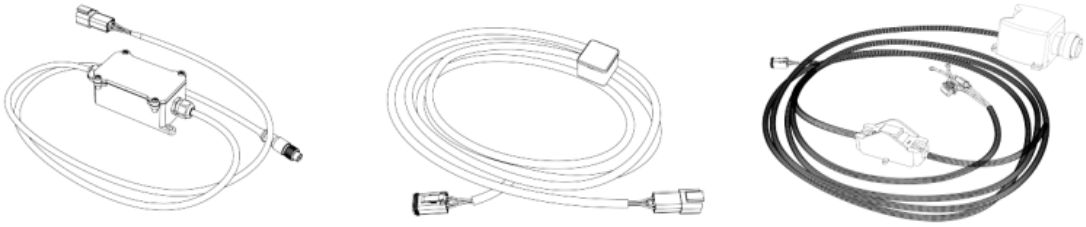
Sveaverken



Sveaverken ISOBUS

User Manual

March 8, 2024 | Rev. 1.0

Copyright Notice:

Revisions:

Manual Version	Software Version	Date	Description
1.0	V23.102.2	2024.03.08	First release

Read Before Use:

Operate in strict accordance with this manual.

If you have any questions during use, contact our customer service.

Disclaimer:

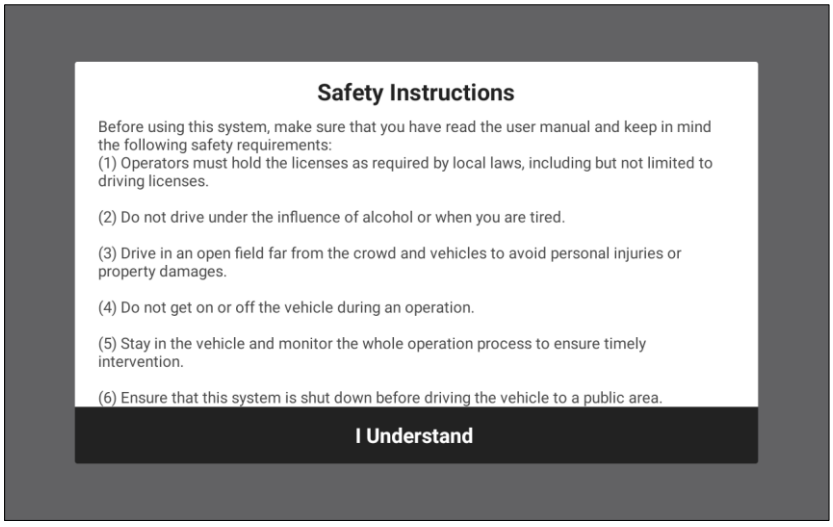
- The purchased products, services, and features are stipulated by the contract. All or part of the products, services, and features described in this manual may not be within the scope of your purchase or usage. Unless otherwise specified in the contract, all the content in this manual is provided "AS IS" without warranties of any kind, express or implied.
- The content of this manual is subject to change due to product upgrades and other reasons. Sveaverken reserves the right to modify the content of this manual without notice.
- This manual only provides guidance for use of this product. Every effort has been made in the preparation of this manual to ensure accuracy of the content, but no information in this manual constitutes a warranty of any kind, express or implied.

Safety Instructions

Before using this product, ensure that you have read and understood all the operation instructions and precautions in this *Sveaverken ISOBUS User Manual.*

Safety Instructions:

Once the control terminal is started, the following popup appears, informing you of safety risks to which you must pay more attention.



Operation Instructions:

1. Disassembling the product housing without authorization may invalidate the warranty. Contact Sveaverken to repair the damaged product.

2. Damage caused by force major events, such as lightning strikes, over voltage, and collision, is not covered by the warranty.

3. Connect the devices in strict accordance with the manual. When connecting cables such as data cables, hold the end of the plug and gently plug or unplug it. Do not pull the plug by force or twist it, which may break the pins.

4. Do not hang the cables in the air. Replace cables if they are damaged or deformed.

5. The IP rating of the product is IP66. When the product is not in use, avoid prolonged exposure to heavy rain; otherwise, the product may be damaged due to water ingress.

Preface

Purpose of Manual:

This manual describes how to use the Sveaverken ISOBUS in concise, simple, and clear language so that users can master each operation procedure easily, quickly, and accurately.

Technical Support:

Starting from the date of purchase, users will be provided with technical support and upgrade services from Sveaverken.

Contact Sveaverken by any of the following methods:

Tel: +46 (0) 150-48 77 00

Email: sales@sveaverken.com (Global Sales)

marketing@sveaverken.com (PR&Business)

service@sveaverken.com (Support)

Official website: https://www.sveaverken.com

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1. Product Overview

1.1 Introduction

ISOBUS, also known as ISO 11783, is an international, universal, and standardized communication protocol developed by the Agricultural Industry Electronics Foundation (AEF) for agricultural and forestry equipment based on the Controller Area Network (CAN). ISOBUS defines an equal protocol for all manufacturers of agricultural and forestry equipment to guarantee full compatibility between tractors, implements, and navigation equipment of all brands and models that are ISOBUS certified.

