User Manual of ISOBUS

> 👷 **UNDER CONSTRUCTION**
>
> Please check this document next week

> ❗ **INTERNAL USE ONLY**
>
> The official user manual available for external use is being prepared...
>
> 在线使用说明仅限内部使用，外部使用的正式说明书正在制作中...

Hardware connection & cabling

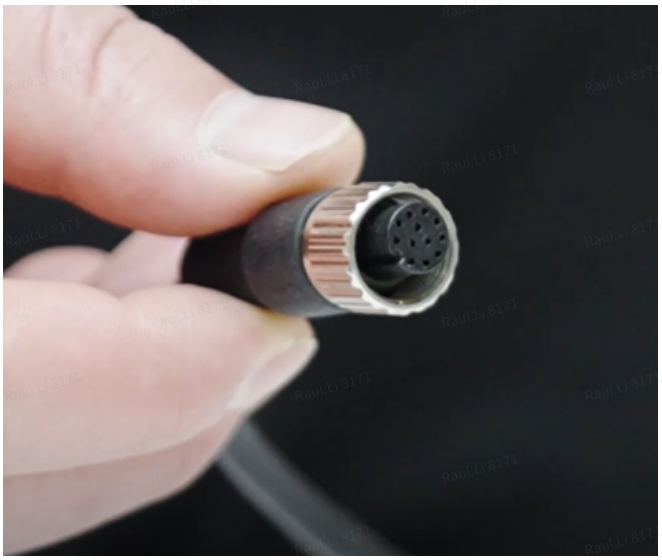
> Video: ISOBUS hardware connection.mp4

AT2 Spare main wiring harness

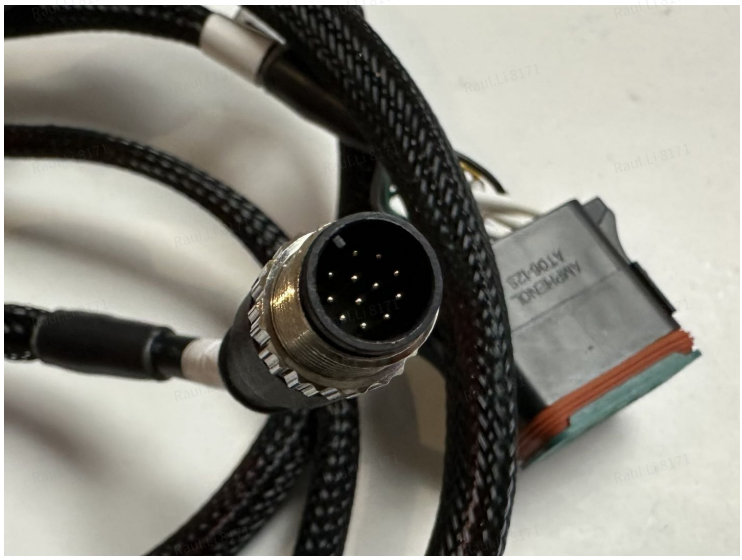
No.	Name	Purpose
1	CAN Box	**Converts signals**, with one end connected to the serial port of th FJD autosteering kit and another end connected to the TBC Box.
2	TBC Box	Biases and terminates the bus when the implement ECU is discon CAN Box and the ISOBUS Box.
3	ISOBUS Box	**Communicates with and powers the implement ECU** through a pin connector.

1. ② CAN Box connector (male) to connect to ③ TBC Box connector (female).
2. ④ TBC Box connector (male) to connect to ⑤ ISOBUS Box connector (female).
3. ⑥ Power port to connect to the battery of the machinery to power the ISOBUS cable harnesses.

4. ⑦ Implement bus quick-change socket, which complies with the ISO11783, to connect to implements.
5. ① 12-pin aviation connector (female) to connect to 12-pin connector of the AT2 Spare main wiring harness.



12-pin aviation connector (female)



12-pin connector onf the AT2 Spare main wiring harness

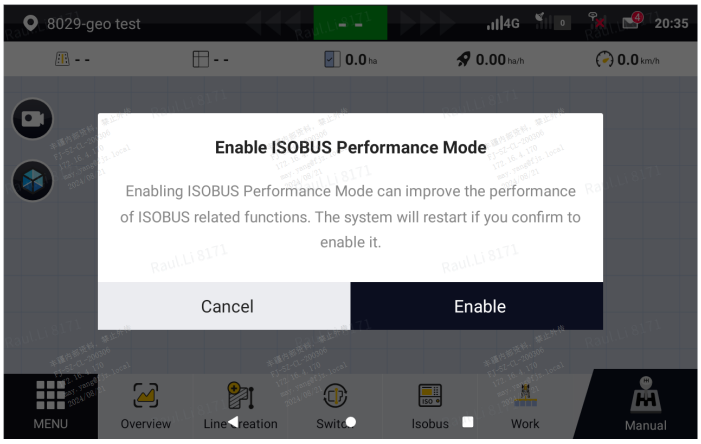
Please refer to 丰疆智能ISOBUS功能使用说明书-英文-final - 230807 - 替换二维码.docx for more information on hardware specifications.

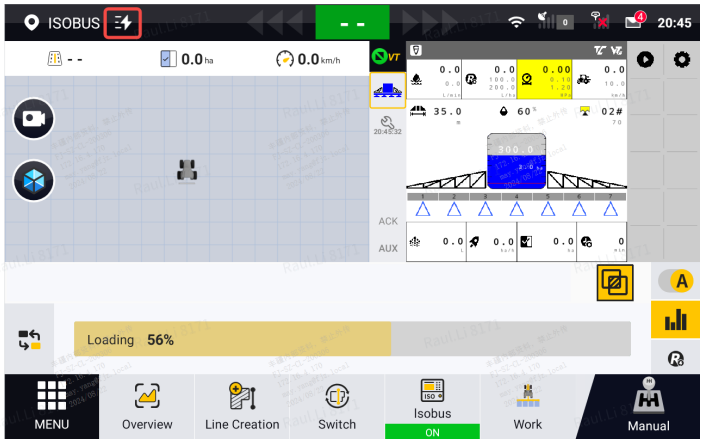
Software User Manual 24.103.0.125

1. Performance Mode 性能模式

> MENU>>APPLICATIONS>>ISOBUS
>
> **Video: ISOBUS Performance Mode.mp4**

You may switch to ISOBUS Performance Mode the first time a new ISOBUS implement is connected. Loading of VT object pool is more stable under this mode. The system will restart if you confirm to enable performance mode, and a special icon on top left in the status bar will indicate that you are in ISOBUS Performance Mode.





