



IBX100 ELECTRONIC CONTROL UNIT



4679002

Object Pool rel. 1.2.0

INSTALLATION, USE AND MAINTENANCE

	= Generic danger
	= Warning
ECU	= IBX100 remote control unit
OP	= Object Pool
TC	= Task Controller

WARNING:

THE NATIVE CONTROLS INSIDE YOUR VIRTUAL TERMINAL HAVE THE PRIORITY ON ALL THE CONTROLS DERIVING FROM THE IBX100. PLEASE, KEEP THIS IN MIND WHEN PROGRAMMING AND USING THE PRODUCT.

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• MANUAL USE MODES

The section of this manual dedicated to the installation contains information for installers. For this reason we have used technical terms without providing explanations which would be necessary for end users only.

THE INSTALLATION MUST BE CARRIED OUT BY AUTHORIZED AND SKILLED PERSONNEL ONLY. ARAG IS NOT RESPONSIBLE FOR ANY OPERATION SPECIFIED IN THIS MANUAL CARRIED OUT BY UNAUTHORIZED OR UNSKILLED PERSONNEL.

• LIMITATIONS

The descriptions of the assembly phases refer to a "general" Virtual Terminal, so specific models will not be mentioned, unless a certain installation procedure concerns exclusively one Virtual Terminal type.

• RESPONSIBILITY

The installer must carry out "workmanlike" installations and ensure to the end user the perfect operation of the whole system both with ARAG components only and other brands' components.

ARAG always recommends using its components to install control systems.

The installer will be held responsible for any malfunction if he decides to use other brands' components even without actually changing the system parts or harness.

The compatibility check with components and accessories of other manufacturers shall be carried out by the installer.

If the ARAG components installed together with other brands' components get damaged because of what stated above, no direct or indirect warranty will be provided.

1 RISKS AND PROTECTIONS BEFORE ASSEMBLY

Installation works, except the main connection (ISOBUS system, Chap. 7) must be done with battery disconnected, using suitable tools and any personal protective equipment deemed necessary.



Use **ONLY** clean water for treatment tests and simulations: using chemicals during simulated treatment runs can seriously injure persons in the vicinity.

2 INTENDED USE

The apparatus you have purchased is a standard ISOBUS system compliant with ISO11783 to be applied to a granular fertilizer spreader machine with belt conveyor.

This device is designed to work on agricultural machinery for granular fertilizer spreading with belt conveyor.

The machine is designed and built in compliance with ISO 14982 standard (Electromagnetic compatibility - Forestry and farming machines), harmonized with 2014/30/EU Directive.

3 PRECAUTIONS



- Do not aim water jets at the equipment.
- Do not use solvents or fuel to clean the case outer surface.
- Do not clean equipment with direct water jets.
- Comply with the specified power voltage (12 VDC).
- In case of voltaic arc welding, remove connectors from the device and disconnect the power cables.
- Only use ARAG genuine spare parts and accessories.

4 PACKAGE CONTENT



Control unit



Harnesses must be ordered separately (Ref. ARAG general catalog).

Fig. 1

5 POSITION ON FARMING MACHINE

5.1 System recommended composition

⚠ WARNING: DO NOT CONNECT ISOBUS CONNECTOR (*chap. 7 on page 9*). **THIS CONNECTION MUST BE CARRIED OUT LATER, ONLY AFTER INSTALLING ALL THE COMPONENTS.**

To connect all parts of the system correctly, make sure to use the proper connection cables. Consider any variants depending on system type.

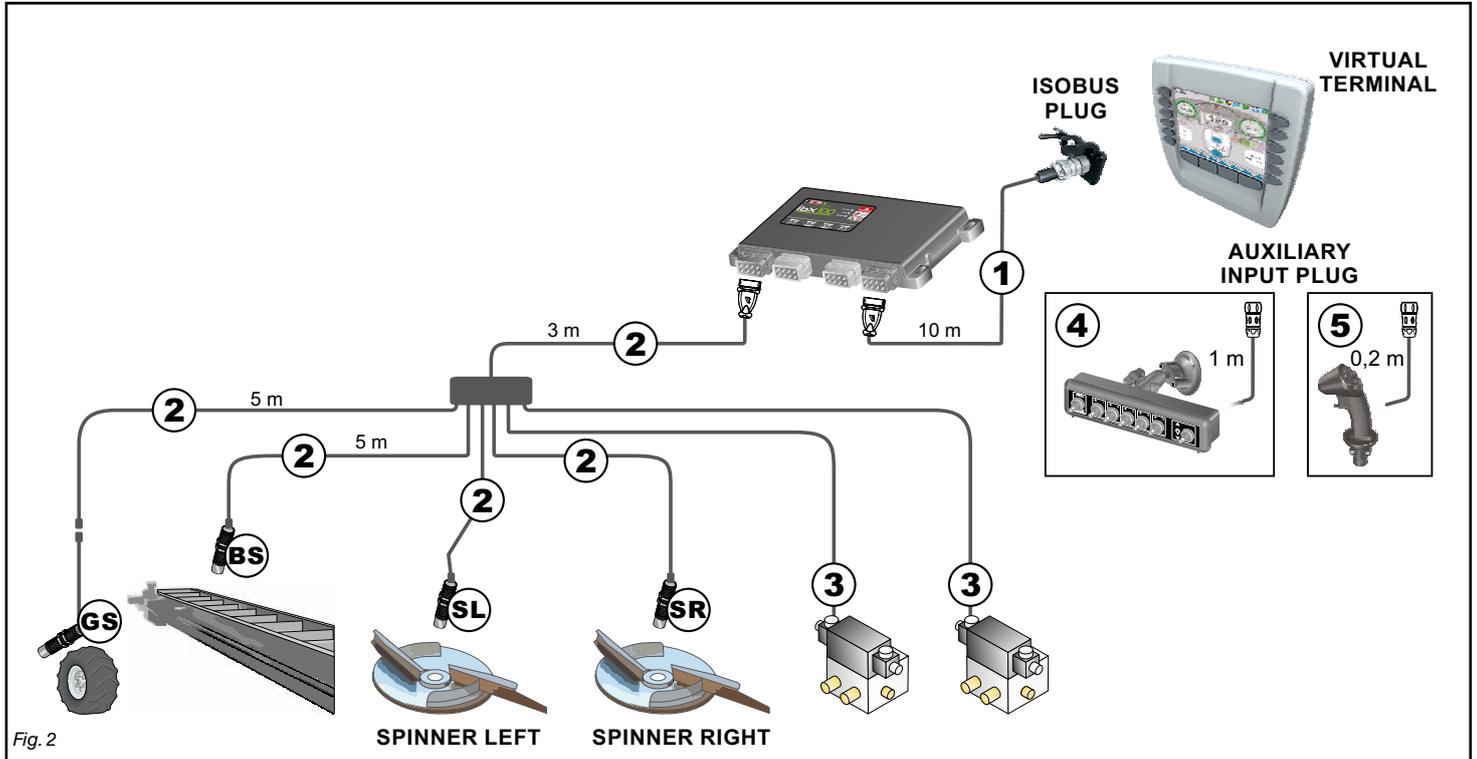


Fig. 2

Legend of connection cables:

- 1** Standard ISOBUS connector (ISOBUS PLUG)
- 2** Sensors
- 3** Proportional hydraulic valves
- 4** Auxiliary ISOBUS Input
- 5** ISOBUS Explorer Joystick

- GS** Speed sensor / Gate
- BS** RPM sensor / Spreading belt
- SL** RPM sensor / Left spreading spinner
- SR** RPM sensor / Right spreading spinner

5.2 Control unit fixing

Fix the control unit in a visible position within easy reach as shown in the figure.

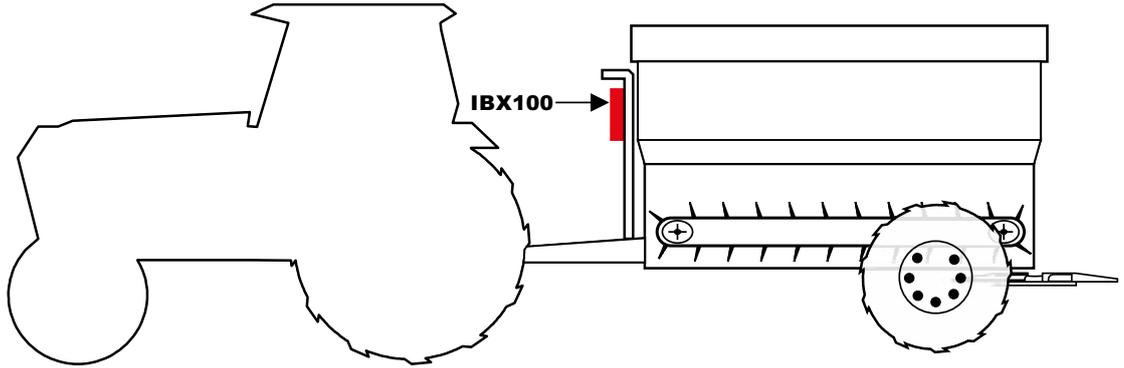


Fig. 3



Consider all necessary connections of the device (par. "Wiring harness connection"), the cable length, and make sure there is enough space for connectors and cables.

For any reference to the system configuration read par. 5.1.

Respect the mounting direction of the control units, as specified in Fig. 4 (connectors shall be facing down).

Fix the ECU using the 4 bolts fitted into their slots (A, Fig. 4).



No other type of assembly is allowed.

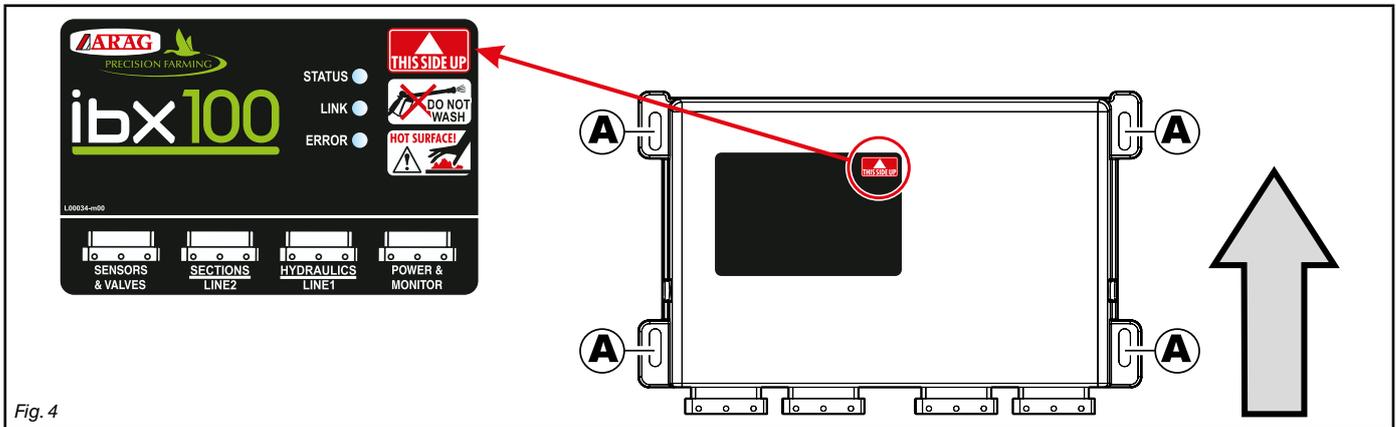


Fig. 4

WIRING HARNESS CONNECTION

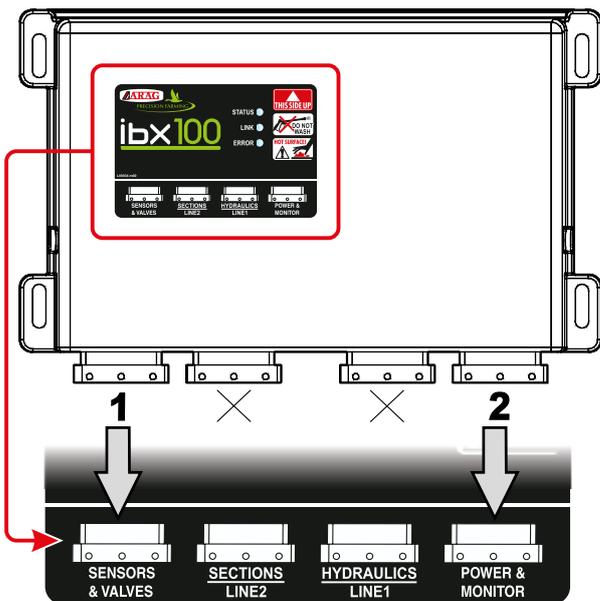


Fig. 5

No. OF	CONNECTION POINTS
1	Proportional hydraulic valves + Sensors
2	Standard ISOBUS connector (ISOBUS PLUG)

OVERALL DIMENSIONS

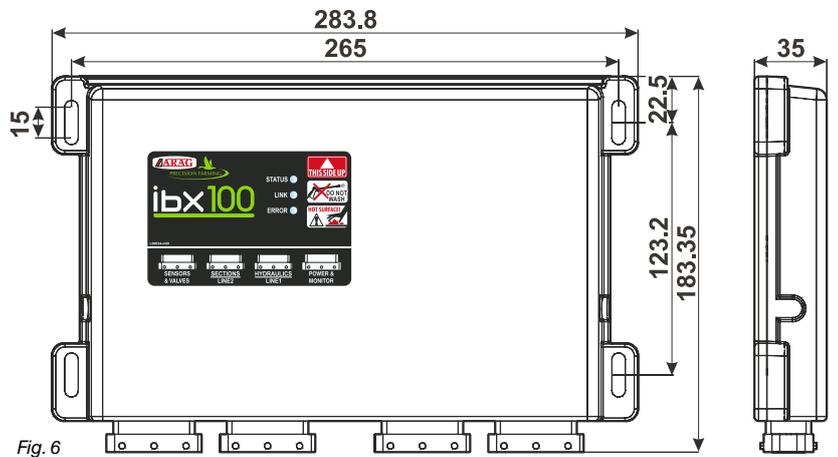


Fig. 6

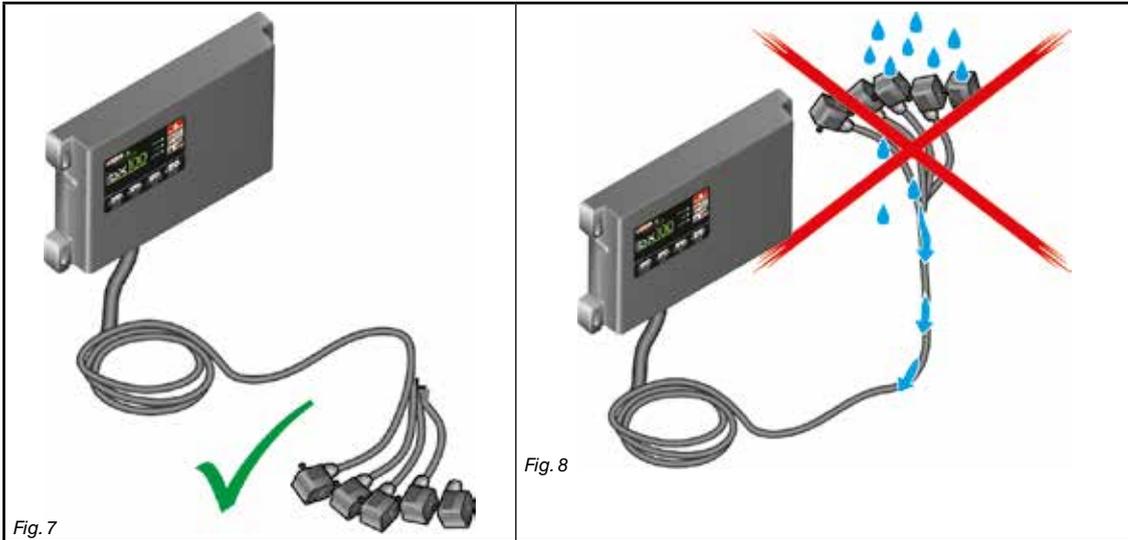
Unit of measurement: mm

6 WIRING CONNECTIONS

- ⚠ • Use original ARAG harnesses only.
- Take care not to break, pull, tear or cut the cables.
- Use of unsuitable cables not provided by ARAG automatically voids the warranty.
- ARAG is not liable for any damage to the equipment, persons or animals caused by failure to observe the above instructions.

