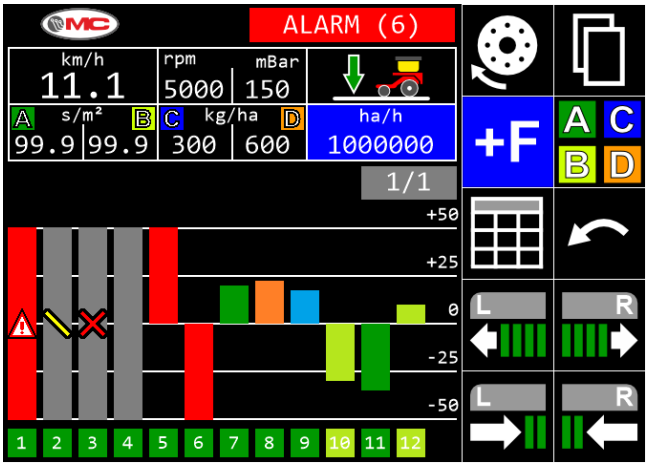

ESD EVO

Electronic Seed Driver

ELECTRIFICATION SYSTEM FOR PLANTERS

USER'S MANUAL

EN

Translation of original language

Read this manual carefully before using the product

NO. 2104-IT
Rev.1
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CE

This product complies with EMC requirements as defined by Directive 2014/30/EU as amended and reference to the Applied Standard EN ISO 14982

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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 of the equipment will no longer be valid if tampering occurs.

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1. 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 regarding how to use the equipment, or when you need to carry out maintenance operations.
A digital copy of this manual is accessible via a web link on the product itself, for easy reference even on the machine.

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

2. General description

The ESD EVO is a system designed for monogerm planters, for sowing, distributing microgranulated fertiliser and solid fertiliser via electric motors.
The ECU Bridge of the system manages and monitors the status of the motor driver control units connected to the CAN BUS network and collects the data, which is then displayed on a third-party ISOBUS monitor, in compliance with standard ISO11783.
At maximum configuration, the system can manage up to 18 motors that can be grouped into 4 distinct product groups, as follows:

- **Products A - B**: the motors for these products move the sowing elements;
- **Product C**: allows the motors that move the microgranulators (if present) to be controlled;
- **Product D**: check the motors installed on the solid fertiliser distributor (if present).

Furthermore, the motor driver control units installed on the sowing elements of products A and B can also monitor one photocell each, either pulse or LIN BUS, in order to measure the sowing distance and population per square metre. If a sowing anomaly occurs with respect to the set targets, the system signals this by means of acoustic alarms and visual messages.

During work, the following data can be checked:

- vehicle speed in kilometres per hour (km/h) or miles per hour (mph)
- vacuum of the sowing unit (-mBar) or inches of mercury (inHg)
- rev speed of fan (RPM)
- flow rate of third-party weed killer (if any), distributed per hectare (litres/ha) or gallons per acre (gal/ac)
- counter of litres of third-party liquid product distributed, if any (litres)
- partial area worked in hectares (ha) or acres (ac)
- partial counter of working time (h)
- linear distance covered in metres (km) or feet (ft)
- instantaneous productivity in hectares per hour (ha/h) or acres per hour (ac/h)

Up to two capacitive sensors can be optionally installed for each driver control unit, which are used to detect the level of products in tanks.

3. Sensors installation

The *ESD EVO* System can be equipped with different types of sensors:

- Speed sensor (optional);
- Photocells (always present), to be ordered from your dealer depending on the planter;
- Work sensor (optional);
- “RPM” sensor (optional);
- Vacuum gauge sensor (optional).

3.1 Wiring harness installation.

To install the wiring harness proceed as follows:

- mount the junction box (Figure 1, ref. **A**) in the centre of the machine, protected from accidental impacts and accessible for fuse replacement
- each box connector goes to connect to 2 rows by means of the specific wiring; the references are indicated by special labels
- distribute the wiring harness cables by fastening them with cable ties to the air tubes of the planter: each cable that leaves the junction box individually connects to 2 specific rows: the connector with the red sheath always corresponds to the first row of the pair, the connector with the black sheath to the second row of the pair. For example, on a planter with 8 rows, it will be necessary to connect the connectors with the red sheathing to rows 1, 3, 5, 7 and the black ones to rows 2, 4, 6, 8.

  It is important to consider the first row of the planter from the left as “row no. 1” and to connect the others in sequence: the example of an eight-row cabling application using the first row on the left of the planter as a reference is shown in Figure 1;
- For planters with odd rows, it is possible to order a special single wiring harness for connection to a single ECU.

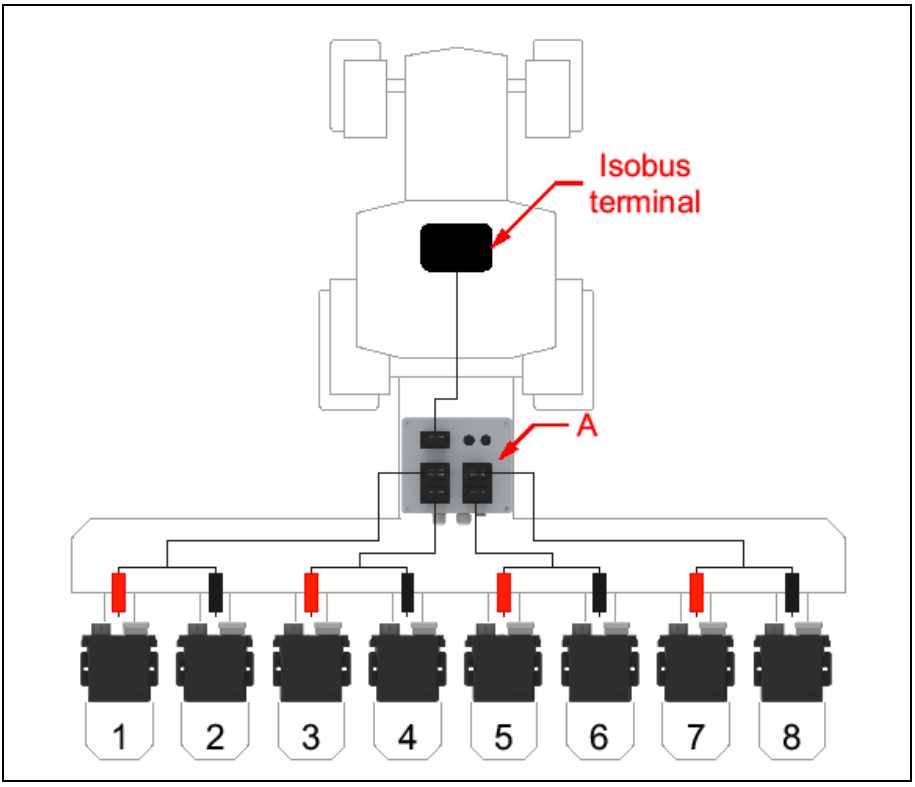


Figure 1. Wiring harness installation.

3.2 Photocell installation

The photocells must be installed on every single row of the planter so that when the seed drops, it passes through the two photocell elements.
The photocells must then be connected locally to the 10CEN-0031 ECU drivers via the appropriate connector.

Contact your dealer to determine the most suitable photocell model for your planter.

To install the photocells proceed as follows:

- If your planter is equipped with disc sowing elements capable of housing seed pipes that carry the seeds to the ground, you can for example install MC UniSeeder TIN photocells complete with seed pipe. Alternatively, they can be fixed by means of ties or special clips on the pre-existing seed pipes on the planter (example in Figure 2);
- If the planter has sickle sowing elements and the seed drops directly from the distributor to the ground, MC UniSeeder photocells can be installed with a specific bracket for the type of planter, to be attached directly to the sowing element (example in Figure 3).

Figure 2. Example of photocell installation on seed pipe.

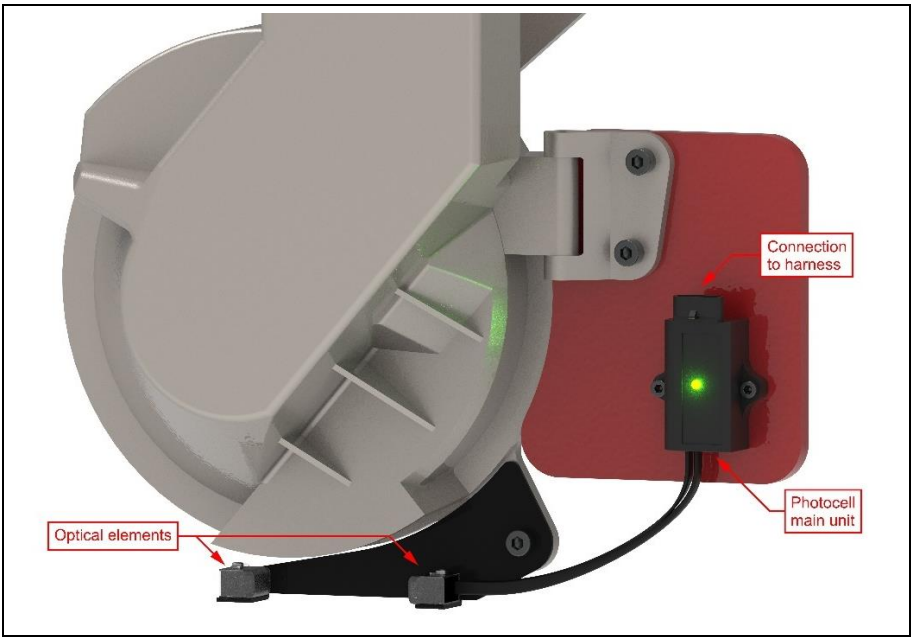


Figure 3. Example of installation of a photocell with bracket on the sowing element.

