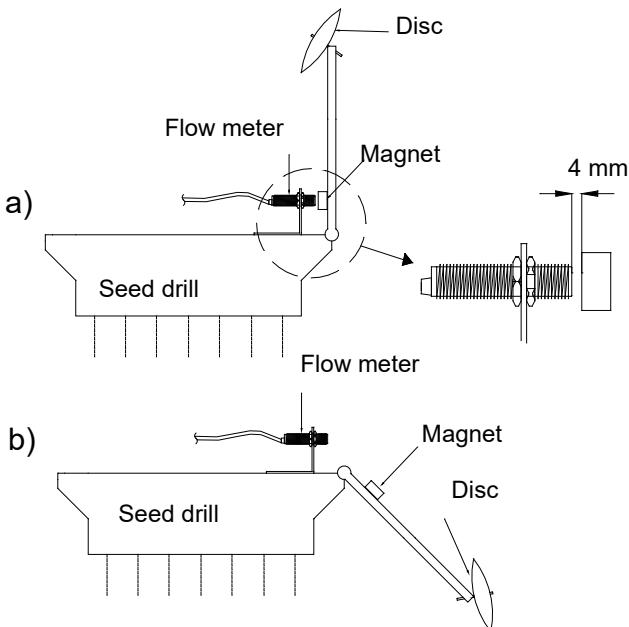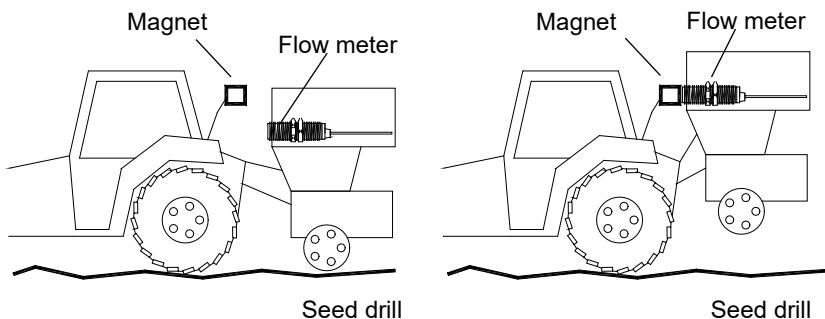
Figure 13 - Example of installation of magnetic row marker sensor.

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

3.3.8 How to install the seed level sensor

The capacitive sensor for the product level should be positioned so as to verify when the level of product in the tank decreases and goes below the minimum level. The capacitive sensor can be installed inside the product tank Figure 10 10 - example 1) using a fixing bracket (not supplied) or it can be fitted directly on the tank body Figure 10 10 - example 2) and attached using its nut and lock nut. It is important for the front part of the capacitive sensor to come directly into contact with the product: this way, by positioning the sensor head in correspondence of the minimum level, when the sensor is covered by the product (ref. <**1**> examples 1 and 2 Figure 10 10) it does NOT emit an alarm signal, while instead when the sensor head remains uncovered during operation, the relative alarm is activated.
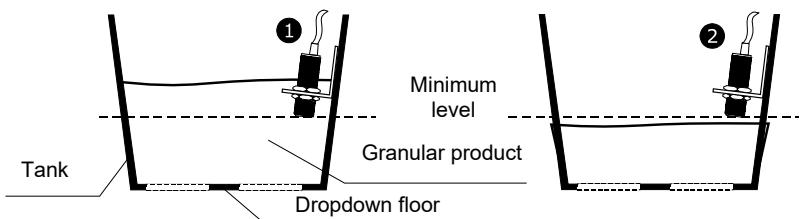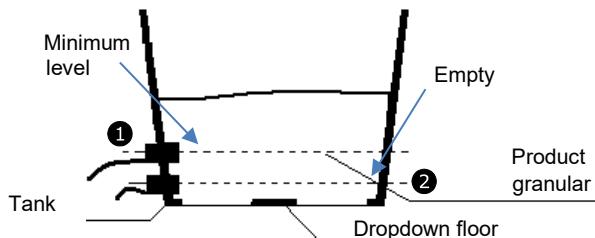
Figure 14 - Examples of installation of seed level sensor.

3.3.9 Radar sensor and GPS installation

As an alternative to the speed sensor seen in paragraph 3.3.1, it is possible to connect non-MC elettronica radar or GPS sensors to the Tram Line control unit, which allow the system to reach the vehicle feed-rate.
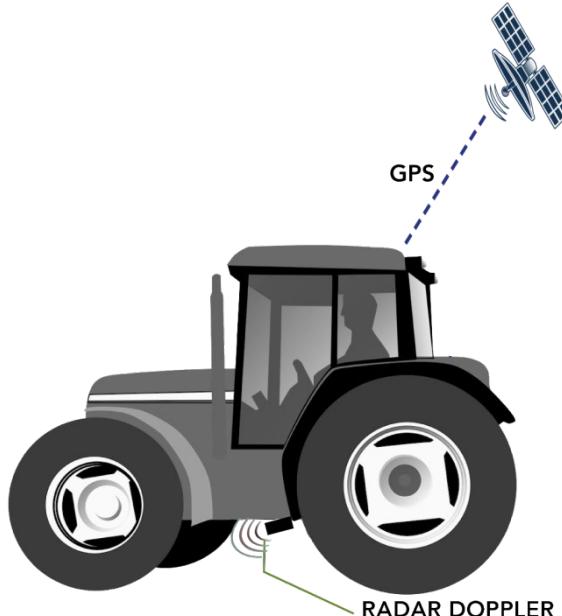
Said sensors can be connected to the 7" VT via adaptive wiring. For more details on how to implement these sensors, contact the MC elettronica technical assistance service.

3.4 **Keyboard operation**

3.4.1 **Main screen**
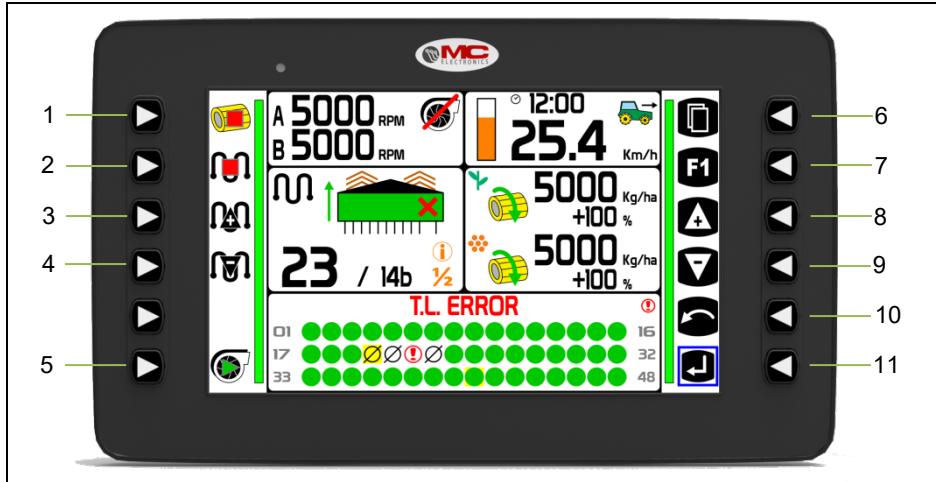
Figure 15

The front panel allows the user to view all the data relating to the working cycle. The following elements can be seen on the panel:

1. **PRE-START**: sowing control system start.
2. **TRAM LINE:** turn tram line function on / off.
3. **TRAM LINE INCREASE:** it increases the number of passes and the exclusion of rows; after reaching the end (top or bottom), the T.L. passes recycle.
4. **TRAM LINE DECREASE:** it decreases the number of passes and the exclusion of rows; after reaching the end (top or bottom), the T.L. passes recycle.
5. **BLOWER:** By keeping this key pressed for 2 seconds, you can activate / deactivate the blower. The blower can only be deactivated with the distributor stopped.
6. **Menu**: press it once to go to the next screen; press and hold down to switch to the programming mode.
7. **F1**: Specific command for some alarms.
8. **UP:** increases the selected value.
9. **DOWN**: decreases the selected value.
10. **RETURN:** closes and silences the alarm.
11. **OK:** used to select the parameter to be edited if the information does not come from the customer's GPS navigator.

3.4.2 Distribution Screen
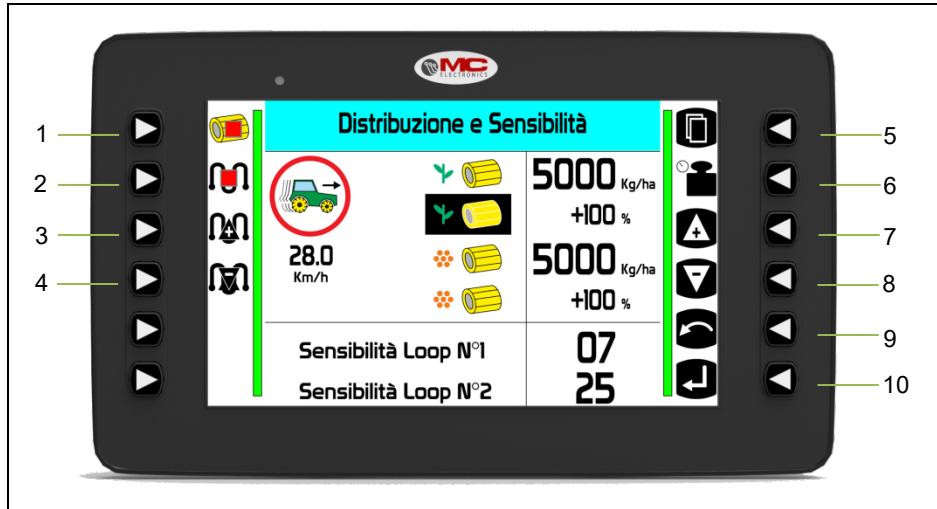
Figure 16

This panel is used to configure the amount of product to be distributed according to the hectares covered:

1. **PRE-START**: sowing control system start.
2. **TRAM LINE:** turn tram line function on / off.
3. **TRAM LINE INCREASE:** it increases the number of passes and the exclusion of rows; after reaching the end (top or bottom), the T.L. passes recycle.
4. **TRAM LINE DECREASE:** it decreases the number of passes and the exclusion of rows; after reaching the end (top or bottom), the T.L. passes recycle
5. **Menu:** used to go to the next screen.
6. **CALIBRATION**: switches to the sowing system calibration menu   (to be performed whenever you change the type of product to be distributed)
7. **UP:** increases the selected value.
8. **DOWN**: decreases the selected value.
9. **RETURN:** goes back to the initial screen.
10. **ENTER:** confirms the selection.