6.1 General precautions for a correct harness position

- **Securing the cables:**
 - secure the harness so that it does not interfere with moving parts;
 - route the harnesses so that they cannot be damaged or broken by machine movements or twisting.
- **Routing the cables to protect against water infiltrations:**
 - the cable branches must ALWAYS be face down (Fig. 7).



- **Fitting the cables to the connection points:**
 - Do not force the connectors by pushing too hard or bending them: the contacts may be damaged and system operation may be compromised.

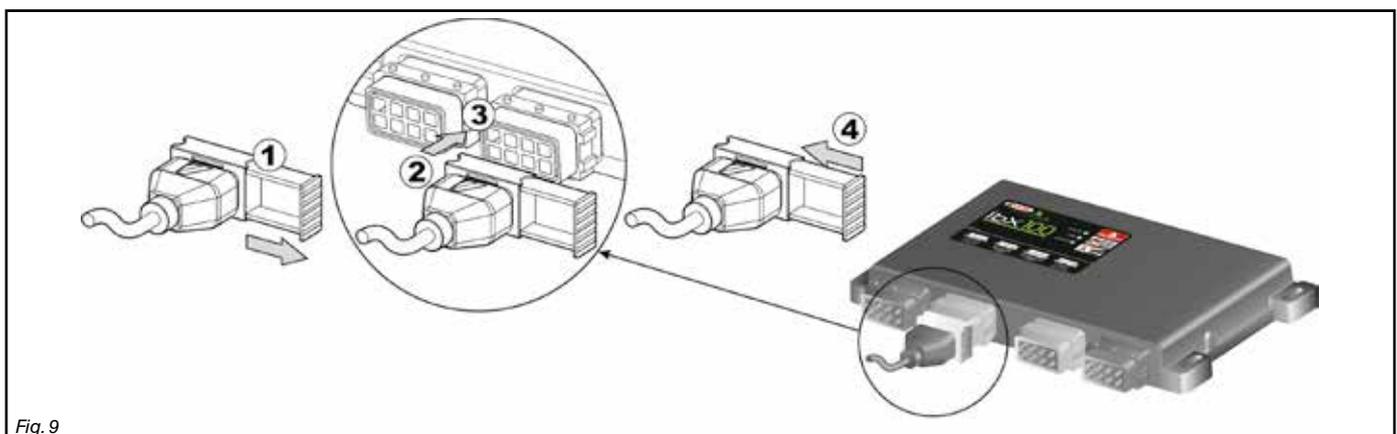
🖐 Use **ONLY** the cables and accessories indicated in the catalog, having technical features suitable for the use to be made of them.

6.2 Control unit (ECU) connection

⚠ **WARNING: DO NOT CONNECT ISOBUS CONNECTOR** (chap. 7 on page 9). **THIS CONNECTION MUST BE CARRIED OUT LATER, ONLY AFTER INSTALLING ALL THE COMPONENTS.**

Connect harnesses as specified in par. "Wiring harness connection"; each one of them shall be connected to the corresponding socket on the remote control unit. Close the unused connectors with the relevant caps supplied in the package.

🖐 If they prove hard to insert, do not force them, but check the shown position.



🖐 **Some connectors are supplied with separated slide. Manually insert the slide in the most convenient position for connector insertion and removal.**

- Open connector slide (1, Fig. 9).
- To position connector (2), insert it inside socket (3), then press: **during this operation, take care not to bend the electric contacts.**
- Close slide (4) until it locks in place.

6.3 Connection of proportional hydraulic valves

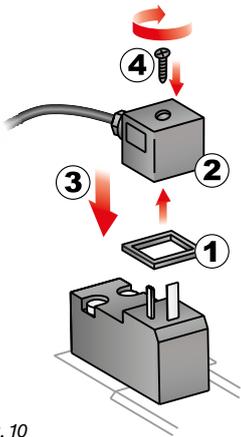


Fig. 10

The system is able to control one belt and two spreading spinners through proportional valves.

Fix the connectors to the relevant valve according to the initials indicated in your assembly general diagram (par. 5.1).

- Position seal (1) onto connector (2), then connect the latter pressing it fully home (3): **during this operation, take special care not to bend valve electric contacts.**
- Insert screw inside connector, and screw it (4) until it is tightened.

The function of each switch on the hydraulic function control panel is described below.

- Connect connectors to the valve as shown in the table:

CONTROL	MOVEMENT		CONNECTOR
SPREADING BELT 	On	↑	BH
	Off	↓	BH
SPREADING SPINNERS 	On	↑	SH
	Off	↓	SH

6.4 Sensor connection

Fix the connectors to the relevant functions according to the initials indicated in your assembly general diagram (par. 5.1).

Harness cables are marked with a symbol denoting their functions: please see the table for correct harness connection.



Use ARAG sensors: use of unsuitable sensors not provided by ARAG automatically voids the warranty.

ARAG is not liable for damage to the equipment, persons or animals caused by failure to observe the above instructions.

ITEM	CONNECTION
GS	Speed sensor
BS	RPM sensor / Spreading belt
SL	RPM sensor / Left spreading spinner
SR	RPM sensor / Right spreading spinner

- The products are supplied with the sensor installation instructions.

The following speed sensors can also be used as RPM sensors:

- inductive speed sensor (**code 467100.086**);
- magnetic speed sensor (**code 467100.100**).

All ARAG sensors use the same type of connector. Connect the sensor connector to the relevant harness; make sure it is correctly fitted and push it until locking it.



Fig. 11



Fig. 12

7 ISOBUS SYSTEM CABLE CONNECTION

After carrying out all the system connections, as described in the previous pages:

- Connect the ISOBUS PLUG and IN-CAB connectors.
- Switch on the Virtual Terminal.
- Wait for the OP complete loading (chap. 8).



Fig. 13

7.1 Connection of in-cab cable

Use the cable supplied in the auxiliary input package:

ARAG Auxiliary Input control system is not compulsory on all systems, and must thus be ordered separately.

Some Virtual Terminals allow controlling spreading spinners and gate directly from monitor touch-screen panel.

7.2 Connection of ISOBUS cable

Use cable **1** (Fig. 2, par. 5.1 System recommended composition).

Connections: fix the connectors (**ISOBUS connection** in Fig. 13); make sure they are correctly fitted and push until locking them.

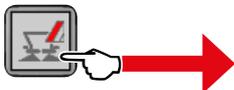
8 "OBJECT POOL" LOADING



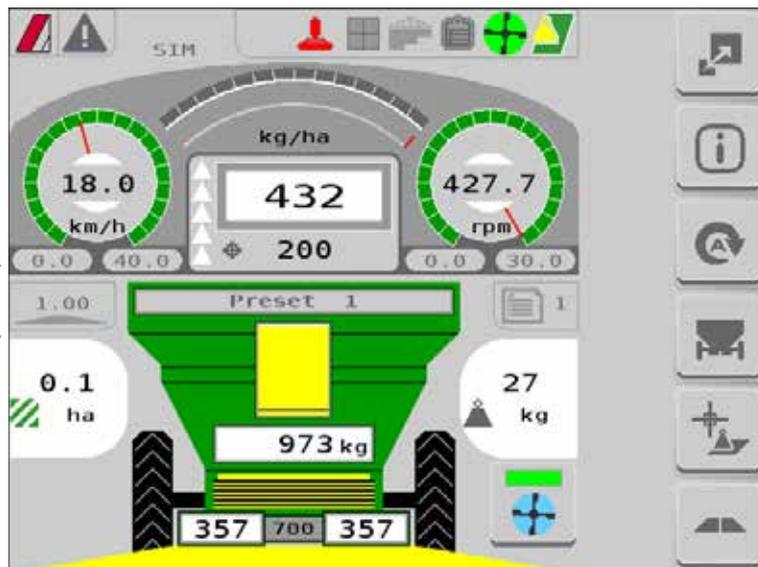
Images and the relevant description texts contained in this manual are given as a reference as they can vary depending on the *Virtual Terminal* used. If the descriptions do not correspond to the text displayed in your *Virtual Terminal*, refer to the manual attached to the latter.



Press to display the OP selection page of the ECU.



Press to enter the main screen. Wait for the ECU OP to be fully loaded.



9 CONTROL LAYOUT



Fig. 14



Fig. 15



Goes back to main screen



Goes back to previous menu, or scrolls the pages of a menu (previous page)



Scrolls the pages of a menu (next page)



Saves the changes to current page



Quits without confirming the changes



Saves the changes

ENTERING A NUMERICAL VALUE



Fig. 16



Deletes



Exits



Confirms



Fig. 17

Read-only value or previously set in another menu.

10 HOME

MENU SELECTION BUTTONS

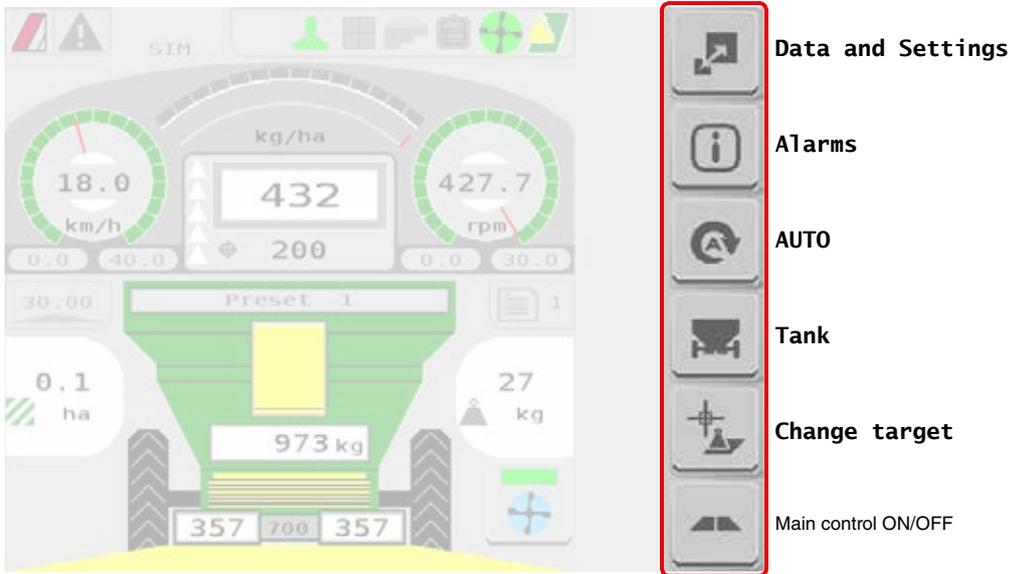


Fig. 18

11 DATA AND SETTINGS

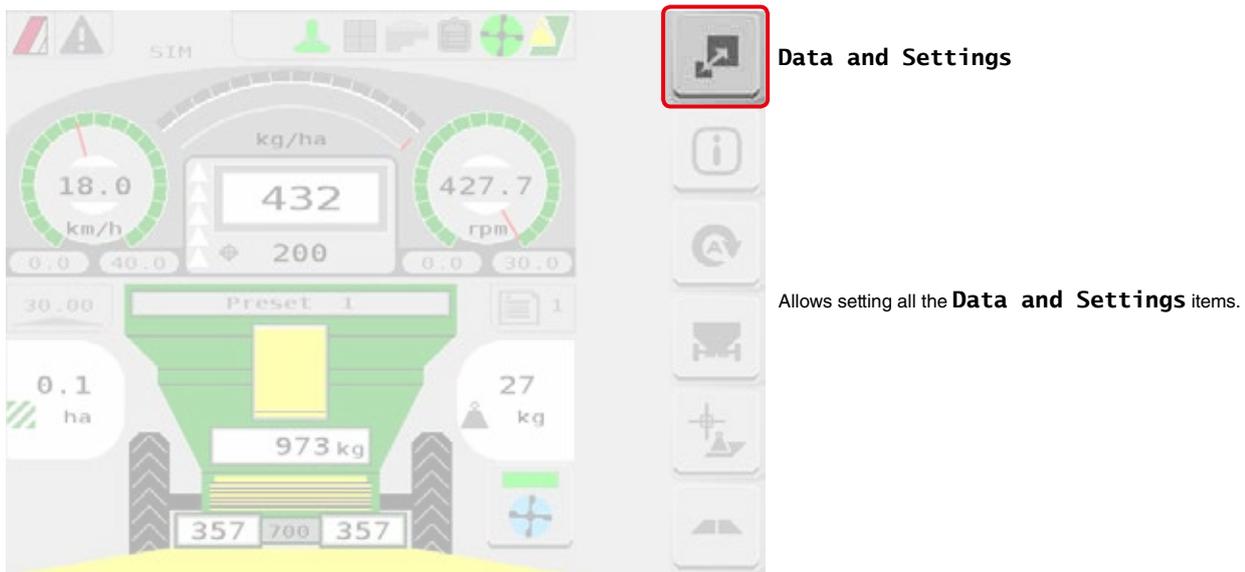


Fig. 19

**Before setting Data and Settings check:**

- that all components are correctly installed;
- the correct connection to the power source;



Failure to correctly connect system components or to use specified components might damage the device or its components.



Upon first switching on, enter the device basic settings



AT THE END OF THE DESIRED SETTINGS IT IS NECESSARY TO SAVE PAGE CHANGES USING BUTTON  OTHERWISE THE CONFIGURATION IS LOST.

