

SERVICE MANUAL

Field-IQ ISOBUS

SEEDER/PLANTER ECU



PTx
Trimble

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Legal Notices

Agriculture Business Area

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For Your Safety

- Basic Safety Instructions
- Intended Use
- Layout and Meaning of Warnings
- Safety Stickers on the ECU
- Disposal

Basic Safety Instructions

Operation

Be sure to always comply with the following instructions during operation:

- Before you leave the vehicle cab, ensure that all automatic mechanisms are deactivated or manual mode is activated.
- Keep children away from the implement and the ECU.
- Carefully read and follow all safety instructions in this manual and in the machine's manual.
- Observe all applicable regulations on accident prevention.
- Follow all recognized safety, industrial and medical rules as well as all road traffic laws.

Servicing

Keep the system in a functional condition. To do so, follow these 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 product.
- Before performing any welding on the tractor or the implement, always disconnect the power supply to the ECU.
- The ECU and the cabling must not be repaired. Unauthorized attempts at repairs can fail and cause hazardous malfunctions.
- Use only original accessories as spare parts.

Intended Use

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

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

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 or damage to property, if not avoided.

DANGER!

THIS SIGNAL WORD IDENTIFIES HAZARDS THAT COULD POTENTIALLY CAUSE DAMAGE TO PROPERTY, IF NOT AVOIDED.

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 appears 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. **NOTICE! This is a notice. It warns that there is a risk involved in the next step.**
2. Step involving risk.

Safety Stickers on the ECU

Sticker	Description
	<p>Do not clean with a high-pressure cleaner.</p>

Disposal

Icon	Description
	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.

About These Instructions

- Target Group of These Operating Instructions
- Directional Information in These Instructions

Target Group of These Operating Instructions

This service manual is intended for the employees of implement manufacturers who would like to install the ECU on their implements to control the implement. It serves to explain the functioning of the ECU to the employees.

These instructions describe all of the functions that can be actuated with the ECU. This means that some chapters may not be relevant for the operation of certain implements.

Directional Information in These Instructions

All directional information in these instructions, such as “left”, “right”, “forward”, “back”, is relative to the movement direction of the vehicle.

Basic Control Principles

- Switching on the ECU
- Layout of the Work Screen

Switching on the ECU

WARNING – Risk of injury from moving machine parts.

Movement of the machine may seriously injure persons or damage property.

Before activating the ECU:

- Make sure that no one is close to moving machine parts.

1. Connect the ISOBUS cable of the ECU to the ISOBUS connector on the tractor.
2. Start the ISOBUS display.

The ECU is started together with the display.

When starting up for the first time, the ECU initially has to transmit lots of information to the display. This can take a few minutes.

When all of the data from the ECU app has been loaded, the icon for the app appears on the display:



3. Open the ECU app. Follow the instructions for the ISOBUS display.

The following message appears: "Machine will be activated. Outputs are switched. Keep distance!"

4. Read and follow the instructions on the display.



5.  - Activate the ECU.

The work screen of the ECU appears.

Please note that you must configure the display of the work screen when you start the ECU for the first time.

6. At the first start in the work screen, press:



7. Follow the instructions in [Configuration of the Work Screen Display](#).

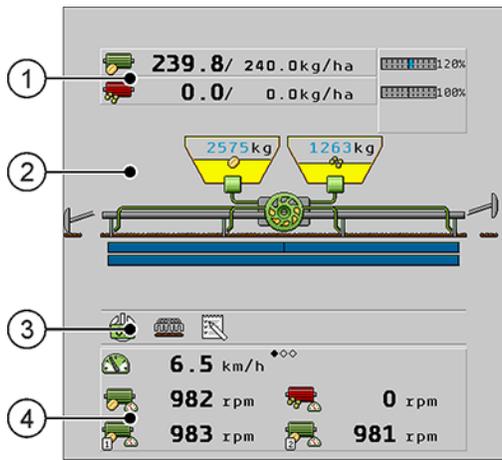
Please note that after starting, the ECU checks whether you have defined the utilized display as the standard. If not, the ECU waits the selected time of the parameters "Wait. Time for Pref. VT" and "Wait. Time for Pref. TC" before it establishes a connection to a different display.

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.

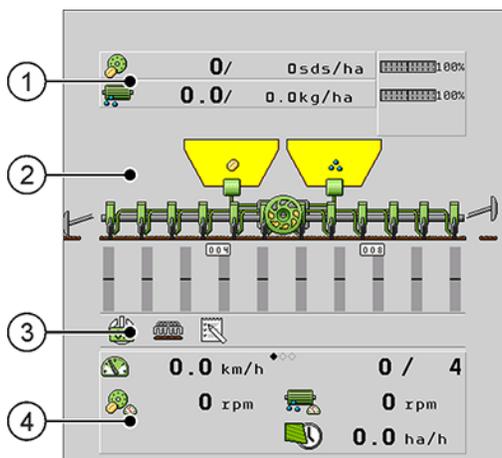
The appearance of the work screen differs for seeders and for precision planters. Depending on the machine type, different icons may be displayed in some cases.

If a predefined limit is exceeded or fallen below during work, the corresponding status display in the work screen is highlighted in red.



Layout of the work screen for a seeder

Item	Description	Item	Description
1	Information on the metering drives	3	Information on the additional functions
2	Information on hoppers and rows	4	Status information



Layout of the work screen for a precision planter

Item	Description	Item	Description
1	Information on the metering drives	3	Information on the additional functions

Item	Description	Item	Description
2	Information on hoppers and rows	4	Status information

Information on the Metering Drives

Icon	Meaning
	The seed rate for each connected metering drive. The current value is always shown here. The icon changes depending on the metering drive type.
	The changed target rate you have entered.

Information on Hoppers and Rows

Icon	Meaning
	The current weight of the seed that is in the hopper. If the hopper has a remaining quantity monitoring, you can see from the colouring how much content is still in the hopper.
	The machine creates a tramline on the side marked with this symbol.
	The target rate is maintained in the respective row.
	The target rate is exceeded in the respective row within the deviation tolerance.
	The target rate is not reached in the respective row within the deviation tolerance.
	The target rate is exceeded in the respective row outside the deviation tolerance.
	The target rate is not reached in the respective row outside the deviation tolerance.
	No seed flow or seed flow in a switched-off row was detected.

Information on the Additional Functions

Icon	Meaning
	The main switch is activated.
	The main switch is deactivated.
	The machine is in work position.
	The machine is not in work position.
	The ISOBUS-TC application is activated.
	SECTION-Control is activated and in automatic mode.
	The pre-metering is activated.
	The pre-metering is activated.
	The waterhole mode is activated.
	The blockage system is activated.
	The fan control is activated.
	The fan control is deactivated.
	There are alarms that have been ignored.
	The boost pump is activated.
	The delay of the metering switch is activated.
	The delay of the metering switch is deactivated.
	The beacon is activated.

Icon	Meaning
	The hopper light is activated.
	The working light is activated.
	Both bout markers are activated.
	The left-hand bout marker is activated.
	The right-hand bout marker is activated.
	Both bout markers are deactivated.
	The bout markers are in change mode. The bout marker is changed when you press the function key.
	The obstacle mode is activated.
	A hopper has issued an alarm.
	The overall lighting is activated.

Status Area

Icon	Meaning
	The current speed of the machine.
	The current fan speed.
	The current speed of the metering drive. The icon changes depending on the metering drive type. If a number appears on the symbol, it is the respective metering drive. If no number appears, it is an average value.
	The current area output.
	The remaining area that can still be worked with the current hopper content of the respective hopper. If a sum symbol appears, it is the sum of the hopper contents from all hoppers.

6

Operating the Implement in the Field

- Filling the Metering Cells or Metering Wheel with Seed
- Start Seeding
- Stop Seeding
- Adjusting the Target Rate During Operation
- Viewing Results

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 on a seeder and the metering roll on a precision planter with seed before starting travel. You can also use the pre-metering function.

1. On the work screen, press

for a seeder:  , for a precision planter: 

As long as the metering cells or the metering wheel are being filled, the following icon appears on the

work screen:  or 

2. Only start driving once the icon is turned off.

Start Seeding

Before you begin, make sure:

- The implement is moving.
- The implement is lowered.
- The metering cells or the metering roll is filled with seed.
- The fan has reached the minimum revolution speed.

1.  - Start seeding.

NOTE - Individual function icons and symbols are hidden after seeding has started.

Stop Seeding

1.  - Stop seeding.

The following message appears in the work screen: "Application is stopped."

All of the metering drives are stopped.

Adjusting the Target Rate During Operation

You can amend the target rate while working.

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

Function icon	Meaning
	Increases the target rate. The target rate will be raised by the value you defined in the "Adjustment" parameter.
	Reduces the target rate.
	Restores the target rate back to 100%.
	Updates the target rate from the task.

Before you begin, make sure you have defined the "Target Rate" and "Adjustment" parameters.

1. In the work screen, press the target rate display:



Function icons for target rate adjustment appear.

2.   or  - Change the target rate.

The target rate of the metering units will be changed.

The ECU regulates the seeding according to the new target rate.

After one minute of work with the changed target rate, the display starts flashing.

Viewing Results

Delete this text and replace it with your own content.

You can access the screen using the following function button:



Results

The “Results” screen shows how much of each product you have spread and on which area.

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

In addition, you can view the results for each product on the “PRODUCT DATABASE” screen.

Function icon	Meaning
	Resets the counter.
	Calls up the “Total Results” screen.
	Calls up the “Row Results” screen.
	Calls up the “Task List” screen.
	Calls up the “Results / hopper” screen.

The following counters are available:

- “Area” - Area on which the implement was in work position.
- “Quantity” - Applied quantity.
- “Area Output” - Applied area per hour.

1. On the work screen, press:



The “Results” screen appears.

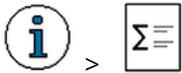
Total Results

On the “Total results” screen, you see the counter that documents the work performed since the initial startup of the ECU.

The following counters are available:

- “Service Hours” - Time for which the ECU is switched on.
- “Total Time” - Time for which the ECU was spreading.
- “Total Distance” - Processed distance.
- “Total Area” - Applied area.
- “Area Output” - Applied area per hour.
- “Total Quantity” - For each metering unit.

1. On the work screen, press:



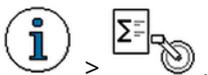
The “Total Results” screen appears.

Row Results

On the “Row Results” screen, you can see how many seeds were spread in each row. These results can only be seen with implements that have counter results for each row.

Function icon	Meaning
	Resets the counter.
	Shows the total counted seeds per row.
	Shows the percentage of skips per row. The value is always based on the last 250 counted seeds.
	Shows the percentage of multiples per row. The value is always based on the last 250 counted seeds.
	Shows the percentage of singulations per row. The value is always based on the last 250 counted seeds.

1. On the work screen, press:



The “Row Results” screen appears.

2. Use the function icons to switch between the individual results.

Task Counter

The task counter serves to document task-related results. The data cannot be exported. The function is intended for users who are working without ISO-XML.

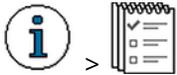
You can maintain up to 30 task counters. Each can be started or stopped at any time.

The following counters are available:

- “Area” - Area on which the implement was in work position.
- “Quantity” - Applied quantity.
- “Area Output” - Applied area per hour.
- “Total Time” - Time for which the ECU was spreading.

To start and stop a task counter:

1. On the work screen, press:



The “Task List” screen appears.

2. In the “Task” parameter, select a task or create or new task.
3. Use the “Renaming” parameter to give the task a different name.
4. In the “Product” parameter, select the product that you want to spread with this task.

5.  - Start the counter.

A green icon appears beside the task name. This means that the counter has been started.

6.  - Stop the counter.

7.  - You can also clear the counter.

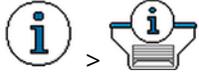
Remaining Quantity Results

On the “Results / hopper” screen, you see the counters that show the quantity remaining in the hopper and how much work can still be performed with the remaining hopper content.

The following counters are available:

- “Rem. quantity” - Remaining hopper content.
- “Rem. area” - The area that can still be worked with the current hopper content.
- “Rem. distance” - The distance that can still be covered with the remaining hopper content.

1. On the work screen, press:



The "Results / hopper" screen appears.

Setting the ECU

- Making Settings
- Selecting and Configuring the Speed Source
- Adjusting Metering Units and Hoppers
- Using Tramline Control
- Operating Additional Functions

Making Settings

You can set and configure different settings and parameters of the ECU. In addition, you can view diagnostic parameters and statistics.

Please note that depending on the software configuration, not all of the functions can always be operated and configured. Sometimes only the current settings for each parameter are shown.

Function Icon	Number	Meaning
	1	Speed
	2	Hopper/Metering drive
	3	Fan (currently not available)
	4	Tramlines
	5	Section control (currently not available)
	6	Additional functions
	7	Statistics
	8	Configuration
	9	Diagnostic

1. On the work screen, press:



The settings screen appears.

2. Select the settings you want to make.

Selecting and Configuring the Speed Source

You can access the screen using the following function button:



When selecting the speed source, only the respective available speed sources are displayed. For example, if no Tractor-ECU with speed is available, the speed source “Tractor” is also not displayed.

Parameter	Description
Simulation	<p>CAUTION – Injury caused by working machine</p> <p>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.</p> <p>Make sure that no one is close to the implement.</p> <p>Activate this parameter if you want to simulate a speed. The desired speed that should be simulated must also be entered.</p>
Tractor	<p>Activate this parameter if the speed should be taken from the tractor.</p> <p>“Wheel” - The speed corresponds to the wheel speed of the tractor.</p> <p>“Ground” - The speed corresponds to the speed that is determined by a GPS speed sensor on the tractor.</p>
Implement	<p>Activate this parameter if the speed should be determined directly from the implement. To do this, you have to know the number of impulses per 100 m. If you know the number of impulses, you can enter it directly. Otherwise, you must determine the number of impulses using the 100 m method.</p>

Calibrating the Speed Sensor with the 100m Method

When calibrating the speed sensor with the 100m method, you determine the number of impulses received by the speed sensor in a distance of 100m. When you know the amount of impulses, the ECU can calculate the current speed.

After the first calibration, you can manually enter the number of impulses as the value for the “Impulses/100m” parameter.

1. Drive the implement onto the field.
2. Mark the tyre position on the ground. You can use a stone for instance.
3. Measure a straight route of 100 m and mark the end.
4. On the settings screen, press:



5.  - Start the calibration.
6. Drive the marked distance.

While driving, the counted impulses are shown in the "Impulses/100m" field.

7.  - Press when you have reached your destination.
Calibration will be finished.

Adjusting Metering Units and Hoppers

You can access the screen using the following function button:



The hopper symbol in the screen shows various information:



- The current weight of the seed that is in the hopper. If the hopper has a remaining quantity monitoring, you can see from the colouring how much content is still in the hopper.



- The hopper content corresponds to the calculated value.