Sveaverken ISOBUS is an advanced feature launched by Sveaverken, and has the following advantages:

- Uniform standard. Enables the easy connection between Sveaverken F100 autosteer system and ISOBUS certified implements of different brands.
- Simplified device. Displays information and issues control instructions efficiently with no additional monitoring devices and cables except for Sveaverken F100 autosteer system.
- Reduced cost and improved efficiency. Automatically controls the implement based on task planning, reducing labor cost and material consumption, and improving work efficiency and quality.
- Precision agriculture. Creates favorable conditions for crop growth at all stages according to the growth model, and provides system diagnosis, optimized prescription, and scientific management.

The hardware of the feature consists of three wiring harnesses, CAN Box, TBC Box, and ISOBUS Box, all complying with the physical attributes of plugs and cables, network data formats, and interfaces defined in ISO 11783.

The software of the feature is embedded in the Sveaverken F100 autosteer system app, and is upgraded and maintained with the app.

1.2 Main Components

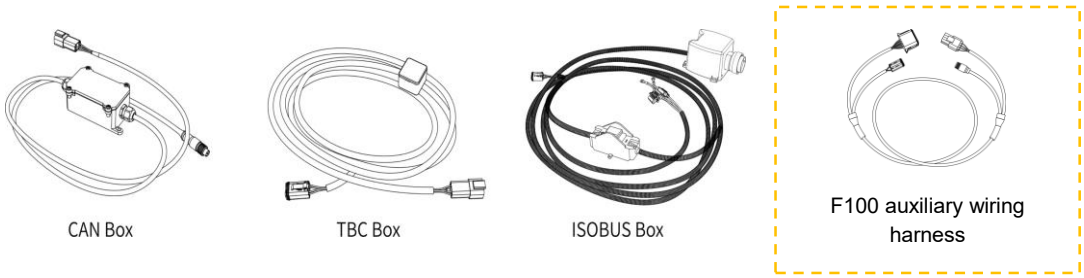

Figure 1. Main Components

No.	Name	Purpose

1	CAN Box	Converts signals, with one end connected to the serial port of the control terminal of the Sveaverken F100 autosteer system and the other end connected to the TBC Box.
2	TBC Box	Biases and terminates the bus when the implement ECU is disconnected. It connects the CAN Box and the ISOBUS Box.
3	ISOBUS Box	Communicates with and powers the implement ECU through an international standard 9-pin connector.
4	F100 Auxiliary Wiring Harness	To connect the implement to the F100 control terminal, connect the 12-pin connector of the CAN Box to the 12-pin connector of the F100 auxiliary wiring harness.

Figure 2. Description of Main Components

1.3 Specifications

Categories	Specifications
Operating Voltage	9-36 V
Input Current	max 50 A
Communication Protocol	CAN
Operating Temperature	-30ºC to 70ºC
Operating Humidity	5% to 95%
Storage Temperature	-45ºC to 85ºC
IP Rating	IP66
CAN Baud Rate	250 Kbps

Figure 3. Specifications

2. Hardware Operation Instructions

2.1 Hardware Interfaces

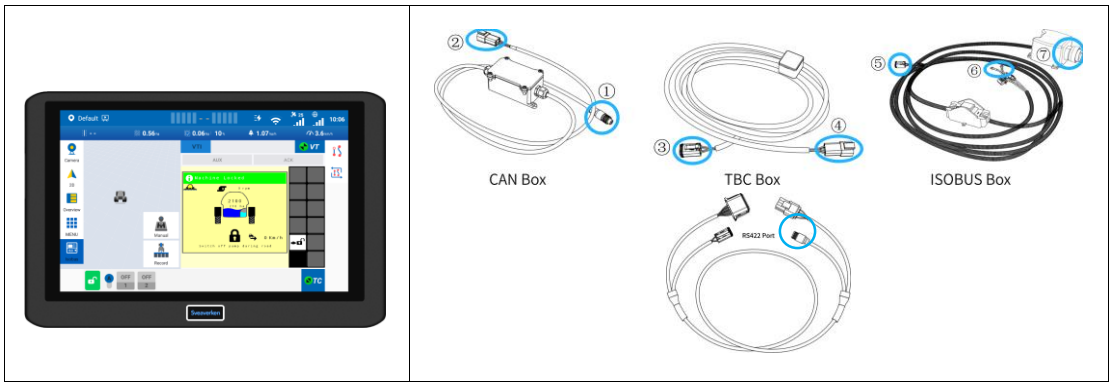

Figure 4. Hardware Interfaces of ISOBUS for F100

①: 12-pin aviation connector (female) to connect to the RS422 port on secondary harness of F100.

②: CAN Box connector (male) to connect to the TBC Box connector (female) □.

③: TBC Box connector (female) to connect to the CAN Box connector (male) □.

④: TBC Box connector (male) to connect to the ISOBUS Box connector (female) □.

⑤: ISOBUS Box connector (female) to connect to the TBC Box connector (male) □.

⑥: Power port. It connects to the battery of the machinery to power the ISOBUS wiring harnesses.

⑦: ISOBUS implement connector, which complies with the ISO11783 standard, to connect to the implement.