12 IMPLEMENT SETTINGS



Fig. 20

1 - 2 Configure farming machine settings.

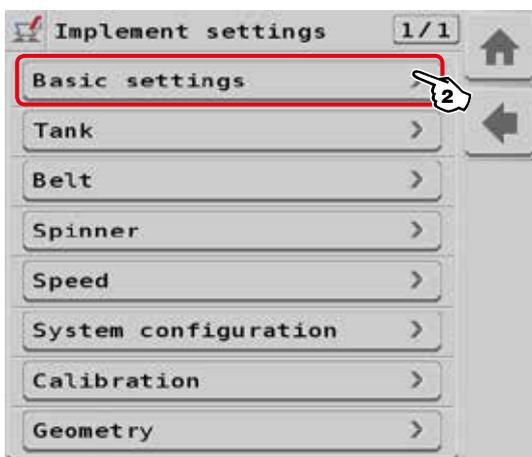


Fig. 21

12.1 Basic settings

Allows configuring:

1/3

Belt actuator: type of device used to control spreading belts.

- **Motorized valve:** system with electric-activated valves - with gearmotor.
- **PWM valve:** system with solenoid valves.

2/3

Spinner sensing: number of sensors used to detect spreading spinner operation.

- **NO sensor**
- **1 sensor**
- **2 sensors**

3/3

Spinner actuator: type of device used to control spreading spinners.

- **Mechanical:** spreading spinners are controlled through the farming machine.
- **Motorized valve:** system with electric-activated valves - with gearmotor.
- **PWM valve:** system with solenoid valves.

12.2 Tank

Allows setting the tank data:

1/1

Tank settings:

- **Reserve:** indicate the reserve value under which the alarm is triggered
- **Capacity:** indicate the tank capacity.

12.3 Belt

Allows setting the spreading belt data:

1/3

Belt settings:

- **Sensor constant:** indicate the constant of the sensor installed on spreading belt roller. The value must be provided by the sensor manufacturer.
- **Belt minimum speed:** indicate the minimum spreading belt speed under which the alarm is triggered.
- **Belt maximum speed:** indicate the maximum spreading belt speed beyond which the alarm is triggered.
- **Gate width:** indicate the distribution gate width.
- **Belt roller diameter:** indicate the spreading belt roller diameter.

2/3

Belt alarms/display:

Alarms:

- **Rate error:** indicate rate tolerance percentage beyond which the alarm is triggered.

Display:

- **Rate display cut-off:** indicate the rate display tolerance percentage beyond which the alarm is triggered and the system displays the actual rate value. Within the set percentage, the system continues displaying the preset rate even if different from the actual one.

3/3

Controller settings:

Belt:

- **Valve:** displays the type of device used to control spreading belts ("*12.1 Basic settings*" on page 13).
- **Aggressiveness:** adjusts the energy used by the valve to control the belt.  Decreases aggressiveness. /  Increases aggressiveness. The ideal adjustment is obtained when belt movement is smooth.

12.4 Spinner

Allows setting the spreading spinners data:

1/2

Spinner settings:

- **Mode:** displays the type of spreading spinner control ("*12.1 Basic settings*" on page 13).
- **Sensors number:** displays the number of sensors for spreading spinner control ("*12.1 Basic settings*" on page 13).
- **Sensor 1 constant:** indicate the constant of spreading spinner sensors. The value must be provided by the sensor manufacturer.
- **Sensor 2 constant:** indicate the constant of spreading spinner sensors. The value must be provided by the sensor manufacturer.
- **Display cut-off:** indicate the spreading spinner speed display tolerance percentage beyond which the alarm is triggered and the system displays the actual speed value. Within the set percentage, the system continues displaying the preset speed even if different from the actual one.
 - **Disabled:** function NOT enabled.
 - **3%:** 3% tolerance
 - **5%:** 5% tolerance
 - **Rate error:** threshold of **Spinner alarms** settings **Relative** mode.
- **Spinner max speed:** enter the maximum RPM value of spreading spinner sensor.
- **Link Spinner to "Main" sw.:** enables or disables activation or deactivation of spreading spinners through the control on switch box:   ON /  OFF
- **Spinner switch-OFF:** enter the number of seconds between spreading spinner deactivation and actual spinner block.

2/2

Spinner alarms:

- **Mode:** displays the type of spreading spinner control ("*12.1 Basic settings*" on page 13).
 - **Disabled:** function NOT enabled.
 - **Absolute:** enter minimum and maximum speed values of spreading spinners. All the values outside the set range will trigger the alarm.
 - **Relative:** enter the percentage value beyond which spreading spinner alarm is triggered.

12.5 Speed

Allows setting the speed data:

1/1

Speed settings:

- **Source:** allows to select the source for speed calculation.
 - **Wheel sensor (ECU):** when this option is enabled, speed is calculated through the pulses coming from the speed sensor, installed on the wheel **and connected to the ECU through proper harness**. The wheel constant must be set in the following item.
 - **Tractor wheel:** when this option is enabled, speed is calculated through the pulses coming from the speed sensor, installed on the wheel **and directly connected to the Virtual Terminal**. The wheel constant must be set in the following item.
 - **Tractor radar:** information concerning speed is received by the GPS, which is connected directly to the system.
 - **Simulated speed:** Allows to enable speed simulation in order to carry out adjustment tests even when the machine is stationary.
- **Wheel sensor constant:** enter the wheel constant value calculated with the suitable formula:

The wheel constant can be calculated with a good approximation by detecting the distance traveled by the wheel with the speed sensor. The longer the distance traveled, the more accurate the wheel constant calculation.

$$K_{\text{wheel}} = \frac{\text{distance traveled (cm)}}{\text{no. of detection points} \times \text{wheel rpm}}$$

<distance traveled> distance expressed in cm covered by the wheel along measurement travel.

<no. of measurement points> number of measurement points (e.g., magnets, bolts, etc.), mounted on wheel.

<no. of wheel revolutions> number of wheel revolutions required to travel measurement distance.



Take measurements with tires at the operating pressure. This test must be performed on medium-hard terrain; for application to very soft or very hard terrain, rolling diameter may vary, leading to inaccurate output calculation; when this is the case, repeat the procedure. During the test, cover the distance with the tank filled up to half capacity with water.

- **Simulated speed:** enter the simulated speed value.

12.6 System configuration

Allows setting the system data:

1/3

Spreading:

- **Rate control:** Selects **automatic activation** or **manual activation** of rate control.
- **Spinner control:** Selects **automatic activation** or **manual activation** of spreading spinner control.
Menu item visible only if **Spinner actuator** selected is **Motorized valve** or **PWM valve**.

2/3

Auxiliary commands: select the type of auxiliary control (Auxiliary Input) connected to the system.

- ARAG Direct Switches
- ARAG joystick
- User Direct Switches
- User joystick

- **Auxiliary enable:** enable / disable the auxiliary control (Auxiliary Input)
- **Main switch:** enable / disable the control that activates the gate.
- **Belt/Spinner ON/OFF:** enable / disable the control that activates or deactivates the spreading belt and spinners.
- **Rate/Spinner speed:** enable / disable the control of spreading spinner output and speed.
- **AUTO/MANUAL:** enable / disable the automatic or manual controls of spreading belt and spinners

3/3

Task controller: functions: some functions carried out by the system through the Task Controller can be performed **ONLY** if enabled in this menu.

- **Job totals:** enable / disable the job total counter control.
- **Section control:** enable / disable automatic deactivation of spreading spinners.
- **Variable application:** enable / disable the use of prescription maps for treatments with variable application.

Task controller: timings: allows managing valve timings depending on the system connected.

- **Section switch-ON:** indicate the time between the moment when the command is sent to the valves and the actual moment in which product output starts.
- **Section switch-OFF:** indicate the time between the moment when the command is sent to the valves and the actual moment in which product output stops.
- **Rate setpoint latency:** adjustment parameter for variable applications (with the use of prescription maps): this datum is used to indicate the advance time of application rate adjustment when the machine approaches the area changeover of the prescription map.

12.7 Calibration

Allows setting the calibration data:

1/1

Calibration settings:

- **Mode:** selects the type of control to carry out calibration.
 - **Belt speed control:** during calibration the system tries to keep the speed target set constant.
 - **Rate control:** during calibration the system tries to keep the rate target set constant.
- **Accumulation time:** enter the value that indicates the belt actuation time in full operational mode.
- **Settling time:** enter the value that indicates the belt stopping time.
- **Minimum belt pulses:** enter the value indicating the minimum number of pulses to start calibration of spreading belt roller.
- **Simulated speed:** enter the value indicating the simulated speed during calibration.
- **Belt speed:** enter the value indicating the spreading belt speed during calibration.
- **Spinner speed:** enter the value indicating the spreading spinner speed during calibration.

12.8 Geometry

Allows setting the equipment data:



Check Virtual Terminal settings: if a specific menu is available (varying based on your system) to program machine geometry, it has the priority over the ECU menu.

1/1

Geometry settings:

- **Hitch point:** select the type of equipment connection.

- Distance Hitch-Axle:

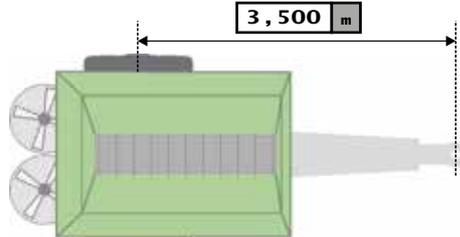


Fig. 22

- Distance Hitch-Spinners:

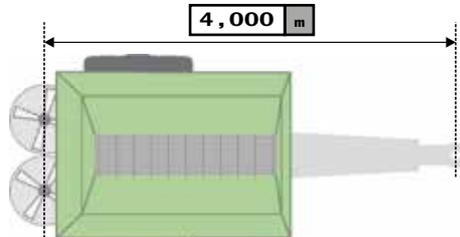


Fig. 23

- Spreading distance:

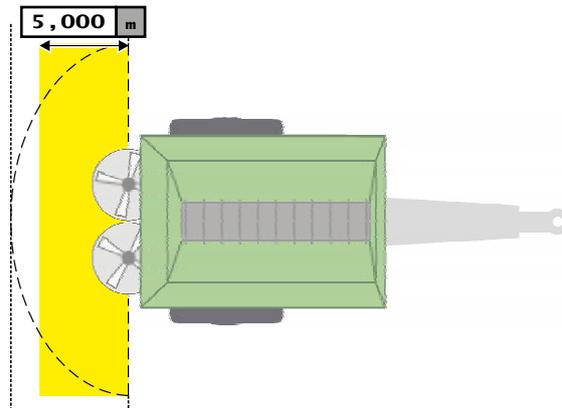


Fig. 24

- Spinners lateral posit.:
difference between the equipment central axis and the central point of spreading spinners axis.

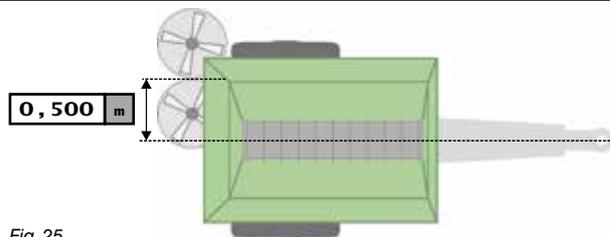


Fig. 25

13 MANAGE PRESETS



Fig. 26

This menu allows:

- Setting 8 different treatment configurations: **Preset**.
- Activating one configuration among the preset ones.
- Consult job data of the treatment selected: **Preset**.

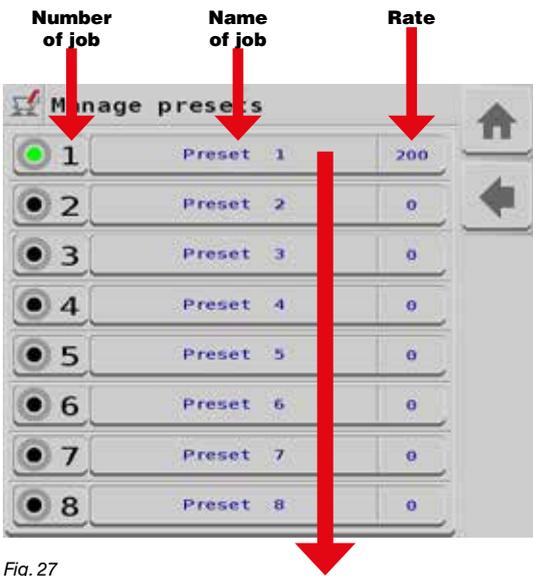


Fig. 27

Allows selecting and activating the **Presets** and setting them.

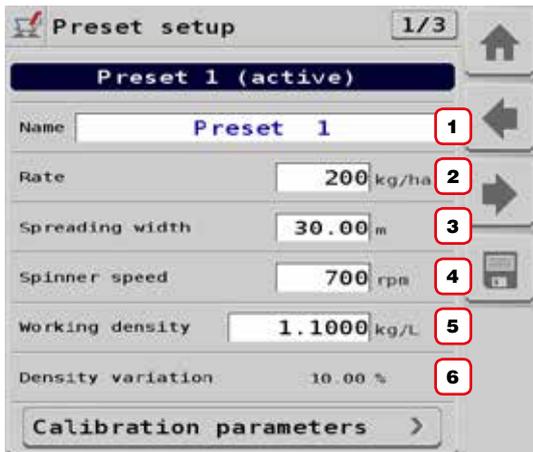


Fig. 28

Features to set for each **Preset**:

- 1 Type in the job name.
- 2 Enter the **Rate** value.
- 3 Enter the **Spreading width** value.
- 4 Enter the **Spinner speed** value.
- 5 Enter the density value suitable for **Working density** treatment start moment.
- 6 Displays the percentage value of the difference between **Working density** 5 and **Density** ("Fig. 29" on page 18).

13.1 Calibration parameters

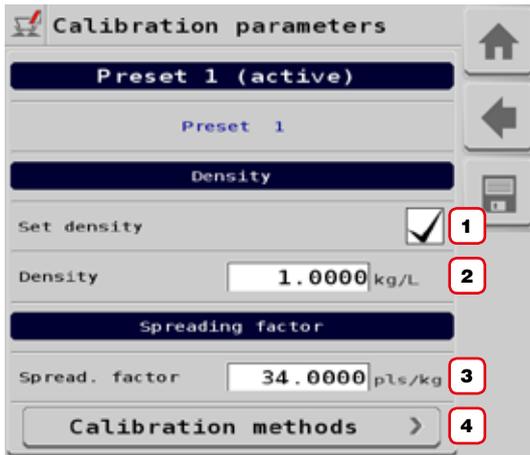


Fig. 29

Features of the selected Preset:

- 1 Activates or deactivates **Density** value entry.
- 2 Enter the product density value suitable for calibration start moment. **THE VALUE COULD BE DIFFERENT FROM THE NOMINAL VALUE**
- 3 Enter the **Calibration factor** value.
- 4 Allows selecting **Calibration methods** if the current **Calibration factor** must be updated.