- The hopper content corresponds to the weighed value (only available if the machine has a weighing system).



If the machine has a weighing system, you can change the displayed value with  or overwrite  the calculated value with the weighed value.

Parameter	Description
Assigned Product	Select the product that is in the respective hopper.
Target Rate	Enter a target rate for each metering unit. The target rate defined how much seed or fertilizer should be spread.
Calibration Factor	For a seeder, enter how much seed or fertilizer is spread per revolution of the metering shaft. For a precision planter, enter the number of seeds spread per revolution of the metering wheel. You can only edit the calibration factor when this function is activated. Otherwise, the value that was determined during calibration will always be shown.
Target Rate Adjustm.	Enter the percent value by which the target rate should be changed when you change it manually during the application.

Performing a Calibration

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

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

Before you begin, make sure:

- You have prepared the implement and its metering drives for calibration as described in the operating instructions from the implement manufacturer.
- The hopper is filled with a sufficient quantity of seed or fertilizer. 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.
- If you have activated the “Fan Monitor. Calibration” parameter, the fan must be stopped.

1. On the settings screen, press:



2. Select the product for which you want to perform the calibration test.



3. - Press.

The “Calibration” screen appears.

4. Select the metering unit for which you want to perform the calibration test.

5. In the input box under the text “Working Speed”, enter the speed you want to use later on when seeding.

6. Enter the target rate with which you want to work later.

7. Enter a calibration factor, if known. For new products, the optimal calibration factor is calculated automatically.

8. Select the mode that you want to use for calibration. If you select “Manual”, you don't need to enter any other values. For “Area”, “Time” or “Revolutions”, you also have to enter the respective value up to which you want to calibrate.



9. - Press to save the entered data in the database.



10. - Fill the metering cells with seed or with fertilizer.

The metering cells rotate for a few seconds until the defined angle from the “Angle Pre-assignment” parameter has been reached



11. If you are using a weighing system, press to save the current measured value internally.



12. - Start the calibration.

13. Start the calibration on the implement. Proceed as described in the operating instructions from the implement manufacturer.

14. Wait until the required quantity has been applied. The ECU calculates a weight from the available data and shows it in the field beside the text “Calculated Value”.

15. Terminate the calibration on the implement. Proceed as described in the operating instructions from the implement manufacturer.

A screen with the text appears on the display screen: "3. Results".

16. Weigh the seed that was applied during the calibration.

17. Enter the weight into the "Weighed Value" field. If you are using a weighing system, press . The total quantity determined by the weighing system will be automatically entered.

The ECU calculates the deviation in percent between the calculated and the weighed value.

The ECU calculates the minimum and the maximum speed at which these target rates are possible using the selected metering roll.

When the calibration button is pressed again, the calibration test continues counting from the weighed value.

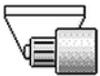
18.  - Confirm.

The ECU saves all of the data on the product in the product database.

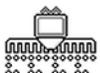
Configuring Target Rate Groups

If you are using a planter, you can set different target rates for a product. You can then assign these target rates to the desired metering drives.

1. On the settings screen, press:



2. Select the product for which you want to create target rate groups.

3.  - Call up the "Target rate groups" screen.

The "Target rate groups" screen appears.

4. Enter the desired target rates. You can maintain up to 6 target rates.

5. Activate or deactivate the respective metering drives to which you want to assign the respective target

rates. Use  /  to scroll further.

6.  - Activate the function.

The status changes.

7. When you want to deactivate this function, press: .

Using Tramline Control

You can access the screen using the following function button:



The ECU can help you in creating tramlines for the tires of other vehicles such as sprayers.

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 will be counted as soon as the time that was set for the “Delay Cycle Switching” parameter has been reached. The time starts counting as soon as the machine is lifted.

When the TRAMLIN-Management automatic tramline system is activated, you do not need to make any other settings, and therefore the individual function icons for using tramline control are not shown.

Function Icon	Meaning
	<p>Increases the number of the track.</p> <p>For example, so that you can continue working again at the same track after leaving the field.</p> <p>This function icon is only shown when the metering unit is stopped or the working conditions are met.</p>
	<p>Reduces the number of the track.</p> <p>For example, when you have lifted the implement within a track and the ECU automatically activated the next track.</p> <p>This function icon is only shown when the metering unit is stopped or the working conditions are met.</p>
	<p>Deactivates the advancing of tramline control.</p> <p>If you deactivate the advancing of tramline control, the tracks are no longer counted. For example, this can be used when working the headlands.</p> <p>Note that the selected tramline rhythm stops at the current track. If a tramline is created in exactly this track, this tramline remains active.</p> <p>If the advancing of tramline control is deactivated, the following icon appears on the work screen: </p> <p>If this icon appears, the bout markers are also not switched further in automatic mode.</p> <p>When you restart the system, tramline shifting is activated by default. You must then deactivate it again.</p> <p>This function icon is hidden when the implement does not have a tramline system.</p>
	<p>Opens the screen for selecting a tramline rhythm for a seeder.</p> <p>Opens the screen to configure the tramline control for a precision planter.</p>

1. On the settings screen, press:



You can change the number of the track.

You can configure the tramline control.

Configuring the Tramline Control

You can either configure the tramlines using the tramline tables or have the tramlines calculated based on various parameters.

For seeders, the tramlines are generally created based on tramline tables, which are used to determine a tramline rhythm.

For precision planters, the tramlines are generally calculated based of various parameters.

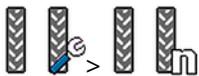
In some cases, however, it can be sensible to use the respective other version for tramline control.

If you want to configure the tramlines with tramline tables, proceed as follows:

1. Determine the implement type.
2. Select a tramline rhythm.
3. If you are using a blockage system: Adjust the blockage system for the tramline rhythm.

If you want to calculate the tramlines, proceed as follows:

1. On the work screen, press:



2. Configure the parameters.

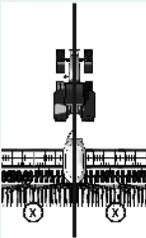
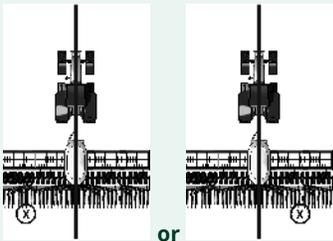
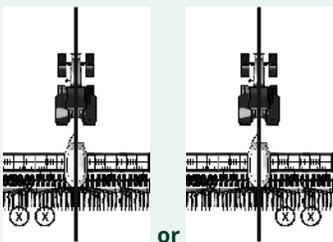
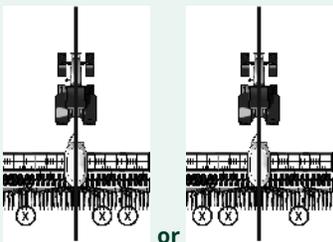
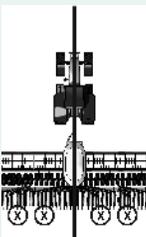
You have configured the tramline control for the precision planter.

When calculating the tramlines, you must configure the following parameters on the “Settings” screen:

Parameter	Description
Sprayer Working Width	Defines the working width of the sprayer for which you want to create the tramline.
Track Width	Defines the track width of the tractor.
Wheel Width	Defines the wheel width of the tractor.
Working Start	Defines where you want to start working: <ul style="list-style-type: none"> • Left Field Edge • Right Field Edge

Determining the Machine Type

If you are working with a seeder with tramline control, you have to know where and how many tramline mechanisms are installed on your seeder. The following overview shows how tramline mechanisms can be installed on your seeder.

Tramline Mechanism	Description
	<p>One tramline mechanism on each side of the seeder.</p>
	<p>One tramline mechanism on one side of the seeder.</p>
	<p>Two tramline mechanisms on one side of the seeder.</p>
	<p>One tramline mechanism on one side and two tramline mechanisms on the other side of the seeder.</p>
	<p>Two tramline mechanisms on each side of the seeder.</p>

Selecting Tramline Rhythm

Tramline Rhythm	Description
RhNo.	Number of the tramline rhythm
Length	Number of tracks until the tramline rhythm is repeated.
Left, right	This shows the passes in which the “left” or “right” seed tubes are closed in order to create a tramline. Up to two track numbers can be entered for each direction.
Indiv	Here you can define your own tramline rhythm.

Before you begin, make sure:

- You know the working width of your implement.
- You know the working width of your sprayer.
- You know which side of your seeder is used to create tramlines and how many tramline mechanisms your seeder has on each side.

1. Decide whether you want to start working on the left or the right field edge.

2. Perform the following calculation:

Working width of the sprayer: Working width of the seeder

e.g.: $12:3=4$; $15:3=5$ or $20:3=6.67$

The following results are possible: Even numbers (2; 4; 6; etc.), uneven numbers (3; 5; 7; etc.) and decimals (1.5; 4.5; 5.33; etc.)

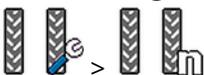
Depending on the result, you have to select a different tramline rhythm. You can find the results in the “Results of the calculation” column in the following sections.

3. Find out which section contains the proper tramline rhythm for you.

- Even numbers - Even tramline rhythms
- Uneven numbers - Uneven tramline rhythms
- Decimal numbers - Special tramline rhythms

4. Select the table with the proper rhythm numbers in the chapters mentioned in step 3. The tables can differ depending on the side of the seeder that is used to create the tramlines, the number of tramline mechanisms on the seeder and the working start.

5. On the settings screen, press:



6. Select the proper rhythm number.

OR

Enter an individual tramline rhythm if the rhythm number indicated in the table is "999".

You can start working.

Creating an Even Tramline Rhythm

Two even tramline rhythms can be created during one or two passes.

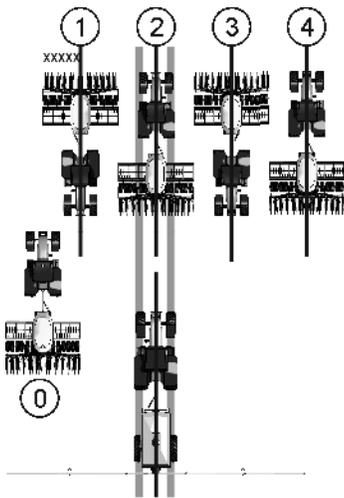
In one pass if the tramlines are created on both sides of the seeder.

In two passes if the tramlines are created on one side of the seeder and a tramline mechanism is installed on the side.

In one pass if the tramlines are created on one side of the seeder and two tramline mechanisms are installed on the side.

Creating Tramlines on Both Sides of the Seeder Simultaneously

Example



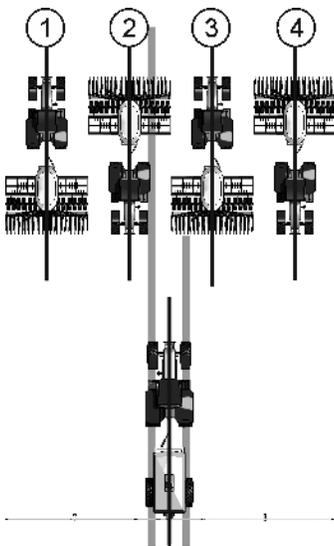
- The figure shows the 4s tramline rhythm.
- The tramlines are created during track 2. (ex.: working width of the sprayer = 12 m, working width of the seeder = 3 m)
- Track 0 must be performed separately. To avoid overlapping, use the "Half width shutoff sys." function.
- The tramline control must be deactivated for track 0.

Possible Position of the Flaps	Result of the Calculation	RhNo.	Length	Left	Right
	2	2s	2	1	1
	4	4s	4	2	2

Possible Position of the Flaps	Result of the Calculation	RhNo.	Length	Left	Right
	6	6s	6	3	3
	8	8s	8	4	4
	10	10s	10	5	5
	12	12s	12	6	6
	14	999	14	7	7

Creating Tramlines on One Side of the Seeder and with Only One Tramline Mechanism

Example



- The figure shows an individual tramline rhythm.
- The tramlines are created during tracks 2 and 3. (ex.: working width of the sprayer = 12 m, working width of the seeder = 3 m)

Possible Position of the Flaps	Result of the Calculation	RhNo.	Length	Left	Right
	2	2L	2	2	1
	4	4L	4	3	2

Possible Position of the Flaps	Result of the Calculation	RhNo.	Length	Left		Right	
	6	6L	6			4	3
	8	8L	8	5	4		
	10	10L	10			6	5
	12	12L	12	7	6		
	14	14L	14			8	7

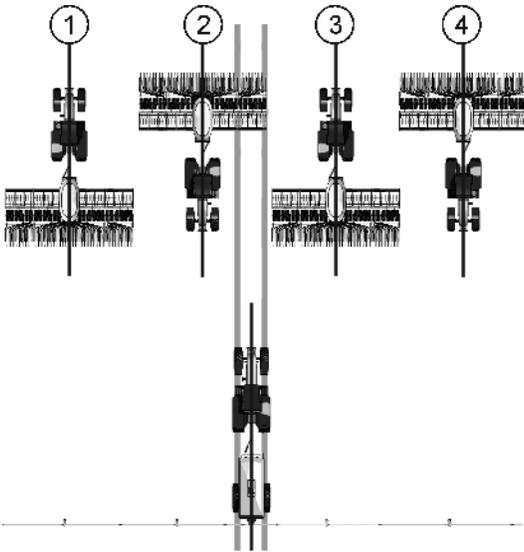
Working start at the left field edge

Possible Position of the Flaps	Result of the Calculation	RhNo.	Length	Left		Right	
	2	2R	2	2	1		
	4	4R	4			3	2
	6	6R	6	4	3		
	8	8R	8			5	4
	10	10R	10	6	5		
	12	12R	12			7	6
	14	14R	14	8	7		

Working start at the right field edge

Creating Tramlines on One Side of the Seeder and with Two Tramline Mechanisms

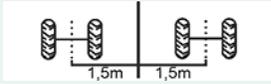
Example



- The figure shows an individual tramline rhythm.
- The tramlines are created during track 2. (ex.: working width of the sprayer = 24m, working width of the seeder = 6m)

Possible Position of the Flaps	Result of the Calculation	RhNo.	Length	Left	Right
	2	999	2		1
	4	999	4	2	
	6	999	6		3

Working start at the left field edge

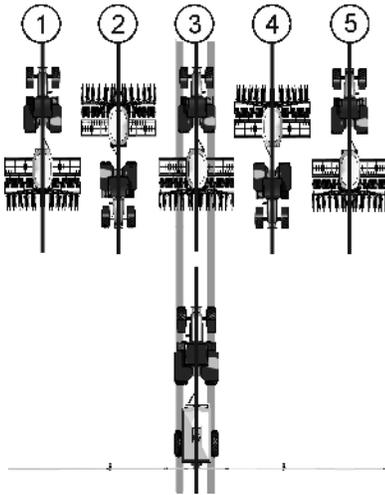
Possible Position of the Flaps	Result of the Calculation	RhNo.	Length	Left	Right
  	2	999	2	1	
   	4	999	4		2
	6	999	6	3	

Working start at the right field edge

Creating Uneven Tramline Rhythms

Uneven tramline rhythms are always created in one track. Uneven tramline rhythms can only be created if the tramlines are created with both sides of the seeder.

