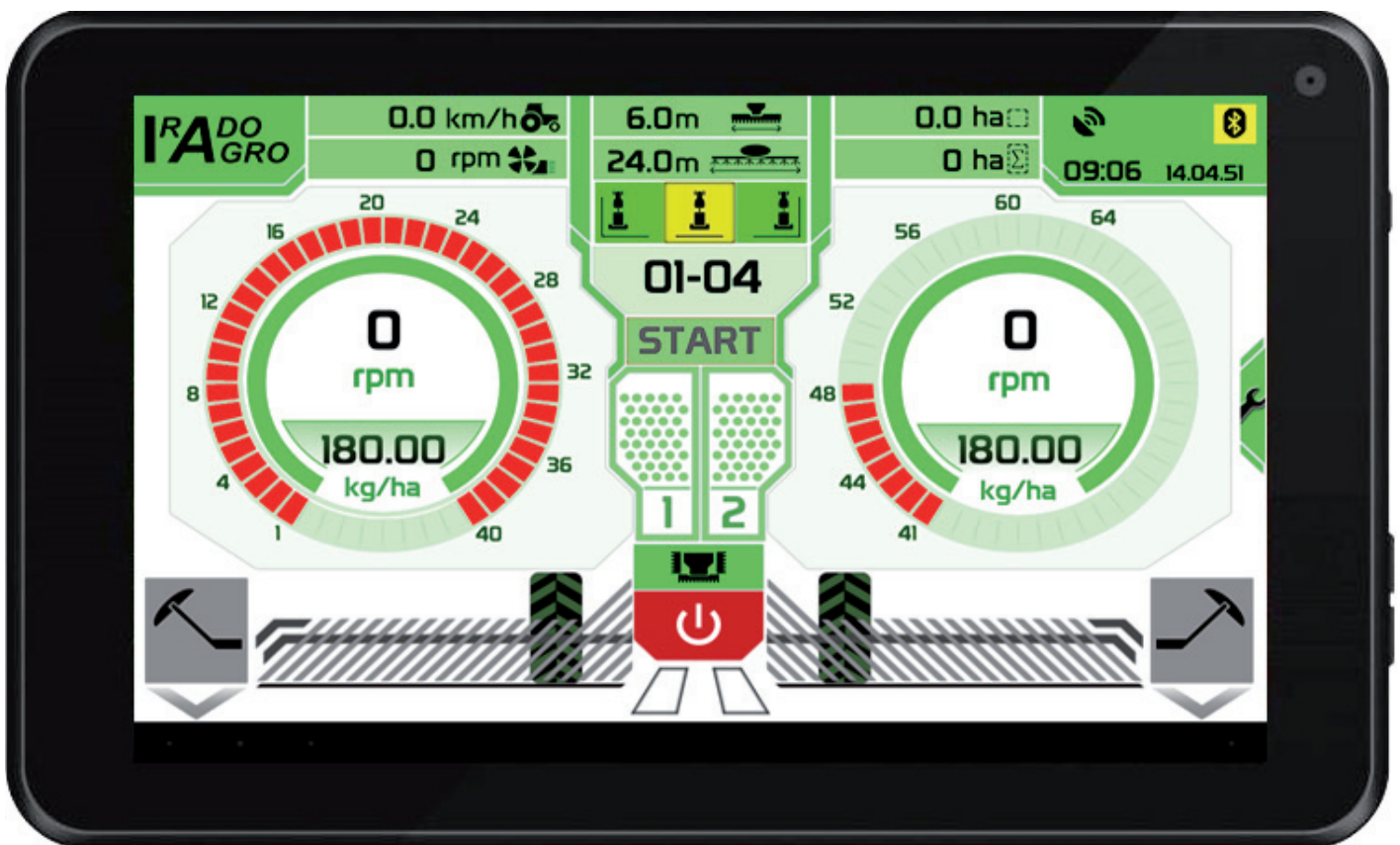


# A100 control system instruction manual





## **Description of the A100 control system for seed drill**

The device is designed for installation into all types of seed drills. All important data on the drill operation and its settings are at disposal for the user via a tablet in the tractor cab.

### **The A100 control system offers the following functions:**

- Automatic or manual creation of tramlines
- Pre-emergent marking of tramlines
- Indication of minimal level of seed in hoppers, 2x
- Assembly travel speed measuring
- Actual date and time
- Fan speed indication
- Seeding mechanism speed indication
- Daily hectare measuring
- Summary hectare measuring
- Automatic seeding test
- Seeding mechanism driven by a motor – up to 4 motors
- Continuous regulation of the seeding dose during sowing
- Drill lighting control
- Drill hydraulic functions control – up to 20 functions
- Scanning of seed passage in each seeding hoses – up to 128 sowings

