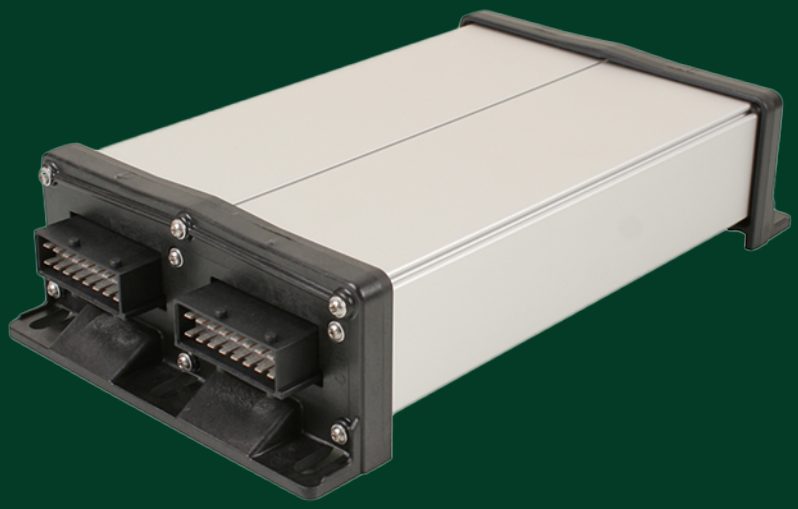
INSTALLATION AND OPERATING INSTRUCTIONS

Field-IQ ISOBUS Sprayer

SPRAYER-CONTROLLER MIDI 3.0



PTx Trimble

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1

For Your Safety

- Basic Safety Instructions
- Intended Use
- Layout and Meaning of Warnings
- User Requirements
- Safety Sign for the Field Sprayer
- Safety Stickers on the Product
- Disposal
- EU Declaration of Conformity

Basic Safety Instructions

Operation

CAUTION – 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.
- In particular, deactivate the following systems if they are installed:
  - TRAIL-Control
  - DISTANCE-Control
- 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 recognised safety, industrial and medical rules as well as all road traffic laws.
- Use only clear water when you are testing the sprayer. Do not use a poisonous spray during the tests or when calibrating the systems.

Servicing

CAUTION – 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. Unauthorised attempts at repairs can fail and cause hazardous malfunctions.
- Use only original accessories as spare parts.

Intended Use

The ECU is used to control machines in agriculture. The manufacturer shall not be held responsible for any installation or use that goes beyond this.

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

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.

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

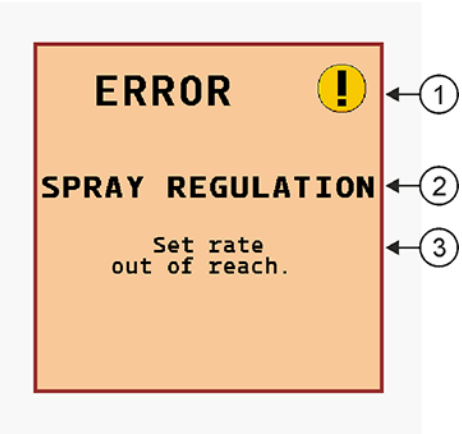
1. **NOTICE! This is a notice. It warns that there is a risk involved in the next step.**
2. Step involving risk.

Layout and Meaning of Alert Messages

An alarm message may appear during operation and have the following purpose:

- **Warning** - These messages warn the operator if the current status of the field sprayer could lead to a dangerous situation.
- **Information** - These messages inform the operator that the current status of the field sprayer or configuration is not correct and could lead to faults in operation.

On the following diagram, you can see how the alarm messages are structured:



Item	Description
1	Type of alarm
2	Name of the component that caused the alarm.
3	Problem description and solution Information on the exact cause of an alarm message or how to rectify a fault can be found in the section “Alarm messages”

User Requirements

- Learn to operate the product in accordance with the instructions. Nobody must operate the product before reading these instructions.
- Please read and carefully observe all safety instructions and warnings contained in these Operating Instructions and in the manuals of any connected vehicles and farm equipment.
- If there is anything within these instructions that you do not understand, please do not hesitate to contact your dealer.

Safety Sign for the Field Sprayer

If the field sprayer is fitted with drawbar steering or with axle steering, everyone approaching the field sprayer must be warned of possible dangers. For that reason you receive a safety sign.

Post the safety sign in the appropriate place. When attaching safety signs, observe the following:

- Safety signs must be attached at a visible location so that they can be seen by everyone approaching the danger zone.
- If the danger area can be approached from several sides of the implement, attach the warning signs on all implement sides.
- Regularly check the safety signs for completeness and legibility.
- Replace damaged or unreadable signs with new ones.

Safety Sign	Where to attach	Meaning
	Near the bend area between tractor and trailed implement.	Do not stay in the bend area during operation.

Safety Stickers on the Product

Sticker	Meaning
	Do not clean with a high-pressure cleaner.

Disposal

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

EU Declaration of Conformity

Herewith we declare that the design and construction of this product and its identical variants, as well as the form brought onto the market by us, is in accordance with the relevant safety and health requirements of the following directives.

EU directives:	2014/30/EU EMV Directive 2011/65/EU RoHS Directive
Harmonised standards applied:	EN ISO 14982:2009 EN IEC 63000:2018

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About These Instructions

- Target Group of These Operating Instructions
- Diagrams in This Manual
- Directional Information in These Instructions

Target Group of These Operating Instructions

These operating instructions are intended for operators of field sprayers that are equipped with the SPRAYER-Controller MAXI 3.0 or MIDI 3.0 system with the standard configuration.

The instructions will show you:

- The meaning of the icons on the screen;
- Where to find the settings that are relevant for a function in the application;
- How to configure the application;
- How to calibrate components that need to be calibrated.

The instructions do not explain how to operate the field sprayer. It is not a substitute for the field sprayer manufacturer's instruction manual.

Diagrams in This Manual

The screenshots of the software interface are intended to serve as a reference. They help you in finding your way around the software screens.

The information shown on the screen depends on various factors:

- The implement type.
- The implement configuration.
- The implement status.
- The implement has different colors on the terminal than in the instructions.
    - Different background color.
    - The icons described in the instructions appear in a different position on the screen.
    - Some of the described functions are not available in the system.

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.

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About the ECU

- ECU Functions
- System Overview
- Main System - MIDI
- Extension: DISTANCE-Control II
- Extension: EDS
- Software Extensions
- Rating Plate

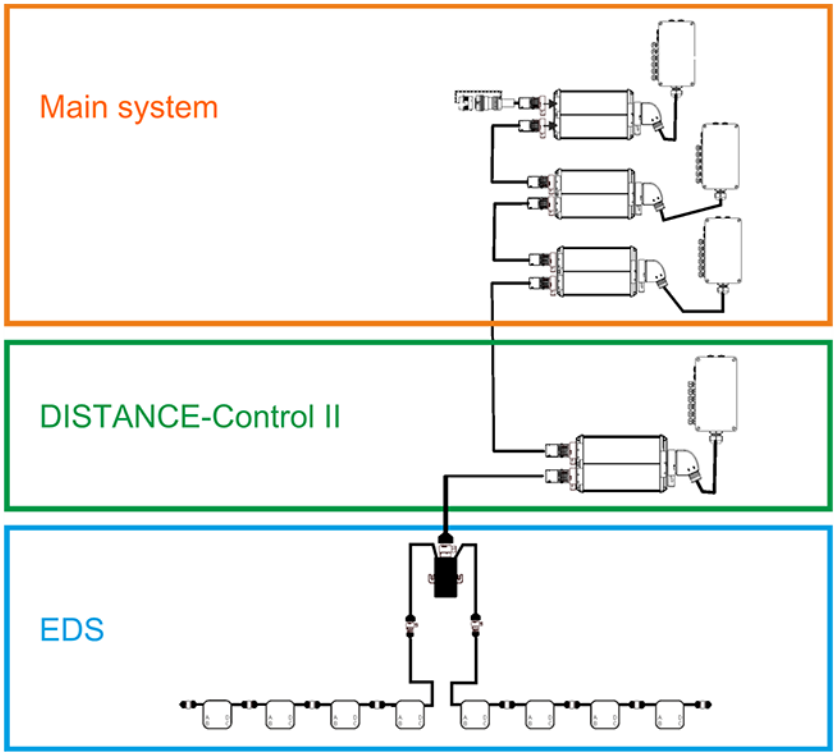
ECU Functions

The SPRAYER-Controller MIDI 3.0 ECU is an ISOBUS ECU that can control the operation of field sprayers.

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

System Overview

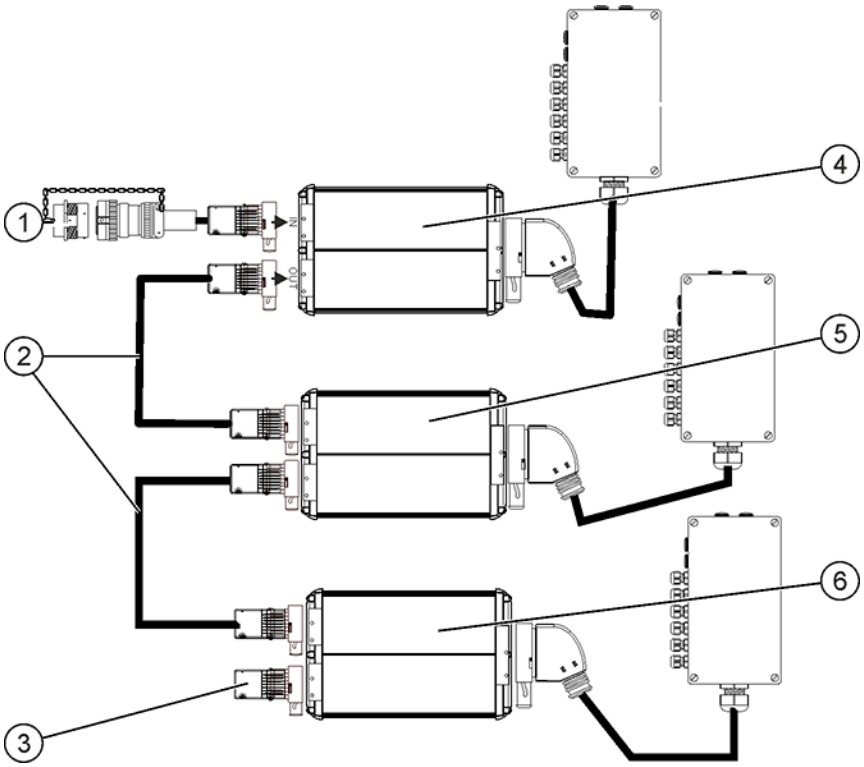
The main system always consists of a base ECU, onto which other additional components can be installed. The overall system can have various sizes depending on these additional components.



Example: SPRAYER-Controller MIDI 3.0 with DISTANCE-Control II and EDS

Main System - MIDI

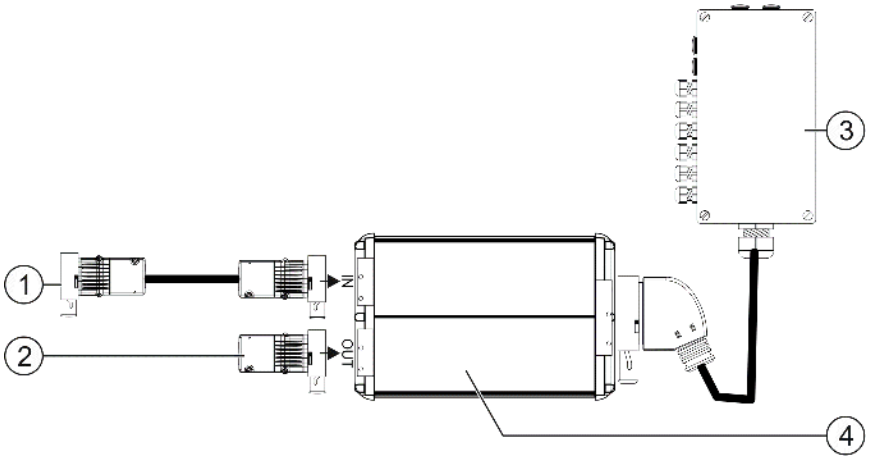
The system can be expanded. The basic version consists of one to three ECUs. The first ECU is connected to the ISOBUS power socket on the tractor.]



Main system of the MIDI 3.0 version

Item	Description	Item	Description
1	Connector cable for ECU to ISOBUS Connection to ISOBUS power socket	4	Primary ECU-MIDI 3.0
2	Connector cable	5	Secondary ECU-MIDI 3.0
3	Termination plug or connection of extensions	6	Secondary ECU-MIDI 3.0

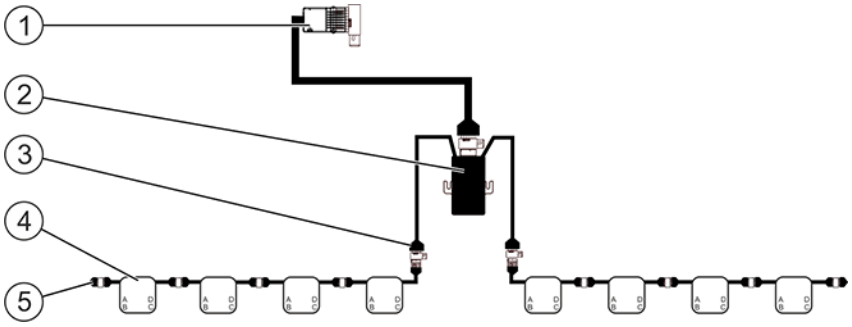
Extension: DISTANCE-Control II



DISTANCE-Control II

Item	Description	Item	Description
1	Connection to the last ECU-MIDI 3.0 ECU.	3	Junction box
2	Termination plug. Otherwise, connection of other extensions.	4	Job computer

Extension: EDS



EDS

Item	Description	Item	Description
1	Connection to the main system or to a system add-on	4	EDS modules
2	EDS communication module	5	Termination plug
3	Connection to the EDS bus		

Software Extensions

In addition to the functions that are configured as a standard, there are software extensions that can be additionally activated:

- TRAIL-Control
- DISTANCE-Control
- VARIO-Select

Rating Plate

Abbreviation	Meaning
K.-Nr.:	Customer number If the product was manufactured for an agricultural machinery manufacturer, the agricultural machinery manufacturer's item number will be shown here.
HW:	Hardware version
P/N:	PTx Trimble item number
DC:	Operating voltage The product may only be connected to voltages within this range.
SW:	Software version upon delivery
SN:	Serial number

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Mounting and Installation

- Installing the ECU
- Connecting the ECU to the ISOBUS
- Installing the Junction Box

Installing the ECU

CAUTION – Instructions for safe installation

To prevent damage to the system components, consider the following during installation:

- Install the ECU where it is protected from dirt. You therefore avoid unintentional cleaning of the ECU by the implement operator using a high-pressure cleaner.
- In the installed position, the connectors and the pressure compensation membrane must be facing to the side.
- Fasten the ECU with four fixing bolts and a flat washer (lock washers can cause cracks in the plastic on the long term) on a conducting spot on the implement chassis. In case of improper installation, the ESD discharges can cause malfunctions.
- All of the sockets and connectors that are not used must be protected from dust and water using suitable dummy connectors.
- All of the connectors must be tightly sealed. This makes them waterproof.
- The connection cable must be mechanically supported in the area of the installation site (distance < 150 mm) so that an in-phase stimulation takes place.
- Do not use the system if some of its parts are damaged. Damaged parts can cause malfunctions and lead to injuries. Replace damaged components.
- Only use original components.

Connecting the AMP connectors

To connect two AMP connectors:

1. Pull out the red locking device of the AMP socket all the way to the end.

   - You will hear a loud clicking sound.
   - The openings for inserting the locking pins of the connector are visible.
2. Insert the connector into the socket. It should be possible to easily insert the locking pins in the openings.

   The connector is loosely inserted in the socket.

3. Press in the red locking device.

- You will hear a loud clicking sound.
- A part of the locking device comes through to the other side of the socket.

You have connected and locked the connector with the socket.

Separating the AMP connectors

To separate two AMP connectors:

1. Press in both ends of the red locking device in direction of the connector.

You will hear a loud clicking sound.

The locking device has been released.

2. Pull out the red locking device of the AMP socket all the way to the end.
3. Pull the connector out of the socket.

Connecting the ECU to the ISOBUS

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

To connect the ECU to the ISOBUS:

1. Take the ISOBUS cable from the ECU.
2. Unscrew the dust protection cap.

3. Insert the ISOBUS connector into the ISOBUS power socket on the tractor.
4. Lock the connector. For basic vehicle harnesses from PTx Trimble, turn the connector clockwise. For other ISOBUS basic vehicle harnesses, the procedure depends on the model.

   The connector fits tightly.
5. Screw the dust protection cap of the connector and the socket together.

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

Installing the Junction Box

Take note of the following when selecting the installation location:

- Ensure that cables cannot be damaged by the moving implement.
- The cable glands must be facing downwards.

Connecting the Sensors and Actuators to the Junction Box

Every sensor and every actuator that is mentioned in the pin-out diagram must be connected to the connection in the junction box mentioned in the pin-out diagram.

This can be done in two ways:

- The sensor or actuator ends with a short cable and an AMP connector.

  In this case, you will receive a fitting sensor connection cable for each sensor. You must insert the sensor connection cable in the junction box and connect it to the fitting terminal.