3.4.3 Hydraulic Control Screen
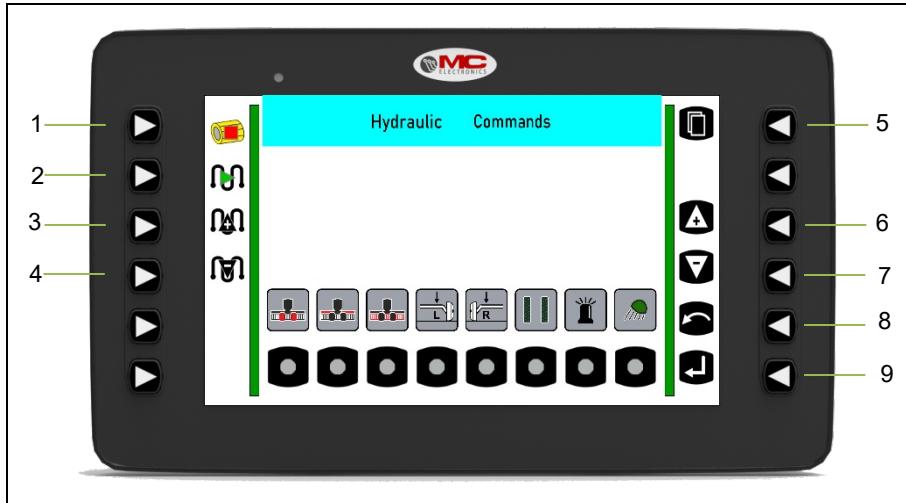
Figure 17

This panel is used to configure the amount of product to be distributed according to the hectares covered:

1. **PRE-START**: sowing control system start.
2. **TRAM LINE:** turn tram line function on / off.
3. **TRAM LINE INCREASE:** it increases the number of passes and the exclusion of rows; after reaching the end (top or bottom), the T.L. passes recycle.
4. **TRAM LINE DECREASE:** it decreases the number of passes and the exclusion of rows; after reaching the end (top or bottom), the T.L. passes recycle
5. **Menu:** used to go to the next screen.
6. **UP:** increases the selected value.
7. **DOWN**: decreases the selected value.
8. **RETURN:** goes back to the initial screen.
9. **ENTER:** confirms the selection.

3.4.4 Information screen
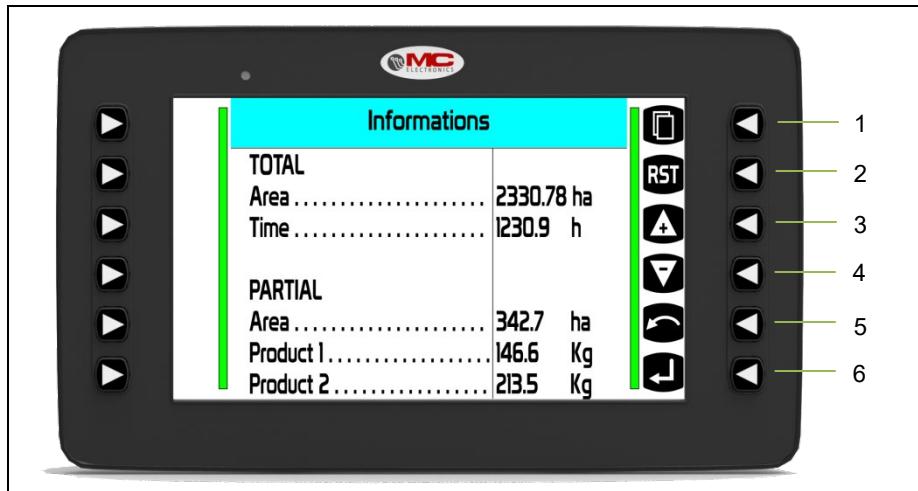
Figure 18

This last window that completes the initial scrolling cycle displays the seed drill use counters:

1. **Menu**: goes back to the initial screen
2. **RESET**: press this key to simultaneously reset all the partial counters
3. **UP:** increases the selected value.
4. **DOWN**: decreases the selected value.
5. **RETURN:** goes back to the initial screen.
6. **ENTER:** confirms the selection.

3.5 **Graphic interface description**

3.5.1 **Seed drill work screen**
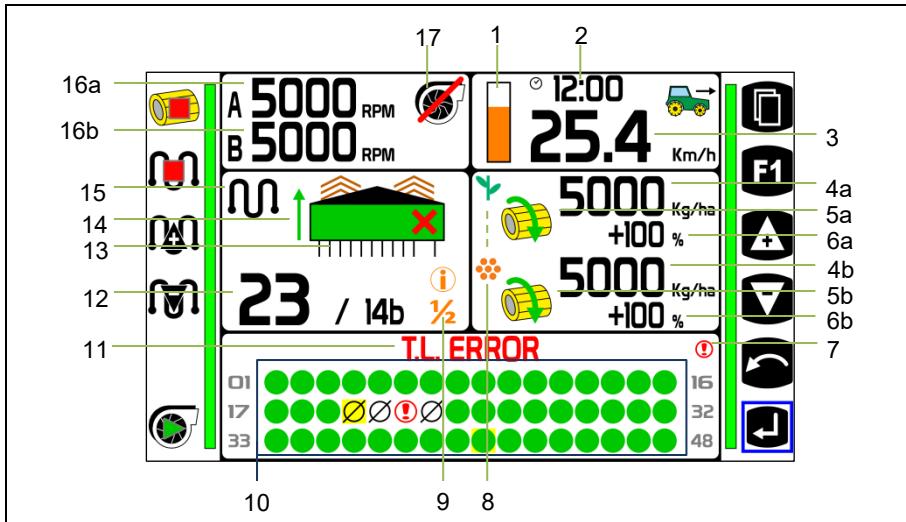
Figure 19

1. **Filling and emptying bar:** displayed at the filling stage upon PreStart and during the emptying stage upon PreStop

   [orange bar] → PreStart status   [green bar] → PreStop status

2. **Clock**
3. **Speed:** if highlighted in orange, it indicates a user-simulated speed through a setting from the user menu described later in this document.

   6.4 Km/h

4. **Value of the product distributed per hectare in real time, from distributor (a) and (b).**
5. **Status of distributor (a) (b):** at the end of the emptying or filling of the bar, the icon will show whether or not it is active.

   [icon] → Distributor off   [icon] ...ributor running

6. **Decrease / increase the distributed product (a) (b):** according to the value in Kg/ha defined on the distribution screen.
7. **General status of the Blockage Monitor system.**

8. **Type of product in the distributor.**

9. **Warning field:** Indications about special rhythm conditions relating to the selected Tram Line. Here is a definition of the warnings that might be displayed:

(i) ½	**Half Seed Drill:** to respect the "rhythm", the first pass through upon entering the field must be made with ½ seed drill.
(i)	**Increased Pneumatic Width:** special rhythm only to be used to achieve increased pneumatic widths.
(i)	**Increased track width:** special rhythm only to be used to achieve increased track widths.

10. **Display area of the individual obstruction sensor statuses:** this screen can be configured through programming menu, with a single 48-sensor panel. Alternatively, the sensors can display two individual panels of 50 sensors each.

   The status of the sensors according to the status in use of the machine is defined below:

- *Status = STOP or WAITING:*

	Text	Description
!	**ERROR**	Sensor in alarm or not detectable
◯	*none*	Flow not detected
●	*none*	Flow detected

- *Status = PRE-START or WORK; Tram Line NOT active:*

	Text	Description
✖	**ALARM**	Sensor not detected
!	**ERROR**	Sensor in alarm or not detectable
◯	**OFF**	Loop sensors disabled by sensitivity = OFF
●	*none*	Flow detected

- *Status = PRE-START or WORK; Tram Line Active:*

	Text	Description	Tram Line
✖	**ALARM**	Sensor not detected	Row not excluded
①	**TL ERR**	Sensor in alarm or not detectable	Row excluded
∅	**T. LINE**	Loop sensors disabled by sensitivity = OFF	Row excluded
!	**ERROR**	Sensor in alarm or not detectable	-
●	*none*	Flow detected	Row not excluded

- *Status = PRE-START or WORK; Sensor icons for ½ machine excluded:*

	Text	Description	Tram Line
🔲	**ERROR**	Sensor in alarm or not detectable	-
◯	*none*	Flow detected	½ machine excluded
∅	*none*	Flow not detected	½ machine excluded

11. **Status warnings field of the obstruction sensors.**
12. **Tram Line Count:** the current "pass through" number is displayed and the total number of "pass through" foreseen by this sequence, besides the type of sequence. The parameter can be changed directly using the following keys ▲ ▼ when circled by BLUE rectangle.
13. **Status of Tram Line exclusion:**

	No exclusion, all rows are active.
	Left exclusion, the rows connected to TL1 output are excluded
	Right exclusion, the rows connected to the TL2 output are excluded
	Exclusion, the rows connected to both TL outputs are excluded

13. **Starting side**: right or left; only for asymmetric rhythms.
14. **Tram Line count status:** the icon shows the general enabling or disabling of the Tram Line functions. The status can be changed by pressing "ESC".
15. **Blower RPM values (a) (b)**: the system allows us to display the RPM speed values of two blowers or you can use the machine settings to display a single blower.
16. **Blower status**: through this icon you will be able to view the general status of the blowers; if set within the machine settings, pressing the blower key allows the operator to switch the blowers with this feature on and off.

3.5.2 Distribution screen
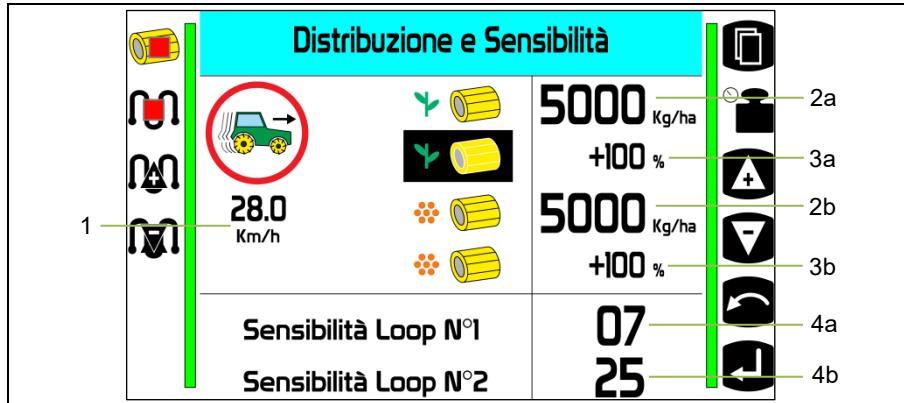
Figure 20

1. **Maximum speed:** indicates the maximum speed the system can reach whilst maintaining the correct product distribution, by taking into account all the parameters currently programmed.

Note:
If the indicated speed is too low, probably there is a parameter programming error: see the Programming chapter. (Chap. 4 page 38)

2. **Nominal amount of product to be distributed, by distributor (a) and (b).**
3. **Decrease / increase the distributed product (a) (b):** according to the value in Kg/ha defined earlier. The percentage variation is then displayed on the main screen.
4. **Sensitivity of photocells (a) (b):** sensitivity on passing can be defined for two separate photocell blocks and its value can be expressed by OFF-20, according to the type of product to be detected.
   With the value OFF all sensors will be displayed as in the absence of flow when the seed drill is at STOP; no flow alarms are generated and the alarms row displays "OFF".

3.5.2.1 Obstruction detection

Obstruction detection of the sowing pipes is entrusted to the seed sensors for which you can program a sensitivity parameter between 1 and 20, the higher the value the greater the flow of seeds through the pipe.

The individual indicators of the seed sensors display the current status in real time, while the alarm and overall display are delayed to prevent false alarms.

When the distributor starts it is necessary to wait for the circuit to be filled, so there is a "Start delay"; no stop time is required because the seed sensors do not generate a flow alarm when stopped.

To prevent false alarms, there is an "Alarm Delay" set for each loop that delays, from the detected condition, the alarm and its "overall display". Similarly, there is an "Alarm Reset Delay" set for each loop that delays, from the reset of the alarm condition, the alarm reset and its "overall display".