3.3 Installing the speed sensor (optional)

The encoder speed sensor can be installed on the frame of the planter and connected via a mechanical transmission (e.g. chain, pulley) to a wheel on the ground (Figure 4, ref. **A**).
This transmission coupling must be connected to a shaft fitted with an independent support hub so as not to put any strain on the sensor shaft (Figure 4, ref. **B**).
Connect the encoder sensor on the same axis via the helical coupling supplied in the kit (Figure 4, ref. **C**)
Finally, secure the sensor firmly to the planter frame using a bracket.
Connect the sensor to the wiring harness via the “SPEED” connector.

> ***Warning***
> It is advisable to check axiality between drive shaft and sensor shaft in order to avoid helical coupling breakage.

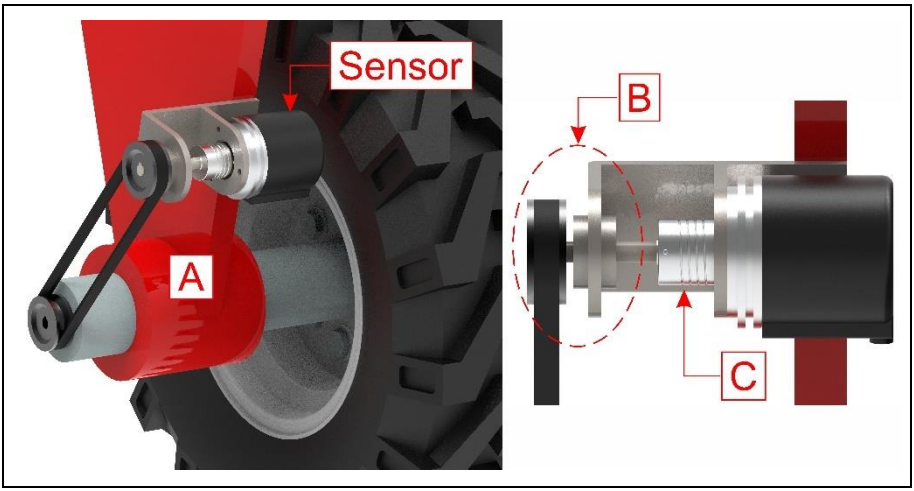


Figure 4. Installing the speed encoder sensor.

3.4 Installing the work sensor (optional)

The work sensor is used to detect when the planter is lowered to the ground. It works like a simple switch (closed when folded).
Connect the sensor to the wiring harness via the “WORK” connector.
The following figures show an installation example.

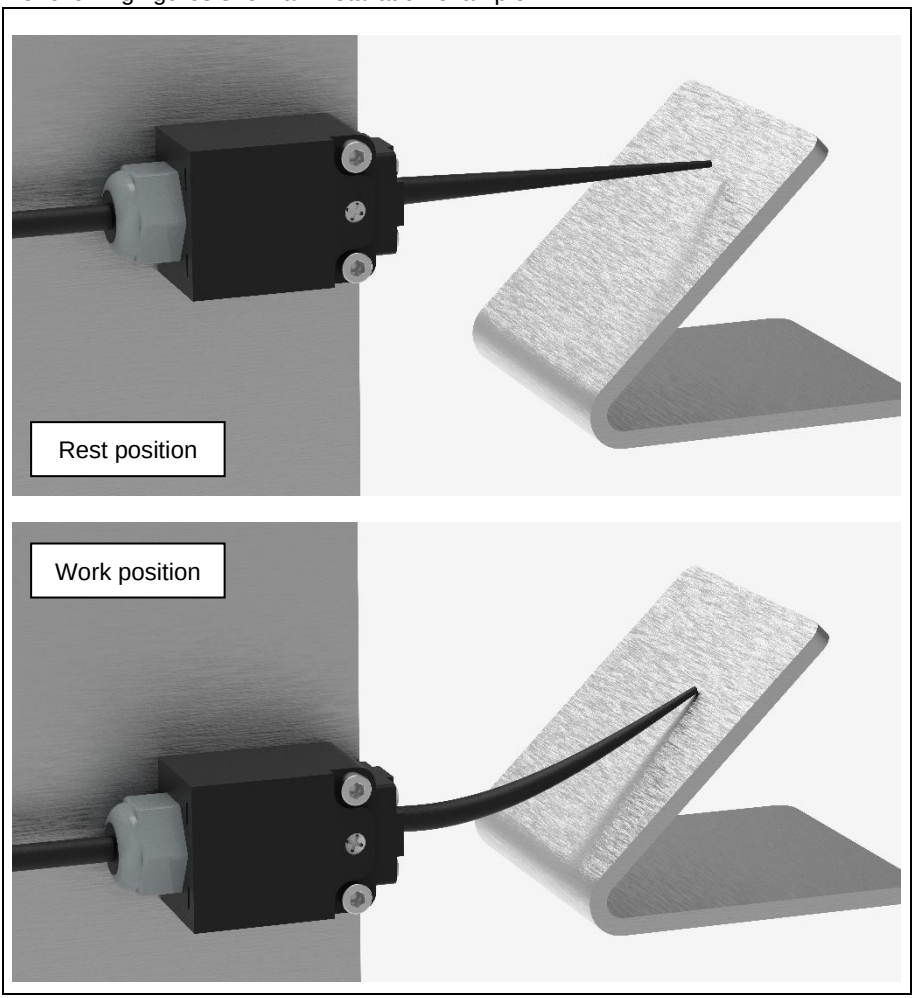


Figure 5 - Work sensor installation

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

3.5 Installing the “RPM” sensor (optional)

An inductive sensor can be used to detect the RPM of a moving planter shaft. The sensor should be positioned close to the shaft or PTO, in front of the ferrous references of at least the same diameter as the sensor and protruding at least 7 mm. The distance between the sensor and the references should be set at approximately 2-3 mm.
Connect the sensor to the wiring harness via the “FAN” connector.
The figures below show two different installation examples.

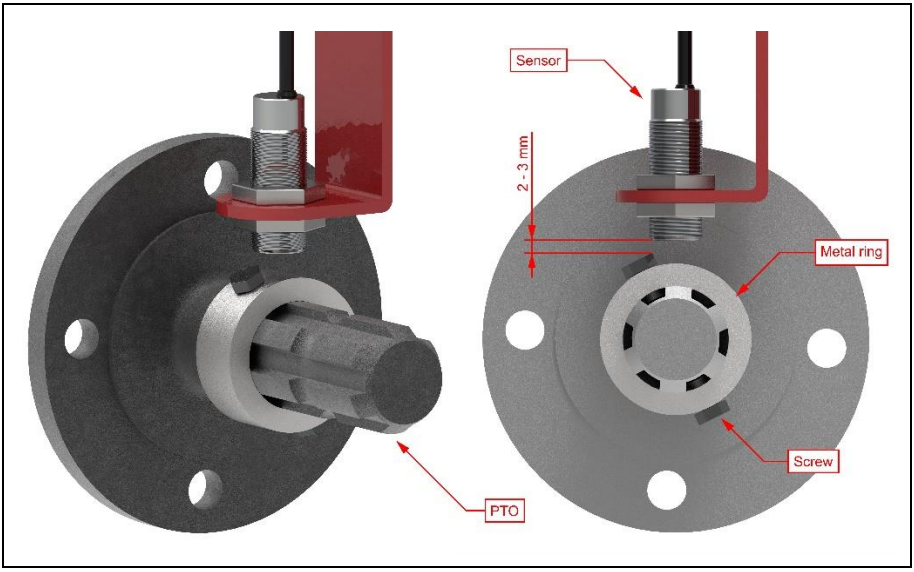


Figure 6. Example of installation of the inductive sensor on the PTO.

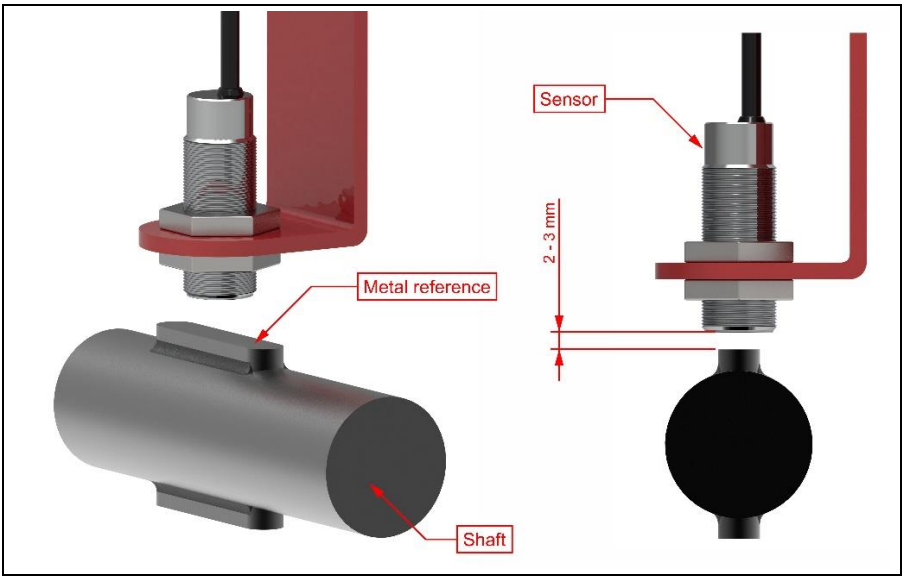


Figure 7. Example of installation of the inductive sensor on the gearbox.