Cross-sectional view of the ISOBUS implement connector:

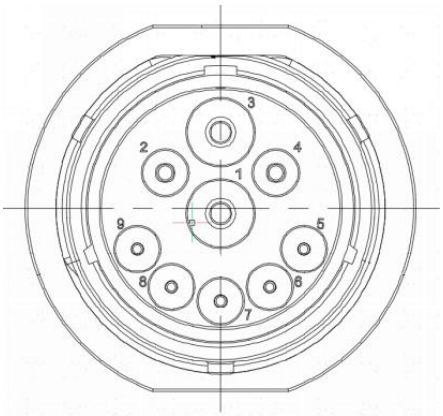

Figure 5. Cross-Sectional View of ISOBUS Implement Connector

2.2 Hardware Connection Procedure

1. Power off the Sveaverken F100 autosteer system and the battery before connecting the wiring harnesses.
2. Fix the ISOBUS wiring harnesses in place. Do not twist or hang them in the air.
3. Connect the power port □ of the ISOBUS Box wiring harness to the battery of the tractor. Do not turn on the battery until all wiring harnesses are properly connected.
4. Connect the implement ECU to the ISOBUS implement connector □ of the ISOBUS Box wiring harness.
5. Connect the TBC Box wiring harness, the ISOBUS Box wiring harness, and the CAN Box wiring harness together.
6. Connect the 12-pin aviation connector (female) □ of the CAN Box wiring harness to the RS422 port on secondary harness of F100.
7. Turn on the battery and the main power switch for wiring harnesses to power on the Sveaverken F100 autosteer system.

3. Software Operation Instructions

3.1 Software Functions

1. Virtual Terminal (VT): Provides a unified interface for displaying and controlling implement systems.

**VT is also known as UT (Universal Terminal).*

2. Task Controller Basic (TC-BAS): Records the cumulative implement operation data, for example, total working area.

3. Task Controller Section Control (TC-SC): Automatically switches on or off sections when passing the field boundary or the worked area.

3.2 Software Operation Procedure

3.2.1 Overview of Operation Procedure

This section introduces Sveaverken ISOBUS features and operation procedure.

For navigation features, refer to the *Sveaverken F100 Autosteer System Software User Manual*.

Procedure for using the Sveaverken ISOBUS features:

Install and commission the Sveaverken F100 autosteer system → Install the SVEA ISOBUS wiring harnesses and connect to the implement → Enable the ISOBUS performance mode on F100 → Enable an ISOBUS feature → Wait for the completion of the object pool loading → Configure the implement (implement setup and material setup) → Configure the task → Configure the speed source → Start the operation → Check task data

3.2.2 Preparations

3.2.2.1 Enable ISOBUS Performance Mode

To ensure good ISOBUS performance, switch to ISOBUS performance mode when you are using the ISOBUS function with Sveaverken F100 autosteer system. Choose **MENU** > **APPLICATIONS** > **ISOBUS** > **Function** and enable **ISOBUS Performance Mode**. The system is restarted immediately after you confirm the action. A lightning icon then appears in the status bar, indicating that you are in ISOBUS performance mode.

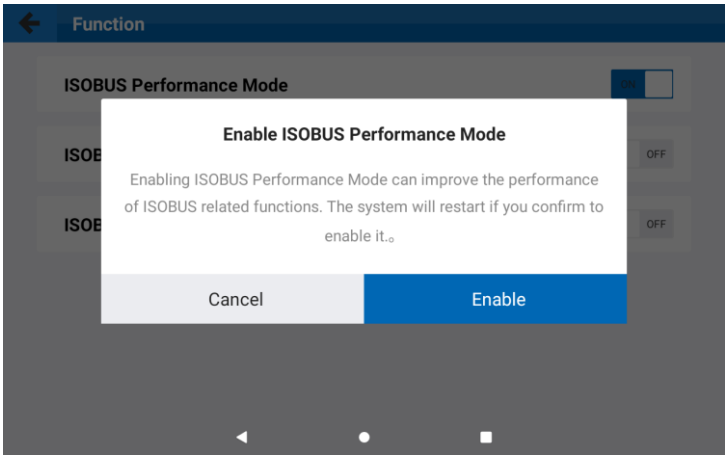

Figure 6. Enable the ISOBUS Performance Mode

3.2.2.2 Enable ISOBUS Features

3.2.2.2.1 Enable ISOBUS VT

Choose **MENU** > **APPLICATIONS** > **ISOBUS** > **Function** and enable **ISOBUS VT**. A VT window then appears on the main screen.

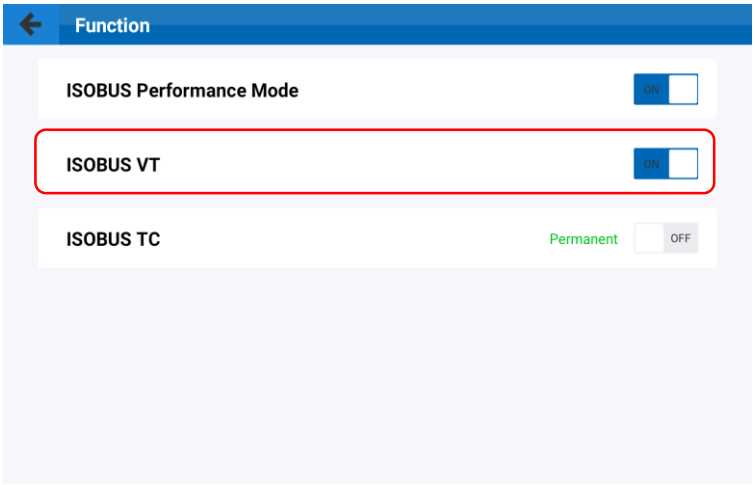

Figure 7. Enable ISOBUS VT

3.2.2.2.2 Activate and Enable TC

Choose **MENU** > **APPLICATIONS** > **ISOBUS** > **Function** and enable **ISOBUS TC**. Enter the activation code for advanced mode in the pop-up window and check the activation information. The code is for one-time use only.