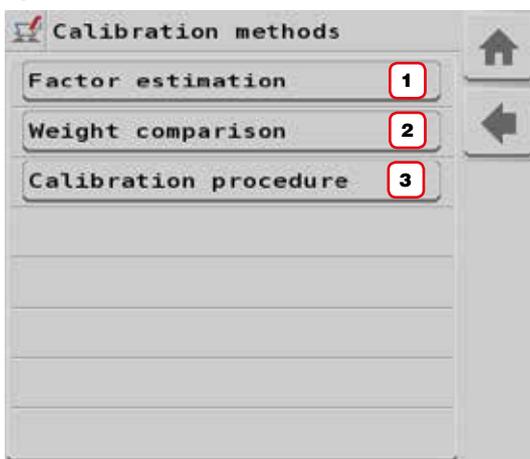


Fig. 30

Allows selecting the calibration method to calculate the **Calibration factor** value.

- 1 estimation of the constant through the geometrical data of system configuration (*par. 13.1.1*).
- 2 comparison between weight flown out of the tank and weight calculated by the application (*par. 13.1.2*).
- 3 automatic calibration procedure: comparison between revolutions made by the roller (spreading belt) and weight flown out of the tank (*par. 13.1.3*).

13.1.1 Factor estimation

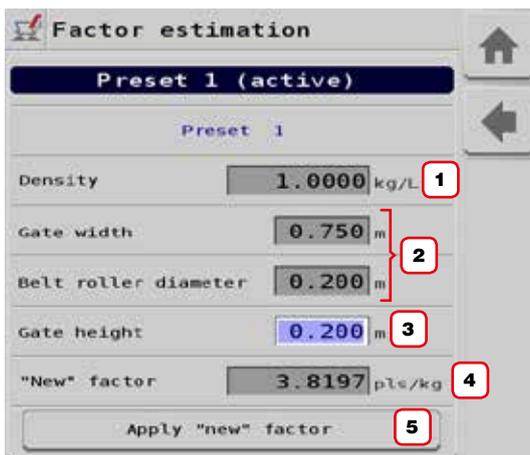


Fig. 31

- 1 Preset datum ("Fig. 29").
- 2 Preset data ("*12.3 Belt*" on page 14)
- 3 Enter the **Gate height** value, the system will calculate the "New" factor.
- 4 Displays the new calibration constant value calculated by the system.
- 5 Press **Apply "new" factor** value to apply the value and confirm the calibration.

13.1.2 Weight comparison



WARNING: before starting the procedure, make sure that the spreading system is off (position OFF).
The spreading belt and spinners must NOT be in motion.

- Insert the material in the tank.
- Activate the spreading system.



WARNING:
The material starts flowing out.

- Stop the system before full tank emptying.
- Weigh the quantity of product flown out of the tank and enter the **Applied product** value **3**.
- The system calculates the new calibration constant value "**New**" factor.
- Press **Apply "New"** factor value to apply the value and confirm the calibration.

The more product flows out of the tank the more accurate will calibration be.

The screenshot shows a control panel for 'Weight comparison' with the following fields and values:

Field	Value	Unit	Annotation
Spread. factor	34.0000	pls/kg	1
Applied product	850	kg	2
Applied product	1000	kg	3
"New" factor	28.9261	pls/kg	4
Apply "new" factor			5

- 1 Preset datum ("Fig. 29" on page 18).
- 2 Weight of the applied product, calculated by the application.
- 3 Quantity of product flown out of the tank during calibration.
- 4 Displays the new calibration constant value calculated by the system.
- 5 Applies the calibration value.

Fig. 32

13.1.3 Calibration procedure

WARNING: before starting the procedure, make sure that the spreading system is off (position OFF). The spreading belt and spinners must NOT be in motion.

- Insert the material in the tank.
- Check that the simulated speed is enabled and select the type of control to carry out the calibration ("12.7 Calibration" on page 16).

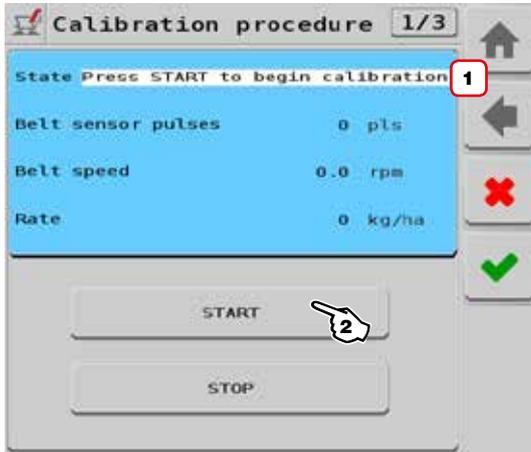


Fig. 33

- 1 Displays the current phase of calibration procedure.
- 2 Press START button to start calibration.

WARNING: The material starts flowing out.

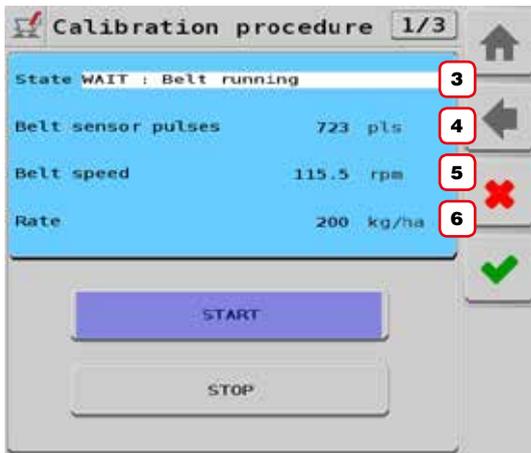


Fig. 34

- 3 The system activates the spreading belt roller and the material flows out of the tank.
 - 4 Number of pulses detected by the sensor on the spreading belt.
 - 5 - 6 Speed detected by the spreading belt roller.
- Depending on the type of calibration control selected ("12.7 Calibration" on page 16):
- Mode: **Bel t speed control**: the system tries to keep the speed target set constant.
 - Mode: **Rate control** the system tries to keep the rate target set constant.

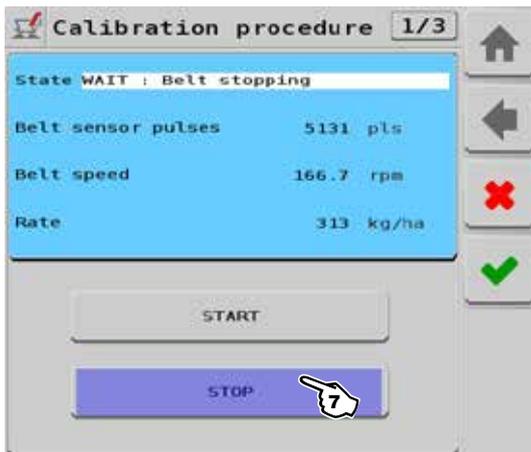


Fig. 35

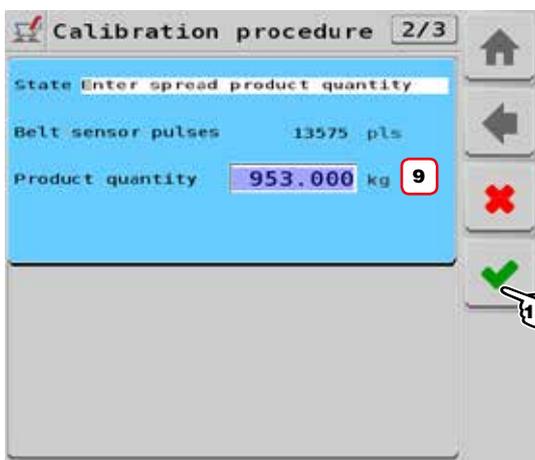
- 7 End the calibration by pressing STOP before the full tank emptying.

If the device signals a calibration error, check that configuration parameters are correctly set ("12.7 Calibration" on page 16).



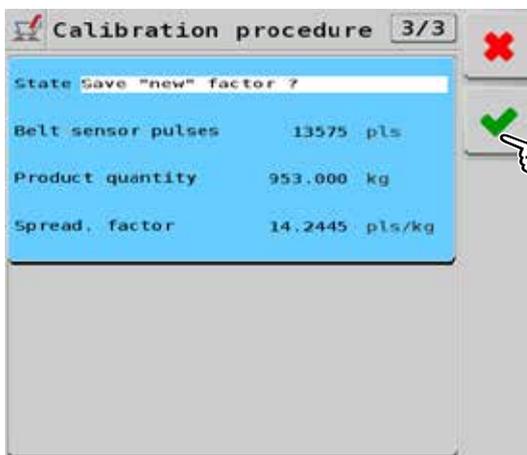
8 Confirm.

Fig. 36



9 Enter the actual value of product quantity flown out of the tank.
10 Confirm.

Fig. 37



11 Save calibration.

Fig. 38

13.2 Preset totals - Preset averages

Allows displaying and deleting data of the Preset selected.

Preset 1 (active)		
Preset 1		
Applied area	1.1	ha
Applied product	33992	kg
Travelled distance	0.38	km
Total time	0:56	
Spreading time	0:06	

Fig. 39

Preset 1 (active)		
Preset 1		
Applied product	4897.1	kg/min
Applied product	293825	kg/hr
Productivity	9.9	ha/hr
Rate	29656.8	kg/ha
Speed	3.3	km/h

Fig. 40

- Select the Preset.
- Use the keys **1** to scroll the pages
- Use the key **2** to delete job data;



WARNING: total counters and average values are simultaneously deleted.

14 WORKING PARAMETERS



Fig. 41

Allows setting the farming machine job limits.

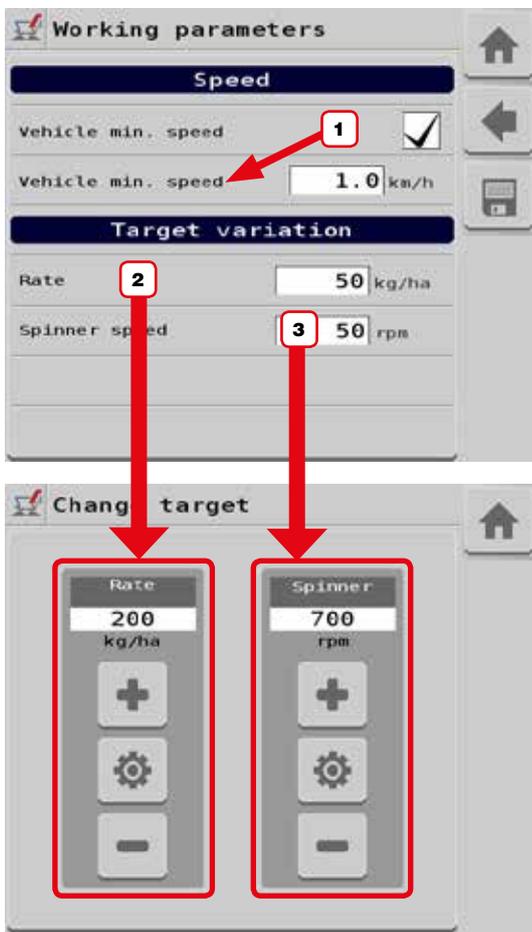


Fig. 42

- 1 Activate the vehicle minimum speed to configure this menu. Set the minimum job speed: the system blocks the spreading when the tractor speed is lower than the set speed.
- 2 Set the increase / decrease amount for the output value: the set value increases / decreases when the keys are pressed.
- 3 Set the increase / decrease amount for the spreading spinner speed value: the set value increases / decreases when the keys are pressed.

15 ALARMS

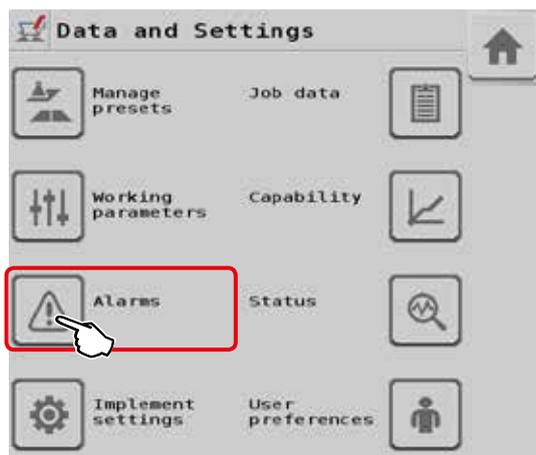


Fig. 43

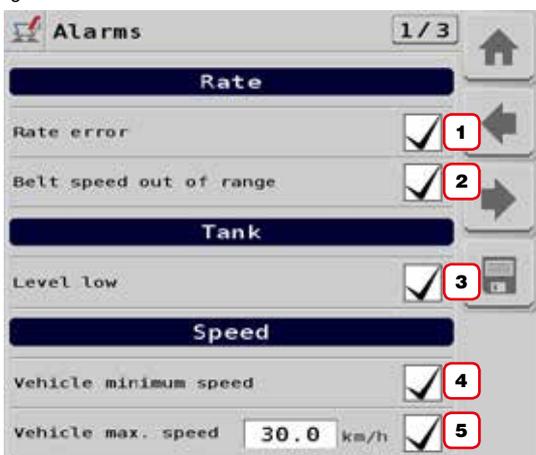


Fig. 44

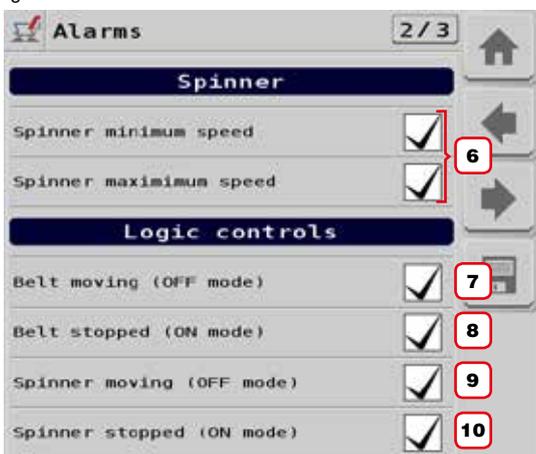


Fig. 45

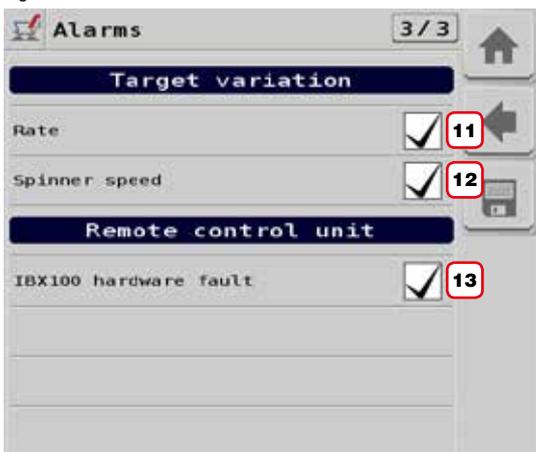


Fig. 46

This menu allows setting visual and acoustic alarm warnings.