## **Controlling the A100 system:**

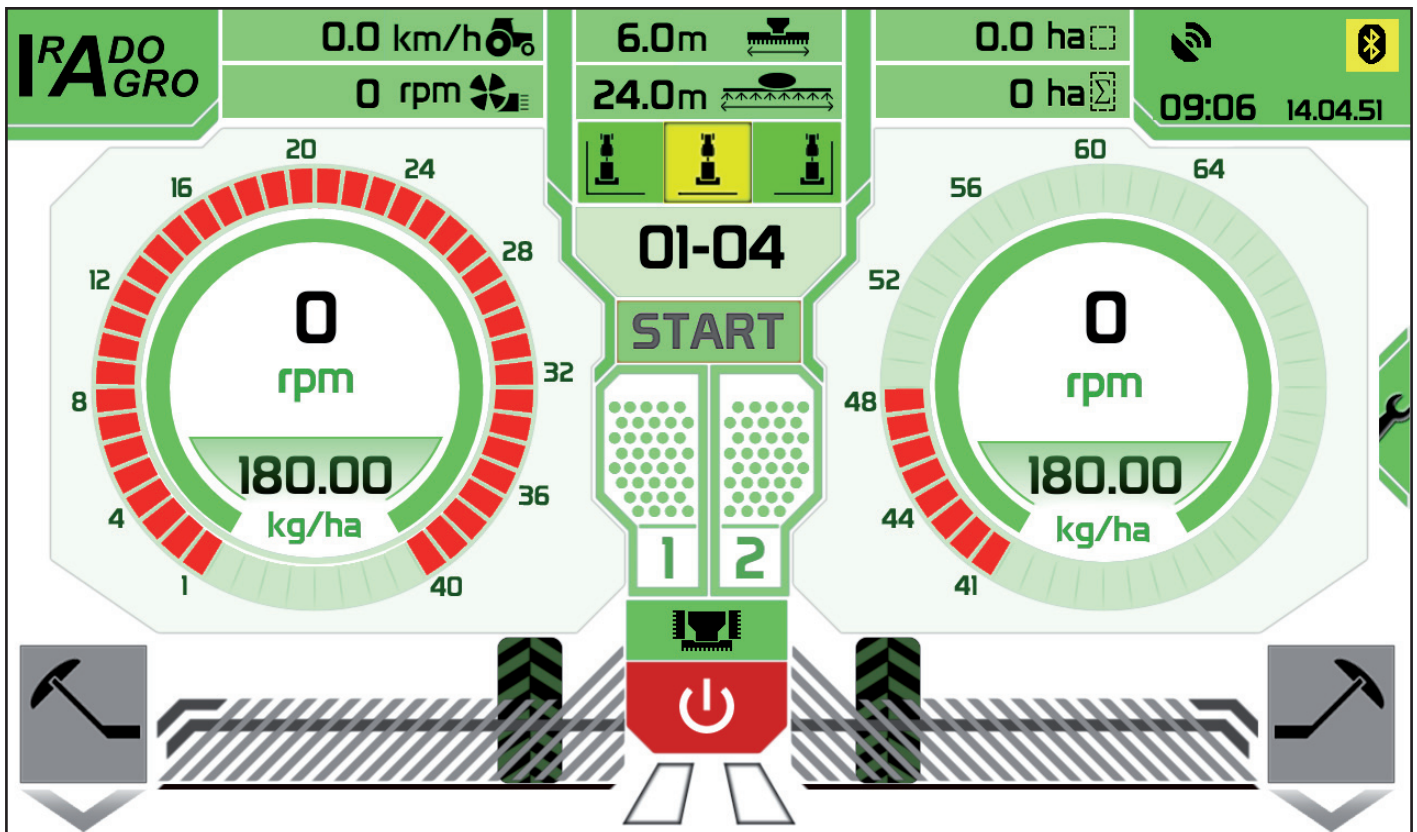
The display unit is controlled via the colour touchscreen of the tablet. Pressing of a key is indicated by an acoustic signal.

## **Displaying structure of the A100 system:**

The controlling of the system is divided into two basic screens.


- Screen No.1:** Displays all important data on the operation of the seed drill which are necessary to monitor during the sowing process and enables to change the parameters of the tramline, seeding dose, fan speed limits, doser 1 and doser 2 seeding dose, all this during the course of the operation.
- Screen No.2:** Serves for the user to input the parameters of the seeding test for dosers 1 to 3, the number of seeding sensors and their sensitivity, the C-factor for the travel speed induction scanning and times for the hydraulic functions. It also comprises the control of the lighting, subsoilers, mulching section and setting of markers automatics.

## Screen No.1:




### Description of the screen No.1:

<b>0.0 km/h</b>	<p><b>1.1 Assembly travel speed</b></p> <p>Displays the actual travel speed of the seeding assembly based on the signal from the GPS/Glonass, radar or induction sensor impulses.</p> <p>In case of usage of the:</p> <ul style="list-style-type: none"><li>• <b>induction sensor</b>, it is necessary to adjust it correctly. The distance of the M12 induction sensor from the scanning rosette must be 4 mm maximally. If the sensor is correctly adjusted, its signalling LED must light on every time the rosette metallic tooth passes around the sensor. In case of an incorrect adjustment, some impulses are skipped which leads to inaccurate travel speed measuring. This will cause inaccuracy of the sown dose and reading distortion of the hectare-meter.</li><li>• <b>radar</b>, it is necessary to install it so it will not be affected by e.g. the rotating wheels of the tractile machine (e.g. a tractor) or by a large cloud of dust or other solid particles flying off of the tractor wheels or the seed drill itself. This will again cause increased inaccuracy of the sowing and hectare-meter values.</li><li>• <b>GPS/Glonass</b>, the antenna must be installed at the highest point of the drill and must not be shaded by any metallic cover. Unless the antenna direct visibility into the sky is ensured, the GPS system will operate incorrectly and the drill will not react to the movement, contingently a non-zero speed could be measured due to the poor signal even in case the drill is at standstill (e.g. when parked under a hall roof).</li></ul>
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0 rpm 


### **1.2 Fan speed**

Displays the actual value of the fan speed. In case the fan speed value drops under a set value, the icon will turn red and an acoustic signal will sound. To set the speed limit, press the fan icon and change the speed value after the numerical entry dialogue appears. Confirm the settings by pressing the **OK** key.