- The sensor or actuator ends with a long cable without a connector. You have to insert it in the junction box and connect it to the fitting terminal.

The terminal to which you must connect the cable core depends on the respective implement and on the type of sensor or actuator.

Please note that the cable cores for the ultrasonic sensor trigger always need to be connected to Pins 2 and 3.

DANGER! RISK OF SHORT-CIRCUIT

WHEN EXCHANGING THE POLARITY OF CABLE CORES, MACHINE SENSORS CAN BE DAMAGED BY A SHORT-CIRCUIT.

PAY ATTENTION TO THE POLARITY OF THE CABLE CORES AND THE TERMINALS.

Before you begin:

- The junction box is not powered.
- There is no voltage on the components to be connected.

1. Remove the cable coating so that all cable cores are exposed.
2. Insert the cable to the end of the coat. There should only be cable cores inside the junction box. The cable coating must end at the junction box casing. This is the only way to ensure that you have enough space in the junction box to be able to guide all of the cable cores to the terminals.
3. Remove the cable coating of the cable cores ca. 1 cm from the end of the cable core.

   CAUTION – Pay attention to the proper polarity of the cable cores and the terminals.

4. Connect the cable cores to the terminals. To do so, use the information on the lid of the junction box, on the relay circuit board and in the pin-out diagram.
5. Close the screw connections of the junction box.

   After screwing them shut, the glands should be sealed.

6. Close unused openings in the casing of the junction box with blind caps.

Inserting the Cable Core into a Terminal

Each terminal consists of two openings:

- The upper opening or the orange opening point of the terminal opens the lower opening.
- The bottom opening of the terminal serves to insert and clamp one cable core.

Before you begin:

- You have prepared a small flat screwdriver that fits the upper opening of the terminal. You only need this screwdriver if there are no wire end sleeves on the cable cores.
- You have cut the cable to the proper length and have exposed the cable cores according to the instructions, or you have a finished cable from PTx Trimble.
- The tractor engine is switched off.
- The junction box is not powered.
- There is no voltage on the components to be connected.

1. Find the proper connectors for the cable cores to be connected.

   To do so, use the information on the lid of the junction box, on the relay circuit board and in the pin-out diagram.

2. Insert the cable core into the opening in the lower part of the terminal. If you are not using wire end sleeves, you first have to use the screwdriver.

   The cable core will be held by the terminal.

   You have clamped the cable core.

Connecting the Junction Box to the ECU

Connect the AMP connector of the junction box onto the proper ECU.

5

Basic Control Principles

- Switching on the ECU
- Layout of the Work Screen
- Control Units

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 terminal.

   The ECU is started together with the terminal.

   When starting up for the first time, the ECU initially has to transmit lots of information to the terminal. 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 terminal:

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

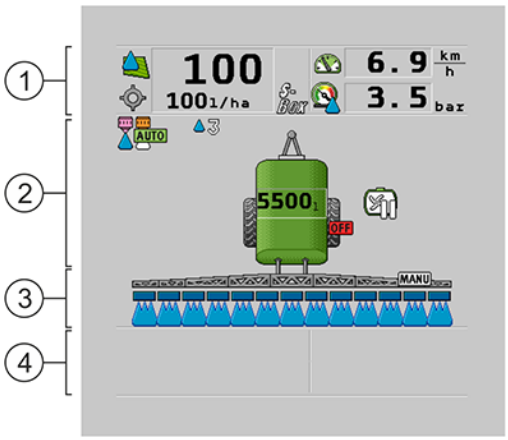
   The work screen of the ECU appears.

Layout of the Work Screen

The work screen is always shown during work and informs you of the status of the field sprayer.

The work screen is divided into several areas. In each area, information on specific topics may appear.

With the configuration of the ECU, the areas can be changed by the field sprayer manufacturer for a specific field sprayer model. For this reason, the following graphs only show the standard version of the overview.



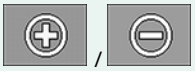
Areas on the work screen

Item	Description	Item	Description
1	**Spray data** area	3	**Boom** area

Item	Description	Item	Description
2	Implement image with icons	4	Icons beside the implement image

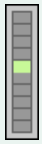
You can read about the information that appears in these areas in the following sections. Function icons appear beside the work screen, which perform functions when they are tapped. Their position and operation depend on the type of ISOBUS terminal.

In the table below, you can see the meaning of the function icons on the work screen.

Icon	Function	Icon	Function
	Opens the “Results” screen.		Shows the next page with function icons.
	Opens the “Parameters” screen.		Switches between two levels of icons, if an additional water sensor is configured.
	Opens the “Tank Filling” screen.		Switches between two levels of icons.
	Opens the “Folding” screen.		Starts and stops the drawbar or axle steering.
	Switches between manual and automatic regulation of the application rate.		Opens a screen with additional functions.

Spray data area

Depending on the configuration, the following icons may appear:

Icon	Meaning	Icon	Meaning
	The application rate will be automatically regulated. An additional number can appear on the icon. This number indicates the pre-set density. The current value (current application rate) appears next to it. If you are working with band spraying, the icon for the application rate changes accordingly: 		The bar graph only appears when the target rate is changed in automatic mode using the +10% and -10% buttons. It shows the deviation from the original target rate.
	No flow. The main valve cannot be opened because one of the requirements has not been fulfilled: • Speed slower than • Section status • Target rate out of reach • SECTION-Control has terminated the application		Trip counter is deactivated.

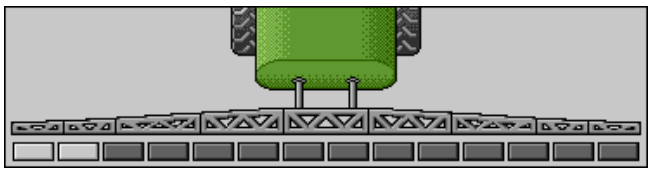
Icon	Meaning	Icon	Meaning
	The application rate will be automatically regulated. The target rate appears next to it.		The sprayer functions will be switched on and off through an “S-Box”.
	The application rate will be manually regulated.		The target rate is defined by an external source: Task Controller, prescription map, external sensor, etc.
	Automatic mode is deactivated. The flow will not be regulated. The current speed is lower than the “Regulation off below” parameter and higher than “Sprayer off below"		• A problem has occurred with the transmission of the target rate from an external source. • The sprayer is outside of the area defined in the prescription map or in an area that should not be sprayed.
	Simulated speed activated.		The vehicle is driving in reverse.
	Speed. If the numbers are red, it means that the regulation or the application have been interrupted because the speed is too low.	 *(background is flashing)*	The speed signal from the tractor / ISOBUS cannot be adopted. The system will now determine the speed using the sensor connected to the junction box. Ensure that the number of impulses per 100m is correctly entered. The icon can only appear if the signal source was automatically selected.
	Pressure control is active.		The pressure measured by the pressure sensor is too low compared to the flow measured by the flow meter.
	Pressure. Per default, the pressure is determined by a pressure sensor. If there is no pressure sensor, a calculated pressure can be shown.		

Boom Display Area

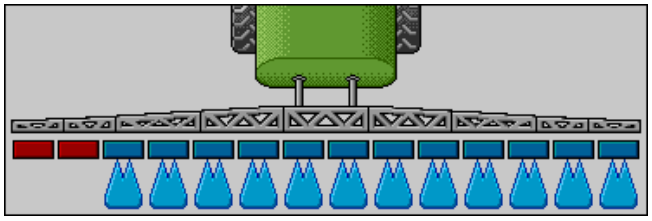
In the boom display you find the following information:

- Number of sections
- Which sections are preselected or switched off
- Which sections are applying

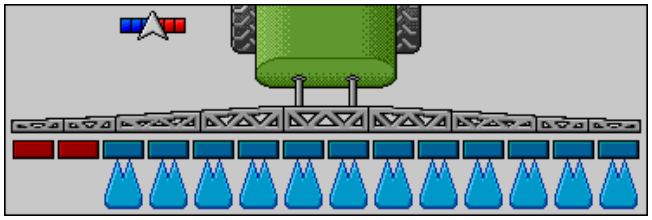
The diagrams below show how the sections may appear in the boom display area:



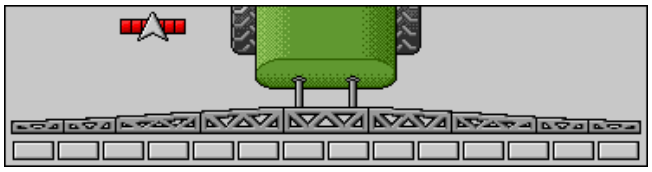
Sections 1 and 2 are closed and deactivated.



Sections 1 and 2 are closed. All of the other sections are open and spraying.



When SECTION-Control is activated, the SECTION-Control icon also appears.



If SECTION-Control is not possible, the colour of the SECTION-Control icon changes.

Each rectangle corresponds to a section valve.

Section Status

Picture	Status of the section valve	Status of the control/main valve
	Closed valve	Closed valve
	Opened valve	Closed valve
	Opened valve	Opened valve
	Closed valve	Opened valve
	The section is permanently deactivated	

When the sections are automatically switched using SECTION-Control, you have to ensure that the sections are not deactivated using an S-Box or a joystick. In this case, the section would be marked with a red cross and remain closed.

Section Status with SECTION-Control and with S-Box

Picture	Status defined by SECTION-Control	Status of the control/main valve	Status via S-Box or joystick
	Opened valve	Opened valve	Closed valve
	Opened/closed valve	Closed valve	Closed valve

Field sprayers with EDS (single nozzle switching) do not have section valves. One section consists of multiple nozzles that are switched by EDS modules. The section icon is divided into several segments. Each segment represents one nozzle.

Section Status with EDS

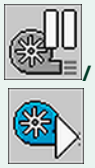
Picture	Nozzle A	Nozzles B, C, D
	Open nozzle	Closed nozzle

Icons Beside the Implement Image

Functions			
Icon	**Meaning**	**Icon**	**Meaning**
	Sections are switched via SECTION-Control.		The SECTION-Control application has closed all sections. Examples for the cause (Other causes are also possible): • The sprayer is outside of the field boundary or in an area that has already been worked. • Sprayer on the headland.
	Beacon is switched on.		Nozzle lighting is switched on.
	The working lights are switched on. If a second working light is used, it is shown by a number.		Reversing light is switched on.
	The mixing hopper lighting is switched on.		Stirrer is working.
 **(flashing)**	Stirrer has been stopped. Cause: Fill level is too low.		Fresh water is being filled into the main tank.

Functions			
Icon	**Meaning**	**Icon**	**Meaning**
 **(not flashing)**	Stirrer has been stopped. Cause: Stopped by the driver.		Fresh water is being transferred.
	Tank internal cleaning is activated.		Low-pressure cleaner is being used.
	High-pressure cleaner is being used.		The ring line is being rinsed.
	Mixing hopper is being lifted.		Mixing hopper is being lowered.
	Nozzles used in Vario mode.		Intended drop size with Airtec or in Vario mode.
	Nozzles used in Select mode.		The pressure is being increased.
	Nozzle cleaning activated.		The pressure will be increased by the pre-set pressure setpoint for the booster pump.
	Pump switched on.		Fan switched on.
	Pump switched off.		Fan switched off.
	Permanent tank internal cleaning is activated.		Filter rinsing is activated.
	Filter rinsing is activated and being used.		Compressed air rinsing is being used.
	The support leg is being lowered.		The support leg is being raised.
	The corresponding unit of the Raven injection system is active.		The corresponding unit of the Raven injection system is deactivated.
	The corresponding unit of the Raven injection system is not connected or not ready for operation.		CURVE-Control is activated.

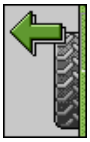
Airtec Icons	
Icon	**Meaning**
	Current air pressure
	System is increasing the air pressure.
	System is reducing the air pressure.
	Air compressor is off.
	Air compressor is on.
	Manual mode is activated. The number indicates the drop size.
	Drop size (automatic mode activated).

Counters and Sensors	
Icon	**Meaning**
	Wind strength
	Output in litres per minute
	Area output per hour
	The output per minute measured by the flow meter is too low compared to the output calculated by the pressure sensor.
	Fan speed
	Pump speed Can also be used to indicate whether a pump is switched on or off.

Icons on the Implement Image

General icons	
Icon	**Meaning**
	Tank counter: • Current fill level (l) • Area that can be sprayed until the tank is empty (ha) • Distance that can be driven until the tank is empty (km) • Acid content in the tank (pH)
	Ring line circulation function switched on.

Boom	
Icon	**Meaning**
	Display of the current boom slope.
	DISTANCE-Control is installed, but is deactivated. The boom has to be controlled manually.
	DISTANCE-Control lifts the boom.
	Boom lifting aborted because a critical upper boom height has been reached.
	DISTANCE-Control lowers the boom.
	Boom lowering aborted because a critical lower boom height has been reached.
	Spot spraying is activated, but a CAN repeater was not detected.
	Spot spraying is activated and a CAN repeater was detected, but no signal is being transmitted from a camera.
	Spot spraying is activated and all nozzles should be closed.
	Spot spraying is activated and some of the nozzles should be closed.

TRAIL-Control		
Meaning	**Icons for drawbar steering**	**Icons for axle steering**
No TRAIL-Control.		
TRAIL-Control is installed but is deactivated.		
TRAIL-Control is in manual mode.		
TRAIL-Control is in automatic mode.		
The drawbar is locked with a pin.		
The implement is being steered to the left.		
The implement is being steered to the right.		

Control Units

The following options are available for operating the ECU:

- Using the function buttons on the screen
- Using AUX-N operating devices
- Using the PTx joystick
- Using the PTx S-Box
- Using an external keypad

6

Operating the ECU on the Field

- Tank Filling
- Controlling the Boom
- Starting the Application
- Regulating the Application Rate
- Operating Sections
- Documenting Work Results
- Using Pressure Registration
- Setting the Rotational Speed
- Operating the PTx Joystick
- Using Foam Markers
- Operating Additional Functions
- Regulating Drop Size with AIRTEC
- Using ISB Short-Cut Button
- Trailed Implement with Dual Axles
- Stirring Control
- TC-GEO Management

Tank Filling

The desired type of tank filling depends on the additional equipment that is installed on your sprayer. The filling procedure can differ depending on the additional equipment.

The following filling methods are available:

- Filling the tank manually without additional systems
- Filling the tank with TANK-Control
- Filling the tank with integrated TANK-Control III

There are also the OEM-specific filling methods TANK-Control II and TANK-Control III. You can obtain more information about this from the respective manufacturers.

Regardless of the filling method, the filling procedure is always performed through the filling screen.

This is how you reach the screen with this function:

Filling the Tank Manually without Additional Systems

If you are filling the tank without additional systems and you are also not using a filling pump or fill stop, you can enter the tank content manually.

1.  - Switch to the “Filling” screen.
2. For the “New tank content” parameter, enter the tank content after the filling.

   or

   Alternatively:  - Enter full tank,  - Enter empty tank.

The new tank content appears on the screen.

Filling the Tank with Filling Pump

If you are filling the tank without additional systems, but are using a filling pump for the filling procedure, proceed as follows:

1.  - Switch to the “Tank filling” screen.
2.  - Switch on the pump to start filling the tank.

   During the filling procedure, the following icon appears on the screen:

3.  - Switch off the pump when the tank is full.

The new tank content appears on the screen.

Filling the Tank with Fill Stop

Filling with a Fill Stop

If a fill stop has been installed and configured on the sprayer, you can use it. The tank filling will then be terminated either manually or automatically when the refilling limit has been reached.

1.  - Switch to the “Filling” screen.
2.  - Start filling.

   or

    - Stop filling manually.

   The tank is filled until the refilling limit has been reached or the filling procedure is interrupted manually.

   The new tank content appears on the screen.

Filling with Fill Stop and Fill Stop Switch

When a fill stop and a fill stop switch are installed and configured on the sprayer, you can start and stop the filling procedure either via the terminal or using the fill stop switch. The filling will then be terminated either manually or automatically when the refilling limit has been reached.

1.  - Switch to the “Filling” screen.
2.  - Start filling.

   or

    - Stop filling manually via the terminal or by pressing the fill stop switch.

   The tank is filled until the refilling limit has been reached or the filling procedure is interrupted manually.

   The new tank content appears on the screen.

Filling with Two Fill Stops

If the sprayer operates with two tanks and a fill stop is installed and configured on each tank, you can use them independently of one another. The filling will then be terminated for the respective tank either manually or automatically when the refilling limit has been reached.

1.  - Switch to the “Filling” screen.
2.  - Select the tank that you want to fill.

3.  - Start filling.

   or

    - Stop filling manually.

   The tank is filled until the refilling limit has been reached or the filling procedure is interrupted manually.

   During the filling procedure, the respective icon appears on the screen:

4. Repeat the filling procedure for the other tank. If you switch from one tank to the other while filling, the filling procedure will be automatically interrupted.

   The new tank content appears on the screen.

Filling with One Fill Stop and Tank Selection

If the sprayer operates with two tanks and a fill stop is installed and configured on one of the tanks, you must select the tank on which the fill stop will be used. The filling will then be terminated for the selected tank either manually or automatically when the refilling limit has been reached.

1.  - Switch to the “Filling” screen.
2.  - Select the tank on which the fill stop will be used.
3.  - Start filling.

   or

    - Stop filling manually.