Example



- The figure shows tramline rhythm 5.
- The tramlines are created during track 3. (ex.: working width of the sprayer = 15m, working width of the seeder = 3 m)

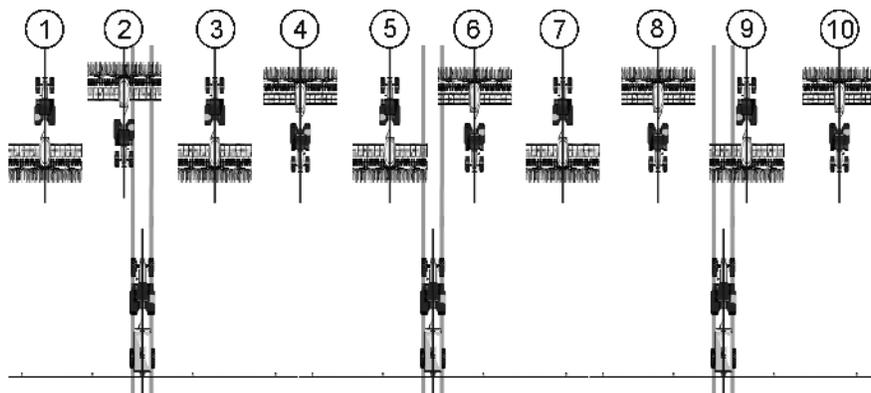
Possible Position of the Flaps	Result of the Calculation	RhNo.	Length	Left	Right
	3	3	3	2	2
	5	5	5	3	3
	7	7	7	4	4
	9	9	9	5	5
	11	11	11	6	6

Creating Special Tramline Rhythms

Special tramline rhythms are always created in four tracks. Special tramline rhythms can only be created if the tramlines are created with both sides of the seeder.

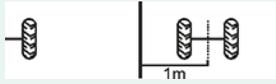
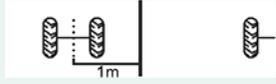
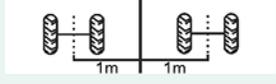
- There is one tramline mechanism on one side of the seeder and two tramline mechanisms on the other side of the seeder.
- Two tramline mechanisms are installed on both sides of the seeder.

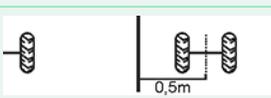
Example



- The figure shows tramline rhythm 20.
- The tramlines are created during tracks 2, 5, 6 and 9. (ex.: working width of the sprayer = 20m, working width of the seeder = 6m)

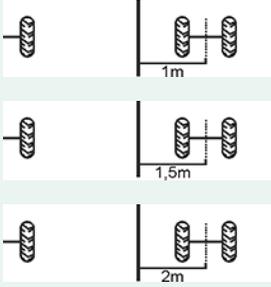
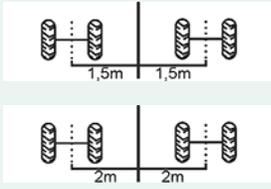
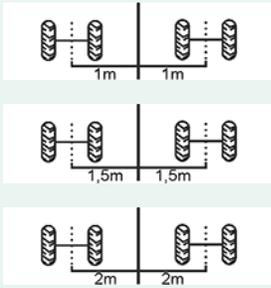
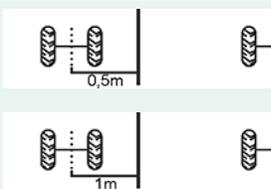
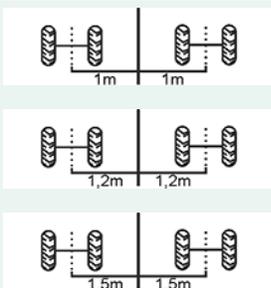
Possible Position of the Flaps	Result of the Calculation	RhNo.	Length	Left			Right	
	1.33	999	4	3	2	1	4	
	1.5	22	6	4	3	6	1	
	2.5	16	10	7	4	9	2	

Possible Position of the Flaps	Result of the Calculation	RhNo.	Length	Left		Right	
 	2.67	62L	8	5	4	7	2
  	3.33	20	10	9	2	6	5
 	3.5	28	14	13	2	9	6
  	4.5	18	18	16	3	12	7
	4.67	63L	14	3	12	7	8
	5.33	24	16	9	8	14	3
	5.5	65L	22	14	9	3	20
 	6.67	64L	20	10	11	4	17

Possible Position of the Flaps	Result of the Calculation	RhNo.	Length	Left		Right	
  	7.5	30	30	27	4	19	12
	9.33	999	28	14	15	5	24

Working start at the left field edge

Possible Position of the Flaps	Result of the Calculation	RhNo.	Length	Left		Right	
	1.33	999	4	1	4	3	2
 	1.5	23	6	6	1	4	3
   	2.5	15	10	9	2	7	4
 	2.67	62R	8	7	2	5	4

Possible Position of the Flaps	Result of the Calculation	RhNo.	Length	Left		Right	
	3.33	21	10	6	5	9	2
	3.5	29	14	9	6	13	2
	4.5	19	18	12	7	16	3
	4.67	63R	14	7	8	3	12
	5.33	25	16	14	3	9	8
	5.5	65R	22	3	20	14	9
	6.67	64R	20	4	17	10	11
	7.5	31	30	19	12	27	4

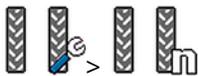
Possible Position of the Flaps	Result of the Calculation	RhNo.	Length	Left		Right	
	9.33	999	28	5	24	14	15

Working start at the right field edge

Programming Individual Tramline Rhythms

If you realize that the tramline rhythms stored do not match your work method, you can program an individual tramline rhythm.

1. On the settings screen, press:



2. In the "RhNo." field, select rhythm number "999".

All of the parameters for the stored tramline rhythms are hidden.

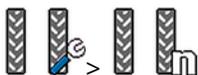
3. Configure the "Length", "Left" and "Right" parameters for individual tramline rhythm.
4. The values you have entered will remain in the screen, also when you have selected some other tramline rhythm. To use an individual tramline rhythm, you always have to select the "RhNo." "999".

Adjusting the Agtron Blockage System for the Tramline Rhythm

A blockage system controls the seed or fertilizer flow in each seed tube.

If you are using a blockage system by Agtron, you have to adjust it for the selected tramline rhythm.

1. On the settings screen, press:



On the screen, you can see the additional area "Number of Each Sensor".

2. In the "Number of Each Sensor" area, enter which blockage system sensors you want to switch off for the respective tramline. You can switch off a maximum of 10 sensors per tramline.

Operating Additional Functions

You can access the screen using the following function button:



With the ECU you can operate various additional functions of your machine. This includes, for example, the lighting or the adjustment of various hydraulic valves of the machine.

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 beacon on and off.

1. On the addons screen, press:



Function icons appear.

2. Select the lighting.

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

Operating the Hydraulic System with the ECU

Note that ECUs are used to adjust the position of the hydraulic valves so that the oil pressure is routed to specified parts of the machine.

When operating the machine with the ECU, remember that the ECU cannot control the oil pressure.

You have to use the control unit in the tractor to generate pressure in the system.

Example

Operation with these systems can then look like this:

1. You press a function key on the display. For example to fold the seeder.

The icon of the function appears on the screen. This confirms that the hydraulic valve is ready and this function can now be controlled hydraulically.

2. Actuate the control unit of the hydraulic system in the tractor that is responsible for folding the implement.

The pressure increases.

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 screen, both when you unfold the implement and when you fold it.

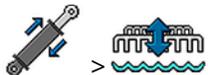
Using the Waterhole Mode

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 tramline from being switched.

Before you begin, make sure the implement is lowered.

1. On the addons screen, press:



The icon for the waterhole mode appears on the work screen.

2.  - Terminate the waterhole mode.

The icon for the waterhole mode disappears.

Adjusting the Working Depth

You can adjust the working depth of the sowing coulters as you work.

1. On the addons screen, press:



2.  - Activate the hydraulic function.

You can adjust the working depth. There is no confirmation displayed on the display.

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

1. On the addons screen, press:



2. or - Activate the hydraulic function.

3. Fold or unfold the implement.

4.  - Confirm.

Using the Wheel Adjustment

With the wheel adjustment, you can change the track width before the implement is folded in.

1. On the addons screen, press:



The track width is being changed. There is no confirmation displayed on the display.

Adjusting the Drawbar Position

You can adjust and view the drawbar position of the seed wagon during operation. By adjusting the drawbar position, the implement is pressed deeper into the soil. 100% corresponds to the maximum traveling distance of the hydraulic cylinder.

Before you begin, make sure you have calibrated the drawbar.

1. On the addons screen, press:



2.  - Activate the hydraulic function.

You can adjust and view the drawbar position of the seed wagon.

Adjusting the Top Link Position of the Three-Point Hitch

You can adjust and view the top link position of the three-point hitch of the seed wagon during operation. The percent value indicates the position of the top link. 100% corresponds to the maximum traveling distance of the hydraulic cylinder.

Before you begin, make sure you have calibrated the top link.

1. On the addons screen, press:



2.  - Activate the hydraulic function.

You can adjust and view the top link position of the three-point hitch on the seed wagon.

Operating Bout Markers

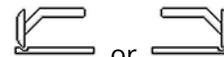
You can use bout markers as you work to mark a pass.

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

1. On the addons screen, press:



2. Select the side on which the bout marker should be lowered first. Press:



The work screen shows which bout marker has been lowered.

3. To activate automatic bout marker control press:



The left bout marker is lowered.

4. Press



again to switch between the left and the right bout markers.
Depending on the settings, an icon for the bout marker appears on the work screen.

Configuring the Integrated Blockage Sensor

Before you begin, make sure:

- The blockage sensors are connected correctly.
- The blockage sensors have been configured in the Field-IQ ISOBUS Configurator.
- The blockage sensors have been taught.

To configure the parameters for the blockage sensors in the ECU software:

1. On the addons screen, press:



The “Configuration / Boom” screen appears.

2. Configure the displayed parameters.

Parameter	Description
Sensitivity	Sensitivity of the sensor for seed detection. The smaller the seeds of the respective product, the higher this value needs to be.
Flow Alarm Delay	Time to wait before an alarm message appears if no pulses are received from the seed flow sensor.
Blockage Alarm Status	Alarm messages are active. Depending on the seed, it may make sense for no alarms to be displayed.

Using the Blockage System

You can access the screen using the following function button:



You can operate and configure the following blockage systems:

- Agtron
- DICKEY-john

Agtron Blockage System

1.  or  - Change the sensitivity. Every number represents a specific number of seeds that should be recorded by the sensors per second. The number of seeds represented by each number can be found in the following table.

2. Optional:  - Call up the diagnostic.

You can see which sensors are not blocked and which sensors did not reach the set value.

Number	Number of grains that was recorded
0	Blockage system is deactivated.
1	1 seed/16s
2	1 seed/8s
3	1 seed/2s
4	1 seed/s

Number	Number of grains that was recorded
5	2 seed/s
6	5 seed/s
7	10 seed/s
8	20 seed/s
9	100 seed/s
10	1000 seed/s

DICKEY-John Blockage System

1. Change the sensitivity levels. Every number represents a specific percentage number of seeds that should be recorded by the sensors per second. The percentage number of seeds represented by each number can be found in the following table.



2. Optional:  - Call up the diagnostic.

You can see which sensors are not blocked and which sensors did not reach the set value.

Number	Percentage of seeds recorded
0	35 %
1	40 %
2	45 %
3	50 %
4	55 %
5	60 %
6	65 %
7	70 %
8	75 %
9	80 %
10	85 %

Configuring the Implement Equipment

- Operating the Configuration Area
- Configuration of the Implement
- Configuration of the Channels
- Configuration of the Products
- Configuration of the Booms
- Configuration of the Fans
- Configuration of the Blockage System
- Configuration of the ME Modules
- Configuration of the Tramline System
- Configuration of the Tramlines
- Configuration of the Linear Actuators
- Configuration of the PWM Parameter
- Configuration of the PID Controller
- Configuration of the PID Value Sets
- Configuration of the Connectors
- Configuration of the Metering Units
- Configuration of the Rotational Actuators
- Configuration of the Revolution Sensors
- Configuration of the Hoppers
- Configuration of the Outlets
- Configuration of the Output Delay
- Configuration of the Conveyor Belts
- Configuration of the Inlets
- Configuration of the Sections
- Configuration of the Rows
- Configuration of the Working Depth
- Configuration of the Downforce Function
- Configuration of the Pressure Sensors
- Configuration of the Work Screen Display
- Configuration of the Virtual Display (VT) and Task Controller (TC)
- Using the Configuration Manager

Operating the Configuration Area

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 - End user
- Level 1 - The dealer can change the configuration.
- Level 2 - The OEM can change the configuration.
- Level 3 - The ME developer can change the configuration.

Function icon	Number	Meaning
	1	Implement
	2	Channels
	3	Product database
	4	Boom
	5	Fan
	6	Blockage System
	7	Modules
	8	
	9	Display of the the work screen
	10	Virtual Display (VT) and Task Controller (TC)
	11	Configuration Manager
	12	Password

Before you begin, make sure the application is stopped.

1. On the work screen, press:



The configuration screen appears.

Behind each function icon you will find parameters for the respective machine part or further function icons for additional machine parts.

You can now configure the parameters for which the authorization level is set at 0.

2.  - Open the password entry if you have a password and want to change other parameters.

3. Enter the password.

Behind the respective function icons, you will now see further parameters.

4. Configure the parameters.

Configuration of the Implement

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

You can access the screen using the following function button:



Via the configuration screen of the implement you can additionally reach the configuration screen of the following machine parts:



- Tramline system



- Connectors



- Tramlines



- Linear actuators



- PWM parameters



- PID controllers



- PID value sets

Parameter	Description
Machine type	Select the machine type of the implement. <ul style="list-style-type: none"> • Seeder • Planter • Spreader
Number of Channels	Enter the number of channels the machine works with. A channel always contains various components that are used together, for example hoppers and metering units.
Number of Booms	Enter the number of booms that the implement works with.
Number of Connectors	Enter the number of connectors on the implement.

Additional Functions

Select which additional functions are available on the implement.