0.0 ha 

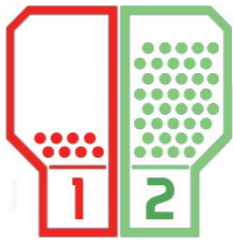
### **1.3 Daily hectare-meter**

Displays the actual state of the sown area up to a maximal value of 99.9 ha. The displayed value can be reset by shortly pressing the daily hectare-meter indicator.

0 ha 

### **1.4 Summary hectare-meter**

Displays the total sown area. This value cannot be reset by the user. Resetting is possible only by a service intervention.

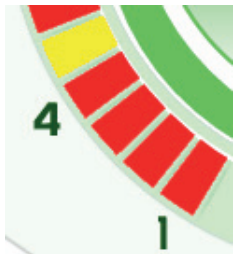


### **1.5 SH1 and SH2 sensors of seed level in hoppers**

Displays the actual state of seed in the hopper. When the seed level drops below the level of the sensor fitted in the hopper, the empty hopper symbol will turn red and an acoustic signal will sound.

### **1.6 Level sensors adjustment**

On the sensor rear side there is a small screw under which the adjusting screw of the sensor sensitivity is located.



### **1.7 A1 sensor of seeding**

Displays the actual state of seed passing to the seeding hoses.

- In case the seed is passing through the seeding sensor, a green box symbol is displayed in the corresponding position.
- In case the seed is not passing through the particular sensor, a yellow box symbol is displayed in the corresponding position.
- In case the sensor is not connected, is not communicating or it is faulty or damaged, a red box symbol is displayed in the corresponding position.

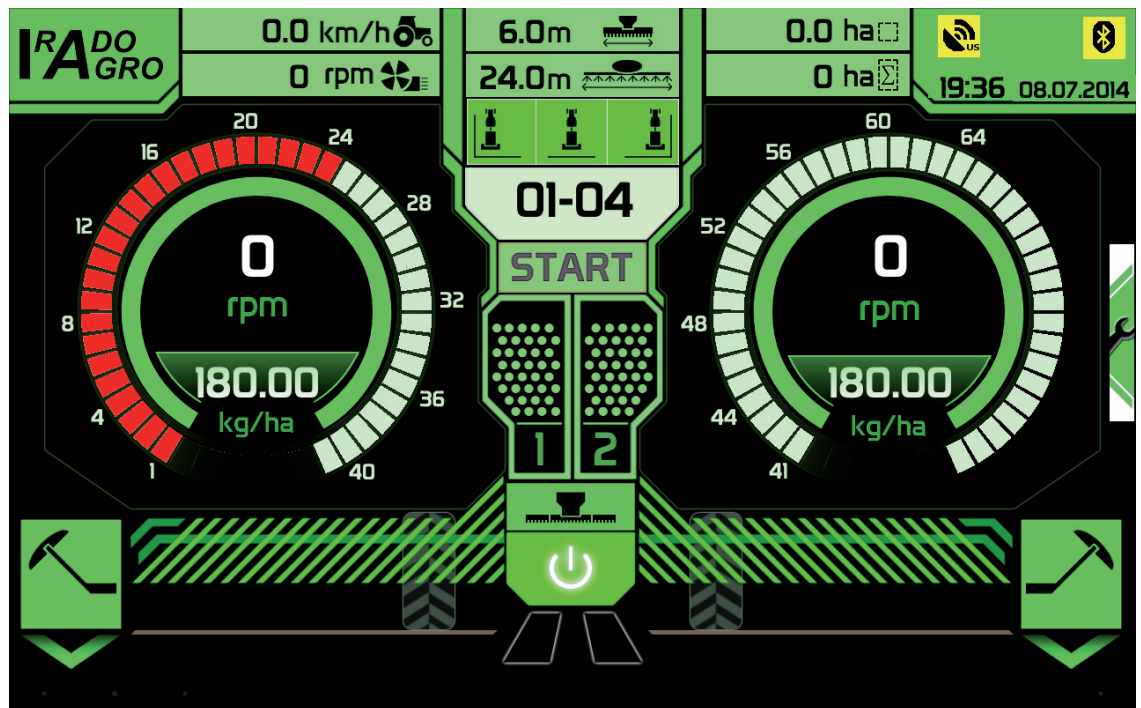
09:08 14.04.51

### **1.8 Actual date and time**

Displays the actual time. The time is set automatically according to the tablet system time and is corrected by the GPS/Glonass signal during the operation. In case the GPS/Glonass signal is unavailable, the time is synchronized with the tablet time upon the entry into the second screen.

**1.9 Night and day mode change**

Pressing the display in the date and time displaying area will invoke the night mode display which is less highlighted and does not disturb during work at night. Pressing the same area again will return the day mode display.