   The tank is filled until the refilling limit has been reached or the filling procedure is interrupted manually.

4. During the filling procedure, the respective icon appears on the screen:

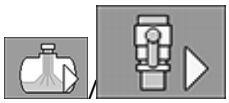
   

   The new tank content appears on the screen.

Filling the Tank with TANK-Control I

Filling the Tank with a Filling Pump or Filling Tap

If you are filling the tank with TANK-Control and a filling pump or filling tap, proceed as follows:

1.  - Switch to the “Filling” screen.
2.  - Start filling.

   During the filling procedure, the following icon appears on the screen:

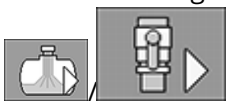
   

   During the filling procedure, the new tank content will appear on the “Current tank content” line.
3.  - Stop filling.

   The new tank content appears on the screen.

Filling the Tank with a Single Fill Stop

If a TANK-Control with fill stop has been installed and configured on the sprayer, you can use it. It will stop the filling automatically when a specified fill level is reached.

1.  - Switch to the “Filling” screen.
2. Set the “Refilling limit” parameter.
3.  - Start filling.

   During the filling procedure, the following icon appears on the screen:

   When the fill level defined as “refilling limit“ is reached, filling will be terminated.

Filling the Tank with Two Fill Stops

If TANK-Control with two fill stops are installed and configured on the sprayer, you can use them independently of one another. The filling will then be automatically terminated for the respective tank when the refilling limit has been reached.

1.  - Switch to the “Filling” screen:
2. Under “Refilling limit”, you can enter up to two refilling limits at which the filling pump should be stopped.

If you enter two refilling limits, a new function icon appears on the screen:

Press the  icon to mark a refilling limit at which the pump should be stopped.

3.  - Start filling.

   During the filling procedure, the following icon appears on the screen:

   Filling starts.

   When the fill level defined as refilling limit 1 is reached, filling will be terminated.

   If there is a second refilling limit, it will be automatically activated.

4. You can now add the spray agent and stir the tank contents.
5. Prepare the sprayer for the second filling.
6.  - Start filling.

   Filling starts.

   When the fill level defined as refilling limit 2 is reached, filling will be terminated.

Filling with Fill Stop and Alarm

If TANK-Control with fill stop and an alarm function are installed and configured on the sprayer, you can use them. It will stop the filling automatically when a specified fill level is reached. In addition, an alarm is issued at a selected fill level.

1.  - Switch to the “Filling” screen.
2. Set the “Refilling limit” parameter.
3. Set the “Refilling limit” parameter for the alarm.
4. Select the duration of the alarm.
5.  - Start filling.

   During the filling procedure, the following icon appears on the screen:

   As soon as the alarm limit is reached, an alarm is issued for the specified duration.

   When the fill level defined as “refilling limit“ is reached, filling will be terminated.

Filling with Fill Stop, Alarm, and Automatic Fresh Water Transfer

If TANK-Control with fill stop and an alarm function are installed and configured on the sprayer, you can also use them with an automatic fresh water transfer. It will stop the filling automatically when a specified fill level is reached. In addition, an alarm is issued at a selected fill level. Moreover, you can automatically transfer fresh water to the main tank.

1.  - Switch to the “Filling” screen.
2. Set the “Refilling limit” parameter.
3. Set the “Refilling limit” parameter for the alarm.
4. Select the duration of the alarm.
5. Set the “Water amount” parameter for the fresh water transfer.
6.  - Start filling.
7. During the filling procedure, the following icon appears on the screen:

   
8.  - Start the automatic fresh water transfer during the filling procedure.
9. The following icon appears:

   The bar graph shows the current status of the fresh water transfer.

   The icon disappears as soon as the fresh water transfer is completed.

As soon as the alarm limit is reached, an alarm is issued for the specified duration.

When the fill level defined as “refilling limit“ is reached, filling will be terminated.

Filling the Tank with Automatic Fresh Water Transfer

You can perform an independent automatic fresh water transfer through the filling screen.

1.  - Switch to the “Filling” screen.
2.  - Start the automatic fresh water transfer.

   The following icon appears:

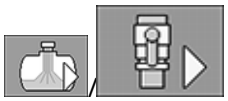
   The bar graph shows the current status of the fresh water transfer.

   The icon disappears as soon as the fresh water transfer is completed.

Filling the Tank with Integrated TANK-Control III

Filling the Tank with Filling Pump

If you are filling the tank with an integrated TANK-Control III and a filling pump, proceed as follows:

1.  - Switch to the “Filling” screen.
2.  - Start filling.

   During the filling procedure, the following icon appears on the screen:

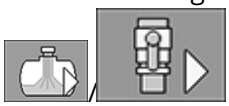
   

   During the filling procedure, the new tank content will appear on the “Current tank content” line.
3.  - Stop filling.

   The new tank content appears on the screen.

Filling the Tank with a Single Fill Stop

If an integrated TANK-Control III with fill stop is installed and configured on the sprayer, you can use them. It will stop the filling automatically when a specified fill level is reached.

1.  - Switch to the “Filling” screen.
2. Set the “Refilling limit” parameter.
3.  - Start filling.

   During the filling procedure, the following icon appears on the screen:

   When the fill level defined as “refilling limit“ is reached, filling will be terminated.

Filling the Tank with Two Fill Stops

If an integrated TANK-Control III with two fill stops are installed and configured on the sprayer, you can use them independently of one another. The filling will then be automatically terminated for the respective tank when the refilling limit has been reached.

1.  - Switch to the “Filling” screen:
2.  - If the sprayer has two tanks, select the tank that you want to fill.

3. Under “Refilling limit”, you can enter up to two refilling limits at which the filling pump should be stopped.

   If you enter two refilling limits, a new function icon appears on the screen: 

   Press the  icon to mark a refilling limit at which the pump should be stopped.

4.  - Start filling.

   During the filling procedure, the following icon appears on the screen:

   Filling starts.

   When the fill level defined as refilling limit 1 is reached, filling will be terminated.

   If there is a second refilling limit, it will be automatically activated.

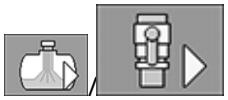
5. You can now add the spray agent and stir the tank contents.
6. Prepare the sprayer for the second filling.
7.  - Start filling.

   Filling starts.

   When the fill level defined as refilling limit 2 is reached, filling will be terminated.

Filling with Fill Stop and Alarm

If an integrated TANK-Control III with fill stop and an alarm function are installed and configured on the sprayer, you can use them. It will stop the filling automatically when a specified fill level is reached. In addition, an alarm is issued at a selected fill level.

1.  - Switch to the “Filling” screen.
2.  - If the sprayer has two tanks, select the tank that you want to fill.
3. Set the “Refilling limit” parameter.
4. Select the duration of the alarm.
5.  - Start filling.

   During the filling procedure, the following icon appears on the screen:

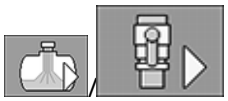
   

   As soon as the alarm limit is reached, an alarm is issued for the specified duration.

When the fill level defined as “refilling limit“ is reached, filling will be terminated.

Filling with Fill Stop, Alarm, and Automatic Fresh Water Transfer

If an integrated TANK-Control III with fill stop and an alarm function are installed and configured on the sprayer, you can also use them with an automatic fresh water transfer. It will stop the filling automatically when a specified fill level is reached. In addition, an alarm is issued at a selected fill level. Moreover, you can automatically transfer fresh water to the main tank.

1.  - Switch to the “Filling” screen.
2.  - If the sprayer has two tanks, select the tank that you want to fill.
3. Set the “Refilling limit” parameter.
4. Select the duration of the alarm.
5. Set the “Water amount” parameter for the fresh water transfer.
6.  - Start filling.

   During the filling procedure, the following icon appears on the screen:

7.  - Start the automatic fresh water transfer during the filling procedure.

   The following icon appears:

   The bar graph shows the current status of the fresh water transfer.

   The icon disappears as soon as the fresh water transfer is completed.

As soon as the alarm limit is reached, an alarm is issued for the specified duration.

When the fill level defined as “refilling limit“ is reached, filling will be terminated.

Filling the Tank with Automatic Fresh Water Transfer

You can perform an independent automatic fresh water transfer through the filling screen.

1.  - Switch to the “Filling” screen.
2.  - Start the automatic fresh water transfer.

   The following icon appears:

   The bar graph shows the current status of the fresh water transfer.

   The icon disappears as soon as the fresh water transfer is completed.

Controlling the Boom

In this section you learn how to control the boom using the terminal.

DANGER! INJURY TO PERSONS THROUGH IMPROPER OPERATION

EVERY FIELD SPRAYER IS DESIGNED DIFFERENTLY AND MUST BE OPERATED DIFFERENTLY. IN THIS SECTION, ONLY THE ICONS THAT APPEAR ON THE SCREEN OF THE TERMINAL CAN BE EXPLAINED.

READ THE FIELD SPRAYER OPERATING GUIDE.

LEARN THE SEQUENCE IN WHICH YOUR FIELD SPRAYER MUST BE OPERATED SAFELY.

Lifting and Lowering the Boom

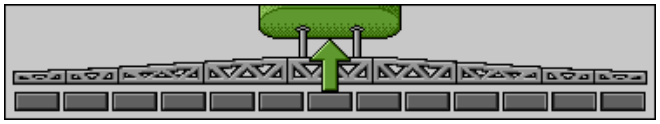
This is how you reach the screen with this function:

To operate this function, the user needs the PTx joystick first of all.

Use the following function keys to operate the function:

Function icon	Function
	Lifts the boom.
	Lowers the boom.
	Activates and deactivates DISTANCE-Control.

On the following diagram you see how this function is shown on the work screen:



Boom is being lifted - the arrow in the middle shows the direction

"MANU" means that DISTANCE-Control is deactivated and the boom must be raised and lowered manually.

Folding and Unfolding the Boom

This function folds the field sprayer boom in and out.

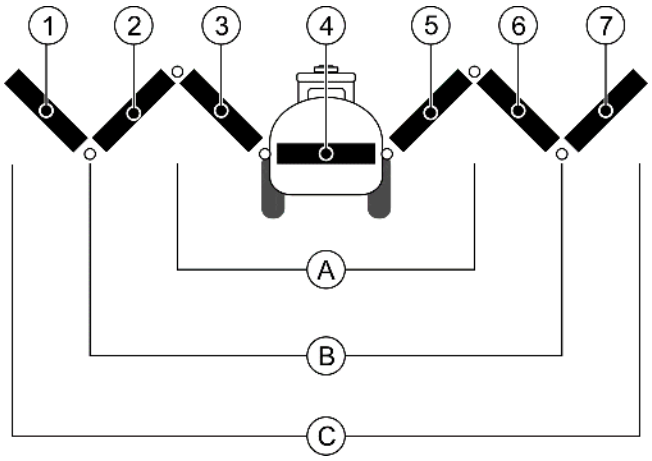
Operation depends on the following factors:

- Number of boom parts that can be folded in and out.
- Type of locking for the folding in and out of the boom.
- Type of field sprayer.

This is how you reach the screen with this function:

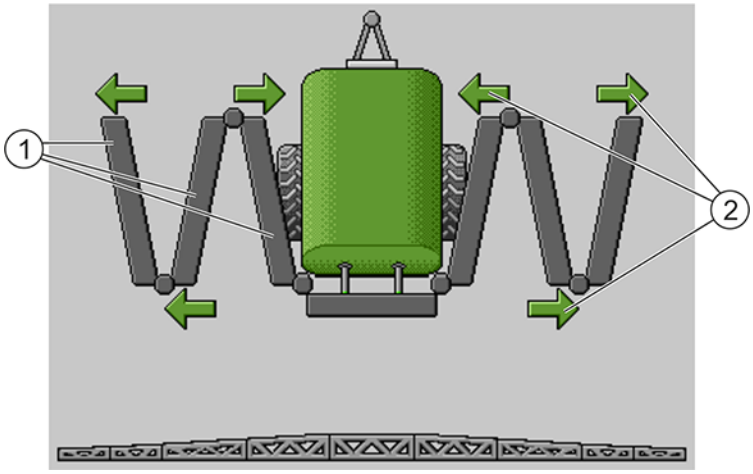
Structure of a Boom

The following diagram shows the structure of booms and what the individual boom parts are called. The diagram shows a field sprayer with a seven-part boom, but it also applies to smaller booms.



Parts of the boom on a field sprayer

Item	Meaning	Item	Meaning
A	Three-section boom	**3**	Boom part: Inner left
B	Five-section boom	**4**	Boom part: Unmoving part
C	Seven-section boom	**5**	Boom part: Inner right
1	Boom part: Outer left	**6**	Boom part: Middle right
2	Boom part: Middle left	**7**	Boom part: Outer right

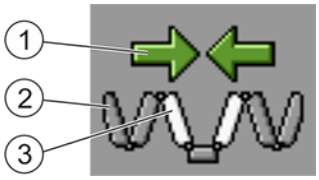


Representation of the boom on the "Boom folding" screen

Item	Meaning
1	Folding parts of the boom
2	Icon: Boom section is being folded in or out The arrows appear for folding boom sections and indicate the direction of movement.

Icon	Meaning
	The boom is at the same height as the boom top height sensor. Requirement: The boom top height sensor is installed.

On the following diagram, you see how a seven-part boom is shown on the function icons.



Item	Meaning
1	Directional arrow Arrow pointing inwards means: Fold in Arrow pointing outwards means: Fold out
2	Sections of the boom marked in grey are not folded in or out with this function icon
3	Sections of the boom marked in white are folded in or out with this function icon

Use the following function keys to operate the function:

Function	Three-section boom	Five-section boom	Seven-section boom
Fold inner boom symmetrically			

Function	Three-section boom	Five-section boom	Seven-section boom
Unfold inner boom symmetrically			
Fold boom in the middle symmetrically			
Unfold boom in the middle symmetrically			
Unfold outer left boom			
Unfold outer right boom			
Fold inner and middle boom symmetrically			
Unfold inner and middle boom symmetrically			
Block boom section			

Locking the Boom

This function enables locking and unlocking of the boom.

This is how you reach the screen with this function:

Use the following function keys to operate the function:

Icon	Meaning
	Locks the boom.
	Unlocks the boom.
	The boom is being locked. The procedure is not completed.
	The boom is being unlocked. The procedure is not completed.
	The boom is locked.
	The boom is unlocked.

Raising and Lowering the Wings (tilting up / down)

The system is capable of raising or lowering wings independently or simultaneously.

This is how you reach the screen with this function:

Use the following function keys to operate the function:

Icon	Function
	Raises the right wing.
	Raises the left wing.
	Lowers the right wing.
	Lowers the left wing.
	Raises both wings symmetrically.
	Lowers both wings symmetrically.

1. Press the function key with the desired function.

   The wings will be moved.

2. Keep function button pressed until the boom reaches the desired angle.
3. Release function key.

Sloping the Boom

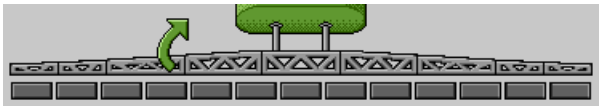
This is how you reach the screen with this function:

To operate this function the user needs the PTx joystick first of all.

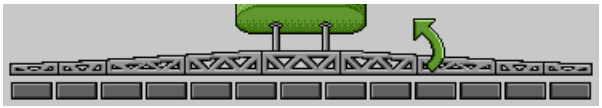
Use the following function keys to operate the function:

Icon	Function
	Slopes the boom to the right. It will be raised on the left.
	Slopes the boom to the left. It will be raised on the right.

On the following diagram you see how this function is shown on the work screen:



Slope boom: raise on the left, lower on the right



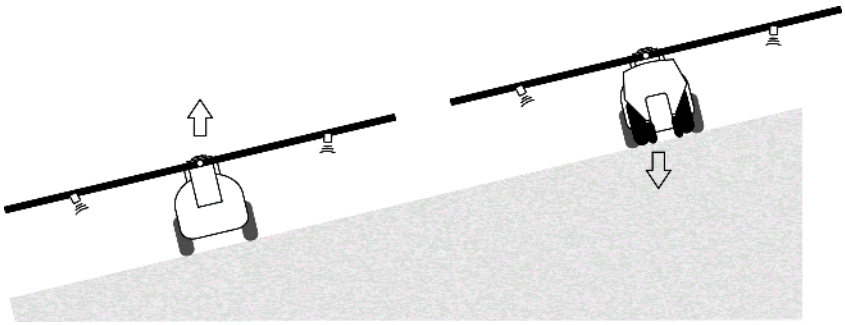
Slope boom: lower on the left, raise on the right

Reproducing the Boom Slope When Turning

This function assists you when working on slopes.

The boom is sloped when working on a hillside. The function saves the angle of slope.

After a turning manoeuvre, the angle of slope is reproduced when the field sprayer is travelling in the opposite direction.

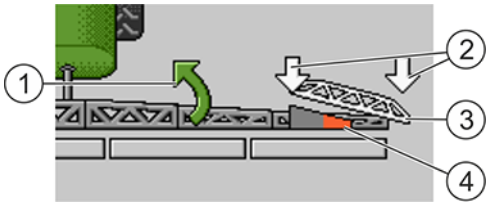


When turning on a slope, you can press a button to slope the boom in the opposite direction.