The following table shows some notes, for indicative purposes, of the sensitivity values recommended for the main crops:

Sensitivity level	Notes
1	Obstruction detection disabled
2	
3	Minimum for rapeseed at minimum speed
4	
5	
6	
7	Minimum for wheat at minimum speed
8	
9	Maximum for rapeseed at maximum speed
10	
11	
12	
13	
14	
15	
16	
17	Maximum for wheat at maximum speed
18	Maximum recommended value
19	
20	

3.5.3 Hydraulic Control Screen
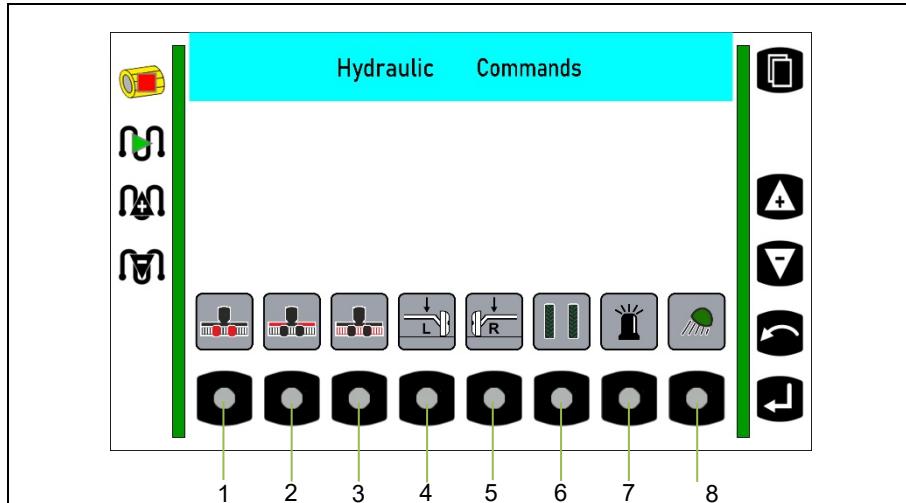
Figure 21

1			**Machine lift**: through this icon it will be possible to lower or lift the machine
2			**Hydraulic arms**: through this icon it is possible to open/close the machine
3			**Seeding/Sowing elements**: through this icon it is possible to lift/lower the seeding/sowing elements
4			**Left row trace**: through this icon it is possible to activate/deactivate the left row trace
5			**Right row trace**: through this icon it is possible to activate/deactivate the right row trace
6			**Tramline marker enabling**: Through this icon, if the Tramline valves are active, it allows to enable or disable the Tramline marker
7			**Blinker**: the blinker can be switched on or off through this icon.
8			**Work lights**: through this icon it is possible to switch on or off the work lights on the tool

3.5.4 Displaying the system counters
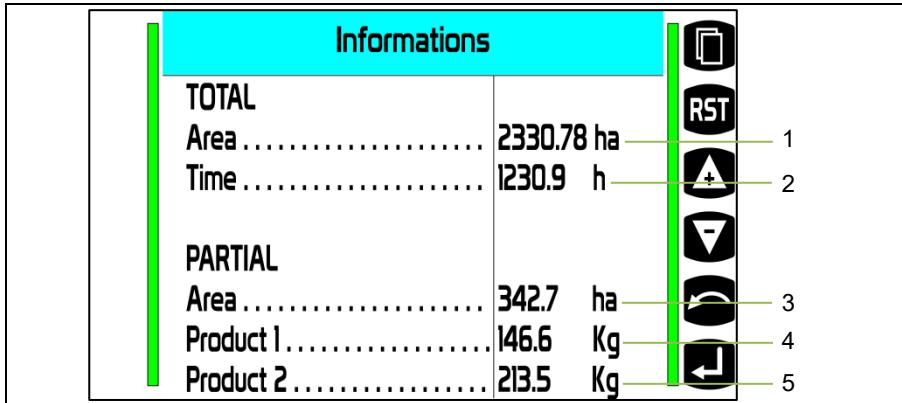
Figure 22

1. **Total hectares covered:** total counter of hectares covered, cannot be reset
2. **Total time:** total counter of operating hours, cannot be reset
3. **Hectares covered partial count:** counter of hectares covered from the previous counter reset
4. **Product 1 partial count:** counter of quantity of type 1 product distributed since the previous reset function
5. **Product 2 partial count:** counter of quantity of type 2 product distributed since the previous reset function

3.5.5 Calibration menu
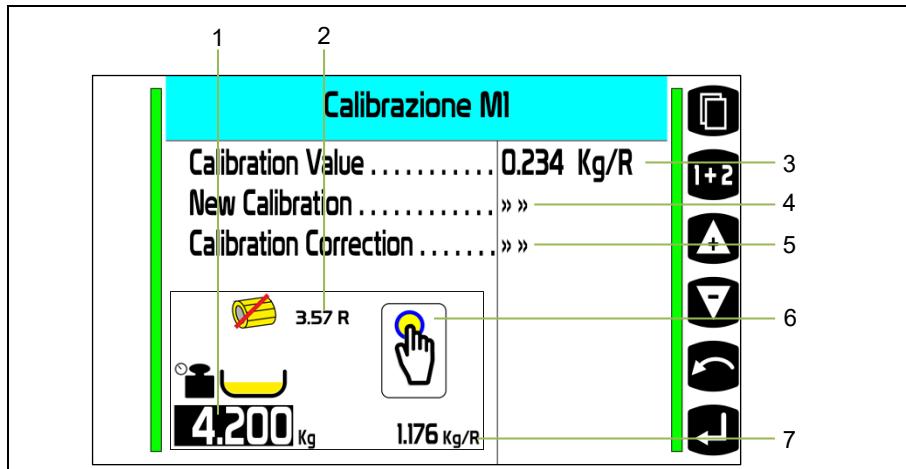
Figure 23

1. **Value weighed by the harvesting tray.**
2. **Rpm value:** Indicates the number of revs performed by the distributor by pressing the calibration key upon its release.
3. **Calibration value (manual)**: you can manually indicate the speed distributor calibration value
4. **New calibration:** run the automatic calibration procedure.
5. **Calibration correction:** this procedure can be performed after the automatic calibration to optimise the theoretical values obtained with the automatic calibration.
6. **Calibration button:** it tells the user to press and hold down the calibration button until this last operation has been completed.
   (see figure in paragraph 3.1)
7. **Calibration value (automatic):** obtained from the amount of product weighed by the containment tray and the distributor revs.

3.6 **Calibration procedure**

The calibration procedure allows you to calibrate the amount of product corresponding to the rotation of the distributor. This procedure must be performed for each product of a different type distributed by the seed drill and if the distribution roller is replaced.

The conditions to access this procedure must be machine stopped and blower stopped. Follow the steps below to perform a proper calibration:

1. Go to the "New Calibration" sub-menu and place a harvesting tray underneath the distributor.
2. Press the calibration button on the seed drill and keep it pressed.
   The distributor starts rotating at set speed. The rotation counter next to the distributor icon indicates actual rotations (reset by pressing the button).
3. Release the calibration button on the seed drill; the field for inserting the weight will appear.
4. Empty the tray and position it under the distributor; the previous rotation was used to fill the distributor.
5. Repeat points 2 and 3, making sure that the quantity exiting is suitable for weighing.
6. Weigh the content of the tray and insert the value using the ▲ ▼ keys and confirm by pressing ENTER.
7. The calibration coefficient in Kg per distributor revolution; if calibration is sufficient, exit calibration; if wanting to repeat the calibration, repeat from point 5.

Instructions for use
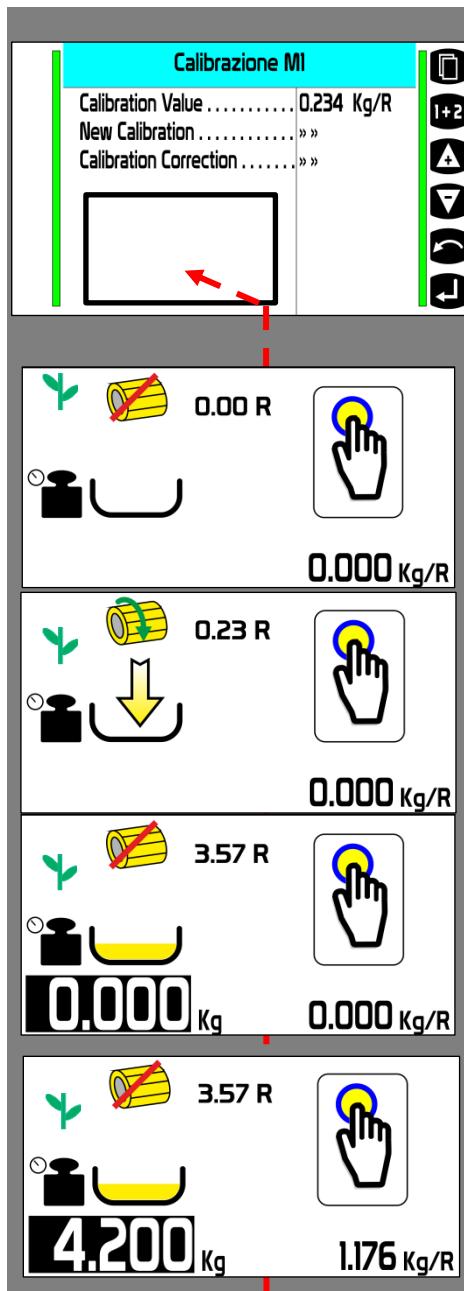
The calibration screens in the 2-motor configuration will indicate the following symbols:

Distributor configuration for different products	
Symbol	**Description**
	Seed distribution
	Fertiliser distribution
Distributor configuration for single product	
Symbol	**Description**
	Right distributor
	Left distributor

3.6.1 Calibration correction procedure

The "calibration correction" sub-menu has the same screens and utilisation processes of the automatic calibration seen in the previous paragraph.
The only difference is that the distribution motor, instead of being rotated at a fixed speed, is rotated at a specific speed that takes into account the following parameters:

- Previously determined or inserted calibration coefficient
- Required distribution quantity
- 10 km/h feed-rate (km/h)

In this way calibration is achieved a distributor speed that is closer to what is actually used; this way calibration will be more precise. Please note that if the distributor speed is beyond the maximum programmed limit, this sub-menu will not be accessible.

4. Programming

4.1 **User Settings**

To go to the VT settings just go to the main screen and hold down the menu key for 4 seconds.

[□] → Menu button
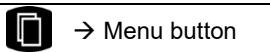
The screens displayed at the end of the previous step, will allow the user to edit all settings required for the work to be performed.