Once TC is activated and enabled, a TC window appears on the main screen.

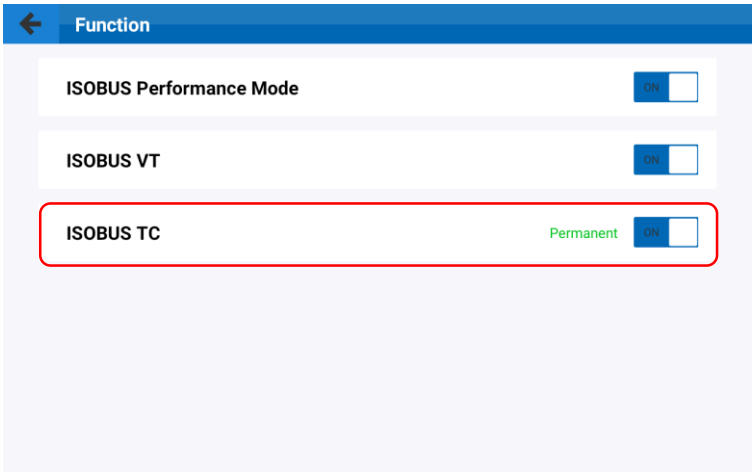

Figure 8. Enable ISOBUS TC

3.2.2.3 Load Object Pools

Follow the instructions in section "Hardware Operation Instructions" to connect the implement. When the connection is successful and ISOBUS VT is enabled, VT object pools start loading and the progress is shown in a pop-up window or the VT window.

Note: The time for loading VT object pools may vary depending on the quantity of object pools of the implement. Please wait patiently.

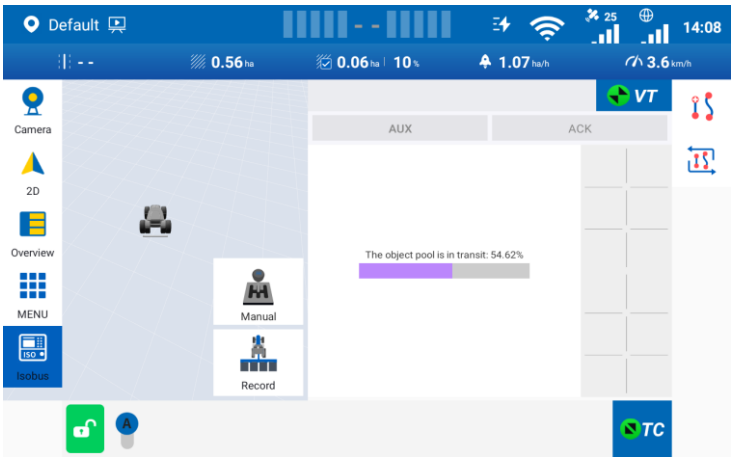

Figure 9. Load Object Pool

If TC is supported, the TC object pool also needs to be loaded. When all object pools are loaded, a window pops up showing the basic implement information.

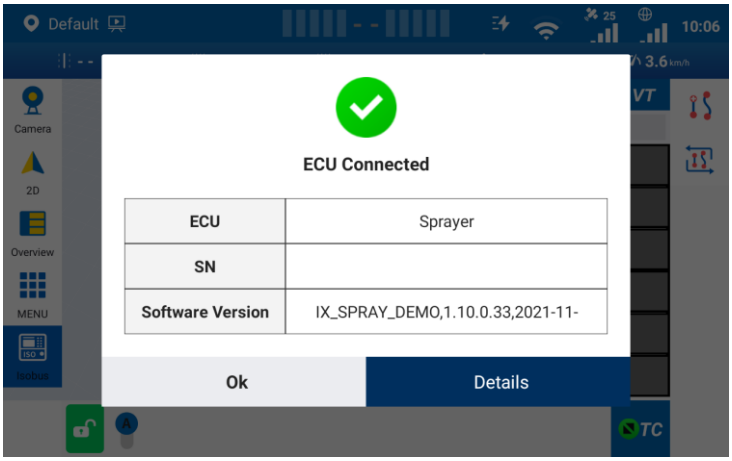

Figure 10. Implement Connected

3.2.2.4 Configure the Implement

Choose **MENU** > **APPLICATIONS** > **ISOBUS** > **Configuration**. Each implement ECU needs to be bound to an ISOBUS implement from **Implement Library** to define the parameters for automatic section control (Refer to "Implement Setup" for details about implement configuration.) A material with target rate information is also needed for real-time control in each channel (Refer to "Material Setup" for details about material configuration.)

Tap the edit icon on the right and select or create an implement and material.