Use the following function keys to operate the function:

Icon	Meaning
	Activates the function. Each time the button is pressed, the target position of the boom (white arrows) changes.
	Slopes the boom manually. By pressing this button, the automatic reproduction of the slope angle is terminated.

When the function is active, the current setting is shown above the boom on the work screen.



Item	Meaning	Item	Meaning
1	Current direction of movement of the boom.	3	Current boom position.
2	Target boom position.	4	Current angle of the angle sensor on the sloping cylinder.

Depending on the configuration, the following icons may appear:

Icon	Meaning
	White arrows: Target position is horizontal. Angle sensor: Horizontal position has been reached.
	Boom is sloped to the right. Function is deactivated.
	Boom is sloped to the right. However, it should be automatically sloped to the left. The system will move the boom in this direction. Current position: Boom is sloped to the right Target position: Sloped to the left. Reproduce boom angle: activated
	Boom is sloped to the right. However, it should be automatically moved to a horizontal position. The system will move the boom in this direction.

Before you begin, make sure you have calibrated the boom potentiometer (slope angle sensor).

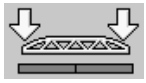
1. Drive across the slope gradient with the field sprayer.
2. Position the boom parallel to the sloped ground.
3.  – Press on the headlands before the turning manoeuvre.

   The current angle will be saved.

    - Two white arrows pointing down appear.

   The system returns the boom to the horizontal position.

   While the boom is moving, a green arrow appears on the work screen.

   When the boom is horizontal, the  icon appears.
4. Turn only when the boom is horizontal.
5.  - Press once after the turning maneuver.

   The ECU slopes the boom in the opposite direction until the previously saved angle is reached on the other side.

   While the boom is moving, a green arrow appears on the work screen.

The function switches off if you change the boom angle manually.

Using Additional Boom Sensors

If you are using additional boom sensors and these sensors detect a specific state, this will be shown on the work screen.

Icon	Meaning
	Boom height
	Transport position – When this state is detected, the boom cannot be lowered or folded.
	Slope middle position
	The telescopic boom is in the end position. When the icon appears, the hydraulic function will be stopped.
	The telescopic boom is in road mode. When the icon appears, the hydraulic function will be stopped.
No icon on the work screen.	Boom folded – This sensor deactivates sections when a pre-set position has been reached.
No icon on the work screen.	Boom unfolded – This sensor deactivates sections when a pre-set position has been reached.

Starting the Application

Before you begin:

- The tractor with the field sprayer is on the field.
- You have configured the ECU.
- You have folded out the boom.

1. Ensure that all prerequisites have been fulfilled.
2.  - Start application
   - Manual mode: The field sprayer starts the application.
   - Automatic mode: The sprayer will be prepared for application.

   As long as the sprayer is not moving, the following icon appears on the work screen, depending on the “Sprayer off below:” parameter:

   
3. If you are in automatic mode, start driving and exceed the minimum speed for the automatic regulation (parameter: “Regulation off below”).

   As long as the field sprayer is not regulating, the following icon appears on the work screen, depending on the “Regulation off below:” parameter:

As soon as the minimum speed is exceeded, the field sprayer starts regulating.

You have started the application.

Immediate Application

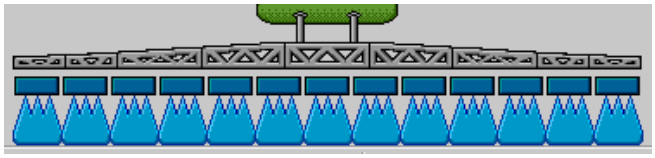
There may be situations where you want to start spraying while the sprayer is still at a standstill. For example, when you have stopped on the field.

To start immediate application in automatic mode:

- The tractor with the field sprayer is on the field.
- You have configured the ECU.
- You have folded out the boom.
- Automatic mode is activated.

1. Press and hold the application button on the joystick for three seconds.
2. The field sprayer starts the application.

   Spray cones appear under the boom icon:



3. Start driving within 5 seconds and exceed the minimum speed for the automatic regulation (parameter: “Sprayer off below”). Otherwise, the application will be automatically terminated.

Regulating the Application Rate

Types of regulation:

Depending on the sprayer equipment, the application rate regulation system can either control the opening of a control valve or the speed of a centrifugal pump.

Work modes:

You can regulate the application rate manually or you can leave the regulation to the ECU:

- In manual mode, you can control the opening of the control valve with two buttons.
- In automatic mode, the ECU regulates the opening of the control valve (or the pump speed) such that the application rate defined as the set rate is reached.

Use the following function keys to operate the function:

Icon	Function
	Switches the mode between manual and automatic.

You will learn how to operate the system in the following sections.

Changing the Application Rate in Manual Mode

When the field sprayer is in manual mode, the application is not regulated according to a specified rate. The application rate must be set manually instead.

The application rate must be regulated manually when the following icon appears in the spray data area of the work screen: 

Application in manual mode

Please note that the pressure is also automatically changed when you change the application rate.

To operate this function the user needs the PTx joystick first of all.

Use the following function keys to operate the function:

Icon	Function
	Increases the application rate.
	Reduces the application rate.

Using Automatic Mode

In automatic mode, the ECU regulates the degree of opening of the control valve and the main valve on the manifold such that the target rate defined for the application rate can be reached.

You are in automatic mode when one of the following icons appears in the spray data area of the work screen:

Icon	Meaning
	Sprayer can apply.
	The speed of the sprayer is lower than “Regulation off below” Sprayer can apply. The flow will not be regulated. The control valve remains in the last known position until the speed changes.
	The speed of the sprayer is lower than “Sprayer off below” The main valve is closed automatically.
	Regulation is not possible because the application was deactivated by the SECTION-Control app.

To use automatic mode, the following conditions must be fulfilled:

- Target rate has been entered.
- Flow meter is calibrated.
- A speed signal is available.
- Working width is set.
- The speed of the field sprayer is higher than the speed for the “Regulation off below” parameter.
- The parameter “Regul. factor” has been set.

In the following cases, the flow is automatically adjusted:

- Speed of the sprayer has changed.
- Number of switched-on sections has changed.
- You have changed the target rate manually.
- The application rate has been changed by the information from the application map.

The speed and precision of the regulation depends on the value of the “Regul. factor” parameter.

You can change the target rate manually while driving in Automatic mode.

To operate this function the user needs the PTx joystick first of all.

Icon	Function
	Increases the target rate by 10%.
	Reduces the target rate by 10%.
	Restores the target rate back to 100%.
	Changes to the entered “Rate 1”.
	Changes to the entered “Rate 2”.
	Increases the pressure.
	Increases the pressure by a previously defined value.

To change the target rate during work:

1.  - Activate automatic steering.
2.  - Open main valve.

   Spray cones appear under the boom icon on the work screen. Still, the sprayer is not spraying.

   As long as you are at a standstill, the sprayer cannot start spraying. See icons:  and 

3. Exceed the speed defined in the “Regulation off below” parameter.

   The sprayer begins adjusting the application rate to the defined target rate.

4.  or  - Press to change the target rate.

   The degree of change appears on the work screen.

5.  - Restores the original target rate.

6. If you have entered several target rates in the configuration, you can also use the function icons: 

   and  to switch among the target rates.

   To change the target rate during work:

   a.  - Activate automatic steering.

   b.  - Open main valve.

      Spray cones appear under the boom icon on the work screen. Still, the sprayer is not spraying.

      As long as you are at a standstill, the sprayer cannot start spraying. See icons:  and 

   c. Exceed the speed defined in the “Regulation off below” parameter.
   d. The sprayer begins adjusting the application rate to the defined target rate.
   e.  or  - Press to change the target rate.

      The degree of change appears on the work screen.

   f.  - Restores the original target rate.

Setting Target Rate

The target rate is the quantity of spray liquid you want to apply per hectare.

The ECU will attempt to maintain this rate during the work.

There are several ways to specify the rate:

- Enter rate on the “Parameters” screen.
- The target rate can be adopted from external sources using the “ISOBUS-TC” app:
  - from tasks,
  - from prescription maps,
  - from external sensors.

Target rate from parameters

Target rate from an external source

Target rates from external data sources have a higher priority than the target rate entered in the ECU. For this reason, you do not have to adjust the “Rate” parameter when you are working with prescription maps.

As an option, you can enter up to three different target rates in the ECU. To do so, use the “Rate 1” and “Rate 2” parameters in addition to the “Target rate” parameter.

Stopping Application

You can stop application in the following ways:

-  - Close main valve.
-  or  - Close the section valves consecutively.
- Drive slower than the set minimum speed (only in automatic mode).

Operating Sections

To operate this function the user needs the PTx joystick first of all.

Use the following function keys to operate the function:

Icon	Function
	Closes section valves from left to right.
	Closes section valves from right to left.
	Opens section valves from left to right. or When all of the section valves are closed, then the first section valve is opened from the left.
	Closes section valves from right to left. or When all of the section valves are closed, then the first section valve is opened from the right.
	If the sections were deactivated via SECTION-Control, press and hold for approx. 3 seconds to override the deactivation of the sections. The sections are then opened for approx. 5 seconds. On the work screen, check marks appear at the respective sections for the 5 seconds.

If your implement has an external main switch, you can use it to open or close all of the sections.

Documenting Work Results

You can document your work in the “Counters” screen.

On the “Results” screen, there are two types of counter:

- Trip counter – documents the work until it is deleted.
- Total counter – documents the work since initial start-up.

You can find various information on the “Results” screen. Depending on the configuration and equipment of the implement, different work results can appear.

- **Quantity** – Applied quantity.
- **Work time** – Duration of the application.
- **Distance** – Distance driven during the application.
- **Area** – Applied area.

This is how you reach the screen with this function:

Use the following function keys to operate the function:

Icon	Function
	Resets the “Volume” counter.
	Resets the “Area” counter.
	Resets the “Distance” counter.
	Resets the “Work time” counter.
	Pressed briefly: Continue to the total counters Pressed long: Back to the work screen
	Clears the contents of the displayed trip counter.
	Stops the trip counter. - The documentation of the work will be stopped until the terminal is restarted or the function button is pressed again. - The icon is flashing on the work screen: 
	Next trip counter. (Optional function)
	Activates the trip counter. (Optional function)

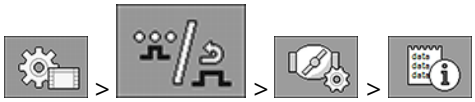
Icon	Function
	Previous trip counter. (Optional function)

Using Pressure Registration

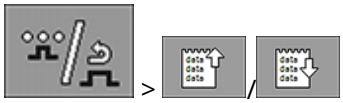
The ECU measures the respective current spray pressure every 10 seconds for documentation purposes.

You can view the measured values via the ECU.

This is how you reach the screen with this function:



Procedure

 - Switch between the individual measurements.

You can always view the pressures measured in the last hour. The respective pressure is measured every 10 seconds when the sprayer is switched on.

Setting the Rotational Speed

If the pump or the fan works with RPM control, you can control it during operation. In doing so, the configured rotational speeds are always used as the speeds.

If you configured rotational speeds for the headlands, cleaning and filling, they will automatically be used for the respective task.

This is how you reach the screen with this function:

Use the following function keys to operate the function:

The table shows the function systems that are displayed when controlling the rotational speed of a pump. For a fan, the function icons change accordingly.

Icon	Function
	RPM control will be started.
	RPM control will be stopped.
	Default rotational speed 1 will be used.

Icon	Function
	Default rotational speed 2 will be used.
	Manual rotational speed will be used.

Operating the PTx Joystick

With the PTx joystick, you can activate and deactivate the sprayer functions. For example:

- Open main valve
- Switch off sections from left to right
- Lifting and lowering the boom manually

Side-Mounted Switch

Three functions are assigned to each button. The position of the side switch determines the function that is executed when a button is pressed.

Position of the switch	LED Color
	Red
	Yellow
	Green

The button assignment depends on the configuration of the sprayer.

Before you begin to operate the PTx joystick, make sure the work screen is called up.

1. Move the side switch into the desired position and hold.

   The LED on the PTx joystick lights up in the corresponding color.

2. Press the button with the desired function.

   The function is executed.

Preview Mode for the PTx Joystick

The preview mode of the joystick can only be used when your joystick works with the AUX1 auxiliary protocol.

When pressing the button for the first time, the preview mode shows the button assignment on the screen. This makes it easier for beginners to activate the right function. As a standard, preview mode is deactivated on new ECUs.

Mode of Operation

When you press a joystick button for the first time after starting, no function will be executed. The button assignment of the joystick appears on the screen instead. The display remains until the time set in the configuration has expired.

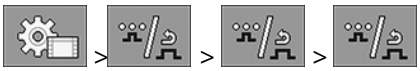
If you press a joystick button during the display, its function will be executed. (Assignment remains on the screen until the time expires).

From now on, you can operate the joystick without the help display appearing.

The help display only appears again if you press a button and simultaneously move the rocker switch on the side to a different position.

Procedure

To activate the preview mode:

1. Switch to the “Parameters” screen:
   
2. For the “PTx Joystick” parameter, set the value to “PTx Joystick”.

   The “Joystick assistant” parameter appears.
3. Set the check mark for the parameter.
4. If necessary, change the display time.

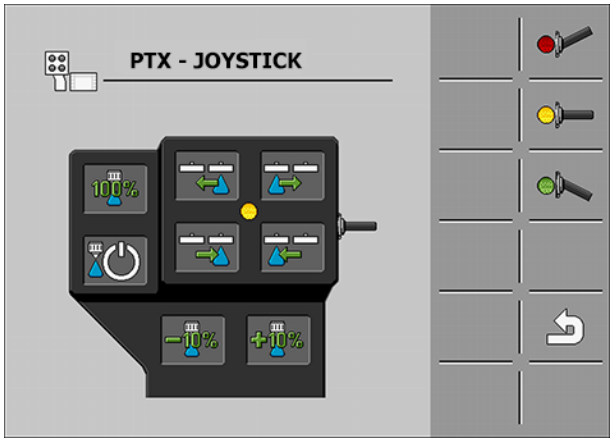
Viewing the Assignment of the PTx Joystick

The assignment of the joystick can only be viewed when your joystick works with the AUX1 auxiliary protocol.

Before you begin to display the button assignment on the screen, make sure the PTx Joystick is configured.

1.  - Press until the  button appears.
2.  - Press.

   The button assignment appears:



3.  ,  ,  - Press to view the assignment on each level.
4. You can also activate the Preview mode.

Using Foam Markers

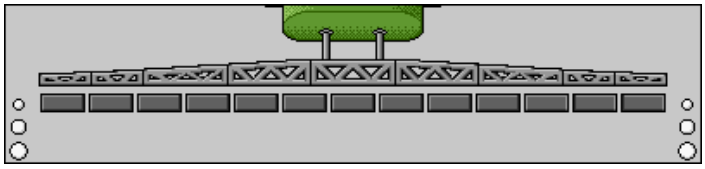
Foam markers produce foam that can be applied by the field sprayer driver on the field at the ends of the boom. The driver can then drive parallel to the foam.

To access the controls:

 >  .

Use the following function keys to operate the function:

Icon	Meaning
	Switches the left foam marker on and off.
	Switches the right foam marker on and off.



Foam marker activated on both sides of the boom

Operating Additional Functions

Additional functions are manufacturer-specific functions. They can only be activated or deactivated by pressing a button.

All functions are in the additional screens.

To access the controls:

 or 

Icon	Function that can be activated or deactivated
	Working light
	Beacon
	Nozzle lighting

Icon	Function that can be activated or deactivated
	Reversing light
	Mixing hopper lighting
	Ring line circulation system
	Cleaning the ring line circulation system
	Tank cleaning
	Permanent tank internal cleaning
	Spray agent pump
	Stirrer
	Low pressure cleaner
	Lift mixing hopper
	Lower mixing hopper
	High pressure cleaner
	Empty fresh water tank
	Fill fresh water tank
	Compressed air flushing
	Filter rinsing
	Left foam marker
	Right foam marker

Icon	Function that can be activated or deactivated
	Four hydraulic functions that can be freely connected
	Drop size increase for AIRTEC
	Drop size decrease for AIRTEC
	Lower the transport hooks for securing the boom
	Raise the support leg
	Lower the support leg
	Spot spraying

Regulating Drop Size with AIRTEC

AIRTEC is a system for regulating the drop size on field sprayers. It adds compressed air to the spray mixture directly in the nozzle at a ratio calculated by the ECU.

Minimum equipment of the field sprayer:

- Nozzles with air support
- Air compressor: on the field sprayer or on the tractor.

The ECU regulates the air pressure such that the drop size always remains constant. Even when the spray pressure changes.

> **NOTE –** For the system to be able to work optimally at the beginning of the field, the speed should be the same when switching off the sprayer at the end of the field as well as when switching on at the beginning of the field, and should correspond as closely as possible to the normal spraying speed.

Airtec Icons

Icon	Meaning
	Current air pressure.
	System is increasing the air pressure.

Icon	Meaning
	System is reducing the air pressure.
	Air compressor is off.
	Air compressor is on.
	Manual mode is activated. The number indicates the drop size.
	Drop size (automatic mode activated).
	Switches between manual and automatic mode.
	Starts and stops the air compressor mounted on the field sprayer. (optional)
	Larger drops.
	Smaller drops.
	Increases the pressure.
	Reduces the pressure.
	Calls up the screen with settings.
	Smaller nozzle.
	Bigger nozzle.