The following additional functions are supported by the ECU:



- Hydraulic folding of the implement



- Hydraulically adjustable bout markers



- Adjustable drawbar on the seed wagon



- Adjustable top link on the seed wagon



- Pre-emergence marker



- Adjustable working depth



- Lighting



- Wheel adjustment

Parameter	Description
Delay Cycle Switching	Enter the desired period of time during which the implement must not be in work position before the track is automatically increased. The bout markers are also only changed after this time has expired.
Delay Work. Pos. Analog	You only need this parameter if you are using an implement with an analogue work position sensor. The metering starts when you change the position from "Not in Work Position" to "In Work Position". Enter the time period required for the implement to be in work position after starting the metering. If this time period is exceeded, the metering stops.
Debounce Time Work. Pos	Enter the time period during which the implement must either be in work position or not in work position before this status is recognized and can be further processed by the system. The threshold values are determined during the reference calibration of the work position.
Charger Monitoring	Select whether the implement has a charger monitoring system. A charger monitoring system checks whether the vehicle's generator is working.
Tramline System	Select the tramline system that the implement works with. <ul style="list-style-type: none"> • No • Tramline table This tramline system is used as a standard for seeders, but it can also be used in some cases with precision planters. With this tramline system, the tramlines are created based on predefined tables. Depending on the implement type, working width of the field sprayer and working width of the seeder/planter, a different tramline rhythm must be selected. • Calculated tramlines This tramline system is used as a standard for precision planters, but it can also be used in some cases with seeders. With this tramline system, the tramlines are calculated based on different parameters that must be entered before beginning operation.
Blockage System	Select whether the implement has a blockage system.
No. of Seed Flow Sensors	Enter the number of seed flow sensors that are monitoring the seed flow.
Agtron Alarm Type	If you are using a seed flow monitoring system manufactured by Agtron, select which alarm type you want to have displayed. <ul style="list-style-type: none"> • Agtron Alarm Text You will receive an alarm message if there is an error. • Agtron diagnosis You will see the diagnostic screen if there is an error. If you select this alarm type, an additional icon appears on the work screen.
Seq. Sect. Control Reset	You only need this parameter if you are using a precision planter. Select whether section control should be automatically reactivated after working on the headlands. Only those sections will be reactivated that have been manually switched off in section control.
Waterhole Mode	Select whether the implement has a waterhole mode.

Parameter	Description
Speed Filtering	Enter the time period for which the average value for the speed should be calculated. This parameter affects the metering.
Display Filter	Enter the time after which the speed display should be refreshed on the work screen. This parameter does not affect the metering. When the impulse-emitting speed sensor transmits few impulses to the implement, the filter helps to smoothen the displayed speed.
Bout Marker Time	Enter the time during which the valve of a bout marker is supplied with power. The entry does not apply for the configuration of all bout markers.
Pre-emergence Marker Time	Enter the time during which the valve of a pre-emergence marker is supplied with power. The entry does not apply for the configuration of all pre-emergence markers.
Evaluation Mode	Select how the display of the individual rows should be calculated for a precision planter. (See Evaluation Mode Parameter Example .) <ul style="list-style-type: none"> Target Rate With the "Target Rate" parameter, you can regulate and monitor the seeding on the individual rows. The display of the rows is adapted to the defined target rate. You see the deviation from the defined target rate. If the deviation is greater than the set tolerance, an alarm message appears. Average Value With the "Average Value" parameter, you can only monitor the seeding on the individual rows. With this setting, the total average value for all of the rows corresponds to the target rate. The average value for all of the rows is also used for the deviation tolerance.
Maximum Variance	If you are using a precision planter, 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 planter accelerates or slows down. The bars react more strongly.
Calculation Delay	If you are using a precision planter, set a time period during which the ECU must wait before performing an error calculation. The minimum waiting period is 0.1 seconds. The delay is performed individually for each row.
Min. Seeds	If you are using a precision planter, here you can enter, for each row individually, the number of seeds 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.
Max. Calculation Delay	If you are using a precision planter, 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.
Min. Working Speed	Enter the minimum working speed that is required for seeding.
Max. Working Speed	Enter the maximum possible working speed for seeding.
Delay Min. Speed	Enter the desired period of time during which the machine speed must be below the minimum machine speed before the bout marker switches.

Parameter	Description
Fan Monitor. Calibration	Select whether the fan should be monitored during calibration. If the parameter is activated, you can only perform the calibration when all of the fans are stopped.
Calibr. Factor Editable	Select whether the calibration factor should be editable in the calibration.
Calibration button	Select which calibration button you use during the calibration. <ul style="list-style-type: none"> • External You have connected an external calibration button to the machine. • Function Icon You want to configure a function icon as a calibration button. • External or Functi. Icon You have connected an external calibration button to the machine and you also want to configure an icon symbol as a calibration button.
Manufacturer Code	Enter the manufacturer code that is specified in the AEF database. A different manufacturer is shown depending on the code.
Machine Name	Enter a name for the machine. This name will be shown e.g. in the ISOBUS-TC application.
Number of MRC Modules	Enter the total number of MRC modules installed on the implement.
Number of Monit. Modules	Enter the total number of monitoring modules installed on the implement.
Number of CAN Repeaters	Enter the total number of CAN repeaters installed on the implement.
PLANTirium available?	Select whether a PLANTirium sensor is available on the machine.
Prescription Cont. State	You must set this parameter to work with your TASK-Controller. Some displays do not support the internal process "Prescription Control State". Your display manufacturer can tell you whether your display supports this process. Per default, this value is set to "Yes". You should only change it if you are having problems with the implement description in the TASK-Controller.
Start Screen	Enter the code for the start screen. Depending on the code, the start screen from different manufacturers is shown.
Minimal Voltage	Enter the minimal supply voltage for 12VL that should always be applied. If the entered value is undercut, an alarm message is displayed.
Flow Alarm Delay	Enter a time during which the system should wait before an alarm message appears if no impulses are received from the seed flow sensor.
Working Depth Function	Select whether the implement has a function that can control the working depth.
CURVE-Control	Select whether your implement works with CURVE-Control.
ISOBUS Source Address	Enter the source address with which the ECU is to log on to the ISOBUS. If the address is already being used by another ISOBUS participant, the entered number is automatically increased.

Parameter	Description
Wait. Time for Pref. VT	If you have saved a display as preferred, enter the time the ECU should try to connect to the preferred display before logging on to another display.
Wait Time for Pref. TC	If you have saved a task controller as preferred, enter the time the ECU should try to connect to the preferred task controller before logging on to another task controller.
Weighing System	Select the type of weighing system of the machine. If the machine does not have a weighing system, select "No".
Geometry Type	Select the fitting geometry type for your implement. <ul style="list-style-type: none"> • Mounted • Trailed • Self-propelled machine
Working Condition Signal	Select whether a signal tone should be issued during operation when the working conditions are not met.
Work. Cond. Signal Delay	Enter the time period during which the machine does not meet the working conditions before this state is detected and a signal tone is issued.
DICKEY-john Blockage M.	Select whether a DICKEY-john blockage system is installed on your machine. If you are working with such as system, you must configure it.
ABL Output	For each ABL output, enter the respective pin of the output.
Working Position	Select where the ECU gets information on the working position from: <ul style="list-style-type: none"> • Tractor From a work position sensor on the implement The sensor, which you can select, switches further a specific component of the implement. • Always in Work Position Per default, the ECU is always in work position. In this case, the ECU does not receive external information about the work position.
Exhibition Mode	Select whether you want to use the machine in exhibition mode. Activate this parameter to start a simulation for exhibitions.
Pre-emerg. Marker Time	Enter the pre-start speed. When the specified speed is reached, the pre-start ends and normal regulation begins.

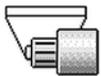
Evaluation Mode Parameter Example

Precision planter with 8 rows; target rate: 100,000 seeds/ha; deviation tolerance: 10%

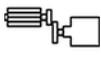
	Version 1	Version 2	Version 3
Row 1	100,000 seeds/ha	89,000 seeds/ha	110,000 seeds/ha
Row 2	100,000 seeds/ha	100,000 seeds/ha	100,000 seeds/ha
Row 3	100,000 seeds/ha	100,000 seeds/ha	100,000 seeds/ha
Row 4	100,000 seeds/ha	100,000 seeds/ha	100,000 seeds/ha
Row 5	100,000 seeds/ha	100,000 seeds/ha	100,000 seeds/ha
Row 6	100,000 seeds/ha	100,000 seeds/ha	100,000 seeds/ha
Row 7	100,000 seeds/ha	100,000 seeds/ha	100,000 seeds/ha
Row 8	100,000 seeds/ha	100,000 seeds/ha	100,000 seeds/ha
Total	800,000 seeds/ha	789,000 seeds/ha	810,000 seeds/ha
Average value	100,000 seeds/ha	98,625 seeds/ha	101,250 seeds/ha
Alarm when the seeding rate is too high (+10% from the average value)	110,000 seeds/ha		111,375 seeds/ha
Alarm when the seeding rate is too low (-10% from the average value)	90,000 seeds/ha	88,762.5 seeds/ha	

Configuration of the Channels

You can access the screen using the following function button:



Via the configuration screen of the channels you can additionally reach the configuration screen of the following machine parts:



- Metering units



- Rotational actuators



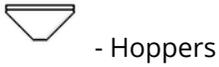
- Rotational speed sensors



- PWM parameters



- PID controllers



Parameter	Description
Element Index	This parameter is an internal structure parameter. No changes can be made.
Index	Enter the desired index.
Assigned Boom	Enter which section is assigned to a channel. A boom must always be assigned to a channel.
Number of Metering Units	Enter the number of metering units used by the implement.
CURVE-Control	Select whether to use CURVE-Control on the selected channel.
Target Rt. Groups	You only need this parameter if you are using a precision planter. Activate this parameter if your planter is to work with target rate groups.
ISOBUS-TC Functionalities	Select whether and which ISOBUS-TC functionalities are supported by the boom. <ul style="list-style-type: none"> • No • TC-BAS The implement sends counter readings to ISOBUS-TC. • TC-BAS/TC-GEO The implement sends counter readings to ISOBUS-TC. To transfer target rates to the implement, tasks can be planned by using prescription maps. • TC-BAS/TC-SC The implement sends counter readings to ISOBUS-TC. Automatic section control is supported. • TC-BAS/TC-GEO/TC-SC The implement sends counter readings to ISOBUS-TC. To transfer target rates to the implement, tasks can be planned by using prescription maps. Automatic section control is supported.
Results Display	Select whether to display the results for the selected channel.
Hopper Type	Select the tank type for the respective channel.

Configuration of the Products

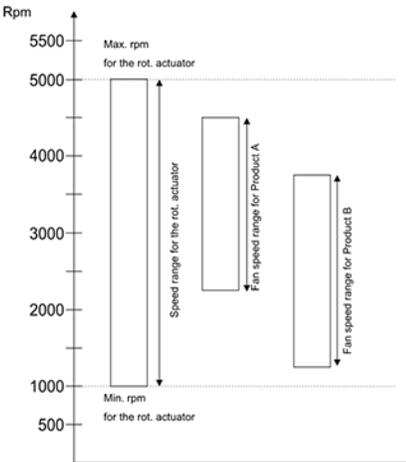
You can configure all of the products that you work with in the product database.

You can access the screen using the following function button:



In addition, you can view the results for each product on the “PRODUCT DATABASE” screen.

Parameter	Description
Product	Select the desired product.
Rename	Enter a name or a number to identify the product.
Product Type	<p>Enter a product type. The icons displayed on the work screen depend on the selected product type. You must always select a product type.</p> <ul style="list-style-type: none"> • Undefined • Seed • Solid fertilizer • Liquid fertilizer
Quantity Type	<p>Select the quantity type of the fertilizer.</p> <ul style="list-style-type: none"> • Undefined • Number • Mass • Volume
Note	You have the option of entering a note for the product.
Target Rate	Enter the target value for the respective product.
Adjustment	Enter the percent value by which the target rate should be changed when you change it manually during the application.
Gear Ratio	<p>Enter the gear ratio between the metering unit and the product.</p> <p>You only have to enter a gear ratio here if your machine works with two gear ratios.</p> <p>To find out how to calculate the correct gear ratio, refer to the corresponding chapter on configuring rotational actuators.</p>

Parameter	Description
<p>Fan Speed Target Rate</p>	<p>The speed is only taken into account if you have assigned a fan to the hopper containing the product. Enter the target speed for the fan that is required to spread the respective product.</p>  <p>The minimum and maximum fan speed for a product must always be within the speed range of the rotational actuator.</p> <ul style="list-style-type: none"> • If a fan speed has been set for a product that is outside the speed range of the rotational actuator, the ECU automatically adjusts the fan speed as follows: • If the fan speed for a product is above the maximum speed of the rotational actuator, the fan speed is set to the maximum speed of the rotational actuator. • If the fan speed for a product is below the minimum speed of the rotational actuator, the fan speed is set to the minimum speed of the rotational actuator. • If a limit of the speed range of the rotational actuator is exceeded or fallen below by the set fan speed plus the fan speed tolerance the respective tolerance value is increased or decreased. <p>You can set the minimum and maximum speed for a rot. actuator in the configuration of the rotational actuators.</p>
<p>Fan Speed Tolerance</p>	<p>For each product, enter the upper and lower tolerance for the fan speed at which the product should still be spread. If the tolerance limit is exceeded or undercut, an alarm message is displayed.</p>
<p>Fill Level Alarm Threshold</p>	<p>Select the level at which the alarms for the hopper fill level should be displayed. The following alarm thresholds are possible:</p> <ul style="list-style-type: none"> • Low/Empty The “Hopper is low.” and “Hopper is empty.” alarms are activated. To be able to use these alarms, an upper and a lower level sensor must be installed. • Empty Only the “Hopper is empty.” alarm is activated. To be able to use this alarm, a lower level sensor must be installed. • deactivated All fill level alarms are deactivated.
<p>Deviation Tolerance</p>	<p>For each product, enter the deviation from the target rate above which an alarm should be triggered. For a precision planter, the deviation tolerance applies for every row. The left value is valid for a deviation upwards, and the right value for a deviation downwards.</p>

Configuration of the Booms

You can access the screen using the following function button:



Via the configuration screen of the booms you can additionally reach the configuration screen of the following machine parts:



- Inlets



- Sections



- Rows



- Linear actuators



- PWM parameters



- PID controllers



- PID value sets



- Metering units



- Outlets



- Working depth



- Downforce function

Parameter	Description
Element Index	This parameter is an internal structure parameter. No changes can be made.
Working Position	<p>Select where the ECU gets information on the working position from:</p> <ul style="list-style-type: none"> • Tractor From a work position sensor on the implement The sensor, which you can select, switches further a specific component of the implement. • Always in Work Position Per default, the ECU is always in work position. In this case, the ECU does not receive external information about the work position.
Manual SECTION-Control	<p>Select whether SECTION-Control can be switched on and off manually during work.</p> <ul style="list-style-type: none"> • No - SECTION-Control cannot be switched on and off manually • Yes - SECTION-Control can be switched on and off manually. • Derived - SECTION-Control is switched on and off depending on the status of the boom from the parameter "Sect. Cont. Refere. Boom".
Automat. SECTION-Control	<p>Select whether SECTION-Control should be switched on and off automatically during work.</p> <ul style="list-style-type: none"> • No - SECTION-Control is not switched on and off automatically. • Yes - SECTION-Control is switched on and off automatically. • Derived - SECTION-Control is switched on and off depending on the status of the boom from the parameter "Sect. Cont. Refere. Boom".
Number of Inlets	Enter the number of inlets the machine works with.
Downforce Function	<p>Select whether the implement has a function that can control the downforce.</p> <p>With controlled downforce, the specified pressure is always kept constant. If the external pressure changes, the control valve is used to counteract this.</p> <p>The function is activated by default when the machine is started and the machine is in working position.</p>
Keep One Section Open	Select whether a section should remain open by default.
Status, when lifted	<p>Select how the ECU should proceed when the implement is lifted.</p> <ul style="list-style-type: none"> • maintain - The ECU switches the sections regardless of the work position. • active - When the implement is lifted, the ECU activates the sections regardless of the SECTION-Control status. • deactivate - When the implement is lifted, the ECU deactivated the sections regardless of the SECTION-Control status.