- **Language:** used to select the language to display when using the system.
- **Alarms:** used to enable all previously silenced alarms.
- **Tram Line:** this sub-menu can be used to set the row exclusion operating parameters.
- **Pre-Start:** used to control the parameters relating to the operation of the motor and distributor connected to it.
- **Obstruction detection unit No. X:** this page is used to set the parameters on which the seed sensors' management is based for detecting the obstruction for each Loop.
- **Blower:** through this screen you can set the limits for the minimum and maximum speed alarms of the blowers.
- **Speed source:** this is used to sent the origin of the speed value of the vehicle and its calculation factor.
- **Clock & Dimmer:** setting of system hour and minutes and definition of the start and end time of the graphic mode at night-time.
- **Backlight**: this is a percentage value referred to the brightness of the screen. [0 – 100 %]

User Setting	1/2
Language	English
Allarms	» »
Tram Line	» »
Pre-Start	» »
Blockage Det. L . Nr . 1	» »
Blockage Det. L . Nr . 2	» »
Blower	» »
↓ Speed Source	» »

User Setting	2/2
↑ Clock & Dimmer	» »
Backlight	100 %
Buzzer Volume	100 %
Diagnostics	» »
Software Update	» »
Machine Settings	» »
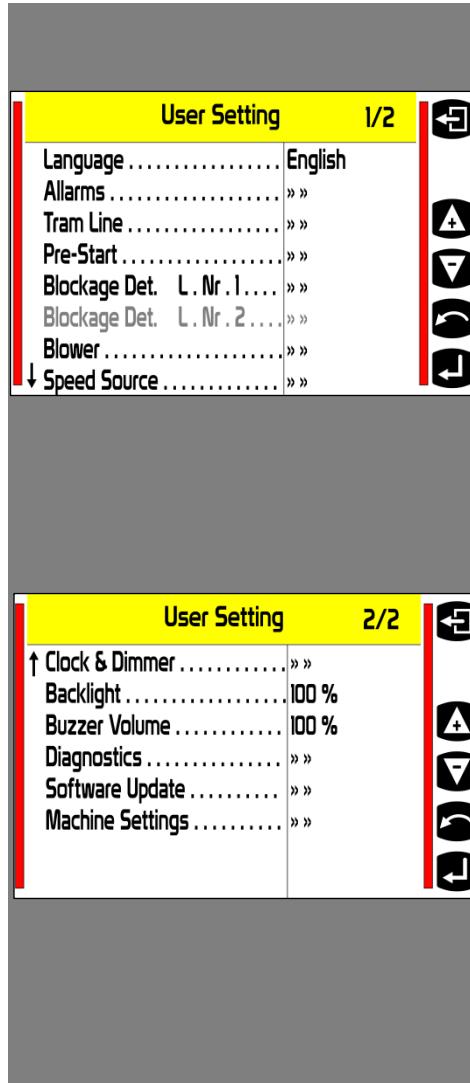
- **Buzzer Volume**: this is a percentage value to define the sound level of the buzzer in the event of acoustic error messages.
  [0 – 100 %]
- **Diagnostics:** through this item you can access the diagnostics menu, which allows the user to have an analysis on the various system components.
- **Software update:** software update of the virtual terminal and of the various control units composing the USC kit.
- **Machine settings:** the screens contained in this sub-menu are protected by a password that must be entered on a screen that appears when said screens open.
  Once the password has been entered correctly, the settings we will edit are necessary to adapt the system to the machine on which it is installed.

4.1.1 Tram Line settings
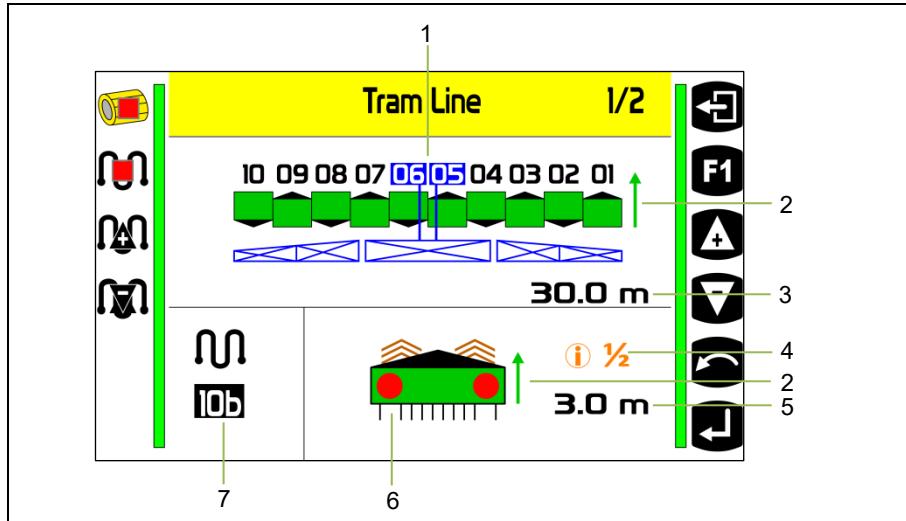
Figure 24

1. **Summary graphic display:** for Pass through and Tram Line traces resulting from the configurations in the screen.
2. **Side:** Side of the field to start form; symbol only present in asymmetric "rhythms". This symbol, when present, it is displayed both next to the graphic of the pass through and next to the seed drill synoptic.
3. **Bar Width:** Field that only displays the width of the spraying bar, defined according to the parameter selected in point 7 "Tram Line Rhythms".
4. **Warning field:** Indications about special rhythm conditions relating to the selected Tram Line. Here is a definition of the warnings that might be displayed:

ⓘ ½	**Half Seed Drill:** to respect the "rhythm", the first pass through upon entering the field must be made with ½ seed drill.
ⓘ	**Increased Pneumatic Width:** special rhythm only to be used to achieve increased pneumatic widths.
ⓘ	**Increased track width:** special rhythm only to be used to achieve increased track widths.

5. **Sowing Width:** Read-only field of the seed drill width (fixed value entered via the machine settings).
6. **Seed drill Synoptic:** Graphical display of the configuration for the tram lines used in this "Rhythm".
7. **Tram Line rhythms:** editing this field allows us to scroll all available rhythms once it has been selected; the rhythms table is made in ascending order of the ratio between bar and sowing, so that the rhythms are displayed in order of bar width. To edit this field, press the "ENTER" key and then with the ▲▼ keys move to the next screen.
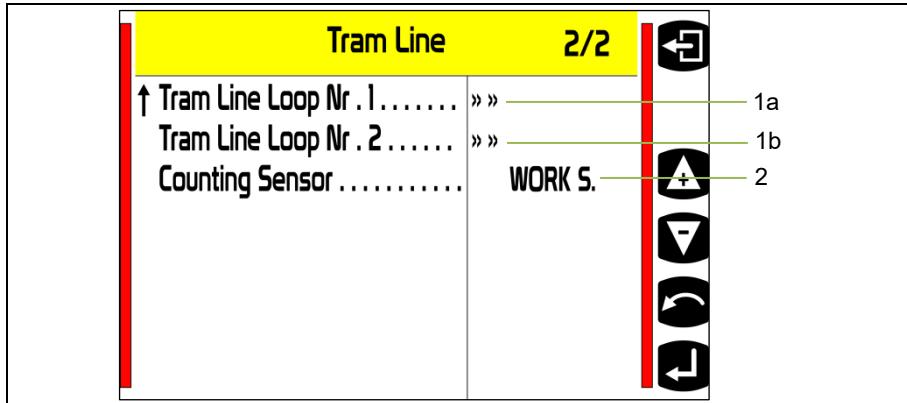
Figure 25

On this second screen you can set:

1. **(a) (b) Configuration of seed sensors excluded from the Tram Line.**
2. **Advancement sensor:** can be configured with the following variants:
    -   **WORK S.**: Seed drill sensor working.
    -   **1-T. FILE**: N. 1 row trace, alternate operation.
    -   **2-T. FILE**: N. 2 row trace, independent operation.

4.1.1.1 Table of rhythm and passes

RIFERIMENTO	BORDO CAMPO	1a = 1/2 Passata ?	N° PASSATE	1	2	3	4	5	6	7	8	9	10
OFF			0										
1			1	LR									
6g	L		6	RR	0	LL	LL	0	RR				
6h	R		6	LL	0	RR	RR	0	LL				
2		SI	2	0	LR								
2a	L		2	R	R								
2b	R		2	L	L								
2c	LR		2	LR	LR								
2d	LR		2	L	R								
10g	L		10	0	RR	0	LL	0	0	LL	0	RR	0
10h	R		10	0	LL	0	RR	0	0	RR	0	LL	0
8e	L		8	0	RR	0	L	L	0	RR	0		
8f	R		8	0	LL	0	R	R	0	LL	0		
3			3	0	LR	0							
10e	L		10	0	LL	0	0	R	R	0	0	LL	0
10f	R		10	0	RR	0	0	L	L	0	0	RR	0
14g	L		14	0	LL	0	0	0	RR	0	0	RR	0
14h	R		14	0	RR	0	0	0	LL	0	0	LL	0
4		SI	4	0	0	LR	0						
4a	L		4	0	L	L	0						
4b	R		4	0	R	R	0						
4c	LR		4	0	LR	LR	0						
4d	LR		4	0	L	R	0						
18g	L		18	0	0	LL	0	0	0	RR	0	0	0
18h	R		18	0	0	RR	0	0	0	LL	0	0	0
14e	L		14	0	0	LL	0	0	0	R	R	0	0
14f	R		14	0	0	RR	0	0	0	L	L	0	0
5			5	0	0	LR	0	0					
16e	L		16	0	0	RR	0	0	0	0	L	L	0
16f	R		16	0	0	LL	0	0	0	0	R	R	0
6		SI	6	0	0	0	LR	0	0	0			
6a	L		6	0	0	R	R	0	0				
6b	R		6	0	0	L	L	0	0				
6c	LR		6	0	0	LR	LR	0	0				
6d	LR		6	0	0	L	R	0	0				
7			7	0	0	0	LR	0	0	0			
22e	L		22	0	0	0	LL	0	0	0	0	0	0
22f	R		22	0	0	0	RR	0	0	0	0	0	0
8		SI	8	0	0	0	0	LR	0	0	0		
8a	L		8	0	0	0	L	L	0	0	0		
8b	R		8	0	0	0	R	R	0	0	0		
8c	LR		8	0	0	0	LR	LR	0	0	0		
8d	LR		8	0	0	0	L	R	0	0	0		
9			9	0	0	0	0	LR	0	0	0	0	
10		SI	10	0	0	0	0	0	LR	0	0	0	0
10a	L		10	0	0	0	0	R	R	0	0	0	0
10b	R		10	0	0	0	0	L	L	0	0	0	0
10c	LR		10	0	0	0	0	LR	LR	0	0	0	0
10d	LR		10	0	0	0	0	L	R	0	0	0	0
11			11	0	0	0	0	0	LR	0	0	0	0
12		SI	12	0	0	0	0	0	0	LR	0	0	0
12a	L		12	0	0	0	0	0	L	L	0	0	0
12b	R		12	0	0	0	0	0	R	R	0	0	0
12c	LR		12	0	0	0	0	0	LR	LR	0	0	0
12d	LR		12	0	0	0	0	0	L	R	0	0	0
13			13	0	0	0	0	0	0	LR	0	0	0
14		SI	14	0	0	0	0	0	0	0	LR	0	0
14a	L		14	0	0	0	0	0	0	R	R	0	0
14b	R		14	0	0	0	0	0	0	L	L	0	0
14c	LR		14	0	0	0	0	0	0	LR	LR	0	0

NUMERO PASSATA / *Path number*

11	12	13	14	15	16	17	18	19	20	21	22

0	0	LL	0
0	0	RR	0

0	RR	0	0	0	LL	0	0
0	LL	0	0	0	RR	0	0

0	LL	0	0
0	RR	0	0

0	0	0	RR	0	0
0	0	0	L	0	0

R	R	0	0	0	0	0	0	LL	0	0	0
L	L	0	0	0	0	0	0	RR	0	0	0

0

0	0
0	0
0	0
0	0
0	0

0	0	0

0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

LEGENDA / *Description*		
sx + dx	**LR**	*ATTIVAZIONE USCITE TL1 e TL2 IN ESCLUSIONE*
sx	**L** **LL**	ATTIVAZIONE SOLA USCITE TL1 IN ESCLUSIONE *TL1 comanda N°2 gruppi Valovole x fare tutta la carreggiata*
dx	**R** **RR**	ATTIVAZIONE SOLA USCITE TL2 IN ESCLUSIONE *TL2 comanda N°2 gruppi Valovole x fare tutta la carreggiata*
	0	NESSUNA ESCLUSIONE