Switching the Air Compressor On and Off

The system works with two types of compressors:

- Compressor on the sprayer - is switched on and off on the ECU using a function key.
- Compressor on the tractor

CAUTION – Liquid in the compressed air system

Damage to the compressed air system

- Only switch the air compressor off when the AIRTEC nozzles are not installed. If AIRTEC nozzles are installed, the air compressor must be activated.

To switch the air compressor on:

1.  - Press.

   This icon appears on the work screen: 

Air compressor will be switched on.

To switch the air compressor off:

1.  - Press.

   This icon appears on the work screen: 

Air compressor will be switched off.

AIRTEC in Automatic Mode

In automatic mode, select the drop size that you want to achieve. The air pressure is adjusted so that this drop size is reached.

Before you begin, make sure:

- AIRTEC nozzles are installed.
- AIRTEC is configured.
- Air compressor is on.

1.  - Setting the drop size.

   The set drop size appears on the work screen: 

AIRTEC in Manual Mode

In manual mode, you control the air pressure manually. The air pressure changes the drop size.

1.  - Set the air pressure.

   The target air pressure appears beside the icon: 

As long as the compressor is regulating the air pressure, + or - appears beside this icon: 

Using ISB Short-Cut Button

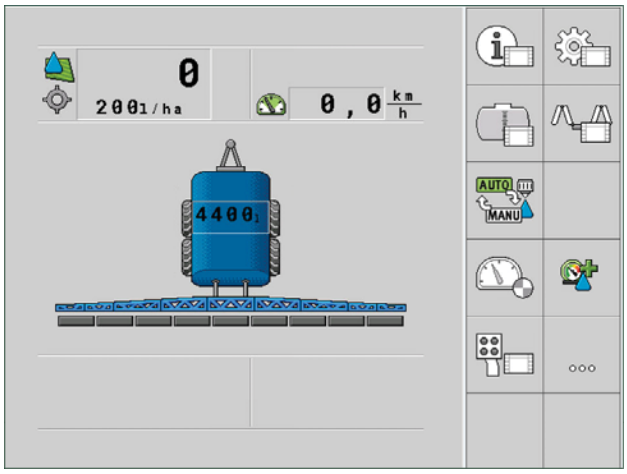
If you are using your terminal with an ISB short-cut button, you can use it to directly terminate various functions of the implement, depending on the configuration.

The following functions can be configured:

- **Sprayer:** All of the spraying functions are stopped.
- **TRAIL-Control:** All TRAIL-Control functions are stopped.
- **DISTANCE-Control:** All DISTANCE-Control functions are stopped.

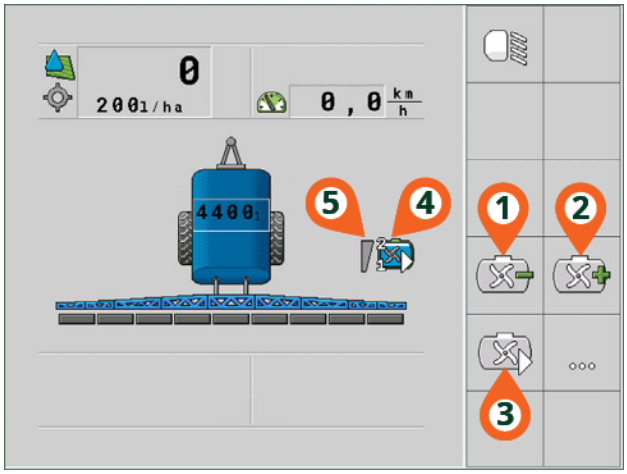
Trailed Implement with Dual Axles

Trailed implements with dual axles can be represented on the display:



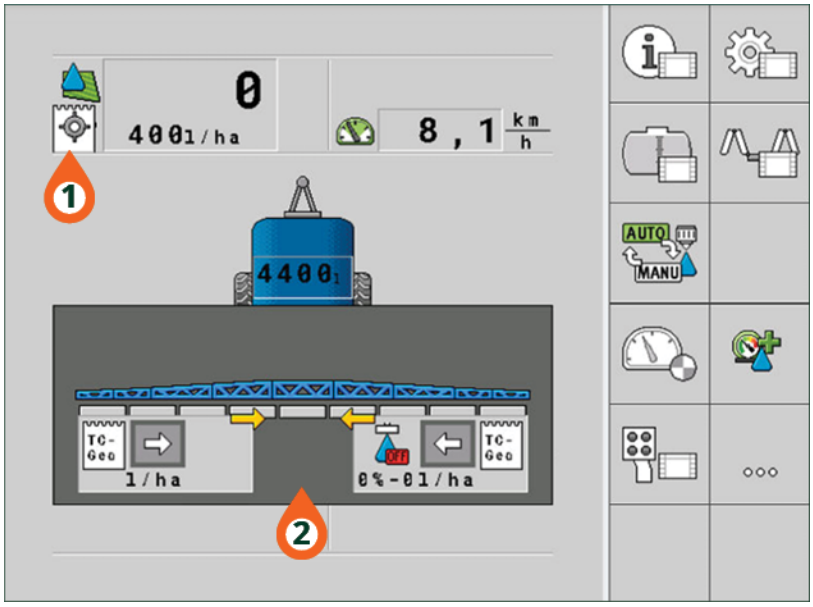
Stirring Control

Added different options and features to control the sprayer stirring phase. Icons and features are directly connected to what's been defined in the sprayer configuration with (Field-IQ ISOBUS Sprayer configurator).

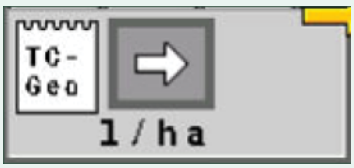


Item	Icon	Description
1		Decrease stirring flow.
2		Increase stirring flow.
3		Toggle: pause, stage
4	  	Status: • Stirring paused • Stirring stage 1 • Stirring both stage 1 plus stage 2
5		Stirring status bar graph Stirring icons include a specific bar graph in order to determine the status of the stirring valve, if the valve includes a proper integrated sensor which can provide a signal to the ECU.

TC-GEO Management



Item	Description
1	Enable TC-GEO pop-up window toggle
2	• Disable/enable rate input • Disable/enable section control

Icon	Meaning
	TC-GEO ACTIVE (Rate applied aligned with TC-GEO input)
	TC-GEO ACTIVE (Applied rate cannot reach TC-GEO input)
	TC-GEO INACTIVE (Rate applied NOT from TC-GEO input)
	Disable Rate input from TC-GEO (Status: ENABLED)
	Enable Rate input from TC-GEO (Status: DISABLED)

Icon	Meaning
	Disable section control with 0% rate from TC-GEO (Status: ENABLED)
	Enable section control with 0% rate from TC-GEO (Status: DISABLED)

7

Configuring the ECU

- Entering Sprayer Parameters
- Configuring the Control Units
- Color Customization
- Calibrating the Flow Meter
- Calibrating an Analog Pressure Sensor
- Selecting and Configuring the Speed Sensor
- Configuring the Nozzles - for sprayers with pressure sensor regulation
- Extremity Nozzles
- Rotational Speed Configuration
- Band Spraying Configuration
- Spot Spraying Configuration
- Configuring AIRTEC
- Entering the Sprayer Geometry
- Configuring the Raven Direct Injection
- Calibrating the Sensors for Reproducing the Boom Slope
- Field Sprayer with Two Circulations and ECUs
- Activating Licenses
- Assigning the Joystick Buttons

If your system includes additional components, such as TRAIL-Control, DISTANCE-Control, AIRTEC, TANK-Control etc., these must also be configured and calibrated.

Entering Sprayer Parameters

Enter the parameters in the following cases:

- Prior to initial start-up.
- When the sprayer parameters change.

To change the value of a parameter:

1. Switch to the “PARAMETERS” screen:

   The “Parameters” screen appears.

   A small rectangular box with a value appears under each parameter.

2. Select this box to change a parameter.

   Screen for data input or keyboard appears.

3. Enter desired value.

   The new value appears on the “Parameters” screen.

The parameters appearing on your screen depend on the type and configuration of your sprayer.

Parameter	Description
Nozzle	Colour of the activated nozzles. The colours are specified by the ISO standard. The nozzles can also be calibrated. This parameter only appears on systems that do not have a flow meter. With these systems, a pressure sensor for determining the application rate is used instead.
Target Rate	The quantity entered as the target rate will be applied when the sprayer is working in automatic mode. You can configure up to three different target rates, between which you can switch on the work screen.
Jump Start Time	With this parameter, you can simulate the speed after switching on the sprayer (at least one section will be switched on). The set simulated speed is then used for the entered “Jump start” duration before switching to the regular speed. If the simulated speed is **0**, this parameter is deactivated. With the “Jump start” duration, the application rate is increased when starting off to prevent insufficient application rates at the beginning of the field.
Working Width	Working width of sprayer.
Wheel Impulses	Number of impulses the wheel sensor sends to the ECU on a 100m distance. Used to calculate the speed. The number is determined by the wheel sensor calibration.
Circulation Type	“Non constant pressure” - For manifolds without the “Constant pressure” function. “Constant pressure” - For manifolds with the “Constant pressure” function.

Parameter	Description
Minimum Pressure	This setting defines the minimum pressure up to which the spraying pressure is optimal. • If the spraying pressure drops below the defined pressure, an alarm is issued. • If no pressure sensor is installed on your sprayer, you must enter "0" as the value. • If the "Pressure limit" parameter is configured on your sprayer, the minimum pressure set there will not be undercut while spraying.
Maximum Pressure	This setting defines the maximum pressure up to which the spraying pressure is optimal. • If the spraying pressure increase beyond the defined pressure, an alarm is issued. • If no pressure sensor is installed on your sprayer, you must enter "0" as the value. • If the "Pressure limit" parameter is configured on your sprayer, the maximum pressure set there will not be exceeded while spraying.
Sprayer Off Below	(Minimum working speed) If the sprayer speed drops below the minimum working speed, the following happens: • Application will be switched off automatically. • The work screen displays the icon  When the value is set to **0**, this function is deactivated.
Regulation off Below	If the sprayer falls below this speed, the following happens: • The flow will no longer be regulated and the flow remains unchanged. • Manual mode will be activated. • The work screen displays the icon  When the value is set to **0**, this function is deactivated. This parameter must be higher or the same as the "Sprayer off below" parameter.
Tank Size	Size of the tank for the spray liquid.
Tank Level Alarm	When the tank content falls below this value, an alarm message appears on the screen.
Impulses Main Flow	Number of impulses the flow meter sends to the ECU per one liter of liquid. Used to calculate the application rate. The number is determined by the flow meter calibration.
Stirring off Below	With this parameter, you can set the fill level below which the stirrer should be switched off. The implement manufacturer (not the user!) can also define whether the stirrer should be switched on automatically when the ECU is started.

Parameter	Description
Regulation Factor	In Automatic mode, the spray pressure of the nozzles is adapted to the current speed of the sprayer. The adjustment should ensure that the volume of spray liquid that is applied is exactly what you defined in the target rate. The regulation factor plays a decisive role here. The regulation factor adjusts the reaction speed of the regulation: • The higher the regulation factor, the faster the spray pressure is adjusted. • The lower the regulation factor, the more slowly the spray pressure is adjusted. When setting the regulation factor, you can pay attention to the following: • If, during movement at constant speed, the current application volume jumps around the target rate, you need to reduce the regulation factor. • If, when speed is changing, the application volume does not adjust to the rate quickly enough, you need to increase the regulation factor. For the regulation factor, you can also define permissible deviations.  - Switch to the “Spray regulation” screen. There, you will find the “Large deviation” and “Smallest deviation” parameters that you can configure for the regulation factor. The “Large deviation” controls the regulation factor if there is a large deviation between the target and the current value and the “Smallest deviation” controls the regulation factor if there is a small deviation between the target and actual value.
Maximum Wind Speed	Wind sensor must be installed. If the maximum wind speed is exceeded, an alarm will be triggered.
Extremity Nozzles Set	With this parameter you can specify which extremity nozzles are mounted on the boom.
Section Control	Manner in which the sections are switched on and off. “Sequential mode” is intended for normal spraying work. It is also suitable for spraying on wedge-shaped areas and strips that are narrower than the working width of the sprayer.
Filling Mode	With this parameter, you can define whether you want to use TANK-Control for filling. • “Manual” - For sprayers without TANK-Control. • “TANK-Control” - Activates TANK-Control.
Boost Pressure Target Rate	Pressure setpoint when a booster pump is being used.

Configuring the Control Units

The joystick and S-Box control units are configured on a screen.

1. Switch to the “Parameters” screen:

   The “AUX controls” screen appears.

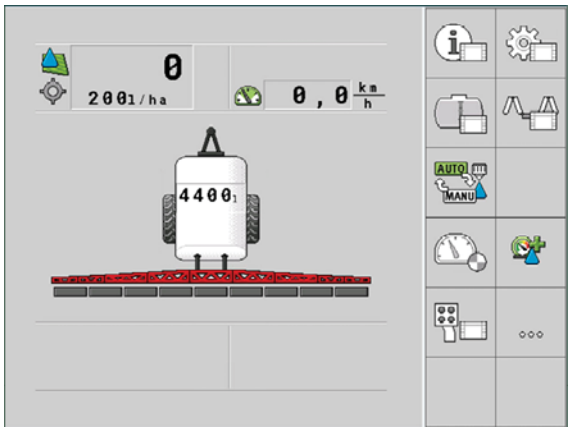
2. Configure parameter.

Parameter	Description
Joystick	“Without joystick” - A joystick is not connected. All functions will be controlled using the terminal or an PTx S-Box. "ME joystick“ - PTx joystick is being used. “Ignore ME joystick” - The joystick should be ignored. Setting for the auxiliary ECU for systems with two ECUs. “ME joyst.: only on/off” - Setting for the auxiliary ECU, if on/off (section main switch) is deactivated on the S-Box.
ME S-Box	“Without ME S-Box” - An S-Box is not connected. “ME S-Box” - Default setting when the S-Box is connected. “Ignore ME S-Box” - For systems with two ECUs, this is the setting for the first ECU. The signals from the PTx S-Box are rejected because this ECU should be operated with the joystick. “ME S-Box without On/Off” - Setting for the second ECU.
Joystick Assistant	☐ - Preview mode deactivated. ☑ - Preview mode activated Beside this, you can set the display time for the button assignment.

Color Customization

Using the Field-IQ ISOBUS Configurator, you can adjust the color of the sprayer's:

- Boom
- Chassis
- Tank



NOTE – Color customization is available ***only*** if it is enabled via Field-IQ ISOBUS Configurator.

Calibrating the Flow Meter

When should you calibrate?

Because the number of impulses per liter can change during the lifespan of a flow meter, calibration must be carried out in the following cases:

- Prior to initial start-up.
- At the start of each season.
- When you detect deviations between the quantity actually sprayed and the quantity displayed.
- When you have replaced or repaired the flow meter.

Methods

There are two ways you can calibrate the flow meter:

- The tank method – it is time-consuming, but precise.
- The nozzle method – it is not as precise as the tank method, but is less time-consuming.

CAUTION – Imprecise calibration

If the calibration is imprecise, the calculations will be very inaccurate and the application imprecise.

- Calibrate the flow meter very precisely.

Calibrating the Flow Meter with the Tank Method

With the tank method, a large quantity of water will be applied from the tank over a specific time.

The flow meter measures the impulses during this time.

After the application, you must enter the quantity of water that has been applied.

The computer calculates the number of impulses per liter.

DANGER! SPRAY LIQUID OR SPRAY LIQUID RESIDUES

DANGER OF POISONING OR CHEMICAL BURNING

- **CLEAN THE SPRAY LIQUID TANK THOROUGHLY PRIOR TO CALIBRATION. THE SPRAYER MUST BE FREE OF SPRAY LIQUIDS OR SPRAY LIQUID RESIDUES.**
- **USE ONLY CLEAR WATER DURING CALIBRATION.**
- **WEAR REQUIRED PROTECTIVE EQUIPMENT.**

Before you begin, make sure:

- All sections are selected.
- Manual mode is activated.

  (the 

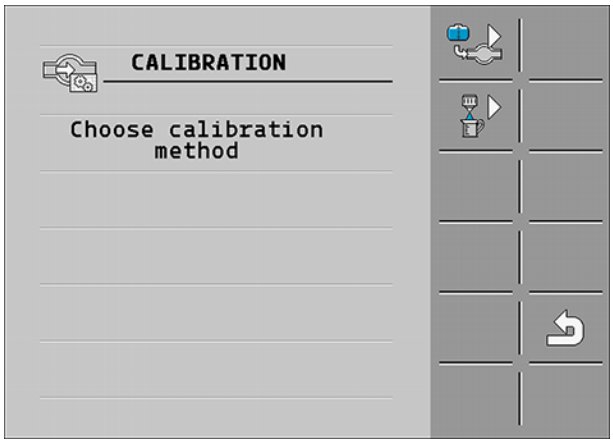
 icon appears in the “Spray data” area of the work screen).
- The tank is filled with clear water. For this, you need several hundred liters of clear water.
- You have the option of weighing the entire trailer or measuring the volume of water applied with another method.
- Pump is switched on.