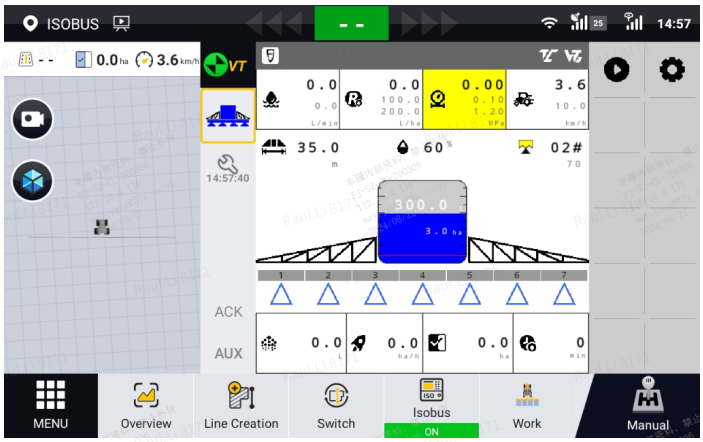
icon of performance mode

2. Function Enabling 功能启用

> MENU>>APPLICATIONS>>ISOBUS
>
> **Video: Enable VT & TC.mp4**

2.1 Enable VT 启用VT

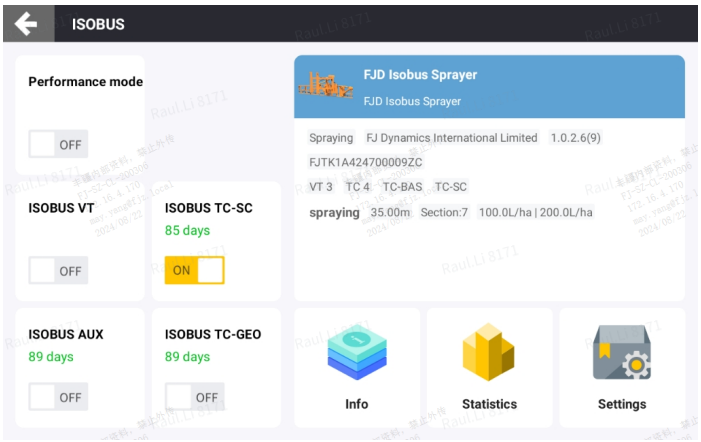
VT is a free feature. Turn on VT in the ISOBUS module and you will see the VT window on the main interface.

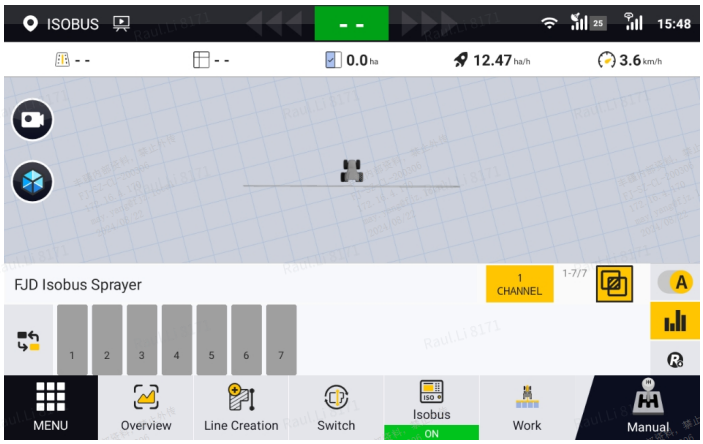


2.2 Activate and enable TC-SC 激活并启用TC-SC

Activation codes are needed to activate TC-SC, TC-GEO and AUX-N. To have a try-out of these functions, please turn to your FAE for help, they will apply for you. Enter the code in the pop-up window and check the activation information. Please remember that once the code is used, you may not activate the same function on another control terminal.

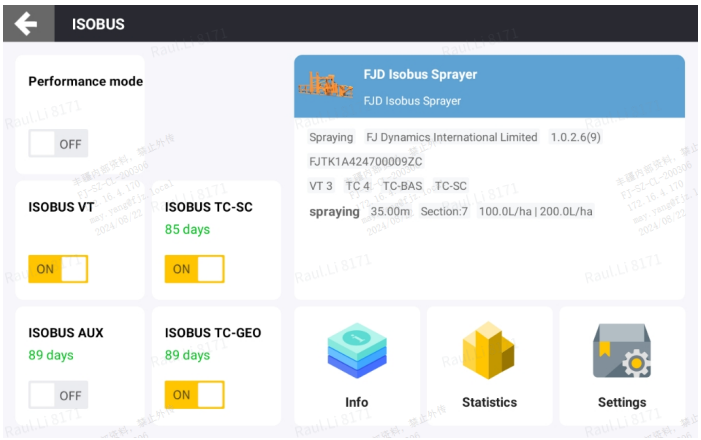
Turn on TC-SC in the ISOBUS module and you will see the TC window on the main interface.

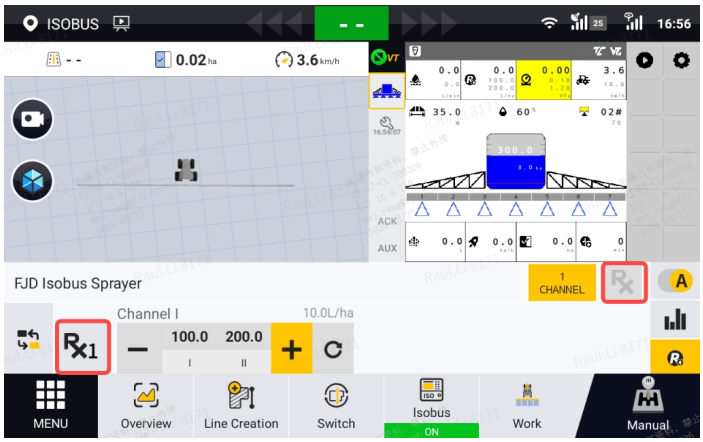




2.3 Activate and enable TC-GEO 激活并启用TC-GEO

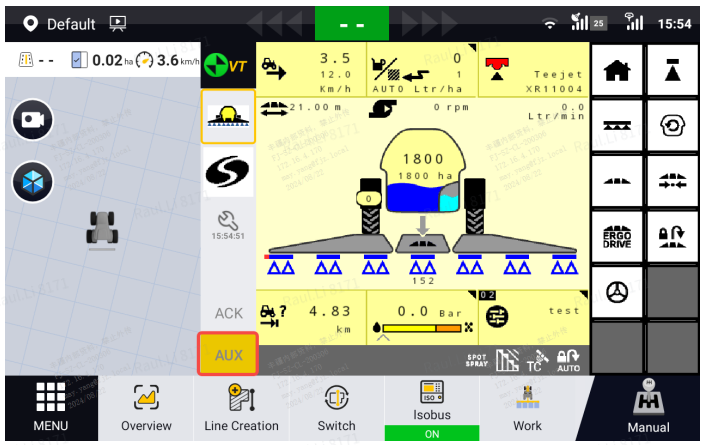
TC-GEO shall be activated with the same procedure as TC-SC. Turn on TC-GEO and you may configure a prescription map and apply variable rate via the entrance "Rx" in the TC window.





2.4 Activate and enable AUX-N 激活并启用AUX-N

AUX-N shall be activated with the same procedure as TC-SC. Turn on AUX-N and you may configure auxiliary assignments via the entrance "AUX" in the VT window.