Entering the Geometry

The geometry of an agricultural implement is defined as a series of parameters describing its dimensions.

The geometry is important particularly for all systems that are GPS-controlled.

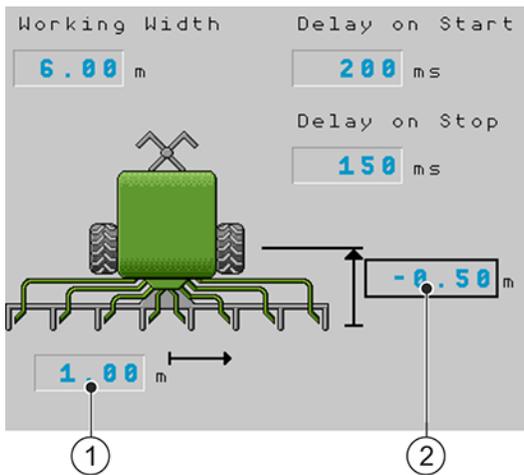
The distances you enter depend on whether the implement is towed, mounted on the tractor or self-propelled.

You must enter the distances for the boom and for the connectors.

In doing so, ensure that the centre point of the implement axle is always the point of origin for all distances. Measurements towards the front are always positive, and measurements towards the rear are always negative.

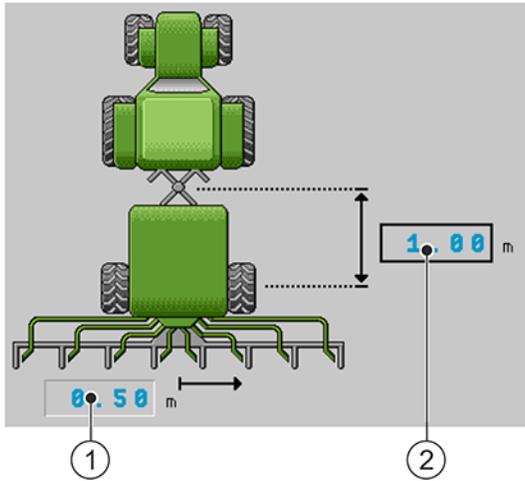
For example, there are the following distances on a trailed machine with one connector:

Distances for a boom



Item	Description
1	<p>Offset Y</p> <p>Distance from the center point of the implement axle to the center point of the coulters bar.</p> <p>Positive value: Center point of the coulters bar is to the right of the center point of the axle.</p> <p>Negative value: Center point of the coulters bar is to the left of the center point of the axle.</p>
2	<p>Offset X</p> <p>Distance from the implement axle to the coulters bar.</p> <p>Positive value: Coulters bar is in front of the axle.</p> <p>Negative value: Coulters bar is behind the axle.</p>

Distances for a connector



Item	Description
1	<p>Offset X</p> <p>Distance from the machine axle to the connector on the tractor. For mounted machines, "0.00" must always be entered.</p> <p>Positive value: Connector on the tractor is in front of the machine axle.</p> <p>Negative value: Connector on the tractor is behind the machine axle.</p>

1. Open the screen for the geometry:



The "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.

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

- If the implement switches too late, increase the delay.
- If the implement switches too early, reduce the delay.

Grouping the Sections

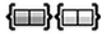
If you are working with more sections than can be processed by the display, you must group the sections together. Each section group will be then considered as one section.

When grouping the sections, the following must be considered:

- You can only group sections if they are assigned to a metering unit.
- The groups will not be saved. When the ECU has been restarted, the sections are no longer grouped.

- You may only start the TASK-Controller after the sections have been grouped, so that the implement description is correctly configured and SECTION-Control can work with the grouped sections.

1. Open the screen for the section grouping:



The "Section Grouping" screen appears.

2. Move the cursor between the section that you want to group together.

3.  - Confirm.

4. Repeat this procedure for the desired sections.

In the bottom area of the screen, you can see the maximum number of section groups that can be created and how many section groups are currently assigned.

You have successfully grouped the sections.

Configuring the Half Width Shutoff System

Various minimal preconditions must be fulfilled and various parameters must be configured for the half width shutoff system. The minimal preconditions and the parameters differ according to the type of half width shutoff system. The following chapters show for the different types which minimal preconditions there are and which parameters must be configured and how.

Half Width Shutoff via Motor

Minimal preconditions

- Two metering units at the boom.
- One section at the metering unit.

Parameter	Value
Manual SECTION-Control	Yes

Half Width Shutoff via Actuator with Analogue Feedback

Minimal preconditions

- One metering unit at the boom.
- Two sections at the metering unit
- One linear actuator must be assigned to one section.

Parameter	Value
Manual SECTION-Control	Yes
Number of Inlets	1

Parameter	Value
Number of Sections	2
Ass. Outlet	Automatic (With "Automatic", the system automatically calculates the position of the section).
Ass. Linear Actuator	Assigned linear actuator
Assigned Logic Output	0
Linear Actuator Type	Linear Actuator Type
Number of Outlets	1 (Should be identical to the number of metering units. Each metering unit has an outlet).

Half Width Shutoff via Actuator with End Position Sensor

Minimal preconditions

- One metering unit at the boom.
- Two sections at the metering unit
- One linear actuator must be assigned to one section.

Parameter	Value
Manual SECTION-Control	Yes
Number of Inlets	1
Number of Sections	2
Ass. Outlet	Automatic (With "Automatic", the system automatically calculates the position of the section).
Ass. Linear Actuator	Assigned linear actuator
Assigned Logic Output	0
Linear Actuator Type	Linear Actuator Type
Number of Outlets	1 (Should be identical to the number of metering units. Each metering unit has an outlet).

Half Width Shutoff via Actuator Without Sensors

Minimal preconditions

- One metering unit at the boom.
- Two sections at the metering unit
- One linear actuator must be assigned to one section.

Parameter	Value
Manual SECTION-Control	Yes
Number of Inlets	1
Number of Sections	2
Ass. Outlet	Automatic (With "Automatic", the system automatically calculates the position of the section).
Ass. Linear Actuator	Assigned linear actuator

Parameter	Value
Assigned Logic Output	0
Linear Actuator Type	Linear Actuator Type
Number of Outlets	1 (Should be identical to the number of metering units. Each metering unit has an outlet).

Half Width Shutoff via Solenoid Valve

Minimal preconditions

- One metering unit at the boom.
- Two sections at the metering unit
- One solenoid valve must be assigned to one section.

Parameters	Value
Manual SECTION-Control	Yes
Number of Inlets	1
Number of Sections	2
Ass. Outlet	Automatic (With "Automatic", the system automatically calculates the position of the section).
Ass. Linear Actuator	0
Assigned Logic Output	Depending on ABL output
Number of Outlets	1 (Should be identical to the number of metering units. Each metering unit has an outlet).

Half Width Shutoff via Recirculation

Parameter	Value
Seed Flow Return	Yes

Configuration of the Fans

You can access the screen using the following function button:



Via the configuration screen of the fans you can additionally reach the configuration screen of the following machine parts:



- Pressure sensors

Parameter	Description
Spread Device Type	Select the respective type for each spread device. With a seeder, you must always select the type "Fan". <ul style="list-style-type: none"> • "No" • "Fans" • "Spinner disc"
Assigned Rot. Actuator	Enter the rotational actuator with which the respective fan is driven. If a fan is not assigned with a rotational actuator, select "No".
Associated pressure sensor	Enter the pressure sensor with which the respective fan is monitored. If a fan is not assigned with a pressure sensor, select "No".
Alarm Delay	Enter the time period after which an alarm message should appear if a fan stops rotating.
Ass. Monitoring Logic	Select the monitoring module that you want to assign to each fan.

Configuration of the Blockage System

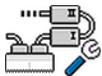
You can access the screen using the following function button:



Parameter	Description
Evaluation Delay	Enter the time that should be waited before the blockage system begins with the evaluation.
Number of sensors	For each sensor loop, select the number of utilized sensors.
Operation Mode	For each sensor loop, select which operation mode should be used.

Configuration of the ME Modules

1. On the configuration screen, press:



The screen for the configuration of the different modules appears.

2. - Call up the status.

An hourglass appears while the status is being called up.

In the "Conf" and "Found" columns, you can see the number of configured and found modules for each type of module.

3. Select the function icon of the modules for which you want to configure the parameters.
4. Configure the parameters.

Configuring the MRC Modules

If you are using MRC modules on your implement, you have to configure them:

Sensor voltage: Voltage that is supplied to the sensor.

1.  - Open the configuration screen for the MRC modules.
2. Select the MRC module that you want to configure.
3. Configure the parameters.
4. Repeat this procedure for all desired MRC modules.
5.  - Exit the configuration screen.

The MRC modules will be configured. All of the changes will be saved.

Teaching the Integrated Blockage Sensor

If you are using an integrated blockage sensor, you can teach the blockage sensors in the software.

Before you begin, make sure:

- The blockage sensors are connected correctly.
 - The blockage sensors have been configured in the configurator.
1. On the configuration screen, press:



The screen for configuring various modules and sensors appears.

2.  - Start the teach-in process.
3. Wait until the teach-in process is complete. You can recognize this by the symbol that then appears again.
4.  - Exit the teach-in screen.

Configuring the PLANTirium Sensors

If you are using PLANTirium® sensors on your machine, you have to configure them:

- **Min length:** Minimum length of the seed for the respective product.
- **Max length:** Maximum length of the seed for the respective product.
- **Min width:** Minimum width of the seed for the respective product.
- **Max width:** Maximum width of the seed for the respective product.

- **Min area:** Minimum area of the seed for the respective product.
- **Max area:** Maximum area of the seed for the respective product.
- **Sensitivity:** Sensitivity of the sensor for seed detection. The smaller the seeds of the respective product, the higher this value needs to be.
- **Various filter values:** These parameters may only be changed by users with expert knowledge. These values are derived from the geometrical data.

For the configuration, you can either use the self-learning mode for each product or you can perform the configuration manually. If you use the self-learning mode, you must observe the following values depending on the application rate:

Seeds/ha	Row spacing in cm	km/h	Seeds/s
60,000	90	10	15
80,000	75	9	15
125,000	37.5	12	15.63

1.  - Open the configuration screen for the PLANTirium® sensors.
2. Configure the parameters.
3.  - Exit the configuration screen.
4. The PLANTirium® sensors will be configured. All of the changes will be saved.

Configuring the Monitoring or Control Modules

If you are using monitoring or control modules on your machine, you have to configure them:

- **Sensor Voltage:** Voltage that is supplied to the sensor.
- **Minimal Voltage:** Minimum supply voltage that is required for operation of the modules.
- **Group Delay:** Delay time between switching on the individual modules.
- **Switch-on Voltage:** Voltage with which the shut-off clutch is supplied while it is being switched on.
- **Hold-on Voltage:** Voltage with which the shut-off clutch is supplied after it is switched on.
- **Switch-on Duration:** Time period during which the shut-off clutch is supplied with the switch-on voltage.

1.  - Open the configuration screen for the monitoring and control modules.
2. Configure the parameters

3.  - Exit the configuration screen

The modules will be configured. All of the changes will be saved.

Configuring the ECU Inputs and Outputs

You can assign the individual inputs and outputs of the ECU to sections and rows.

The inputs are always assigned to rows and the outputs are always assigned to sections.

1.  - Open the configuration screen for the ECU inputs and outputs.
2.  /  - Select the input or output that you want to assign to a row or section.
In the "42 pin." field, you can see which pin is assigned to this input/output.
3. Select the desired row or section.
4.  - Exit the configuration screen.

The ECU inputs and outputs will be configured. All the changes will be saved.

Configuring the Connectives

Only configure the connectives if you have extensive experience with electrical engineering.

The connectives involve the assignment of digital information. You can connect different logics with each other.

There are three different types of logic, each of which you can assign to different functions. Depending on the function, there are input, output, and hydraulic logics.

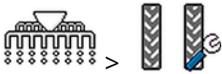
Icon	Connective type
&...-	AND connective
&...o	AND-NOT connective
>=1...-	OR connective
>=1...o	OR-NOT connective
>=1...-	XOR connective
=1...o	XOR-NOT connective

1.  - Open the configuration screen for the connectives.
2.  /  - Select each connective that you want to create or change.
3. Set the desired connectives. The different types of connectives can be found in the table above.

4.  - Exit the configuration screen.
5. The connectives will be configured. All of the changes will be saved.

Configuration of the Tramline System

You can access the screen using the following function buttons:



Parameter	Description
Sprayer Working Width	Enter the working width of the sprayer for which you want to create the tramlines.
Track Width	Enter the track width of the tractor.
Tyre width	Enter the tyre width of the tractor.
TRAMLINE-Management	Select whether you are using the TRAMLINE-Management additional module in the TRACK-Leader display application.
Half Working Width	Select whether you make the first field track with only half of the working width after starting to work.
Working Start	Select the point on the field at which you want to start working.

Configuration of the Tramlines

You can access the screen using the following function buttons:



Parameter	Description
Assigned Logic Output	Enter which logic output is assigned to a tramline.
Switching Time	Enter the switching time for each tramline.

Configuration of the Linear Actuators

You can access the screen using the following function buttons:



Performing the Reference Calibration for the Linear Actuators

If you are using linear actuators on your implement, you have to calibrate them. With the calibration, you ensure that the linear actuators are always properly positioned.

-  - Open the screen for the reference calibration.
-  or  - Move the linear actuator to reference point 1. Select the left position of the implement part that you control with the linear actuator.
-  - Confirm.
-  or  - Move the linear actuator to reference point 2. Select the middle of the implement part that you control with the linear actuator.
-  - Confirm.
-  or  - Move the linear actuator to reference point 3. Select the right position of the implement part that you control with the linear actuator.
-  - Confirm.

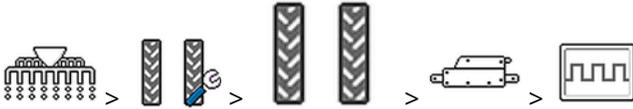
You have calibrated the linear actuators.

Optionally, you can use the determined values again for another calibration of the linear actuator, and enter them manually on the screen.

