MCK 2500 SX

TRAMLINE
DRILL SEEDER

INSTRUCTION MANUAL

EN

NR.2734-EN
REV. 7

CE

This product complies with EMC requirements as defined by Directives
2004/108/CE and successive modifications
in accordance with standard EN ISO 14982 applied

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1. General instructions and warnings

1.1 Introduction

This instruction manual provides all the detailed information necessary in order to understand your device and use it correctly.
Please ensure you read it carefully soon after purchasing the Monitor and refer to it whenever in any doubt as to how to use it or when preparing to carry out maintenance.
The manual must be kept near the machine or, at least, when this is not feasible, in a well-known and conveniently accessible location so that it can easily be consulted when required.

ALL RIGHTS RESERVED. THIS MANUAL IS FOR CUSTOMER USE ONLY.
ANY OTHER USE IS PROHIBITED

1.2 Terms of guarantee

- **SUBJECT OF THE GUARANTEE:** the guarantee applies to the product and its components which bear the serial number or other identification number used by MC electtronica;
- **DURATION OF THE GUARANTEE:** MC Elettronica S.r.l. guarantees the product and its accessories for 1 year from the date of manufacture (as indicated on the identification plate at the rear of the Monitor) and also accessories.
  This guarantee covers the product and all repairs made within the agreed timeframe.
  This guarantee does not apply in the event of:
  - accidental damage;
  - improper use;
  - unauthorised modifications or incorrect installation/fine tuning;
  - damage caused by the failure or malfunction of non-MC Elettronica equipment connected mechanically or electrically to our equipment;
  - force majeure (lightning strikes, floods, fire or other causes beyond the control of *MC Elettronica*).

  Repairs under the guarantee, which must be carried out at the laboratories of our authorised centres, are completely free of charge provided the equipment is transported directly to them or sent carriage paid. The costs of and risks associated with the transport are to be borne entirely by the Customer.
  The guarantee described above is valid unless otherwise agreed between MC Elettronica and the Customer.

Warning
Mc Elettronica declines any liability for damage or costs incurred directly or indirectly by improper use or by the inability of the Customer to use the equipment on its own and/or in conjunction with other devices.

1.3 Support Service

Support is available in all countries where the Monitor is officially distributed by MC Elettronica (during and after the guarantee period).
Any work requested on the product must be carried out in accordance with this manual or as agreed with MC Elettronica.
Otherwise the guarantee may become void.

2. General description

The *SEEDER MAT MCK 2500 SX* is a multifunction electronic computer designed to be used on pneumatic or mechanical seed drills.

Its main function is to automatically shut off certain seeding rows in order to a leave a non-sown row to be used as a “path” for the subsequent passage of the sprayer.

In addition, the computer can process the signals arriving at two inputs that can be used to control the rotation of the turbine and of the distributor. The computer can be programmed to warn the operator by means of an acoustic alarm or a visual alarm when one or both these devices are turning too slow or have stopped (*HOWEVER, THE DISTRIBUTOR RPM IS NOT SHOWN ON THE DISPLAY)*.

During sowing operations the display can show the following readings:

- travel speed (km/h)
- hectares sown, through 2 independent counters (total and sub-total)
- linear distance travelled
- turbine RPM

For information on how to program the alarms see chapter 5 “Programming”

The computer performs these functions by means of the following sensors: an inductive speed sensor, which should preferably be installed on the machine’s wheel axle; an inductive sensor that measures the turbine RPM; a capacitive sensor to be installed in the seed tank to measure the seed level; a third inductive sensor to measure the distributor RPM; finally a magnetic sensor to be installed on the arm of the row marker disc or on the machine’s lifting point (see paragraph 5.6) when leaving un-sown “paths” (*tramlines*).

3. How to install the system

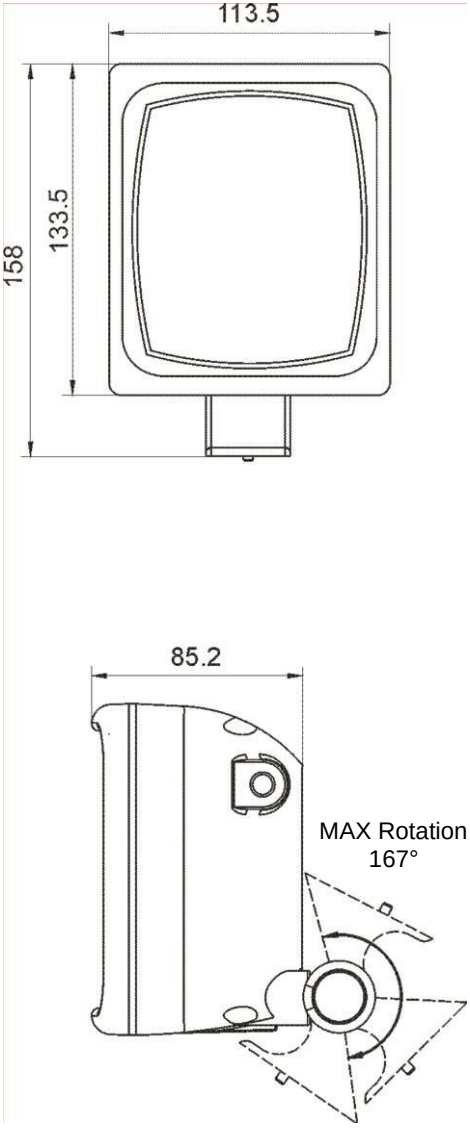


Figure 1. Overall dimensions.

Installation and use

3.1 How to install the computer

To install the computer proceed as follows.

- Drill a Ø9 mm hole on a flat surface inside the cab and fasten the supporting bracket by applying a screw (not supplied) into the opening **(A)** on the bracket.
  - Fasten the computer to the bracket using the two knobs on the sides (ref. <B> Figure 2)

N.B.: We recommend installing the computer in front of the operator to make it easier to use during sowing operations.

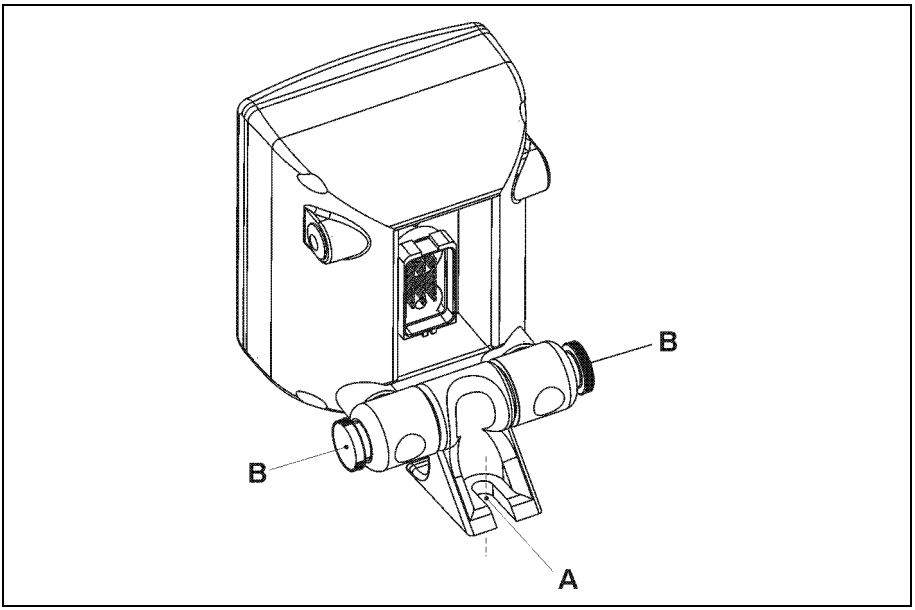


Figure 2. Installing the computer.

3.2 How to install the sensors

The *MCK 2500 SX* computer is provided with 3 kinds of sensors:

- inductive or magnetic sensors (Ø12 or Ø18) for measuring speed, turbine RPM and distributor RPM (code 1404)
- a magnetic sensor (Ø12) for the row marker (code 00SEN-1402)
- a capacitive sensor (Ø18) for measuring the seed level (code 1403)

3.2.1 How to install the Ø18 speed sensor – code 1404

You can install the speed sensor anywhere there is mechanical movement, on the wheel (front or rear wheel) of the agricultural vehicle/machine or applying a metal reference protruding by at least 7 mm (Figure 3 – ref. <**C**>). We recommend installing the speed sensor inside the wheel and placing the sensor head opposite the rim bolts (Figure 3 – ref. <**A**>).