0  
rpm

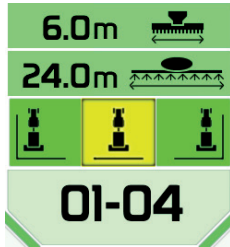
**1.10 Seeding mechanism speed**

Displays the actual value of seeding mechanism speed during the drill operation. The speed range is within a scale of 0 rpm to 255 rpm. The maximal speed range is given by the manufacturer and is derived from the width and the maximal travel speed of the drill. In case the seeding mechanism stops during drill operation, a zero speed value is displayed and an acoustic signal is sound to alert the operator about this serious fault. In case the speed value is lower or higher than the required speed, the speed numerical value is highlighted in red and an acoustic signal is sound. This signals to the operator that he must either reduce the seeding assembly travel speed or stop the drill and check the seeding mechanism for possible faults. To manually stop the doser, press the

0  
rpm

STOP  
rpm

speed numerical value. By this, the **STOP** symbol will be displayed instead of the speed value and the doser motor will be blocked during driving. By pressing the **STOP** symbol, the doser motor will return to the standard operation mode.

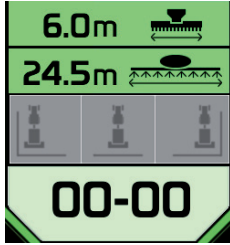


### **1.11 Setting and displaying the tramline**

This section of the screen is intended for displaying and setting all data related to the tramline creation.

The first key on the top and in the middle of the screen represents the seed drill width setting. To set a value, press this key and set the required width of the seed drill by means of the numerical dialogue.

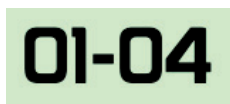
The second line is for setting the sprayer width. The setting is carried out as described above. After setting the sprayer width, the number of tramline rides is automatically calculated and displayed. Also the permitted sides of sowing start are displayed. The permitted sides are highlighted in green and the unpermitted sides are in grey. Select any of the permitted (green) sides of sowing start by pressing it and its colour will change to yellow. The sowing sides can be changed anytime. In case a non-existing combination of the seed drill and sprayer widths is set, the number of rides is calculated as zero and all sowing sides are highlighted in grey. The tramline settings and the state of the counter are stored in the internal memory of the unit even after turning the system off. After turning the feeding power on, all data are set to the state as they were before turning off.



### **1.12 Tramline automatic mode**

The tramline creation is displayed as two strips in the middle of the screen bottom side. If the strips are uncoloured, the tramline is not created. If the strips are colored, the tramline is created.


After pressing the tramline symbol, the **STOP** symbol will be displayed across both strips. By this, the tramline creation is manually stopped. The function is enabled by pressing it again. This is useful when it is necessary to drive around obstacles. With the **STOP** symbol displayed, the tramline rides counting is blocked.




### **1.13 Tramline manual mode**


Shortly pressing the tramline key will manually add up one ride. By pressing it for a longer time, the tramline counter is reset to the default state, i.e. to 1.





	<p><b><u>1.14 Pre-sowing function</u></b></p> <p>Pre-sowing is a function that ensures rotation of all dosers for about 7 seconds while the drill is stopped. This enables to sow places which cannot be sown during driving, e.g. a place where it is necessary to reverse-drive first, turn the pre-sowing on and then drive forward. Press the <b>START</b> key to start the pre-sowing. Pre-sowing is accompanied by an acoustic signal during the whole time the function is in operation. After the assembly is set in motion, the dosers automatically switch to the regulation mode according to the assembly speed.</p>
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	<p><b><u>1.15 Seeding dose</u></b></p> <p>The combined round indicator states information on the set seeding dose in kilograms per hectare. This value can be changed by tapping on the numerical value of the seeding dose, changing the value in the dialogue window and pressing the <b>OK</b> key. When changing the value during driving, the speed of the dosers motors is changed based on the new dose value.</p> <p>Based on your actual need, you can also add or reduce the dose anytime during operation.</p>
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**Controlling the drill hydraulics:**

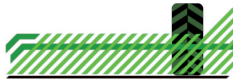
	<p><b><u>1.16 Hydraulics turning on and off</u></b></p> <p>Pressing this key will turn on all hydraulic controlling functions. In case the hydraulics are not turned on, none of the hydraulic functions controlling keys will be functional. By pressing the key again, the hydraulics controlling functions are turned off.</p>
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	<p><b><u>1.17 Drill unfolding</u></b></p> <p>Pressing this key will start the drill unfolding function which will be in operation for a pre-programmed time. During the pre-programmed time, the drill remains unfolded and after the time elapses, the function will automatically turn off.</p>
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	<p><b><u>1.18 Drill folding</u></b></p> <p>Pressing this key will start the drill folding function which will be in operation for a pre-programmed time. During the pre-programmed time, the drill remains folded and after the time elapses, the function will automatically turn off.</p>
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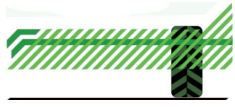
	<p><b><u>1.19 Left side marker</u></b></p> <p>Pressing the  key will start the  left marking function which will be in operation for a pre-programmed time. After the set time elapses, the function will automatically turn off.</p>
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	<p><b><u>1.20 Right side marker</u></b></p> <p>Pressing the  key will start the  right marking function which will be in operation for a pre-programmed time. After the set time elapses, the function will automatically turn off.</p>
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### **1.21 Seed drill lowering**

Pressing this key will turn on the drill lowering function which will start the lowering for sowing for a pre-programmed time. After lowering, the function will automatically turn off.