Instructions for use

4.1.1.2 Tram Line Loop configuration
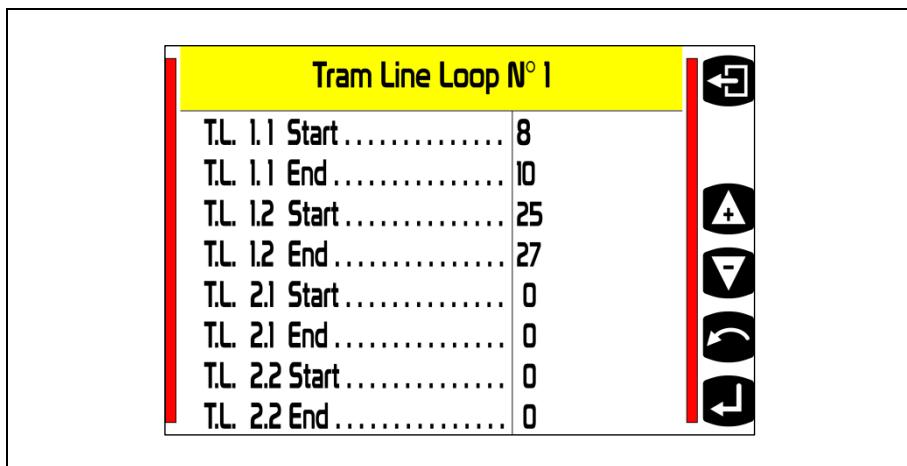
Figure 26

This screen is used to set the seed sensors that are located on rows which may be excluded from Tram Line; in the event of 2 Loops there are 2 sets of independent settings (1 and 2). The units specifically refer to the ECU Tram Line outputs (T.L. 1 and T.L.2); there are 2 units for each output (X.1 and X.2):

- **T.L. "Out.n" Start:** First sensor included among those that can be excluded in Tram Line unit "n"; the value can be set at "OFF" (unit not present, the "End" will also be OFF) and between a minimum of 1 and a maximum equal to the number of Loop sensors.
- **T.L. "Out.n" End:** Last sensor included among those that can be excluded in Tram Line unit "n"; the value can be set between a minimum equal to the value set in "Start" and a maximum equal to the number of sensors in the Loop; it will be OFF if "Start" is OFF.

The above example shows a single loop of seed sensors, and the tram line function is performed by closing rows from 8 to 10 (Output TL. 1) and from 25 to 27 (Output TL. 2), therefore, it is necessary to program these number as above: in this way, during the tram line phases, the seed sensors mounted on rows 8-9-10 and 25-26-27 will not have to detect product passage and should not signal an alarm.

4.1.2 Pre-Start settings
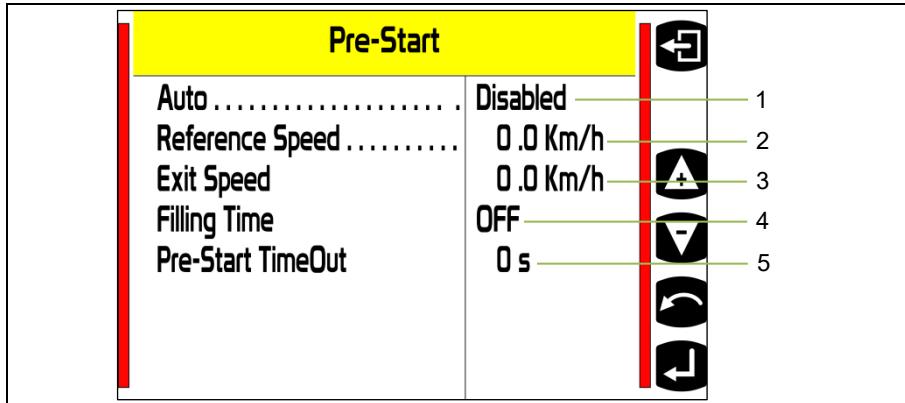
Figure 27

The Pre-Start and Pre-Stop functions are intended to compensate, respectively, the filling time of the machine at the beginning of each pass through and the emptying time of the machine at the end of each pass through:

1. **Automatism:** If enabled, the distribution motor starts automatically in Pre-Start mode, as soon as the seed drill is placed in Work Position, even if the speed is "0"; if Disabled, along with the work position, you also need to press the relative key on the main screen [On – Off]
2. **Reference Speed:** This is the "equivalent" speed that the system uses to turn the distributor motor in Pre-Start (therefore without actual seed drill advancement). [0.0 – 25.5 Km/h]
3. **Exit Speed:** Once this speed has been reached, the system exits Pre-Start mode and proceeds with DPA distribution; this minimum speed is also used as a threshold to determine actual movement of the seed drill and start distribution if the Pre-Start functions have not been activated. [0.0 – 10.0 Km/h]
4. **Filling Time:** Used from the filling / emptying bar from the main screen. In this parameter you can set the time that lapses between the start of distributor rotation and the actual drop of the seeds on the ground. [OFF - 25.5 s]
5. **Pre-Start TimeOut:** Maximum operation time in PreStart before returning to "waiting" is one does not pass to "work". [0 – 30 s]

4.1.3 Loop obstruction detection
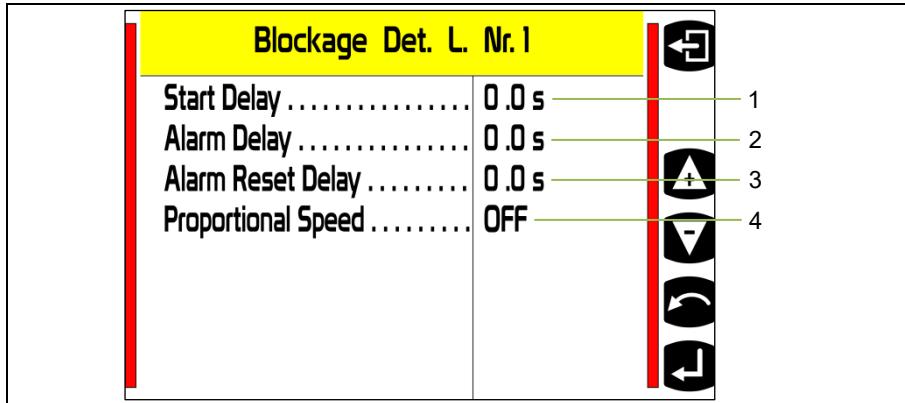
Figure 28

1. **Start delay:** Delay, when passing the STOP/WAITING and PRE_START/WORK conditions, in detecting the alarm; therefore, this parameter is the time the system waits at each start-up before checking for any sowing problems; if this parameter is programmed too low, false alarms can be generated.
    [0.5 – 25.5 sec ± 0.1 sec]
2. **Alarm Delay:** Delay in generating the alarm, this parameter indicates the time that lapses between the actual detection of a sowing problem and its display on the Virtual Terminal; this time starts at the end of the previous "start delay"; if this parameter is programmed too low, false alarms can be generated.
    [0.5 – 25.5 sec ± 0.1 sec]
3. **Alarm Reset Delay:** Delay in deleting the alarm, this parameter indicates the minimum time for which sowing must go back to being regular before its alarm clears on its own.
    [0.5 – 25.5 sec ± 0.1 sec]
4. **Proportional Speed:** This setting is used to determine whether the alarm detection threshold of the seed sensors (sensitivity) should be fixed or vary when the work speed varies.

4.1.4 Blower setting
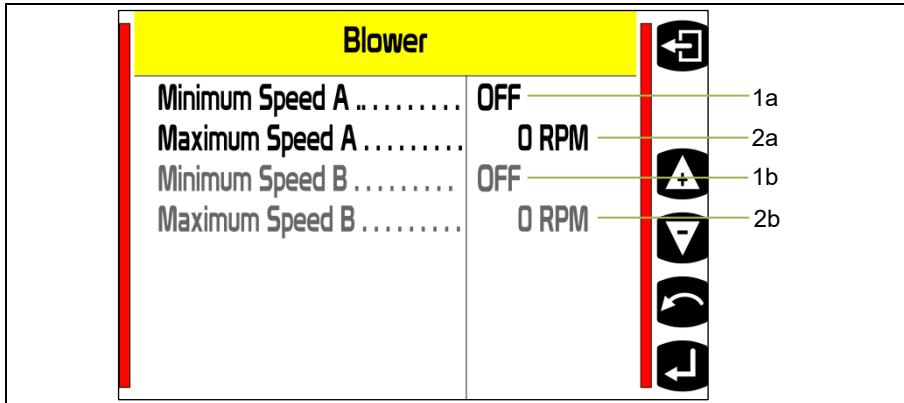
Figure 29

This screen is used to set the limits for the minimum and maximum speed alarms relating to the blower in question. On the user menu there are two items associated with "blower A" and "blower B", if present.

Set the value at steps of 50 RPM; interlock the two parameters so that the maximum is always higher than the minimum. To exclude the minimum speed alarm, set to "OFF"; to exclude the maximum speed alarm, set a value higher than 7000, the screen will display the word "OFF".

Here are the graphic components on this screen:

1. **(a) (b) Minimum speed**: sets the minimum speed value of the blower in question, expressed in RPM [OFF – 6950 ± 50 RPM]
2. **(a) (b) Maximum speed**: sets the maximum speed value of the blower in question, expressed in RPM. [1000 - OFF ± 50 RPM]

4.1.5 Speed Source
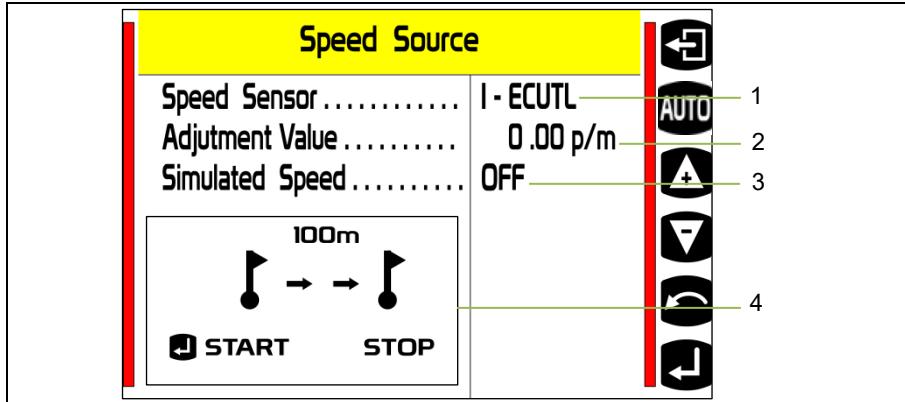
Figure 30

1. **Speed Sensor:** This field allows you to select the source of the speed value, i.e. you need to program which ECU the speed source is connected to.
    - **I-ECUTL:** ECU Tram Line Input: the speed sensor is connected to the specific wiring on the ECU Tram Line.
    - **I-VT:** VT Input: the speed is detected by Radar or GPS sensor connected to the appropriate input in the main connector of the Virtual Terminal.
    - **ISO-**VT: CAN IsoBus VT Input: the speed is collected from the tractor's ISO BUS line via appropriate control unit; for more information, please contact the *MC elettronica* technical service.
2. **Adjustment Value:** This value, in pulses per metre (with 2 decimals) is the sensor resolution. In order to ensure you have distributed product values that match the values set in the Distribution screen, we recommend using high frequency sensors with at least 10 impulses per metre. Optimal system conditions are obtained with 100 impulses per metre.
    [0.30 – 250.00 ± 0.01]
    When selecting this field, using the AUTO key it is also possible to access sensor "auto-calibration".
3. **Simulated Speed:** When this parameter is set to "0", OFF appears and the speed used by the system will be the real one detected by the source and the
    and the speed used by the system will be the real detected by the programmed source; if, for any reason, you want to force a speed ignoring the data from the sensor, set the forced speed here; the work screen will suitably highlight that the speed is NOT the real one. [OFF – 25.5 ± 0.1 Km/h]
4. **Graphic area for speed sensor calibration.**

4.1.5.1 Speed sensor calibration

To run the speed sensor automatic calibration procedure, follow the path: User Settings > Speed Source, then press the AUTO key. This key can only be used when the "Calibration Ratio" field is selected.
The screen that is displayed is like the one shown in point 1. The steps to take for proper calibration are as follows:

1. Position 2 indicators on the ground at a distance of 100 metres from each other.
2. Take the tractor to a previously assigned reference point and press the ENTER key to start measuring.