Set the gap between the sensor and the bolts at about 2-3 mm (Figure 3– ref. <**B**>).

Fasten the sensor to a fixed part of the vehicle/machine, so that it is firmly secured to the structure. Fix the sensor in place using the nut and the lock nut.

> ***Warning***
> We recommend protecting the sensor cable with a rubber sheath.

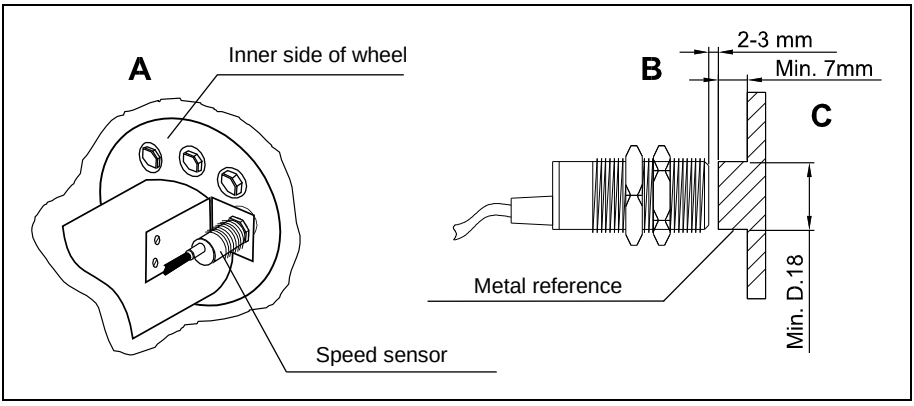


Figure 3. Installing the speed sensor, code 1404 (or code 481 if including bracket).

3.2.2 RPM sensor installation examples

The inductive turbine RPM sensor (and distributor RPM sensor, if present) (see chapter “General description”) must be placed opposite a metal reference having a diameter at least as large as the respective sensor (12 mm) and protruding from any other metal body by at least 7 mm. The gap between the sensor and its respective metal reference should be 2 to 3 mm.

The figures below show two different installation examples.

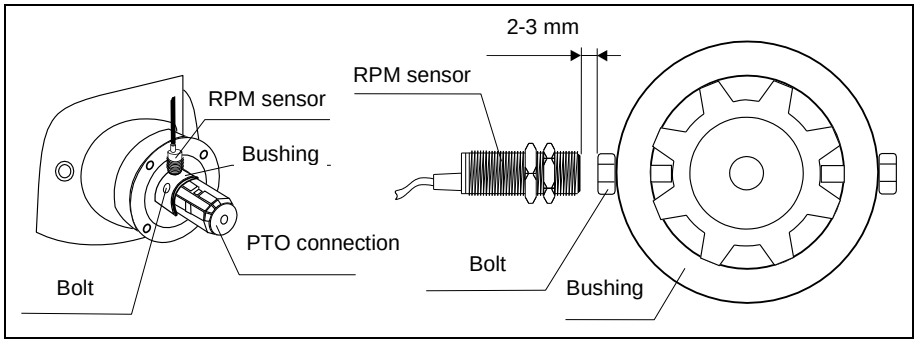


Figure 4. Ø18 Inductive sensor installed on PTO.

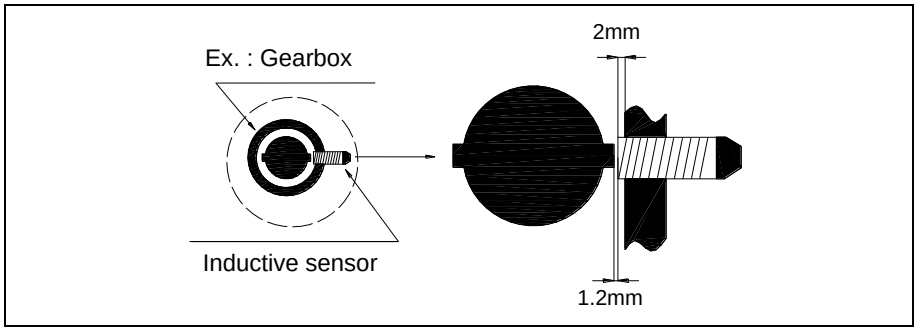


Figure 5. Ø12 Inductive sensor installed on gearbox.

⚠	**Warning** We recommend protecting the sensor cable with a rubber sheath.

3.2.3 How to install the Ø12 magnetic sensor – code 00SEN-1402

Type 1 installation: The magnetic row marker sensor can be installed on the seed drill on one of the articulated joints of a row marker disc arm. The corresponding 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 6 – ref. <**a**>) and moves away from the sensor when the arm is lowered (Figure 6 – ref. <**b**>).

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

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

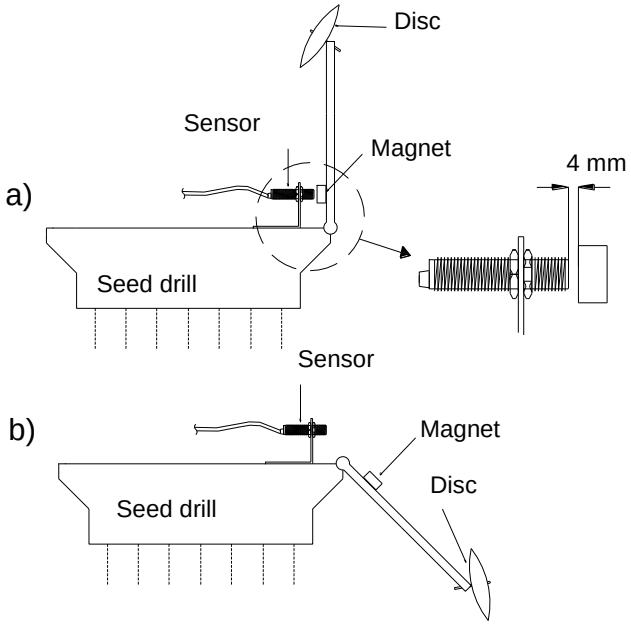
Fasten the sensor to the bracket using the nut and the lock nut.

N.B. The reference element should be as close as possible to the row marker 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 6 shows an example in which the sensor and the magnet are opposite each other when the machine is raised.

NOTE: The "disc" parameter must be set according to the type of installation selected. See paragraph 5.6

TYPE 1 INSTALLATION ("disc" parameter = 1. See par.5.6)



TYPE 2 INSTALLATION ("disc" parameter = 2. See par. 5.6)

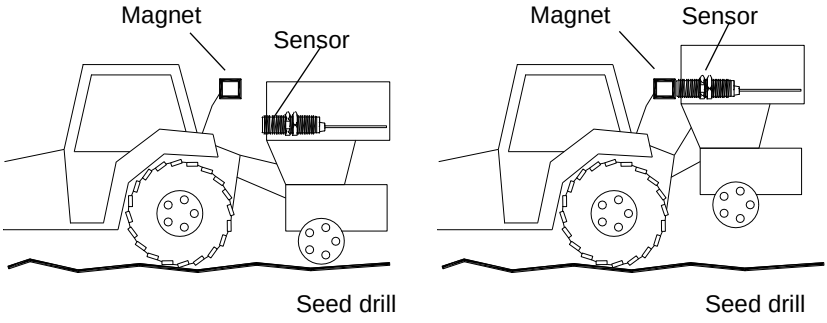


Figure 6. Example of installation of magnetic row marker sensor.

Warning
We recommend protecting the sensor cable with a rubber sheath.

3.2.4 How to install the Ø18 seed level sensor – code 1403

The capacitive seed level sensor should be installed where it can signal a warning when the level in the seed tank drops below a predetermined minimum level. The capacitive sensor can be installed inside the seed tank (Figure 7 - example 1) by means of a support bracket (not supplied) or mounted directly on the tank body (Figure 7 - example 2) and secured with a nut and lock nut. The red part of the capacitive sensor must be in direct contact with the seeds. In this manner, with the sensor head placed at the minimum seed level, when the sensor is covered by seeds (ref. <**1**> examples 1 and 2,Figure 7) it emits NO alarm signal, but when the sensor head is uncovered (ref. <**2**> examples 1 and 2,Figure 7) the system signals a low seed level warning.