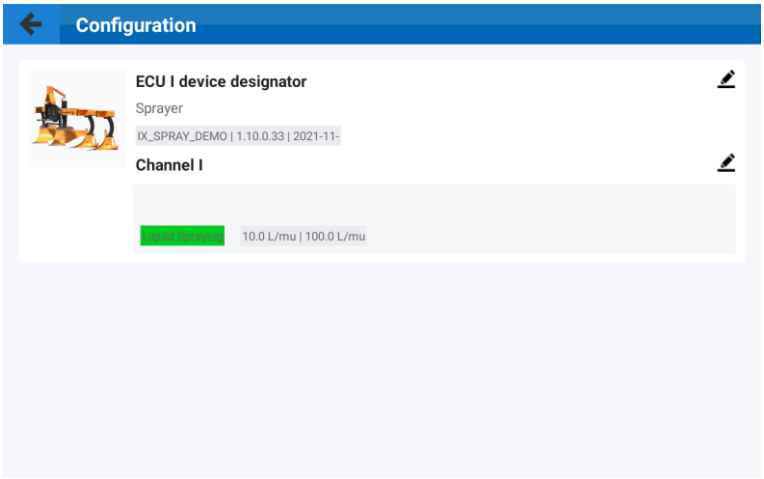

Figure 11. Implement Configuration

3.2.2.4.1 Implement Setup

Tap the edit icon on the **Configuration** screen or choose **MENU** > **DEVICE SETTINGS** > **Implement Library**, and tap **New**.

Select the implement type, complete the basic information and parameters, tap **Save,** and then tap **Yes** to configure ISOBUS parameters.

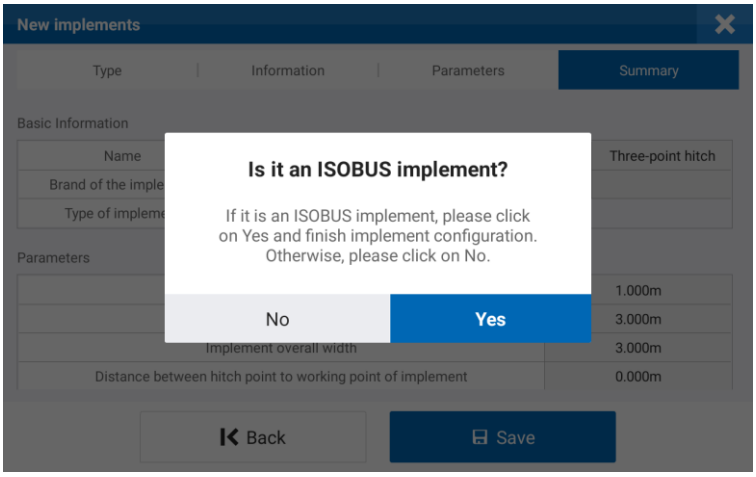

Figure 12. Create an ISOBUS Implement

If a single material is used, you only need to edit the first channel on the **Implement control** tab. Set the parameters on the **Type**, **Control**, **Latency**, and **Overlap** tabs, confirm the section width on the **Geometry** tab and the parameters on the **Overview** tab, and then tap **Save**. Complete log settings, confirm the parameters on the **Overview** tab, and then tap **Save**. An ISOBUS implement is created.

Parameter	Description
Channel Name	Enter the name of the channel.
Material Name	Select the material used with the implement. Refer to section "Material Setup" for creation of a material.
Set as Priority Channel	The channel is displayed as **Channel I** on the screen.
Section Control	Refer to section "Section Control".
Rate Control	Refer to section "Rate Control".
Number of Sections	Total section number automatically synchronized from the implement.
Boundary Latency	To offset the transmission delay, commands for turning on/off sections are sent before the vehicle actually leaves/reaches a boundary. This parameter specifies how much earlier the commands should be sent.
Application Latency	To offset the transmission delay, commands for turning on/off sections are sent before the vehicle actually leaves/enters a worked area. This parameter specifies how much earlier the

	commands should be sent.
Boundary Overlap	Sections are turned on/off one by one based on this ratio when passing the field boundary to reduce application outside the boundary.
Application Overlap	Sections are turned on/off one by one based on this ratio when passing a worked area to reduce duplicate application.
Enable Logging	ISOBUS logs are collected and uploaded together with app logs when logging is enabled.

Figure 13. ISOBUS Implement Parameters

3.2.2.4.2 Material Setup

If the material applied is changed, tap the edit icon on the **Configuration** screen and select or create the material for the current channel.

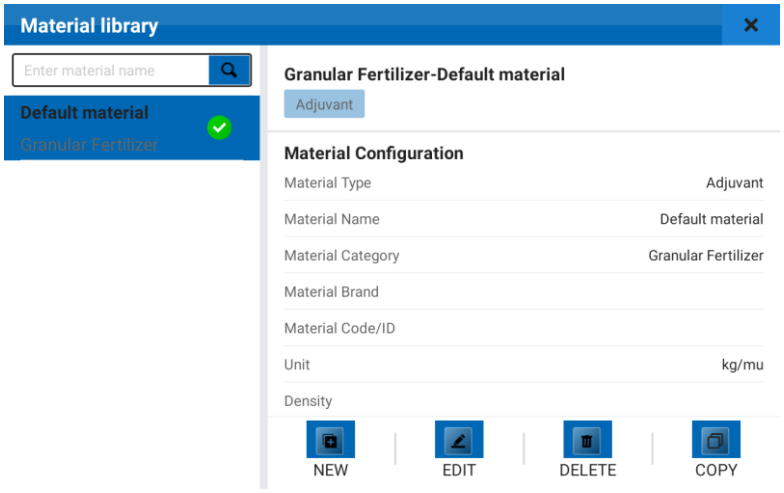

Figure 14. Create Material

Parameter	Description
Material Name	Enter the name of the material.
Material Category	Select the category of the material.
Material Type	Select the type of the material.
Unit	Select the unit for the material.
Target Rate I	Set the target rate at which the material is applied.