### **1.22 Seed drill raising**

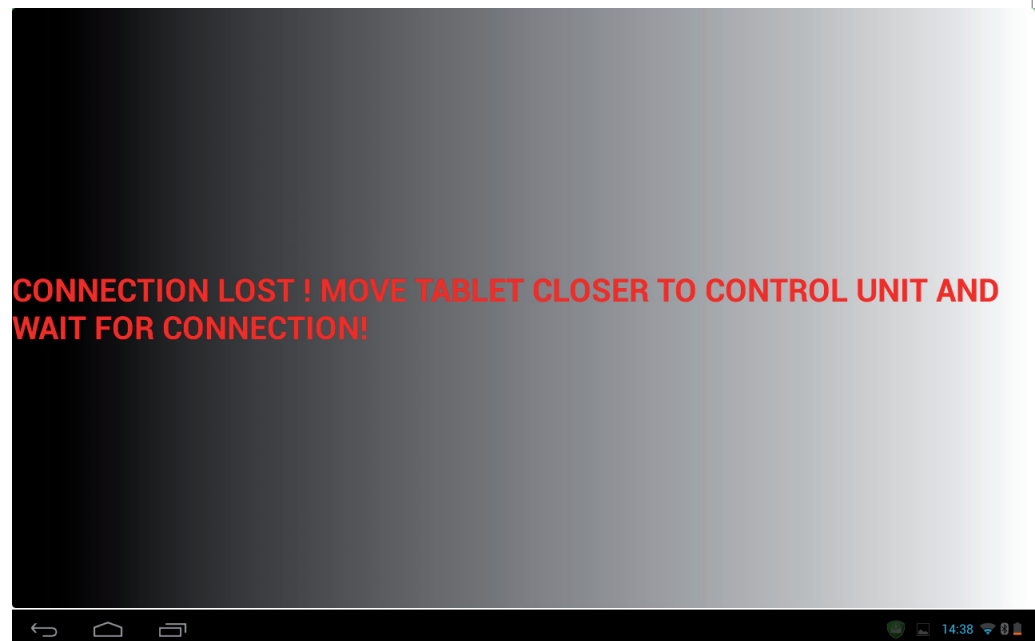
Pressing this key will turn on the drill raising function which will start the raising from sowing for a pre-programmed time. After raising, the function will automatically turn off.



### **1.23 Info bar**



This symbol represents the wireless connection with the control unit via BLUE-TOOTH. If the symbol is not yellow colored, the tablet is disconnected from the control unit and it cannot be controlled. The following notice is displayed on the tablet:



This symbol informs the user that the GPS/Glonass signal is available. In case the drill is equipped with and controlled by the GPS/Glonass, it is necessary to wait until the symbol turns yellow before starting work.



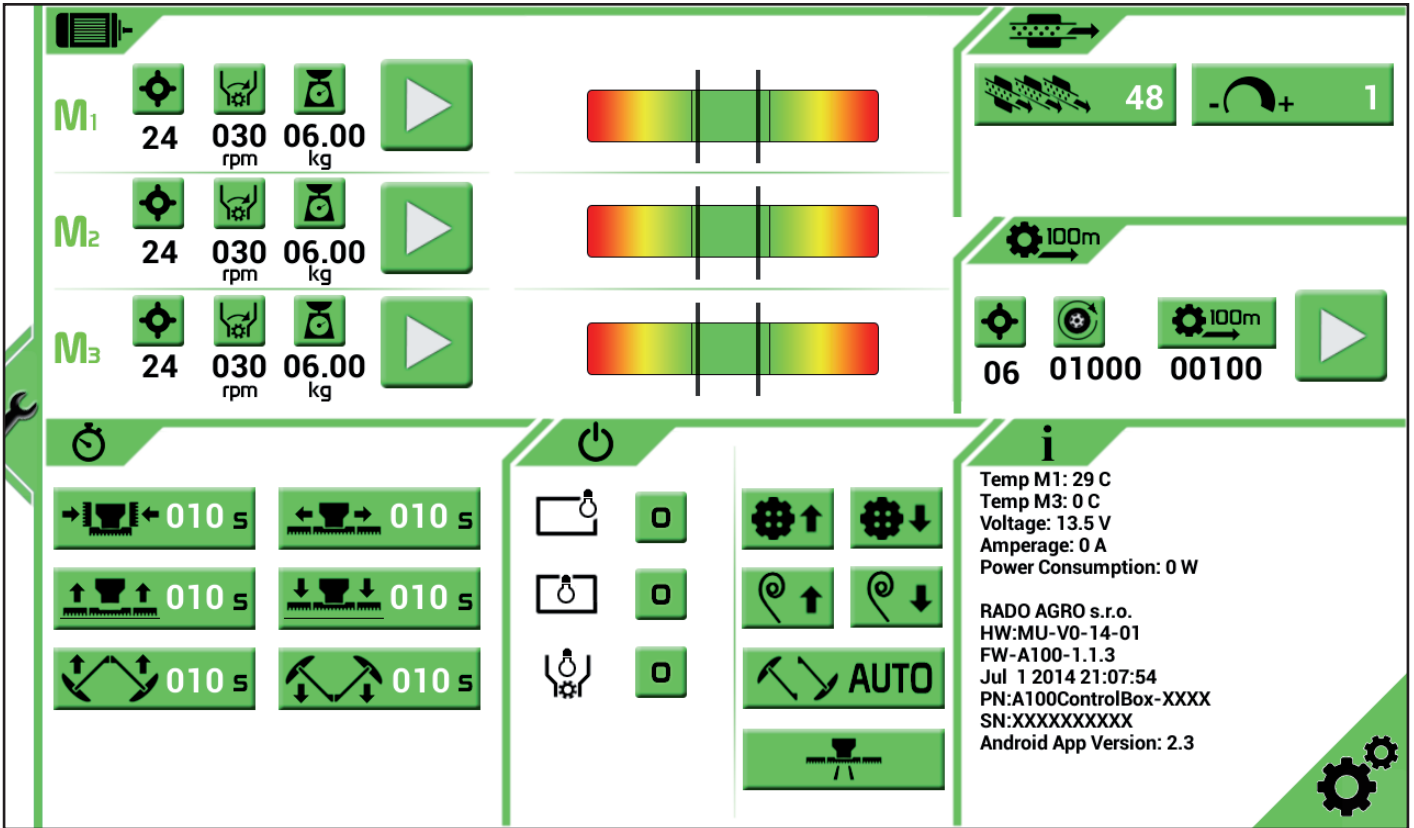
**Unless the symbol is highlighted in yellow, the speed measuring, hectare counting and the regulation of dosers motors will be blocked!**