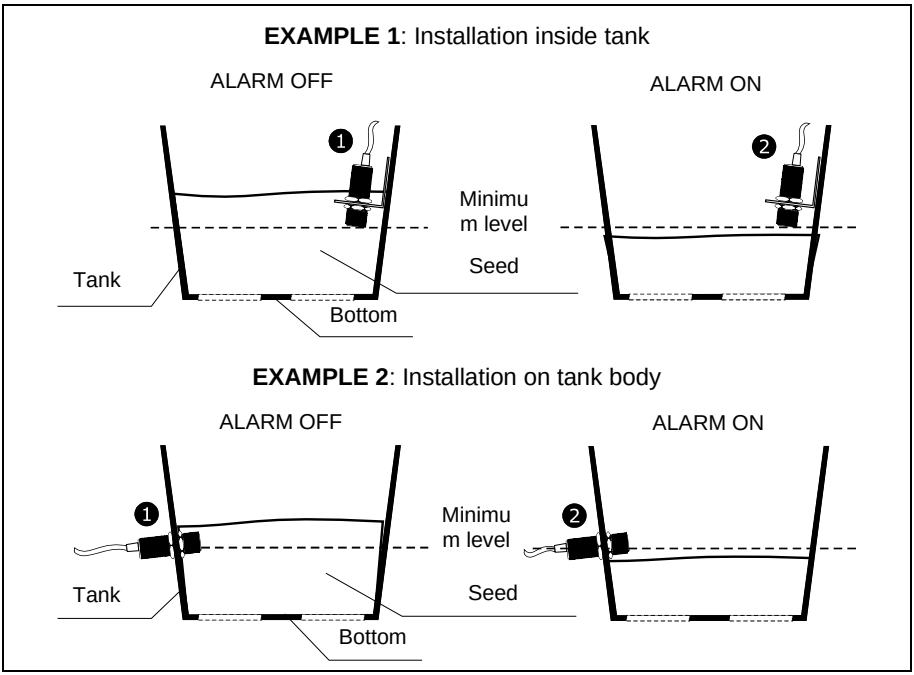


Figure 7. Examples of installation of seed level sensor.

4. Front view

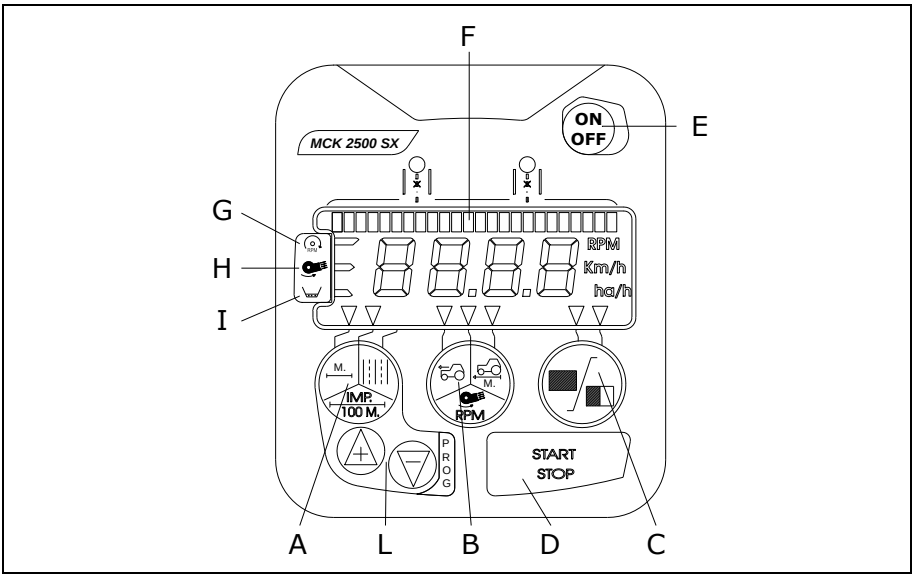


Figure 8. Front view.

The front panel allows the operator to visualize all the data of the work cycle. The following elements can be distinguished:

REF.	DESCRIPTION
A.	Key for programming work parameters
B.	Key for displaying advancing speed/ covered area/ turbine RPM
C.	Key for displaying/ zeroing total/partial worked area
D.	Key for activating (start) and de-activating (stop) controls for automatic row closing and alarms
E.	Computer on/off key
F.	Backlit LCD for displaying dimensions
G.	Alarm signal on distributor RPM
H.	Alarm signal on turbine RPM
I.	Product reserve alarm signal
L.	<+> and <-> keys for modifying work constants (during programming phase) or for modifying the “path” during the working process (see chapter 6, “Operation”).

4.1 Keyboard

	FUNCTION KEY
	Programming key: Allows to program (through the and keys) the parameter when selected (indicates the specific signal arrow, see chapter 5, “Programming” –). ▪ Seeder operating width; ▪ Impulses from speed inductive sensor every 100 linear meters covered; ▪ Number of “paths” to seed for covering the width of the sprayer that will be used;
	Display key: allows to display, at that moment, the size indicated by the specific signal arrow: ▪ advancing speed in Km/h ▪ linear distance covered in meters ▪ Turbine RPMs
	Display key: allows, at the moment, to visualize and set to zero the quantity indicated by the signal arrow: ▪ total worked area ▪ partial worked area
	START / STOP key : allows to activate and de-activate the alarms and the “path” counter, in order to properly activate the closing of rows.
	ON/OFF key: used to turn the computer on and off
	During the programming phase, this key allows to increase the value of the parameter selected, one digit at a time (by keeping the key pressed, the values displayed will change more rapidly). During the working phase, allows to move from one “path” to the next without the need to raise or lower the row tracer disk arm on which the special magnetic sensor is installed.

	FUNCTION KEY
	During the programming phase, allows to decrease the value of the parameter selected, one digit at a time (by keeping the key pressed, the values displayed will change more rapidly). During the working phase, allows to move from one “path” to the next without the need to raise or lower the row tracer disk arm on which the special magnetic sensor is installed.

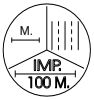
5. Programming

5.1 Programming the operating width

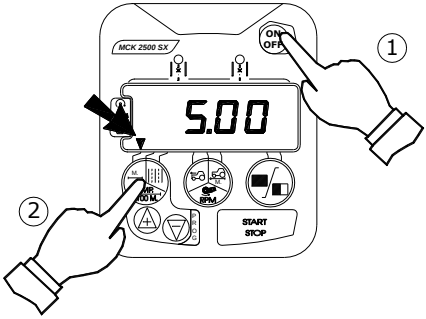
The seeding width must be programmed in meters and centimeters, corresponding to the width of each seeding swath:

turn the computer on (

key) and keep pressing the key



until the <u>first left arrow on the display</u> appears



Programmable field	: 0,10 ÷ 40,00	**step**	: 0,10	**default**	: 5,00

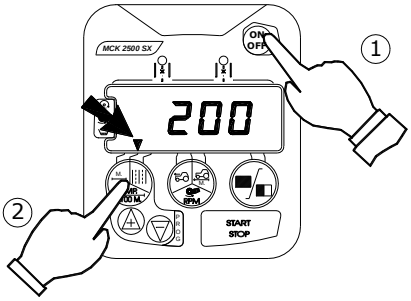
Press and to change the value displayed.
Once the desired value is reached, release the key and wait <3> seconds to allow for the new data to be memorized.

5.2 Programming the calibration of the advancing speed

The number of impulses from the speed sensor must be programmed every 100 linear meters covered by the machine:

turn the computer on (ON OFF key) and keep pressing the key

M. IMP. 100 M. until the first left arrow on the display appears



Programmable field	: 40 ÷ 999	**step**	: 1	**default**	: 48

Press ▲ and ▼ to change the value displayed.
Once the desired value is reached, release the key and wait <3> seconds to allow for the new data to be memorized.

NOTE: An automatic calibration of this parameter is recommended (see paragraph 5.4Automatic calibration of the “C” parameter).