1. Ensure that all prerequisites have been fulfilled.
2. Weigh the tank.

3. Switch to the “CALIBRATION” screen:

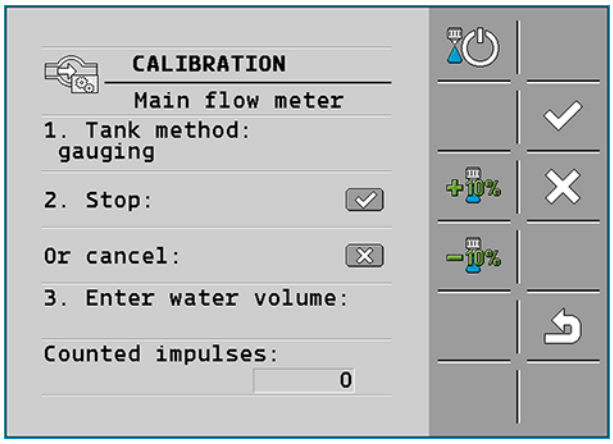
   

   The following screen appears:

4.  - Select the tank method.

   The following screen appears:

5.  - Start application

   During application, the number of impulses will be counted on the “CALIBRATION – Main flow meter” screen.

6. Apply a few hundred litres. Do not fully empty the tank. This prevents air bubbles from forming and distorting the results.

7.  - Stop application.

   The application will be stopped.

   No impulses are counted on the display.

8.  - Stop calibration.

   Weigh the tank.

   Enter the applied quantity in litres on the “Enter water volume” line.

9.  - Exit the screen.

You have calibrated the flow meter with the tank method.

Calibrating the Flow Meter with the Nozzle Method

When calibrating the flow meter using the nozzle method, you determine the average quantity of the liquid applied through a nozzle in a specific time.

When calibrating using this method, you must apply clean water over the entire working width and measure the applied quantity on different nozzles using a measuring cup.

The flow meter measures the impulses during this time.

When you have finished the application, you must enter how much water was applied on average by one nozzle in one minute.

The computer calculates the number of impulses per liter.

DANGER! SPRAY LIQUID OR SPRAY LIQUID RESIDUES

DANGER OF POISONING OR CHEMICAL BURNING

- **CLEAN THE SPRAY LIQUID TANK THOROUGHLY PRIOR TO CALIBRATION. THE SPRAYER MUST BE FREE OF SPRAY LIQUIDS OR SPRAY LIQUID RESIDUES.**
- **USE ONLY CLEAR WATER DURING CALIBRATION.**
- **WEAR REQUIRED PROTECTIVE EQUIPMENT.**

Before you begin, make sure:

- Manual mode is activated.

  (The 

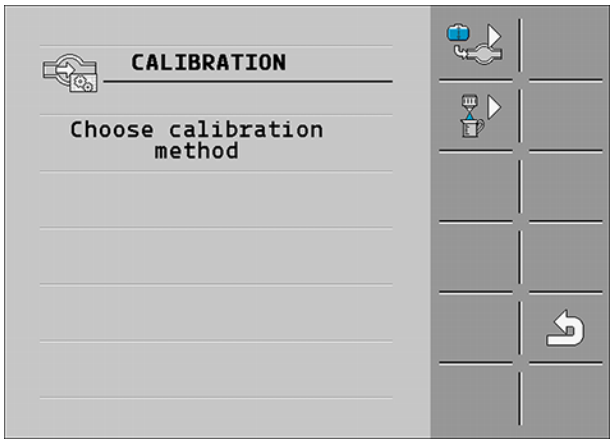
 icon appears in the “Spray data” area of the work screen.)

- You have prepared a measuring cup to measure the applied quantity.
- You have prepared a stopwatch to be able to count one minute precisely.
- All of the sections are preselected, and the sprayer can apply over the entire working width.
- The tank is filled with clear water.
- The set working width is correct.
- The number of nozzles per section and the number of sections is entered correctly.

1. Ensure that all prerequisites have been fulfilled.
2. Switch to the “CALIBRATION” screen:

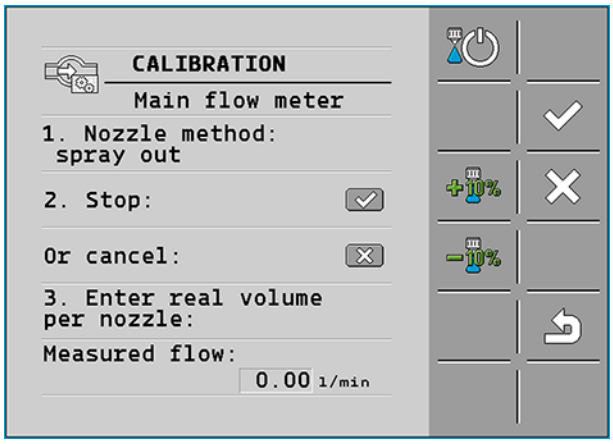
   

   The following screen appears:

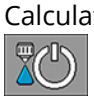
   

3.  - Select the nozzle method.

   The following screen appears:

   The current flow appears on the “Measured flow” line.

4.  - Start application
5. Go to one of the nozzles and carefully collect the water sprayed for 60 seconds by using the prepared measuring cup.
6. Write down the applied water volume.
7. Repeat the last two steps on several nozzles.
8. Calculate and write down an average of several measurements.
9.  - Stop application.

   The application will be stopped.

10.  - Stop calibration.

    On the "3. Enter real volume per nozzle ” line, an input box appears.

    Enter the average applied volume in litres in this box.

11.  - Exit the screen.

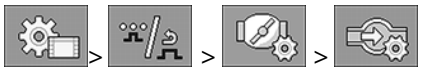
    The value of the “Impulses main flow” parameter will be updated.

You have calibrated the flow meter with the nozzle method.

Manually Entering the Number of Impulses per Liter for the Flow Meter

If you know the precise number of impulses per liter for the flow meter, you can enter this value manually.

1. Switch to the “FLOW METER” screen:

2. Enter number of impulses per liter on the “Impulses main flow” line.

Combining the Flow Meter with the Pressure Sensor

If a pressure sensor is installed on the sprayer, you can combine the regulation via the flow meter and the pressure sensor. This enables more stable regulation even at low flow rates.

1. Switch to the “FLOW METER” screen:

2. Activate the “Combined flow/pressure regulation” parameter.
3. Configure parameter.

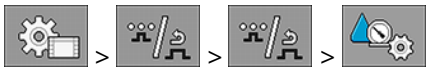
Parameter	Description
Flow Tolerance	Enter a percent value at which the system should switch to pressure regulation. If the difference between the calculated flow from the pressure sensor and the measured flow from the flow meter is greater than the entered value, the system switches to pressure control.
Threshold Flow	Enter the minimum flow that must be reached for flow regulation to be used. If the flow rate is below the entered value, the system switches to pressure control.

Calibrating an Analog Pressure Sensor

If an analogue pressure sensor is installed on the sprayer, you have to calibrate it before initial use. Calibration determines how high the respective current is when there is no pressure and at maximum pressure.

Before you begin, make sure you have a reference sensor at hand to measure the pressure.

1. Switch to the “PRESSURE MEASUREMENT” screen.

   The “PRESSURE MEASUREMENT” screen appears.

   The currently measured pressure appears.

2.  - Open the “CALIBRATION” screen.
3. Use the reference sensor to verify the pressure of 0 bar.
4.  - Open the calibration for the zero value.
5. Switch off the implement to put it in a depressurized state.
6.  - Start the calibration for the zero value.

   The current is being measured.

7. Using the pressure regulator, set the maximum system pressure and measure it with an external reference pressure sensor.
8. Enter the maximum pressure of the flow meter in the “Maximum pressure” parameter.
9.  - Open the calibration for the maximum value.
10.  - Start the calibration for the maximum value.

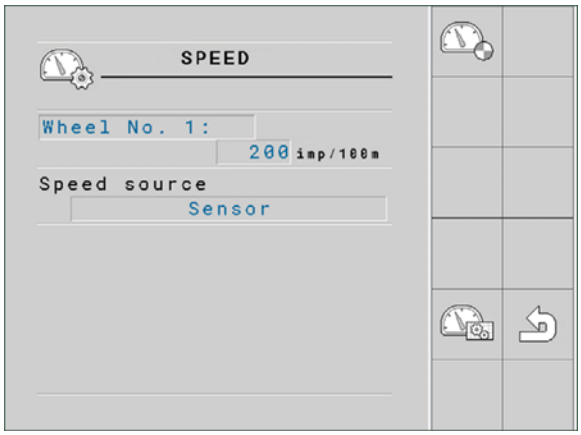
    The current is being measured.

11. You have completed the calibration of the analogue pressure sensor.

Selecting and Configuring the Speed Sensor

You must enter the source from which the ECU shall obtain the current speed.

The configuration procedure can differ depending on the speed source.



Selecting the Speed Source

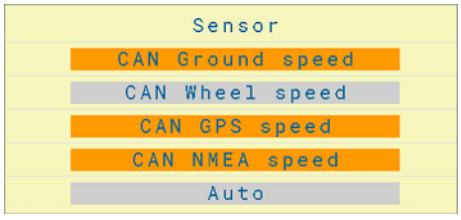
Supported speed sources:

- **Sensor** – Sensors that are installed on the implement and connected to the ECU:
  - Examples: Wheel sensor, radar sensor, impulse-transmitting GPS speed sensor
  - Configuration: Configure the number of impulses per 100 meters.
- **CAN Ground Speed** - Ground speed provided by tractor via ISOBUS line.
  - Example: Radar sensor
- **CAN Wheel Speed** - Tractor wheel speed speed is provided via ISOBUS line.
  - Example: Tractor wheel speed
- **CAN GPS speed** - Speed detected by GNSS system is provided via ISOBUS line.
  - Example: GNSS receiver
- **CAN NMEA Speed** - Speed detected by an unspecified source is provided in NMEA2000 format via CAN line.
  - Examples: Wheel speed, GNSS receiver, signal socket, etc.

> **NOTE –** For all CAN speed inputs: For systems without option of selecting the sensor input, the "Wheel impulses" parameter must be set to **0**.

- **Auto** – Some systems enable automatic detection of the speed source.
  - Mode of operation: If a speed signal is detected on the ISOBUS, this speed will be used as a basis. In the case of signal failure, the ECU will take the impulses from the sensor connected to the ECU as a basis for determining the speed.
  - Configuration: For systems that have two sensor types, it is recommended to calibrate the sensor that is connected to the ECU. In other cases, set the "Wheel Impulses" parameter to 0.

Speed sources highlighted in **orange** means that the speed source is not detected (CAN or ext. input). Speed sources highlighted in gray mean that the speed source is available (CAN or ext. input).



Procedure 1

To configure the speed source:

1. On the work screen, press the following keys successively:

The “Speed” screen appears.

2. Configure the “Speed source” parameter.

Procedure 2

If the “Speed source” parameter does not appear on the “Speed” screen, and the speed signal should be received through the ISOBUS, proceed as follows:

NOTE – The speed signal can be received through the ISOBUS.

1. Switch to the “PARAMETERS” screen:

2. Set the “Wheel impulses” parameter to “0”.

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.

If you know the number of impulses for the wheel sensor, you can also enter this number manually.

You can enter different pulse values for up to three different wheels.

Before you begin, make sure:

- Wheel sensor, radar sensor or GPS speed sensor is installed on the implement.
- A distance of 100m has been measured and marked. The distance must correspond to the field conditions. It should therefore lead over a meadow or a field.
- The tractor with connected implement is ready for a 100m drive and is at the start of the marked distance.

1. Ensure that all prerequisites have been fulfilled.
2. Switch to the “CALIBRATION – wheel impulses” screen:

3.  - Start calibration.

   The following function icons appear:

    - Stop calibration.

    - Abort calibration.

4. Drive the previously measured 100m distance and stop at the end.

   During the drive, the currently determined impulses are displayed.

5.  - Stop calibration.
6.  - Exit the screen.

   The number of impulses appears on the “Wheel impulses” line

Configuring the Reverse Driving Sensor

If the trailed implement or the tractor sends a reverse driving signal through the ISOBUS, the ECU can use this signal to adjust its regulating behavior when driving in reverse.

You can find more information in this section: Configuring automatisms when driving in reverse

Signal Sources

The following signal sources are possible:

- “None” - The ECU should not expect a reverse driving signal. Even if a reverse driving signal is transmitted through the ISOBUS, the ECU will ignore the signal.
- “ISOBUS” - The reverse driving signal is sent by the tractor or a different ECU through the ISOBUS.
- “Sensor” - A reverse driving sensor is connected to the junction box or cable harness of the ECU.

Procedure

To select the reverse signal source:

1. Switch to the “Speed” screen:

2. Select the box below the “Reverse drive sensor” parameter.

   The available signal sources appear. See the description at the beginning of this section.

3. Select the signal source.
4. Restart the ECU.

“Simulated Speed” Function

The simulated speed function is only used during tests and when looking for faults. It simulates the movement of the implement when the implement is at a standstill.

By activating the “Simulated speed” function, it is possible for customer service employees to check the correct functioning of a sensor.

By default, the value is set at **0 km/h** and the function is switched **off**.

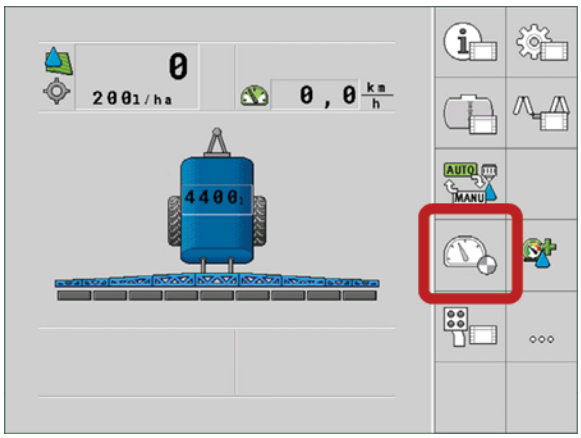
After restarting the computer, the function is always deactivated.

The most recently set value is saved and used for the next activation.

1. Switch to the “Speed” screen:

    >

2.  - Activate the simulated speed. By pressing again you can deactivate the function.

3. The “Simulated speed” line appears.
4. Enter the speed to be simulated on the “Simulated speed” line.
5.  - Exit the screen.
6. The set speed and the flashing  icon appears on the work screen.

Configuring Sections

Entering the Number of Nozzles per Section

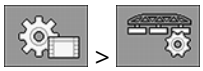
You must enter the number of nozzles installed on each section.

When to enter?

- Prior to initial start-up.
- If the number of nozzles in a section changes.

Procedure

1. Switch to the “Boom” screen:

    >

   The “Boom” screen appears.

   Here, you can see the set working width, the number of sections and the number of nozzles. The two last values may not be changed.

2.  - Press.

   The “NUMB. OF NOZZLES” screen appears.

3. Here, you can enter the number of nozzles for each section. Multiple nozzle holders count as one nozzle in this case.

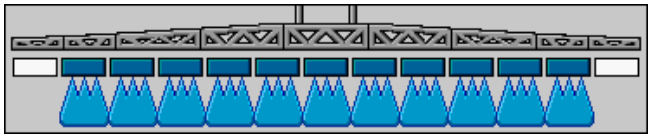
   With each change, the number of nozzles changes on the “BOOM” screen.

Switching Sections Off Permanently

You can permanently switch off any section. This is useful, for example, if the tramlines on the field are designed for a smaller field sprayer than yours.

Switching off the outer sections has the following effects:

- With TRACK-Leader: The newly calculated working width will not be taken into account for the calculation of the headland width.
- With SECTION-Control: After switching off the outer sections, you will need to change the “Line spacing” parameter so that the distance between the guidance lines matches the actual working width. You cannot change the “Working width” parameter.
- The actual working width changes. However, as the sprayer has not changed:
  - Do **not** change the “Working width” parameter.
  - Do **not** change the sprayer geometry.



Permanently switched off sections are marked in white on the work screen

1. Switch to the “Boom” screen:

    > 

   The “Boom” screen appears.

2.  - Press.

   The “Sections” screen appears.

   For each section, you can see one of the following icons:

    - Section activated

    - Section deactivated.

3. For each section, you can select and change this icon.

Permanently Switching Off a Section using a Sensor

If a sensor for monitoring the unfolding of boom sections is installed on the boom, sections can be automatically permanently switched off.

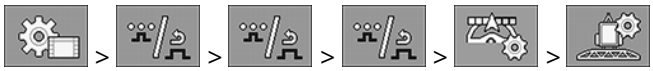
This enables the use of a field sprayer with multiple working widths without having to change the configuration each time.

System Delay When Switching the Sections

For SECTION-Control to be able to open and close the section valves precisely, you must determine how many milliseconds are required for the liquid to travel from the valve to the nozzle. Afterwards, the ECU will switch the valves earlier or later accordingly.

Before you begin, make sure you are using the automatic SECTION-Control.

1. Read the operating instructions for the TRACK-Leader app to find out how to determine the delay times.
2. Determine the delay times.
3. Open the ECU application.
4. On the work screen, press:

   The “SECTION-Control” screen appears:
5. Enter the determined delay times under “Delay on start” and “Delay on stop”.

Parameter	Description
Delay on Start	Time that elapses between the opening of a section valve and the emergence of liquid out of the nozzles. Rule of thumb: • If the sprayer switches too late, increase the value of the parameter. • If the sprayer switches too early, decrease the value of the parameter.
Delay on Stop	Time during which the nozzles continue spraying after the valve has been closed. Rule of thumb: • If the sprayer switches too late, increase the value of the parameter. • If the sprayer switches too early, decrease the value of the parameter.