Target Rate II	Optional target rate to switch to during operation.
Rate Increment	Change in the target rate with each adjustment.
Rate Range	Adjustable range of the target rate.
Density	Enter the density of the material.
Material ID	Enter the material ID.
Brand	Enter the brand of the material.

Figure 15. Material Parameters

3.2.2.5 Configure the Task

To create a task, tap **Overview** and configure the field, guidance line, boundary, and task parameters. The implement parameters are already configured in the section "Configure the Implement".

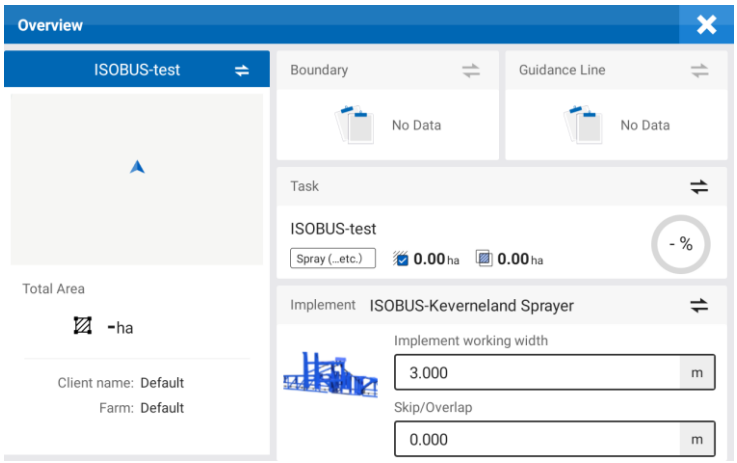

Figure 16. Create Task

3.2.2.6 Configure the Speed Source

If the implement needs an additional speed source, configure it on the **Speed** tab in the VT window. Select the required speed source and frequency.

Note: Ensure that the selected speed source is the same as that set in the implement VT. The frequency must meet the communication requirements of the implement. Confirm the frequency with the implement dealer, for example, the frequency of Kverneland self-propelled sprayer is 5 Hz.

Implement Speed Source	**SVEA F100 Autosteer System Speed Source**

NMEA	GPS Position
GPS J1939/SAE J 1939	GPS J1939
ISO 11783 Wheel/ISO Wheel	ISO 11783 Wheel
ISO 11783 Radar/ISO Radar/Radar	ISO 11783 Radar

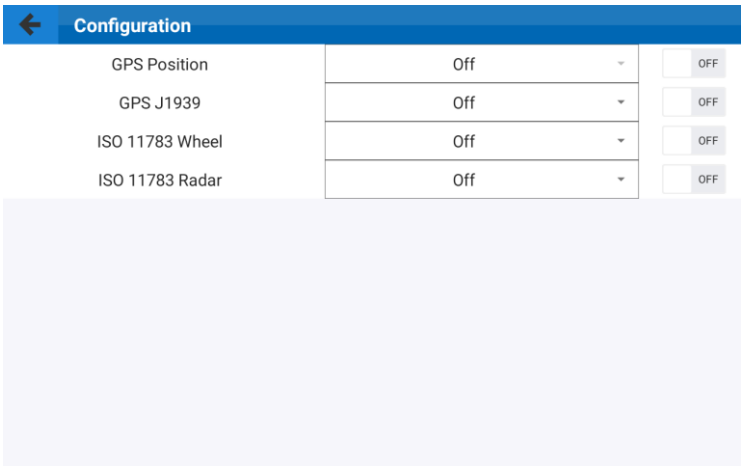

Figure 17. Speed Source Configuration

3.2.3 Start the Operation

3.2.3.1 Main Screen Elements

Tap **Isobus**, and the ISOBUS VT and TC windows appear.

3.2.3.1.1 VT Window

Figure 18. VT Window (Kverneland Sprayer)

No.	Element	Description

①	VT Window	Implement VT screen, consisting of □□□□.
②	Data Mask Area	Displays the implement status, information, and alarm messages.
③	Softkey Area	Allows for screen switch and quick implement control.
④	ACK	Clears alarm pop-ups.
⑤	AUX	Currently unavailable.
⑥	Speed	Speed source configuration screen.
⑦	Zoom Button	Zooms in or out on the VT window.