5.3 Practical example for calculating the “C” parameter to be programmed

In the “C” parameter you have to program the number of impulses the proximity sensor has to send to the Computer every 100 linear meters the machine works. Therefore, you must calculate how many reference points will pass in front of the sensor in 100 linear metres. In this example, we assume that the proximity sensor is assembled so as to sense the 4 wheel bolts

1. Place the machine on flat ground and, for example with a chalk, mark visible on the outside of the tire wheel, the point where it touches the ground *(*Figure 9 - *ref. <A>)*;
2. Choose a reference point on the ground in correspondence to the mark that was made on the wheel *(*Figure 9 *rif. <A>)*, and move the machine slowly forward until the wheel completes an exact number of rotations. In our example, these are 30. Then stop the machine *(*Figure 9 *rif <B>)*. To obtain a calibration that is as precise as possible, at least 50 meters should be covered.
3. Measure the distance covered from the starting point to the arrival point.
4. If a distance of 60 meters was measured, with a simple calculation of 60 meters divided by 30 rotations, the result is that each wheel rotation corresponds to 2 meters.
5. Dividing 100 meters (distance of reference for parameter “C”) by 2 meters (wheel circumference), the result is that in 100 meters, the wheel of the machine completes 50 rotations.
6. At this point, just multiply the number of rotations the **wheel completes in 100 meters** (from the calculations of our example: 50) by the reference number that the sensor detects for each wheel rotation (in our example: the 4 bolts) to obtain the number of references/impulses that are detected every 100 linear meters (in our example: 50x4 = 200). Program this value in parameter “C”.

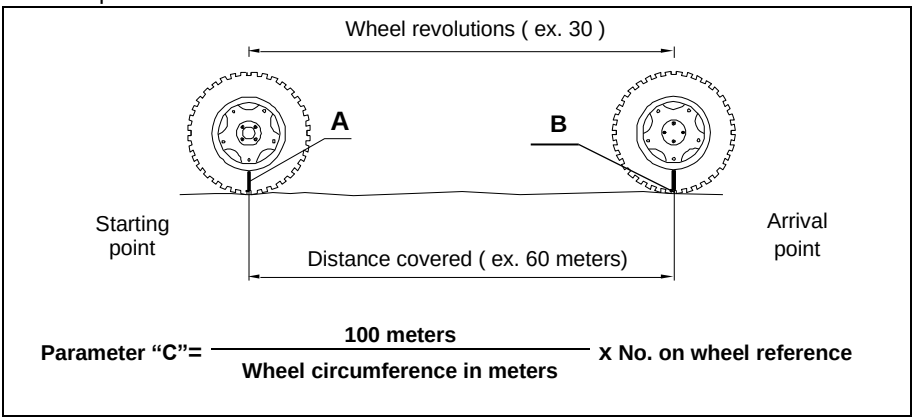


Figure 9 Practical example for calculating the “C” parameter

5.4 Automatic calibration of the “C” parameter (recommended!)

The automatic calibration for parameter “C” is carried out by covering an established distance of 100 meters, following this procedure:

- with the computer turned on, press the

key more than once, until the second left arrow on the display appears;

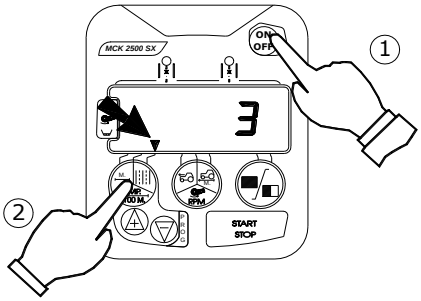
  simultaneously press the and keys; <0> will appear on the computer;
- cover the 10 meters; the impulses counted (1..2..3..) will appear on the display.

  Once the 100 meters are covered, confirm by using the key: the computer will automatically memorize the number of impulses detected.

NOTE:
We recommend that this procedure be performed at least 2 consecutive times, verifying that the value detected is always the same, ± 1 impulse. If the difference is greater, this means that the speed inductive sensor is NOT positioned correctly, therefore, it must be repositioned.

5.5 Programming the number of “paths”

For greater clarity, consult the examples in paragraph 5.5.1. It is necessary to program the number of swaths the seeder performs, which correspond to the swaths of the sprayer that will be used; for example: if a 4 meter seeder is used, and a 20 meter sprayer is chosen, program “5” (5 X 4 = 20); if a 3 meter seeder is used,



and an 18 meter sprayer is chosen, program “6” (6 X 3 = 18). Turn on the computer (ON OFF key), and press the M. IMP. 100 M. key more than once, until the third left arrow on the display appears.

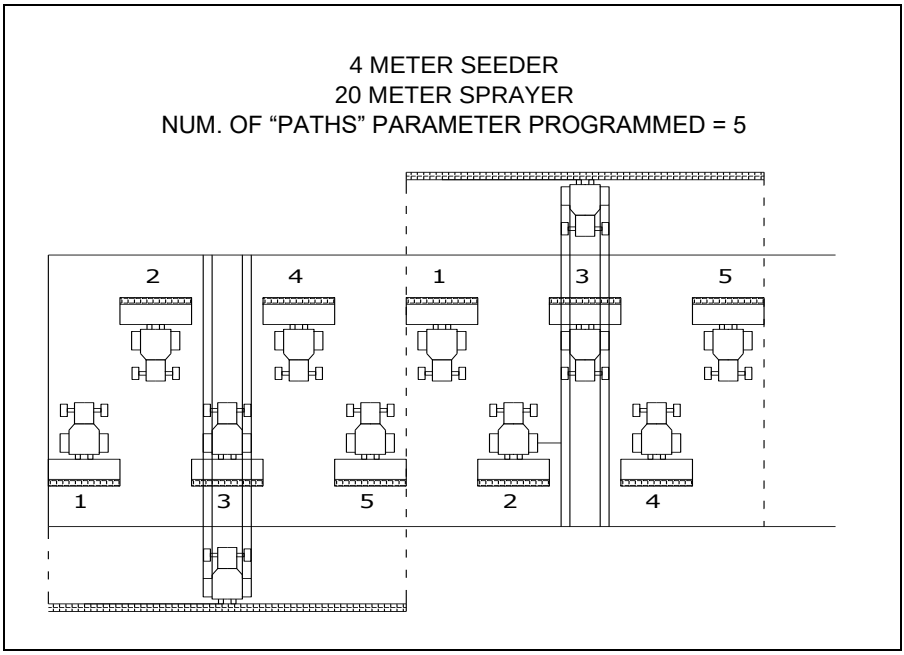
Programmable field : see table - paragraph 5.5.2	**step** : 1	**default** : 3

Press + and − to change the value displayed.
Once the desired value is reached, release the keys, and wait <3> seconds to allow for the new data to be memorized.
When the data has been memorized, the bars in the upper portion of the display will turn on to visualize the programmed number of parts.

5.5.1 Example for programming the number of “paths”

By properly programming the number of “paths”, 4 different types of functions for the *MCK 2500 SX* computer are available:

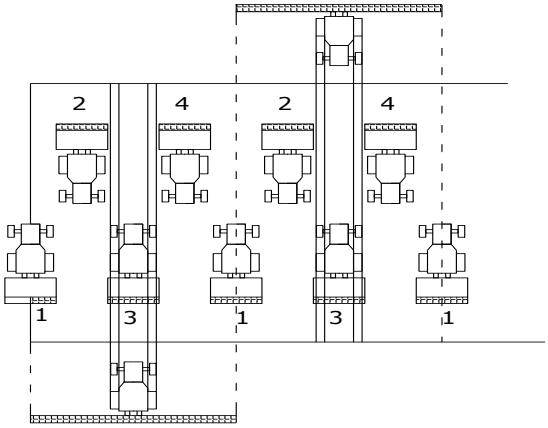
1) If the working width of the sprayer is divided by the working width of the seeder, an uneven number is obtained (ex. 20 ÷ 4 = 5); by programming the number obtained (5), the computer will activate the row closing devices **only for the central swaths**.



Also see following page

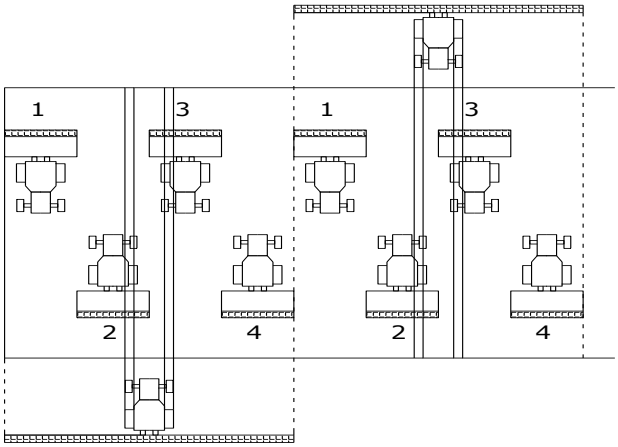
2) If the working width of the sprayer is divided by the working width of the seeder, an even number is obtained (ex. 12 ÷ 3 = 4); by programming the number obtained (4), the computer will activate the row closing device only for the swaths after the central line. Therefore, the first seeding swath must be performed with only half of the width of the seeder.