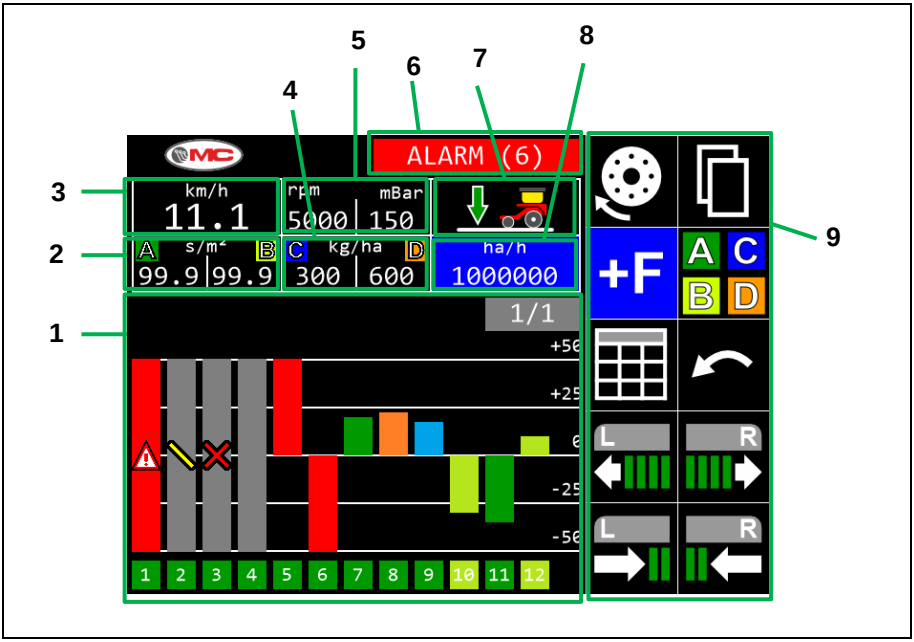
⚠	**Warning** The sensor cable should be protected with a rubber sheath.

4. Operation

4.1 Home screen

Once the Isobus display is started and its “UT” function is selected, the ECU Bridge starts to transfer the ESD system graphic OP to the display: this phase can take several minutes when first loaded and is managed directly by the third-party monitor operating system.
Once the OP is successfully loaded, the splash screen appears and the ECU Bridge initialises the system. On this screen you can see the system name and the SW version currently installed on the ECU Bridge. After a few seconds, this screen is automatically replaced by the main screen.

4.2 Main screen



This screen summarises all the main information related to the current work. Specifically, the following elements are displayed:

1. **Seeding quality area**: displays the sowing distance or population of each individual row, represented by histograms or tables.

2. **Sowing distance and Population:** shows the target values of sowing distance or population of sowing products A and B, depending on the current display of the sowing quality area. If sowing product B is not active, the corresponding box is empty. Touch the desired product box to access the relevant menu.

3. **Vehicle speed:** shows the speed according to the set source (Bridge, Driver, ISB_GPS, ISB_WH, ISB_GND, ENC+GPS, Simulated). Touch this area to go to the speed sensor menu.
   If simulated speed is activated, the background of the area turns orange. The simulated speed value can be set by touching the area.

4. **Microgranulators C and Fertiliser D:** shows the average distributed dose of microgranulators C and fertiliser D. If one or both products are inactive, the

relevant box or boxes are empty, respectively. Touch the desired product box to access the relevant menu.

5. **Fan and Vacuum gauge:** shows the fan speed (RPM), if present, and the average vacuum of the sowing unit (mBar), if present. If one or both sensors are absent, the respective box/es are empty. Select the desired sensor box to access the relevant menu.

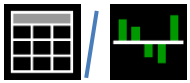
6. **Alarm:** if at least one alarm condition is active, the button to access the list of active alarms is displayed.

7. **Work sensor:** shows the status of the work sensor, provided by the set source. The icon is represented with an arrow aimed downward when the planter is lowered in its work position. The arrow pointing up instead shows when the planter is lifted for road transport.
   If manual work mode is active, the arrow is replaced by the letter “M” and the background is grey when the planter is in the work position, otherwise the background remains black.
   When manual work mode is not active, touching this area allows access to the work sensor menu.

8. **Multi-functional area**: it is possible to change the data shown in this box by touching the blue *Multi-functional* soft key. The data that can be shown:
   - weed killer dose distributed per hectare (l/ha)
   - counter of litres of liquid product distributed (litres)
   - partial area worked in hectares (ha)
   - partial counter working time (h)
   - linear distance covered in metres (km)
   - instantaneous productivity (ha/h)

9. **Soft keypad:** this area contains the touch keys for navigation and management of the main screen.

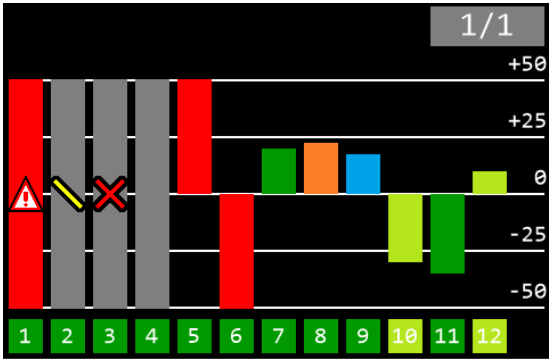
Key	Function
	Menu: accesses the system menu
	Multi function: changes the parameter displayed in the blue box of the main screen
	Back: disables an active function (e.g. simulated speed and work)

	Pre-load: when pressed for 3 seconds, activates the sowing disc pre-load function
	Motor diagnostics: allows access to the motor diagnostic screens
	**Change display:** allows you to change the display of the central area, showing histograms or 2 types of table
	Activate left sections: activates product sections A and B in sequence to the left, starting with the first one excluded on the right
	Activate right sections: activates product sections A and B in sequence to the right, starting with the first one excluded on the left
	Exclude left sections: excludes product sections A and B in sequence to the left, starting with the first active one on the right
	Exclude right sections: activates product sections A and B in sequence to the right, starting with the first active one on the left

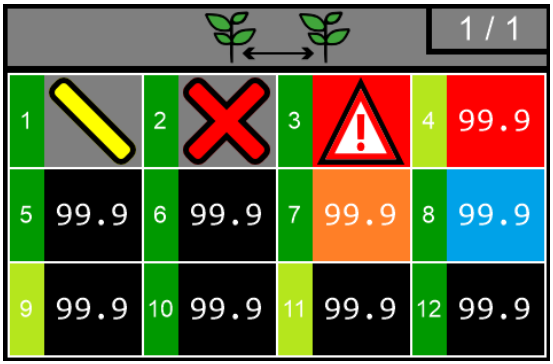
4.2.1 Seeding quality area

If the working mode parameter of products A and B is set to “counting”, the population and sowing distance of each row of both products can be measured.
The user can choose between three different layouts of this area: histograms, table of sowing distance, and table of sowing populations.
If the system is set up for more than 12 rows, rows beyond the 12th are displayed on a second page, which is accessed by pressing the grey “1/2” button in the top right-hand corner.
In detail:

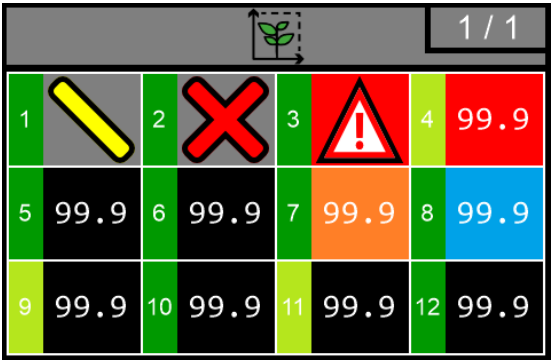
(1) ***Histograms:*** The sowing populations of each row are graphically represented by histograms.



(2) ***Sowing distance table:*** The sowing distances of each row are displayed numerically on a table with values in centimetres.



(3) ***Sowing population table:*** The sowing population of the rows is numerically represented by a table of values in seeds per square metre.

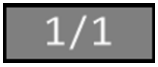


4.2.1.1 Histograms

In this graphic display, each histogram represents a sowing row. The height of each histogram is updated in real time, proportionally to the sowing population of the row. In detail, we can have the following sowing conditions:

Icon	Description
	Manually excluded row: touch the histogram of a row to manually exclude or open its section, respectively, stopping or starting its motor.
	Automatically excluded row: with Task Controller and Section Control active, the histogram turns grey with a red *X* symbol when the row is automatically excluded by the ISOBUS system.

	Lock condition: in the event of a motor locking, e.g. due to over-temperature, the histogram turns red and the failure triangle appears. Press the histogram for more than 3 sec. to go to the row diagnostics menu.
	Over seed: the system reports sowing with a population above the target and above the error percentage set in the menu. The histogram is red and is displayed above the centre line with the maximum height.
	Under seed: the system reports sowing with a population lower than the target and above the error percentage set in the menu. The histogram is red and is displayed under the centre line with the minimum height.
	Sowing within limits: the population value is off target but within the upper and lower error limits. The height of the histograms is proportional to the % error of the off-target population. The histogram is dark or light green depending on whether it belongs to product A or B, respectively.

	Seeding distance on target: The population detected by the system corresponds to the target sowing value. The histogram is green.
	Signals: if a fault or error occurs on a row, the colour of the histogram may vary depending on the severity of the problem: - **Orange:** warning; - **Blue:** diagnostics info; Press for more than 3 sec. to go to the row diagnostics menu (see par. 3.3.2.2).
	Row index: the progressive indicator of the sowing rows, which can be either dark or light green in colour to define belonging to product A or product B.
	Error percentage: represents the reference scale of the sowing error percentage in relation to the row target.
	**Page index:** the indicator of the page of photocells in view and the total number of pages present. If the system consists of more than 12 sowing lines, pressing it allows a page change.