Parameter	Description
Linear Actuator Type	<p>Select the fitting rotational actuator type for each linear actuator.</p> <ul style="list-style-type: none"> • No: A linear actuator is not being used. • Analog Sensor Only: No rotational actuators are controlled. Measured values are only read and displayed. Example: If you adjust the gate manually, the value will be read automatically. • Without Sensors: The linear actuator works without external sensors. You can define the time for which the linear actuator should move in one direction. It is assumed that the linear actuator has reached the desired position when the time has expired. • Actuator + 2 Sensors: The linear actuator works with two position sensors. The linear actuator stops as soon as the corresponding sensor position is reached or the preset time has elapsed. • 2 Sensors (Monitoring): The linear actuator is monitored with 2 sensors and works without actuators. • Rot. Actuator + Analogue Sensor 2P: The linear actuator works with one analogue sensor with 2 positions. • Rot. Actuator + Analogue Sensor 3P: The linear actuator works with one analogue sensor with 3 positions. • Step Mode: The linear actuator works in step mode. The linear actuator is moved by pressing a button. • Only Sensor Closed: The linear actuator works with a sensor. It issues a signal when the actuator has reached the closed position. • Metering Drive: A linear actuator is used as a metering drive.
Max. Actuator Time 1	<p>Enter the time during which the respective linear actuator should move in one direction when you are using a rotational actuator without sensors.</p> <p>If you are using a rotational actuator with sensors, the defined time will be used as an alarm time. If the end position of a linear actuator is not reached within this time, an alarm message appears.</p>
Max. Actuator Time 2	<p>Enter the time during which the respective linear actuator should move in one direction when you are using a rotational actuator without sensors.</p> <p>If you are using a rotational actuator with sensors, the defined time will be used as an alarm time. If the end position of a linear actuator is not reached within this time, an alarm message appears.</p>
Ass. PID Controller	<p>Enter which PID controller you want to associate with the respective linear actuator. If you do not want to associate a PID controller with a linear actuator, select "No".</p>
Ass. PWM Parameter	<p>Enter which PWM parameter you want to associate with the respective linear actuator. If you do not want to associate a PWM parameter with a linear actuator, select "No".</p>
Hysteresis Threshold	<p>You only need this parameter if you want to apply liquid fertiliser.</p> <p>If you are using linear actuators to apply the liquid fertiliser, enter the allowed deviation from the minimum and maximum rotational speed.</p>
Gate height	<p>Enter the current gate height.</p>
Min. Gate Height	<p>Enter the minimum gate height that may be reached with the respective linear actuator.</p>
Max. Gate Height	<p>Enter the maximum gate height that may be reached with the respective linear actuator.</p>

Configuration of the PWM Parameter

You can access the screen using the following function buttons:



Configuration of the PWM Settings

In order to configure the PWM settings, you must perform the following steps:

1. Determine the minimum and maximum values in the diagnostic screen.
2. Enter the determined values in the configuration.
3. Optionally compensate possible vibrations with the parameter "Amplification Factor".

Determining the Minimum and Maximum Values in the Diagnosis

WARNING – Risk of injury from moving machine parts

Movement of the machine may seriously injure persons or damage property.

Before machine parts are moved, make sure that no one is close to moving machine parts.

Before you begin, make sure the machine is ready for operation.

1. Switch to the diagnostic screen.
2. Increase the PWM value in the setting "Output Value LS" gradually, until the rotational actuator turns, e.g. 1 % per step.
3. Note the entered PWM value and the determined measured value of the "Rotational Speed" field.

WARNING – Observe the manufacturer instructions about the maximum rotational speed.

4. Increase the PWM value gradually, until the measured value in the field "Rotational Speed" no longer increases.
5. Note the entered PWM value and the determined measured value of the "Rotational Speed" field.
6. Change the value of "Output Value LS" to "Rev.".
7. Enter a few speed values to test if the correct PWM values are shown.
8. You have determined the minimum and maximum values.

Enter the Determined Values in the Configuration

Before you begin, make sure you have determined the values in the diagnosis.

1. Switch to the configuration of the PWM parameter.
2. Enter the determined values in the parameters "Minimum PWM" and "Maximum PWM".

3. Switch to the configuration of the rotational actuators.
4. Enter the determined values in the parameters "Min. Rotational Speed" and "Max. Rotational Speed". Use a buffer of about 10 % in this process. The determined value "Min. Rotational Speed" should be increased by about 10 % and the determined value for "Max. Rotational Speed" should be decreased by about 10 %.
5. Switch to the diagnostic screen.
6. Enter some test values in the field "Output Value LS" > "Rev." and pay attention to the response time and possible vibrations.
 - If there are no vibrations you have completed the PWM settings.
 - If there are vibrations you have to adjust the "Amplification Factor" parameter.

Compensate Vibrations by the Parameter "Amplification Factor"

Before you begin, make sure:

- You have entered the determined values in the configuration.
 - During testing in the diagnostic screen vibrations have occurred.
1. Switch to the configuration of the PID value sets.
 2. Decrease the value in the parameter "Amplification Factor", if vibrations have occurred. Increase the value at slow reaction.
 3. Switch to the diagnostic screen.
 4. Enter some test values again.
 - If there are no vibrations you have completed the PWM settings.
 - If there are still stronger vibrations, repeat steps 1 to 4. Slight vibrations are okay and intended.

Parameter	Description
Minimum PWM	Enter a minimum PWM value. The set value determines the percentage of the maximum rotational speed of a rotational actuator or linear actuator. You can enter several PWM parameters for different rotational actuators and linear actuators.
Maximum PWM	Enter a maximum PWM value. The set value determines the percentage of the maximum rotational speed of a rotational actuator or linear actuator. You can enter several PWM parameters for different rotational actuators and linear actuators.

Configuration of the PID Controller

WARNING – Damage to the implement due to erroneous association of PID controllers and PID value sets

If the wrong PID value sets and PID controllers are assigned, it can cause damage to the implement.

- Only change the values if you have experience with control theory.
- Check the PID value sets after replacing components that were assigned with the PID controllers.

You can access the screen using the following function buttons:



Parameter	Description
Values low rpm range	For each PID controller, select a PID value set that the controller should use in the low rpm range.
Values norm. rpm range	For each PID controller, select a PID value set that the controller should use in the normal rpm range.
Values high rpm range	For each PID controller, select a PID value set that the controller should use in the high rpm range.
Threshold Value low/nor	For each PID controller, select an rpm above which it should switch between the low and normal rpm range.
Threshold Value nor/high	For each PID controller, select an rpm above which it should switch between the normal and high rpm range.

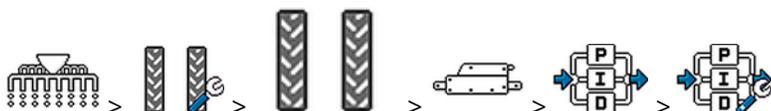
Configuration of the PID Value Sets

WARNING – Damage to the implement due to erroneous association of PID controllers and PID value sets

If the wrong PID value sets and PID controllers are assigned , it can cause damage to the implement.

- Only change the values if you have experience with control theory.
- Check the PID value sets after replacing components that were assigned with the PID controllers.

You can access the screen using the following function buttons:

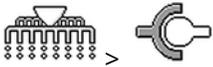


Parameter	Description
Amplification Factor	Enter an amplification factor for each PID value set. The value that is entered is respectively multiplied with the values of the “Proportional value”, “Integral value” and “Differential value” parameters.
Proportional Value	Enter a proportional value for each PID value set. The proportional value describes the proportional fraction of the PID controller.
Integral Value	Enter an integral value for each PID value set. The integral value describes the integral fraction of the PID controller.

Parameter	Description
Differential Value	Enter a differential value for each PID value set. The differential values describe the differential fraction of the PID controller.

Configuration of the Connectors

You can access the screen using the following function buttons:



Parameter	Description
Connector type	Select the connector type of the implement. <ul style="list-style-type: none"> • "Unknown" • "Drawbar" • ""3-point hitch mounted" • ""3-point hitch semi-mounted" • "Hitch hook" • "Clevis coupling" • "Piton-type coupling" • "CUNA hitch" • "Ball-type hitch" • "Chassis mounted" • "Pivot wagon hitch"
Offset X	Enter the offset X for each connector. You can find out which distances you have to measure for this in the geometry section.
Offset Y	Enter the offset Y for each connector. You can find out which distances you have to measure for this in the geometry section.

Configuration of the Metering Units

You can access the screen using the following function buttons:



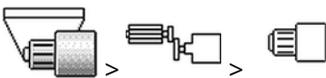
Parameter	Description
Element Index	This parameter is an internal structure parameter. No changes can be made.

Parameter	Description
Number of Outlets	Enter the number of outlets the machine works with.
Metering Unit Type	<p>Select the metering unit type with which your machine is working.</p> <ul style="list-style-type: none"> • “Undefined” • “Metering Wheel” • “Metering Disc” • “Metering Belt” • “Metering Auger” • “Servo Valve” • “Linear Actuator”
Assigned Meteri. Shaft	Enter which metering shaft is driving the metering roll of the respective metering unit. If a metering unit is not assigned with a metering shaft, select “No”.
Assigned Rot. Actuator	Enter which actuator is controlling the respective metering unit. If a metering unit is not assigned with an actuator, select “No”.
Assigned Calibra. Flap	Enter which electric calibration flap is installed on the respective metering unit. If there is no electric calibration flap installed on a metering unit, select “No”.
Assigned Hopper	Enter which hopper is assigned with the metering unit. If the metering unit is not assigned with a hopper, select “No”.
Overdose Duration	<p>Enter how long the overdose should last immediately after switching on the metering unit. During this time, the motor rotates at the speed determined during the calibration.</p> <p>As soon as the speed is above the speed from the calibration, the overdosing stops.</p>
Pre-start Time	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 ECU takes over the control. If you do not start working in this time, the metering drive switches itself off after this time.
Pre-stop Time	Enter the time after which the metering unit should stop when the early stop function is activated. When the function has been activated, the metering unit only stops after the entered time.
Angle Pre-assignment	Enter the angle the metering unit should turn when you start the pre-filling in the calibration.
Standstill Alarm Delay	Enter the time during which the system should wait before an alarm message appears if no impulses are received from the metering unit.
Current Rate Filter	<p>Select whether you want to use a current rate filter.</p> <p>You can use a current rate filter to prevent strong fluctuations of the displayed current rate during spreading.</p>

Parameter	Description
Working Width Mode	<p>Select the desired working width mode for each metering unit.</p> <ul style="list-style-type: none"> • Reduce linear: The speed of each metering unit is reduced by the ratio between total working width and actual working width. The software assumes that the row spacing within the sections is always the same. Example: If the total working width is 20 m and the actual working width is only 15 m, the speed of the metering unit is 75%. • Independent: The speed of each metering unit is independent of the total working width and the actual working width. • Independent, off at 0: The speed of each metering unit is independent of the total working width and the actual working width. However, if the actual working width is "0", the target rotational speed of the respective metering unit is also set to "0".
Ass. Spread Limiter	This parameter only needs to be configured if you are using the software with a fertiliser spreader.
Ass. Linear Actuator	Enter which linear actuator is controlling the respective metering unit. If a metering unit is not associated with a linear actuator, select "No".
Current Rate Source	<p>Select the source from which the ECU gets information on the current rate.</p> <ul style="list-style-type: none"> • Rot. Actuator • Rows • Linear Actuator
Ass. Calib. Button Logic	Select the calibration button logic that you want to assign to each metering unit.

Configuration of the Rotational Actuators

You can access the screen using the following function buttons:



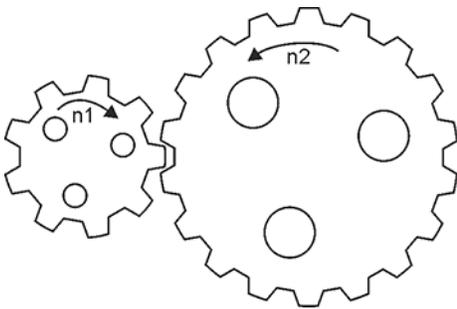
Parameter	Description
Element Index	This parameter is an internal structure parameter. No changes can be made.
Rot. Actuator Type	<p>Select the proper rotational actuator type for each rotational actuator.</p> <ul style="list-style-type: none"> • External: The rotational actuator is external, e.g. the PTO. • Tail Wheel: A mechanical wheel acts as a rotational actuator. This rotational actuator type is only suitable for the driving of metering units. • Electric Motor: The rotational actuator is electric. • CANopen: The drive is powered by a CANopen motor. • Hydraulic Motor: The rotational actuator is hydraulically regulated. • MRC: MRC modules act as rotational actuator. • Control Valve: A control valve acts as rotational actuator.

Parameter	Description
Assigned Revol. Sensor	Enter which revolution sensor is monitoring the respective rotational actuator. If a rotational actuator is not monitored by a revolution sensor, select "No".
Min. Rotational Speed	Enter a minimum speed for each rotational actuator. If the minimum speed is undercut during operation, an alarm message is displayed. If the respective rotational actuator is assigned with a fan, the minimum speed must be exceeded so that the implement fulfils the operating conditions.
Max. Rotational Speed	Enter a maximum speed for each rotational actuator. If the maximum speed is exceeded, an alarm message is displayed. If the respective rotational actuator is assigned with a fan, the maximum speed must be undercut so that the implement fulfils the operating conditions.
Ass. PID Controller	Enter which PID controller you want to associate with the respective rotational actuator. If you do not want to associate a PID controller to a rotational actuator, select "No".
Ass. PWM Parameter	Enter which PWM parameter you want to associate with the respective rotational actuator. If you do not want to associate a PWM parameter to a rotational actuator, select "No".
Hysteresis Threshold	You only need this parameter if you want to apply liquid fertiliser. If you are using rotational actuators to apply the liquid fertiliser, enter the allowed deviation from the minimum and maximum rotational speed.

“Gear Ratio” Parameter

For each rotational actuator, enter the gear ratio between the impulse transmitter on the rotational actuator and the motor shaft.

To calculate the gear ratio, you need to know the number of respective teeth of the gears.



The gear ratio is calculated with the following formula:

Gear ratio (i) = Number of teeth gear 2 (n2) / Number of teeth gear 1 (n1)

Example

$$i = n2/n1$$

$$i = 18/9$$

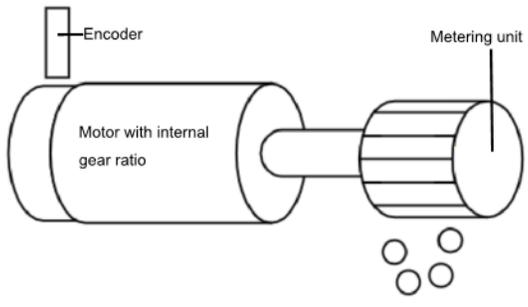
$$i = 2$$

The gear ratio is therefore 2/1.