3 METER SEEDER
12 METER SPRAYER
NUM. OF “PATHS” PARAMETER PROGRAMMED = 4



3) If, on the other hand, through the division of the working width of the sprayer by the working width of the seeder, you get an even number (ex. 16 ÷ 4 = 4), and to start working with **all the seeder completely entering from the right-hand side of the field, you must enter the parameter "no. of paths" = r4**. With this program, the computer will activate the closing devices **of just the two right rows in the two central passages** (in our example, no. 2 and no. 3).

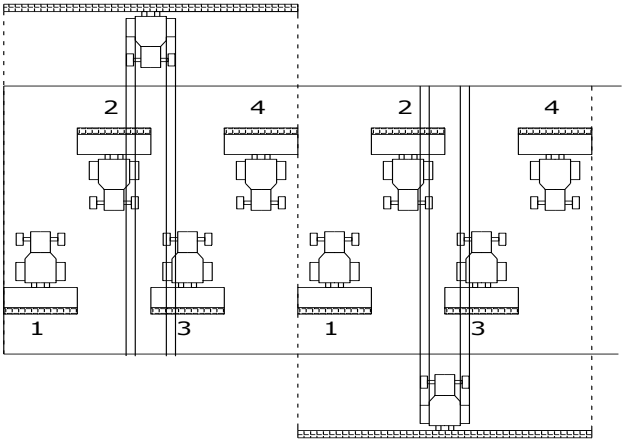
4 METER SEEDER
16 METER SPRAYER
PROGRAMMED “NO. OF PATHS” PARAMETER = r4



Also see the next page

4) If, on the other hand, through the division of the working width of the sprayer by the working width of the seeder, you get an even number (ex. 16 ÷ 4 = 4), and to start working with **all the seeder completely entering from the left-hand side of the field, you must enter the parameter "no. of paths" = L4**. With this program, your computer will activate the closing devices **justof the two left rows of the seeder during the two central passages** (in our example, no. 2 and no. 3).

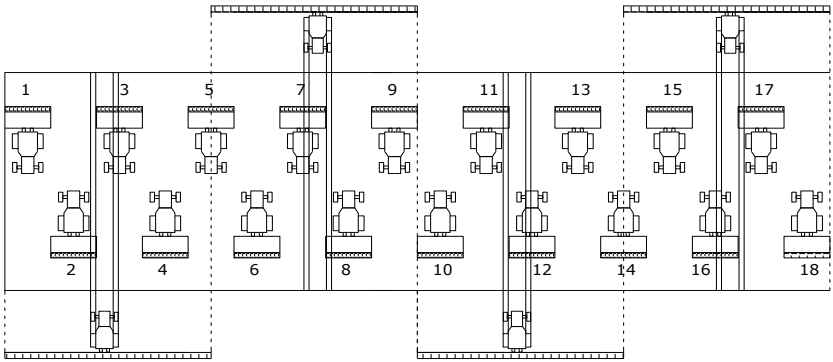
4 METER SEEDER
16 METER SPRAYER
PROGRAMMED “NO. OF PATHS” PARAMETER = L4



Also see the next page

5) If, instead, you intend using a 4 meter seeder and an 18 meter sprayer, regardless of the side from which the field will be entered, you must set the parameter "number of paths" = 18: with this particular programming, the computer will activate the closing devices **in just two of the right rows of the seeder in passages no. 3 and 16 and in just two of the left rows of the seeder in passages no.7 and 12; this creates 1 of the lanes for sprayer wheels, while the other lane will be obtained on the boundary between passages 2 and 3, 7 and 8, 11 and 12, 16 and 17;** (see example below)