4.2.1.2 Tables display

The system allows the sowing distance and sowing population to be displayed in tabular form.

To access the tabular displays, simply press the appropriate soft key.

Up to 12 rows can be displayed in a table at a time; additional rows are displayed on the next page.

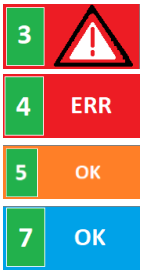
In the tabular displays, the units for sowing distance (***cm***) and population (***seed/m²***) are represented in the sowing target boxes in the area above the sowing quality area.

If products A and B are set in ***counting mode***, the table could show:

Box	Description
	Manually excluded row: select the box in a row to activate/exclude that row.
	Automatically excluded row: with Task Controller and Section Control active, the box may turn grey with a red X symbol when the row is automatically excluded from the ISOBUS system.
	Sowing within limits: the system detects a sowing within the programmed target value. The background goes black.
	Over seed: seeding distance is lower than target, or population is higher than target. The background goes red.
	Under seed: seeding distance is higher than target, or population is lower than target. The background goes red.
	Lock condition: signalled with a red box and a failure triangle. Press for more than 3 seconds to go to the row diagnostics menu.
	Signals: if a fault or error occurs on a row, the colour of the relative box may vary depending on the severity of the problem: - **Orange:** warning; - **Blue:** diagnostics information; Press for more than 3 seconds to go to the row diagnostics menu (see par. 3.3.2.2).

	Row index: the progressive indicator of the sowing rows, the box of which can be either dark or light green to define product A or product B, respectively.

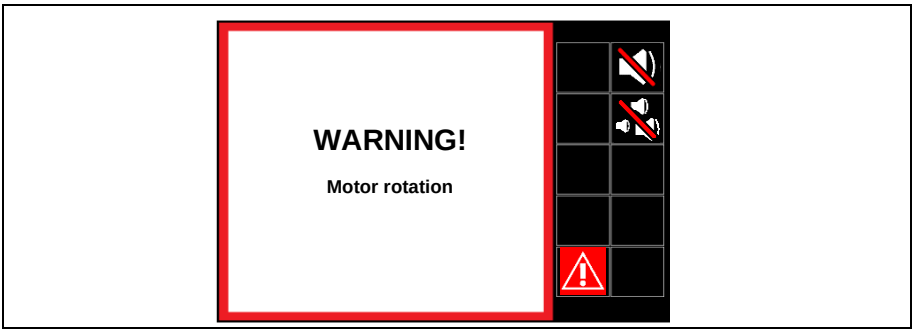
While in ***passage mode***, the tables can show:

Box	Description
	OK: the photocell is detecting seeds and has no active alarm.
	**Signals:** in the event of an active alarm on the photocell of a row, the background of the box can turn a colour: - **Red with warning icon**: motor locking or fault alarm - **Red with "ERR" label**: photocell and flow not detected alarm - **Orange with "OK" label**: warning - **Blue with "OK" label**: diagnostics info

4.2.2 Pre-load function

CAUTION: Movement of mechanical parts

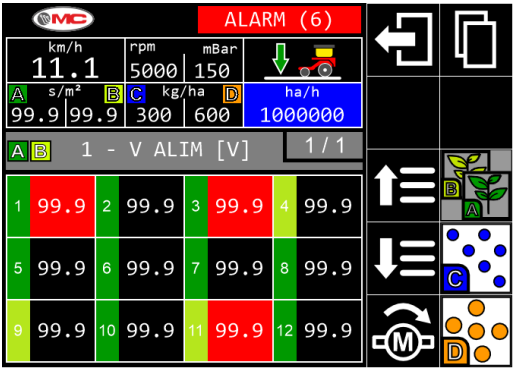
The pre-load function allows the operator to load the discs with product A and product B (if present) before sowing.
Press the pre-load soft key for 3 seconds and a safety warning is displayed for handling mechanical parts:



Key	Function
	Single alarm snooze: allows the acoustic alarm to be snoozed and the alarm window currently shown on the screen to be closed.
	Alarm snooze: allows all active acoustic alarms and alarm windows to be snoozed with a single touch.
	Alarm reminder: displays the list of active alarms, even after snoozing.

4.2.3 Motor diagnostics

The motor diagnostics menu can be accessed by pressing the soft key:



The screen lets you choose what data to display and represents it in tabular form for each motor in the system. If a value is outside of the acceptable range of the data, the background of the box turns red, as shown in the image.

The data that can be shown:

1. **Driver voltage [V]:** supply voltages upstream of the ECU driver relay;
2. **BUS voltage [V]:** supply voltage downstream of the ECU driver relay;
3. **Motor speed [RPM]**: rotations per minute of the fast shaft;
4. **Gearbox speed [RPM]**: rotations per minute of the slow shaft;
5. **Disc speed [RPM]**: rotations per minute of the sowing discs;
6. **Shaft speed [RPM]:** rotations per minute of the shaft sensor;
7. **Motor temperature [°C]:** temperature of the motors;
8. **Driver temperature [°C]:** temperature of the ECU driver;
9. **PWM [%]:** percentage of the average supply voltage to the motors;
10. **Current [A]:** currents absorbed by the ECU drivers.

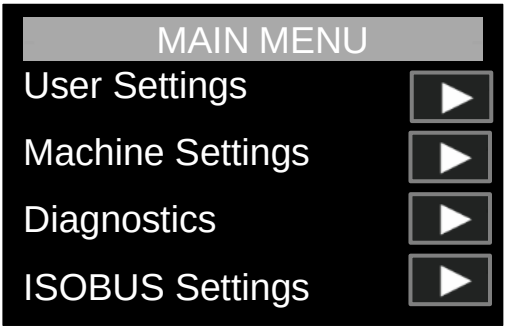
The table header shows the number, name and unit of the selected parameter.

Up to 12 motors are displayed in a table at a time; additional motors are displayed on the next page.

Key	Function
	EXIT: lets you return to the main screen
	Menu: lets you access the programming menus
	Next parameter: updates the table by selecting the next parameter from the list of those available
	Previous parameter: updates the table by selecting the previous parameter from the list of those available
	Product A – B (sowing): lets you select the products A - B to be displayed in the table. When selected, the background of the button turns grey.
	Product C (microgranulators): lets you select product C to be displayed in the table. When selected, the background of the button turns grey.
	Product D (fertiliser): lets you select product D to be displayed in the table. When selected, the background of the button turns grey.
	Motor rotation: this function can be used to activate the rotation of all motors of the product being displayed (seed [A] [B], microgranulator [C] or fertiliser [D]). Upon activation, the system displays a safety warning, similar to the pre-load function, followed by a beep. The background of the button turns grey.

4.3 Menu

For parameter programming, press the menu soft key to access the first page of the programming menu:



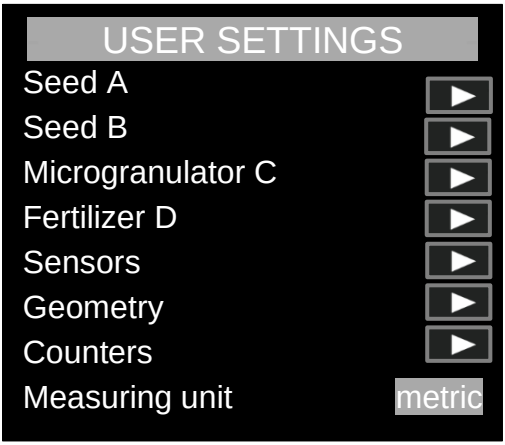
In general, the user can change a parameter by touching its name or value in the menu. When a parameter is selected, it's value background turns GREY.
In the case of numeric entries, a numeric keypad is displayed for entering the new parameter value.
In the case of string parameters, entry is made by selecting the desired value from the list of those available.

Key	Function
	EXIT: lets you return to the main screen
	CANCEL: cancels the modification and restores the previous value.
	Plus: increases the selected digit or scrolls to the previous listed string.
	MINUS: decreases the selected digit or scrolls to the next listed string.

Key	Function
	Alarm reminder: allows the list of active alarms to be displayed. The soft key background flashes red intermittently.

4.3.1 User settings

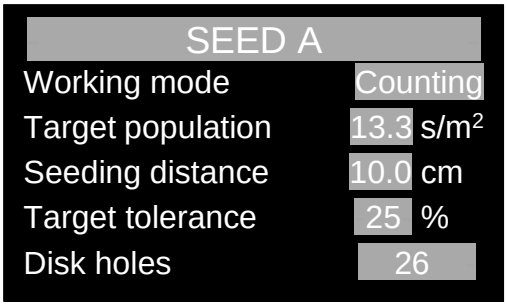
This submenu allows you to set the main system parameters:



Unit of measurement: defines the unit of measurement of the system (metric, imperial).

4.3.1.1 Seed A or Seed B

These 2 menus configure the working mode of sowing products A and B:

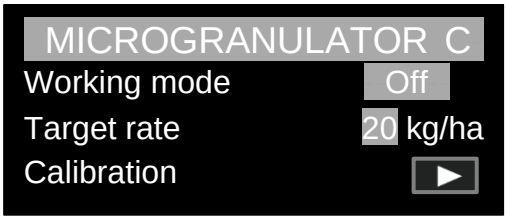


- **Working mode:** allows you to set the mode for calculating and verifying the sowing distance and population. The ESD system allows the operator to choose between counting mode and passage mode.
    - **Counting:** the system measures sowing distance and population from photocells of each row, and compares their value vs. target.
    - **Passage:** the system checks only presence or absence of pulses from the photocells.

