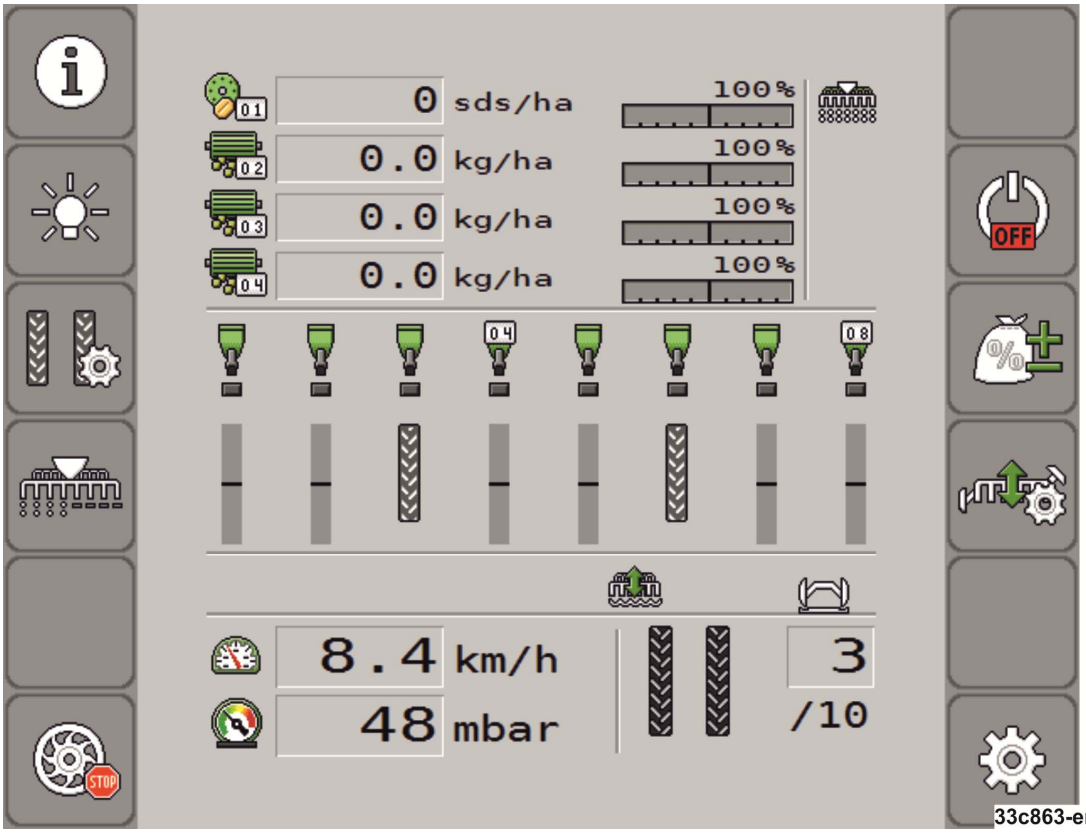
Operating Manual

AMAZONE

Software ISOBUS ED



MG5220
BAH0085-4 11.17
Printed in Germany

Please read this operating manual
before commissioning.
Keep it in a safe place for future use!

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READING THE INSTRUCTION

manual and to adhere to it should not appear to be inconvenient and superfluous as it is not enough to hear from others and to realise that a machine is good, to buy it and to believe that now everything would work by itself. The person concerned would not only harm himself but also make the mistake of blaming the machine for the reason of a possible failure instead of himself. In order to ensure a good success one should go into the mind of a thing or make himself familiar with every part of the machine and to get acquainted with its handling. Only this way, you would be satisfied both with the machine as also with yourself. To achieve this is the purpose of this instruction manual.

Leipzig-Plagwitz 1872. Rud. Sack.

Read and follow these operating instructions.

Keep these operating instructions in a safe place for later reference.

Company details

Document	Service manual Product: DRILL-Controller Document number: 30124695-02-200 As of software version: 01.09.00.00 Original language: German

Table of Contents

1 For your safety

1.1 Basic safety instructions

Operation

During operation, always comply with the following instructions:

- Read the operating instructions to the agricultural device which you want to control by using the product.
- Before you leave the vehicle cabin, ensure all automatic mechanisms are deactivated or manual mode is activated.
- Keep children away from the trailer device and from the job computer.

Repairs

Keep the system in functioning condition. To do so, comply with the following instructions:

- Do not make any unauthorized modifications to the product. Unauthorized modifications or use may impair safety and reduce the service life or operability of the unit. Modifications are considered unauthorized if they are not described in the product documentation.
- Never remove any safety mechanisms or stickers from the product.
- Before charging the tractor battery, always disconnect the tractor from the job computer.
- The product does not include any user serviceable parts. Do not open the casing.

1.2 Intended use

The job computer is only intended for use in the agricultural sector. The manufacturer is not liable for any other installation or use of the job computer.

The manufacturer cannot be held liable for any personal injury or property damage resulting from such non-compliance. All risk arising from improper use lies solely with the user.

Intended use also includes compliance with the conditions for operation and repairs prescribed by the manufacturer.

All applicable accident prevention regulations and all other generally recognized safety, industrial, and medical standards as well as all road traffic laws must be observed. Any unauthorized modifications made to the equipment will void the manufacturer's warranty.

1.3 Layout and meaning of warnings

All safety instructions found in these operating instructions are composed in accordance with the following pattern:

⚠ WARNING

This signal word identifies medium-risk hazards, which could potentially cause death or serious physical injury, if not avoided.

⚠ CAUTION

This signal word identifies hazards that could potentially cause minor or moderate physical injury, if not avoided.

NOTE

This signal word identifies hazards that could potentially cause damage to property, if not avoided.

Indicates handling tips and particularly useful information.

These instructions will help you to use all the functions of your implement in the best way possible.

There are some actions that need to be performed in several steps. If there is a risk involved in carrying out any of these steps, a safety warning will appear in the instructions themselves.

Safety instructions always directly precede the step involving risk and can be identified by their bold font type and a signal word.

Example

1. NOTE! This is a notice. The notice warns you of a risk that is involved in the next step.
2. Step involving risk.

1.4 Safety sticker on the product

Sticker on the job computer

	Do not clean with a high-pressure cleaner.

1.5 Disposal

When it has reached the end of its service life, please dispose of this product as electronic scrap in accordance with all applicable waste management laws.

2 About the job computer

2.1 Job computer functions

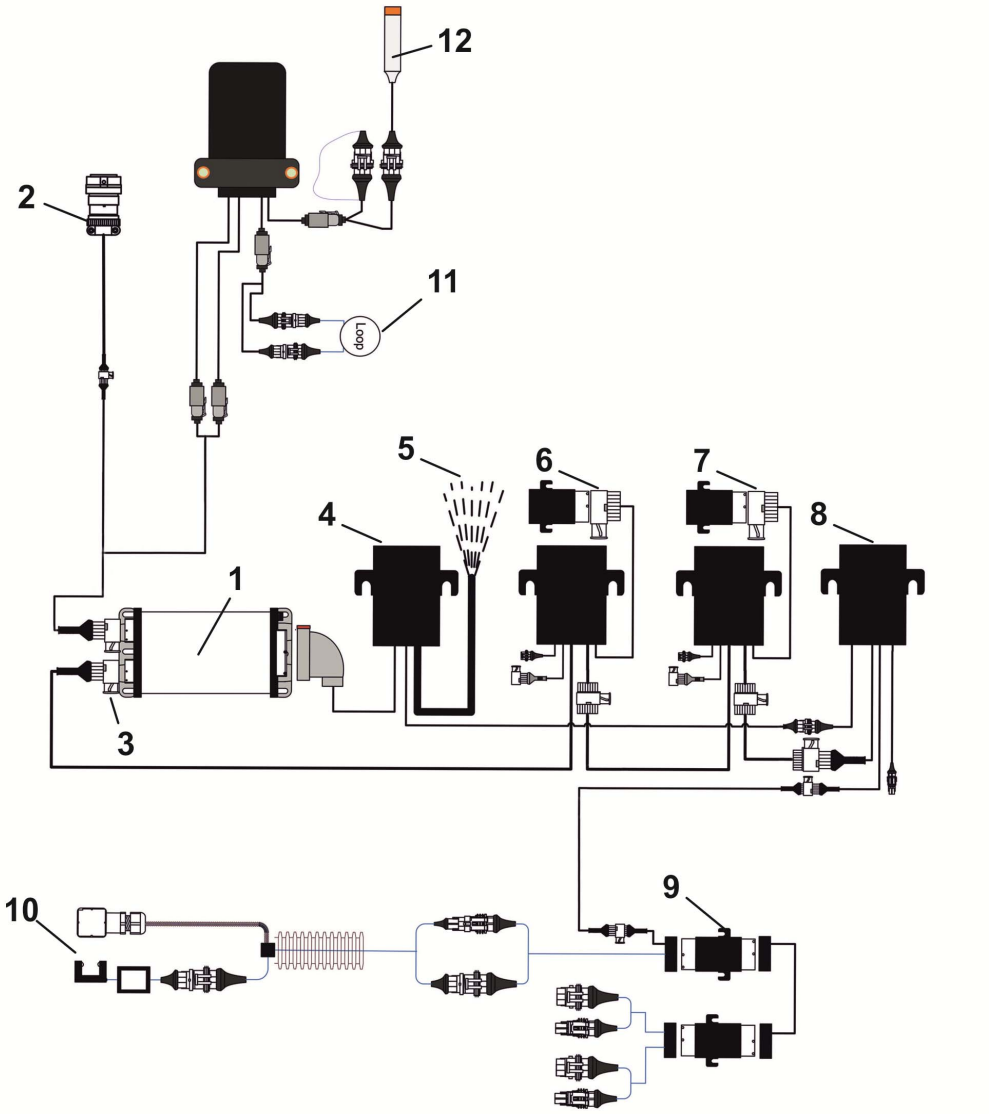
The ISOBUS job computer is the switching central of the precision airplanter. Several sensors are connected to the job computer, which monitor important implement parts. The job computer controls the implement based on these signals and on the operator's specifications. An ISOBUS terminal serves as an interface. All implement-specific data are stored in the job computer and are therefore maintained even when changing the terminal.

Among other things, the job computer can perform the following tasks:

- Monitoring of the metering shaft
- Control of the track marker
- Control of the tramline valves
- Starting the calibration test using the calibration button
- Speed recording from different sources
- Monitoring of the blower fan speed
- Monitoring and shutoff for each individual row on precision airplanters with ERC modules
- Grouping of rows into part width sections on precision airplanters

2.2 System overview

The system consists of one or several job computers that are mounted on the precision airplanter and control the operation. Each job computer is responsible for controlling selected functions and receives signals from selected sensors.



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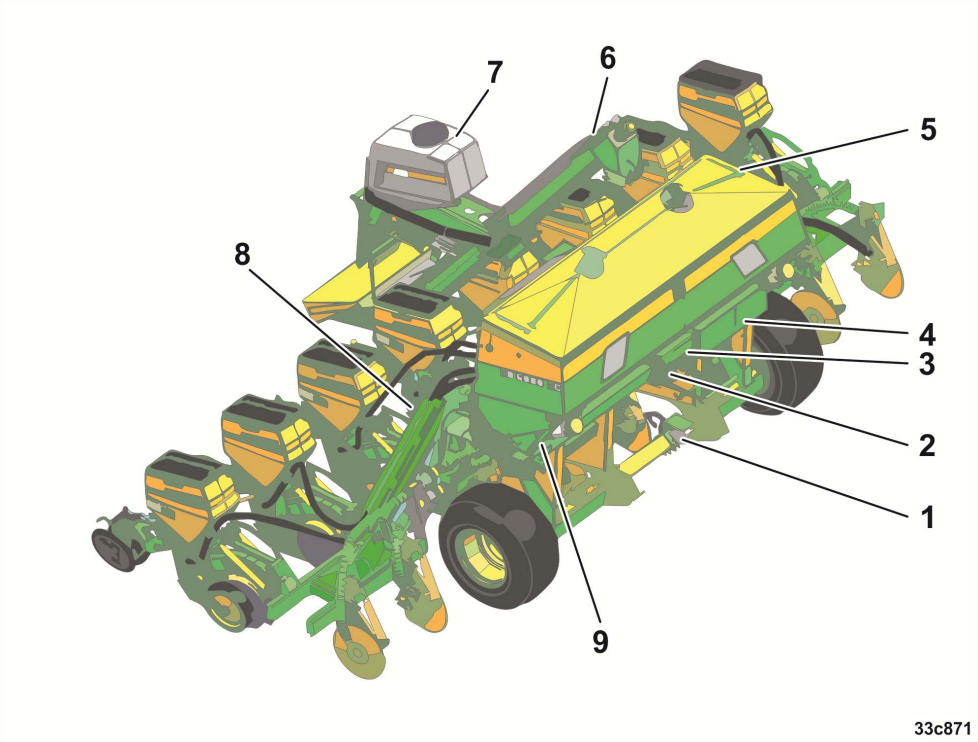
1	ISOBUS job computer	7	Micropellet 2 job computer (optional)
2	ISOBUS implement plug	8	ERC junction box
3	CAN bus connector	9	ERC module
4	Junction box	10	Unit line 1-12
5	Implement wiring harness	11	Fertiliser line monitoring (optional)
6	Micropellet 1 job computer (optional)	12	Additional working position sensor (optional, only with fertiliser line monitoring)

Example

The following diagram shows an example of how an implement can be structured:



1. Radar sensor (optional)
2. Working position sensor
3. ISOBUS socket
4. ISOBUS job computer
5. Calibration button
6. Loading auger (optional)
7. Micropellet spreader (optional)
8. Precision metering drive
9. Volume metering drive (fertiliser, optional)

2.3 Information on the rating plate

On the job computer casing you will find a rating plate. The rating plate provides a unique job computer identification.

Information on the rating plate

1. Client's item number
   If the product was manufactured for an agricultural machinery manufacturer, the agricultural machinery manufacturer's item number will be shown here.
2. Hardware version
3. Müller-Elektronik item number
4. Operating voltage
   The product may only be connected to voltages within this range.
5. Software version at the time of delivery.
   If you update the software, this version will no longer be up-to-date.
6. Serial number

3 About this service manual

3.1 Scope of the instructions

These instructions describe all of the functions that can be operated with the job computer. This means that depending on the implement, some of the sections may not be relevant for the operation.

3.2 Layout of operating instructions

The operating instructions explain step by step how you can perform certain operations with the product.

We use the following icons throughout these operating instructions to identify different operating instructions:

Type of depiction	Meaning
1. 2.	Actions that must be performed in succession.
⇨	Result of the action. This will happen when you perform an action.
⇨	Result of an operating instruction. This will happen when you have completed all steps.
☑	Requirements. In the event that any requirements have been specified, these must be met before an action can be performed.

3.3 Layout of references

If any references are given in these operating instructions, they will appear as:

Example of a reference: see page 17

The number shows you the page number for the section in which you can find further information.

4 Basic control principles

4.1 Connecting the job computer to the ISOBUS

To connect the job computer to the power supply and to the ISOBUS terminal, you have to connect the ISOBUS cable to an ISOBUS socket on the tractor.