### **1.24 Access to the second screen**

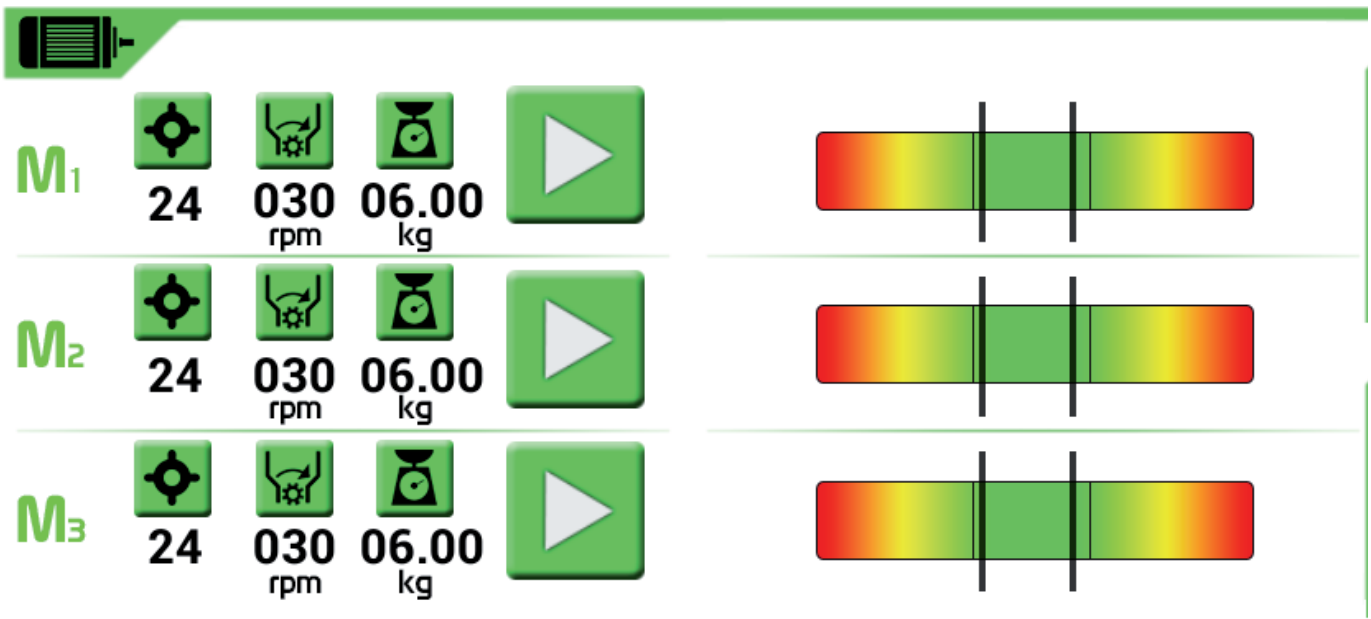
Press this key to access the screen No.2 which enables adjustment of other parameters.

**Screen No.2:**



**Description of the screen No.2:**

**2.1 Seeding test**



This screen enables adjustment of the seeding test for the doser 1 to 3.

180.00  
kg/ha

### 2.1.1 Setting the seeding dose for a given doser


Before carrying out the seeding test, it is necessary to set the seeding dose for a given doser. This is carried out in the first screen, see the chapter 1.14.



24


### 2.1.2 Setting the number of metal rosette teeth for the doser speed scanning

This parameter is set by the drill manufacturer. Before starting the seeding test, it is necessary to check the number of teeth and in case the displayed value does not correspond with the number of the rosette teeth of the given doser, it must be changed.

Carry out the change by pressing the gearwheel symbol  and entering the correct number of teeth after the setting dialogue is displayed. Confirm the set value by means of the **OK** key. After this, the newly set value will be displayed under the gearwheel symbol.




### 2.1.3 Seeding test speed counter resetting

Pressing the  key will reset the speed counter. The value 000 will be displayed under the key.




### 2.1.4 Starting/stopping the seeding test

Pressing this key will start the motor of a given doser. The counter will start to count the doser speed. To stop the doser, press the  key. The seed falling from the doser during the test must be caught into a suitable container or a bag. Allow the doser to rotate until the required amount of seed fills the container. After the test ends, weigh its weight and input the value according to the following table (2.1.5).



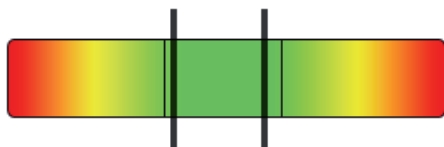
06.00  
kg

### 2.1.5 Entering the seed weight

After stopping the seeding test, it is necessary to enter the weight of the seed which has been dosed during the seeding test. To enter the weight, press the  key and use the settings dialogue to input the value. Confirm the input by pressing the **OK** key and the new value will be displayed under the symbol of a scale.