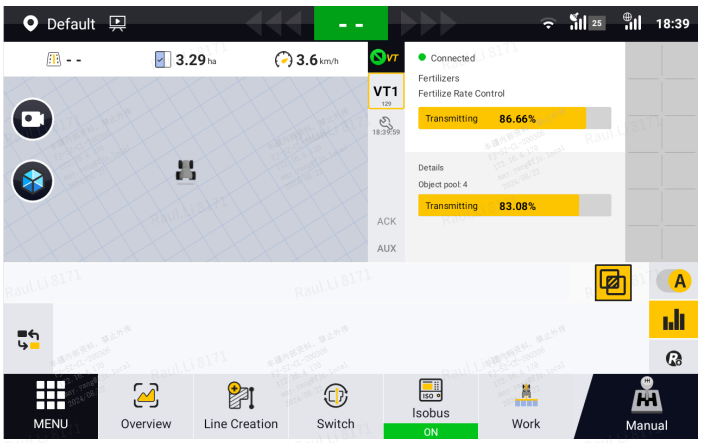
3. Implement connection 机具连接

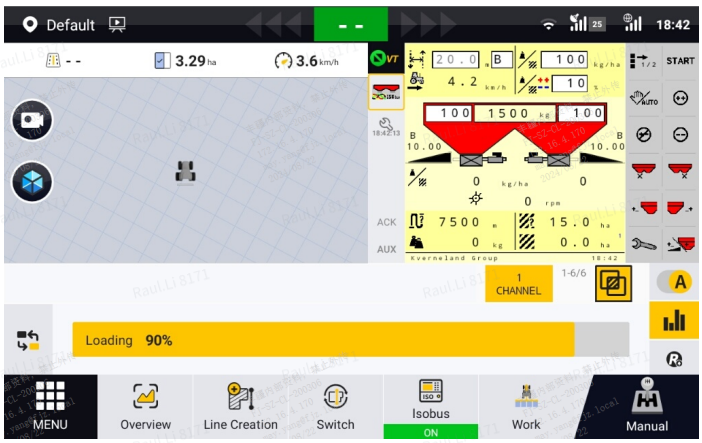
> **Video: Object pool loading.mp4**

Once the implement is properly installed and connected to FJD Auto Steer System, loading of VT and TC object pools will start instantly and you may check the loading progress in VT and TC

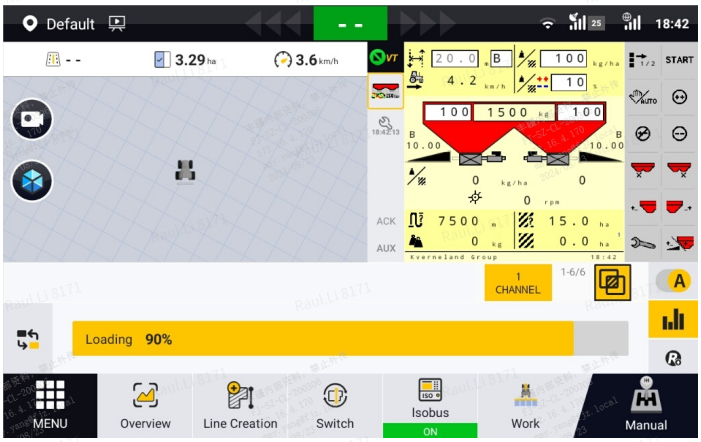
windows.

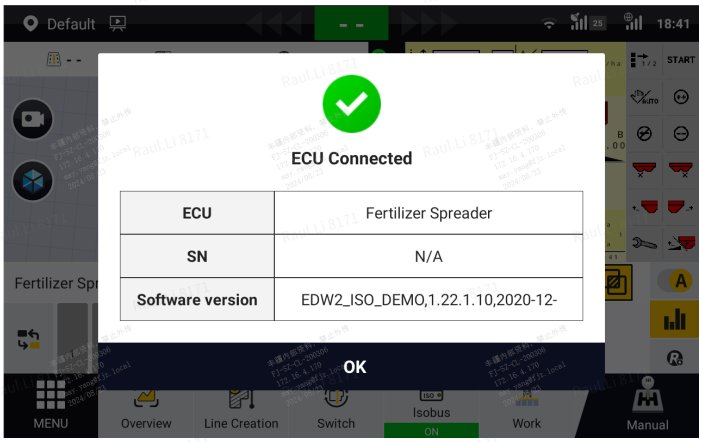
Once the implement VT is connected, a tab with the VT address is displayed in the VT window on the left side. A description of the implement and its function is shown on the main interface in the VT window, followed by a main process bar, indicating the overall loading process. Another process bar shows the loading process of each object pool from the VT. When the main process bar reaches 100%, the VT interface of the implement will appear in the VT window.





TC object pool loading process is shown by a process bar in the TC window. When it reaches 100%, a pop-up window with the basic information of the implement will appear.





4. Preparation 预备作业

4.1 Implement setup 机具设置

> MENU>>DEVICE SETTING>>Implement Library
>
> **Video: Implement setup.mp4**

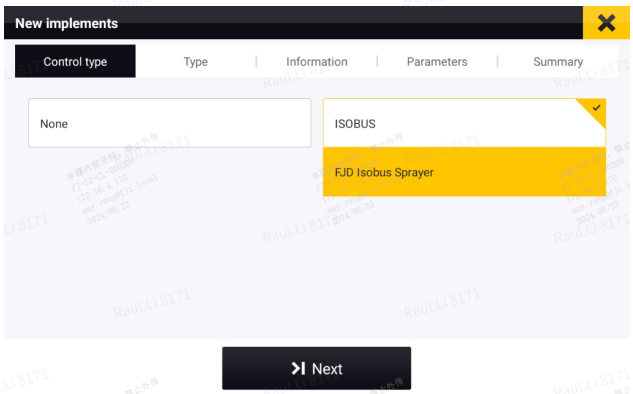
For each ISOBUS ECU, an ISOBUS implement needs to be created in Implement Library, and it will be bound up with the ISOBUS ECU. The next time when the ISOBUS implement is connected, the corresponding implement will be applied automatically.

Please follow the procedure below to create a new ISOBUS implement.

Procedure	Interface

Control Type

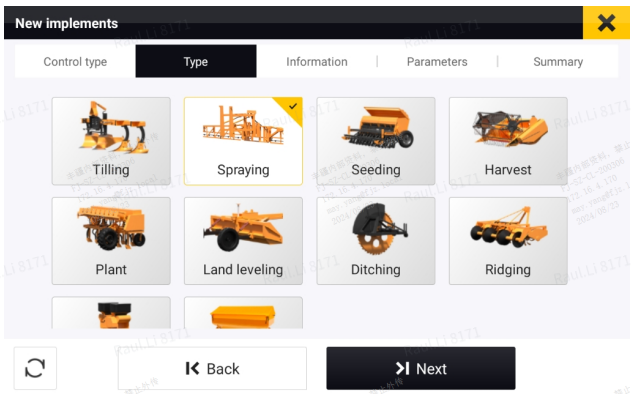
To create an ISOBUS implement, please select ISOBUS as the control type of the implement. The name of the implement ECU will be displayed underneath. There might be multiple choices if there is more than one ISOBUS device connected via CANBUS. Select the one that shares the same designator as your implement ECU and continue.



Type

The type of implement is chosen automatically if it is reported by the implement ECU. You may also edit it manually if it is not properly set.

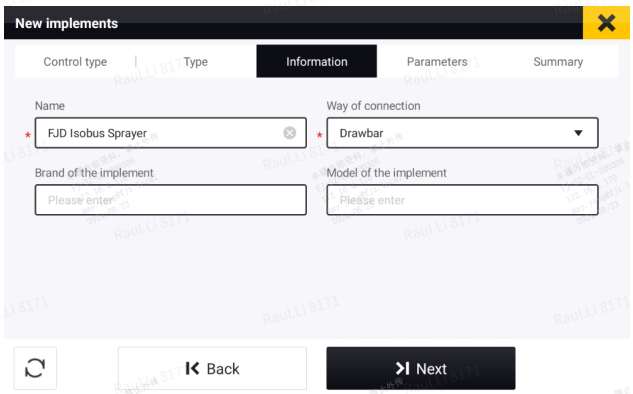
Press the "refresh" button in the bottom left corner, the chosed type will be refreshed to what is reported by the implement.



Information

The name and way of connection is set automatically if they are reported by the implement ECU. You may also edit them manually if they are not properly set.

Press the "refresh" button in the bottom left corner, the name and way of connection will be refreshed to what is reported by the implement.



Parameters

1. **Skip/Overlap**

The spacing or overlapping between two adjacent rows.