Key	Symbol	Function
		Starts / Stops pulse measurement for sensor calibration

3. Move forward with the tractor to the second assigned point and press ENTER again to stop measuring, like in point 2. If the pulses are not within the allowed interval, an error will be displayed like in point 3.

4. If the calibration procedure continues with no errors, the pulses accumulated on a 100 metre base will be displayed in the row under the words START - STOP.
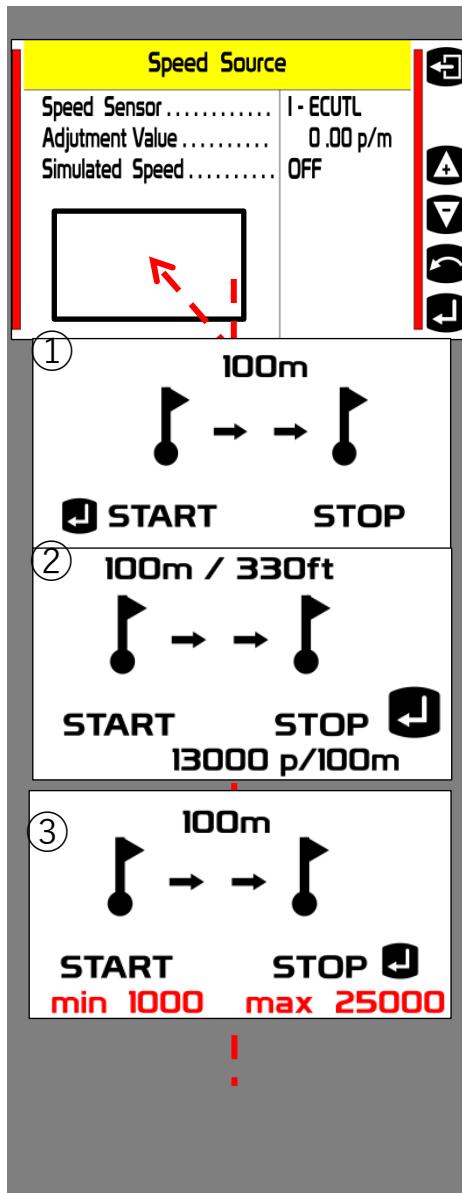
4.1.6 Clock & day / night dimmer configuration
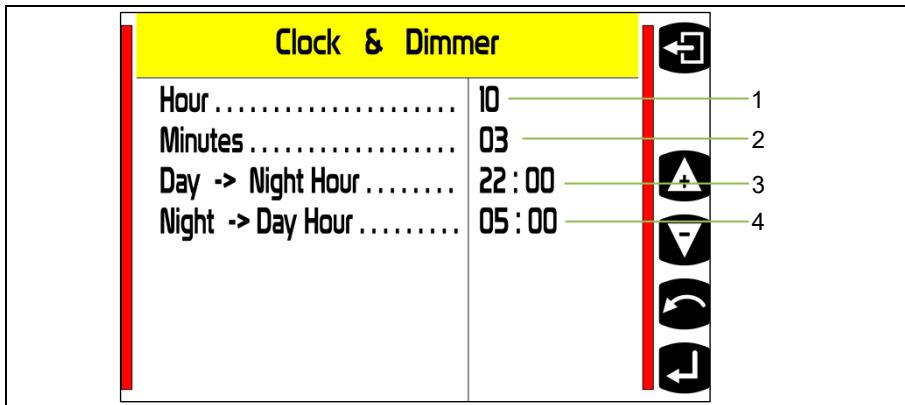
Figure 31

1. **Hour**
   [0 - 23 ± 1]
2. **Minutes**
   [0 - 59 ± 1]
3. **Time value of passage from day to night mode**
   [00:00 – 23:50 ± 00:10]
4. **Time value of passage from night to day mode**
   [00:00 – 23:50 ± 00:10]

4.1.7 Diagnostics Menu
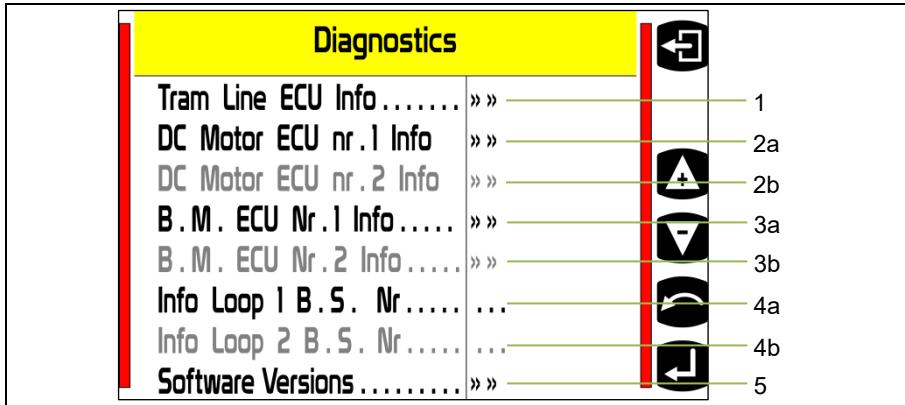
Figure 32

The screens of the "diagnostics" sub-menu that allow the operator to complete diagnostic verifications on the various system components. The system items are:

1. Tram Line ECU Info: displays operation information of the ECU Tram Line. The inputs are grouped by type and are indicated with "0" (sensor OFF) or "1" (sensor ON); below is a list of displayable types of status:

- **Work Inputs:** Status of the inputs WORK, ROW TRACER 1 - 2
- **Blower Inputs:** Status of the inputs BLOWER ROTATION SENSOR 1 - 2
- **Level Inputs:** Status of the inputs Level 1 - 2 - 3 - 4
- **Door Inputs:** Status of the inputs CALIBRATION DOOR 1 - 2 - 3 - 4
- **Sensor Inputs:** Status of the inputs BLOCKAGE SENSOR 1 - 2 - 3 - 4
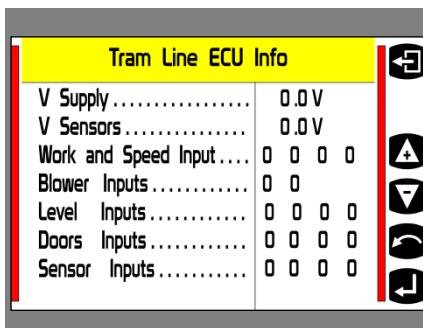
2. **DC Motor ECU nr.X Info:** displays operation information for the relative motor driver; there are 2 identical screens for displaying the 2 drivers (if present).

- **V Supply:** (Vol) indicates the power supply voltage detected by the ECU. If less than 10,5 V, the distributor may not work properly.

- **Average current:** (Amps) indicates the average current absorbed by the motor at that time.

- **Peak Current:** (Amps) indicates the maximum current absorbed by the motor at that time.

- **Driver Temperature:** (degrees Celsius) indicates the temperature inside the piloting circuits of the electric motor.

- **Motor driving:** 0-100% indicates the piloting percentage of the electric motor connected to the distributor.
  [0% = distributor stopped]; [100% = motor at maximum power]

- **Motor speed:** (RPM) indicates the speed inside the electric motor at that time (excluding gearmotor).

- **Distributor speed:** (RPM) indicates the speed detected by the appropriate sensor on the distributor shaft.

- **Sensor Inputs:** Status (1 or 0) of the sensor inputs, distributor shaft 1-2 and calibration button.

3. **B.M. ECU nr.1 Info:** display of operation information for the relative gateway ECU; there are 2 identical screens for displaying the 2 gateway ECUs (if any). Thus diagnosing the following parameters:

- **V Supply:** (Vol) indicates the power supply voltage detected by the ECU. If less than 10,5 the correct operation of the seed sensor is not guaranteed.

- **V Sensors:** (Volt) indicates the power supply voltage supplied by the ECU to the auxiliary sensors connected to it, see next point.

- **Inputs:** state of the work inputs (auxiliaries), blower speed, seed drill speed and configuration. Note: in the USC kit these inputs are NOT connected as they are already connected to the Tramline ECU; these inputs are managed in the BM kit.

- **Loop State:** "OK" = Daisy Chain (seed sensors chain) working properly, that is all seed sensors connected and operating; "Error" = Daisy Chain interrupted.
- **Detected Sensors:** No. of sensors detected; in case of error (see previous point) the displayed value is the last sensor correctly detected in the chain.

4. **Info Loop 1 B.S. Nr.XX:** allows to view the operating information of the Loop 1 or Loop 2 Blockage Sensor seed sensors (one at a time). The rateable parameters for each seed sensor are:

- **Release Software**
- **V Supply:** Power supply voltage detected on the sensor; if the voltage is less the 10,5V the correct operation of the sensor is not guaranteed.
- **Dirty level:** Dirty level 0-100%. When the dirt level is too high, a LED on the sensor's body also lights up.
- **State:** 0 = Not blocked; 1 = Blocked, in alarm.

```
Info  Loop  1  B.S.  Nr.  1
Release  Software ........  V   0.00
V  Supply ................  0.0 V
Dirty  Level ..............    0%
State ....................  0
```

5. **Software Version:** through this item in the diagnostics menu you can view all versions of the USC system components.

```
Software  Versions
VT_USC .................  V   0.02
ECU_TL .................  V - - - . - -
ECU_DCM1 ...............  V - - - . - -
ECU_DCM2 ...............  V - - - . - -
ECU_BM1 ................  V - - - . - -
ECU_BM2 ................  V - - - . - -
```

4.1.8 Virtual Terminal software update

Figure 33

1) To update the system, you must use the SD card with following characteristics:
   - Micro SD card;
   - Maximum capacity 2GB;
   - Not HC, not XC;
   - Formatted FAT16 (not FAT32).
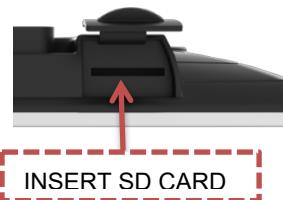
INSERT SD CARD

Figure 34

2) Insert the SD card in the slot at the base of the VT. At this point, make sure that the screen is off and take care not to damage the card slot when inserting the card.
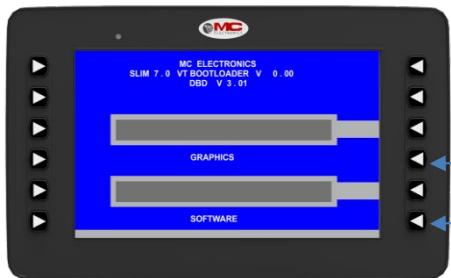
Figure 35

3) Access the Bootloader screen by holding down the ON + 1 and 2 keys shown in figure 29 at the same time.