Procedure

This is how to connect the job computer to the ISOBUS:

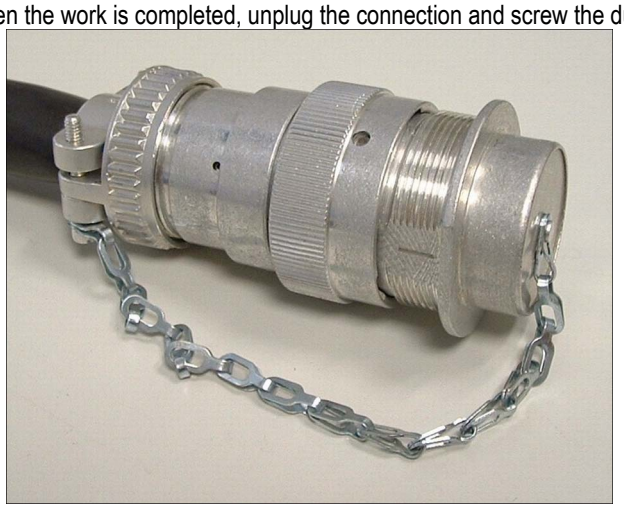
1. Take the ISOBUS cable for the job computer.
2. Unscrew the dust protection cap.

⇨ 

3. Insert the ISOBUS plug into the ISOBUS socket on the tractor.
4. Lock the connector. For basic vehicle harnesses from Müller-Elektronik, turn the connector clockwise. For other ISOBUS basic vehicle harnesses, the procedure depends on the model.
   ⇨ The connector fits tightly.
5. Screw the dust protection caps for the plug and the socket together.

⇨ 

6. When the work is completed, unplug the connection and screw the dust protection cap back on.

⇨ 

4.2 Switching on the job computer

Procedure

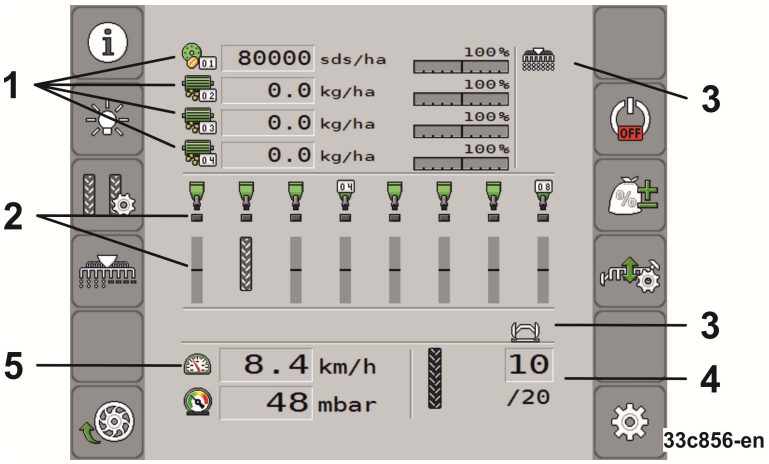
1. Connect the ISOBUS cable of the job computer to the ISOBUS connector on the tractor.
2. Start the ISOBUS terminal.
   - ⇨ The job computer is started together with the terminal.
   - ⇨ When starting up for the first time, the job computer initially has to transmit lots of information to the terminal. This can take a few minutes.
   - ⇨ When all of the data from the job computer application has been loaded, their icon appears on the terminal:  .
3. Open the job computer application. To do so, follow the instruction for the ISOBUS terminal.
   - ⇨ The work screen of the job computer appears.

4.3 Configuring the terminal

- If you are using only one terminal as a Universal Terminal (UT) and Task Controller (TC), confirm the terminal as the standard terminal.
- If you are using more than one terminal or more than one Task Controller, you can choose which one you want to use each time (see Selecting the Universal Terminal (UT) and Task Controller (TC), page 51).

4.4 Layout of the work screen

The work screen is the part of the screen where you can see the current status of the implement based on the icons shown. Depending on the implement equipment, not all of the icons are always shown.

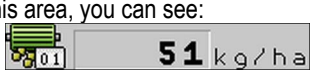


1. Information on the volume metering drives, see page 17
   Information on the row metering drives, see page 17
2. Information on the rows, see page 18
3. Information on the additional functions, see page 19
4. Status information, see page 18
5. Travel speed

The layout of the user interface depends on the control terminal.

Information on the volume metering drives

In this area, you can see:

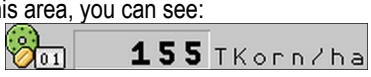
- 

- The spread rate for each connected metering drive. The number indicates which metering drive is meant. The current value is always shown here.
- 

- The changed target rate you have entered.

Information on the row metering drives

In this area, you can see:

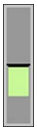
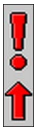
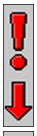
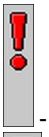
- 

- The spread rate for each connected metering drive. The number indicates which metering drive is meant. The current value is always shown here.
- 

- The changed target rate you have entered.

Information on the rows

In this area, you can see:

- What is being spread in each row:
  -  - Seed
  -  - Solid fertiliser
- The current deviation from the target rate per row.
  -  - The target rate is being met.
  -  - The target rate is being exceeded within the deviation tolerance.
  -  - The target rate is being undercut within the deviation tolerance.
  -  - The target rate is being exceeded outside of the deviation tolerance. Alarm is issued!
  -  - The target rate is being undercut outside of the deviation tolerance. Alarm is issued!
  -  - No seed flow detected or seed flow detected in a switched-off row.
  -  - Whether a tramline is being created.
-  - The numbering of the rows.

Status information

In this area, you can see:

-  - The current speed of the implement.
-  - The current speed of the blower fan. The number indicates which fan is meant.
-  - The current pressure in the monitored system.
-  - Whether tramline control is deactivated.
-  - Which track you are currently driving on.

Information on the additional functions

In this area, you can see if specific functions are activated.

-  - The warning beacon is activated.
-  - The hopper lighting is activated.
-  - The work floodlights are activated.
-  - The Water hole mode is activated.
-  - The metering wheels are being filled with seed.
-  - Both track markers are being used.
-  - The left track marker is being used.
-  - The right track marker is being used.
-  - No track marker is being used.
-  - The left track marker is being used. Alternating mode is activated for the track marker.
-  - The right track marker is being used. Alternating mode is activated for the track marker.
-  - The obstacle mode is activated.
-  - The ISOBUS-TC application is activated.
-  - SECTION-Control is activated and in automatic mode.
-  - A hopper has issued an alarm.
-  - The implement is in working position.
-  - The pre-stop function is activated.

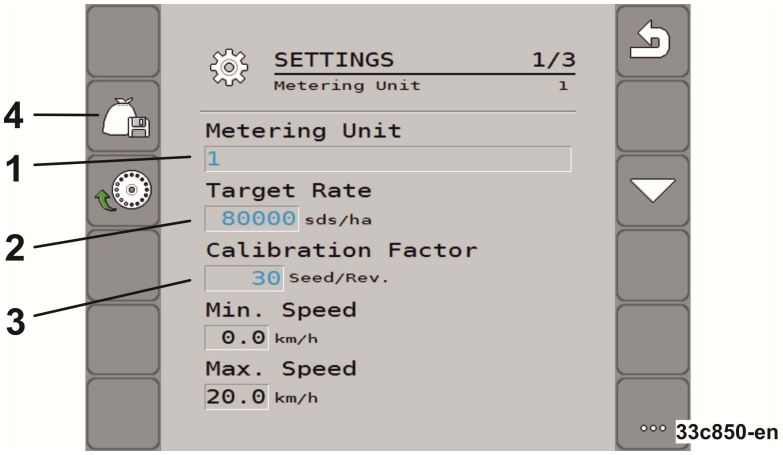
5 Operating the implement on the field

5.1 Setting target rate

On the "Settings/Metering unit" screen, you can view or configure the following parameters for each metering unit.

On the work screen, press: 

⇨ "Settings/Metering unit" screen appears.



(1) Defines the currently selected metering unit.
1: Seed
2: Fertiliser (optional)
3: Micropellets (optional)
4: Micropellets (optional)

(2) Defines how much seed or fertiliser should be spread per hectare.

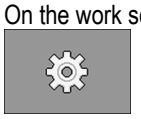
(3) For precision airplanters, defines how many grains are applied per revolution of the metering wheel.

(4) Saves the settings for the selected metering unit.

- "Min. speed"
  Shows the minimum speed that is required for spreading.
- "Max. speed"
  Shows the maximum possible speed for spreading. If the maximum possible speed is exceeded, the application stops automatically.
- "Adjustment"
  Defines the percent change for the target rate when you change it manually during the spreading. (see page 46).

Procedure

1. On the work screen, press:



⇨ "Settings/Metering unit" screen appears.

2. Configure the parameters (see page 20)
3.  - On a precision airplanter (see page 20), you have the option of saving the settings for the selected metering unit. In doing so, the "Gear ratio" (see page 47) parameter of the selected product is also adopted.

5.2 Performing a calibration test

The operating instructions of the implement explain when to perform a calibration test.

You can only perform a calibration test when the machine is ready for operation.

☑ You have prepared the implement and its metering drives for calibration test as described in the operating instructions from the implement manufacturer.

☑ The hopper is filled with a sufficient quantity of seed or fertiliser. Do not fill the hopper all the way, so that it is easier to remove or adjust a metering roll if necessary.

☑ The implement is at a standstill.

☑ Activate the application.

☑ Deactivate the control unit for the blower fan of the implement.

5.2.1 Electric metering drive

Procedure

1. On the work screen, press:

⇨ "Settings/Metering unit" screen appears.

2. If you are using several metering units, select the metering unit for which you want to perform the calibration test (see page 20).
   ⇨ You can see the currently selected metering unit by the number in the upper area of the screen.
3. Enter the "Target rate" (see page 20) with which you want to work later on.
4. Press the function key of the metering drive for which you want to perform the calibration test.

e.g. 

⇨ "Calibration test" screen appears.

5. In the input box under the text "Speed correct?", enter the speed that you want to use later on when seeding.

6.  - Fill the metering cells with seed or fertiliser.
   ⇨ The metering wheels will rotate for a few seconds, until the angle defined in the "Angle pre-assignment" parameter (see page 64) is reached.
7.  - Start the calibration test.
8. Start the calibration test on the implement. Proceed as described in the operating instructions from the implement manufacturer.
9. Wait until the desired quantity has been spread. The job computer calculates a weight from the available data and shows it in the "Calculated value" box.
10. Terminate the calibration test on the implement. Proceed as described in the operating instructions from the implement manufacturer.
    ⇨ On the display screen, a screen with the text: "3. Result" appears.
11. Weigh the seed or fertiliser that was collected during calibration test.
12. Enter the weight in the "Weighed value" box.
    ⇨ The job computer calculates the deviation in percent between the calculated and the weighed value.
    ⇨ The job computer calculates the minimum and the maximum speed at which this spread rate is possible using the selected metering roll.
    ⇨ When the calibration button is pressed again, the calibration test continues counting at the weighed value.
13.  - Confirm.

⇨ The job computer saves all of the data on the product in the product database.

5.2.2 Mechanical metering drive

☑ You have prepared the implement and its metering drives for the calibration test as described in the operating manual from the implement manufacturer and determined the gearbox setting for the mechanical metering drive.

Procedure

1. On the work screen, press:
   
   ⇨ "Settings/Metering unit" screen appears.
2.  - Press the function key for the calibration test with a mechanical fertiliser metering drive.
3. In the input box under the text "Speed correct?", enter the speed that you want to use later on when seeding.
4.  - Start the recording of the calibration test.
5. Continue with the calibration test on the implement. Proceed as described in the operating manual from the implement manufacturer.

6. During the calibration test, the job computer calculates a weight from the available data and shows it in the "Calculated value" box.
7. Terminate the calibration test on the implement. Proceed as described in the operating instructions from the implement manufacturer.
   ⇨ On the display screen, a screen with the text: "3. Result" appears.
8. Enter the weight in the "Weighed value" box.
   ⇨ The job computer calculates the deviation in percent between the calculated and the weighed value.
   ⇨ The job computer calculates the minimum and the maximum speed at which this spread rate is possible using the selected metering roll.
9.  - Confirm.

⇨ The job computer saves all of the data on the product in the product database.

5.3 Pre-metering – Filling the metering cells or metering wheel with seed

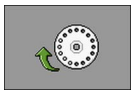
To be able to seed right from the beginning and to avoid having areas without seed at the beginning of the field, you have to fill the metering cells and the metering wheels with seed before starting operation. You can also use the pre-metering function.

Procedure

1. On the work screen, press

   for volume metering: 

   ⇨ The metering cells turn for several seconds ("Pre-start time" parameter, see page 64).

   For single grain metering:  > 

   ⇨ The metering wheels will rotate for a few seconds, until the angle defined in the "Angle pre-assignment" parameter (see page 64) is reached.

   ⇨ As long as the metering cells or the metering roll are being filled, the following icon appears on the work screen:  or 
2. Only start driving when the icon is turned off.

The quantities spread during pre-metering are saved.

An error message appears if the hydraulic metering drive is not supplied with oil. Check the proper position of the control units.	Metering drive is stationary!

5.4 Start seeding

Procedure

☑ The implement is moving.

☑ The implement is lowered.

☑ The metering cells or the metering roll is filled with seed.

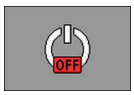
☑ The blower fan has reached the minimum speed.

1. 

- Start seeding.

5.5 Stop seeding

Procedure

1. 

- Stop seeding.

⇨ On the work screen, the following message appears: "Application is stopped."

⇨ All of the metering drives are stopped.

5.6 Pre-stop function

Procedure

1. 

- Stop the seeding for selected metering drives.

⇨ All of the selected metering drives are stopped.

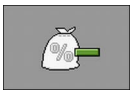
The metering drives are selected with the "Pre-start time“ parameter (see page 64).

In some countries, implements and/or additional metering units much be equipped such that certain active substances (e.g. toxic micro-fertilisers) are not deposited on the seedbed surface! Metering units that spread toxic active substances must be configured with a pre-stop time of 0 seconds (see page 64). Before raising the implement, the selected metering units must be manually deactivated at a sufficient distance from the headlands. Ask your local importer/implement dealer about the legal guidelines.

5.7 Adjusting the target rate during operation

You can adjust the target rate while working.

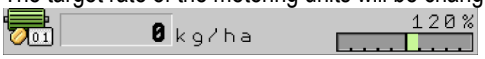
If you are working with several products, you can adjust the target rate for each product individually. A number then appears for each product on the screen and on the function icons.

Function icon	Meaning
	Increases the target rate.
	Reduces the target rate.
	Restores the target rate back to 100 %.

The target rate is changed by the value that you defined for the "Adjustment" parameter on the "PRODUCT DATABASE" screen (see page 46).

Procedure

☑ You have defined the "Target rate" and "Adjustment" parameters.

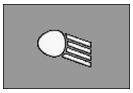
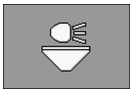
1. On the work screen, press:
   
   ⇨ Function icons for the adjustment of the target rate appear.
2.  ,  or  - Change the target rate.
   ⇨ The target rate of the metering units will be changed:
   

   ⇨ The job computer regulates the seeding according to the new target rate.

⇨ After one minute of operation with the changed target rate, the display will begin to flash.

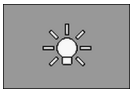
5.8 Switching the lighting on and off

You can switch the lighting on and off during operation.

Function icon	Meaning
	Switches working lights on and off.
	Switches hopper lights on and off.
	Switches warning beacon on and off.