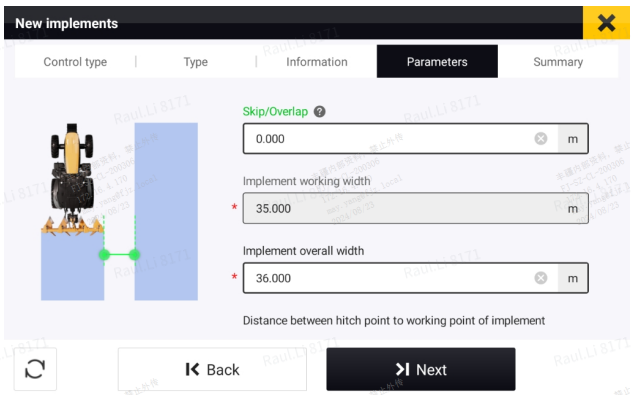
2. **Implement working width**

The total width of the implement sections will be automatically calculated and filled in. It cannot be edited manually for ISOBUS implements.

3. **Implement overall width**

The total width of the implement. It is used to reserve the safety distance during automatic path planning.

4. **Distance between hitch point to working point of implement**



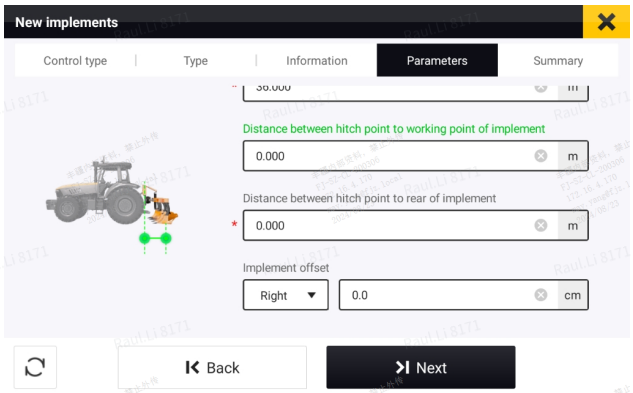
The value will be automatically calculated and filled in. It can be edited to better fit in the real working scenario.

5. **Distance between hitch point to rear of implement**

The total length of the implement. It is used to reserve the safety distance during automatic path planning.

6. **Implement offset**

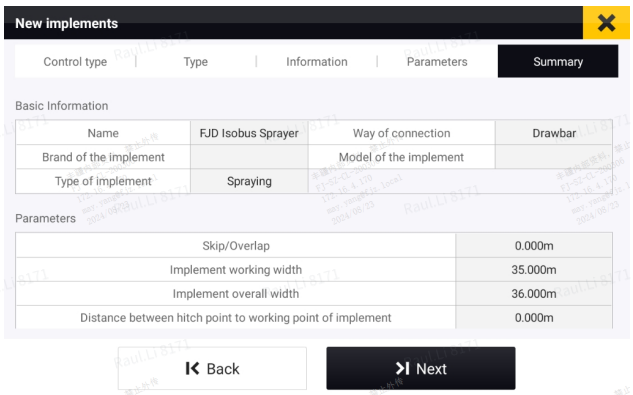
The value will be automatically calculated and filled in. It can be edited to better fit in the real working scenario.



Summary

Basic information of an implement is summarized on this page.

Press "Next" to continue setting up parameters, especially required by ISOBUS implements.

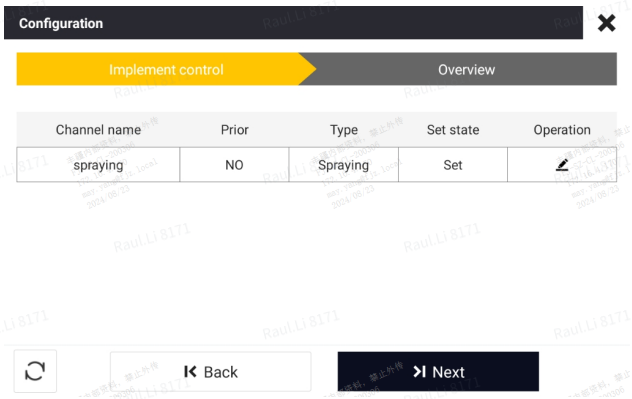


Channel

Each channel stands for a specific application scenario or a cultural practice.

Press the "refresh" button in the bottom left corner, some of the channel information will be refreshed all together to what is reported by the implement.

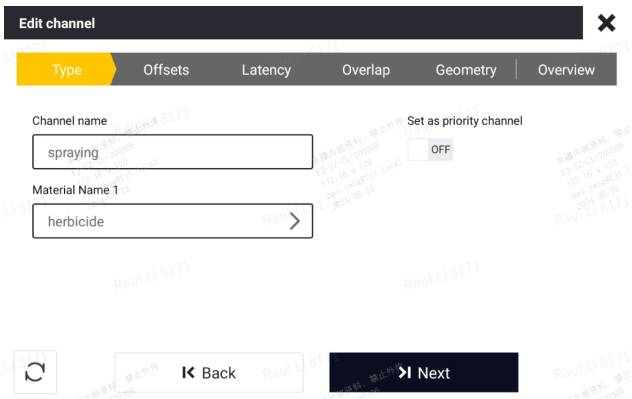
*Only one channel is supported at present.



Channel - Type

Enter the channel name and select a material for the channel.

*Refer to the chapter "Material setup" for details.



Channel - Offsets

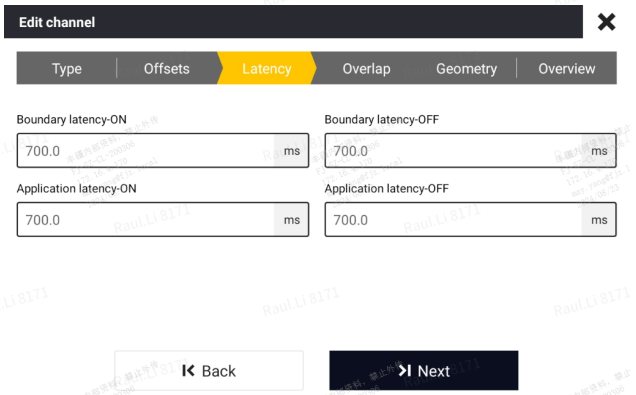
If the working units of the implement channel are not mounted on the center of the boom, there will be an offset of the channel.

The offset of the channel will be automatically synchronized from the implement ECU and cannot be edited.

Channel - Latency

It may take some time for the sections to respond to the instructions, thus the instructions will be issued ahead of time to deal with the delay.

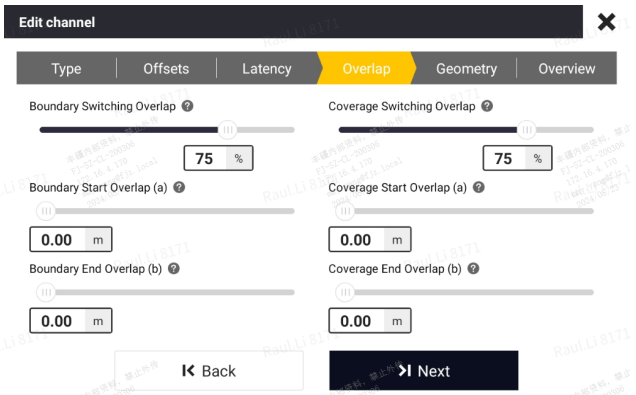
The latency of the channel will be automatically synchronized from the implement ECU and cannot be edited.