Figure 36

4) Then press key 1 to update the VT graphic file; when the first file has been loaded, press key 2 to update the software. When the latter has loaded, press the ON key to restart the VT

4.1.9 ECU software update
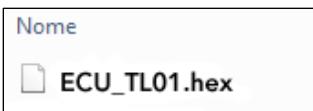
Nome ☐ ECU_TL01.hex Figure 37	1) Put the ECU_TL01.hex file on the SD card that is in the USC kit if, for example, you wish to update the Tram Line control unit firmware. Keep in mind that at this point, there must be no other files.
Software Update ECU TL01 - V. 1.00 Figure 38	2) Turn on the VT and access the user settings by holding down the MENU key for 4 seconds. After having displayed the user settings screen, scroll using the DOWN key. Use the ENTER key to confirm the item "Software Update". A screen like the one to the side will be displayed. Using the UP and DOWN keys, scroll through the list of update files on the SD card.
Software Update ECU TL01 - V. 1.00 Figure 39	3) Confirm with ENTER and wait for the updates to load. When the update is over, the VT will restart automatically.
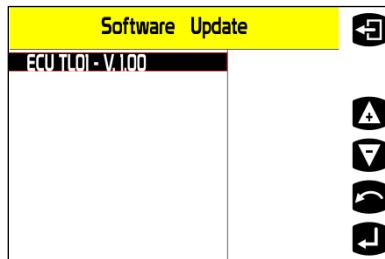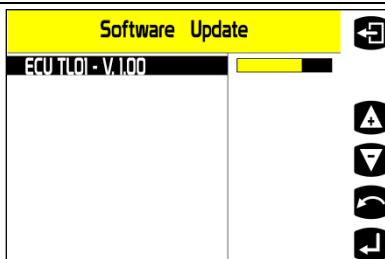
4.1.10 Machine settings

ATTENTION:
The following information is provided for information purposes only. The parameters described are closely associated with the features of the seed drill. An incorrect programming can damage the USC system or seed drill.

4.1.10.1 How to access the machine menu
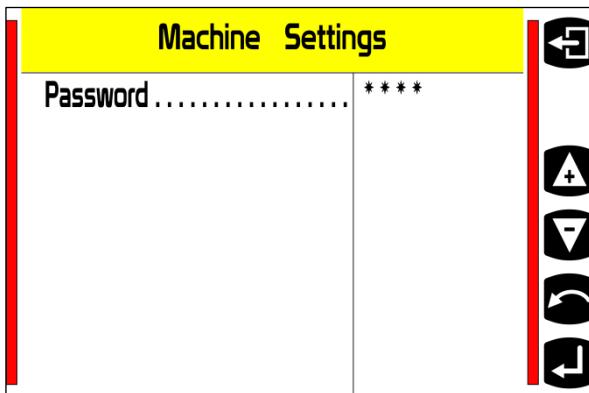
Figure 40

To enter the password, you must use the ▼▲ keys to select the number, starting from the most significant digit, and confirming the desired value with the ENTER key. The procedure must be repeated for the 4 digits that make up the password. Pressing the ENTER key on the last digit verifies the entered credentials. If the password is not correct, the system automatically goes back to the "User Settings" screen.

4.1.10.2 General explanation

After correctly inserting the numeric password, you access the sub-menu screen "machine settings" that ensure the manufacturer can edit all the settings necessary to adapt the system to the machine it is installed on.

Use the ▲▼ keys and ENTER to select the sub-menu to be accessed or the field to be modified.

The grey menu lines are related to unused parameters in relation to the other programmed parameters. Example: If the "Distributors" parameter is 1-D/1-M, the row for motor driver 2 will be grey.

By presenting the modifying parameters of this menu, we will find:

- **Distributor:** this setting is used to inform the system of the configuration to be used:
    - **1-D / 1-M** = N.1 Distributor, N.1 Motor
    - **2-D / 1-M** = N.2 Distributor, N.1 Motor
    - **2-D / 2-M** = N.2 Distributor, N.2 Motor
- **Motor driver:** access this sub-menu to control the parameters relating to the operation of the motor.
- **Blower:** edit this parameter to define the configuration of the blowers connected to the system. Below is a list of the possible combinations:
    - **1 =** N. 1 Blower, read only
    - **2** = N. 2 blower, read only
- **Blower A or B Calibration**: Setting the number of impulses per revolution of the blower.
- **Hopper**: this parameter is used to define the number of hoppers and relative sensors connected to them. Here below are the possible system combinations:
    - 1-T / 1-S = N.1 hopper, N.1 sensor
    - 2-T / 1-S = N. 2 hoppers, N.1 sensor
    - 2-T / 2-S = N. 2 hoppers, N. 2 sensors

- **Seeder Width:** Seed drill width set here is used both for calculating the worked area, for calculating distribution in Kg/ha and for calculating sprayer bar width in the Tram Line.
- **Total Machine Rows nr.:** when setting this value, you tell the system the total number of rows in place on the machine.
- **T.L. Excluded Rows nr.:** when setting this value, you tell the system the number of rows excluded from every Tram Line output. The setting depends on the configuration of the Tram Line valves. If Tram Line valves with hopper recirculation are used, the last parameter must be set at "0", because the excluded files subtract product from the total amount provided by the distributor. If using 2-way valves or 3-way valves recirculating in the mushroom itself, the last parameter must be set to the correct value so that the distributor can slow down in a proportional way.
- **Exclude sectors:** by setting this parameter to "ON", you display the "Hydraulic Controls"; vice versa, the screen will not be visible and the operator will not have access to the hydraulic controls.

4.1.10.3 Distributor settings

Figure 41

In this screen it is possible to set configuration parameters of the related motor driver; there are N. 2 identical screens for setting parameters of the 2 drivers (if present).

1. **Current Limit:** Maximum current issued by the driver in continuous; once this value is exceeded continually, the driver enters current limitation and the related alarm is displayed. [5.0 – 40.0 ± 0.5]
2. **Maximum Speed:** Maximum theoretical speed of the motor with power supply within the foreseen range; this is needed first of all to determine maximum allowed feed-rate of the seed drill. [500 – 8000 ± 100]
3. **Encoder Pulses:** Number of pulses per revolution of the encoder mounted on the motor.
   [100 – 500 ± 1]
4. **Encoder Phases**: Number of phases of the incremental encoder mounted on the motor;
   1 = single pulse / sensor; 2 = Incremental encoder with phases A+B.
   [1 – 2 ± 1]
5. **P Coefficient**: These are the driver retroaction coefficients; these values must never be set incorrectly, since an incorrect setting of these coefficients could lead to an incorrect motor adjustment.
   [1 – 99 ± 1]
6. **I Coefficient**: These are the driver retroaction coefficients; these values must never be set incorrectly, since an incorrect setting of these coefficients could lead to an incorrect motor adjustment.
   [1 – 99 ± 1]

Note:
Coefficients P and coefficient I affect the speed and stability of the kg/ha distributed. If the values are high, the system can be unstable, if they are too low the system may be slow in terms of setting.

7. **Distributor sensor:** Set the number of impulses per revolution of the sensor on the distributor shaft; setting this value at 0 (View OFF) the alarm related to missing rotation of the distributor shaft will be deactivated directly by the driver. [0 . . .1.00 – 99.00 ± 0.01]

8. **Motor: distributor ratio**: Set the ratio between the motor shaft and the distributor shaft (including the reducer of the actual motor). For example, let's suppose we have a motor with a 30.00 ratio. If we connect it directly to the distribution shaft, we will program the value 30 on the system. However, if we assume that instead of interposing a chain with a ratio of 2: 1 between the motor and the distribution shaft, the number we will need to program in this case will be 60.00. [1.00 – 300.00 ± 0.01]

4.1.10.4 Sensor Loop Configurations
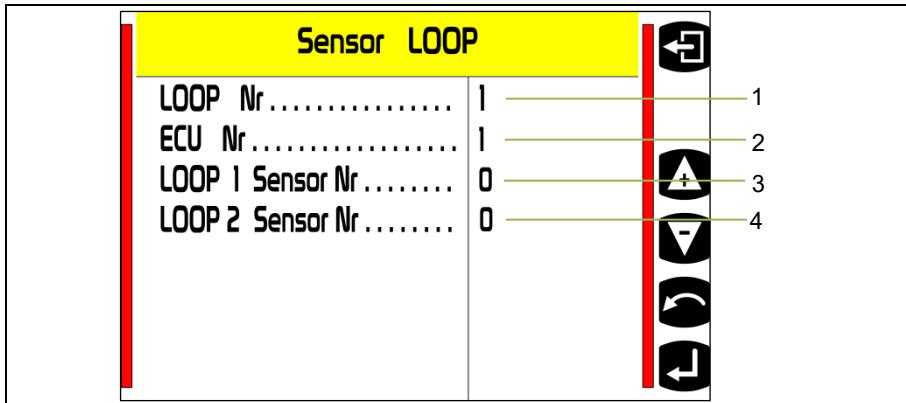
Figure 42

This screen is used to set the configuration parameters of the Sensor loop(s). Below is the list of programmable parameters:

- **Loop Nr.:** Number of Virtual or physical loops in the system:
  - 1 = No.1 Loop, in this case it is not possible to select the number of ECU that will be forced to "1" and the No. of sensors of the second Loop.
  - 2 = No.2 Loops, select with the next parameter whether 1 ECU (virtual loops) or 2 ECUs (physical loop). [1 – 2 ± 1]
- **ECU Nr.:** Number of connected gateway ECUs; cannot be selected and fixed at "1" if LOOP = 1. [1 – 2 ± 1]
- **Loop 1 Sensor Nr.:** Number of sensors composing the first loop, also connected to ECU No.1. [1 – 100 ± 1]
- **Loop 2 Sensor Nr.:** Number of sensors composing the second loop (if any), if connected to ECU No.1 (virtual loop) the physical numbering of the sensors starts at the end of loop 1 and the number of the physical sensors is the sum of the 2 loops; if connected to ECU No.2 (physical loop), then the number is independent. [1 – 100 ± 1]

5. Programmable parameters

Field	Unit	Minimum	Maximum	Resolution	Default
Sowing Distribution	Kg/ha	100.0	6500.0	0.1	-
Fertiliser distribution	Kg/ha	100.0	6500.0	0.1	-
Sowing distributor calibration	Kg/rev	0.001	9.999	0.001	1.000
Fertiliser distributor calibration	Kg/rev	0.001	9.999	0.001	1.000
Backlighting	%	0	100	1	100
Buzzer volume	%	0	100	1	100
Language	-	0	5	1	0
TL advancement sensor	-	0	2	1	0
PreStart automatism	-	0	1	1	0
PreStart reference speed	Km/h	5	255	0.1	50
PreStart output speed	Km/h	1	100	0.1	20
Speed sensor	-	0	3	1	0
Speed calibration coefficient	Pulses/m	0.30	250.00	0.01	130000
Simulated speed	Km/h	0.0	25.5	0.1	0
Rhythm TL setting	-	0	59	1	0
Blower A minimum speed	RPM	1000	6950	50	2500
Blower A maximum speed	RPM	1000	7000	50	5000
Blower B minimum speed	RPM	1000	6950	50	2500
Blower B maximum speed	RPM	1000	7000	50	5000
Hours	h	0	23	1	0
Minutes	min	0	59	1	0
Day/night dimmer	h	0	23	1	5
	min	0	50	10	0