Procedure

1. On the work screen, press:

   ⇨ Function icons appear.

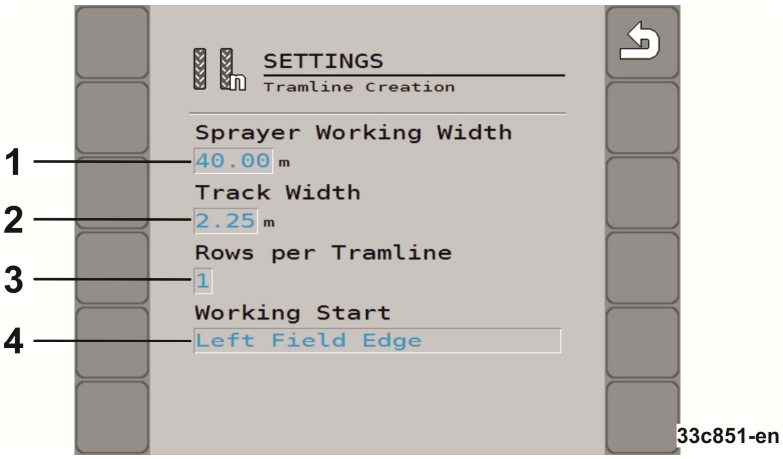
2. Select the lighting.

⇨ The icons for the switched on lighting appear on the work screen.

For road transport, only switch on the lighting equipment intended for this purpose.

5.9 Configuring the tramline control

If you are using a precision airplanter, you must configure the following parameters on the "Settings/Tramlines" screen:



(1) Defines the working width of the sprayer for which you want to create the tramline.

(2) Defines the track width of the tractor.

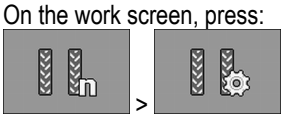
(3) Defines how many rows you want to switch off per wheel for creating a tramline.
1 - 3 rows can be switched off per wheel.

(4) Defines where you want to start working:
"Left field edge" / "Right field edge"

This is how to configure the tramline control on a precision airplanter:

Procedure

☑ You have activated the tramline control.

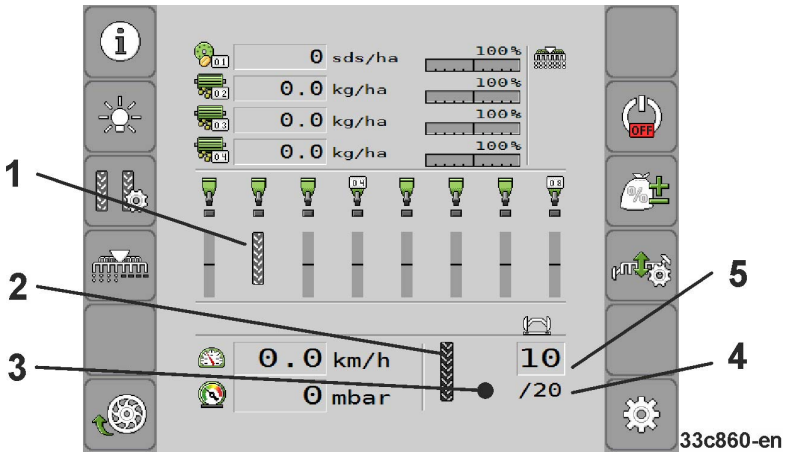
1. On the work screen, press:


⇨ The "Settings/Tramlines" screen appears.
2. Configure the parameters.

⇨ You have configured the tramline control for the precision airplanter.

5.10 Using tramline control

The job computer can help you to create tramlines for the tires of other vehicles, for example, a sprayer. A tramline is created by closing the seed tubes to the seeding coulters. This creates an area behind the implement where there is no seeding. When the tramline control is activated, the tracks are counted to create the tramlines for the defined tracks. The tracks are counted as soon as the implement is lifted out of the soil.

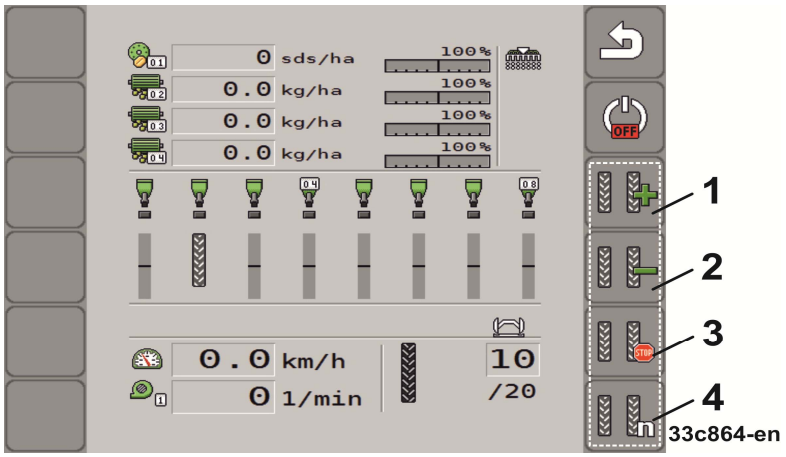


1. A tramline is being created.
2. A tramline is being created on the left side of the implement.
3. Tramline control is not active on this side of the implement. Therefore, no tramline will be created for this track. No icon appears.
4. Length of the tramline rhythm
   Number of tracks until the tramline rhythm is repeated.
5. Number of the current track

Procedure

1. On the work screen, press:

⇨ You can change the number of the track.



1. Increases the number of the track.
   For example, so that you can continue working again at the same track after leaving the field.
2. Reduces the number of the track.
   For example, when you have lifted the implement within a track and the job computer has automatically activated the next track.

③ Deactivates the tramline control.

If you deactivate the tramline control, the tracks are no longer counted. For example, this can be used when working the headlands. The selected tramline rhythm is then no longer relevant. When tramline control is deactivated, the following icon appears on the work screen:  . When this icon appears, the track markers are also not advanced in automatic mode.

④ Opens the screen to configure the tramline control for a precision airplanter.

5.11 Operating the hydraulic system with the job computer

The job computer is used to adjust the position of the hydraulic valves so that the oil pressure is routed to specified parts of the implement.

When operating the implement with the job computer, remember that the job computer cannot control the oil pressure. You have to actuate the control unit in the tractor to generate pressure in the system.

Example

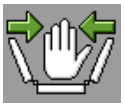
Operation with these systems can then look like this:

1. Press a function key on the terminal. For example  for folding the implement.
   ⇨ The function icon appears on the work screen. This confirms that the hydraulic valve is ready and that this function can now be hydraulically regulated.
2. Actuate the control unit of the hydraulic system in the tractor that is responsible for folding the implement.
   ⇨ The pressure builds up.
   ⇨ The implement is folded.
3. If you now remove the pressure from the valve, the implement will be unfolded.
   ⇨ The function icon must appear on the work screen, both when you unfold the implement and when you fold it.

The following sections explain which hydraulic functions can be operated with the job computer.

5.11.1 Folding the implement

You can fold or unfold the implement when it is lifted and at a standstill. You can only start working when the implement is unfolded.

Function icon	Meaning
	Unfold implement
	Fold implement
	Raise boom on the right to avoid obstacle
	Lower boom on the right
	Raise boom on the left to avoid obstacle
	Lower boom on the left

NOTE

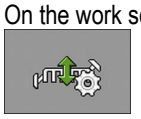
Because the terminal does not detect the position of the boom, the unfolding procedure must be performed each time the terminal is restarted.

Procedure

1. On the work screen, press: 
2.  or  - Activate the hydraulic function.
3. Fold or unfold the implement.
4.  - Confirm.

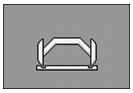
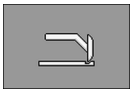
If obstacles arise during operation:

Procedure

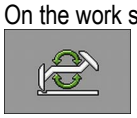
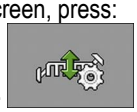
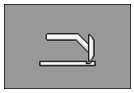
1. On the work screen, press:

2.  or  - Activate the hydraulic function.
3. Raise boom to avoid obstacles.
4.  - Confirm.

5.11.2 Operating track markers

You can use track markers as you work to mark a pass.

Function icon	Meaning
	Only use the left track marker. The track marker is not changed when lifting the implement. For example, to work on the headlands.
	Deactivate both track markers.
	Lift the track marker to pass over obstacles. The implement itself is not lifted.
	Use both track markers simultaneously. You can use this function e.g. if you do not have a pre-emergence marker on the implement.
	Only use the right track marker. The track marker is not changed when lifting the implement. For example, to work on the headlands.
	Use the track markers alternately. The track marker is always changed when you lift the implement.
	Change the track markers manually. The track marker is changed when you press the function key.

Procedure

1. On the work screen, press:
 > 
2. Select the side on which the track marker should be lowered first. To do so, press: 
or 
   ⇨ On the work screen, you can see which track marker is lowered.
3. Activate the automatic control of the track markers with: 
   ⇨ The left track marker is lowered.
4. Press  again to switch between the left and the right track markers.

⇨ Depending on the settings, an icon for the track marker appears on the work screen.

NOTE	
If the tractor stops during the automatic lifting of the track markers, an error message appears and the track markers come to a stop in their position. The message must be acknowledged to continue with the procedure!	 Track marker movement has been paused. The speed is too low.

5.11.3 Comfort circuit

If there are fewer tractor control units available than are required, two implement functions can be assigned to one tractor control unit.

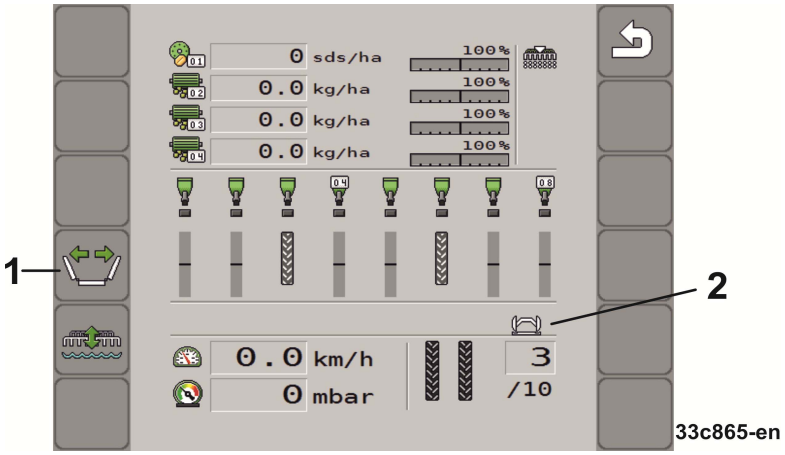
Risk of mixing up the functions!

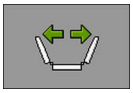
Before actuating the tractor control unit, check the switch position of the control unit.

Procedure

1. On the work screen, press:

2. Activate the hydraulic function:

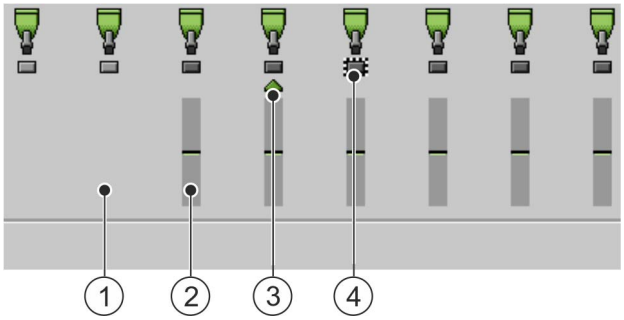


(1)  Activates the function " Fold implement"

 Activates the function "Fold track marker"

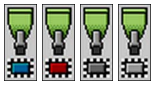
(2) Shows the activated function

5.12 Row deactivation



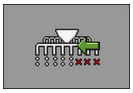
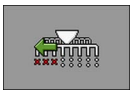
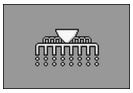
1. Row switched off
2. Row switched on
3. Current cursor position
4. Marked row

For a precision airplanter, the following row statuses are possible:

-  - The row is activated during operation.
-  - The row is deactivated during spreading by SECTION-Control or the user.
-  - The row will be activated as soon as the application has been started.
-  - The row remains deactivated as soon as the application has been started.
-  - The row is marked to be permanently switched on or off.

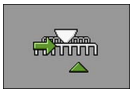
5.12.1 Switching off in steps

If you are using a precision airplanter, you can switch the rows on or off in steps.

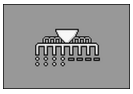
Function icon	Meaning
	Switches off from left to right.
	Switches off from right to left.
	Switches on from left to right.
	Switches on from right to left.
	Switches all of the rows on. Also when switching off the rows using Section Control.

5.12.2 Switching off in blocks

If you are using a precision airplanter, you can switch the rows on or off in blocks.

Function icon	Meaning
	Moves the cursor on the work screen from left to right. Pre-selection of rows that should be switched off. Multiple selections are possible!
	Moves the cursor on the work screen from right to left. Pre-selection of rows that should be switched off. Multiple selections are possible!
	Confirm selection. Includes the row in the multiple selection. Selected rows can be deselected by pressing again.
	Switches all of the selected part width sections/rows off or on.

Procedure

1. On the work screen, press:
   
2. Perform the desired switching.

5.13 Using the Water hole mode

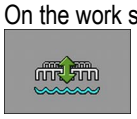
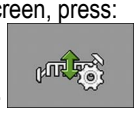
You can lift or lower the implement while working without interruption. By doing so, you prevent:

- The implement from sinking into a puddle.
- A new track from being counted.
- The track marker from being switched.

Procedure

☑ The implement is lowered.

1. On the work screen, press:

 > 

⇨ The icon for the Water hole mode appears on the work screen: 

2.  - Terminate the Water hole mode.

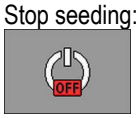
⇨ The icon for the Water hole mode disappears.

5.14 Activating the loading auger

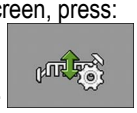
You can activate a loading auger while working.

Procedure

1. Stop seeding:



2. On the work screen, press:

 > 

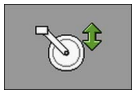
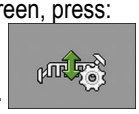
⇨ The loading auger is activated. There is no confirmation displayed on the terminal.

5.15 Lifting and lowering the drive wheel (only with front hopper)

You can lift and lower a drive wheel while working.

Procedure

1. On the work screen, press:

 > 

⇨ The drive wheel will be lifted or lowered. There is no confirmation displayed on the terminal.

5.16 Viewing results

5.16.1 Results

On the "Results" screen, you can see the applied quantity for each product and the applied areas.

You can reset the counter on this screen before starting work.

In addition, you can also view the results for each product on the "PRODUCT DATABASE“ screen (see page 46).

Function icon	Meaning
	Resets the counter.
	Calls up the "Total results" screen.

There are the following counters:

- "Area" - Area on which the implement was in working position.
- "Quantity" - Applied quantity.
- "Area efficiency" - Worked area per hour.

The quantities spread during pre-metering are saved.

Procedure

1. On the work screen, press:

   ⇨ The "Results" screen will appear.

In addition, you can also view the results for each product on the "PRODUCT DATABASE" screen (see page 46).

5.16.2 Total results

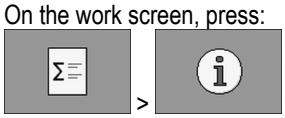
On the "Total results" screen, you see the counter that documents the work performed since the initial startup of the job computer.