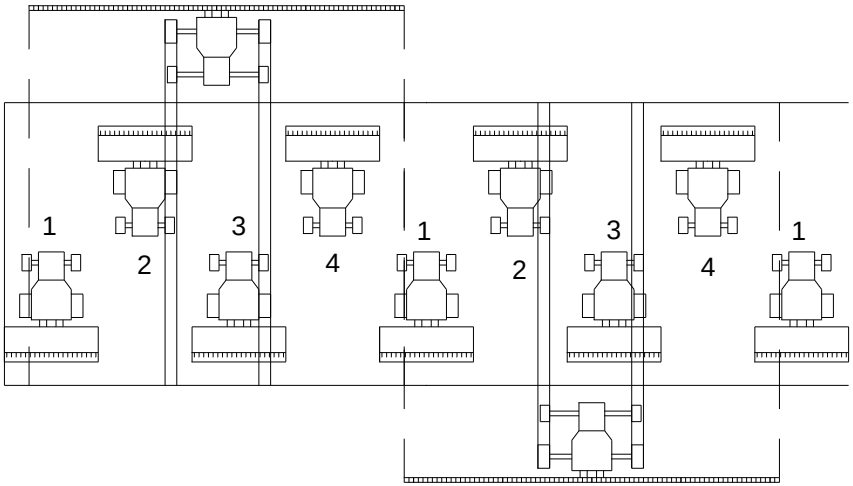
4 METER SEEDER
18 METER SPRAYER
PROGRAMMED "NO. OF PATHS" PARAMETER = 18



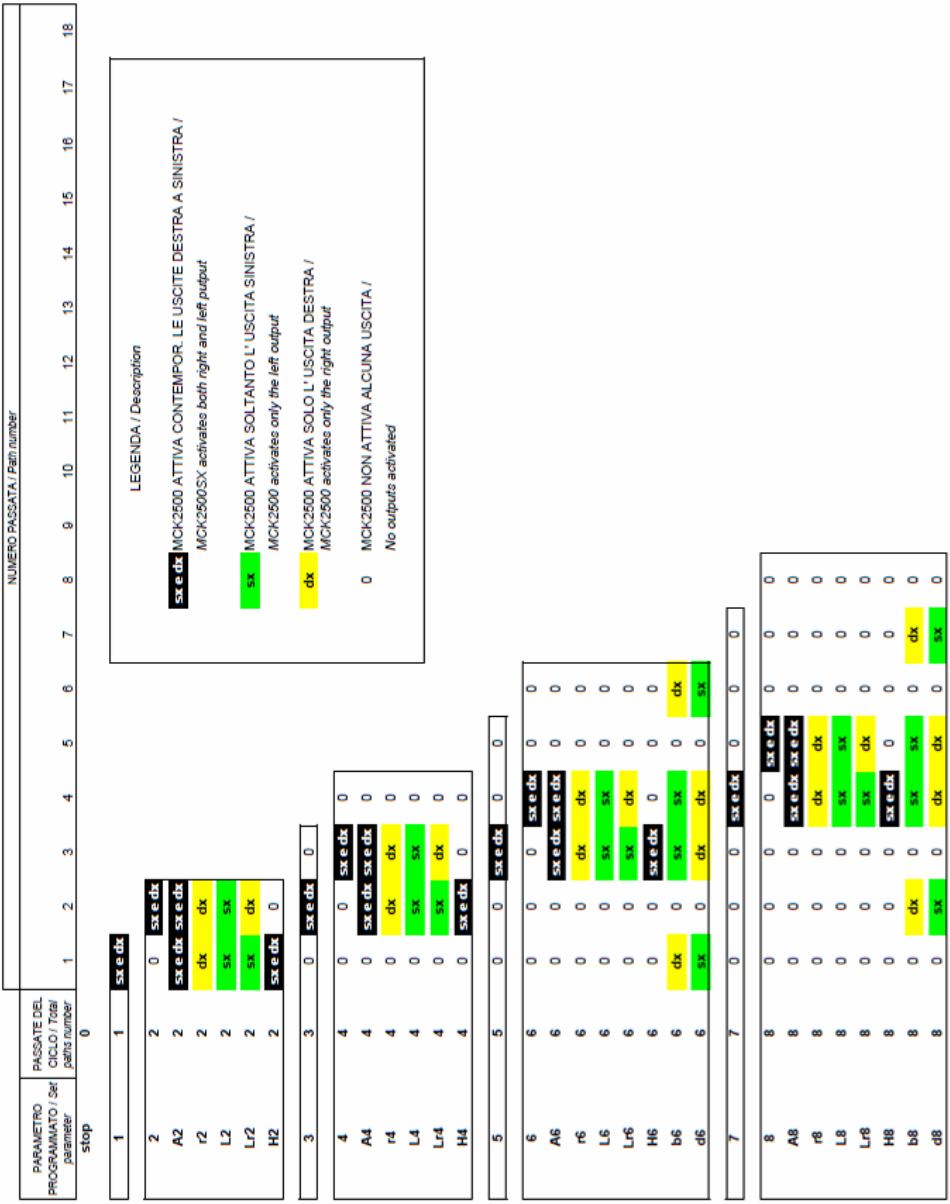
Also see the next page

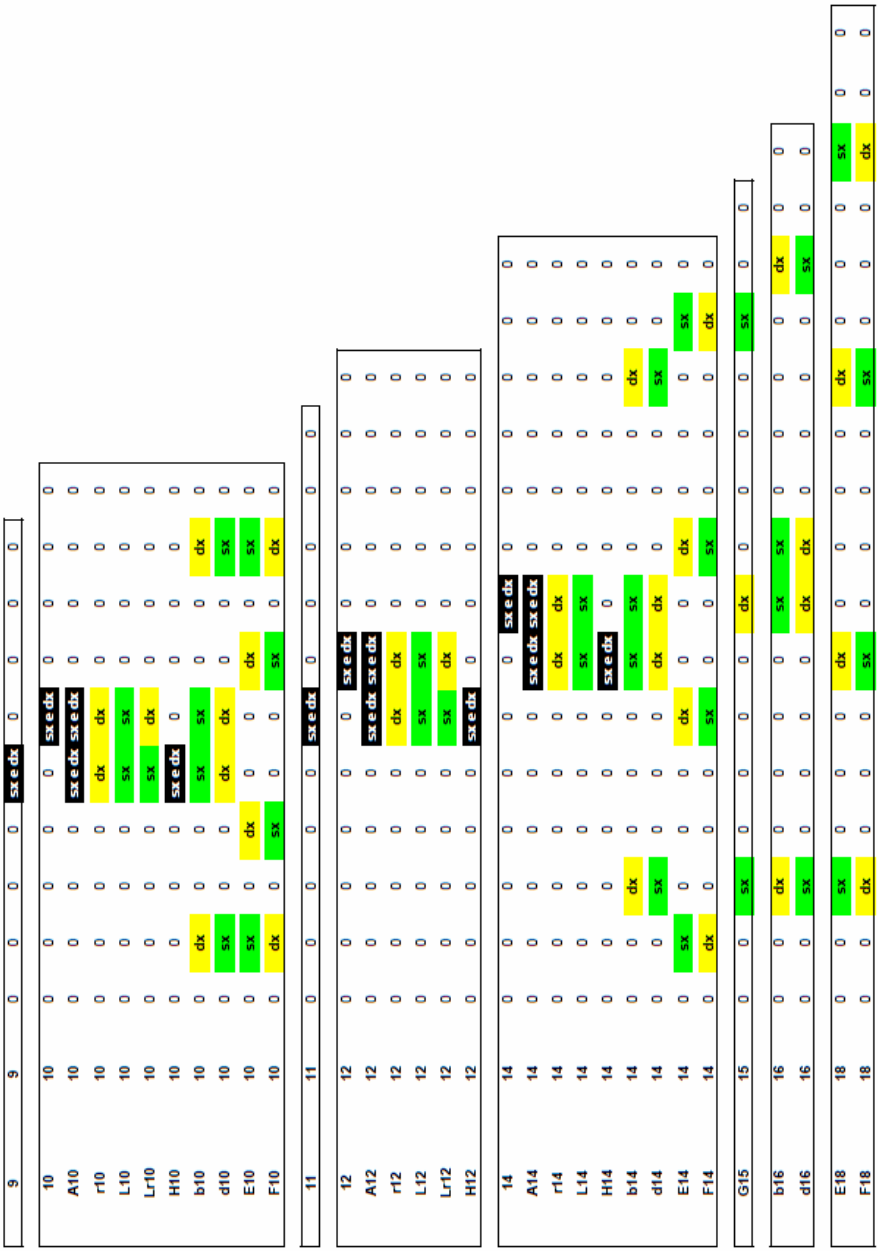
6) If, through the division of the working width of the sprayer by the working width of the seeder, you get 4 (e.g. 16: 4 = 4), but you want a greater track path for the sprayer compared to that of the seeder, you must program the parameter "no. of paths" = Lr4. With this program, the computer will activate the closing devices of the left rows of the seeder during the second passage and of the right rows during the third passage (see the following example, steps 2 and 3).

4 METER SEEDER
16 METER SPRAYER
PROGRAMMED “NO. OF PATHS” PARAMETER = Lr4



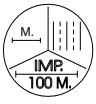
5.5.2 Table of activations




9 9 0 0 0 0 0 sx e dx 0 0 0 0
10 10 0 0 0 0 0 0 sx e dx 0 0 0 0 0
A10 10 0 0 0 0 0 sx e dx sx e dx 0 0 0 0 0
r10 10 0 0 0 0 0 dx dx 0 0 0 0 0
L10 10 0 0 0 0 0 sx sx 0 0 0 0 0
Lr10 10 0 0 0 0 0 sx dx 0 0 0 0 0
H10 10 0 0 0 0 0 sx e dx 0 0 0 0 0
b10 10 0 dx 0 0 0 sx sx 0 0 0 dx 0
d10 10 0 sx 0 0 0 dx dx 0 0 0 sx 0
E10 10 0 sx 0 dx 0 0 dx 0 0 0 sx 0
F10 10 0 dx 0 sx 0 0 sx 0 0 0 dx 0
11 11 0 0 0 0 0 sx e dx 0 0 0 0 0
12 12 0 0 0 0 0 0 sx e dx 0 0 0 0 0
A12 12 0 0 0 0 0 sx e dx sx e dx 0 0 0 0 0
r12 12 0 0 0 0 0 dx dx 0 0 0 0 0
L12 12 0 0 0 0 0 sx sx 0 0 0 0 0
Lr12 12 0 0 0 0 0 sx dx 0 0 0 0 0
H12 12 0 0 0 0 0 sx e dx 0 0 0 0 0
14 14 0 0 0 0 0 0 0 sx e dx 0 0 0 0 0
A14 14 0 0 0 0 0 sx e dx sx e dx 0 0 0 0 0
r14 14 0 0 0 0 0 dx dx 0 0 0 0 0
L14 14 0 0 0 0 0 sx sx 0 0 0 0 0
H14 14 0 0 0 0 0 sx e dx 0 0 0 0 0
b14 14 0 0 dx 0 0 sx sx 0 0 0 dx 0
d14 14 0 0 sx 0 0 dx dx 0 0 0 sx 0
E14 14 0 sx 0 0 0 dx 0 0 0 0 sx 0
F14 14 0 dx 0 0 0 sx 0 0 0 0 dx 0
G15 15 0 0 sx 0 0 0 dx 0 0 0 sx 0 0
b16 16 0 0 dx 0 0 0 sx sx 0 0 0 dx 0 0
d16 16 0 0 sx 0 0 0 dx dx 0 0 0 sx 0 0
E18 18 0 0 sx 0 0 0 dx 0 0 0 dx 0 0 sx 0 0
F18 18 0 0 dx 0 0 0 sx 0 0 0 sx 0 0 dx 0 0

5.6 Programming the alarms RPMs, “Speed”, “Mode”, “Tramline”, and “Disk” constants, and SELF-ACQUISITION procedure

The *MCK 2500 SX* computer is capable of visualizing, on the display, the value of the rotations per minute (RPMs) of the turbine. It can also keep the rotations under control, and simultaneously control another secondary rotating part (distributor), as well as signal the operator when these rotating parts slow down excessively or if they stop working. To display the exact RPM value of the primary part and determine the minimum rotation threshold of both parts, proceed as follows:

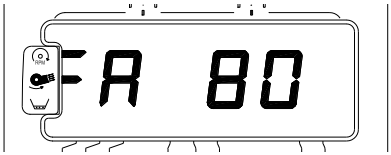
1) program the number of impulses/rotations of the turbine: turn on the instrument while keeping the 

key pressed: the indication “ **i – 2.0**” will appear on the computer. With the and keys, change the number and program the reference number detected by the special RPM inductive sensor for every rotation of the turbine.