Channel - Overlap

To avoid waste of material and pollution, sections will be automatically closed when they are out of boundary or inside the worked area. The performance of overlapping control will be defined by the parameters on this page.

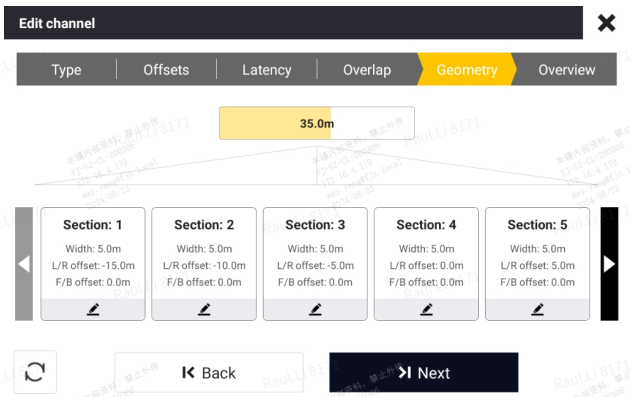
*Refer to the chapter "Overlapping settings" for details.



Channel - Geometry

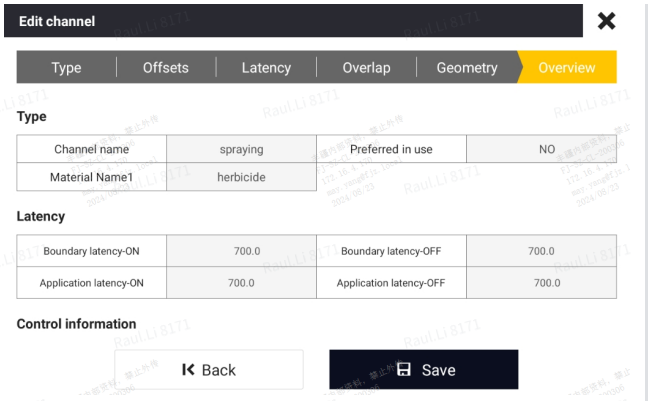
Number of sections and the width of each section will be automatically synchronized from the implement ECU. The total width of all sections is automatically calculated and displayed above.

*If the section width is not synchronized properly (the value is 0 in a few cases), it can be corrected manually by pressing the "edit" button.



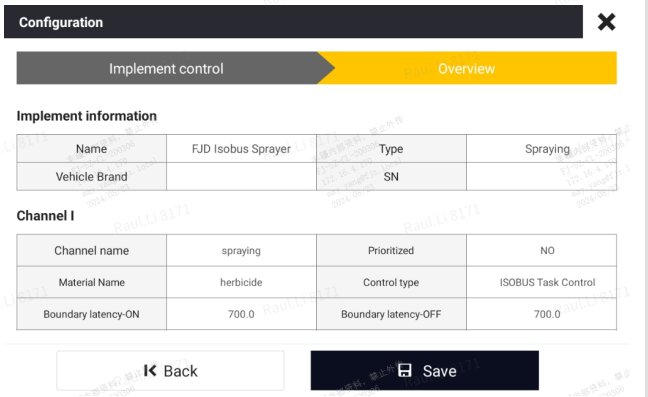
Channel - Overview

Summary of channel information.



Overview

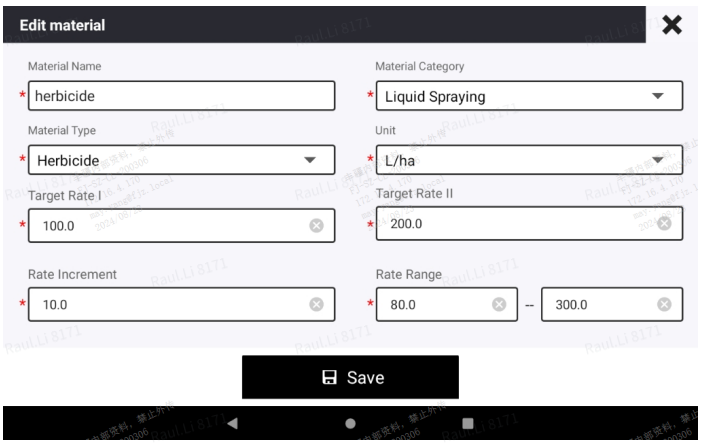
Summary of information of all channels.

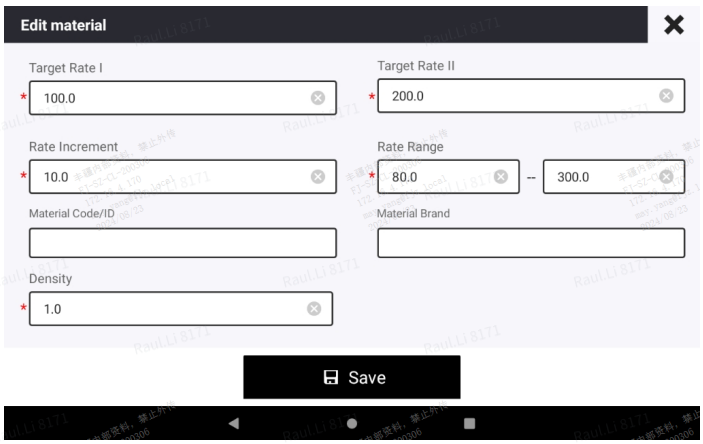


4.2 Material setup 物料设置

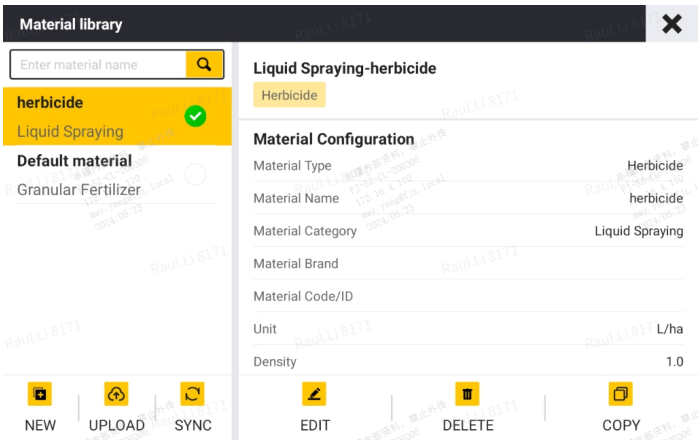
> MENU>>DEVICE SETTING>>Material Library
>
> **Video: Material setup.mp4**

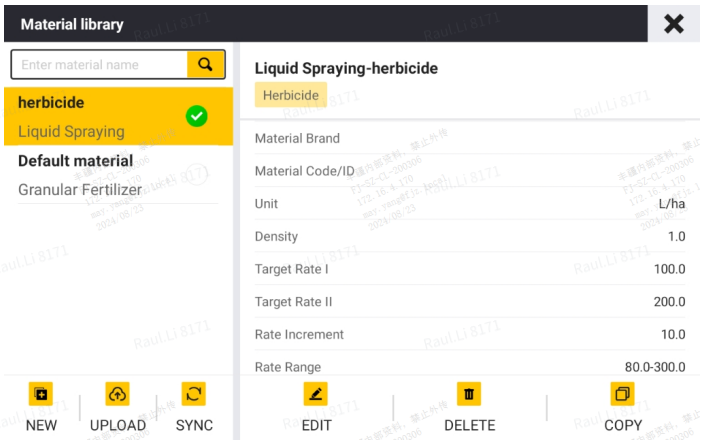
A material carries critical information of target rates. Create new material and set the rates properly according to the requirements of application scenario or cultural practice.