Alarm activated / Alarm deactivated.

For the procedure to be followed when an alarm occurs, please refer to par. "25.3 Error messages" on page 39.

- 1 Alarm enabled when the rate is different from the preset one (14 on page 23).
- 2 Alarm enabled when the spreading belt speed exceeds the preset limits (12.3 on page 14).
- 3 Alarm enabled when the tank level exceeds the preset values (12.2 on page 14).
- 4 Alarm enabled when the vehicle speed is lower than the preset one (14 on page 23).
- 5 Enable the maximum vehicle speed to configure this menu.
Enter the maximum speed beyond which the alarm is triggered.

- 6 Alarm enabled when the spreading spinner speed exceeds the preset limits (12.4 on page 14).
- 7 Alarm enabled when the spreading belt is active but spreading is not enabled.
- 8 Alarm enabled when the spreading belt is stationary but output is enabled
- 9 Alarm enabled when the spreading spinners are active but sensors do not detect any movement.
- 10 Alarm enabled when the spreading spinners are stationary but sensors detect movement.

- 11 Alarm enabled when a temporary rate change is carried out (14 on page 23).
- 12 Alarm enabled when a temporary spreading spinner speed change is carried out (12.4 on page 14).
- 13 Enable / disable ECU hardware status alarm.

16 JOB DATA



Allows consulting treatment total data.

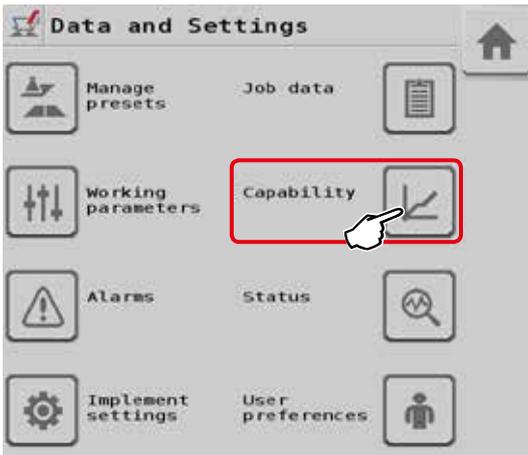
Fig. 47



1 Resets job data.

Fig. 48

17 CAPACITY



Allows checking treatment performance based on speed and configurations installed on the machine.

Fig. 49

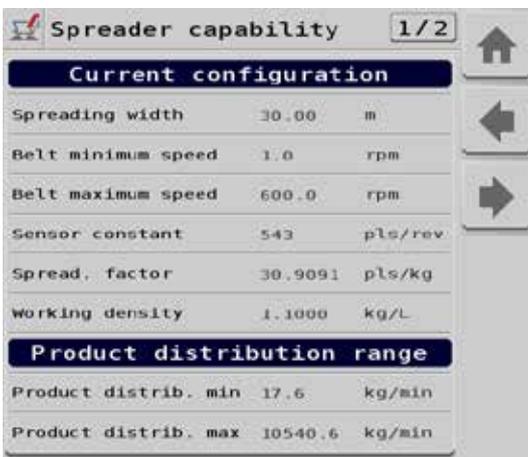
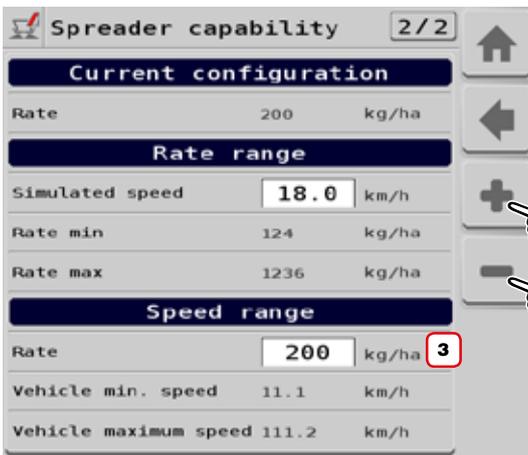


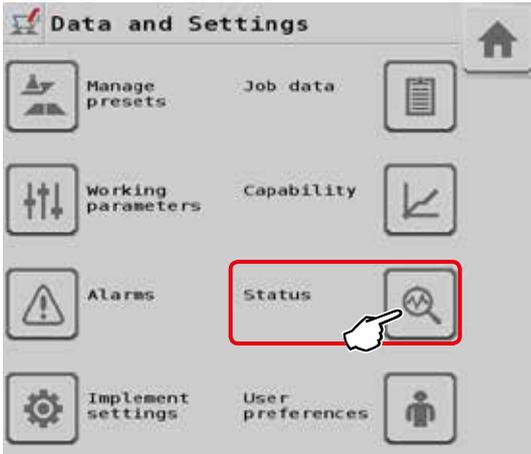
Fig. 50



Press **1** and **2** to increase or decrease the simulated speed: the system simulates the minimum and maximum rate.
3 enter the simulated rate value: the system simulates the minimum and maximum speed.

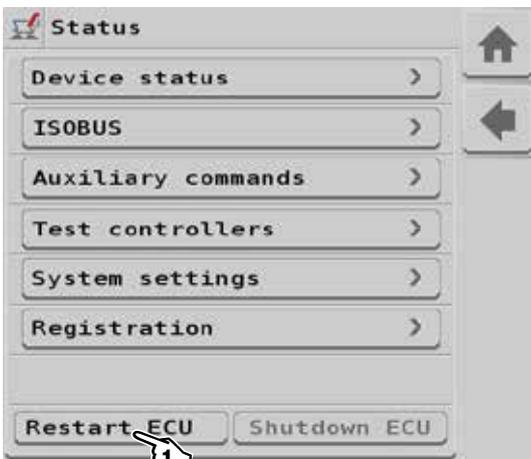
Fig. 51

18 STATUS



Allows checking the correct operation of the system.

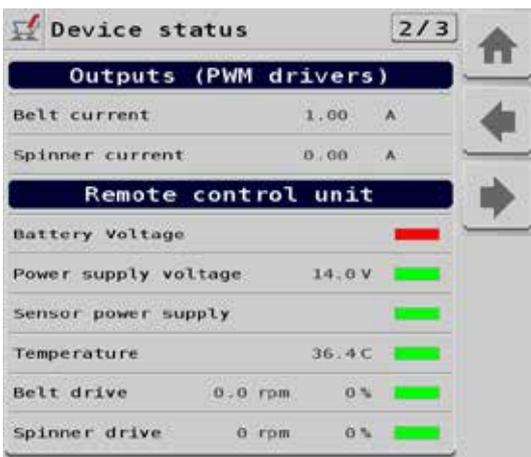
Fig. 52



1 Press **Restart ECU** button to restart ECU and confirm the control unit restart.

Fig. 53

18.1 Device status



Displays system information:
 [Green bar] Hardware working correctly
 [Red bar] Hardware malfunction

Fig. 54

18.2 ISOBUS

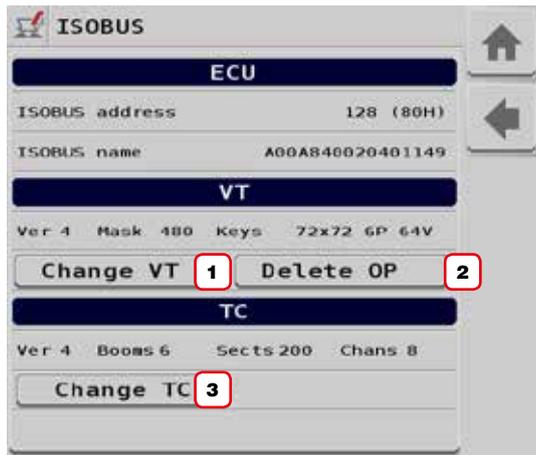


Fig. 55

Displays information on ISOBUS protocol.

- 1 Allows displaying the OP on another system, if any, present on the ISOBUS line.
- 2 Allows deleting and reloading the ECU OP.
- 3 Allows reloading the TC.

18.2.1 Auxiliary commands



Fig. 56

Checks the connection of the Auxiliary Input.

- █ Hardware working correctly
- █ Hardware malfunction

18.3 Test controllers

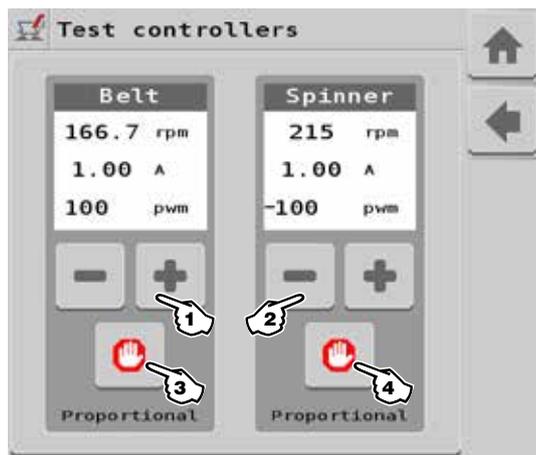


Fig. 57

This menu allows checking the correct operation of the spreading belt and spinners:



Before carrying out the test, make sure that the output is enabled.

- 1-2** These buttons allow starting the operation test of the spreading belt and spinners.
- 3-4** These buttons allow interrupting the operation test of the spreading belt and spinners.

18.4 System settings

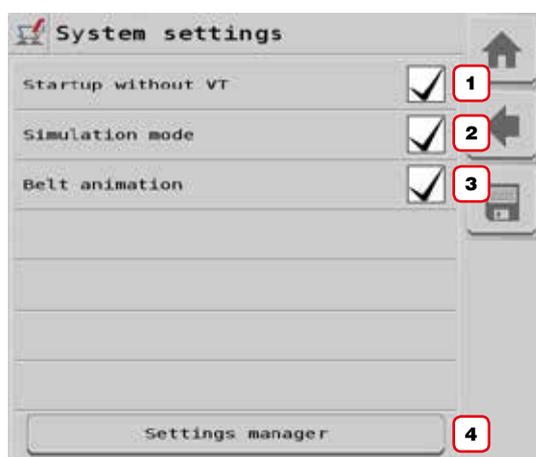


Fig. 58

- 1** This function acts on OP job screen loading mode, so as to make its displaying easier. Take into account that screen loading differs based on the used system.

- OFF function

After having connected the ECU to tractor, main screen loading is started only when the special Virtual Terminal key* is pressed.

- ON function

After having connected the ECU to tractor, main screen is pre-loaded on system: as soon as the special Virtual Terminal key* is pressed, loading has already been completed and screen is displayed without any waiting time.

* Key used to display ISOBUS spreader management application.

- 2** Enables/disables simulation mode (mainly used for demonstrative purposes, training, etc.)
- 3** Enables / disables the simulation mode of the spreading belt.
- 4** Restores factory default settings of the device.

18.5 Registration

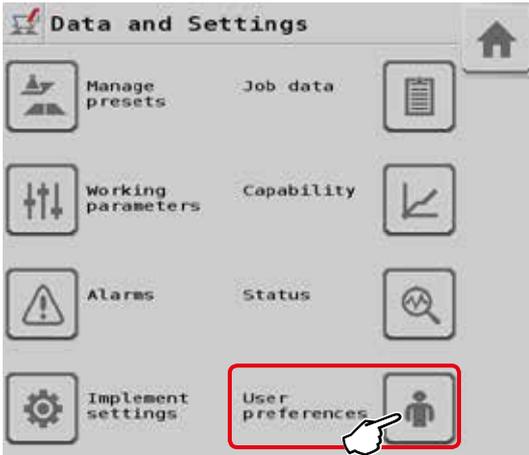


Fig. 59

This menu allows entering the ECU registration code.

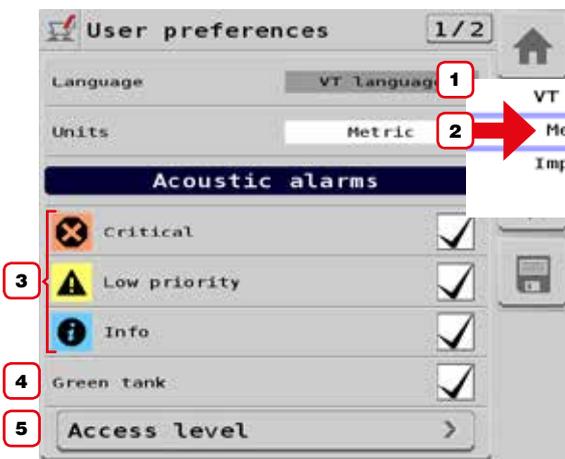
- 1** Press and enter the code, then confirm.

19 USER PREFERENCES



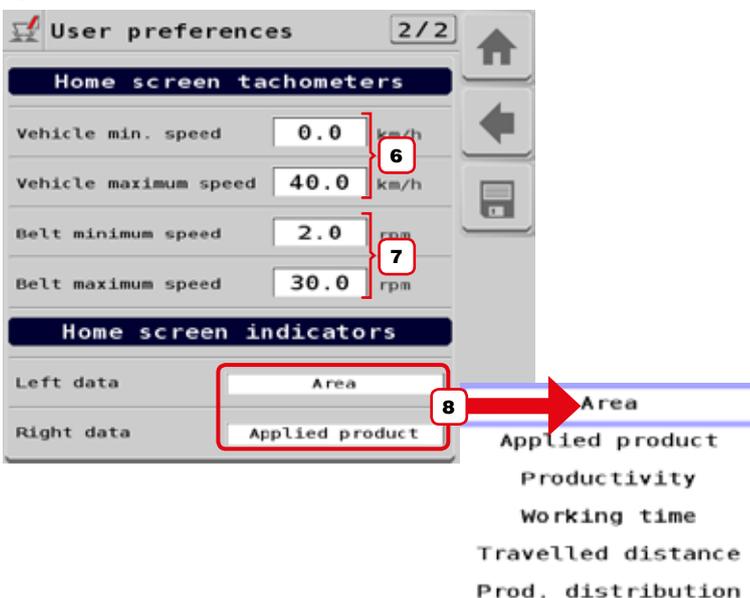
Allows customizing the user settings.

Fig. 60



- 1 Displays the OP use language source.
- 2 Set OP units of measurement.
- 3 Allows enabling or disabling alarm groups depending on their relevance.
- 4 Allows changing the tank color:
 - **OFF function** red tank.
 - **ON function** green tank.
- 5 Set OP access level.
 - **Operator**: inhibits any kind of setting. The operator only carries out the treatment.
 - **Manager**: inhibits machine feature setting but allows treatment configuration: an access PIN can be set.
 - **Technician**: allows configuring both the machine features and the treatment: an access PIN can be set.
 - **ARAG-Tech**: for ARAG staff, only.