Programmable field :1.0 ÷ 20.0	**step** : 0.1	**default** : 2.0

Confirm the data by pressing the

key. The following indication will appear on the display:

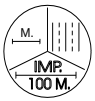


2) In parameter “A”, the minimum alarm threshold for the RPMs of the primary and secondary organs can be programmed: the value near the letter “A” indicates the **percentage** (in the example: 80%) of the RPMs under which the computer will then activate the alarm. The percentage is referred to the value of the RPMs memorized with the “SELF-ACQUISITION” procedure (see point 3). This means that, in our example, if during the working process, one or both of the parts controlled slow down until they reach a value that is lower than 80% of the RPM value memorized with the Self-Acquisition procedure, the relevant alarm will be activated (acoustic and visual). Practical example: If the value acquired for the turbine RPMs is 3,000, the alarm will activate when the RPMs are lower than 2,400.

Programmable field : 1 ÷ 99	**step** : 1	**default** : 0

5.7 “S”, “M”, “t” , “d” constants

Along with those already described in this paragraph, for a correct operation, the three constants, *Speed, Mode, and Tramline* (indicated by letters “S”, “M” e “t”) must also be set. The programming method remains the same:

Press the 

key to confirm the data set, then move on to the next parameter.

With the and keys, change the data

Description

“S” (speed): set the speed threshold that the computer uses as reference to activate or deactivate the alarms (active only when the “M” parameter is set to 1).

Programmable field : 0.0 ÷ 20.0 km/h	**step** : 0.1	**default** : 3.5 km/h

“M” (alarm mode): in this mode, the alarm is activated in relation to either the advancing speed (M=1) or if the “START / STOP” key is pressed (M = 0), located on the front of the computer

.

Programmable field : 0 ÷ 1	**step** : 1	**default** : 1

“t” (tramline): configure the computer to work in the tramline mode (t = 1), whether activated or not (t = 0). With t = 0, the computer simply monitors and manages the data read by the sensors: it does not activate any output for performing the tramline.

Programmable field : 0 ÷ 1	**step** : 1	**default** : 0

“d” (disk): with the tram line activated, the passage from one path to the next occurs in relation to the commutation of the disk sensor. With (d = 1), the sensor must be installed on the row tracer disk; with (d = 2), the sensor must be installed on the lifting point of the machine. In other words, with (d = 1), EACH time the magnet moves towards OR moves away from the sensor, the computer passes to the next path; with (d = 2), to go to the next path, the magnet must move towards AND THEN move away from the sensor (or vice versa).

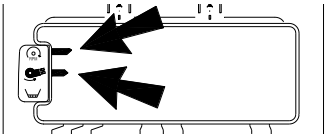
By programming d=0 instead, the passage to one path to the next one occurs without the disc sensor intervention (the sensor can therefore be removed): during working operations, after pressing Start key, the passage occurs every time the advancing speed goes down to 0.0 km/h for over 15 seconds.

Programmable field : 1 ÷ 2	**step** : 1	**default** : 1

5.8 Self-acquisition

With the following simple procedures described, the normal rotation value (RPM) of the rotating parts to be kept under control can be automatically memorized.
Turn on the machine and bring all the parts of the seeder (PTO, ventilator, etc.) to a normal working rotation speed.

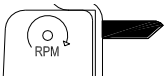
Turn on the computer using the ON OFF key and, after the computer has terminated its initial test, simultaneously pres the + and − keys and keep them pressed until two flashing dashes appear on the display, as shown in the figure:



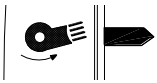
Release the + and − keys so as to allow the computer to return to its normal working mode.

N.B. If the dashes do not appear, repeat the procedure. If both the turbine and the distributor are monitored, but only one of the two dashes appear, make sure that respective sensors are correctly connected and are actually working. If not, the alarm related to the missing dash will not be activated.

From this moment, the computer memorizes the RPM value of the two shafts, and when one of the two falls under the programmed percentage (ex. 80%), the acoustic alarm is activated, and a segment that corresponds to the relevant symbol on the panel appears on the display:



= RPM distributor alarm



= RPM turbine alarm

NOTE:

The self-acquisition procedure must only be carried out the first time the seeder is used. Afterwards, the computer keeps the rotation and alarm thresholds memorized, even if the battery is disconnected.

5.9 Checking speed sensor operation

Check the speed inductive sensor as follows:

1. Turn on the computer (

key);
2. repeatedly press the

key until the indication, “Km/h”, appears on the right side of the display.
3. Using a screwdriver, or another metallic mass, pass it repeatedly in front of the red part of the sensor. If on the computer display the simulated speed indication appears (which will probably not be constant), this means that the sensor is properly working and correctly connected.

5.10 Checking turbine RPM sensor operation

Check the RPM speed as follows:

1. Turn on the computer (< ON/OFF> key);
2. repeatedly press the

key until the indication, RPM, appears on the right side of the display.
3. Using a screwdriver, or another metallic mass, pass it repeatedly in front of the red part of the sensor. If on the computer display the simulated RPM indication appears (which will probably not be constant), this means that the sensor is properly working and correctly connected.

5.11 Checking row tracer sensor operation

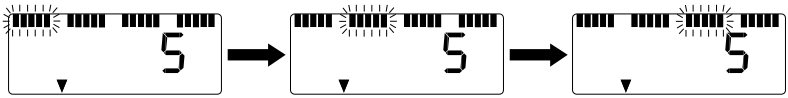
Check the row tracer sensor as follows:

1. Completely raise the row tracer disc arm on which the sensor to inspect)) is installed.
2. Turn on the computer (

key), then press the

key. The first bars on the upper left side will begin to flash.
3. The computer will probably activate visual and acoustic alarms: these should be ignored!

4. Slowly and repeatedly lower and raise the row tracer disk, then verify, on the display, if the flashing on the bars moves from one bar sector to the next ,as in the figure:

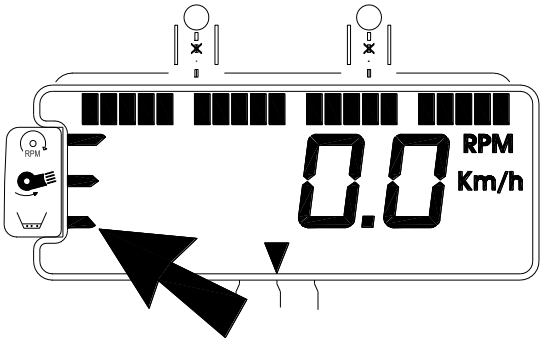


5.12 Checking product level sensor operation

Check the product level sensor as follows:

1. With the machine not running, turn on the computer and wait for the initial test to end.
2. Make sure that the red part of the capacitive sensor is completely free, then press the start key

. The computer will activate the acoustic alarm intermittently and, along with any alarms present (for example, RPM alarms, see paragraph 5.6), check that the segment on the lower left side of the display is flashing, as in the figure:



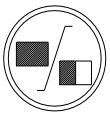
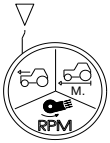
3. Covering the sensor with your hand, the segment indicated by the arrow should turn off and the acoustic alarm must stop.
4. If the computer does not perform as described in the following points, check the settings of constant “M”, the connections, and the installation of the capacitive sensor.

6. Operation

After programming the working parameters (see chapter 5, “Programming” – pg. 22), follow the instructions below:

- Turn the computer on (

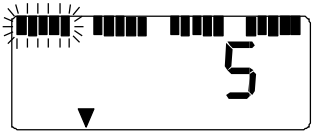
key). The system will carry out a brief test for two seconds, turning on the LEDs and the segments on the display. Then the worked hours will be displayed for three seconds (they can be set to zero ONLY at this time by pressing any key). The advancing speed will then appear on the display.
- During normal operation, the quantity worked can be checked by simply pressing the

and  keys. The arrows in the lower part of the display will indicate the quantity selected. Ex. 

indicates that the advancing speed is being checked.

- Position the seeder at the beginning of the field, then lower the specific row tracer disk arm: it is NOT important that the lowered arm is exactly the one on which the special row tracer sensor is installed.
- Press the

key and start seeding: the bars on the display will flash to indicate the beginning of the 1st path. Ex.