Field	Unit	Minimum	Maximum	Resolution	Default
Distributor settings	-	0	2	1	0
Hopper settings	-	0	2	1	0
Blower settings	-	0	3	1	0
Automatic calibration door	-	0	1	1	0
Seed drill width	m	2.00	40.00	0.01	0
Total number of machine rows	-	8	255	1	24
Number of rows excluded from TL	-	0	8	1	0
Motor1 current limit	A	5.0	40.0	0.5	15.00
Motor1 speed limit	RPM	500	8000	100	3000
Motor1 encoder impulses	Impulses/rev	100	500	1	100
Motor1 encoder type	-	0	1	1	1
Motor1 P coefficient	-	1	99	1	50
Motor1 I coefficient	-	1	99	1	50
Motor1 distributor sensor	Impulses/rev	1.00	99.99	0.01	2.00
Distributor1 motor coefficient	01:00	1.00	655.35	0.01	50.00
Motor2 current limit	A	5.0	40.0	0.5	15.00
Motor2 speed limit	RPM	500	8000	100	3000
Motor2 encoder impulses	Impulses/rev	100	500	1	100
Motor2 encoder type	-	0	1	1	1
Motor2 P coefficient	-	1	99	1	50
Obstructions sensitivity	-	1	20	1	7

Field	Unit	Minimum	Maximum	Resolution	Default
Loop No.	-	1	2	1	1
ECU NO.	-	1	2	1	1
Loop 1 sensors no.	-	1	100	1	1
Loop 2 sensors no.	-	1	100	1	1
Blower calibration	-	0.10	4.00	0.02	-
Blockage detection Start Delay	s	0.5	25.5	0.1	-
Blockage detection Alarm Delay	s	0.5	25.5	0.1	-
Blockage detection Alarm Reset Delay	s	0.5	25.5	0.1	-
T.L. Start	-	0	No. sensors	1	-
T.L. End	-	T.L.start	no.sensors	1	-

Instructions for use

6. Alarms

The alarms are always displayed based on the priority of the message. They are following by red flashing LED bars on the display, a modulated audible signal to get the operator's attention regarding the problem that is then displayed on the screen.

An error message can always be turned off by pressing 📞. With this system the system will stop showing the problem on the display and turn off the acoustic signal, though the bars will keep flashing to indicate that the problem persists.

There are two main error categories, those due to incorrect communication and those generated by the motor drivers.

ERRORS:

Communication Errors:

- Communication errors are always with an active control when the system is operating. Here below are the possible sources and the repercussions that can give the system:

Description	State/Action
ECU TRAM LINE	System STOPPED, OUTPUTS deactivation
ECU DC MOTOR 1	
ECU DC MOTOR 2 (if enabled)	
ECU GATEWAY 1	System WORKING for distribution only
ECU GATEWAY 2 (if enabled)	
ECU SPEED	...exception with simulated speed.

DC MOTOR 1 / 2 errors:

- The errors due to DC MOTOR 1 / 2 always have an active control and the causes of this error are:

Description	State/Action
DRIVER MALFUNCION	System STOPPED due to the stopped distributor
MAXIMUM VOLTAGE LIMIT	
MINIMUM VOLTAGE LIMIT	
MAXIMUM TEMPERATURE LIMIT	

WARNINGS:

DC MOTOR 1 / 2 warnings:

- The ECU DC MOTOR 1 / 2, ECU DISTRIBUTOR 1 / 2, CALIBRATION DOOR 1 / 2, GATEWAY ECU 1 / 2, LOOP 1 / 2 warnings, 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

CALIBRATION DOOR 1 / 2:

Description	State/Action
JAMMED NOT OPEN	Operation possible with operator mechanical intervention
JAMMED NOT CLOSED	

GATEWAY 1 / 2:

Description	State/Action
LOOP FAULT	Operation; impossible to complete enumeration
ENUMERATION INTERRUPTED TO SENSOR X	
LOOP ERROR	Operation; sensors detected correctly but different from the programmed ones
INCONSISTENT ENUMERATION	
XX SENSORS DETECTED	

LOOP 1 / 2:

Description	State/Action
SENSORS / LOOP FAULT	Operation; impossible to communicate with the sensor(s) indicated

- There are also warnings related to the ADVANCEMENT SPEED, BLOWER SPEED 1 / 2, LOOP 1 / 2 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

BLOWER 1 / 2 SPEED:

Description	State/Action
LOW	Operation; possible sowing problems
HIGH	

LOOP 1 / 2:

Description	State/Action
NO FLOW	Operation; probable absence of flow on the sensor(s) excluded from Tram Line
FLOW PRESENT (on unit excluded from Tram Line)	Operation; probable presence of flow on the sensor(s) excluded from Tram Line

- Finally, the HOPPER 1 / 2 warning are active during the WAITING, PRE-START and WORK stages, here are the possible series of cases:

HOPPER 1 / 2:

Description	State/Action
RESERVE	Operation
EMPTY	Operation; seed exhaustion

7. Maintenance

This chapter gives instructions on how to carry out routine and special maintenance.
Routine maintenance refers to those operations which must be carried out periodically. As they do not require specific skills, they can be carried out by the users (operators, etc.).
Special maintenance refers to unforeseeable operations due to mechanic or electric failures. They require specific technical skills, so they should be exclusively carried out by qualified personnel (maintenance personnel etc.).

7.1 **Routine maintenance**

Routine maintenance consists in cleaning the instrument.
Clean the instrument with a wet cloth and mild detergent to avoid erasing the serigraphs on the panel.

> ⚠️ ***Warning***
> * *Do not use pressurised water jets.*
> * *Do not use abrasive products, solvents or alcohol.*
> * *Do not use hard pointed objects to press on the keyboard.*

7.1.1 How to protect the main connector

If the monitor is not used for a long time, disconnect the main signal connector from the wiring. We recommend isolating both connectors (of the monitor and of the wiring harness) with Nylon. If they are not disconnected, no protection is needed.

7.1.2 Cleaning the Sensors

In the event of the "seed sensor dirty" alert of the Blockage Sensor, disconnect the sensor indicated by the pipe through the quick-connection forks/fittings, without unscrewing the clamps, and check the state of the seed passage area; if necessary clean the inside with a non-abrasive brush.
Then remount the seed sensor on the fittings / pipe.

8. Troubleshooting

In case of appliance malfunctioning, perform the simple checks below to find out what you need to do.

If the problem still remains after carrying out the suggested checks, contact your local dealer or *MC elettronica* Technical Service.

PROBLEM	CAUSE	SOLUTION
The Monitor does not turn on	a. The power cable is disconnected	a. Check the power cable
The feed-rate remains at "0.0" or is not constant.	a. Speed sensor cable interrupted b. The distance between the speed sensor and the references is too much c. Red part of speed sensor damaged	a. Restore connection b. Register the calibration distance. c. Replace the sensor
Sowing is acceptable but there are continuous alarms in the "Blockage Monitor" section	The "Alarm Sensitivity" parameter is too low	Reprogram the "Alarm Sensitivity" parameter by gradually increasing its value
The distributed product dose is not the desired one	a. Incorrect parameter programming b. Incorrect speed detection	a. See chapter 3.4.4 b. See chapter 4.5
The Monitor does not recognised one or several seed sensors	a. Relative seed sensor cable interrupted b. One or several seed sensors have a different code compared to others	a. Restore connection b. Contact MC Elettronica Customer Services

9. Technical data

9.1 **7" Virtual Terminal**

Power supply voltage	: 12-24 Vdc
Maximum absorbed current (excluding sensors)	: 700 mA (12V) 350 mA (24V)
Operating features	
Protection rating	: IP65
Mechanical vibrations resistance	: 2G
Operating conditions	
Room temperature	: -20°C ÷ +70°C
Weather conditions	: Relative humidity 80%
Transport and storage	
Temperature	: -25°C ÷ +75°C

9.2 **Motor ECU**

Power supply voltage	: 12-24 Vdc
Absorbed current in stand-by	: < 200 uA
Maximum energy consumption	: 40 A (80 A peak value < 2 seconds)
Operating temperature	: -20°C ÷ +70°C 80%
Protection rating	: IP65
Digital inputs	: 2 x PNP 0-50 kHz (encoder A/B) 1 x NPN 0-1 kHz 2 x NPN 0-500 kHz (1 additional input NPN 0-1 kHz can be activated upon request)
Sensor power supply	: 1 x Vbatt , 160 mA max
Encoder power supply	: 1 x Vbatt , 120 mA max (upon request the output can be configured to deliver 5 Vdc, stabilised)
DC motor control output	: 1 x PWM 20 kHz 40 A max continuously 80 A peak value (< 2 seconds)
Status LED	: 1 x Red 1 x Green
Communication line	: 1 x CAN BUS 2.0B (up to 500 kbit/s)

9.3 **ECU Tram Line**

Power supply voltage	: 10-16 Vdc
Absorbed current in stand-by	: < 200 uA
Maximum energy consumption	: 13 A
Operating temperature	: -20°C ÷ +70°C 80%
Protection rating	: IP67

Digital inputs	: 1 x NPN 0-3 kHz
	  9 x NPN 0-500 Hz
	  4 x NPN 0-1 kHz

Sensor power supply	: 1 x Vbatt , 2 A max
Digital outputs	: 2 x ON/OFF (PWM upon request) 2 A max 4 x polarity reversal 4 A max
Status LED	: 1 x Red 1 x Green
Communication line	: 1 x CAN BUS 2.0B (up to 500 kbit/s)

9.4 **Accessories**

9.4.1 **Proximity inductive sensor**

Power supply voltage	: 12 Vdc
Output signal	: NPN
Working temperature	: - 25°C / +75°C
Max. operation distance	: 4 mm
Protection rating	: IP 67

9.4.2 **Capacitive sensor**

Power supply voltage	: 12 Vdc
Output signal	: NO-500mA
Working temperature	: - 20°C / +75°C
Max. operation distance	: 5 mm
Protection rating	: IP 67

9.4.3 Magnetic sensor

Output signal	: Contact to ground
Max. working frequency	: 100 Hz
Working temperature	: - 25°C / +70°C
Max. operation distance	: 10 mm (with ∅12 magnet)
Protection rating	: IP 67

9.4.4 MCV300 valve

Power supply voltage	: 12 Vdc – with polarity reversal
Maximum energy consumption	: 0.25 A
Working temperature	: - 25°C / +70°C
Opening / closure time	: 0.4 seconds
Protection rating	: IP 65

9.4.5 Blockage Sensor

General Features	
Power supply voltage	: 12 Vdc (range allowed 8-16 Vdc)
Maximum energy consumption	: 55 mA
Electrical Connectors	: SUPERSEAL 5pin Male and Female
Pipe Connections	: Internal Adapters for Ø 30-32mm pipes
Weight	: 345 g
Operating features	
Protection rating	IP 67
Mechanical vibrations resistance	2g. within range 50-2000 Hz
Operating conditions	
Room temperature	: -20°C ÷ +70°C
Weather conditions	: Relative humidity 80%
Transport and storage	
Temperature	: -20°C ÷ +80°C

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9.4.6 Level sensor

Power supply voltage	: from 10 to 30 VDC
Output signal	: NPN - NO
Max. working frequency	: 1000 Hz
Working temperature	: - 25°C / +70°C
Max. operation distance	: 7 mm
Protection rating	: IP 67

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

Electronic equipment for agriculture

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