  In the "Seed B" menu, it is possible to set the third choice "Seed A", which replicates the same settings as product A.
- **Target population:** in counting mode, sets the target seeding population, for computing histograms and tables.
  This parameter is related to the sowing distance: when one is modified, the other is automatically re-calculated.
- **Seeding distance:** in counting mode, sets the target seeding distance, for computing histograms and tables.
  This parameter is related to the sowing population: when one is modified, the other is automatically re-calculated.
- **Target tolerance:** defines the threshold of off-target sowing detection for updating histograms on the main screen.
- **Disc holes:** number of holes of the seeding disc, to accurately compute the seeding distance from photocell's pulses.

4.3.1.2 Microgranulators C

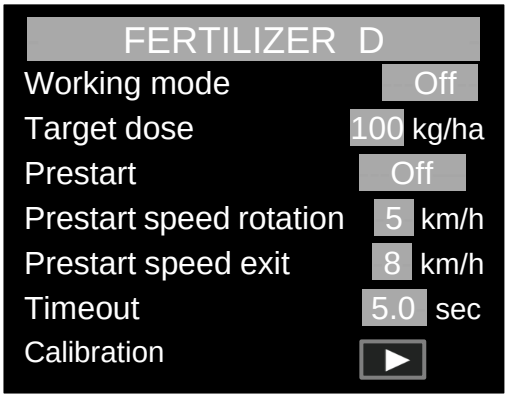
This submenu allows you to configure product C for microgranulator management:



- **Working mode:** allows the microgranulator motors to be activated or deactivated.
- **Target rate:** defines the target dose to be distributed, in kg/ha.
- **Calibration:** accesses the microgranulator calibration procedure (see 3.3.1.4 Calibration procedure).

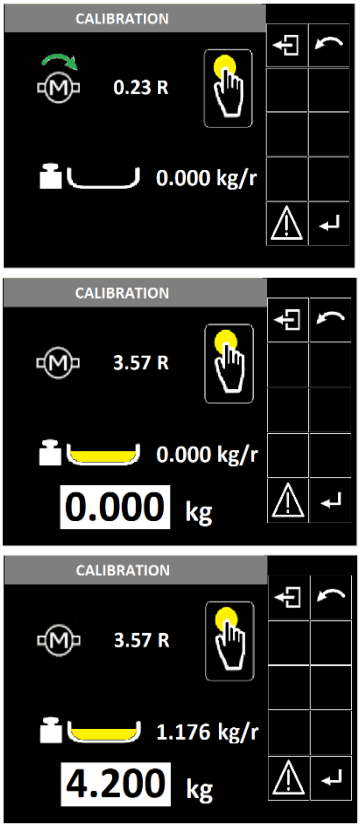
4.3.1.3 Fertiliser D

This submenu allows the fertiliser product to be configured:



- **Working mode:** allows the fertiliser motors to be activated or deactivated.
- **Target dose:** defines the target dose to be distributed, in kg/ha.
- **Pre-start:** enables the pre-start function for the fertiliser product, which pre-loads the fertiliser distribution circuit when the machine is stopped.
- **Pre-start rotation speed:** defines the equivalent speed the system uses to run the motors during pre-start.
- **Pre-start exit speed:** maximum ground speed value at which the system exits pre-start, starting to distribute in proportion to the actual ground speed.
- **Timeout:** defines the maximum time within which the system still exits pre-start, even if the exit speed has not been reached.

- **Calibration:** allows access to fertiliser motor calibration (see next paragraph).



4.3.1.4 Calibration procedure

The calibration procedure makes it possible to calibrate the amount of product distributed for each motor rotation. Calibration must be performed each time the type of product is changed or when the distribution roller is replaced.

The steps of the procedure are as follows:

1. Access the “New calibration” submenu and place a drip tray under the distributor.
2. Press and hold down the calibration button on the planter until the programmed rotations for the product have been reached.
   Rotation of the distributor is started at a pre-set speed. The counter next to the distributor icon indicates the actual rotation in real time.
3. When the calibration button on the planter is released, the field for entering the weighing appears.
4. Empty the tray and place it under the distributor; the previous rotation was necessary to fill the distributor.
5. Repeat steps 2 and 3, taking care to dispense a quantity of product appropriate for weighing.
6. Weigh the contents of the tray and enter the value.
7. The calibration coefficient in kg/rev of the distributor appears; to confirm, exit calibration. If you wish to repeat the calibration, repeat from step 5.

4.3.1.5 Calibration correction

This optional procedure can be performed following the initial calibration, following the same steps.

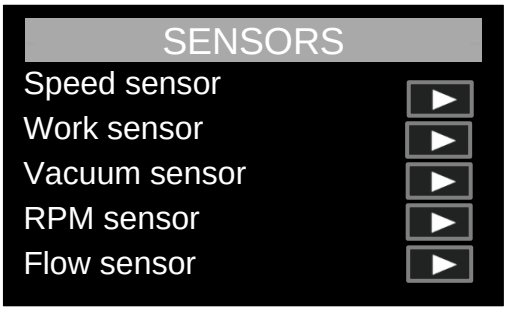
The only difference is that the distributor, instead of rotating at the pre-set speed for the initial calibration procedure, is rotated at a speed calculated according to these parameters:

- Calibration coefficient determined by the previous initial calibration
- Target Rate of distribution set in the previous menu
- Simulated feeding speed of 6 km/h

In this way, calibration is carried out at the rotation speed closest to the actual speed, resulting in a more accurate calibration.

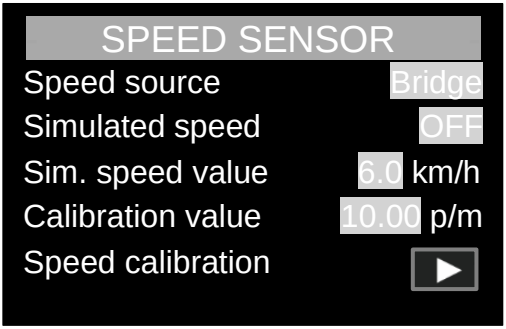
4.3.1.6 Sensor menu

This submenu allows you to adjust the sensors connected to the system:



4.3.1.6.1 Speed sensor

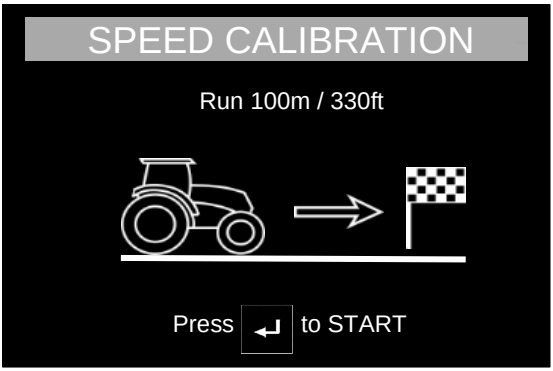
This submenu allows you to adjust the feeding speed reading of the planter:



- **Speed source:** allows selection of the speed source:
  - BRIDGE: select this value if there is a rotary encoder keyed to a ground wheel and connected to the ECU Bridge input;
  - DRIVER: the rotary encoder is connected to an ECU DRIVER (to be configured via MCE Calibration Tool);
  - ISB-GND: the ground speed is read from the TECU, if supported by the ISOBUS display;
  - ISB-WH: the wheel speed is read from the TECU, if supported by the ISOBUS display;

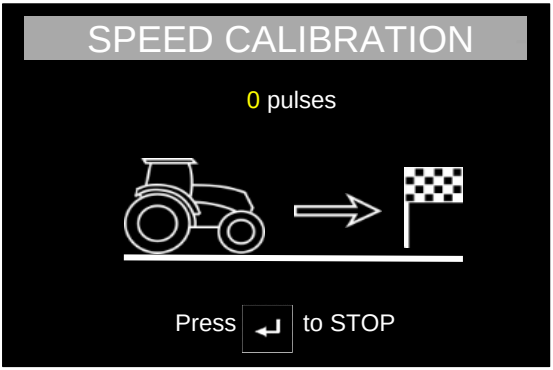
- ISB-GPS: the speed is read from the GPS antenna, if supported by the ISOBUS display;
- ENC+GPS: speed is read from the rotary encoder below 3 km/h and from the GPS antenna above 3 km/h, if supported by the ISOBUS display;

- **Simulated speed:** When ON, a fictitious speed value is forced ignoring any other source. On the main screen, the speed value is highlighted with an orange background; the value can be changed by touching the box.
  Furthermore, press and hold the CANCEL soft key in the main screen, to disable the simulated speed and restore the programmed speed source.
- **Simulated speed value:** value of the fictitious speed.
- **Calibration value**: sets the number of pulses generated by the rotary encoder in one metre.
- **Speed calibration**: through this submenu it is possible to carry out the automatic calibration procedure of the rotary encoder.



To perform the automatic calibration, the following steps should be followed:

1. Place two flags on the ground 100 metres apart.
2. Align the tractor to the 1st flag and press the ENTER soft key to start the measurement.