There are 3 different scenarios of how the rotational actuator and the motor shaft can be constructed. Depending on the scenario, the gear ratio must be determined and entered differently.

The following subsections show the respective scenarios.

Motor with Internal Gear Ratio



The internal ratio in the motor is the only ratio.

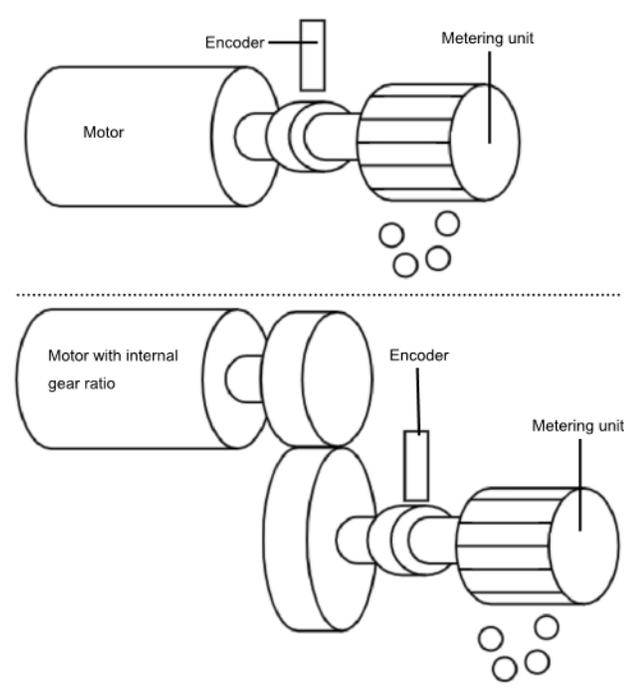
Example

Gear 1 with 18 teeth; Gear 2 with 29 teeth

Gear ratio $i = 29/18 = 1.6111$

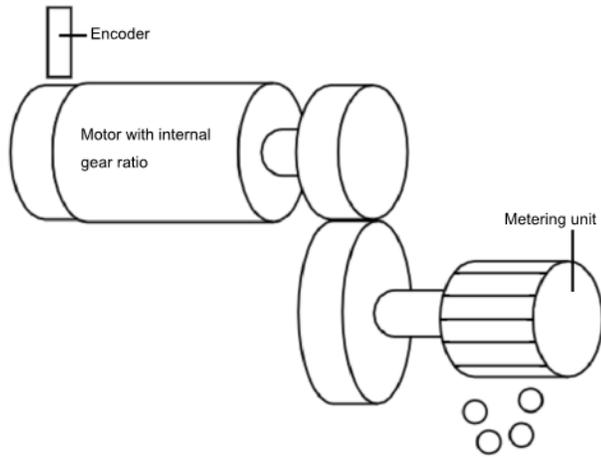
"1.61/1" must be entered as the gear ratio. A transmission ratio of "161,11/100" can also be set for higher accuracy.

Encoder on the Same Motor Shaft as the Metering Unit



If the encoder is on the same motor shaft as the metering unit, no gear ratio is required.

Two Gear Ratios



There are two gear ratios. The sum of the ratios can then be entered in the rotational actuator settings.

If the gear ratio between motor and metering shaft can be changed, the motor gear ratio should be set in this parameter and the second gear ratio in the product database.

Example

Gear 1 with 18 teeth; Gear 2 with 29 teeth; Gear 3 with 12 teeth; Gear 4 with 14 teeth

Gear ratio $i_1 = 29/18 = 1.6111$

Gear ratio $i_2 = 14/12 = 1.6666$

Total gear ratio $i_1 * i_2 = 1.6111 * 1.6666 = 2.684$

"2.684/1" must be entered as the gear ratio.

If the transmission ratio i_2 can be changed mechanically by the user "161.11/100" must be set in this parameter and "26.84/10" in the "Gear Ratio" parameter in the product database.

Configuration of the Revolution Sensors

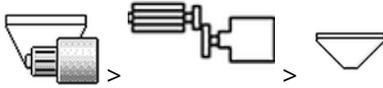
You can access the screen using the following function buttons:



Parameter	Description
Resolution	For each revolution sensor, enter the number of impulses per revolution it should transmit to the ECU during operation.

Configuration of the Hoppers

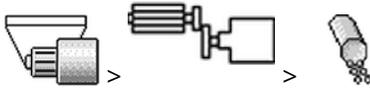
You can access the screen using the following function buttons:



Parameter	Description
Upper Level Sensor	Enter the logic input of the number of the pin to which the upper level sensor is connected.
Lower Level Sensor	Enter the logic input of the number of the pin to which the lower level sensor is connected.
Rem. Quantity Monitoring	Select whether the respective hopper has a remaining quantity monitoring.
Maximum Quantity	For each hopper, enter the maximum quantity that can be contained in the hopper.
Assigned Load Cell	Select the load cell that is assigned to the respective hopper. If a hopper is not assigned with a load cell, select "No".
Assigned Product	Select the product that is in the respective hopper.

Configuration of the Outlets

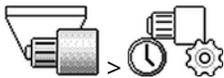
You can access the screen using the following function buttons:



Parameter	Description
Element Index	This parameter is an internal structure parameter. No changes can be made.
Assigned Fan	For each outlet, enter which fan is assigned to the outlet. If an outlet is not assigned with a fan, select "No".

Configuration of the Output Delay

You can access the screen using the following function buttons:



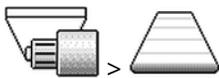
Parameter	Description
Delay on Start	Enter the delay with which the different outputs should be switched on. If the outputs switch too late, increase the delay. If the outputs switch too early, reduce the delay.
Delay on Stop	Enter the delay with which the different outputs should be switched off. If the outputs switch too late, increase the delay. If the outputs switch too early, reduce the delay.

Parameter	Description
Dependency Selection	<p>Select the dependency for the delay of the respective outputs.</p> <ul style="list-style-type: none"> • Appl. Status On/Off: The respective output is switched as soon as the function icon is pressed on the work screen. • Working condition: The respective output is switched as soon as the operating conditions are met (as soon as spreading is started).

Configuration of the Conveyor Belts

Conveyor belts only need to be configured if you are using the software with a fertilizer spreader.

You can access the screen using the following function buttons:



Configuration of the Inlets

You can access the screen using the following function buttons:



Parameter	Description
Element Index	This parameter is an internal structure parameter. No changes can be made.
Number of Sections	Enter the number of sections the respective inlet works with.
Ass. Outlet	Enter which outlet is assigned to the respective inlet.

Configuration of the Sections

You can access the screen using the following function buttons:



Parameter	Description
Element Index	This parameter is an internal structure parameter. No changes can be made.
Number of Rows	<p>Enter the number of rows that the implement works with.</p> <p>Seed and fertilizer are counted separately.</p> <p>Example: If you have an implement that spreads seed from 8 rows and fertilizer from 8 rows, you must enter "16".</p>
Ass. Linear Actuator	Enter which linear actuator switches a section. If a section is not switched by a linear actuator, select "No".
Assigned Logic Output	Enter which logic output is assigned to a section.

Parameter	Description
Width	Enter the respective width for each section.
Seed Flow Return	For each section, select whether it has seed flow return.

Configuration of the Rows

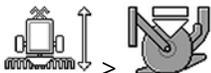
You can access the screen using the following function buttons:



Parameter	Description
Element Index	This parameter is an internal structure parameter. No changes can be made.
Assigned Section	Enter the section on which the respective row is located. If the row is not assigned with a section, select "No".
Assigned Tramline	Enter the tramline with which the respective row is assigned. If a row is not assigned with a tramline, select "No". Based on this, the metering unit reduces the percentage of the application when switching the respective tramline. If you use the "Calculated Tramlines" function to create tramlines, you must activate the "Use Section Actuator" value.
Ass. Product Flow Logic	Select the product flow logic that you want to assign to each row.
Sensor Use	Select whether a sensor is used on the respective row and what a sensor used is used for. <ul style="list-style-type: none"> • No: No sensor is used on the selected row. • Count: A sensor is used for counting on the selected row. • Seed Flow Monitoring: A sensor for seed flow monitoring is used on the selected row.
Seed Flow Return	For each row, select whether it has seed flow return.

Configuration of the Working Depth

You can access the screen using the following function buttons:

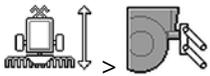


Parameter	Description
Ass. Linear Actuator	Enter the linear actuator with which the respective working depth function is assigned. If a linear actuator is not assigned with a working depth function, select "No".

Parameter	Description
Min. Working Depth	Enter the respective minimum working depth for each working depth function.
Max. Working Depth	Enter the respective maximum working depth for each working depth function.
Hysteresis	Enter the allowed deviation of the working depth from the minimum or maximum working depth, before an alarm message appears.
Alarm Delay	Enter a waiting time before an alarm message appears if the minimum working depth has fallen below or the maximum working depth has exceeded.
Working Depth	Enter the desired working depth.

Configuration of the Downforce Function

You can access the screen using the following function buttons:



Parameter	Description
Ass. Linear Actuator	Enter the linear actuator with which the respective downforce function is assigned. If a linear actuator is not assigned with a downforce function, select "No".
Minimum Pressure	Enter the minimum pressure for each downforce function, that must be present on a sowing coulter. For this function, a downforce sensor must be installed to detect the pressure.
Maximum Pressure	Enter the maximum pressure for each downforce function, that must be present on a sowing coulter. For this function, a downforce sensor must be installed to detect the pressure.
Hysteresis	Enter the allowed deviation of the pressure from the minimum or maximum pressure before an alarm message appears.
Alarm Delay	Enter a waiting time before an alarm message appears if the minimum pressure has fallen below or the maximum pressure has exceeded.
Downforce	Enter the desired downforce.

Configuration of the Pressure Sensors

You can access the screen using the following function buttons:



Parameter	Description
Sensor Type	Select the type of the pressure sensor.
Initial Value	Enter the value that the pressure sensor always measures at the beginning.

Parameter	Description
Incline	Enter the increased measured value from the pressure sensor on an inclination.
Minimum Value	Enter the minimum measured value from the pressure sensor.
Maximum Value	Enter the maximum measured value from the pressure sensor.

Configuration of the Work Screen Display

The work screen is divided into different areas where status information can appear.

Depending on the display and configuration, you can assign different icons to the respective area.

By default, you can assign the icons to the following areas of the work screen:

Function icon	Number	Meaning
	1	Hopper information area (currently not available)
	2	Status area
	3	Lower area
	4	Function icon area (currently not available)

Which icons you can assign to the individual areas depends on the respective configuration. In the individual selection lists, all possible icons appear with the corresponding meaning.

A number on an icon means that the icon can be selected multiple times, for example if the machine has several hoppers.

1. On the configuration screen, press:



2. Select the area of the work screen to which you want to assign icons.
3. Assign the desired icons.

4.  - Confirm.

5. Repeat the procedure for other areas on the work screen.

Configuration of the Virtual Display (VT) and Task Controller (TC)

If you are using more than one display or more than one Task Controller, you can choose which one you want to use in each case.

Please note that after starting, the ECU checks whether you have defined the utilized display as the standard. If not, the ECU waits the selected time of the parameters “Wait. Time for Pref. VT” and “Wait. Time for Pref. TC” before it establishes a connection to a different display.

1. On the configuration screen, press:



2. Select which Virtual Display (VT) you want to use.
3. Select which Task Controller (TC) you want to use.

4.  - Confirm.
5. You have selected the Virtual Display and the Task Controller.

Using the Configuration Manager

In the Configuration Manager, you can change or replace the existing configuration for a machine.

Before you begin, ensure that the pin assignment is compatible with the machine for any subconfigurations you want to add.

To use the Configuration Manager:

1. On the configuration screen, press:



The “Configuration Manager” screen appears.

On the screen, you can see the currently selected machine and an overview of the individual subconfigurations that were used to configure the machine.

2.  - Add a new configuration for a machine.
3. Enter a name for the new machine.
4. Select the subconfiguration that you want to add.
5.  - Confirm.

6. Optionally, you can also rename the machine.
You have reconfigured the machine.

Troubleshooting

- Standard Diagnostics
- Expert Diagnostic
- Alarm Messages
- Compatibility Between Display and ECU

Standard Diagnostics

Viewing ECU information data

You can access the screen using the following function buttons:

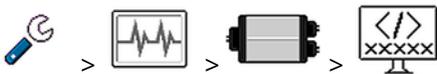


The following diagnostic data appear on the screen:

- Serial number
- Item number
- Hardware version
- Power Voltage
- Sensor voltage
- ISOBUS termination
- ISOBUS bus load
- Sub-BUS CAN load

Viewing Software Information

You can access the screen using the following function buttons:



The following diagnostic data appear on the screen:

- Manufacturer
- Machine type
- Software version
- Build date
- Pool version
- Hydraulic version

Expert Diagnostic

Performing Diagnostics in the Configuration Area

In the diagnostic, which you can open from the configuration area, you can read the measured values for all pins that are connected to the junction box. In addition, you can test whether the functions of the ECU are working as desired.

The following abbreviations are possible for the cable cores:

- **MA:** MA means primary ECU.
Example: MA28 means primary ECU, pin 28
- **1S... 4S:** 1S to 4S represent the respective secondary ECUs.
Example: 1S14 means first primary ECU, pin 14

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

- **Frequency:** Current measured frequency of the input.
- **Rpm:** Current measured rpm of the function.
- **Impulses:** Current measured number of impulses of the function.
- **Analog Value:** Current 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 rpm, you can test how long it takes for an electric or hydraulic motor to reach the defined rpm.
- **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 actuators.
 - **Stop:** The function is deactivated. The linear actuator is not moving.
 - **+/-:** The linear actuator is moving in one direction. The direction in which the linear actuator is moving depends on the respective connection.
 - **-/+:** The linear actuator is moving in one direction. The direction in which the linear actuator is moving depends on the respective connection.

Before you begin, make sure:

- Seeding is stopped.
- You have entered the password.

1. In the configuration area, press:



The “Diagnostic” screen appears.

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

Performing the ME Module Diagnostic

If you use different ME modules on your machine, additional function icons appear in the diagnostics in the configuration area depending on the module. These function icons are used to call up the diagnostic screen for the respective modules.

Depending on the module, you will see different measured values and can test various functions.

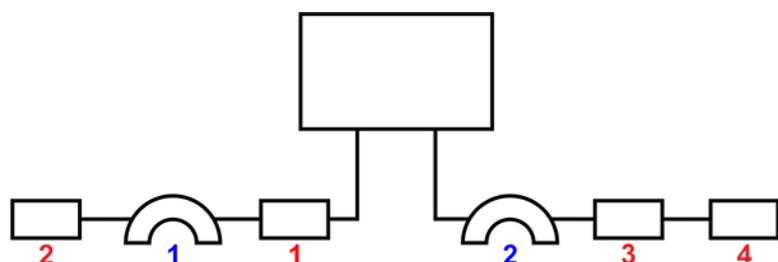
The following function icons are available:

Function Icon	Meaning
	Calls up the MRC module diagnostic screen.
	Calls up the PLANTrium® sensor diagnostic screen.
	Calls up the monitoring and control module diagnostic screen.