### 2.1.6 Checking the correctness of the seeding test

To check the correctness of the seeding test, use the so called zonal regulation diagram.



The aim is to get the black lines to the centre of the green zone. In case both black lines are not within the green zone in the middle of the diagram, the seeding test has been carried out incorrectly and it is necessary to repeat it. In case both black lines are within the green zone, the test has been carried out correctly and the doser regulation will proceed correctly within the whole range of the travel speed.




**The maximal travel speed of the assembly must be taken into account. It must not be exceeded, otherwise the seed will be incorrectly dosed!**


*Use the same procedure for other dosers.*

## 2.2 Seeding sensors setting





This field of display serves for setting the number of connected seeding sensors and their scanning sensitivity.

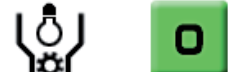
	<b><u>2.2.1 Setting the number of seeding sensors</u></b> Pressing this key will allow to set the number of sensors connected to the control unit bus. This value is set by the manufacturer and is intended for service purposes only.
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	<b><u>2.2.2 Setting the seed passage scanning sensitivity</u></b> The range of the sensor sensitivity is from 1 to 255. The value depends on the size of the seed and the selected seeding dose. Setting the sensitivity to 5 means that minimally 5 pieces of seed must pass through the sensor within 1 second in order for the sensor to evaluate that the seeding is correct and "SOWS". In case less than 5 pieces of seed passes through within 1 second, the sensor evaluates this as the seed is not passing through, i.e. "DOES NOT SOW".  <ol style="list-style-type: none"><li>1. For small seeds, such as poppy and rape, the recommended value is 3 to 12.</li><li>2. For medium-sized seeds, such as wheat and barley, the recommended value is 30 to 100.</li><li>3. For large seeds, such as corn and bean, the recommended value is 10 to 30.</li></ol>
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## 2.3 Lighting functions

	<b><u>2.3.1 Seed drill lighting</u></b> Pressing this key will turn on the seed drill lighting. Press it again to turn the lighting off.
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	<b><u>2.3.2 Hopper lighting</u></b> Pressing this key will turn on the lighting inside the hopper. Press it again to turn the lighting off.
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	<b><u>2.3.3 Seeding mechanism lighting</u></b> Pressing this key will turn on the lighting of the seeding mechanism. Press it again to turn the lighting off.
-------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------

## **2.4 Other hydraulic functions**



### **2.4.1 Flexible leveller - raising**

Upon pressing, the key will highlight in yellow and the flexible leveller will begin to raise. Press it again and the key will highlight in green and the flexible leveller raising stops.



### **2.4.2 Flexible leveller - lowering**

Upon pressing, the key will highlight in yellow and the flexible leveller will begin to lower. Press it again and the key will highlight in green and the flexible leveller lowering stops.



### **2.4.3 Mulching section raising**

Pressing this key will turn on the mulching section raising function. To end the raising, press the key again and the mulching section raising function will turn off.




### **2.4.4 Mulching section lowering**

Pressing this key will turn on the mulching section lowering function. To end the lowering, press the key again and the mulching section lowering function will turn off.




### **2.4.5 Pre-emergent marking of tramline**

Pressing this key will turn on the pre-emergent tramline marking function. The function enabling is indicated by yellow color of the key. Its subsequent functions are derived from the tramline valves function. In case the tramline valves close and unsown marks are created, the pre-emergent marking automatically lowers. Upon opening of the valves, the pre-emergent marking raises. By pressing the  key again, the pre-emergent tramline marking function turns off.



### **2.4.6 Markers automatics**

Pressing this key will turn on the function of automatic switching-over of the markers at the dead centre. The key will be highlighted in yellow . By this, the automatic switching-over is enabled and the position of markers will always automatically change after raising.

## **2.5 Procedure with the markers automatic switching-over function enabled:**

If the automatic function



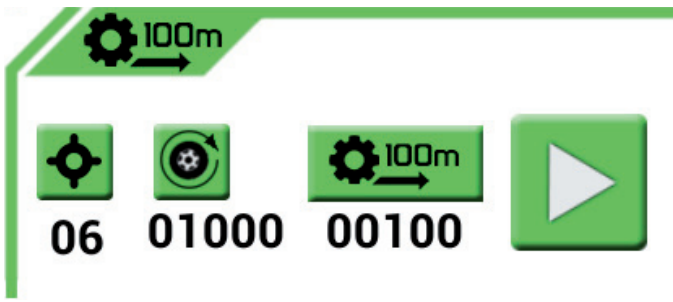
is enabled in the second screen, use the



key to return to the first screen.

Now, based on which side of the field you intend to start, press either the left or right marker lowering key. Prior to the selection of the marker, the seed drill must be unconditionally raised, both keys must be grey-coloured and the markers symbols on the icons must point upwards. After pressing the marker corresponding key, both markers will turn green and the symbol of the pressed marker will point down. Immediately after the start of the drill lowering, the pre-selected marker will lower as well. At the ride end, during the drill raising, both marker keys will switch-over and the lowered marker will automatically raise. At the subsequent lowering of the drill, the second marker will start lowering.

## 2.6 C-factor (speed correction)



This serves for adjusting the C-factor of the travel speed sensor. This adjustment can only be carried out if the C-factor is installed on the drill and the GPS/Glonass system is not in use.