There are the following counters:

- "Service hours" - Time for which the job computer is switched on.
- "Total time" - Time for which the job computer was spreading.
- "Total distance" - Processed distance.
- "Total area" - Worked area.
- "Area efficiency" - Worked area per hour.
- "Total quantity" - For each metering drive.

Procedure

1. On the work screen, press:



⇨ "Total results for implement" screen appears.

2. On the "Total results for implement", press:

⇨ "Total results for metering unit" screen appears.

There are the following counters:

1: Seed
2: Fertiliser (optional)
3: Micropellets (optional)

6 Configuring the job computer for work

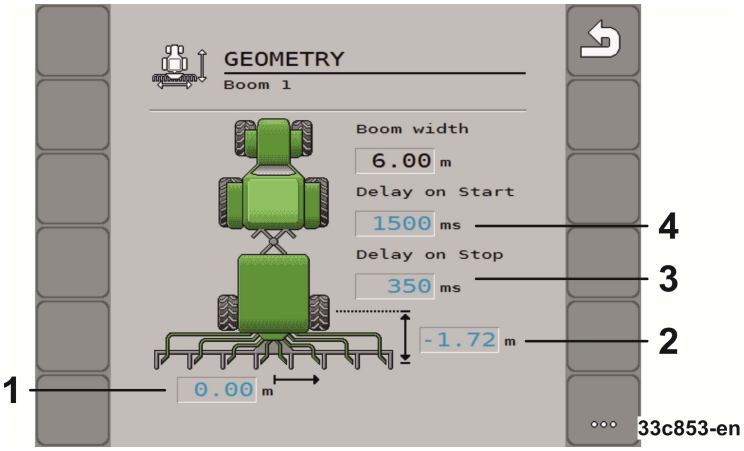
6.1 Entering the geometry

The geometry of an agricultural implement is defined as a series of parameters describing its dimensions. The geometry is particularly important for all systems that are GPS-controlled.

The distances you enter depend on whether the implement is towed, mounted on the tractor or self-propelled.

You must enter the following distances for the implement:

- Boom 1: Seed placement
- Booms 2/3: Fertiliser/Micropellet placement (optional)
- Connector: Mounted implement = 0



(1) Offset Y
Distance from the centre point of the implement to the centre point of the seed/fertiliser placement.
- Positive value: centre point of the seeding rail is to the right of the centre point of the implement.
- Negative value: centre point of the seeding rail is to the left of the centre point of the implement.

(2) Offset X
Distance from the coupling point (lower link mounting) of the implement to the seed/fertiliser placement.
- Positive value: seeding rail is in front of the coupling point (lower link mounting).
- Negative value: seeding rail is behind the coupling point (lower link mounting).

(3) On/off point delay for switching off (see page 40)

(4) On/off point delay for switching on (see page 40)

6.1.1 On/off point delay for switching on and off

In addition, you can enter the delay for each boom when switching the implement on and off.

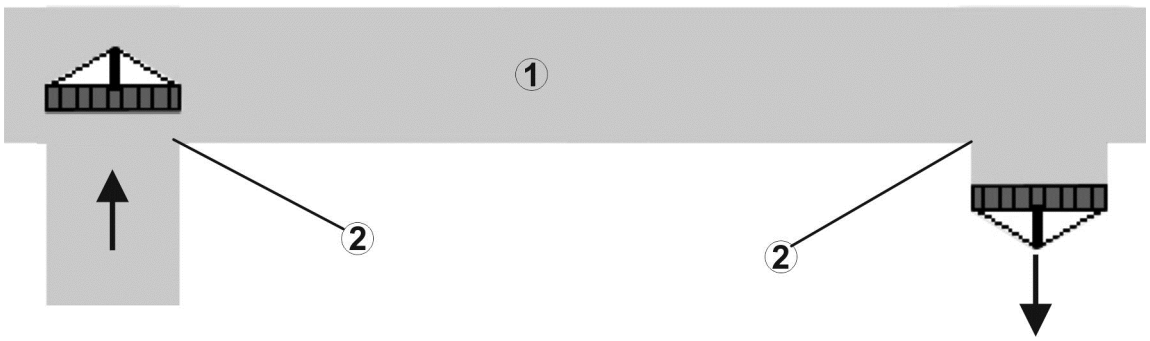
If gaps occur, the settings can be adapted by the customers at any time - this is no reason for customer complaint!

- It is absolutely necessary to perform a manual check of the seed placement in the field as well as the adaptation of the on/off point delay to the individual operating conditions.
- The on/off point delay is used for setting a seamless working of the field
  - During the transition from non-worked to worked areas.
  - During the transition from worked to non-worked areas.
- The size of the overlapping/underlapping depends, amongst other things, on the forward speed.
- The on/off point delay is a time entry in milliseconds.
- Longer on/off point delays and higher speeds may lead to undesired switching conditions.

For precise switching at the headlands – especially for seed drills – the following points are absolutely necessary:

- RTK accuracy of the GPS receiver (update rate min. 10 Hz)
- Constant speed when driving in or out of the headlands

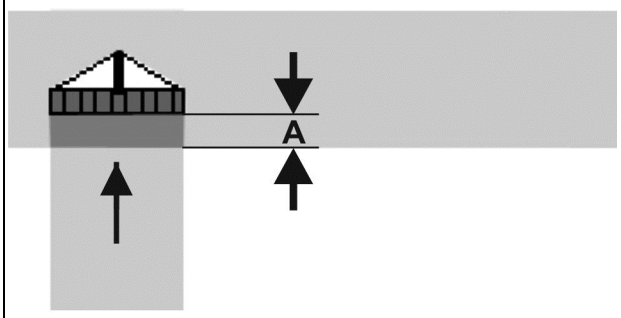
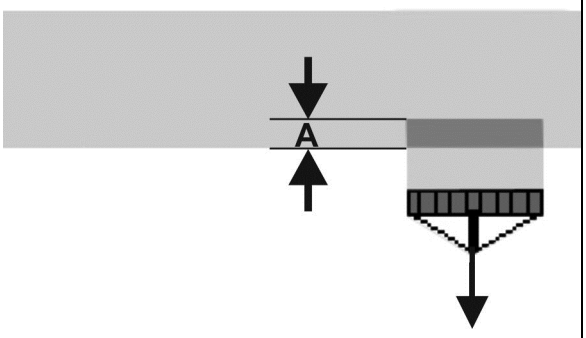
6.1.1.1 Optimal working of the field



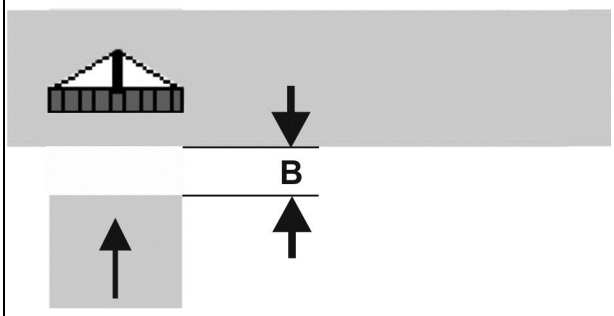
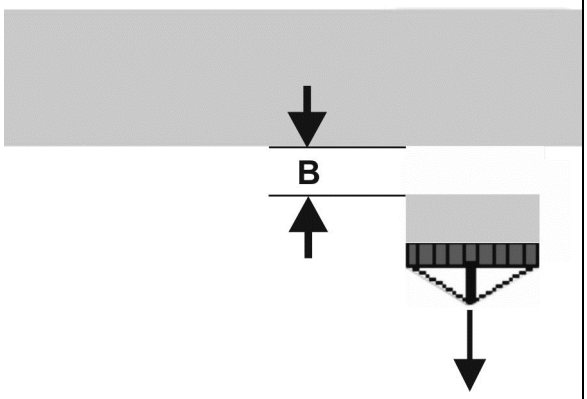
(1) Headlands/worked field

(2) Seamless working of the field without overlapping

6.1.1.2 Overlapping of worked areas

On/off point delay for switching off (see page 39)	On/off point delay for switching on (see page 39)
	
(A) Length of the overlap	
Switching off – Entering a worked area: increase off-point delay (see page 42).	Switching on – Moving off a worked area: reduce on-point delay (see page 42).

6.1.1.3 Unworked area

On/off point delay for switching off (see page 39)	On/off point delay for switching on (see page 39)
	
(B) Length of the unworked area	
Switching off – Entering a worked area: Reduce the off-point delay (see page 42).	Switching on – Moving off a worked area: Increase on-point delay (see page 42).

6.1.1.4 Correction times for on/off point delays for overlapping/unworked areas

The correction times are not compatible with every control terminal.

Forward speed [km/h]	Length of the overlapping (A) / Length of the unworked area (B)					
	0.5 m	1.0 m	1.5 m	2.0 m	2.5 m	3.0 m
5	360 ms	720 ms	1080 ms	1440 ms	1800 ms	2160 ms
6	300 ms	600 ms	900 ms	1200 ms	1500 ms	1800 ms
7	257 ms	514 ms	771 ms	1029 ms	1286 ms	1543 ms
8	225 ms	450 ms	675 ms	900 ms	1125 ms	1350 ms
9	200 ms	400 ms	600 ms	800 ms	1000 ms	1200 ms
10	180 ms	360 ms	540 ms	720 ms	900 ms	1080 ms
11	164 ms	327 ms	491 ms	655 ms	818 ms	982 ms
12	150 ms	300 ms	450 ms	600 ms	750 ms	900 ms
13	138 ms	277 ms	415 ms	554 ms	692 ms	831 ms
14	129 ms	257 ms	386 ms	514 ms	643 ms	771 ms
15	120 ms	240 ms	360 ms	480 ms	600 ms	720 ms

Correction times for speeds and distances (A, B) which are not listed can be interpolated/extrapolated or calculated using the following formula:

$$\text{Correction times for on/off point delays [ms]} = \frac{\text{Length [m]}}{\text{Forward speed [km/h]}} \times 3600$$

The lead in/delay off times for seeding technology for switching on and off is influenced by the following factors:

- Delivery times depending on the
  - Seed type
  - Delivery path
  - Blower fan speed
- Driving behaviour depending on the
  - Speed
  - Acceleration
  - Braking
- GPS accuracy depending on the
  - Correction signal
- Update rate of the GPS receiver

Procedure

☑ Seeding is stopped.

1. On the work screen, press:

⇨ "Geometry" screen appears.

⇨ On the screen, you can see which measurements need to be taken and where they can be entered.

2. Enter the measured values.

⇨ You have entered the geometry.

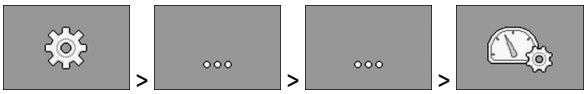
6.2 Selecting and configuring the speed source

- If a speed of 20 km/h is exceeded, the application stops automatically.
- For optimal placement quality, we recommend using the speed sensor on the implement. Calibrate the speed sensor with the "100 m method" (see page 44).

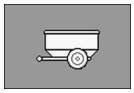
Procedure

☑ Seeding is stopped.

1. On the work screen, press:



⇨ The "Settings/Speed" screen appears.

2.  - Press.

⇨ In the "Speed source" parameter, the value "Implement" appears.

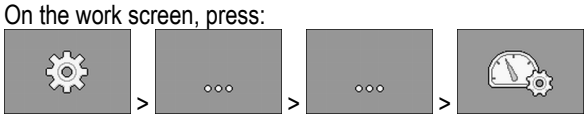
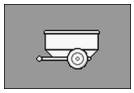
3.  - Confirm.

6.2.1 Calibrating the speed sensor with the 100 m method

When calibrating the speed sensor with the 100 m method, you determine the number of pulses received by the speed sensor over a distance of 100 m. The "Implement" speed sensor can be a ground wheel pulse counter or a radar sensor. When you know the number of pulses, the job computer can calculate the current speed.
After the first calibration, you can enter the number of pulses manually as a value for the "Calibration factor" parameter.

Procedure

☑ Seeding is stopped.

1. Drive the implement onto the field.
2. Mark the tyre position on the ground. For example with a stone.
3. Measure a straight route of 100 m and mark the end.
4. On the work screen, press:
   
   ⇨ The "Calibration/Speed" screen appears.
5.  - Press.
   ⇨ In the "Speed source" parameter, the value "Implement" appears.
6.  - Call up the "Calibration" screen.
   ⇨ "Calibration" screen appears.
7.  - Start the calibration.
8. Drive the marked distance.
   ⇨ While driving, the counted pulses are displayed in the "No. of pulses" field.
9.  - Press when you have reached the end.
   ⇨ The calibration is terminated.

Repeat the calibration when the soil conditions change.

6.2.2 Alternative speed sources

If the "Implement" speed sensor on the implement does not provide a usable signal, the speed signal from the tractor (see page 45) or a simulated speed (see page 45) can be used in some cases.

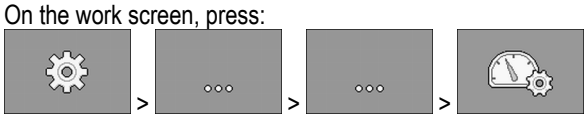
The alternative speed sources can have a negative effect on the placement quality!

6.2.2.1 Using the speed signal from the tractor

Instead of the implement speed sensor, the speed signal is transmitted through the ISOBUS cable from the tractor to the job computer of the implement.

Procedure

☑ Seeding is stopped.

1. On the work screen, press:

⇨ The "Calibration/Speed" screen appears.
2.  - Press.
⇨ In the "Speed source" parameter, the value "Tractor" appears.
3.  - Confirm.

6.2.2.2 Entering the simulated speed

CAUTION

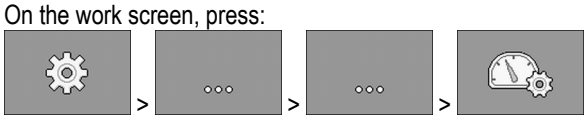
Injury caused by working implement

If the function is activated when the implement is at a standstill, the driver can activate functions that can otherwise only be activated during travel. This can cause injury to persons standing close to the implement.

- Make sure that no one is close to the implement.

Procedure

☑ Seeding is stopped.

1. On the work screen, press:

⇨ The "Calibration/Speed" screen appears.
2.  - Press.
⇨ In the "Speed source" parameter, the value "Simulation" appears.
3. In the "Sim. speed" parameter, enter the speed to be simulated.
4.  - Confirm.

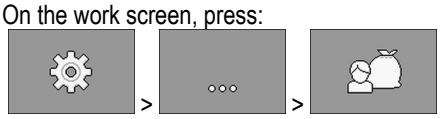
⇨ The desired speed will be simulated.

⇨ When you restart the job computer, the simulated speed will automatically be set to the value "0".

6.3 Configuring products

You can configure all of the products that you work with in the product database.

Procedure

1. On the work screen, press:
   
   ⇨ The "PRODUCT DATABASE" screen appears.
2. Select the product that you want to configure.
3. Configure the parameters.
   ⇨ You have configured the product.
4.  - Optionally, you can delete the configuration for the product.

In addition, you can also view the results for each product in the "PRODUCT DATABASE".

6.3.1 "Rename" parameter

Enter a name or a number to identify the product.

6.3.2 "Product type" parameter

Enter a product type. The icons displayed on the work screen depend on the selected product type. You must always select a product type.