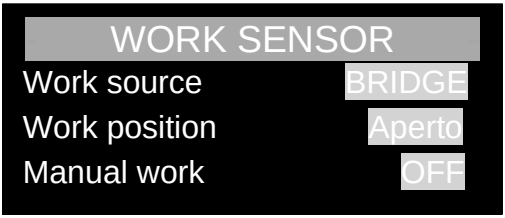


3. Drive the tractor to the 2nd flag and press ENTER again to stop the procedure. An error message is displayed if the pulses are not in the permitted range 1000-25000.
4. Once completed, the accumulated pulses in 100 metres are displayed at the bottom.

Key	Function
	EXIT: lets you return to the main screen
	CANCEL: goes back one menu level
	ENTER: starts and stops the calibration procedure

4.3.1.6.2 Work sensor

This submenu is used to set the working position detection of the planter:



- **Work Source:** allows selection of the work status source:
  - BRIDGE: select this if there is a mechanical switch connected to the ECU bridge;
  - DRIVER: the mechanical switch is connected to an ECU Driver (to be configured via MCE Calibration Tool);
  - ISOBUS: work status read from TECU, if supported by the Isobus display;

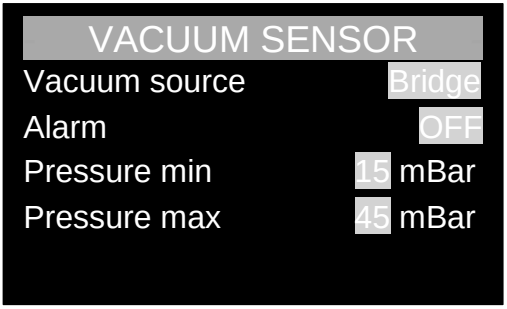
- **Work Position:** the parameter defines whether the working position corresponds to the open or closed contact of the mechanical switch, if present.
- **Manual work:** when ON, the system ignores the work sensor source and forces a fictitious state. On the main screen, the work position icon turns grey with letter “M” and the system starts to run the motors:

When the icon is

touched again, it will turn black with letter “M” and the system stops the motors. Press the Cancel soft key on the main screen to deactivate the manual work simulation, returning to the actual source set.

4.3.1.6.3 Vacuum gauge

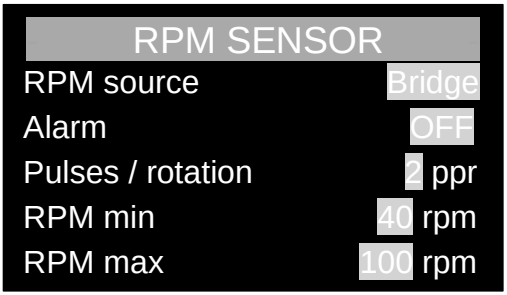
Adjusts the optional vacuum reading of the sowing elements:



- **Vacuum Source:** allows selection of the vacuum gauge source:
  - **OFF:** no vacuum gauge sensor connected to the system.
  - BRIDGE: vacuum gauge sensor connected to the ECU Bridge.
  - DRIVER: vacuum gauge sensor connected to an ECU Driver (to be configured via MCE Calibration Tool).
- **Alarm:** activates/deactivates the alarm depending on the limits entered below.
- **Minimum pressure:** minimum vacuum below which the alarm is activated.
- **Maximum pressure:** maximum vacuum above which the alarm is activated.

4.3.1.6.4 RPM sensor

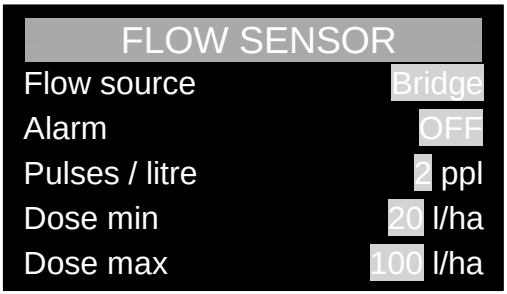
Adjusts parameters relating to the optional fan speed sensor:



- **RPM source:** allows selection of the RPM sensor source:
  - OFF: no inductive sensor connected to the system.
  - BRIDGE: inductive sensor connected to the ECU Bridge.
  - DRIVER: inductive sensor connected to an ECU Driver (to be configured via MCE Calibration Tool).
- **Alarm:** activates/deactivates the alarm according to the limits entered below.
- **Pulses/rotation:** defines the number of pulses per revolution detected by the sensor.
- **Minimum RPM:** minimum speed below which the alarm is activated.
- **Maximum RPM:** maximum speed above which the alarm is activated.

4.3.1.6.5 Flowmeter

Adjusts the reading of the optional flow sensor, alternative to the fan sensor, which measures the flow rate of a third-party liquid product distribution system:

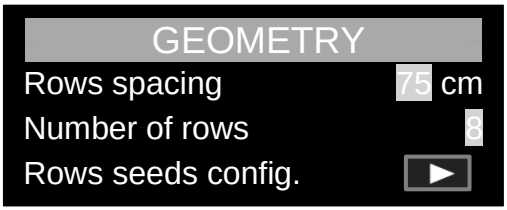


- **Flow source:** flowmeter source:
  - OFF: no flow sensor connected to the system.
  - BRIDGE: flow sensor connected to the ECU Bridge.
  - DRIVER: flow sensor connected to an ECU Driver (to be configured via MCE Calibration Tool).
- **Alarm:** activates/deactivates the alarm according to the limits set below.

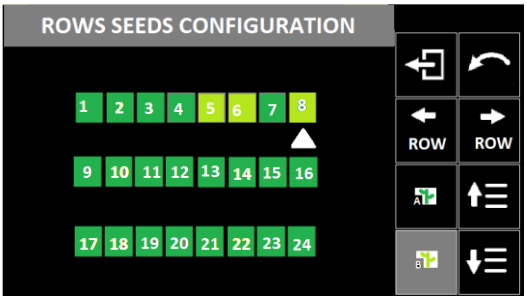
- **Pulses/litre:** defines the calibration value in pulses/litre of the flowmeter.
- **Minimum dose:** minimum flow below which the alarm is activated.
- **Maximum dose:** maximum dose above which the alarm is activated.

4.3.1.7 Geometry

This menu allows you to configure the mechanical characteristics of the planter:



- **Rows spacing:** sets the distance between the sowing rows.
- **Number of rows:** number of sowing rows of the planter.
- **Rows seeds configuration:** allows access to the procedure for assigning sowing lines to product A or B, as follows:



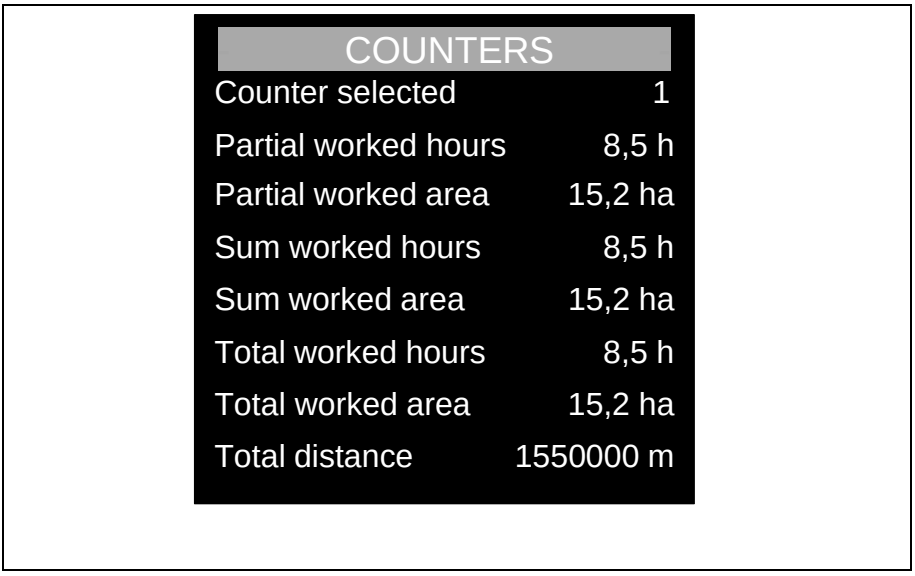
Using the soft keys, the boxes corresponding to the sowing rows can be selected and assigned to product A, then coloured dark green, or assigned to product B and coloured light green:

Key	Function
	EXIT: lets you return to the main screen

	CANCEL: goes back one menu level
	Previous row: selects the previous sowing row, moving the cursor.
	Next row: selects the next sowing row, moving the cursor.
	Seed A: allows the selected row to be assigned to product A.
	Seed B: allows the selected row to be assigned to product B.

4.3.1.8 Counters

This menu allows you to view all the counters available in this system.
Up to 10 groups of independent partial counters are available, each one assignable to a different customer.



- **Selected counter:** allows selection of the set of partial, sum and total counters to be displayed, from 1 to 10.

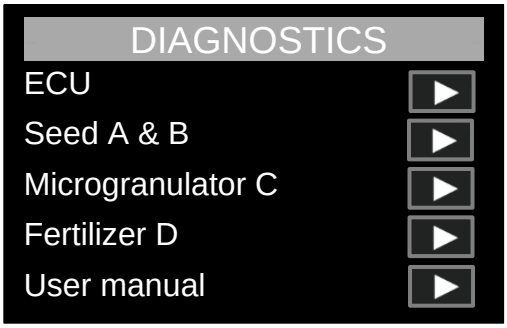
- **Partial worked hours:** partial worked time per selected customer. When reset, its previous value is added to the sum of hours worked by the same customer.
- **Partial worked area:** partial worked surface of the selected customer. When reset, its previous value is added to the sum of worked area of the same customer.
- **Sum worked hours:** sum of the hours worked by the selected customer since the last reset. When reset, the value is added into total work hours of same customer.
- **Sum worked area:** sum of worked surfaces of the selected customer since the last reset. When reset, the value is added into total work area of same customer.
- **Total worked hours:** total seasonal worked time of selected customer since the last reset.
- **Total worked area:** total seasonal worked area of selected customer since the last reset.
- **Total distance:** overall odometer of the planter, regardless of selected customer.
  This counter is not resettable.