Firstly check and, if necessary, correctly set the number of the induction sensor sensing teeth. This value is pre-set by the manufacturer. In case the number of teeth differs from the set value, it is necessary to adjust the value.



### 2.6.1 Setting the number of the travel speed sensor teeth

Press the symbol to adjust the setting. In the entering numerical dialogue, input the new value and confirm it by pressing the **OK** key. The value will be displayed under the symbol.





### 2.6.2 Setting the circumference of the travel speed sensor wheel


Press the symbol to set the wheel circumference. In the entering numerical dialogue, input the new value and confirm it by pressing the OK key. The value will be displayed under the symbol.



**Attention, the value must be set in millimetres!**

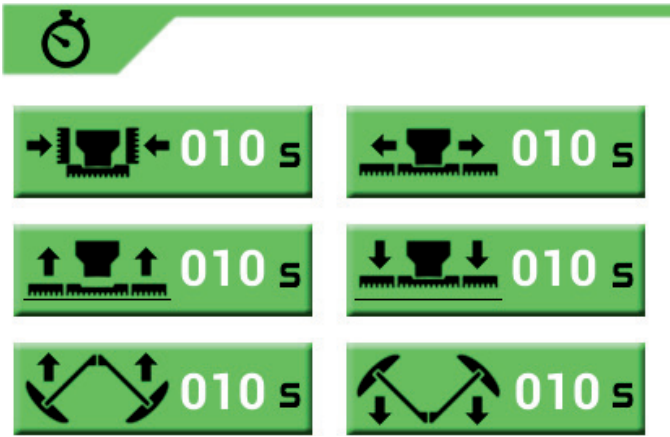
### 2.6.3 Setting the C-factor

Firstly, it is necessary to mark-out a 100 meters long straight path in the concrete location of your work. This path must be covered by the assembly when measuring the C-factor. Once the path is marked-out, drive the seed drill to the path beginning and stop it. Press the  key which will start the C-factor measuring. Now, travel along the marked-out path and stop at its end. Press the  key to stop the measuring.

The relative travelled path will appear under the  symbol. The speed measuring correction will be carried out according to this path.

**00100**







## 2.7 Setting the operational times of the hydraulic functions



This section of the screen enables the settings of the times necessary for individual hydraulic functions of the drill. The times can be set within a range of 1 to 100 seconds according to your need.

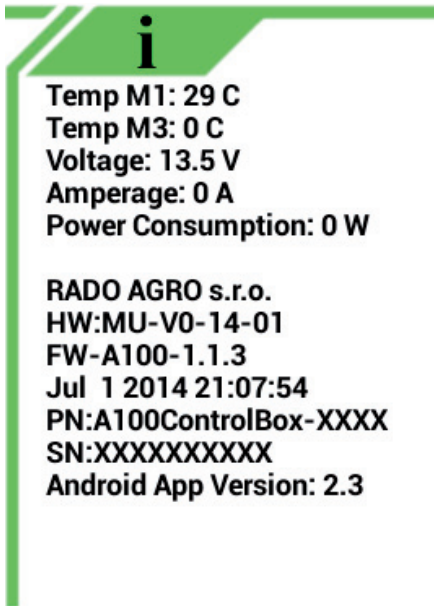
Every drill has a different flow rate and oil pressure (hydraulic circuit power output), therefore the times of individual movements may significantly differ.

In overall, it is possible to set six different hydraulic functions:

	<b>2.7.1 Drill folding</b> Press the key, set the required value in the setting dialogue and confirm it by pressing the <b>OK</b> key. The new value will be automatically stored in the memory.
	<b>2.7.2 Drill unfolding</b> Press the key, set the required value in the setting dialogue and confirm it by pressing the <b>OK</b> key. The new value will be automatically stored in the memory.
	<b>2.7.3 Drill raising</b> Press the key, set the required value in the setting dialogue and confirm it by pressing the <b>OK</b> key. The new value will be automatically stored in the memory.
	<b>2.7.4 Drill lowering</b> Press the key, set the required value in the setting dialogue and confirm it by pressing the <b>OK</b> key. The new value will be automatically stored in the memory.
	<b>2.7.5 Markers raising</b> Press the key, set the required value in the setting dialogue and confirm it by pressing the <b>OK</b> key. The new value will be automatically stored in the memory.
	<b>2.7.6 Markers lowering</b> Press the key, set the required value in the setting dialogue and confirm it by pressing the <b>OK</b> key. The new value will be automatically stored in the memory.



## 2.8 Information about the device



This section of the screen contains important information regarding the feeding state and the manufacturing data.

### Comments:

Temp M1: 26 C	Temperature of transistor cooler of motor 1 and 2
Temp M3: 0 C	Temperature of transistor cooler of motor 3 and 4
Voltage 12.2 V	Dashboard mains feeding voltage, in volts
Amperage: 0 A	Current bleed by the unit from the dashboard mains, in amperes
Power Consumption: 0 W	Total power consumption, in watts
RADO AGRO s.r.o.	Control system manufacturer
HW:MU-V0-14-01	Controlling unit hardware version
FM-A100-1.1.2	Controlling unit firmware version
May 28 2014 12:14:35	Controlling unit firmware creation date
PN:A100CB	Controlling unit type
SN:000000001	Controlling unit serial number
Android App Version: 2.4	Tablet software version





**RADO AGRO s.r.o.**

**Tečovice 309**

**763 02**

**Zlín 4**

**Czech Republic**