-  - "Seed"
-  - "Solid fertiliser"

6.3.3 "Operating speed" parameter

Indicates the value that was determined by the calibration test.

6.3.4 "Target rate" parameter

Indicates the value that was determined by the calibration test.

6.3.5 "Adjustment" parameter

Enter the percent value by which the target rate should be changed when you change it manually during spreading.

6.3.6 "Calibration factor" parameter

For a precision airplanter, enter the number of grains spread per revolution of the metering wheel. Indicates the value that was determined by the calibration test.

6.3.7 "Gear ratio" parameter

Enter the gear ratio between the pulse transmitter on the actuator and the metering shaft.

E.g.: a gear ratio of 50/1 means that the metering shaft must rotate 50 times to rotate the motor shaft one time.

6.3.8 "Min. blower fan speed" parameter

Enter the minimum blower fan speed that is required to spread the respective product. If the minimum speed is undercut during operation, an alarm message is displayed.

The speed is only taken into account when the hopper containing the product has been associated with a blower fan.

At a blower fan speed of less than 200 rpm, the electric motor that drives the metering roller in the metering unit stops.

6.3.9 "Max. blower fan speed" parameter

Enter the maximum blower fan speed up to which the respective product should be spread. If the maximum speed is exceeded, an alarm message is displayed.

The speed is only taken into account when the hopper containing the product has been associated with a blower fan.

A notification tone is issued if the maximum blower fan speed is exceeded.

6.3.10 "Fill level alarm limit"

Select the fill level in the hopper at which an alarm should be displayed.

The following alarm limits are possible:

- "Low"
  The "Hopper is low." and "Hopper is empty." alarms are activated.
- "Empty"
  The "Hopper is empty" alarm is activated.
- "Deactivated"
  All fill level alarms are deactivated.

6.3.11 "Deviation tolerance" parameter

For each product, enter the deviation from the target rate above which an alarm should be triggered. For a precision airplanter, the deviation tolerance is valid for every row.

The left value is valid for a deviation upwards, and the right value for a deviation downwards.

Fertiliser metering with mechanical metering drive:

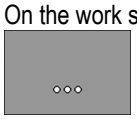
For implements with mechanical fertiliser metering drive, the deviation tolerance is pre-set such that the alarm is only triggered at fluctuations greater than ± 25%.

6.4 Associating products with a hopper

On the "Settings/Hopper" screen, you can associate a product with each hopper. There are the following parameters:

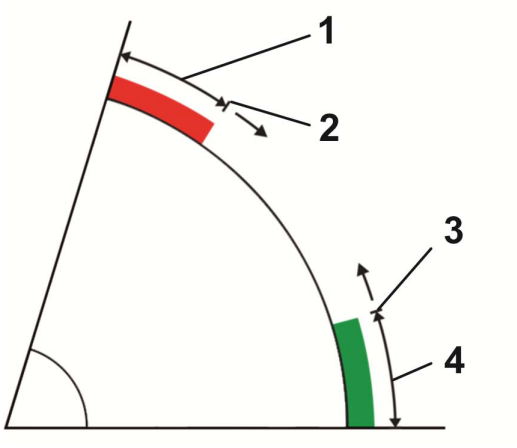
- "Hopper"
  Defines the currently selected hopper.
- "Associated product"
  Defines which product should be associated with a hopper.
- "Status"
  Shows whether the associated product is currently activated.

Procedure

1. On the work screen, press:
    > 
   ⇨ The "Settings/Hopper" screen appears.
2. Configure the parameters.
3.  - Optionally, you can change the status of the selected product.

6.5 Perform reference calibration of the working position

You must perform a calibration so that the job computer can properly detect when your implement is in working position. It is absolutely necessary to perform a manual check of the seed placement in the field.



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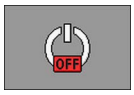
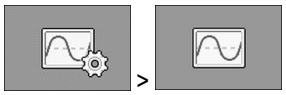
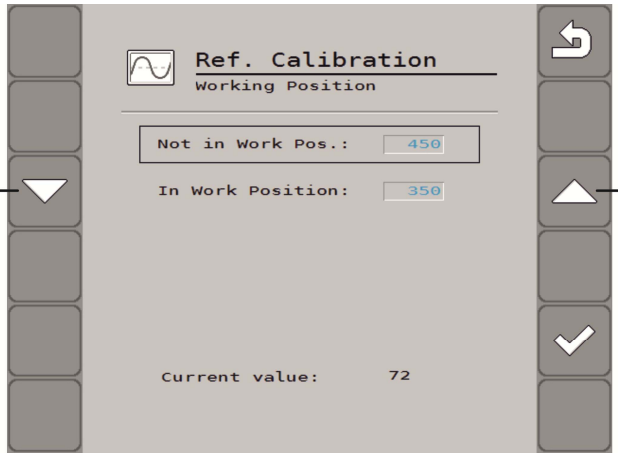
Statuses for the reference calibration

1. Implement is not in working position
2. Switch point: if this implement height is undercut, the metering units are switched on (switch-on height)
3. Switch point: if this implement height is exceeded, the metering units are switched off (switch-off height)
4. Implement is in working position

Procedure

1.  - Stop seeding
2.  - Confirm.
3.  - Open the screen for the reference calibration



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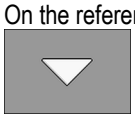
4. On the reference calibration screen, scroll to the working position setting.



⇨ Lower your implement and then raise the implement until the seed placement point is 1 cm above the ground.

⇨ If this implement height is exceeded, the metering units are switched off (switch-off height).

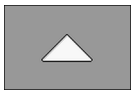
 - Confirm.

If seed is resting on top of the seedbed, reduce the switch-off height in steps.

Caution: Do not set the switch-off height too low! If the implement briefly jumps over the switch-off height, the metering units do not start back up again afterwards.

⇨ In this case, the implement must be fully raised and then lowered again.

5. On the reference calibration screen, scroll to the non-working position setting.



⇨ Raise your implement and then lower the implement until the seed placement point is 11 cm above the ground.

⇨ If this implement height is undercut, the metering units are switched on (switch-on height).

 - Confirm.

If seed is resting on top of the seedbed, reduce the switch-on height in steps.

Caution: Do not set the switch-on height too low! In this case, the metering units start too late. If gaps occur, the settings can be adapted by the customers at any time – this is no reason for customer complaint!

⇨ You have completed the calibration.

⇨ As an option, you can use the determined values again to repeat the calibration of the working position and enter these manually on the screen.

6.6 Selecting the Universal Terminal (UT) and Task Controller (TC)

If you are using more than one terminal or more than one Task Controller, you can choose which one you want to use each time.

1. On the work screen, press:

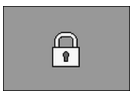
2. Select which Universal Terminal (UT) you want to use.
3. Select which Task Controller (TC) you want to use.
4.  - Confirm.

⇨ You have selected the Universal Terminal and the Task Controller.

7 Configuring the implement equipment

The equipment of the implement is configured in a separate area of the application. You will find different parameters within the area. For each parameter, there are independent authorization levels:

Level 0 – Anyone can change the configuration.

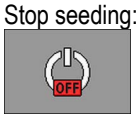


Level 1 – The configuration can only be changed with the password.

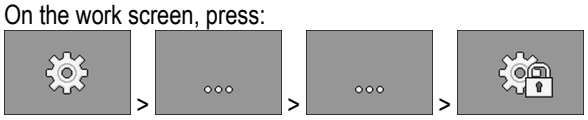
Procedure

This is how to perform a configuration:

1. Stop seeding:

2. On the work screen, press:

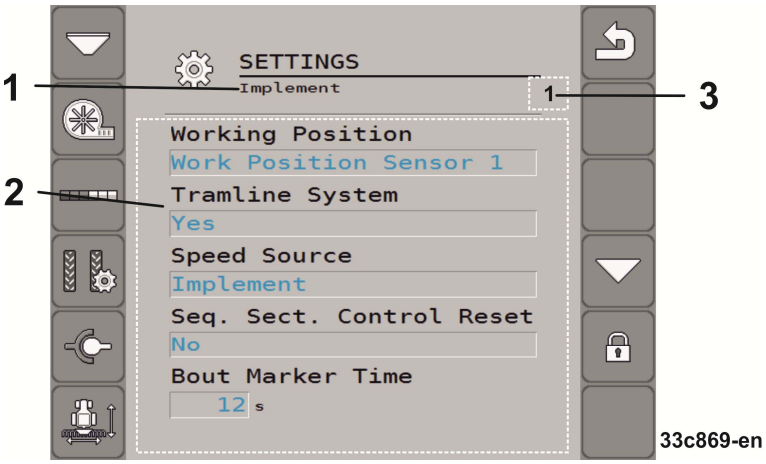
   

   ⇨ The "Settings" screen appears.
   ⇨ You will find parameters for an implement part behind each function icon. The following chapter explains which function icon represents which implement part.
   ⇨ You can only configure the parameters for which the authorization level is set at 0.

3. Configure the parameters.

7.1 General configuration – Level 0

For the configuration of the implement, you must set the basic equipment of the implement. The implement must always be configured first.



(1) Implement part that is currently being configured

(2) List of parameters

(3) A number appears here if there are several identical implement parts that can be configured. The number indicates the implement part that is currently being configured (metering unit 1...3).

7.1.1 "Working position" parameter

Select where the job computer gets information on the working position from:

- A working position sensor on the implement
  (see "Perform reference calibration of the working position", page 49)
  The sensor that you can select advances a specific component of the implement (e.g. tramlines or track markers).
- "Tractor"

7.1.2 "Tramline" parameter

Select whether the implement has tramline control.

To activate the tramline control, perform the following configuration:

Procedure

- On the "Settings/Implement" screen, select:
  Tramline system: YES

⇨ You can now configure the tramline control (see "Configuring the tramline control", page 27).

7.1.3 "Speed source" parameter

Select the source from which the job computer takes the current speed.

You must configure the speed source (see Selecting and configuring the speed source, page 43).

7.1.4 "Seq. PWS Control Reset" parameter

You only need this parameter if you are using a precision airplanter.

Select whether the part width section control should be automatically reactivated after working on the headlands. Only the part-width sections that you have manually switched off in the part-width section control are reactivated.

7.1.5 "Water hole mode" parameter

Select whether the implement has a Water hole mode.

7.1.6 "Track marker time" parameter

Enter the time during which the valve of a track marker is supplied with power.
The entry does not apply for the configuration of all track markers.

7.1.7 "Calibration factor" parameter

For volume metering, enter how much fertiliser is spread per rotation of the metering shaft.

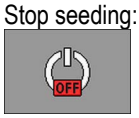
For a precision airplanter, enter the number of grains spread per revolution of the metering wheel.

7.1.8 "Calibration factor editable" parameter

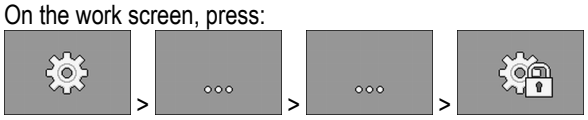
Select whether the implement has an editable calibration factor.

7.2 Advanced configuration – Level 1

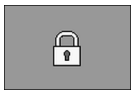
1. Stop seeding:



2. On the work screen, press:



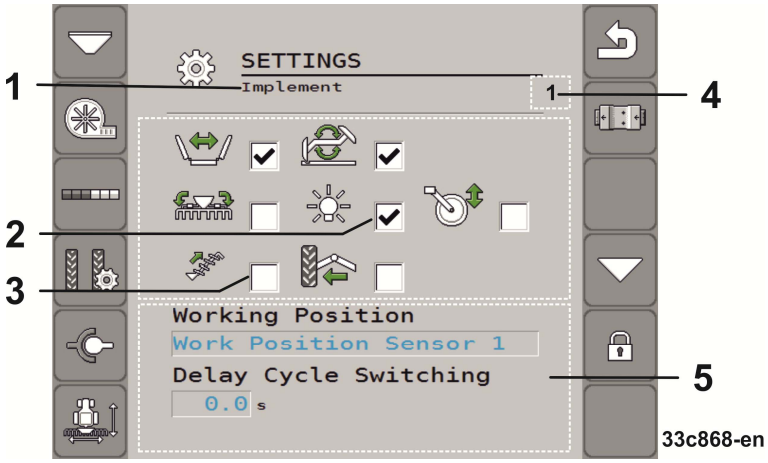
   ⇨ The "Settings" screen appears.
   ⇨ You will find parameters for an implement part behind each function icon. The following chapter explains which function icon represents which implement part.

3.  - Open the password entry

4. Enter the password. The password is "456123".
   ⇨ You are now in Level 1 and can see further parameters.

5. Configure the parameters.

During the advanced configuration, you will see the following screen:



(1) Implement part that is currently being configured

(2) Activated auxiliary function

(3) Available auxiliary functions

(4) A number appears here if there are several identical implement parts that can be configured. The number indicates the implement part that is currently being configured (metering unit 1...3).

(5) List of the advanced parameters

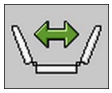
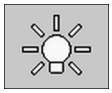
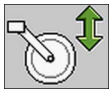
7.2.1 Parameter – Auxiliary functions

Depending on the equipment, the listed functions are *not* supported by the job computer.

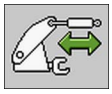
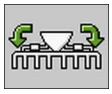
☑ You are in Level 1.

Select which additional functions are available on the implement.

The following additional functions are supported by the job computer:

-  - Hydraulic folding of the implement
-  - Hydraulically adjustable track markers
-  - Lighting
-  - Adjustable drive wheel
-  - Hydraulic loading auger

The other auxiliary functions are *not* supported by the job computer.

-  - Opens the calibration flaps
-  - Adjustable drawbar on the seed wagon
-  - Adjustable top link on the seed wagon
-  - Adjustable placement depth
-  - Wheel adjustment

7.2.2 "Debounce Time Work. Pos" parameter

☑ You are in Level 1.

Enter the time period during which the implement must either be in working position or not in working position before this status is recognized and can be further processed by the system.

You determine the threshold value during the reference calibration of the working position.

7.2.3 "Display filter" parameter

☑ You are in Level 1.

Enter a time after which the speed display on the work screen should be refreshed. This parameter does not affect the metering.

If the impulse-emitting speed sensor on the implement delivers too few impulses, the filter helps to smoothen the displayed speed.

7.2.4 "Maximum variance" parameter

☑ You are in Level 1.

If you are using a precision airplanter, set the sensitivity for the bar on the work screen during work.

The higher the value, the more sensitively the bars react when the precision airplanter accelerates or slows down. The bars react more strongly.

7.2.5 "Calculation delay" parameter

☑ You are in Level 1.

If you are using a precision airplanter, set a time period during which the job computer must wait before performing an error calculation. The minimum waiting period is 0.1 seconds. The delay is performed individually for each row.

7.2.6 "Min. seed grains" parameter

☑ You are in Level 1.

If you are using a precision airplanter, here you can enter, for each row individually, the number of grains that must be counted before performing an error calculation. An error calculation causes the bars on the work screen to refresh.

A higher value causes the bars to react less strongly.

7.2.7 "Max. calculation delay" parameter

☑ You are in Level 1.

If you are using a precision airplanter, set the time after which an error calculation should be performed, regardless of the "Maximum variance" and/or "Min. seed grains" parameters. After this time at the latest, the bars on the work screen are refreshed.