Changing the Display of Areas on the Terminal

You can make different settings to change the display of the areas on the terminal, e.g. for the TRACK-Leader application.

1. On the work screen, press:

   
2. Configure the “Zero target rate areas” parameter. The following configuration options are available to you:

Sections off	Applied on the map	Function
deactivated	---	The sections are not closed when the application rate is 0 l/ha. Everything is recorded in the process.
activated	deactivated	The sections are closed when the application rate is 0 l/ha. Only the applied areas are recorded.
activated	activated	The sections are closed when the application rate is 0 l/ha. Both the applied areas and areas where nothing was applied will be recorded. This is the standard setting when using SECTION-Control.

Configuring the Nozzles - for sprayers with pressure sensor regulation

By configuring the nozzle type, the ECU can calculate the current application rate based on the measured spray pressure.

You only have to configure the nozzles if a pressure sensor is installed on the sprayer.

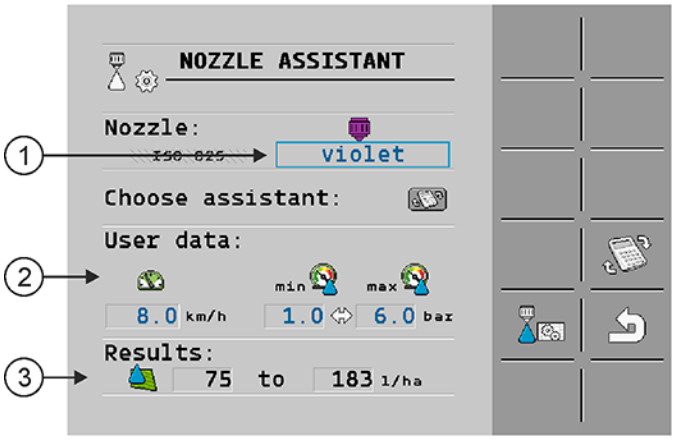
If no pressure sensor is installed on the sprayer and the application rate is regulated only through the flow rate, then you do not need to configure the nozzles.

Nozzle Assistant

The nozzle assistant serves the following purposes:

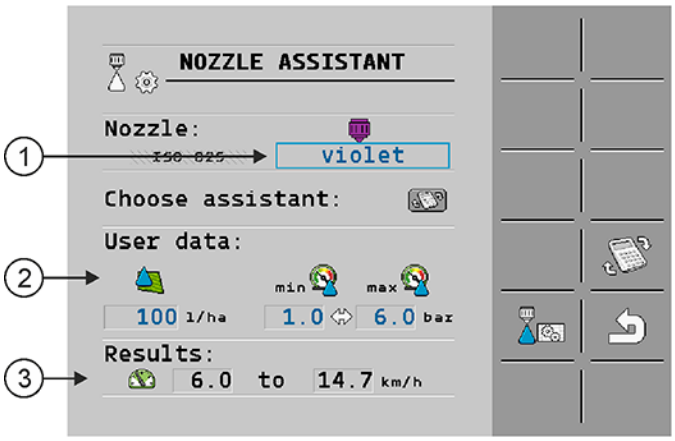
- To show how the nozzle type affects the possible application rates and speeds.
- To help with the correct selection of the installed nozzle type.
- To change the target rate.

Function icon	Meaning
	Changes the calculated data



Determination of possible application rates

Item	Meaning
1	Selected nozzle
2	Here, you can enter: • The intended working speed • The optimal pressure for the nozzle
3	Here, you can see which application rates are possible with this nozzle at the set working speed.



Determination of the fitting nozzles

Item	Meaning
1	Selected nozzle
2	Here, you can enter: • The intended application rate This is adopted directly from the “Rate” parameter. • The optimal pressure for the nozzle.
3	Here, you can see the speed at which this application rate can be reached.

To calculate the application rate that can be reached with a nozzle at a given pressure:

1. Switch to the “Nozzle assistant” screen:

2.  - Press for the  speed icon to appear in the “User data” area.
3. Select the box with the nozzle color to select a nozzle.

   The list contains all standard nozzles and four positions for the configuration of custom nozzles.

4. Enter the intended working speed in the  box.

5. In the 

area, set the optimal pressure range that enables the intended drop size with the selected nozzle. This value can be found on the nozzle data sheet.

> **NOTE –** The pressure range set here will not be adopted for the application. During operation, you must ensure for yourself that the sprayer is working in the intended pressure range.

In the “Results” area, the possible application rates appear.

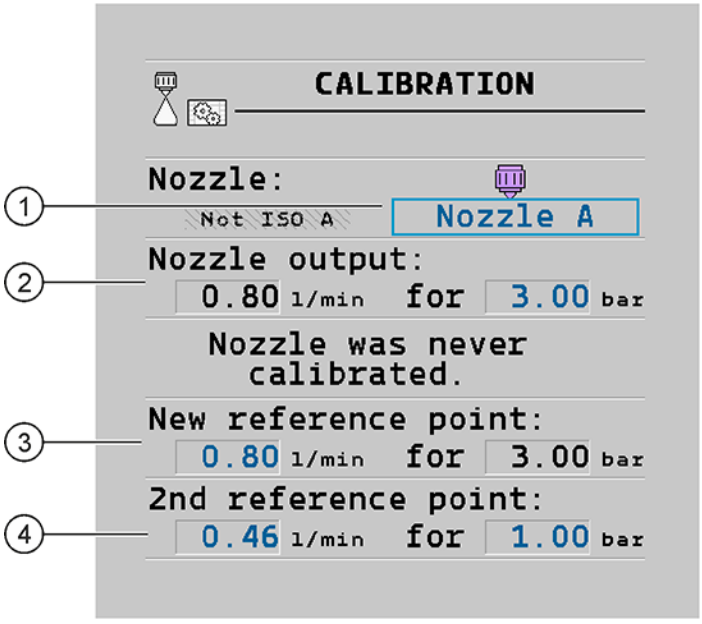
If the calculated application rate is too high or too low:

- Change the working speed.
- Install different nozzles. Perform the calculation for the new nozzle color.

The calculation can be performed based on the intended application rate:

1.  - Press for the  icon to appear in the “User data” area.
2. Enter the intended application rate in the  field.
3. Enter the pressure range for the nozzle color.
4. In the “Results” area, you can see the speed at which the application rate can be achieved.

Calibrate the Nozzles



“Calibration” screen

Item	Meaning	Item	Meaning
1	Selected nozzle	3	Nozzle output at 3 bar - Result of the calibration

Item	Meaning	Item	Meaning
2	Current nozzle output. When you change the pressure, the newly calculated nozzle output appears.	4	For non-standard nozzles, the calibration must be repeated at a different pressure. This pressure should be about as high as the intended working pressure.

DANGER! SPRAY LIQUID OR SPRAY LIQUID RESIDUES

DANGER OF POISONING OR CHEMICAL BURNING

- **CLEAN THE SPRAY LIQUID TANK THOROUGHLY PRIOR TO CALIBRATION. THE SPRAYER MUST BE FREE OF SPRAY LIQUIDS OR SPRAY LIQUID RESIDUES.**
- **USE ONLY CLEAR WATER DURING CALIBRATION.**
- **WEAR REQUIRED PROTECTIVE EQUIPMENT.**

Before you begin to calibrate a standard nozzle, make sure:

- The tank is filled with clear water.
- There are no spray liquid residues in the tank or the pipelines.

1.  - On the work screen, switch the application mode to manual.
2.  - Start application
3.  and  - Set the spray pressure to 3 bar.
4. Using a measuring cup, collect the water from several nozzles for one minute each.
5. Calculate average application rate.
6.  - Stop application.
7.  - Activate automatic mode.
8. Switch to the “Calibration” screen:

    >  > 

9. On the “Nozzle” line – select nozzle for calibration. Standard nozzles are referred to by their colors.
10. In the box below the “New reference point” line, enter the calculated average quantity in l/min.
11. For undefined nozzles, you must also enter the nozzle's minimum output in the “2nd reference point” parameter. To do so, you must repeat the procedure at a different pressure.

    You have calibrated the selected nozzle.

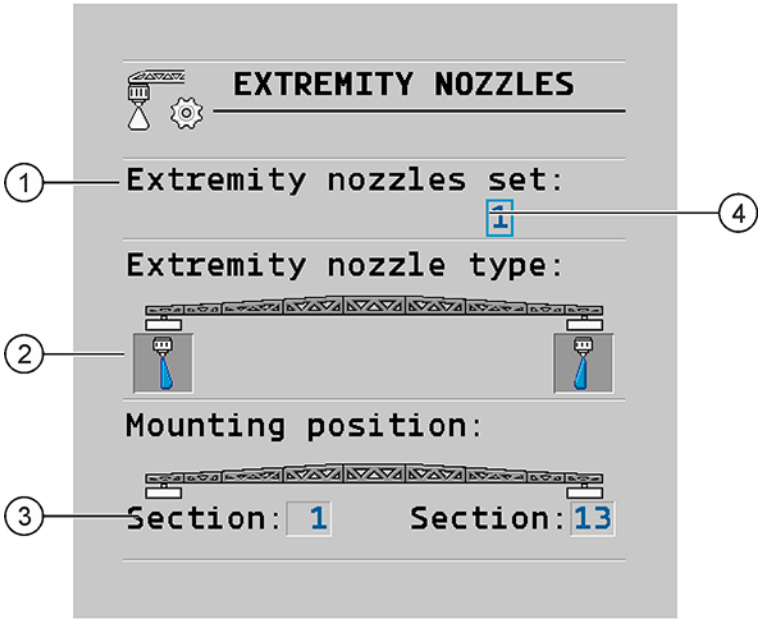
Extremity Nozzles

Extremity nozzles are nozzles with a different spray pattern from the other nozzles on the boom. They can either restrict the spray width, in which case they are used for spraying field edges (corner nozzles), or increase the spray width of a section (wide area nozzles).

Before using extremity nozzles, note the following:

- Wide area nozzles or corner nozzles can be installed as extremity nozzles. You can choose the icon used to represent the extremity nozzle on the work screen.
- Extremity nozzles can be installed at the outer end of any section.
- The width of the spray cone is irrelevant for the ISOBUS ECU. It is never detected and is not taken into account in the following calculations:
  - when calculating the working width,
  - when calculating the applied quantity,
  - when calculating the tank content.
- The TRACK-Leader and SECTION-Control applications from PTx Trimble do not take account of the width of the spray cone from the extremity nozzles; they treat them as normal nozzles.. If you are using these applications, you may have to adjust the working width manually.

Configuring the Extremity Nozzles



Screen for configuring the extremity nozzles

Item	Meaning	Item	Meaning
1	“Extremity nozzles set” parameter	3	Installation site for the left and right extremity nozzle
2	Extremity nozzles left and right	4	Currently selected extremity nozzle pair

“Extremity Nozzles Set” Parameter

You can define up to three sets of extremity nozzles via the “Extremity nozzles set” parameter. For each set, you can define the installation site and the relevant work screen icon.

Icon	Meaning
	No nozzle

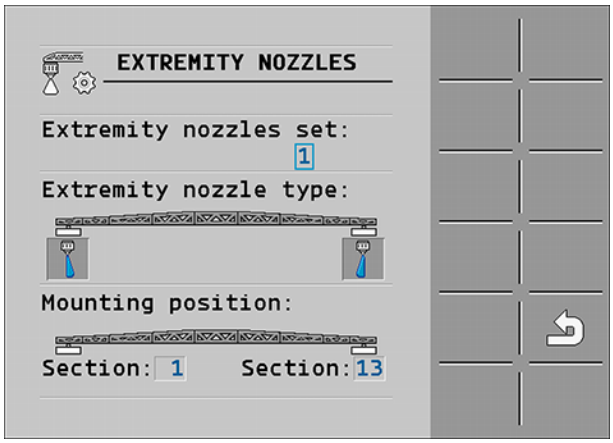
Icon	Meaning
	Corner nozzle
	Wide area nozzle

To configure the extrem. nozzles modes:

1. Call up the screen with the extremity nozzle settings:

   The following screen appears:

2. On the “Extremity nozzles set” line, enter the set of extremity nozzles for which you want to enter settings. For example “2”:

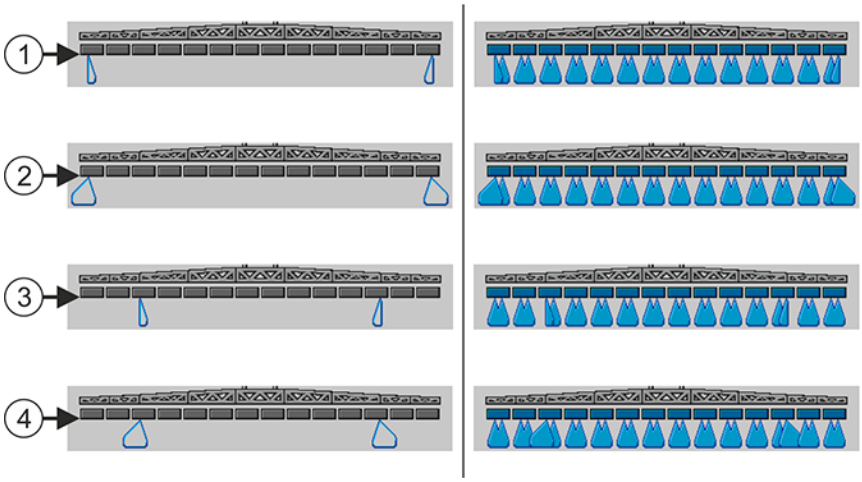
   The saved settings appear on the screen.

3. Select one of the nozzle icons under the boom icon.
4. Select the type of extremity nozzle required.

   An alarm message appears. This message informs you that the ECU must be restarted so that the changes can be applied. Do not restart the ECU yet; wait until you have entered all the settings.

5. In the “Installation site” area, enter the section on which the extremity nozzles are installed.
6. Restart the ECU.

Operating the Extremity Nozzles



Extremity nozzles on the work screen: Left: before application; Right: during application.

Item	Meaning	Item	Meaning
1	Corner nozzles on sections 1 and 14	**3**	Corner nozzles on sections 3 and 12
2	Wide area nozzles on sections 1 and 14	**4**	Wide area nozzles on sections 3 and 12

Icon	Meaning
	Activate and deactivate corner nozzles on left and right
	Activate and deactivate wide area nozzles on left and right

To operate the extremity nozzles:

1. Stop application.
2. Change to the additional screens:

   Function icons used to operate the extremity nozzles should appear on the screen.
3. Press the function keys for the extremity nozzles to show them on the screen.

   Spray cones for the extremity nozzles appear below the boom icon. The icons are only used to show the extremity nozzle positions.

Rotational Speed Configuration

If the rotational speed of the fan or the pump is higher than the maximum permitted rotational speed, an error message appears. This allows drivers to have better control of their work and prevent the fan or the pump from being damaged when the speed is too high.

Different rotational speeds can be configured for the fan or the pump for different types of work. A different icon is shown depending on whether you are configuring a fan or a pump.

The available rotational speeds can be found in the following table:

Icon	Meaning
	Default rotational speed 1
	Default rotational speed 2
	Rotational speed when working on the headlands
	Rotational speed when cleaning
	Rotational speed when filling
	Rotational speed in manual mode

1. Switch to the “RPM control” screen:

    >  > 

2. Enter the rotational speed for the desired types of work.
3. Activate the rotational speed for the desired types of work.
4.  - Configure other rotational speed parameters.

Parameter	Description
Acceleration	The percentage acceleration of the rotational speed.
Regulation Factor	The regulation factor adjusts the rotational speed of the fan or the pump: • The higher the regulation factor, the faster the rotational speed is adjusted. • The lower the regulation factor, the more slowly the rotational speed is adjusted.
Max. Speed	Maximum rotational speed of the fan or the pump.

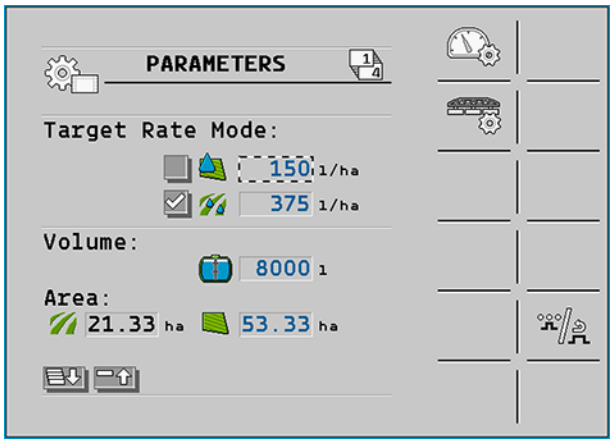
Band Spraying Configuration

When you work with band spraying, the target rate can be converted to the area ratio. The worked area is then only a percentage of the area that is covered with the tractor. Only the respective seed bands are still sprayed.

1. Switch to the “PARAMETERS” screen:

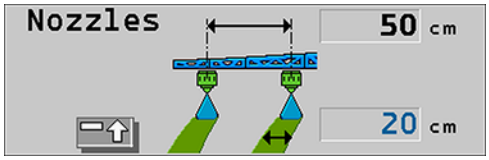
   

The following screen appears:



2.  - Activate band spraying mode.
3.  - Call up the configuration for the width of the individual bands.