Parameter	Description
Target Rate	Amount of application (E.g. Volume per unit area)
Rate increment	Change in target rate with each adjustment
Rate range	Adjustable range of target rates





4.3 (Export & import of TASKDATA.XML 任务文件导入、导出)

> MENU>>APPLICATIONS>>Data Transfer

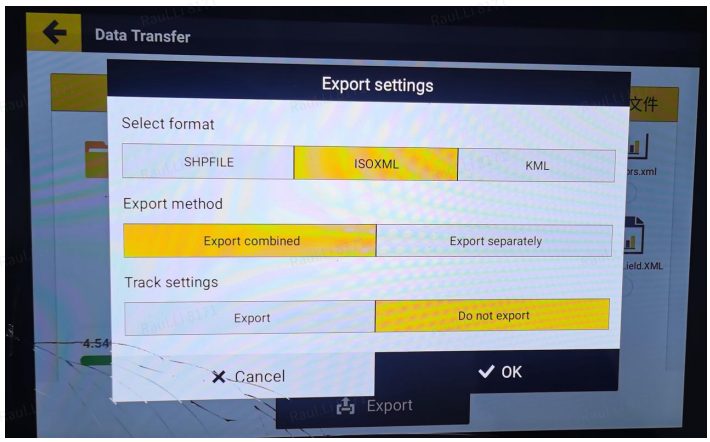
Tasks created on FMS platform or other control terminals can be imported in the form of a standard **TASKDATA.XML** file via Data Transfer.

4.3.1 Export a TASKDATA.XML file 导出一个TASKDATA.XML文件

Enter the Data Transfer interface, select a task file in the "Local" folder along the following path:

Field >> Client >> Farm >> Field >> Task >> TASKDATA.XML

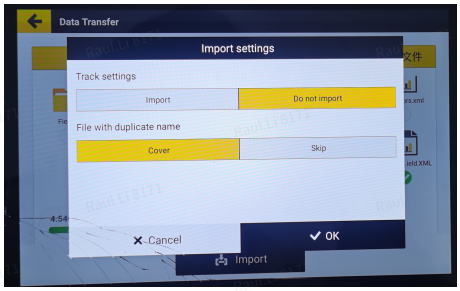
Click on the "Export" button and select file format "ISOXML", and select "export merged file". A standard TASKDATA.XML will be generated copied to the USB. If the task file contains tracks of the worked area, you may choose whether the tracks should be exported. If there is already a file that has the same file name as the file to be exported, you may choose whether you want to cover the existing file or stop exporting the file.

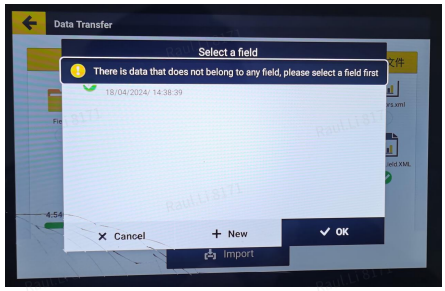


4.3.2 Import a TASKDATA.XML file 导入一个TASKDATA.XML文件

Enter the Data Transfer interface, select a TASKDATA.XML file or a folder that contains a TASKDATA.XML (which may also contain some external files that end with .xml). Click on the "Import" button and the task file will be imported and parsed. Please check the details of the imported task in MENU>>FIELD>>Field.

If the imported TASKDATA.XML does not contain information on Field, you have to select an exsiting field (you may also create a new field) to which the imported task belongs.





Note:

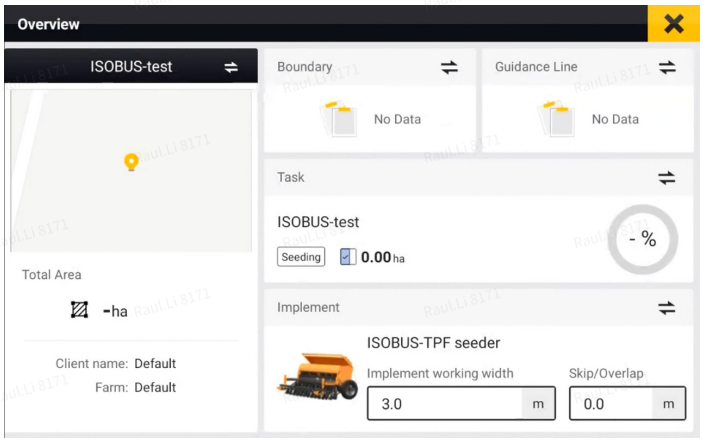
1. The imported task file should be named exactly as "TASKDATA.XML" (all capitalized).
2. When switching Field, Boundary, Guidance line or Task when there is an ongoing task, the task will be paused and can only be started manually after switching.

4.4 Task setup 任务设置

> MENU>>FIELD>>Field
>
> **Video: Task setup.mp4**

For quick setup of a new task, please go to the "Overview" section and complete the configuration of Field, Guidance line, Boundary, and Task. The implement is already configured as stated in the chapter "Configuration".

Note: Only the tasks that fall under the group of "Incompleted" can be applied.



4.5 (Prescription setup 处方设置)

4.5.1 Prescription map generation & import 处方图生成

> **Video:**
>
> FJD FMS--simple prescription: FJD FMS prescription.mp4
>
> FJD FMS--NDVI prescription: FJD FMS--NDVI prescription.mp4 Image Prescription
>
> Fieldview (third-party): Prescription generation.mp4

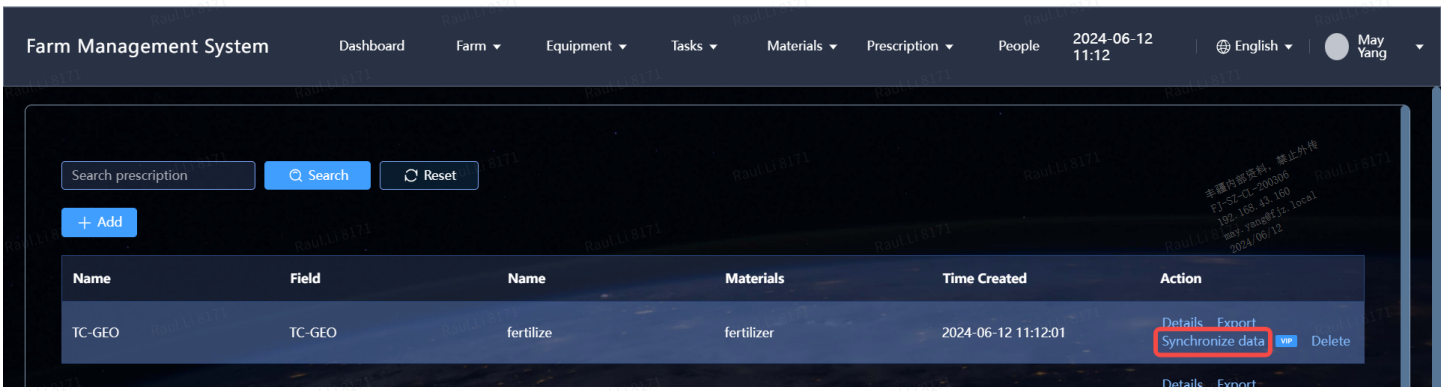
Please refer to the above videos and prepare a prescription map in advance.

Prescription maps in **XML**, **SHP** and **TIF** format are supported. You may check the imported prescription map in "Menu--FIELD--Field--Prescription".

Note:

XML(offline)--please import the XML file together with the bin file, or you may also import a zip file that contains the XML and bin file.