7.2.8 "Min. working speed" parameter

☑ You are in Level 1.

Enter the minimum working speed that is required for spreading.

7.2.9 "Max. working speed" parameter

☑ You are in Level 1.

Enter the maximum possible working speed for spreading.

7.2.10 "Implement name" parameter

☑ You are in Level 1.

Enter a name for the implement. This name is shown e.g. in the ISOBUS-TC application.

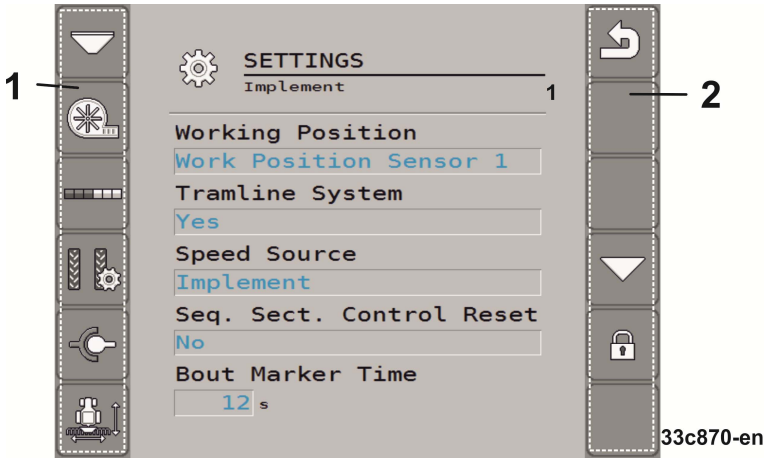
7.2.11 "Delay min. speed" parameter

☑ You are in Level 1.

In combination with a mechanical metering drive, enter the time during which the implement speed must fall below the minimum speed of the implement before the track marker is advanced.

7.3 Configuration of individual implement parts

If you want to configure individual implement parts, you can find out how to reach the respective configuration screen in the chapters on the individual implement parts. For some implement parts, there are several possible ways. Always only one possible way is mentioned.



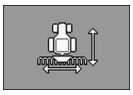
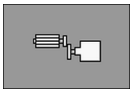
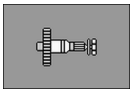
(1) Function icons for the implement parts

(2) Function icons for operation

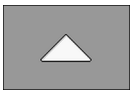
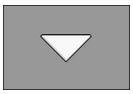
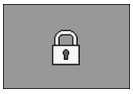
☑ You are in Level 1.

⇨ Parameters with this reference can only be seen in the advanced configuration.

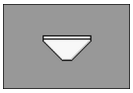
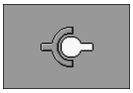
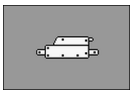
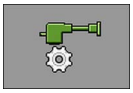
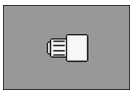
Function icons for the implement parts

Function icon	Implement parts
	Booms see Configuration of the booms, page 61
	Metering units see Configuration of the metering units, page 63
	Metering shafts see Configuration of the metering shafts, page 65
	PWM parameters see Configuration of the PWM parameter, page 65
	Linear sensors see Configuration of the linear sensors, page 69
	Part-width sections see Configuration of the part width sections, page 69
	Tramline system see Configuration of the tramline system, page 68

Function icons for operation

Function icon	Meaning
	Scrolls up.
	Scrolls down.
	Starts the screen for the next part of the same type.
	Starts the screen for the next part of the same type.
	Password entry
	Back

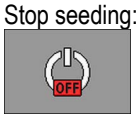
The configurations of the following implement parts are *not* supported by the job computer.

Function icon	Implement parts (no configuration possible)
	Hoppers (no configuration possible)
	Connectors (no configuration possible)
	Linear drives (no configuration possible)
	Calibration flaps (no configuration possible)
	Speed sensors (no configuration possible)
	Solenoid valves (no configuration possible)
	Rows (no configuration possible)
	Blower fan (no configuration possible)
	Drives (no configuration possible)

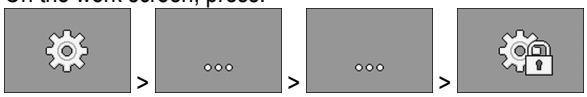
7.3.1 Configuration of the booms

Procedure

1. Stop seeding:

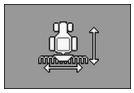


2. On the work screen, press:



   ⇨ The "Settings" screen appears.

☑ You have called up the configuration screen.

3.  - Configure the booms

7.3.1.1 "ISOBUS-TC functionality" parameter

Select whether and which ISOBUS-TC functionalities are supported by the boom.

- "No"
- "TC-BAS"
  - Counter readings are being received.
- "TC-BAS/TC-GEO"
  - Counter readings are being received.
  - Counter readings are being sent and tasks can be planned with prescription maps.
- "TC-BAS/TC-SC"
  - Counter readings are being received.
  - Automatic part-width section control is supported.
- "TC-BAS/TC-GEO/TC-SC"
  - Counter readings are being received.
  - Counter readings are being sent and tasks can be planned with prescription maps.
  - Automatic part-width section control is supported.

7.3.1.2 "Working position" parameter

Select the source from which the job computer gets information on the working position.

If you are working with several working positions, several sensors can also be selected.

7.3.1.3 "Delay on Start" parameter

Enter the delay for each boom when switching the implement on.

If the implement is switched too late, increase the delay.

If the implement is switched too early, decrease the delay.

7.3.1.4 "Delay on Stop" parameter

Enter the delay for each boom when switching the implement off.

If the implement is switched too late, increase the delay.

If the implement is switched too early, decrease the delay.

7.3.1.5 "Offset Y" parameter

☑ You are in Level 1.

Enter the Offset Y for each connector.

The distances to be measured for this purpose can be found in the section "Entering the geometry" (see page 39).

7.3.1.6 "Offset X" parameter

☑ You are in Level 1.

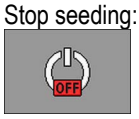
Enter the Offset X for each boom.

The distances to be measured for this purpose can be found in the section "Entering the geometry" (see page 39).

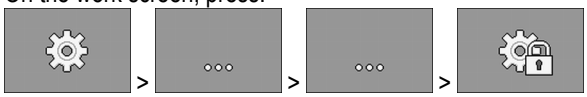
7.3.2 Configuration of the metering units

Procedure

1. Stop seeding:



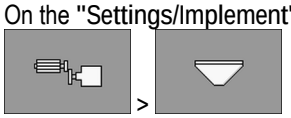
2. On the work screen, press:



⇨ The "Settings" screen appears.

☑ You have called up the configuration screen.

3. On the "Settings/Implement" screen, press:



⇨ You can configure the metering units.

7.3.2.1 "Target rate" parameter

Enter a target rate for each metering unit. The target rate defines how much seed or fertiliser should be spread per hectare.

7.3.2.2 "Calibration factor" parameter

For a seed drill, enter how much seed or fertiliser is spread per rotation of the metering shaft.

For a precision airplanter, enter the number of grains spread per revolution of the metering wheel.

7.3.2.3 "Pre-start time" parameter

☑ You are in Level 1.

Enter the time by which the metering unit should start earlier when the pre-start function is activated. If you start working within this time, the job computer takes over the control. If you do not start working in this time, the metering drive switches itself off after this time.

7.3.2.4 "Pre-stop time" parameter

☑ You are in Level 1.

Enter the time after which the metering unit should stop when the pre-stop function is activated. After the function has been activated, the metering unit stops after the specified time.

⇨ All metering units with the value 0 stop immediately when the "Pre-stop function" button is pressed.

7.3.2.5 "Angle pre-assignment" parameter

☑ You are in Level 1.

Enter the angle at which the metering unit should rotate when you start the pre-assignment in the calibration test.

7.3.2.6 "Standstill alarm delay" parameter

☑ You are in Level 1.

Enter how long the system should wait before an alarm message appears if no pulses are received from the metering shaft.

This parameter is only required if your metering unit is driven by a mechanical drive wheel.

If the metering unit is not mechanically driven, the alarm time is calculated dynamically. The set time is then added to the dynamic alarm time.

7.3.2.7 **"Current value filter" parameter**

☑ You are in Level 1.

For each metering unit, select whether you want to use a current value filter.

You can use a current value filter to prevent strong fluctuations in the displayed current value while spreading.

Fertiliser metering with mechanical metering drive:

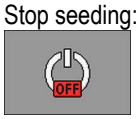
For implements with mechanical fertiliser metering drive, the current value filter is pre-set such that the display of the current value is only refreshed at fluctuations greater than ± 25%.

7.3.3 Configuration of the metering shafts

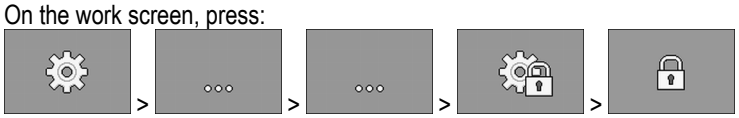
Procedure

This is how to call up the configuration screen:

1. Stop seeding:



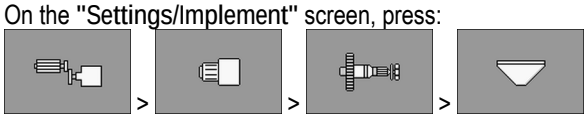
2. On the work screen, press:



3. Enter the password
   ⇨ The "Settings" screen appears.

☑ You have called up the configuration screen.

4. On the "Settings/Implement" screen, press:



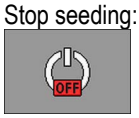
⇨ You can configure the metering shafts.

7.3.4 Configuration of the PWM parameter

Procedure

This is how to call up the configuration screen:

1. Stop seeding:



2. On the work screen, press:

3. Enter the password
   ⇨ The "Settings" screen appears.

4. On the "Settings/Implement" screen, press:

7.3.4.1 "Minimum PWM" parameter

NOTE
The "Minimum PWM" parameter defines the start-up point of the metering units.

☑ You are in Level 1.

Enter a minimum PWM value. The set value determines the percentage of the maximum speed of a drive or linear drive.

You can enter several PWM parameters for different drives and linear drives.

7.3.4.2 "Maximum PWM" parameter

☑ You are in Level 1.

Enter a maximum PWM value. The set value determines the percentage of the maximum speed of a drive or linear drive.

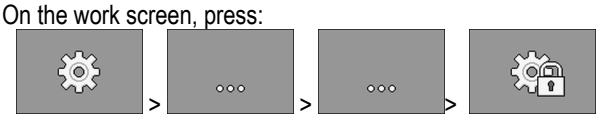
You can enter several PWM parameters for different drives and linear drives.

7.3.5 Configuration of the ERC modules

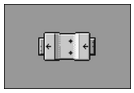
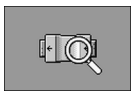
If you are using ERC modules on your precision airplanter, you have to configure them:

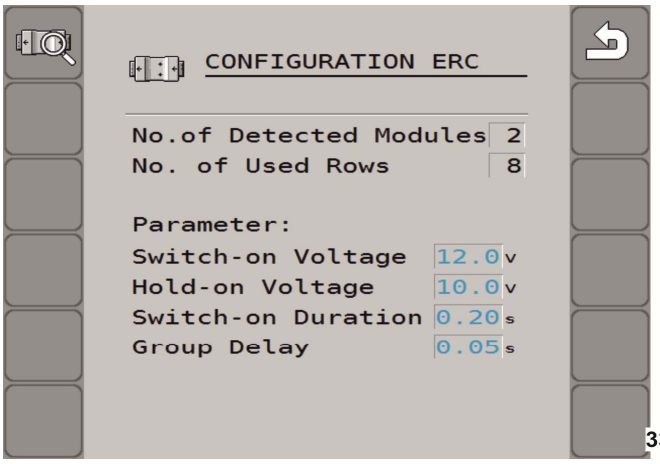
- "Switch on voltage"
  Voltage with which the shut-off clutch is supplied while it is being switched on.
- "Holding voltage"
  Voltage with which the shut-off clutch is supplied after it is switched on.
- "Switch on length"
  Time period during which the shut-off clutch is supplied with the switch on voltage.
- "Group delay"
  Time between switching on the individual modules.

Procedure

1. On the work screen, press:
   
   ⇨ The "Settings" screen appears.

☑ You are in Level 1.

2. - Open the configuration screen for the ERC modules.
3. 
4.  - Call up the status.
   ⇨ An hourglass icon appears while the status is being requested.
   ⇨ In the lines "No. of detected modules" and "No. of used rows" , you can see the status. This status is transmitted to the job computer.



33c861-en

5. Configuration of the factory setting:
   - "Switch on voltage": 12.0 V
   - "Holding voltage": 10.0 V
   - "Switch-on time": 0.20 s
   - "Module delay": 0.05 s

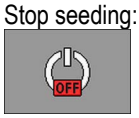
3.  - When exiting the configuration screen, you send the configuration to the ERC modules.

7.3.6 Configuration of the tramline system

Procedure

This is how to call up the configuration screen:

1. Stop seeding:



2. On the work screen, press:

   ⇨ The "Settings" screen appears.

3. On the "Settings/Implement" screen, press:

⇨ You can configure the tramline system.

7.3.6.1 "Associated tramline" parameter

☑ You are in Level 1.

For each tramline, select whether it is associated with a tramline system.

7.3.6.2 "Sprayer working width" parameter

Enter the working width of the sprayer for which you want to create the tramlines.

7.3.6.3 "Rows per tramline" parameter

Enter the number of rows you want to switch off for the creation of a tramline.

7.3.6.4 "Track width" parameter

Enter the track width of the tractor.

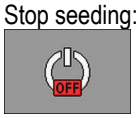
7.3.7 Configuration of the linear sensors

The values that you must enter for the configuration of the linear sensors can be found on the data sheet from sensor manufacturer.

Procedure

This is how to call up the configuration screen:

1. Stop seeding:

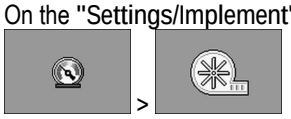


2. On the work screen, press:

3. Enter the password
   ⇨ The "Settings" screen appears.

☑ You have called up the configuration screen.

4. On the "Settings/Implement" screen, press:



⇨ You can configure the linear sensors.

7.3.7.1 "Initial value" parameter

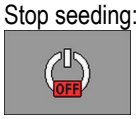
Enter the value that the linear sensor always measures at the beginning.

7.3.8 Configuration of the part width sections

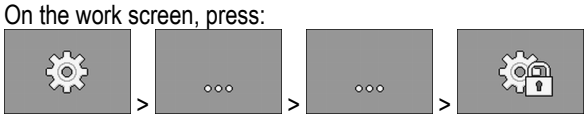
Procedure

This is how to call up the configuration screen:

1. Stop seeding:



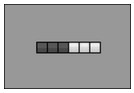
2. On the work screen, press:



   ⇨ The "Settings" screen appears.

☑ You have called up the configuration screen.

3. On the "Settings/Implement" screen, press:



⇨ You can configure the part width sections.

4.  - Starts the screen for the next part of the same type.

7.3.8.1 "Associated metering unit" parameter

Enter which metering unit switches a part width section. If there is no metering unit switching a part width section, select "No".

7.3.8.2 "Working width" parameter

☑ You are in Level 1.

Enter the respective working width for each part width section.

When changing the working width, the new value must be configured for each row.

7.3.8.3 "Autom. PWS control" parameter

☑ You are in Level 1.