   The following depiction appears:

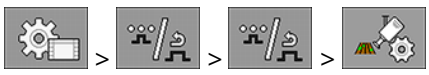
   You will see the set nozzle spacing.
4. Enter the width of the individual bands as shown in the figure.
5.  - Go to the previous screen.
6. You will now see the  - Total area and  - Area for application. The set target rate of 375 l/ha will therefore now be based on an area of 21.33 ha.

Spot Spraying Configuration

Spot spraying is camera-supported spraying where only the desired target surfaces are treated. Spot spraying can only be used in conjunction with the EDS system.

Pressure-based regulation is used for operation. Spot spraying enables correct control of the flow with very rapid nozzle switching.

1. Go to the “Spot Spraying” screen:

   The “Spot Spraying” screen appears.
2. Configure parameter.

Parameter	Description
Resolution	If “Triple” or “Quintuple” is activated, the nozzle is opened as soon as the camera detects a corresponding area.
VT Update Rate	This parameter defines how often display instructions are sent to the terminal. The lower the value, the fewer display instructions are sent. The default value should be set to “5”.

Configuring AIRTEC

For the AIRTEC configuration, you only have to select the nozzle number for the mounted nozzle.

> CAUTION – **Wrong nozzle number**
>
> Damage to the plants
>
> Always enter the correct nozzle number.

1. Switch to the “AIRTEC” screen:

    >

2.  - Set the nozzle number.

Entering the Sprayer Geometry

Sprayer geometry is a set of parameters that describe the dimensions of your implement.

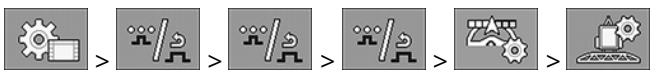
Setting the sprayer geometry lets the software know exactly how long and how wide the sprayer is and where the individual sections are located.

Sprayer Geometry Parameters

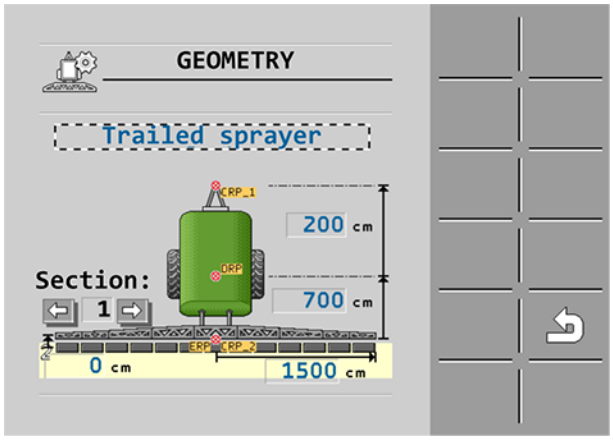
When setting the sprayer geometry, you must measure the following distances:

- **CRP** – Attachment point, or point from which the measurements are taken. For self-propelled machines, it can be the position of the GPS receiver, and for mounted and trailed sprayers, the mounting or attachment point.
- **DRP** – Pivot point of the sprayer, or point at which there is soil contact.
- **ERP** – Position of the nozzles.

1. Switch to the “Geometry” screen:

   The following screen appears:



2. Select the sprayer type in the topmost box.

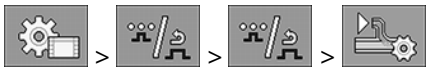
   A diagram of the sprayer appears.

3. Measure the distances shown in the figure.
4. Enter the distances measured.

Configuring the Raven Direct Injection

If your sprayer is equipped with a direct injection manufactured by Raven, you have to configure it before using it for the first time.

1. Switch to the “INJECTION” screen:

2. Activate the units that you want to use.
3.  - Switch to the calibration and diagnostics screen.
4. Assign the individual units to each “ECU number”.

   You have configured the Raven direct injection.

   Depending on the status, the following icons can appear:

Status of the Raven Direct Injection

Display Screen		Meaning
Calibration	Work	
		The ECU did not recognise the injection unit on the ISOBUS.
		The ECU recognised the injection unit on the ISOBUS, but is not receiving any messages from this unit.

Display Screen		Meaning
Calibration	Work	
		The ECU recognised the injection unit on the ISOBUS, and is also receiving messages from this unit. There is a connection between the ECU and the injection unit. But the injection unit is currently not ready.
		The ECU recognised the injection unit on the ISOBUS, and is also receiving messages from this unit. There is a connection between the ECU and the injection unit. The injection unit is ready, but the pump is switched off.
		The ECU recognised the injection unit on the ISOBUS, and is also receiving messages from this unit. There is a connection between the ECU and the injection unit. The injection unit is ready and the pump is switched on.

Calibrating the Sensors for Reproducing the Boom Slope

The purpose of the calibration process is to detect and save the boom position at maximum slope and in the horizontal position.

You must perform the calibration in the following instances:

- Prior to initial start-up.
- When the boom slope is not displayed correctly.

The current boom position can appear at the following places:

- Work screen
- “BOOM SLOPE CONTROL” screen

To calibrate the angle sensor:

1. Position the field sprayer on level ground.
2. Switch to the “Boom slope control” screen:

    >  > 

   The “Boom Slope Control” screen appears.
3.  - Press.
4. Position the boom horizontally. The actual boom position is important here. The display on the screen is not calibrated yet at this time.
5.  - Initiate calibration of the horizontal position.

   The following progress icon appears: 

   You must now start the calibration within a few seconds.

6.  - Start calibration.

   Horizontal position is being saved as long as the  icon appears.

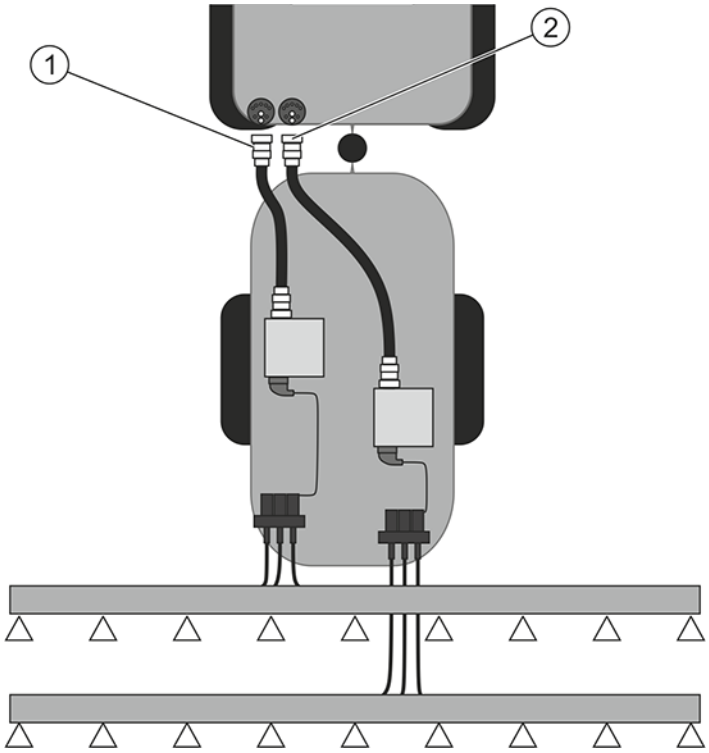
   You have saved the horizontal position.
7. Slope the boom to the right.
8.  - Calibrate the slope to the right. Proceed in the same way as for the horizontal position.
9. Slope the boom to the left.
10.  - Calibrate the slope to the left.

Field Sprayer with Two Circulations and ECUs

For field sprayers with two manifolds and booms, which are controlled by two ECUs, you must configure each ECU for the equipment of the respective boom.

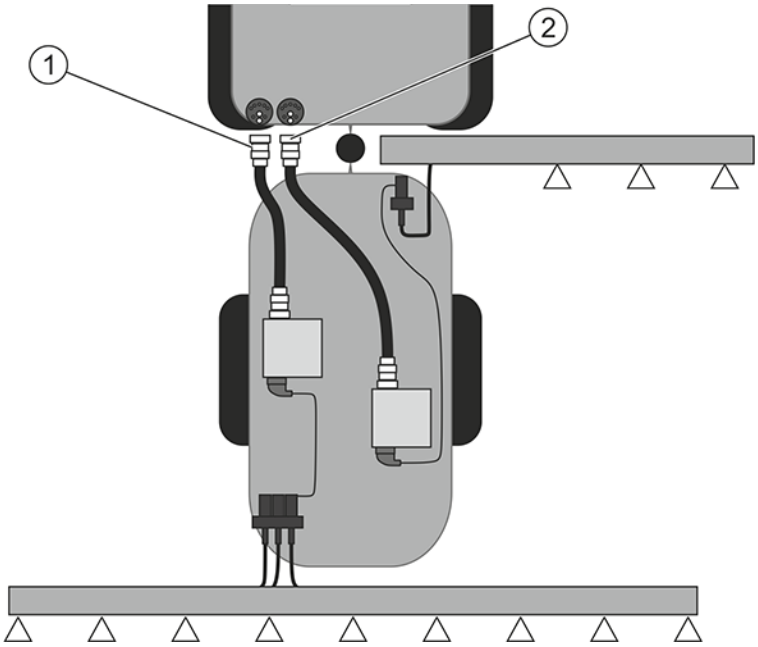
There are also the following settings:

- You must decide which system should be the main system and which should be the auxiliary system. On the main ECU, mark the 2nd connector parameter.
- You must set the geometry on both ECUs.
- You have to select an operating device for each boom.



Field sprayer with two booms at the rear.

Item	Meaning	Item	Meaning
1	Main system	2	Auxiliary system



Field sprayer with one boom at the front and one at the rear.

Item	Meaning	Item	Meaning
1	Main system	2	Auxiliary system

Identifying the ECU

For systems with two ISOBUS ECUs, you must identify both ECUs. You must activate the so-called second connector on the main ECU.

The second connector is a virtual connection for a second ISOBUS ECU. By activating the parameter, you are telling the ISOBUS system that there is a second implement in addition to the implement that is controlled by the main ECU.

The terminal can then take account of the geometry of both implements and thus enable section control. In doing so, the position of the second implement is always indicated relative to the position of the first implement.

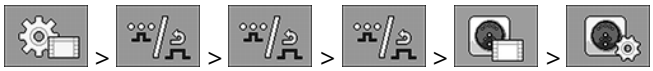
A second manifold with boom can be considered as the second implement - like the example in these instructions. However, a different implement can also be mounted behind the field sprayer or in front of the tractor.

Because the system described here does not have a second ISOBUS power socket, you must use a second ISOBUS power socket on the tractor.

Parameter	Standard system without auxiliary ECU	With two manifolds: Main ECU	Auxiliary ECU
No. 'ECU Number'	1	1	2-32
2nd connector	Do not activate	activate	Do not activate

Before you begin, make sure you have entered the user and service password.

1. Switch to the "ISO 11783" screen:

   The "ISO 11783" screen appears:

2. Configure parameter.

Geometry on a Field Sprayer with Two ECUs

You must measure and enter the following distances:

- On the main ECU: Distances between the main boom, the axle, and the attachment point.
- On the auxiliary ECU: Distance between the main boom (CRP_2) and the auxiliary boom.

On systems with a one-sided folding auxiliary boom, you must also enter the distance **DRP_Y**:

- The boom is located only on the left side: 0cm
- Boom on the right side: Working width of the boom in cm

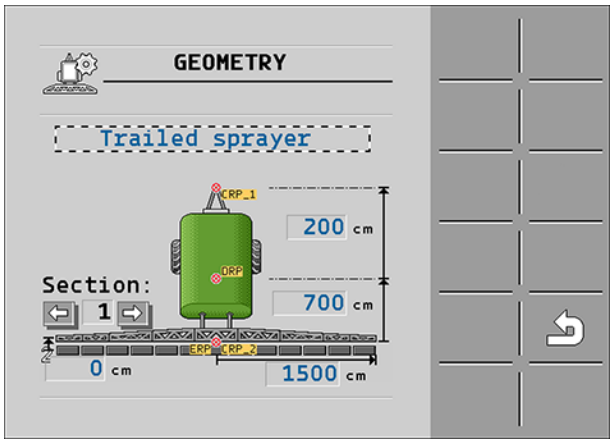
Enter the Sprayer Geometry in the Main ECU

Before you begin, make sure you have set the second connector on the main ECU.

1. Switch to the "Geometry" screen in the application of the main ECU:

   The following screen appears:



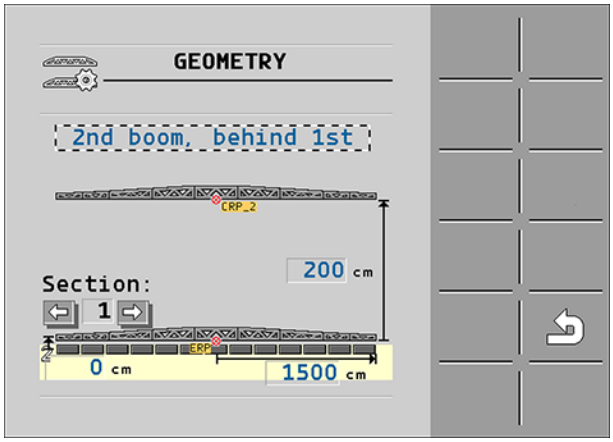
There are two red dots on the diagram: CRP_1 - Attachment point; DRP - Axle; CRP_2 - Work point of the main boom. You must also measure the distance from this point to the second boom later.

2. On the line above the drawing, set the corresponding sprayer type.
3. Enter the measured values.

Enter the Sprayer Geometry in the Auxiliary ECU

1. Switch to the “GEOMETRY” screen in the application of the auxiliary ECU:

The following screen appears:



The red dot **CRP_2** marks the first boom.

2. On the line above the drawing, select whether the second boom is located in front of or behind the first boom (looking in the direction of travel): “2nd boom, behind the 1st” or “2nd boom, front of 1st”
3. Measure the distance between CRP_2 and the second boom (ERP) and enter this value.

Activating Licenses

If you want to extend the functions of your ECU, you can activate additional licenses. You need a password for this.

1. Switch to the “Licenses” screen:

The “Licenses” screen appears.

2. In the “App” parameter, select the application that you want to activate.
3.  - As an option, you can activate a temporary license for the selected application.

   In the bottom area, you can see how long you have already been working with a temporary license. You can test each application for 50 hours.

4. Use the "PTx code“ to order a password from PTx Trimble.

5. Enter the password.
6. Restart the ECU.

   The license is now activated.

Assigning the Joystick Buttons

If you are using the AUX2 auxiliary protocol, you can assign the buttons on the joystick yourself.

The buttons on the joystick can be assigned in the "Service“ application of the terminal. You can read how to do this in the operating instructions for the terminal.

The functions that can be assigned to the individual buttons can also be seen in the "Service“ application of the terminal. You can always recognize the respective function by the function icon.

The meaning of the respective function icons can be found in the different sections of these instructions.

In addition, for some functions, you can decide whether you want to operate the respective function with a button or with a switch. You can see the mode of operation by the respective icon. If an icon does not appear behind a function, operation takes place with a function icon, i.e., like a button.

Icon	Meaning
	The function is operated with a button.
	The function is operated with a switch.
	The function is operated with a switch that has three different positions. After actuation, the switch always goes back to the center position.
	Determines whether the function is actuated as a button like on the joystick or as a switch like on the S-Box.

8

Troubleshooting

- Checking the Software Version

Checking the Software Version

To find out the software version:

1. Switch to the “Parameters” screen:

   The software version will be shown.

9

Technical Specifications

- ECU-MIDI 3.0 Technical Specifications
- Available Languages

ECU-MIDI 3.0 Technical Specifications

Specification	Description
1. processor:	32-bit ARM Cortex™-M4 CPU 168 MHz, 2048 KB flash; 256 KB RAM
2. processor:	32-bit ARM Cortex™-M4 CPU 168 MHz, 2048 KB flash; 256 KB RAM
External memory:	SPI-Flash 16 MB; SDRAM 16 MB; FRAM 16 kByte
Connections:	▪ 42-pin connector for connecting actuators/sensors ▪ 2x 16-pin connector for power supply and CAN The connectors can be locked and equipped with single conductor insulation.
Interfaces:	up to 3xCAN*
Power supply:	12 V electrical system (9-16 V), maximum current consumption 30 A
Current consumption (IN):	500 mA (at 14.4 V without power output, without supply to external sensors)
Standby current (OFF):	70 µA (typ.)
Temperature range:	-40 ... +70 °C
Housing:	Anodized aluminum continuous cast casing, plastic lid with seal and pressure compensation element, stainless steel screws
Protection rating:	IP6K6K (with installed connectors)
Environmental tests:	Vibration and shock testing in accordance with DIN EN 60068-2 Temperature testing in accordance with IEC68-2-14-Nb, IEC68-2-30 and IEC68-2-14Na Protection testing in accordance with DIN EN 60529 Electromagnetic compatibility according to DIN EN ISO 14982: 2009-12
Dimensions:	Approx. 262 mm x 148 mm x 62 mm (L x W x H, without connector)
Weight:	ca. 1 kg

Available Languages

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

Bulgarian, Croatian, Czech, Danish, Dutch, English, Estonian, Finnish, French, German, Greek, Hungarian, Italian, Latvian, Lithuanian, Norwegian, Portuguese, Polish, Romanian, Russian, Serbian, Slovak, Slovenian, Spanish, Swedish, Turkish


PTx
Trimble