The user can reset the partial, sum and total counters of the selected customer by simply touching the desired counter line. Before resetting, a confirmation window is displayed as follows:

Key	Function
	CANCEL: cancels the reset, and keeps the counter value.
	Confirm: confirms the reset and clears the selected counter to zero.

4.3.2 Diagnostics menu

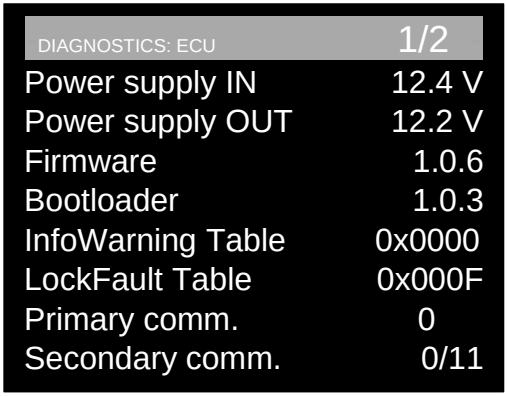
This submenu shows the system diagnostic information:

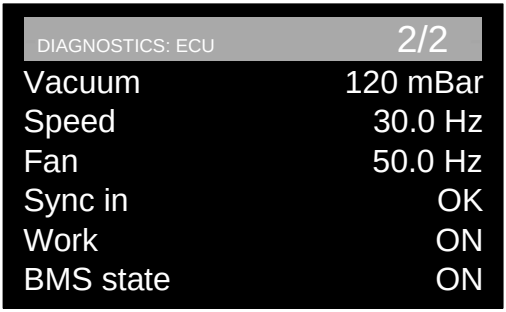


- **ECU:** shows the ECU Bridge diagnostics.
- **Seed A&B:** analyses the ECU drivers of products A and B (sowing) one by one.
- **Microgranulator C:** analyses the ECU drivers of product C (microgranulators) one by one.
- **Fertiliser D:** analyses the ECU drivers of product D (fertiliser) one by one.
- **User manual:** shows a QR code with the link to this online manual.

4.3.2.1 ECU Bridge

This screen shows all diagnostic information for the ECU Bridge.
The first screen contains general ECU information, the second is the diagnostics of the sensors connected to the ECU.





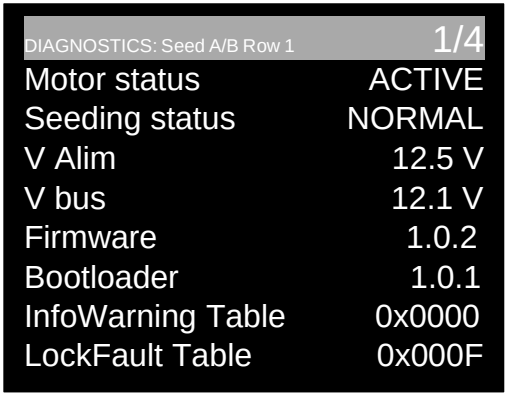
- **Power supply IN:** input power supply voltage to the ECU Bridge.
- **Power supply OUT:** ENABLE voltage to the ECU drivers and sensor power supply.
- **Firmware:** firmware version.
- **Bootloader:** bootloader version.
- **InfoWarning table:** cumulative value of active information alerts.
- **LockFault table:** cumulative value of active locking alarms.
- **Primary comm.:** number of CAN nodes on the BUS.
- **Secondary comm.:** number of ECU drivers enumerated compared to those set.
- **Vacuum sensor:** vacuum gauge sensor vacuum value.
- **Speed sensor:** frequency read by the speed sensor.
- **Fan sensor:** frequency read by the fan sensor.
- **Sync In:** status of the Sync In input.
- **Work sensor:** work input status.
- **BMS status:** BMS signal status.

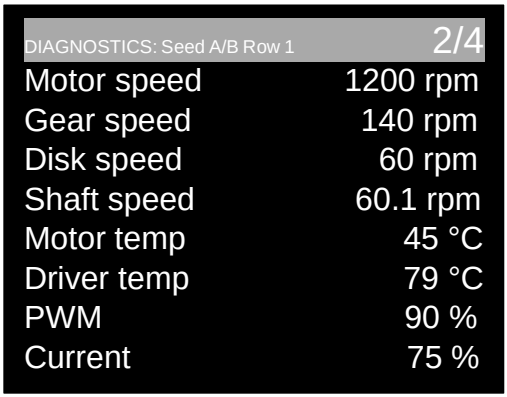
Key	Function
	Exit: returns to the main screen.
	Cancel: returns to the previous menu.
	Previous page: goes to the previous page of ECU diagnostics
	Next page: goes to the next page of ECU diagnostics

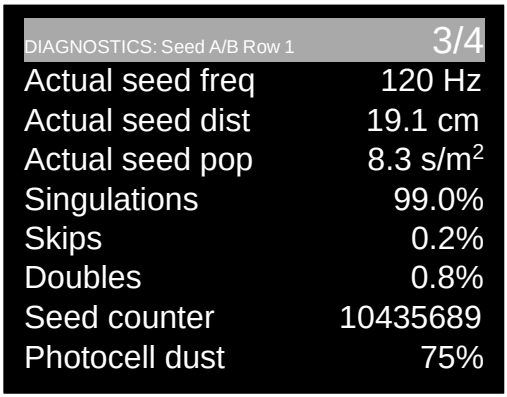
4.3.2.2 Seed A & B, Microgranulator C, Fertiliser D

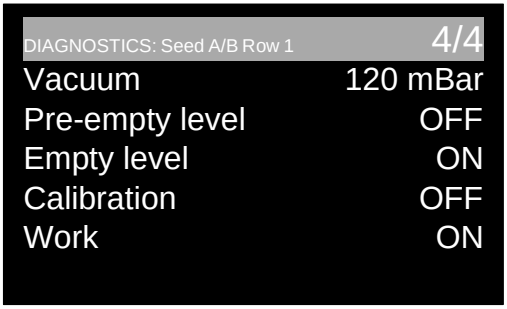
These submenus show the diagnostics information of each ECU Driver of the selected product.

The first page shows information from the ECU Driver, the second from the motor, the third the seeding statistics (only for products A and B), the fourth the diagnostics of the sensors connected to the ECU Driver.









- **Motor status:** motor status ACTIVE or LOCKED.
- **Seeding status:** sowing status on the row NORMAL or ALARM.
- **V alim:** power supply voltage upstream of the ECU Driver relay;
- **V bus:** power supply voltage downstream of the ECU driver relay;
- **Firmware:** firmware version.
- **Bootloader:** bootloader version.
- **InfoWarning table:** cumulative value of active information alerts.
- **LockFault table:** cumulative value of active locking alarms.
- **Motor speed:** rotation speed of the fast shaft.
- **Gear speed:** rotation speed of the slow shaft.
- **Disc speed:** rotation speed of the sowing disc.
- **Shaft speed:** rotation speed of the shaft sensor.
- **Motor temperature:** temperature detected on the motor.
- **Driver temperature:** temperature detected on the ECU driver.
- **PWM:** percentage of the average supply voltage to the motors.
- **Current:** percentage of current drawn by the motor.

For seed products A and B only:

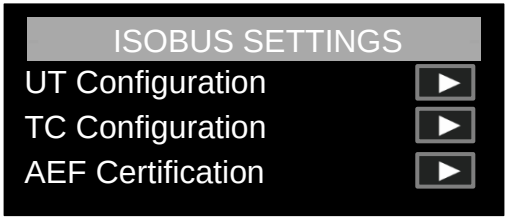
- **Actual seeding frequency:** seeds/sec drop rate, in real time.
- **Actual seeding distance:** sowing distance, in real time.
- **Actual seeding population:** seeds/m^2 population, in real time.
- **Singulations:** Statistical % of single seeds detected according to ISO7256/1.
- **Skips:** Statistical % of undetected seeds detected according to ISO7256/1.
- **Doubles:** Statistical % of double seeds detected according to ISO7256/1.
- **Seed counter:** number of seeds counted from start-up.
- **Photocell dust level:** % of dust detected by the photocell.
- **Vacuum gauge sensor:** vacuum gauge sensor vacuum value.
- **Pre-empty level:** status of the 1st level sensor in the hopper.
- **Empty level:** status of the 2nd level sensor in the hopper.
- **Calibration:** input status for calibration button.
- **Work sensor:** work sensor input status.

Key	Function
	Exit: returns to the main screen.
	Cancel: returns to the previous menu.
	Previous row: goes to the previous sowing row.
	Next row: goes to the next sowing row.
	Previous page: goes back to previous diagnostics page of the same row.
	Next page: goes to the next diagnostics page of the same row.
	Product A – B (Sowing): goes to the ECU Driver diagnostics of A - B sowing products.
	Product C (Microgranulators): goes to the ECU Driver diagnostics of product C of the microgranulators.

	Product D (Fertiliser): goes to the ECU Driver diagnostics of product D of the fertiliser.
	Motor test: while pressed, activates the rotation of the selected motor at a test speed. A safety warning appears (see par. 3.2.2)
	Reset statistics: If a sowing row A or B is selected, it resets all statistical data of the currently selected photocell to zero. No confirmation is required. This has no effect for products C and D.