Fig. 61



- 6 Set the full scale for speed displayed in HOME job screen.
- 7 Set the full scale of spreading belt displayed in HOME job screen.
- 8 Select the job data displayed on the RIGHT / LEFT side of HOME job screen

Fig. 62

20 USE

DISPLAY ITEMS

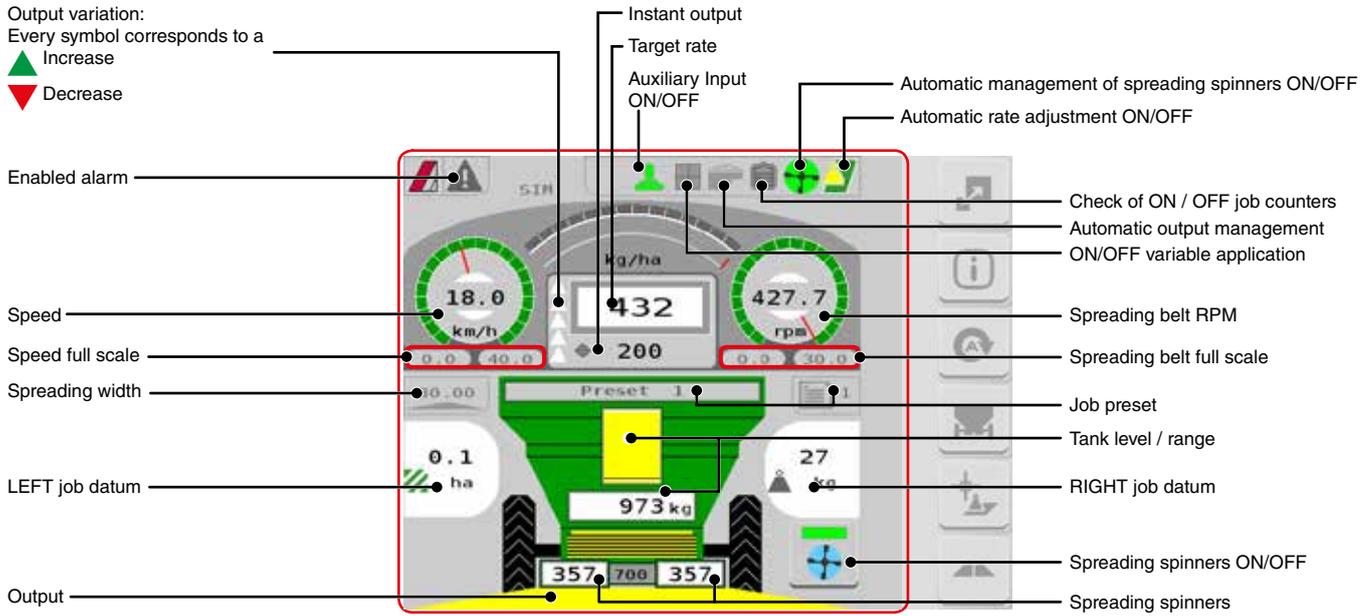
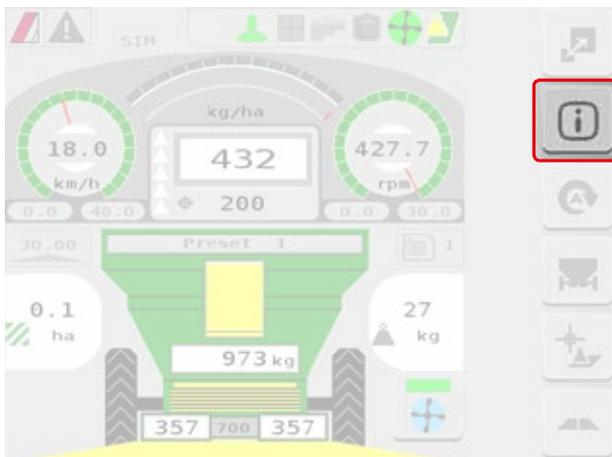


Fig. 63

20.1 Alarms



Alarms

Allows displaying alarm notifications.

Fig. 64



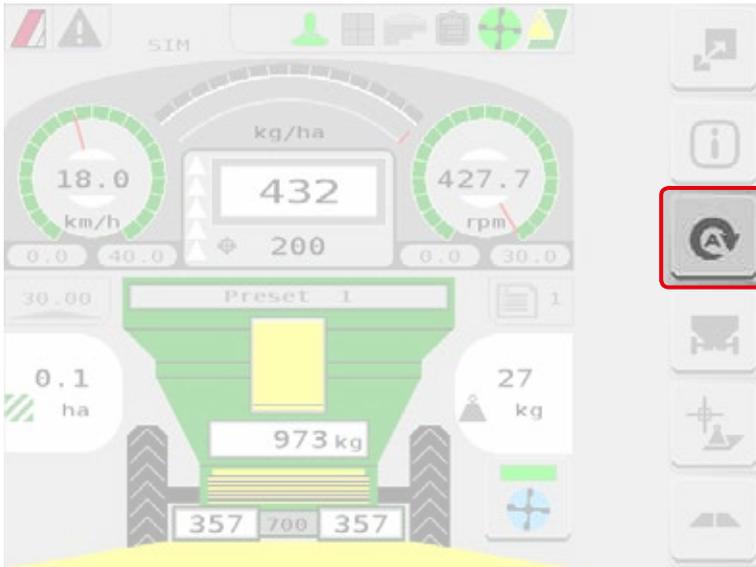
Fig. 65



For the procedure to be followed when an alarm occurs, please refer to par. 25.3.

- 1 Enabled alarm.
- 2 Alarm just corrected.

21 AUTO



Auto

Allows setting the manual or automatic mode:
 - rate control.
 - spreading spinner control.

Allows enabling or disabling the simulated speed.

Fig. 66

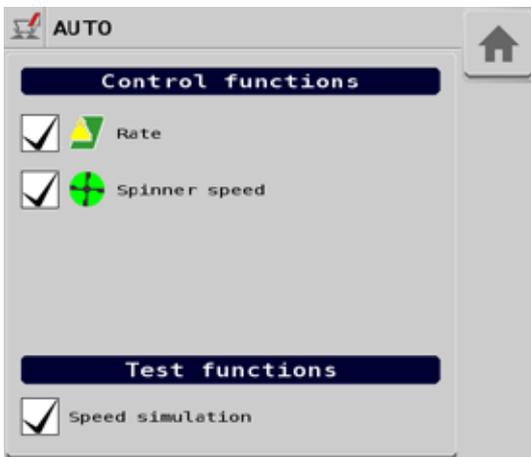


Fig. 67



For the procedure to be followed when an alarm occurs, please refer to par. 25.3.

21.1 Rate

Enables / disables automatic output adjustment (DEFAULT: ON).

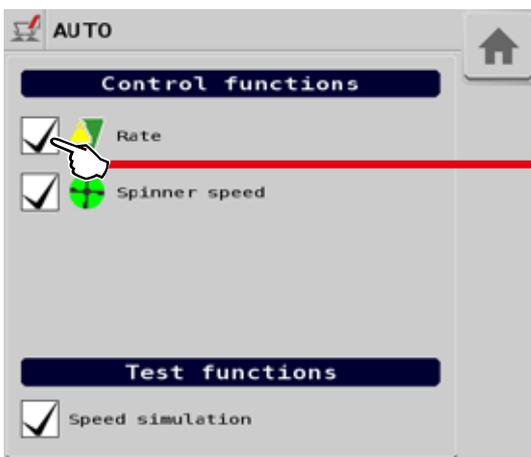
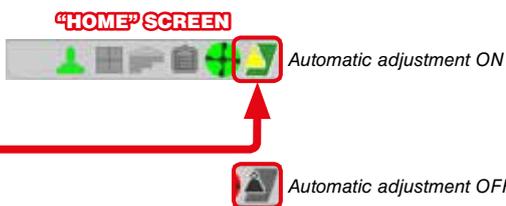


Fig. 68

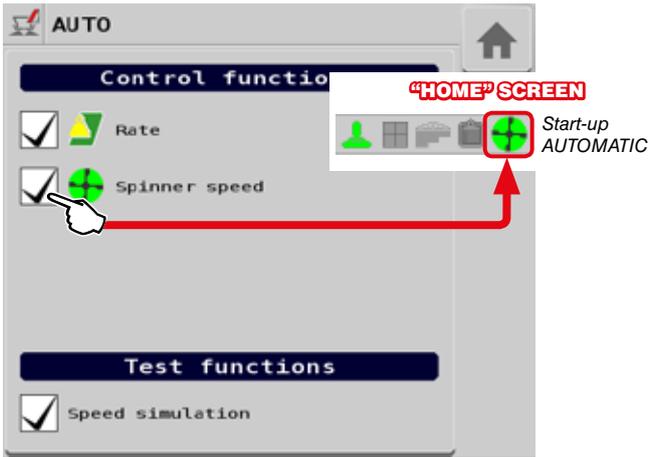


AUTOMATIC ADJUSTMENT ON
 The system keeps the set application rate constant, regardless of the changes in speed and spreading spinners status.
 In this case the application rate can be set with the proper functions **Rate** (par. 13) - **Change target** (par. 23), or by loading a prescription map from TC.

If necessary, during output, it is possible to intervene on output control (Auxiliary Input) to adjust output to crop conditions, increasing or decreasing momentarily the application rate (par. 23).

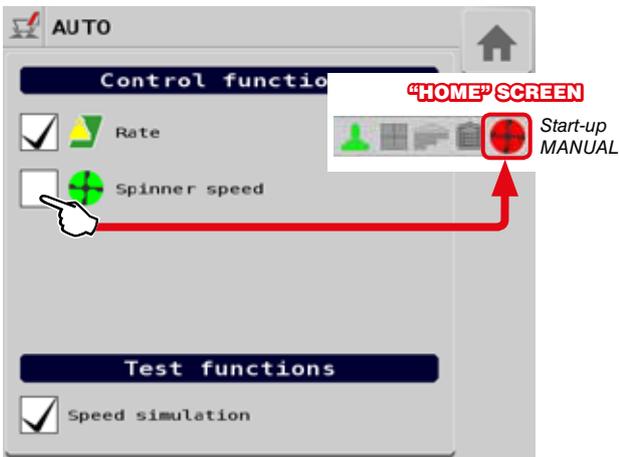
AUTOMATIC ADJUSTMENT OFF (MANUAL)
 Rate manual regulation shall be carried out with the suitable command (Auxiliary Input).

21.2 Spinner speed



Automatic management of spreading spinners.

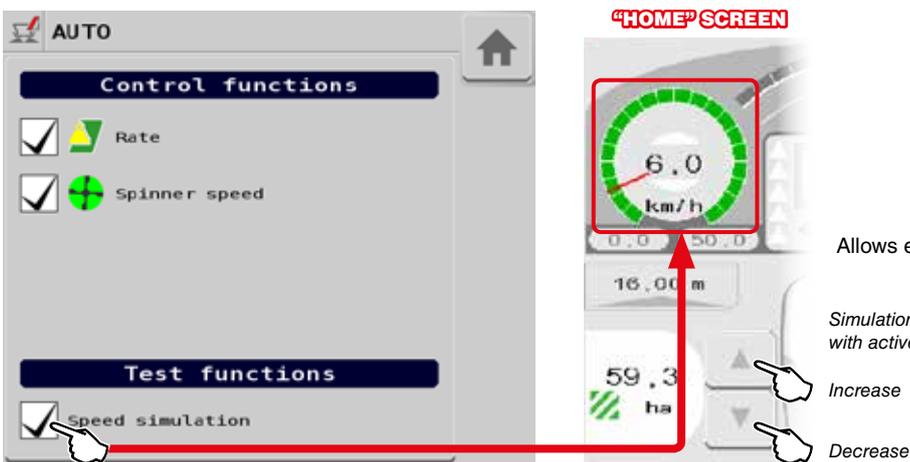
Fig. 69



Manual management of spreading spinners.

Fig. 70

21.3 Speed simulation



Allows enabling/disabling the speed simulation.