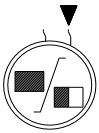


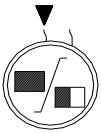
- When working, each time the row tracer disk raises and lowers, the flash on the vertical bars moves, indicating which swath is being carried out.

If during the seeding phase maneuvers must be carried out, raising and lowering the row tracer disk, without taking into account the swath (for example, near obstacles), the counter must be stopped by pressing the START STOP key, in order to interrupt the flashing on the bars of the display. Once the maneuver has terminated:

- press the START STOP key again to reactivate the automatic cycle (on the display, the "path" that was previously flashing before the maneuver will begin to flash again).

- To bring the counter to zero,


a) partial area

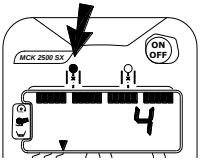

b) total area

c) linear meters covered

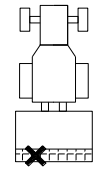
the relevant key must be kept pressed for more than <3> seconds, while displaying the counter that must be brought to zero, and only when the machine is not running.

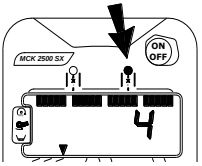
NOTE: The counters are all independent of each other, therefore, they can be brought to zero independently.

- During operation, when one of the "path" is reached which requires closing on right row, left rows or both, on the computer panel, the LED relevant to the rows that were closed will turn on, according to the following scheme:

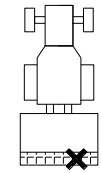


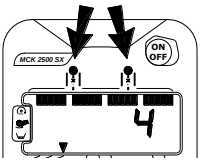
If this LED lights up: only the left rows of the seeder close.





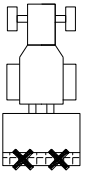
If this Led lights up: only the left rows of the seeder close.





If both LEDs light up:

Both the left and right rows of the seeder close.



NOTE: all the alarms (product reserve, turbine RPM, and distributor) are active only when working and if the start/stop key has been pressed (the working condition is always signaled by the flashing of a part of the bars on the display). When the start/stop key is pressed again, the bars on the display remains permanently lit, and the alarms are interrupted (also see settings for “S” and “M” constants).

- When working, the computer controls the state of the magnetic sensor on the row tracer disk arm, moving from one path/swath to the next each time the row tracer disk is raised or lowered. According to the programmed number of “paths” parameter (see paragraph 5.5.1), the computer will carry out the closing of rows for the seeder, in order to trace the paths for the next swath of the sprayer.
- If a wrong maneuver is performed with the row tracer disk arm, and the monitor moves to the next path/swath, the computer can be brought back to the previous swath by simply pressing the key once. It is also possible to bring the computer to the next swath by pressing the key.

Example:

If the computer is in the fourth swath of the six programmed, by pressing the key once, the computer will pass to the fifth swath. Instead, by pressing the key once, the computer will pass to the third swath.

7. Maintenance

This chapter describes how to perform ordinary maintenance and extraordinary maintenance on the *SEEDER MAT MCK 2500 SX*.

Ordinary maintenance refers to operations which must be carried out periodically. As they do not require specific skills, they can be carried out by the users (operators, etc.).

Extraordinary maintenance refers to special operations made necessary by mechanical or electrical failures. They require specific technical skills and should be carried out only by qualified personnel (maintenance staff, etc.).

7.1 Ordinary maintenance

Ordinary maintenance consists in cleaning the computer.

Clean the computer using a damp cloth and a mild detergent to avoid erasing the serigraphs on the panel.

Warning

- *Do not use pressure water jets.*
- Do not use abrasive products or solvents.

7.1.1 Protection fuses

The MCK2500SX computer is provided with SELF-RESETTING fuses for protection against overcurrent faults on the sensors or row shut-off devices. In case of a failure, the fuses cut the power supply to the sensors or the shut-off devices. If this occurs, disconnect the power cable for a few minutes, remove the cause of the problem and then reconnect the cable to the monitor.

7.1.2 How to protect the main connector

During prolonged periods of inactivity we recommend disconnecting the main signal connector and isolating it from the environment with a nylon protection.

7.2 Extraordinary maintenance

Warning

Extraordinary maintenance must be carried out by authorized personnel only.

8. Troubleshooting

In case of a computer malfunction, perform the simple checks below to find out what you need to do.
If the problem persists, consult your local dealer or contact *MC Elettronica* Customer Service.

PROBLEM	CAUSE	REMEDY
Computer does not turn on	Power cable disconnected or inverted connection on battery	a. Check power cable
Display not showing travel speed or showing incorrect speed	a. Speed sensor cable damaged or disconnected b. Speed sensor gap too large c. Red head of speed sensor damaged d. "C" constant incorrectly set	a. Check cable and restore connection b. Adjust gap as shown in par. 3.2.1 c. Replace sensor d. Check setting of "C" constant. If necessary repeat procedure on page 21
Display non showing turbine RPM	a Turbine RPM sensor cable damaged or disconnected b RPM sensor gap too large c Red head of PTO sensor damaged	a Check cable and restore connection b Adjust gap as shown in par. 3.2.2 c Replace sensor

PROBLEM	CAUSE	REMEDY
When sowing, the flashing bars on the display do not shift correctly between sectors when raising/lowering the row marker disc arm or the machine	a. Row marker sensor cable damaged or disconnected	a. Check cable and restore connection
	b. Row marker sensor gap too large	b. Adjust gap as shown in par. 3.2.3
	c. Head of row marker sensor damaged	c. Replace row marker sensor
	d. “t” constant incorrectly set	d. Check setting of “t” constant as shown on page **31**
	e. “disc” constant incorrectly set	e. Check setting of “disc” constant as shown on page 32
Computer continually warns of low seed level	a. Capacitive sensor cable damaged or disconnected	a. Check cable and restore connection
	b. Head of capacitive sensor damaged	b. Replace capacitive sensor
Computer not displaying distributor RPM alarm	a. Distributor RPM sensor cable damaged or disconnected	a. Check cable and restore connection
	b. RPM sensor gap too large	b. Adjust gap as shown in par. 3.2.2o
	c. Red head of sensor damaged	c. Replace sensor
Computer not displaying any alarms	a. Incorrect programming settings	a. Check settings of “M” and “S” constants as shown on page 33

9. Technical data

9.1 Seeder Mat MCK 2500 SX

Power supply voltage	: 10 ÷ 16 VDC
Max. power absorption at 16 VDC (not including outputs)	: 8 A
Operating details	
Protection rating	: IP 56
Resistance to mechanical vibrations	: 2 G
Operating conditions	
Temperature range	: -20°C / +70°C
Weather conditions	: Relative humidity 90%
Transport and storage	
Temperature range	: -25°C / +75°C

9.2 Sensors

9.2.1 Ø18 Proximity sensor

Power supply voltage	: 5 ÷ 9 VDC
Output signal	: NAMUR
Max. operating frequency	: 1000 Hz
Operating temperature	: - 25°C / +70°C
Max. gap	: 4 mm
Protection rating	: IP 67

9.2.2 Ø12 Magnetic sensor

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

9.2.3 Ø19 Capacitive sensor

Power supply voltage	: 10 ÷ 30 VDC
Output signal	: NPN NO
Max. operating frequency	: 10 Hz
Operating temperature	: - 25°C / +70°C
Max. gap	: direct contact (zero gap)
Protection rating	: IP 67

9.2.4 Ø12 Inductive sensor

Power supply voltage	: 10 ÷ 30 VDC
Output signal	: NPN NO
Max. operating frequency	: 1000 Hz
Operating temperature	: - 25°C / +70°C
Max. gap	: 3 mm
Protection rating	: IP 67

9.3 MC Cables

Main connector	: AMP 16 way CPC IP 45
Secondary connectors	: AMP 2 way Superseal IP 67
Operating temperature	: -20°C / +80°C

WARNING: THIS PRODUCT CONTAINS TIN AND LEAD. IT MUST BE DISPOSED OF AT THE END OF ITS LIFE CYCLE AT THE DESIGNATED DISPOSAL FACILITIES OR DELIVERED DIRECTLY TO MC ELETTRONICA SRL (ITALY).

Electronic equipment for agricultural, earth moving and industrial machinery

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