For each part-width section, select whether it has an automatic part-width section control.

7.3.8.4 "Selec. PWS control" parameter

☑ You are in Level 1.

For each part-width section, select whether it has selective part-width section control. With selective part width section control, you can switch all of the part-width sections independently.

7.3.8.5 "Seq. PWS control L"

☑ You are in Level 1.

For each part-width section, select whether it has sequential part-width section control on the left side.

7.3.8.6 "Seq. PWS control R"

☑ You are in Level 1.

For each part-width section, select whether it has sequential part-width section control on the right side.

8 Troubleshooting

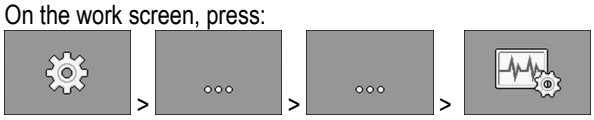
8.1 Performing a diagnostic

In the diagnostic, you can read the measured values for all of the pins that are connected to the junction box. In addition, you can test whether the functions of the job computer are working as desired.

Procedure

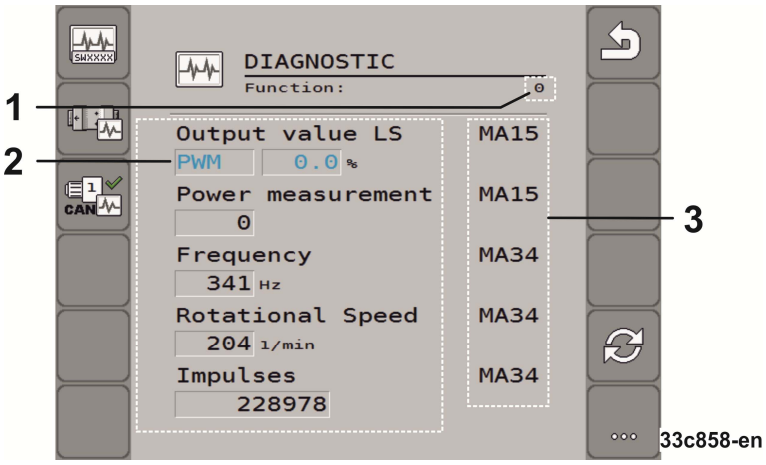
- Seeding is stopped.

On the work screen, press:



⇨ The "Diagnostic" screen appears.

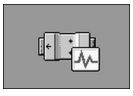
In the extended diagnostic, you will see the following screen:



(1) Number representing a specific function.

(2) Parameters and measured values

(3) Connected cable cores.
The meaning of the abbreviations can be found in this section.

Function icon	Meaning
	Call up the "Version numbers" screen see Checking the version numbers, page 75.
	Calls up the "DIAGNOSTIC ERC" screenopen see Diagnostic ERC, page 74.
	Activates the transmission of diagnostic data to the CAN bus. Only appears when the password was previously entered.
	Deactivates the transmission of diagnostic data to the CAN bus. Only appears when the password was previously entered.
	Sets the current measured values to "0".
	Calls up the next function.

The following abbreviations are possible for the cable cores:

- "MA"
  MA means master job computer.
  Example: MA28 means master job computer, pin 28
- "1S"... "4S"
  1S to 4S represent the respective slave job computers.
  Example: 1S14 means first slave job computer, pin 14

Depending on the functions of the individual components, the following measured values are possible:

- "Frequency"
  Current measured frequency of the function.
- "Speed"
  Current measured speed of the function.
- "Pulses"
  Current measured number of pulses of the function.
- "Analogue value"
  Currently measured analogue value of the function. The analogue value always increases or decreases proportionally.
  Example: The higher the position of an analogue work position sensor, the higher the analogue value.
- "Power measurement"
  Currently measured current flow of the function. The value of the power measurement always increases or decreases proportionally.
  Example: The faster an electric motor is turning, the higher the value of the power measurement.
- "Input"
  - "low"
    The function is deactivated. There is no voltage at the input.
  - "high"
    The function is activated. There is voltage at the input.

You can enter the following settings:

- "Output value LS"
  - "PWM"
    Depending on the entered PWM value, you can test whether an electric or hydraulic motor is turning at the entered PWM value.
  - "Rev."
    Depending on the speed, you can test how long it takes for an electric or hydraulic motor to reach the defined speed.
- "Output value HS"
  - "low"
    The function is deactivated. There is no voltage at the input.
  - "high"
    The function is activated. There is voltage at the input.
- "Output value HS/LS"
  - "low"
    The function is activated or deactivated. Depending on how the function is switched, there either is voltage or not.
  - "high"
  - The function is activated or deactivated. Depending on how the function is switched, there either is voltage or not.
- "Full bridge"
  With the respective selection, you can test the linear drives.
  - "Stop"
    The function is deactivated. The linear drive is not moving.
  - „+/-„
    The linear drive is moving in one direction. The direction in which the linear drive is moving depends on the respective connection.
  - „-/+“
    The linear drive is moving in one direction. The direction in which the linear drive is moving depends on the respective connection.

8.1.1 Diagnostic ERC

☑ Seeding is stopped.

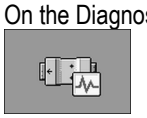
☑ The ERC modules are configured (see page 66).

Procedure

1. On the work screen, press:

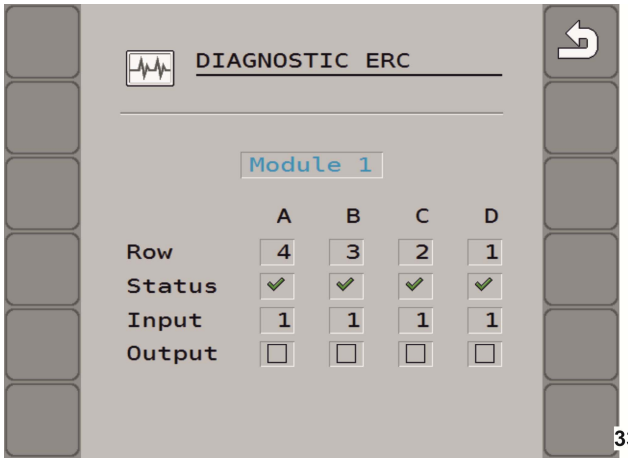
⇨ The "Diagnostic" screen appears.

2. On the Diagnostic screen, press:



⇨ Call up the illustrated screen. On the screen, you can see the measured values and possible settings for the individual functions.

If you are using a precision airplanter, you must also observe the following screen:



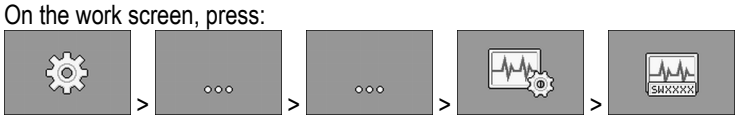
- "Row"
  In this line, you can see which output is associated with each row.
- "Status"
  In this line, you can see the status of the individual rows.
- "Input"
  In this line, you can see the pulses that were counted for each row.
- "Output"
  In this line, you can activate or deactivate individual rows that you want to have tested.

8.1.2 Checking the version numbers

Procedure

To check the version numbers:

1. On the work screen, press:



⇨ The "Version numbers" screen appears.

⇨ All of the version numbers are shown.

The following version numbers exist:

Version number	Meaning
Serial number	Serial number of the job computer
HW version	Hardware version of the job computer
SW (initial)	Delivered software version of the job computer
SW (current)	Current software version of the job computer
Pool version	Version of the pool with texts and images
Hydraulics version	Version of the hydraulic system configuration
CL version MA	Version of the control layer configuration of the master job computer
CL version S	Version of the control layer configuration of the slave job computer

8.1.3 Checking the functioning of a sensor

To test the proper functioning of a sensor, you can simulate a speed (see Entering the simulated speed, page 45).

8.2 Alarm messages

8.2.1 ISO alarms

Overview of the alarm messages

ID	Alarm text	Possible cause	Remedy
001/011	The system has been stopped. Restart required.	The connection to a slave job computer has been interrupted. A download manager has been activated.	Restart the job computer.
002	The configuration has been changed. The job computer is restarting.	The configuration has been changed.	Wait until the job computer has been restarted.
003	Input is too high.	The entered value is too high.	Enter a lower value.
004	Input is too low.	The entered value is too low.	Enter a higher value.
005	Error with reading or writing data in flash or EEPROM.	An error has occurred while starting the job computer.	Restart the job computer.
006	The data has been successfully adopted.		
007/012	Error detected in the configuration.	The configuration is faulty.	Check the configuration.
008	The procedure is not allowed when a job is activated in the ISOBUS-TC application.	A job is activated in the ISOBUS-TC application.	Deactivate the job.
009	Speed signal from CAN bus has been lost.	The cable connection has been interrupted.	Check the cable connection.
010	Error with the initialisation of the control layer configuration.	The control layer was not properly configured.	Check the configuration.
017	The application has been stopped.		

8.2.2 Hydraulic alarms

Overview of the alarm messages

ID	Alarm text	Possible cause	Remedy
201	The hydraulic table is not compatible with the configuration.	The hydraulic table does not match with the configuration of the job computer.	Use a different hydraulic table or change the configuration.
202	The hydraulic table is not compatible. All hydraulic functions are deactivated.	The hydraulic table does not match with the configuration of the job computer.	Use a different hydraulic table.
203	Track marker movement has been paused. The speed is too low.	The working speed is too slow.	Increase the working speed.
204	Track marker time not expired yet.	The track marker time has not expired yet.	Wait until the track marker time has expired.

8.2.3 Regulation alarms

Overview of the alarm messages

ID	Alarm text	Possible cause	Remedy
401	Blower fan is rotating too slowly.	The current blower fan speed is lower than the value for the "Min. rpm" parameter.	Increase the blower fan speed or change the "Min. rpm" parameter for the fan.
402	Blower fan is rotating too fast.	The current blower fan speed is higher than the value of the "Max. rpm" parameter.	Decrease the blower fan speed or change the "Min. rpm" parameter for the fan.
403	Pressure is too high.	The pressure of a linear sensor exceeds the value for the "Maximum value" parameter.	Reduce the pressure or change the "Maximum value" parameter.
404	Pressure is too low.	The pressure of a linear sensor is below the value for the "Minimum value" parameter.	Increase the pressure or change the "Minimum value" parameter.
405	The metering was stopped because the working position was not reached. Raise the implement.	The implement is not in working position.	Raise the implement.
406	The metering unit has been stopped, because the implement is not completely raised. Raise the implement.	The implement has not been completely raised.	Raise the implement.
407	Metering drive is stationary.	The current speed of the metering drive is lower than the minimum speed.	Stop immediately! Remediate the cause.

ID	Alarm text	Possible cause	Remedy
408	Metering shaft is stationary.	The speed sensor on the metering shaft does not register any movement of the metering shaft.	Stop immediately! Remediate the cause.
409	The metering drive is rotating too fast.	You are driving too fast. The metering drive cannot work reliably at the current speed.	Drive more slowly or install a larger metering roll.
410	Metering drive regulation range exceeded.	The current speed of the metering drive is higher or lower than the set speed.	Drive more slowly or faster or install a larger metering roll.
411	Metering drive cannot maintain target rate.	You are driving too fast or too slow. It is not possible to reach the target rate at the current speed.	Drive more slowly or faster, so that the job computer can control the spread rate.
412	The application has been stopped because of a critical error.		
413	The application has been stopped because the forward speed is too high.	The forward speed is too high.	Reduce the forward speed.
414	The calibration test has been interrupted because of an alarm.		

8.2.4 Implement-specific alarms

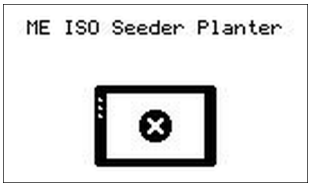
Overview of the alarm messages

ID	Alarm text	Possible cause	Remedy
602	Connection lost.	The connection to an ERC module has been lost.	Check the cable.
603	Connection disrupted.	The connection to an ERC module is disrupted.	Check the cable.
604	The power supply voltage is too low.	The power supply voltage to the ERC modules is too low.	Check the power supply voltage and check the vehicle battery.
605	Short circuit	There is a short circuit with the ERC modules.	Check the cable.
606	Open load current circuit	An open load current circuit has been detected with the ERC modules.	Check the cable and check whether there is a shut-off clutch.
607	Error in blockage system. Error: Sensor:	An error has occurred in the blockage system.	Check the blockage system.
608	No seed flow detected.	The blockage system has not detected any seed flow.	Check the blockage system.
609	Seed flow detected.	Seed flow has occurred in a tramline.	Check the tramline control.

ID	Alarm text	Possible cause	Remedy
610	Seed flow was detected in a row that is switched off.	The row is faulty.	Check the row.
611	Hopper level is low.	There is not enough seed or fertiliser in the hopper.	Fill the hopper.
612	Hopper is empty.	There is no more seed or fertiliser in the hopper.	Fill the hopper.
613 /614	Timeout with the switching of a part width section.	The switching of a part width section is taking too long. 613: Left part width section 614: Right part width section	Check if something is stuck.
617	Product flow detected in an inactive row.	Product flow has been detected in an inactive row.	Check the shut-off.
618	No product flow detected in an active row.	No product flow was detected in an active row.	Check the product flow, there may be blockage in one of the supply lines.
621	Error in blockage system.	An error has occurred in the blockage system.	Check the blockage system.
622	Charger fault.	There is a malfunction in the alternator of the charger.	Check the alternator of the charger.

8.3 Compatibility between terminal and job computer

If the following icon appears after starting the application, your terminal is not compatible with the job computer. You need a different terminal to be able to work with the job computer.



The terminal can be incompatible with the job computer for the following reasons:

ID	Meaning
018	There is an undefined error.
019	There is not enough available storage on the terminal.
020	The resolution of the width for function icons is too low (less than 60 pixels).
021	The resolution of the height for function icons is too low (less than 32 pixels).
022	The number of physical or virtual function icons is too low (less than 8).
023	The terminal does not support the colour depth of 256 colours.
024/025	The resolution of the terminal for screens is too low (less than 200 pixels).
026	There is an error in the configuration of the inputs and outputs.

8.4 Compatibility with ISOBUS terminals

DRILL-Controller MIDI job computer software version: V01.09.00

Terminal	SW	ISO-BUS-TC	UT	SC	SC: Delay	SC: Geom.	Aux2	MULTI-Control
ME-Touch	2.10.14	✓	✓	✓	✓	✓	✓	MB: ✓ MD: ✓ MP: ✓ MR: ⊘ MS: ✓
ME non-touch terminals BT1N	4.12.00	✓	✓	✓	✓	✓	✓	MB: ✓ 1) MD: ✓ MP: ✓ MR: ⊘ MS: ✓
Amapad	3.17.53a z	✓	✓	✓	⊘	✓	✓	MB: ✓ MD: ⊘ MP: ⊘ MR: ⊘ MS: ⊘
Amatron 3	01.06.00	✓	✓	✓ 2)	✓	✓	✓	MB: ⊘ 2) MD: n.t. MP: ✓ MR: ⊘ MS: ⊘
Case AFS 700-Pro	30.4.0.0	✓	✓	n.t.	✓	✓	✓	⊘
Fendt 7"		⊘	✓	⊘	⊘	⊘	⊘	⊘
Fendt 10"	779	✓	✓	✓		✓	✓	MB: ⊘ MD: ⊘ MP: ⊘ MR: ⊘ MS: ✓

Terminal	SW	ISO-BUS-TC	UT	SC	SC: Delay	SC: Geom.	Aux2	MULTI-Control
JD 1800	2.13.1023	⊘	✓	⊘	⊘	⊘	⊘	⊘
JD 2600	2.8.1033	⊘	⊘	⊘	⊘	⊘	⊘	⊘
JD 2630	3.30.1232	✓	✓	✓	✓	✓	n.t.	MB: ⊘ MD: ⊘ MP: ⊘ MR: ✓ MS: ⊘
Kverneland Isomatch Tellus Go	V1.02	⊘	✓	⊘	⊘	⊘	✓	⊘
Kverneland Isomatch Tellus Pro	V1.12	✓	✓	✓	✓	✓	✓	⊘
Topcon X30	3.18.43	✓	✓	✓	⊘	✓	✓	MB: ✓ MD: ⊘ MP: ⊘ MR: ⊘ MS: ⊘
Trimble TMX-2050	3.5.1.3	✓	✓	⊘	⊘	⊘	✓	⊘

Remarks:

[1)] If there is more than one boom, the boom for SECTION-Control can be selected in the ISOBUS-TC application.