Simulation speed modification:
with active simulation press the indicated keys

Increase

Decrease

Fig. 71

22 TANK

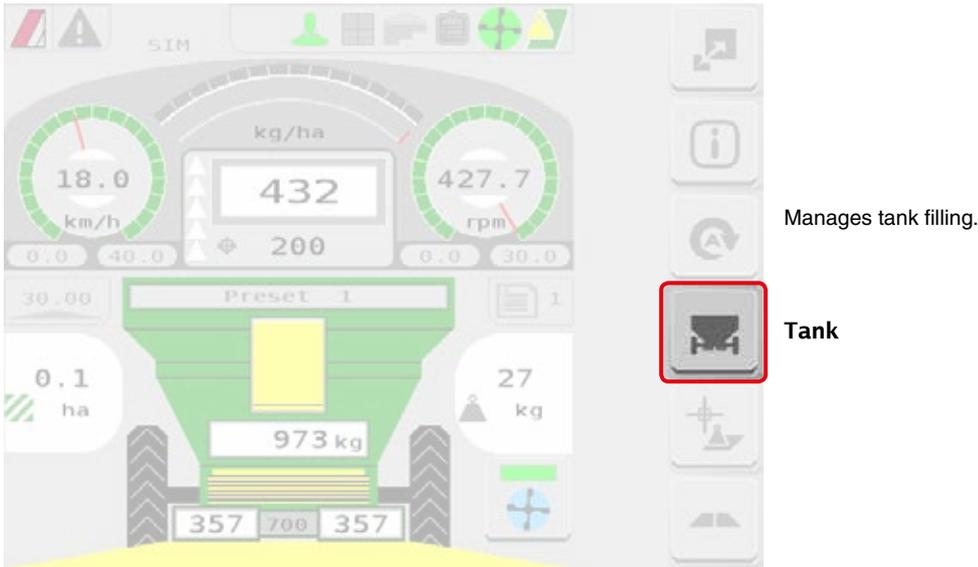


Fig. 72

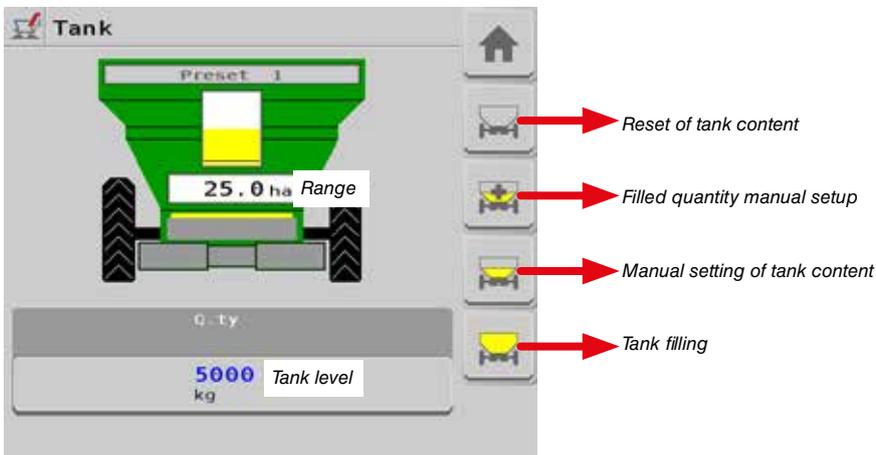


Fig. 73

22.1 Reset of tank content

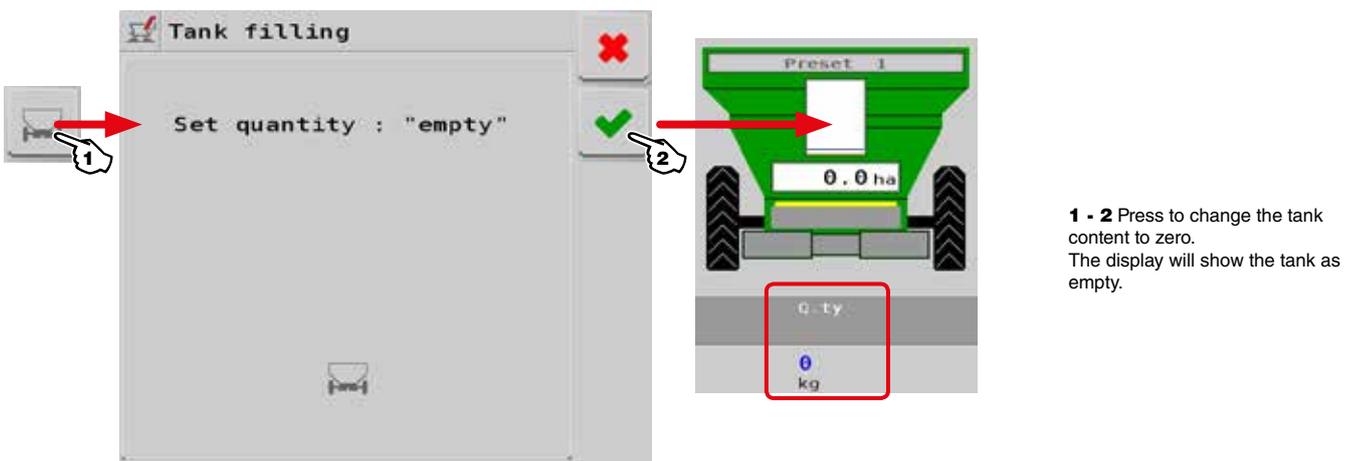


Fig. 74

22.2 Filled quantity manual setup

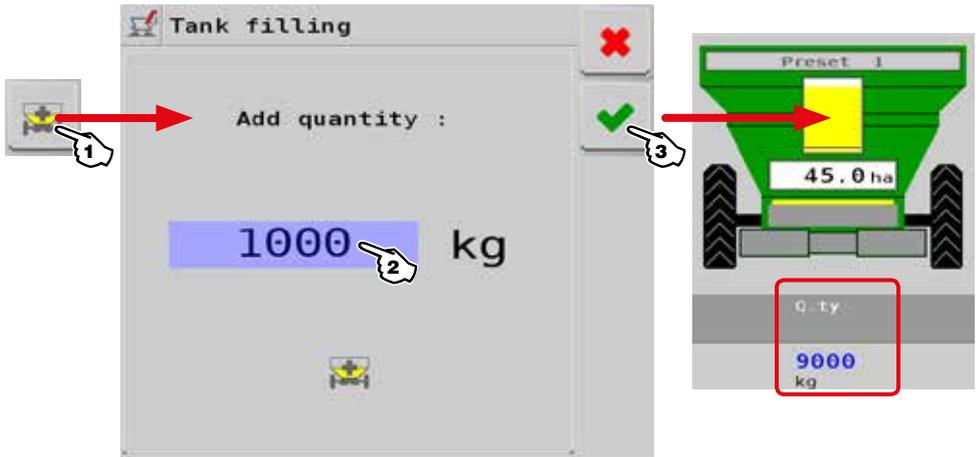


Fig. 75

1 Press to set the quantity of product filled in the tank.
 2 - 3 Set the value and confirm.
 The display shows the quantity of product contained in the tank.
 It is not possible to set values higher than tank total capacity.

22.3 Manual setting of tank content

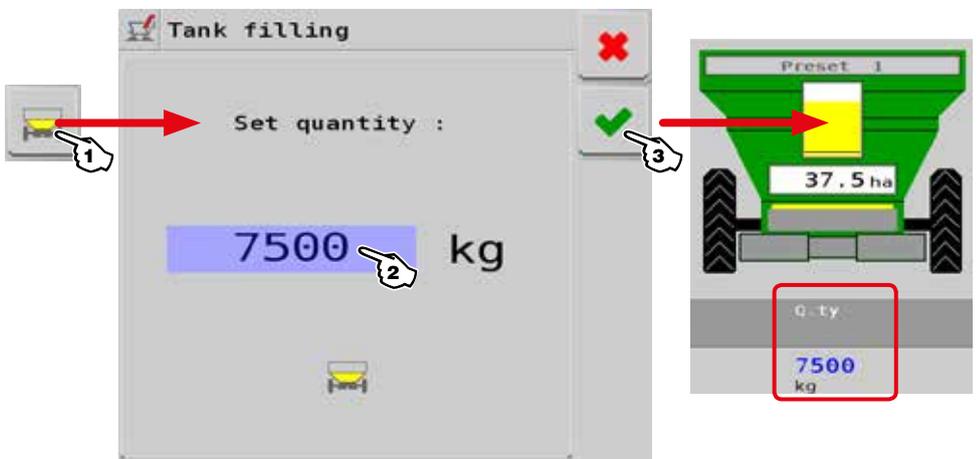


Fig. 76

1 Press to set the quantity of product present in the tank.
 2 - 3 Set the value and confirm.
 The display shows the quantity of product contained in the tank.
 It is not possible to set values higher than tank total capacity.

22.4 Tank filling

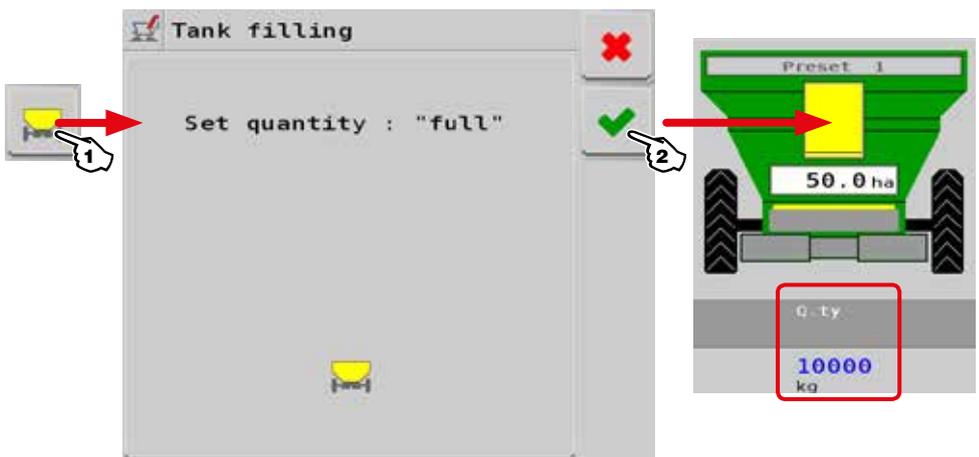
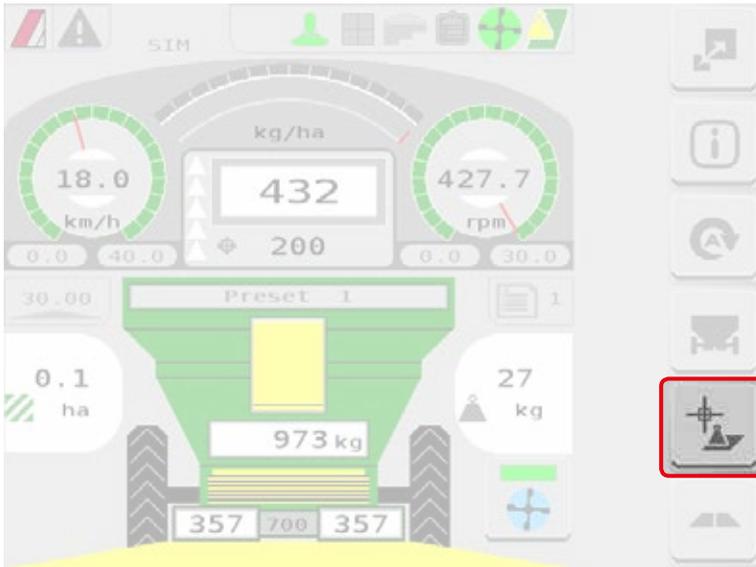


Fig. 77

1 - 2 Press to change the tank filling to the maximum.
 The display will show the tank as full.

23 CHANGE TARGET



This menu allows making a temporary change in rate and RPM of spreading spinners:

Change target

Fig. 78

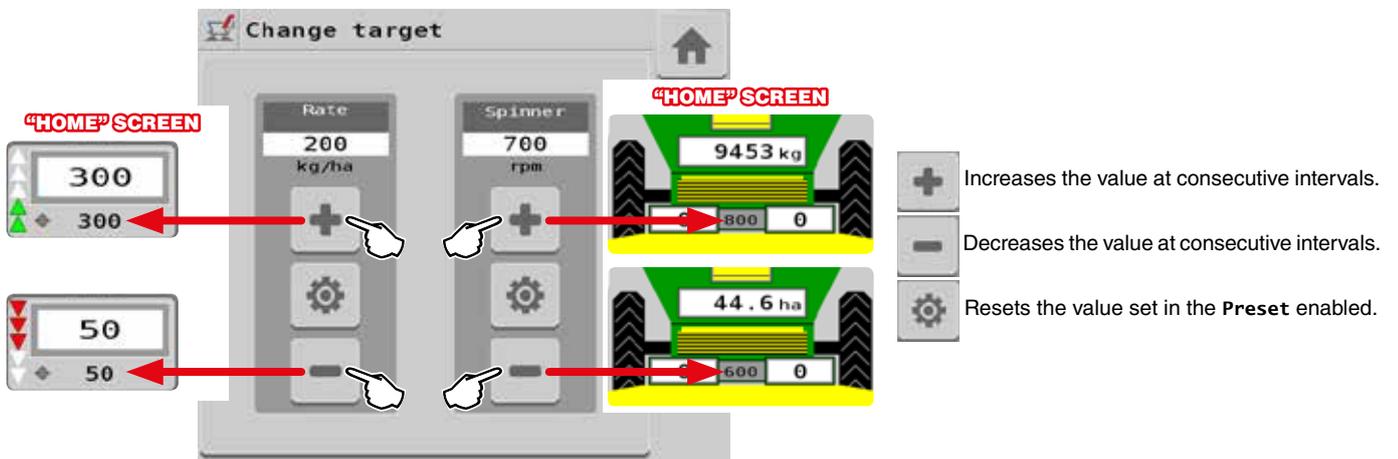
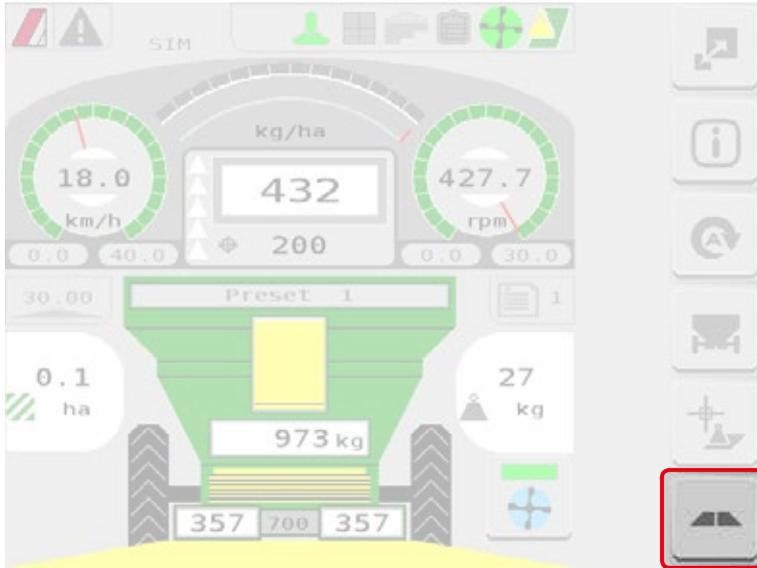


Fig. 79

24 MAIN CONTROL ON/ OFF



This menu allows enabling or disabling the main control

Main control ON/ OFF

Fig. 80

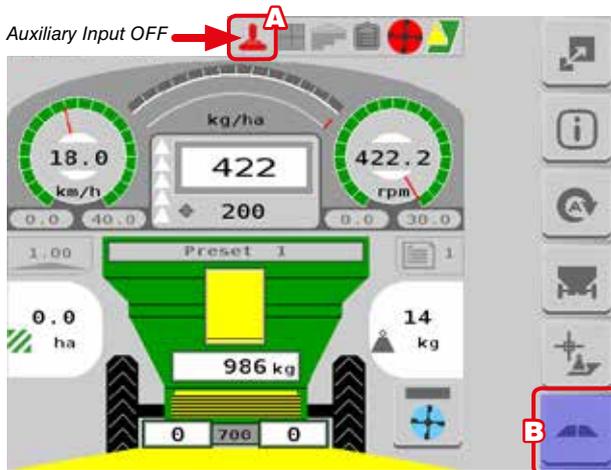
24.1 Controls WITH Auxiliary Input

Refer to the user's manual supplied with the device.



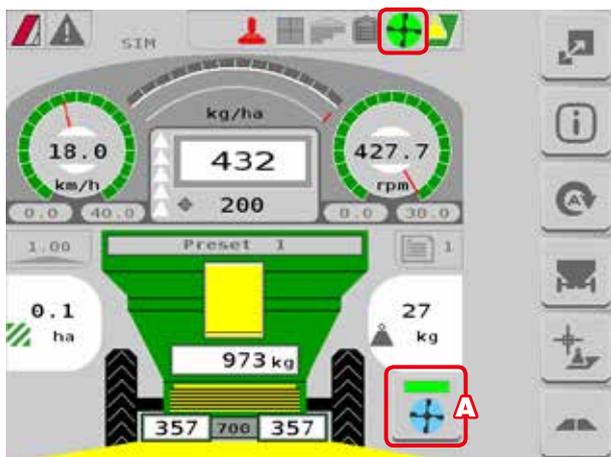
ARAG Auxiliary Input control system is not compulsory on all systems, and must thus be ordered separately. Some systems allow controlling section valves directly from monitor touch-screen panel.