XML(online)--Online transmission of XML prescription map is supported with Farm management system. Choose synchronize data and the prescription map will be synchronized to the bonded terminal. You may check the imported prescription map in "MENU--FIELD--field--current field--current task--Prescription".



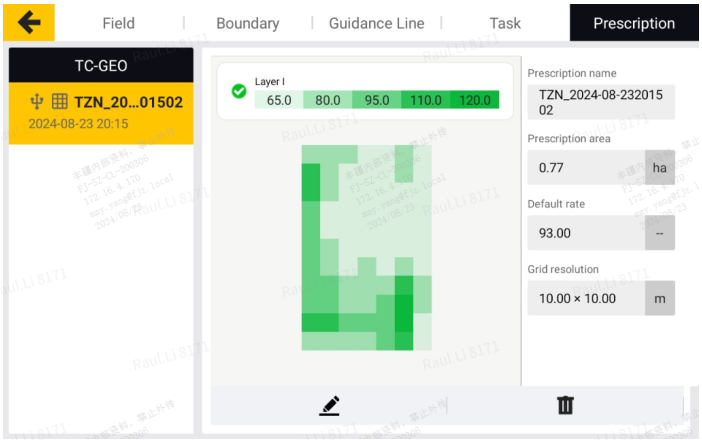
SHP--for prescription maps in SHP format, please add "prescription" (case insensitive) into the name of each file, otherwise they might be parsed as boundaries.

TIF--It may take some time (up to several minutes, depending on the file size) to import a TIF file, please wait patiently. You may check the imported prescription map in "MENU--FIELD--field--current field--current task--Prescription".

4.5.2 Prescription import & configuration 处方图导入

> MENU>>APPLICATIONS>>Data Transfer
>
> MENU>>FIELD>>Field
>
> **Video:** Import prescription map.mp4

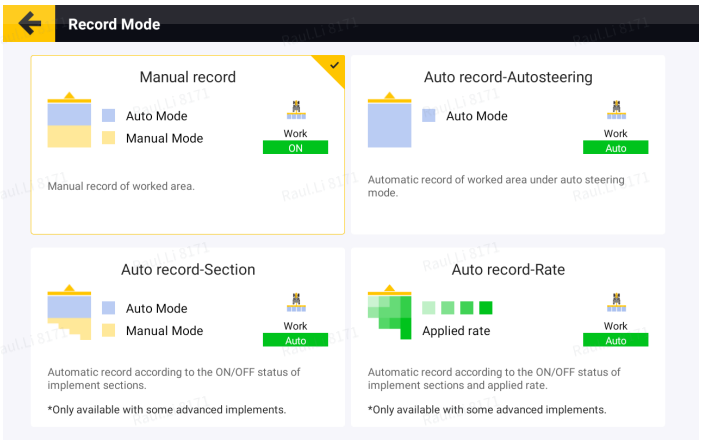
Import the prescription map via Data Transfer. Once imported successfully, you may find the prescription map in Field>>Prescription.



4.6 (Select recode mode 选择计亩模式)

Once an ISOBUS implement is applied, the system will automatically enable the "Auto record-Section" mode, with which the record status of the worked area is determined by the ON/OFF status of each implement section. The record and rendering is started automatically when a section is ON.

Note: You may also switch to other record mode but the record and redering will be less precise.



Record Mode	Record Strategy
Manual record	The record status is consistent with the task status. The record starts when the task status is switched to "ongoing".
Auto record-Autosteering	When the task is ongoing, the record status is consistent with the status of driving mode. The record starts when in autopilot mode.
Auto record-Section	When the task is ongoing, the record status is consistent with the status of implement sections. The record starts when the implement sections are on. *Only available with ISOBUS implements
Auto record-Rate	When the task is ongoing, the record status is consistent with the status of implement sections and the real-time applied rate. The record starts when the

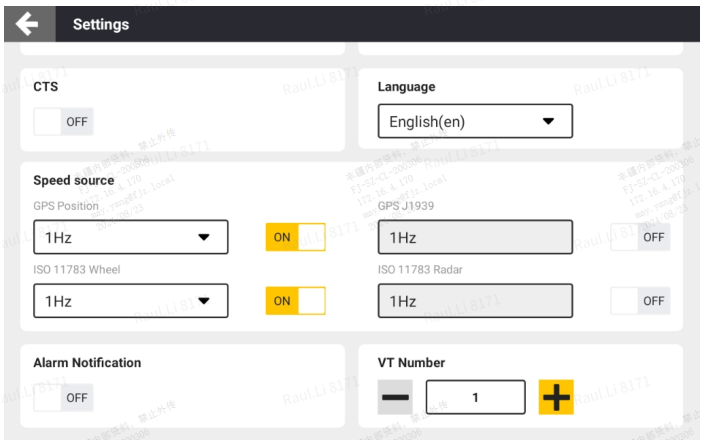
	implement sections are on and the applied rate is not 0. *Only available with ISOBUS implements when a prescription map is in use

4.7 Speed source setup 速度源配置

> Video: Speed source setup.mp4

Speed source should be configured before starting the operation, otherwise TC might not function properly. Ensure that the selected speed source is the same as what is set in the implement VT. The frequency must meet the communication requirements of the implement.

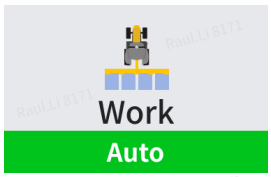
Note: Different implement manufacturers may require different frequencies. Confirm the frequency with the implement dealer if necessary.

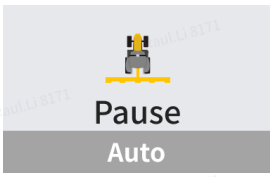


5. Start ISOBUS Operation 开始ISOBUS作业

5.1 Start/Pause task

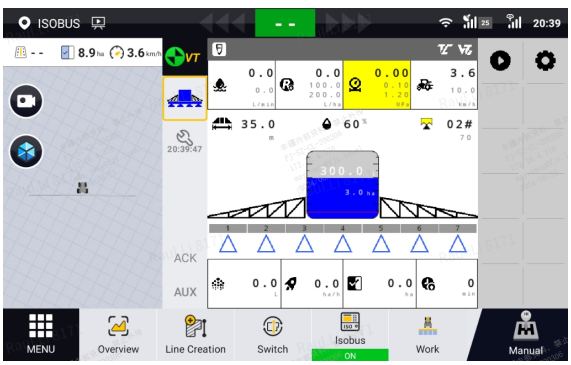
Click on the Start/Pause button in the Menu Bar to start a task. Please note when the task is paused, VT is still operable while TC may not function properly. Only when the task is started, does the system start to record the worked area.