Figure 19. VT Window Elements

3.2.3.1.2 TC Window

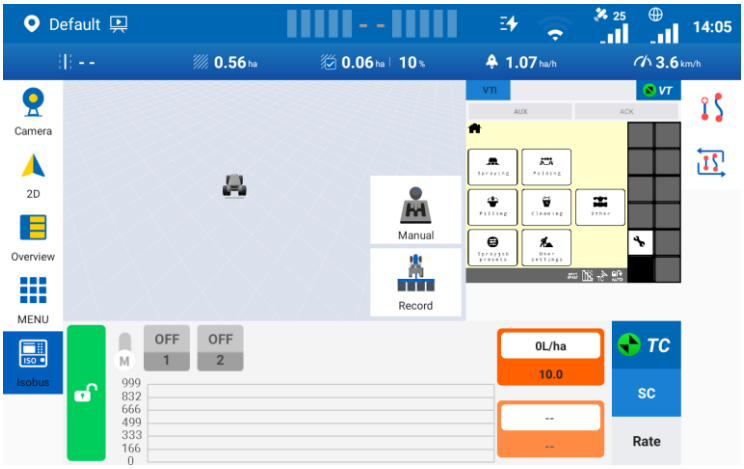

Figure 20. TC-SC Window

No.	Element	Description
①	TC Window	Implement TC screen, consisting of the following elements.
②	Section Control Screen	Displays the section control information.
③	Manual / Auto Mode	Switches the section control mode.

④	Section Display Area	Displays the section status and application rate.
⑤	Rate Display Area	Displays the target rate and real-time rate of the implement.
⑥	Lock Button	Locks the section status in manual mode.
⑦	Rate Control Screen	Allows for rate adjustment and quick rate switch.

Figure 21. TC Window Elements

3.2.3.2 Implement Operations

3.2.3.2.1 VT

When an implement is attached to the tractor using the Sveaverken F100 autosteer system, the implement information that was originally displayed on its control terminal is displayed in the VT window, where you can check the running status of the implement and change its settings.

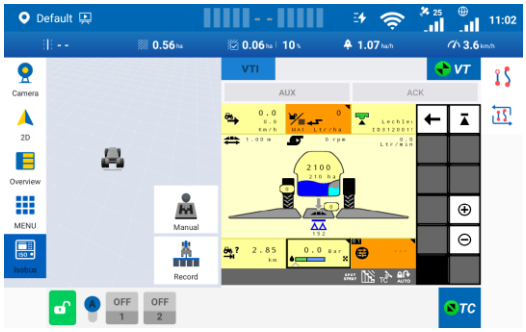

Figure 22. Kverneland Sprayer (simulator image)

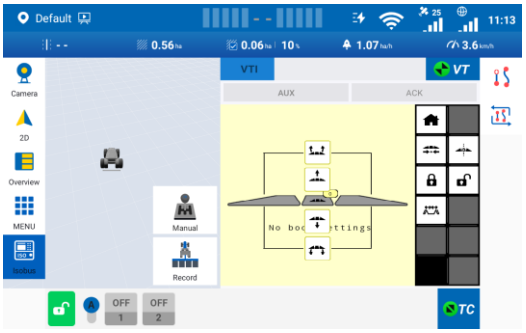

Figure 23. Spray Boom Settings

If TC is also enabled, the VT window is minimized by default. Tap the VT button in the upper right corner of the VT window to maximize it.

3.2.3.2.2 TC

3.2.3.2.2.1 Section Control

When the tractor passes the field boundary or worked area in auto mode, the system turns on or off sections automatically based on settings of parameters such as the latency and overlap. You may also switch to manual mode and turn on or off each section manually.

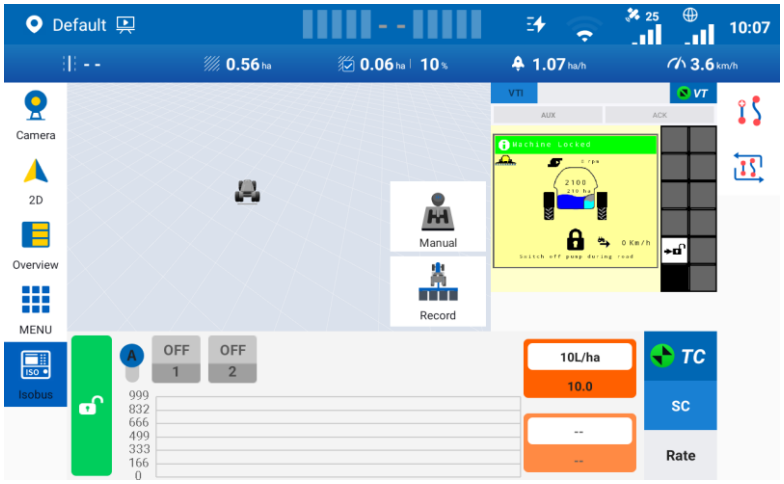

Figure 24. TC-SC Window

3.2.3.2.2.2 Rate Control

Once the material is configured for each channel, the implement works based on the target rate set for the selected material. Press the plus or minus icon to adjust the target rate by the rate increment within the rate range.