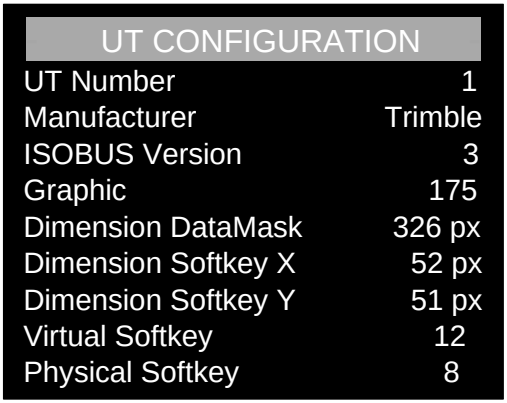
4.3.3 ISOBUS settings

This menu displays and manages the system ISOBUS settings:



4.3.3.1 UT configuration

This submenu shows the values read from the UT Server of the third-party Isobus display:



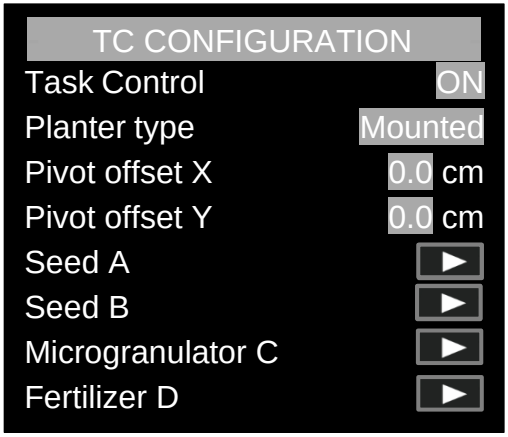
- **UT number:** identification number of the VT on which this application is currently displayed.
- **Manufacturer:** manufacturer of the VT on which this application is displayed.
- **ISOBUS version:** version of the VT.
- **Graphic:** number of colours supported by the graphics of the VT.
- **Dimension DataMask:** size of the DataMask in pixels.
- **Dimension Softkey X:** X size of the soft key in pixels.
- **Dimension Softkey Y:** Y size of the soft key in pixels.
- **Virtual softkey:** number of virtual soft keys supported by the VT.
- **Physical softkey:** number of physical soft keys supported by the VT.

Key	Function
	Exit: returns to the main screen.
	Cancel: returns to the previous menu.
	Change VT: starts the procedure to move this application to another VT, if there is more than one VT on the ISOBUS network. A warning message is displayed in the event of an error.

When there are several VTs on the ISOBUS network, the application connects to the one with instance 0 (UT number 1) at the very first connection.

4.3.3.2 TC configuration

This submenu displays and manages parameters related to TC functions:

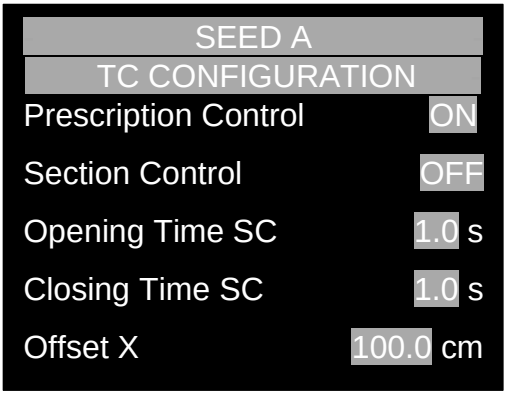


- **Task Control:** activates or deactivates all TC Client functions of this application.
- **Planter type:** sets the planter type in DDOP.
- **Pivot offset X:** sets the distance between the GPS antenna and the ground wheels of the planter in the DDOP, along travel direction X. Only available for “trailed” planter type.
- **Pivot offset Y:** sets the distance between the GPS antenna and the symmetry axis of the planter in the DDOP, along its width Y. . Only available for “trailed” planter type.
- **TC number:** identification number of the TC Server.

- **Manufacturer:** manufacturer of the TC Server currently assigned to the application.
- **ISOBUS version:** version of the TC Server.
- **TC-BAS:** availability of the TC-BAS function of the TC Server.
- **TC-GEO (log):** availability of the data-log functions of the TC Server.
- **TC-GEO (ctrl):** availability of the geo-referenced control function (Prescription Control) of the TC Server.
- **Peer control:** availability of the Peer Control function of the TC Server.
- **TC-SC:** availability of the Section Control function of the TC Server.
- **Booms:** number of booms available in the Section Control of the TC Server.
- **Sections:** number of sections available in the Section Control of the TC Server.
- **Control Channels:** number of channels available in the Prescription Control of the TC Server.

4.3.3.2.1 Seed A, Seed B, Microgranulators C, Fertiliser D

These submenus are quite similar to each other and allow you to set the TC Client parameters for the selected product:



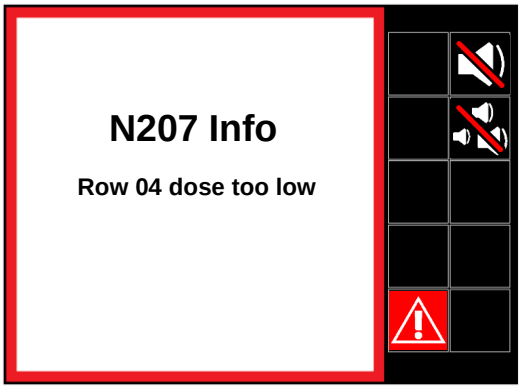
- **Prescription Control:** activates or deactivates the geo-referenced Variable Rate for the selected product.
- **Section Control:** activates or deactivates the automatic geo-referenced section control for the selected product.
- **Opening Time SC:** advance time for opening sections (if managed by TC Server).
- **Closing Time SC:** advance time for closing sections (if managed by TC Server).
- **Offset X:** sets the distance between the planter wheels and the selected product distribution point along the direction of travel X.

4.3.3.3 AEF Certification

This screen shows only the AEF registration number of MC Electronics (214).

4.4 Alarms

This system monitors the alarms of all its components, i.e. motors, sensors, photocells, etc., in real time. If an alarm condition is detected, an acoustic signal is immediately emitted and an alarm window is displayed on the screen, with an identification code and a description of the alarm:



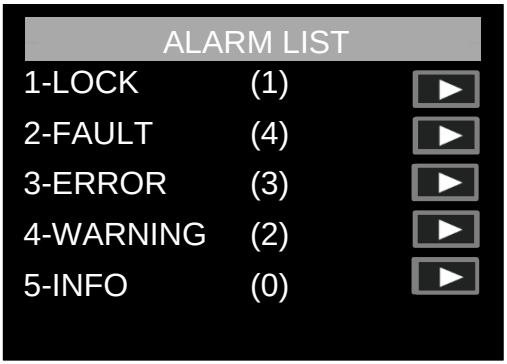
Key	Function
	Single alarm snooze: allows the acoustic alarm to be snoozed and the alarm window currently shown on the screen to be closed.
	Alarm snooze: allows all active acoustic alarms and alarm windows to be snoozed with a single touch.
	Alarm reminder: displays the list of active alarms, even after snoozing.

Depending on the settings in the alarm configuration menu, the alarm windows and their acoustic signal can be snoozed after a programmed timeout and reappear after a predefined delay, if the error condition is still active.

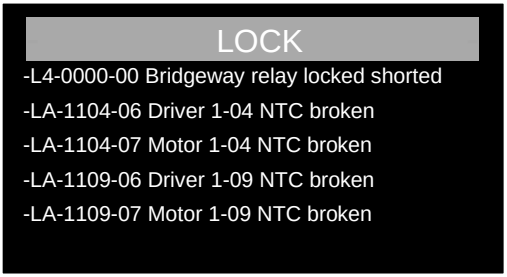
If several alarms are active at the same time, the relative alarm windows are displayed one by one, in order of group and priority; once the highest priority alarm is silenced, the next one is displayed, and so on.

When there is at least one active alarm in the system, even if snoozed, the “ALARM” reminder appears on the main screen and in the menus, which you can touch to display the list of active alarms.

The list of active alarms is sorted by alarm type: block, fault, error, warning, info. To the right of each group is a counter with the number of currently active alarms of the same type and a button to access the list of alarms in that group:



Press these buttons to view a new list of alarms of the same type. In the example below, the list of active Block type alarms is shown:

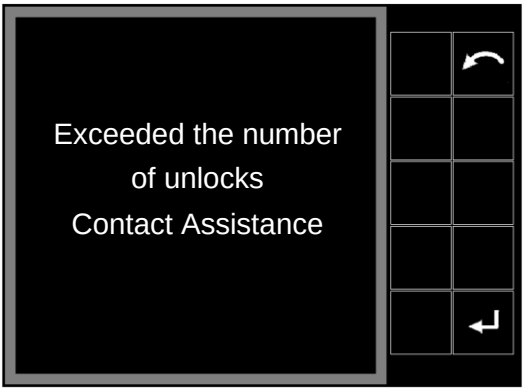


CAUTION: if a motor has signalled a locking alarm, it will NOT rotate any more until this alarm is manually reset. Locking alarms remain even after the system is switched off.

The list of locking alarms includes this additional button:

KEY	Function
	Lock reset: using this key, all motor driver locking alarms can be reset up to a maximum of 3 times.

Resetting is not possible more than 3 times, and if this number of attempts is exceeded, a screen with a warning message is displayed:



In this case, the system will not clear the locking alarms and the end user will have to call for assistance.

CAUTION!!

DO NOT WASH WITH PRESSURE JET WASHER

WARNING: at the end of its use, the product and its packaging must be disposed of according to the local WEEE regulations of your country

Precision farming solutions

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