24.2 Controls WITHOUT Auxiliary Input



Main control through touch-screen panel:
With no Auxiliary Input (indication **A**), the main control is commanded directly from monitor touch-screen panel (**B key**).

Fig. 81



Spreading spinner control through touch-screen panel:
The spreading spinners are directly controlled through the touch-screen panel of monitor (**A key**).



Control available only if the automatic spreading spinner control function is enabled.



This type of control is not available if the mechanical control of spreading spinners is selected in the equipment programming.

Fig. 82

25 MAINTENANCE / DIAGNOSTICS / REPAIRS

25.1 Cleaning rules

- Clean only with a soft wet cloth.
- **DO NOT** use aggressive detergents or products.
- **DO NOT** aim water jets directly at control unit.

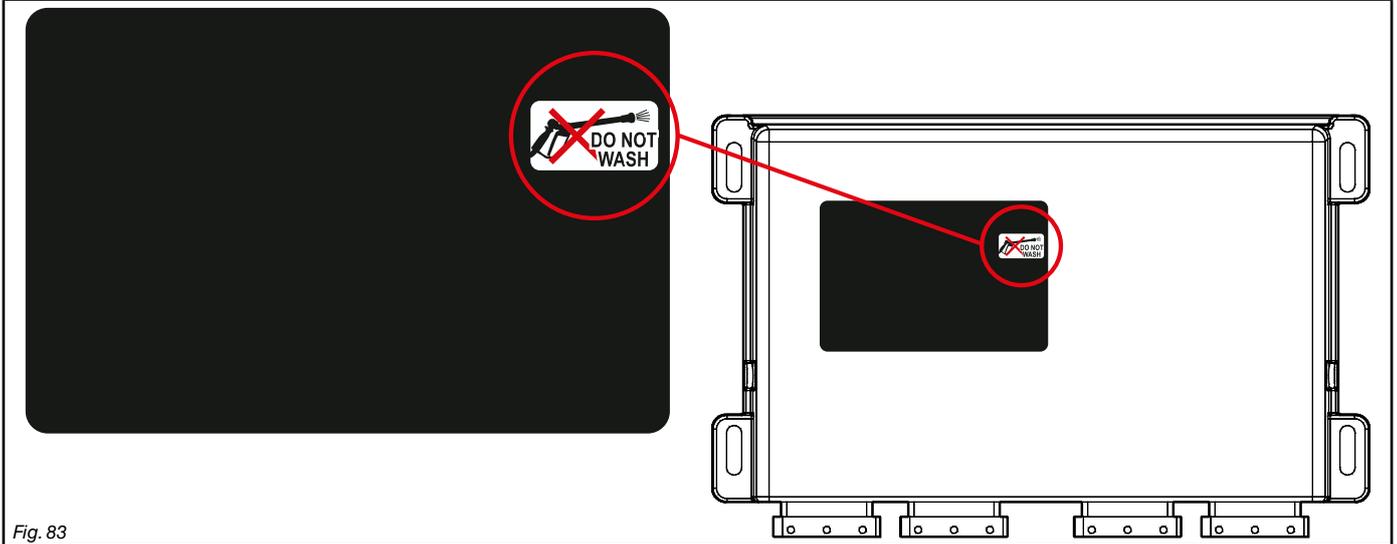
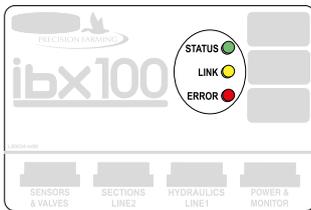


Fig. 83

25.2 LED status key



COLOR	
STATUS	● green
LINK	● yellow
ERROR	● red

- **regular blinking**= constant blinking
- **periodical blinking** = series of blinks interrupted by a pause

Switching on Upon start-up, the control unit carries out the **LED switching on in a sequence**, as follows:
1 green LED - 2 yellow LED - 3 red LED
 Whole sequence duration: 2 seconds.

STATUS ●

- **OFF**: control unit not powered
- **steady ON**: control unit powered, software not present or severe error
- **1 periodical blink**: Control unit initialization
- **2 periodical blinks**: The control unit has been correctly initialized and is waiting for connection with Virtual Terminal and loading of Object Pool
- **3 periodic blinks**: ERROR - OP loading on Virtual Terminal failed
- **4 periodical blinks**: SEVERE ERROR - internal flash drive formatting in progress
- **regular blinking**: control unit operational

LINK ●

- **steady ON**: CAN-Bus communication lines operate regularly
- **1 periodical blink**: error on CAN ISOBUS line

ERROR ●

- **OFF**: no error
- **1 periodical blink**: temperature too high
- **2 periodical blinks**: supply voltage out of range
- **3 periodical blinks**: BUS 1 (LINE 1) short circuit or absorption too high
- **4 periodical blinks**: BUS 2 (LINE 2) short circuit or absorption too high
- **5 periodical blinks**: hydraulic circuit short circuit or absorption too high
- **6 periodical blinks**: control valve short circuit or absorption too high
- **7 periodical blinks**: section valve short circuit or absorption too high
- **8 periodical blinks**: analog sensor connection problem

25.3 Error messages

MESSAGE ON DISPLAY	MALFUNCTION	CAUSE	SOLUTION	WORK MODE
IBX100 hardware fault!	Internal control unit error	A control unit component or part is damaged	Replace the control unit	---
		Sensor signals are not valid	Check sensor status and electrical connection.	
Spinner moving!	Spinners move when they should not move	Spinners are moving	Check the cause of spinner movement and remove it	Master OFF
Belt moving!	Belt moves when it should not move	The belt is moving	Check the cause of belt movement and remove it	Master OFF
Spinner stopped!	Spinners do not move when they should move	Spinner sensor damaged	Replace the sensor	Master ON + AUTO Adjustment ON
		Spinner sensor disconnected	Check that the sensor is correctly connected to the proper connector in the harness	
		Harness damaged	Check that the part of harness, connectors and cables, related to sensor connection to the control unit is not damaged	
		Control unit damaged	Replace the control unit	
		Spinner rotation is blocked	Check that spinner rotation is not mechanically or hydraulically slowed down by external causes, and remove them if present.	
Belt stopped!	Belt does not move when it should move	Wrong or no setting of belt sensor constant	Check that the constant indicated has been set on the sensor, and decrease the value if necessary.	Master ON + AUTO Adjustment ON
		Belt sensor damaged	Replace the sensor	
		Belt sensor disconnected	Check that the sensor is correctly connected to the proper connector in the harness	
		Harness damaged	Check that the part of harness, connectors and cables, related to sensor connection to the control unit is not damaged	
		Control unit damaged	Replace the control unit	
		Belt rotation is blocked	Check that belt rotation is not mechanically or hydraulically slowed down by external causes, and remove them if present.	
Spinner 1 speed high!	High spinner speed	Wrong setting of spinner sensor constant	Check that the constant indicated has been set on the sensor, and decrease the value if necessary.	Master ON + AUTO Adjustment ON
Spinner 1 speed low!	Low spinner speed	Wrong setting of spinner sensor constant	Check that the constant indicated has been set on the sensor, and decrease the value if necessary.	Master ON + AUTO Adjustment ON
		Spinner rotation is not free	Check that spinner rotation is not mechanically or hydraulically slowed down by external causes.	
Target spinner speed changed!	Spinner job speed different from preset	The operator has set a spinner job speed different from preset	Check that such new speed is actually required	Master ON + AUTO Adjustment ON
Target rate changed!	Job rate different from preset	The operator has set a job rate different from preset	Check that such new rate is actually required	Master ON + AUTO Adjustment ON
Vehicle speed low!	The vehicle speed is too low	Vehicle stationary or moving slowly	Increase speed during the treatment	Master ON + AUTO Adjustment ON
		Wrong setting of sensor constant	Correct sensor constant setting	
		Speed sensor damaged	Restore or replace the speed sensor	
		Speed sensor connection damaged	Restore speed sensor connection	
Vehicle speed high!	The vehicle speed is too high	The vehicle speed exceeds the set limit	Slow down	Master ON + AUTO Adjustment ON
		Wrong setting of sensor constant	Correct sensor constant setting	
		Speed sensor damaged	Restore or replace the speed sensor	
Rate error!	Rate does not reach the target required	Incorrect rate target	Check the set target correctness, depending on the machine capacity, and correct it if necessary	Master ON + AUTO Adjustment ON
		Belt speed maximum or minimum limit reached	Check the set limit correctness, depending on the machine capacity, and correct it if necessary	
		Speed maximum or minimum limit reached	Check the set limit correctness, depending on the machine capacity, and correct it if necessary	
		Wrong setting of spreading width	Check the spreading width set value	
		Wrong setting of calibration factor	Check the calibration factor set value	
		Wrong setting of wheel constant	Check the wheel constant set value	
Tank level low	Product level in the tank is low.	No filling or actual emptying of the tank during the treatment.	Add product in the tank.	Master ON

25.4 Troubleshooting

MALFUNCTION	CAUSE	SOLUTION
Spinner speed does not reach the desired value	Control valve is not connected	Connect the control valve
	Harness damaged	Check that the part of harness, connectors and cables, related to valve connection to the control unit is not damaged
	Speed maximum or minimum limit reached	Check the set limit correctness, and correct it if necessary
	Wrong setting of sensor constant	Correct sensor constant setting
	Wrong control circuit dimensions	Check dimensions
Belt speed does not reach the desired value	Control valve is not connected	Connect the control valve
	Harness damaged	Check that the part of harness, connectors and cables, related to valve connection to the control unit is not damaged
	Speed maximum or minimum limit reached	Check the set limit correctness, and correct it if necessary
	Wrong setting of sensor constant	Correct sensor constant setting
	Wrong control circuit dimensions	Check dimensions
The vehicle speed displayed is not correct	Wrong setting of wheel constant	Check the wheel constant set value
	No signal coming from the speed sensor (if enabled)	Check sensor integrity and connection to the control unit
	No signal coming from GPS (if enabled)	Check the correct GPS signal reception
	Wrong setting of wheel constant	Check the wheel constant set value
	Simulation mode enabled	Exit from simulation mode if it is not necessary
Output volume count is inaccurate	Wrong setting of spreading width	Check the spreading width set value
	Wrong setting of calibration factor	Check the calibration factor set value
	Wrong setting of wheel constant	Check the wheel constant set value
	Wrong setting of belt sensor constant	Check that the constant indicated has been set on the sensor, and decrease the value if necessary.
Covered area count does not match actual area covered	Wrong setting of spreading width	Check the spreading width set value
	Wrong setting of wheel constant	Check the wheel constant set value
	No signal coming from the speed sensor (if enabled)	Check sensor integrity and connection to the control unit
	No signal coming from GPS (if enabled)	Check the correct GPS signal reception
	Counter not reset	Reset the counter
Traveled distance count does not match actual distance covered	Wrong setting of wheel constant	Check the wheel constant set value
	No signal coming from the speed sensor (if enabled)	Check sensor integrity and connection to the control unit
	No signal coming from GPS (if enabled)	Check the correct GPS signal reception
	Counter not reset	Reset the counter
Applied product volume count does not match the actual applied product	Wrong setting of spreading width	Check the spreading width set value
	Wrong setting of calibration factor	Check the calibration factor set value
	Wrong setting of wheel constant	Check the wheel constant set value
	Wrong setting of belt sensor constant	Check that the constant indicated has been set on the sensor, and decrease the value if necessary.
	Counter not reset	Reset the counter
Treatment time count does not match actual work time.	Counter not reset	Reset the counter

26 TECHNICAL DATA

DESCRIPTION	IBX100
Power supply voltage	9 ÷ 16 Vdc
Operating temperature	-40 °C ÷ +60 °C -40 °F ÷ +140 °F
Storage temperature	-40 °C ÷ +85 °C -40 °F ÷ +185 °F
Weight (without cables)	1213 g
Digital inputs	For Open Collector sensors: Max. frequency 2000 Hz
Analog inputs	4-20 mA
Digital outputs (valves)	Active high (max 200 mA)
Hydraulic valve power outputs	Active high (max 2.5 A)
Protection against polarity inversion	•
Protection against short-circuit	•
Protection rating	IP65

27 END-OF-LIFE DISPOSAL

Dispose of the system in compliance with the established legislation in the country of use.

28 GUARANTEE TERMS

1. ARAG s.r.l. guarantees this apparatus for a period of 360 days (1 year) from the date of sale to the client user (date of the goods delivery note).
The components of the apparatus, that in the unappealable opinion of ARAG are faulty due to an original defect in the material or production process, will be repaired or replaced free of charge at the nearest Assistance Center operating at the moment the request for intervention is made. The following costs are excluded:
 - disassembly and reassembly of the apparatus from the original system;
 - transport of the apparatus to the Assistance Center.
2. The following are not covered by the guarantee:
 - damage caused by transport (scratches, dents and similar);
 - damage due to incorrect installation or to faults originating from insufficient or inadequate characteristics of the electrical system, or to alterations resulting from environmental, climatic or other conditions;
 - damage due to the use of unsuitable chemical products, for spraying, watering, weedkilling or any other crop treatment, that may damage the apparatus;
 - malfunctioning caused by negligence, mishandling, lack of know how, repairs or modifications carried out by unauthorized personnel;
 - incorrect installation and regulation;
 - damage or malfunction caused by the lack of ordinary maintenance, such as cleaning of filters, nozzles, etc.;
 - anything that can be considered to be normal wear and tear;
3. Repairing the apparatus will be carried out within time limits compatible with the organizational needs of the Assistance Center.
No guarantee conditions will be recognized for those units or components that have not been previously washed and cleaned to remove residue of the products used;
4. Repairs carried out under guarantee are guaranteed for one year (360 days) from the replacement or repair date.
5. ARAG will not recognize any further expressed or intended guarantees, apart from those listed here.
No representative or retailer is authorized to take on any other responsibility relative to ARAG products.
The period of the guarantees recognized by law, including the commercial guarantees and allowances for special purposes are limited, in length of time, to the validities given here.
In no case will ARAG recognize loss of profits, either direct, indirect, special or subsequent to any damage.
6. The parts replaced under guarantee remain the property of ARAG.
7. All safety information present in the sales documents regarding limits in use, performance and product characteristics must be transferred to the end user as a responsibility of the purchaser.
8. Any controversy must be presented to the Reggio Emilia Law Court.

29 EU DECLARATION OF CONFORMITY

The declaration of conformity is available at the website www.aragnet.com, in the relevant section.

Only use genuine ARAG accessories or spare parts to make sure manufacturer guaranteed safety conditions are maintained in time. Always refer to the internet address www.aragnet.com

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42048 RUBIERA (Reggio Emilia) - ITALY
Via Palladio, 5/A

Tel. +39 0522 622011
Fax +39 0522 628944

<http://www.aragnet.com>
info@aragnet.com