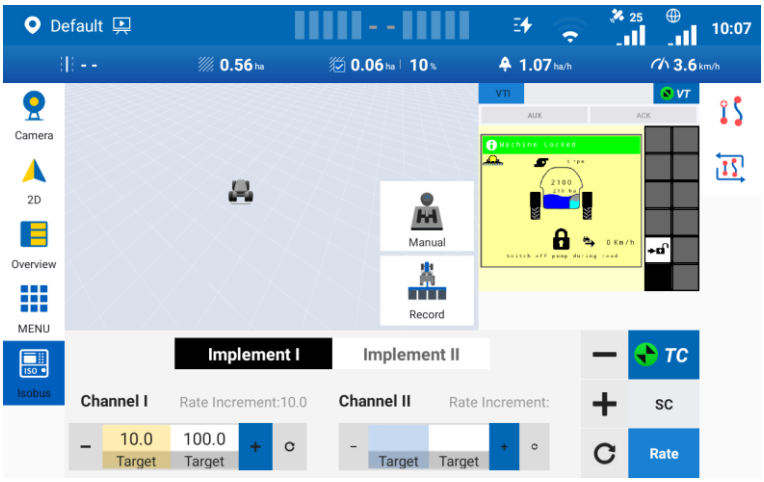

Figure 25. TC-Rate Window

3.2.4 Task Data and Others

3.2.4.1 Connection

The progress of object pool loading and the connection status of the implement are shown on the **Connection** screen. If both VT and TC are marked with a check, the implement is ready to go.

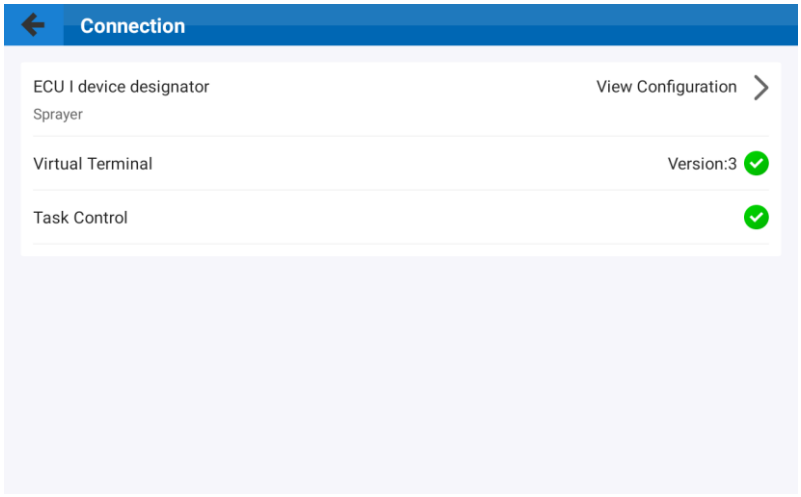

Figure 26. ISOBUS "Connection" Page

3.2.4.2 Diagnosis

The implement statistics and the VT object pools are shown on the **Diagnosis** screen. If no cumulative data is reported by the implement, the area is blank. When no screen appears, UI elements are missing, or the system is unresponsive or frozen after the VT object pools are loaded, delete the VT object pools and restart the control terminal. The VT object pools are reloaded. The process takes time. Therefore, delete the VT object pools only when necessary.

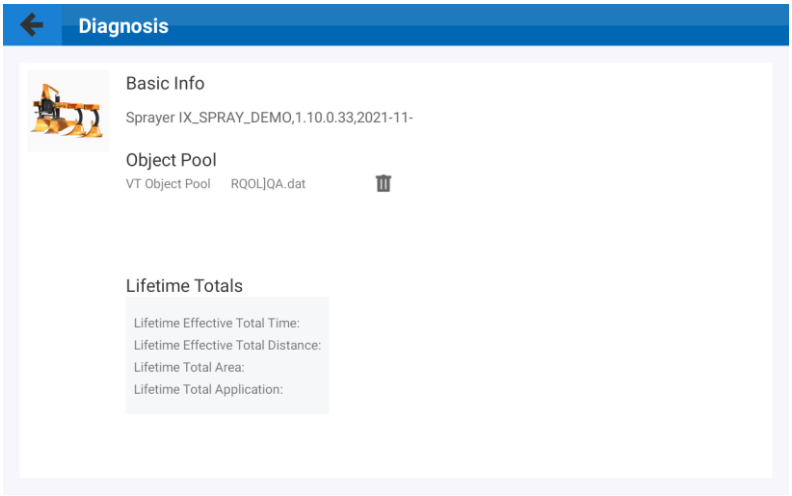

Figure 27. ISOBUS "Diagnosis" Page

3.2.4.3 Task Data

The statistics of the current task are shown on the **Statistics** screen. If no cumulative data is reported by the implement, the area is blank.

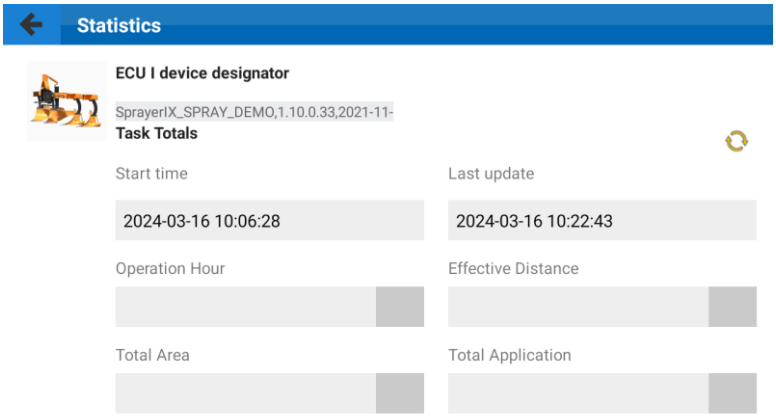

Figure 28. ISOBUS "Statistics" Page