To prevent confusion, all of the modules are numbered according to a specific scheme.

Depending on the type, the modules are numbered starting with 1 from the center going out, beginning with the left side.

Example



Icon	Description
	Example of monitoring modules
	Example of the MRC modules

MRC modules

- **Row:** Row assigned to the module.
- **Seeds:** Number of seeds spread until now on the respective row.
- **A:** Current amperage at the output of the respective row.
- **RPM:** Current rotational speed of the metering shaft on the respective row.
- **Impul.:** Current number of impulses that are recorded.
- **Output Val:** Output value for the rotational speed of the metering shaft that should be used for the calculation.

PLANTirium® sensors

- **Software Version:** Current software version for the respective PLANTirium® sensor.
- **Hardware Version:** Current hardware version for the respective PLANTirium® sensor.
- **Supply Voltage:** Current supply voltage for the respective PLANTirium® sensor.
- **Status:** Status of the respective PLANTirium® sensor.
- **Row:** Row to which the respective PLANTirium® sensor is assigned.
- **Degree of contamin.:** Degree of contamination of the respective PLANTirium® sensor.
- **Requested:** Specification of how many sensor impulses should be sent by the respective PLANTirium® sensor during the sensor impulse test.
- **Received:** Display of how many sensor impulses have been sent by the respective PLANTirium® sensor during the sensor impulse test.
- **Total Seeds:** Total number of counted seeds for the respective PLANTirium® sensor.

- **Total Seeds Rejects:** Counted total seed rejects for the respective PLANTirium® sensor.
- **Seeds too small:** Number of seeds that were too small that were counted by the respective PLANTirium® sensor.
- **Seeds too big:** Number of seeds that were too big that were counted by the respective PLANTirium® sensor.
- **Seeds too short:** Number of seeds that were too short that were counted by the respective PLANTirium® sensor.
- **Seeds too long:** Number of seeds that were too long that were counted by the respective PLANTirium® sensor.
- **Seeds too narrow:** Number of seeds that were too narrow that were counted by the respective PLANTirium® sensor.
- **Seeds too broad:** Number of seeds that were too broad that were counted by the respective PLANTirium® sensor.

Monitoring and Control Modules

- **Mon. Module Type:** Type of the module.
- **Software Version:** Current software version of the respective module.
- **Hardware Version:** Current hardware version of the respective module.
- **Electronic Voltage:** Current electronic voltage for the respective module.
- **Power Voltage:** Current power voltage for the respective module.
- **Status:** Status of the individual outputs of the respective module.
- **Section:** Section to which the respective output of the module is assigned.
- **Output:** Individual outputs that you want to test, activate or deactivate.

Alarm Messages

ISO Alarms

ID	Alarm message	Possible cause	Possible solution
001	System has been stopped. Reboot required.	The connection to a secondary ECU has been interrupted. A download manager has been activated.	Restart the ECU.
002	Configuration has been changed. The ECU is rebooting.	The configuration has been changed.	Wait until the ECU has rebooted.
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 the reading or writing of data to the flash memory or EEPROM.	An error has occurred while the ECU was starting.	Restart the ECU.
006	Data has been successfully imported.		
007	Error detected in the configuration.	Faulty configuration.	Check the configuration.
008	Procedure is not allowed while a task is activated in the ISOBUS-TC application.	A task is activated in the ISOBUS-TC application.	Deactivate the task.
009	Speed signal from CAN bus has been lost.	The cable was disconnected.	Check the cable connection.
010	Error with the initialisation of the Control Layer configuration.	There was an error in the Control Layer configuration.	Check the configuration.
011	Several displays have the same number.	There are several displays with the same number on the ISOBUS (function instance).	Change the number (function instance) on the display.
012	Several TASK-Controllers have the save number.	There are several TASK-Controllers with this number on the ISOBUS.	Change the number.
013	The task list is full.	There are too many tasks in the task list.	Delete task data that is no longer required.
014	The recording of an internal task has been stopped because the product was changed.	The product has been changed during the recording of an internal task.	Select the initial product.
015	The task could not be started because a different product was assigned.	A different product is stored in the task than was assigned to the hopper in the configuration.	Check which is the correct product and correct the task or the hopper assignment.

ID	Alarm message	Possible cause	Possible solution
043	Dataset already exists.	An identical dataset already exists.	Check the dataset or change the name.
044	Dataset has errors.	The dataset has an error.	Check the dataset.
045	Dataset not found.	A selected dataset could not be found. You did not perform a calibration for the selected product.	Select a different data set or perform a calibration test for the selected product.
046	Loop overflow.	A conflict has occurred between the database and the implement.	Check the dataset.
047	Database is full.	The database is full.	You must first delete a dataset to be able to save a new one.
049	Error in calibration database. General error	There is a general error that cannot be directly specified in more detail. Possible causes are, for example, errors in the hardware, in the display communication or configuration errors.	The exact error must be determined by reading out the configuration.
050	Display Error	The display memory of the ECU has detected an error.	
060	Entry cannot be adopted. Value has been corrected.	The boom width cannot be divided by the assigned sections.	Check the boom width and the number of sections.

Hydraulic Alarms

ID	Alarm message	Possible cause	Possible solution
201	Hydraulic table is not compatible with the configuration.	The hydraulic table does not match with the configuration of the ECU.	Use a different hydraulic table or change the configuration.
202	Hydraulic table is not compatible. All hydraulic functions are deactivated.	The hydraulic table does not match with the configuration of the ECU.	Use a different hydraulic table.
203	Movement of the bout marker is paused. The speed is too low.	The working speed is too low.	Increase the working speed.
204	Bout marker time has not expired yet.	The bout marker time has not expired yet.	Wait until the bout marker time has expired.

Regulation Alarms

ID	Alarm message	Possible cause	Possible solution
398	Lower limit of fan speed too low. Product: XXXX	The set target rotational speed is below the defined minimum limit of the fan drive for the respective product.	Change the minimum limit for the target rotational speed of the product.
399	Upper limit of fan speed too high. Product: XXXX	The set target rotational speed is above the defined maximum limit of the fan drive for the respective product.	Change the maximum limit for the target rotational speed of the product.

ID	Alarm message	Possible cause	Possible solution
401	Fan is rotating too slowly.	The current fan speed is lower than the defined value for the "Fan Speed Tolerance" parameter.	Increase the fan speed or change the tolerance limit.
402	Fan is rotating too fast.	The current fan speed is higher than the defined value for the "Fan Speed Tolerance" parameter.	Reduce the fan speed or change the tolerance limit.
403	Pressure is too high.	The measured pressure exceeds the value for the "Maximum Value" parameter.	Reduce the pressure or change the "Maximum Value" parameter.
404	Pressure is too low.	The measured pressure 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 work position was not reached. Raise the machine.	The machine is not in work position.	Raise the machine.
406	The metering unit has been stopped because the machine has not been completely raised. Raise the machine.	The machine has not been completely raised.	Raise the machine.
407	Metering drive is stationary.	The current speed of the metering drive is lower than the minimum speed.	Stop immediately! Remove the cause.
408	Metering shaft is stationary.	The rotational speed sensor on the metering shaft does not register any metering shaft movement.	Stop immediately! Remove the cause.
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 slowly. It is not possible to reach the target rate at the current speed.	Drive more slowly or faster, so that the ECU can control the target rate.
412	Application has been stopped because of a critical error.	Another error has occurred. This error always appears in combination with another error.	Fix the related error.
413	Application has been stopped because the forward speed was too high.	The forward speed is too high.	Reduce the driving speed.
414	The metering unit has been stopped because the machine has not been completely raised. Raise the machine.	The machine has not been completely raised.	Raise the machine.
415	Fan is rotating too fast. Metering stopped.	The current fan speed is higher than the value of the "Max. Rotational Speed" parameter.	Decrease the fan speed or change the "Max. Rotational Speed" parameter for the fan.
416	Fan is rotating too slowly. Metering stopped.	The current fan speed is lower than the value for the "Min. Rotational Speed" parameter.	Increase the fan speed or change the "Min. Rotational Speed" parameter for the fan.
417	Calibration flap is open. Please close it.	The calibration flap is open although the seeder is currently spreading.	Close the calibration flap.

ID	Alarm message	Possible cause	Possible solution
418	Calibration flap is closed. Please open it.	The calibration flap is closed although a calibration test is currently being performed.	Open the calibration flap.

Machine-Specific Alarms

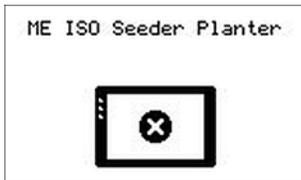
ID	Alarm message	Possible cause	Possible solution
602	Connection lost.	The connection to an ERC module has been lost.	Check the cable.
603	Connection disrupted.	The connection to an ERC module has been disrupted.	Check the cable.
604	Supply voltage is too low.	The supply voltage for the ERC modules is too low.	Check the supply voltage and check the vehicle battery.
605	Short circuit	There is a short circuit in the ERC modules.	Check the cable.
606	Open load circuit	An open load circuit has been detected in the ERC modules.	Check the cable and check whether the shut-off clutch is available.
607	Error detected in ERC module.	Faulty configuration.	Check the configuration of the inputs and outputs.
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.
611	Hopper 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	Timeout during section switching.	The switching of the left section is taking too long.	Check if something is stuck.
617	The charger does not work.	There is a malfunction in the alternator of the charger.	Check the alternator of the charger.
618	No product flow detected in active row.	No product flow has been detected in an active row.	Check the product flow, there may be a blockage in one of the supply lines.
619	Excessive product flow detected in active row.	Excessive product flow has been detected in an active row.	Check the calibration.
620	Insufficient product flow detected in active row.	Insufficient product flow has been detected in an active row.	Check the calibration.
621	There is no dataset for this product.	The calibration was not performed yet for the respective product.	Perform a calibration before working with the product.
622	Calibration button is activated.	The calibration button has been activated before the calibration screen has been called up.	Let go of the calibration button.
630	Connection lost.	The connection to an MRC module has been lost.	Check the cable.
631	Undefined Module Index.	A software error has occurred.	Contact Customer Service.
636	No seed during pre fill.	No seed or too little seed was detected during pre-metering.	Ensure that enough seed is available.
638	Motor is at standstill.	The MRC motor is at a standstill.	Check the cable.

ID	Alarm message	Possible cause	Possible solution
639	Current too high.	The MRC motor requires too much current.	Check if something is stuck.
640	Rot. speed not reached.	The MRC module has not reached the required rotational speed.	Check the cable. Check the seeding units.
641	Power voltage too low.	The power voltage on the MRC module is too low.	Check the cable.
642	Electronic voltage too low.	The electronic voltage on the MRC module is too low.	Check the cable.
643	Sensor voltage too low.	The sensor voltage on the MRC module is too low.	Check the cable.
650	Connection lost.	The connection to the AIRidium® sensor has been disconnected.	Check the cable.
651	Undefined Module Index.	An error has occurred on the AIRidium® module.	You must contact Customer Service.
660	Connection lost.	The connection to the CAN repeater has been disconnected.	Check the cable.
663	Voltage is too low.	The voltage is lower than the pre-set minimum supply voltage.	Check the cable and the power supply.
664	Error detected in PLANTirium® sensor. Degree of conta. too high.	The sensor is soiled. The sensitivity does not match the selected product.	Clean the sensor and/or change the sensitivity in the product.
665	Error detected in PLANTirium® sensor. Sensor transmit. defective.	The sensor transmitter is defective.	Check the cable on the sensor.
666	Error detected in PLANTirium® sensor. Supply voltage undercut.	The minimum supply voltage has been undercut.	Check the cable.
667	Error detected in PLANTirium® sensor. LIN bus communication error	A LIN bus communication error has occurred. The sensor does not receive messages from the LIN bus.	Check the cable.
668	Working speed is outside the speed range.	The working speed is too high or too low.	Make sure that you are in the speed range that was determined during calibration.
669	Error detected in PLANTirium® sensor. Connection lost.	The connection to the PLANTirium® sensor has been disconnected.	Check the cable on the sensor.
670	Error in blockage system. Error: Sensor:	An error has occurred in the blockage system.	Check the blockage system.
671	Error in blockage system.	An error has occurred in the blockage system.	Check the blockage system.
672	Product flow detected in inactive row.	Product flow has been detected in an inactive row.	Check the shut-off.
680	Connection lost.	The connection to the monitoring/control module has been disconnected.	Check the cable.
681	Undefined Module Index.	A non-configured monitoring/control module has been found.	Check the number of configured or connected modules.

ID	Alarm message	Possible cause	Possible solution
685	Error detected in control module.	An error has been detected in the control module. The outputs of the control module were detected as undefined at start-up.	Check the cable connections and the assignment of the outputs.
686	Supply voltage is too low.	The supply voltage on the monitoring/control module is too low.	Check the cable.
688	Target rate is out of reach. Downforce	The required target rate for the linear actuator has not been reached.	Check the linear actuator for blockage.
689	Target rate is out of reach. Working depth	The required setpoint for the linear actuator has not been reached.	Check the linear actuator for blockage.
690	Error detected in CAN repeater. 5 V - Voltage faulty.	The CAN repeater is faulty.	You must contact Customer Service.
691	Error detected in CAN repeater. 3.3 V - Voltage faulty.	The CAN repeater is faulty.	You must contact Customer Service.
692	Error detected in CAN repeater. 2.5 V - Voltage faulty.	The CAN repeater is faulty.	You must contact Customer Service.
693	Error detected in CAN repeater 12 VE - Voltage faulty.	The electronic voltage source is faulty.	Check the cable.
694	Error detected in CAN repeater. 12 VL - Voltage faulty.	The power voltage source is faulty.	Check the cable.
695	Error detected in CAN repeater. Error in AD conversion.	The CAN repeater is faulty.	You must contact Customer Service.
696	Error detected in CAN repeater. Error in address assignment.	An error was detected during the address teach-in procedure.	Check the cable.
697	Error detected in CAN repeater. Error in the parameter block.	The CAN repeater is faulty.	You must contact Customer Service.
698	Transmission of the log file has started. Message, when finished.		
699	Transmission of the log file completed.		
777	Error detected in CANopen motor.	The CANopen motor is defect.	You must contact Customer Service.

Compatibility Between Display and ECU

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



The display can be incompatible with the ECU for the following reasons:

ID	Meaning
018	Undefined error occurred.
019	There is not enough available storage on the display.
020	The resolution of the width for function icons is too low (less than 60 pixels).
021	The resolution of the high 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 display does not support the color depth of 256 colors.
024/025	The resolution of the display for screens is too low (less than 200 pixels).
026	Input and output configuration seems to be wrong.
027	A critical error has occurred during the initialization.