[2)] If the implement is equipped with MULTI-Boom, only the first boom with be used for SECTION-Control.

Legend: See Compatibility with ISOBUS terminals, page 83

8.4.1 Compatibility with ISOBUS terminals

Legend L3:

- Terminal = The job computer was tested with this terminal.
- SW = Software version of the tested terminal.
- ISOBUS-TC or TC = Is the target rate correctly transmitted from the Task-Controller of the terminal to the job computer?
- ISOBUS UT or UT = Does the job computer log onto the terminal? Is it possible to operate the job computer through the terminal?
- SECTION-Control or SC = Can SECTION-Control switch the part width sections of the job computer?
- SC: Delay = Is the delay registered in the job computer? If yes, is it correctly transmitted to the terminal?
- SC: Geom. = Is the geometry entered in the job computer loaded by the terminal?
- Aux1 = Can the job computer be operated with a joystick in Aux1 mode?
- Aux2 = Can the job computer be operated with a joystick in Aux2 mode?
- Read FS = Can the job computer use the file server function of the terminal for reading?
- Write FS = Can the job computer use the file server function of the terminal for writing?
- MULTI-Control = Is the job computer, together with the Task-Controller of the terminal, capable of using the following functions? If none apply, a checkmark is sufficient.
  - MB – MULTI-Boom – For ISOBUS job computers that control several metering units and have several application points (working width). Example: Seed drill with liquid fertiliser and seed metering.
  - MD – MULTI-Device – For systems that consist of several job computers. Each job computer controls at least one metering unit. Example: Field sprayer with two valve chests. One job computer per valve chest and boom.
  - MP – MULTI-Product – For job computers that are capable of spreading more than one product. Each product can have its own hopper and its own metering unit. Example: Fertiliser spreader with more than one hopper and metering unit.
  - MR – MULTI-Rate – For job computers that not only control several metering units, but are also capable of assigning an individual target rate from an application map to each metering unit.
  - MS – MULTI SECTION-Control – For job computers that support "MULTI-Device" or "MULTI-Boom" and therefore enable automatic part-width section control for each working point. A separate working track is saved for each working point. Example: Field sprayer with two booms and two valve chests. The automatic part-width section control works for both valve chests.

8.4.2 Compatibility of older software versions

You can find tables with the compatibility of older software versions in the compatibility list on our website.

8.5 Configuring the ISOBUS job computer

Upon delivery, the job computer has default settings.

After each replacement, before the initial operation of the computer, the settings for the specific implement must be entered.

- These settings cannot be made through the implement setup!
- The settings are entered with a configuration file that is installed with the software package.

9 Technical Data

9.1 Technical data for the job computer

ECU-Midi job computer HW 1.5.0, 1.5.3, 1.5.4, 1.6.0, 1.7

Processor:	Fujitsu MB96F338RS 48MHz with 32kByte RAM and 544kByte flash ROM
Memory:	64kBit I2C-EEPROM and 32MBit SPI flash memory
Connections:	▪ 16-pin connector for power supply and CAN (J1939 or ISO 11783) ▪ Optional second 16-pin connector for cascading other ECUs ▪ 42-pin connector for sensors and actuators
Power supply:	9 - 32 V DC
Power consumption:	110 mA (at 13.8 V without power output, without supply to external sensors)
Temperature range:	-20 to +70 ºC
Housing:	Anodized aluminum continuous cast casing, lid with pressure compensation element and stainless steel screws
Protection degree:	IP66K (dustproof and protected against hose water at elevated pressure in accordance with DIN 40050 Part 9: 1993)
Environmental tests:	Vibration and impact test in accordance with IEC68-2
Dimensions:	262 mm x 148 mm x 62 mm (LxWxH)
Weight:	0.84 kg

9.2 Available languages

You can set the following languages in the software for the operation of the implement.

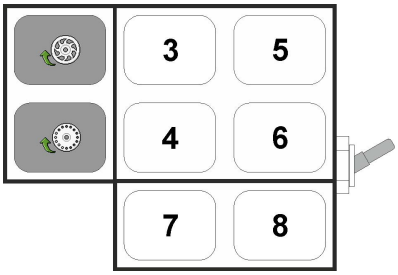
Software version	Added languages
01.05.21	BG, CS, DE, EN, ES, FR, IT, NL, PL, RU, TR
01.06.04	HU
01.07.xx	DA, PT, SK, UK
01.08.00	EL, ET, FI, HR, LT, LV, NO, RO, SL, SR, SV

9.3 Joystick button assignment

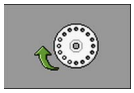
9.3.1.1 Standard joystick button assignment on the AmaStick

If you are using an AmaStick, the following functions are activated when you press a certain button on the joystick.

The illustrations also show the required position for the side switch.

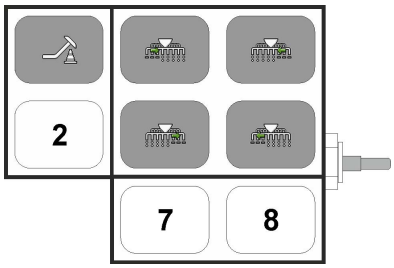


For a seed drill, fills the metering cells with seed.



For a precision airplanter, fills the metering wheel with seed.

Buttons 3-8 are not assigned.



Lifts the track marker to pass over obstacles. The implement itself is not lifted.

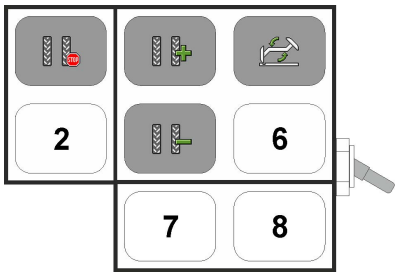
Switches off from left to right.

Switches on from left to right.

Switches off from right to left.

Switches on from right to left.

Buttons 2, 7, and 8 are not assigned.



Deactivates the tramline control.

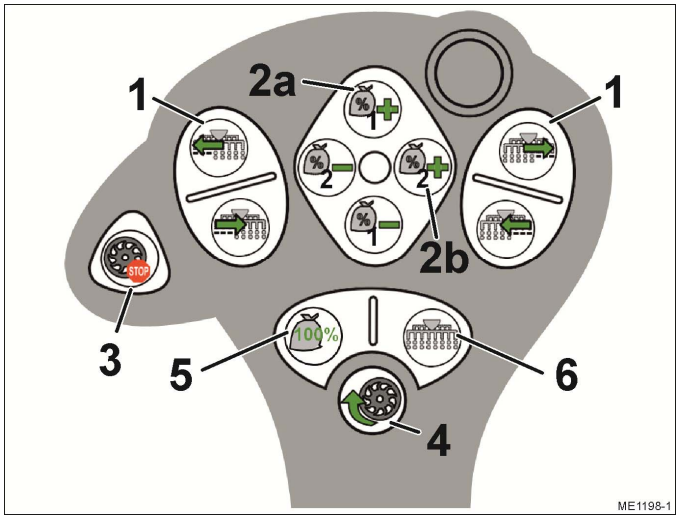
Increases the number of the track.

Reduces the number of the track.

Changes the track marker manually.
The track marker is always changed when you lift the implement.

Buttons 2 and 6-8 are not assigned.

9.3.2 Button assignment for the AmaPilot



Level 1

(1) Switch rows on/off in steps

(2) Adjusting the target rate during operation

(2a) Fertiliser (1)

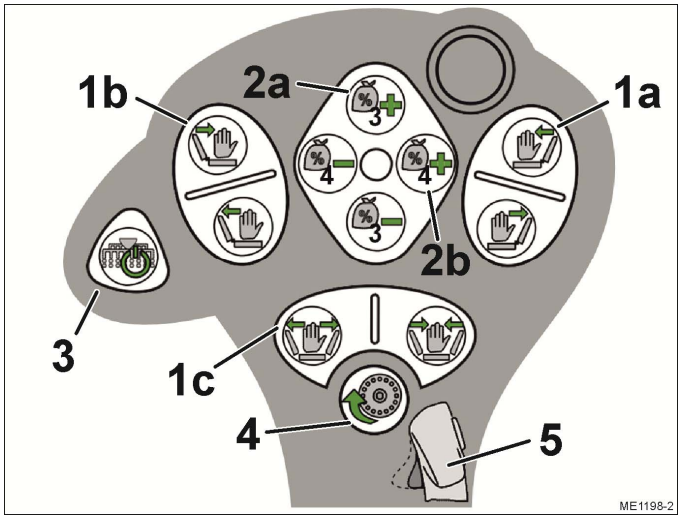
(2b) Seed (2)

(3) Pre-stop function, all of the selected metering drives are stopped

(4) Pre-metering, fills the metering cells with seed

(5) Restores the target rate back to 100 %

(6) Switches all of the rows on



Level 2

(1) Operating the hydraulic system

(1a) Raise/lower the boom on the right to avoid obstacle

(1b) Raise/lower the boom on the left to avoid obstacle

(1c) Fold/unfold the implement

(2) Adjusting the target rate during operation

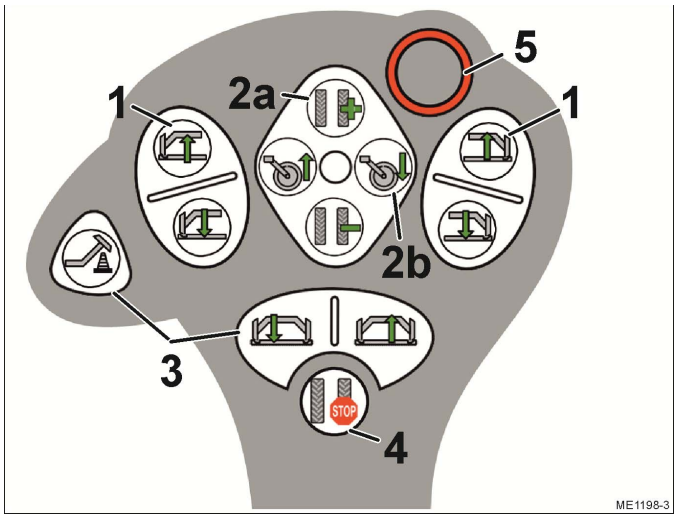
(2a) Fertiliser (3)

(2b) Seed (4)

(3) Switches all of the selected part width sections/rows off/on

(4) Pre-metering, fills the metering wheel with seed

(5) Change levels



Level 3

(1) Operating track markers

(2a) Adjusting the number of the track

(2b) Lifting and lowering the drive wheel

(3) Operating track markers

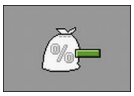
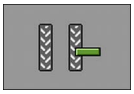
(4) Deactivates the tramline control

(5) Change levels

9.3.3 Available functions with AmaPilot +

If you are using AmaPilot +, you can assign the buttons with any of the following functions.

You can read how to configure the assignment of the joystick buttons in the operating instructions for the terminal.

Function icon	Meaning
	Increases the target rate.
	Reduces the target rate.
	Restores the target rate back to 100 %.
	For a seed drill, fills the metering cells with seed.
	Switches on from right to left.
	Switches off from left to right.
	Switches on from left to right.
	Switches off from right to left.
	Deactivates the tramline control.
	Increases the number of the track.
	Reduces the number of the track.

10 Explanation of the signals in the assignment plan

There is an assignment plan for each implement model. You can obtain the assignment plan corresponding to your implement from your contact person at Müller Elektronik.

In the next tables, you will find explanations for the texts that are found on the assignment plan.

Glossary – Input signals

Deutsch	English	Explanation
0VE or GNDE	0VE or GNDE	0V for sensors
12VE	12VE	12V for sensors
Calibration button	Calibration button	Sensor that checks if the calibration button is switched.
Working position sensor	Work position sensor	Sensor that checks if the implement is in working position
Upper fill level sensor	Upper level sensor	Sensor that checks if there is seed in a hopper.
Lower fill level sensor	Lower level sensor	Sensor that checks if there is seed in a hopper.
Half width sensor	Half width sensor	Sensor that measures the position of a half width motor.
Metering drive speed sensor	Metering drive speed sensor	Sensor that measures the speed of a metering drive.
Blower fan speed sensor	Fan speed sensor	Sensor that measures the speed of a fan.
Metering shaft speed sensor	Metering shaft speed sensor	Sensor that measures the speed of a metering shaft.
Speed sensor	Vehicle speed sensor	Sensor that measures the speed.
Calibration flap position sensor	Calibration flap position sensor	Sensor that measures the position of a calibration flap.
Drawbar position sensor	Drawbar position sensor	Sensor that measures the position of the drawbar hydraulic cylinder.
Top link position sensor	Top link position sensor	Sensor that measures the position of the top link hydraulic cylinder.
Vacuum sensor	Vacuum sensor	Sensor on a precision airplanter that checks if the fan is producing sufficient vacuum to suck in the seeds.

Glossary – Output signals

Deutsch	English	Explanation
0VL or GNDL	0VL or GNDL	0V for actuators
12VL	12VL	12 V for actuators
Metering drive	Metering drive	Actuator that supplies energy to the metering unit.
Lift seed drill	Lift seeder	Actuator that lifts the implement.
Fold seed drill	Fold seeder	Actuator that folds or unfolds the implement.
Half width motor	Half width motor	Actuator that switches the half width.
Track marker	Track marker	Actuator that controls the track marker.
Pre-emergence marker	Pre-emergence marker	Actuator that controls the pre-emergence marker.
Tramline	Tramline	Actuator that closes the tramline.
Calibration flap	Calibration flap	Actuator that opens and closes the calibration flap.
Loading auger	Loading auger	Actuator that activates and deactivates the loading auger.
Wheel adjustment	Wheel adjustment	Actuator that changes the track width.
Drawbar	Drawbar	Actuator that adjusts the drawbar position.
Top link	Top link	Actuator that adjusts the top link position.
Coulter pressure adjustment	Coulter pressure adjustment	Actuator that increases the coulter pressure to adjust the placement depth.
Selection of ERC module	Select ERC module	Actuator that addresses the ERC modules.
Work floodlights	Working light	Actuator that switches the work lights.
Tank lighting	Hopper light	Actuator that switches the hopper lights.
Warning beacon	Beacon	Actuator that switches the warning beacon.

11 Notes

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