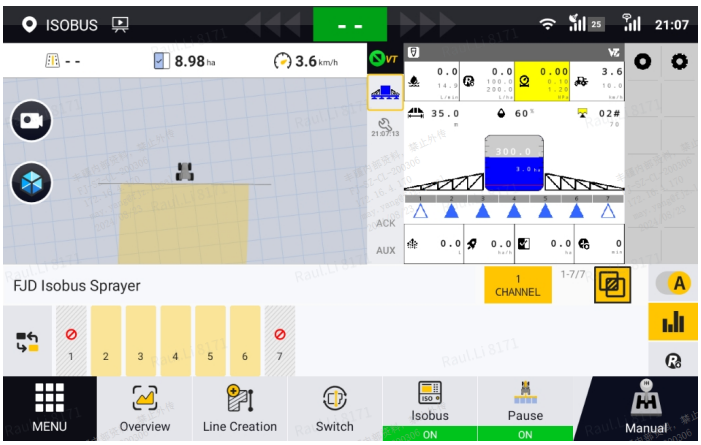
5.2 Main Screen Elements

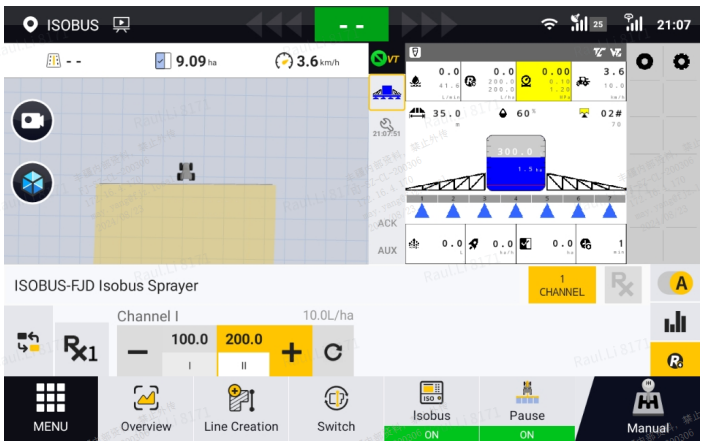
5.2.1 VT Window



No.	Element	Description
①	VT window	Implement VT screen, consisting of the following elements.
②	VT tab	Tab to switch between and activate VTs.
③	Settings	Fast entrance to ISOBUS settings.
④	Data mask area	Displays the implement status, information, and alarm messages.
⑤	Softkey area	Allows for screen switch and quick implement control.
⑥	ACK	Clears alarm pop-ups in VT.
⑦	AUX	Assign auxiliary inputs and functions.
⑧	Zoom button	Zooms in or out of the VT window.

5.2.2 TC Window





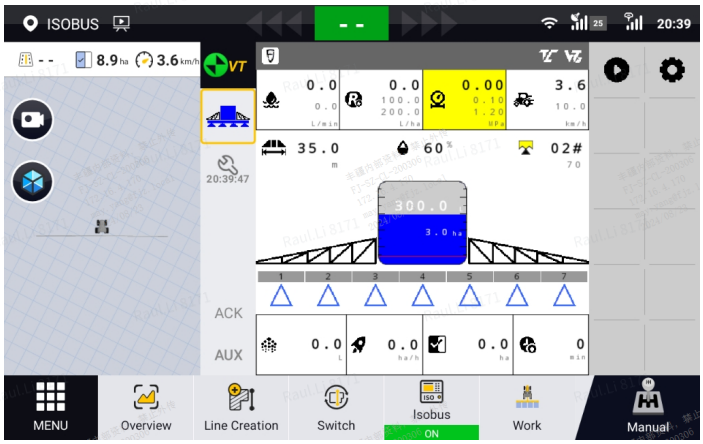
No.	Element	Description
①	TC window	Implement TC screen, consisting of the following elements.
②	Section control screen	Displays the section control information.
③	Manual/Auto mode	Switches the section control mode.
④	Section display area	Displays the section status and application rate.
⑤	Rate display 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.

5.3 VT operation

> Video: VT operation.mp4 VT operation.mp4 AT2 VT操作_20230722.mp4

The control terminal of the implement is taken over and displayed in the VT window. Check the running status of the implement and change implement settings are supported, as if using the original implement control terminal.

*When enabled together with TC, VT is minimized under the default layout. You may click on the VT button on the top right of the VT window to maximize it.



5.4 TC operation

> Video: TC operation (23.103.3).mp4 TC operation.mp4 Raven operation-VT&TC.mp4

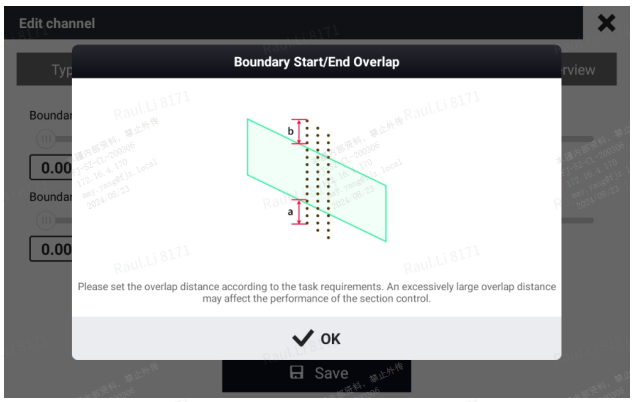
5.4.1 Section control 区段控制

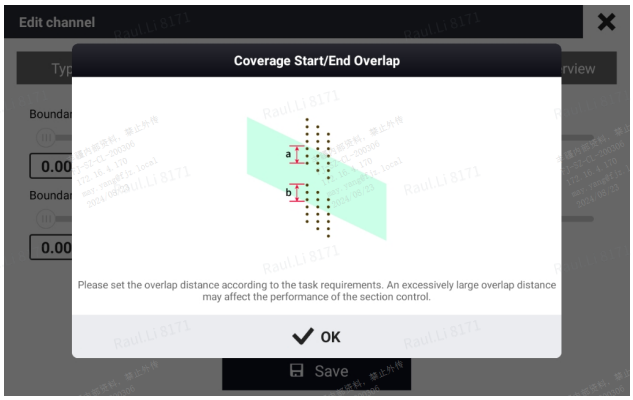
Sections will be turned on and off automatically under auto mode when passing the selected bonudary and the worked area, according to the settings of latency and overlap, etc. You may also switch to manual mode and turn on and off each section manually.

5.4.1.1 Overlapping settings

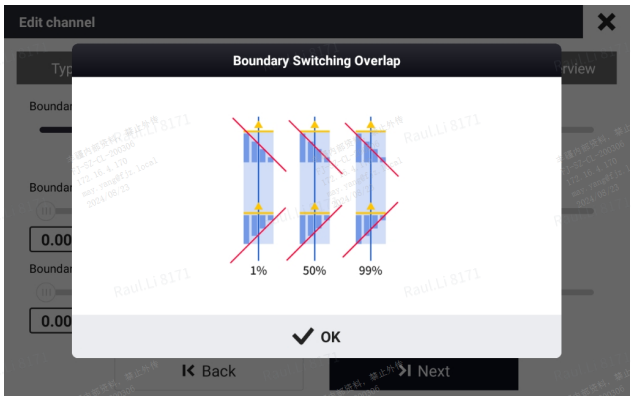
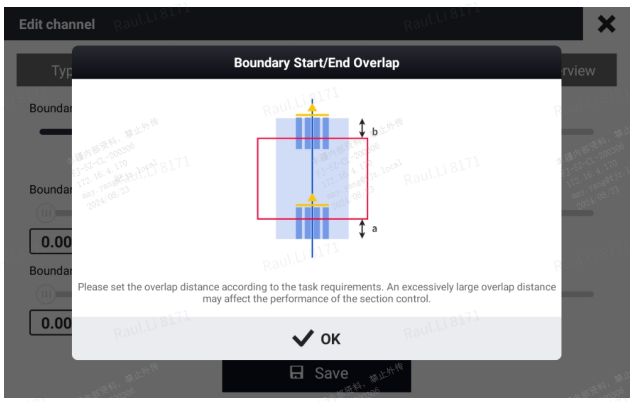
The overlap settings are slightly different between an applied material that is "Granular Seed" and others.

Overlap settings for "Granular Seed"

Description	Interface
Boundary Start Overlap (a) **Boundary End Overlap (b)**	
Coverage Start Overlap (a)	

Coverage End Overlap (b)	

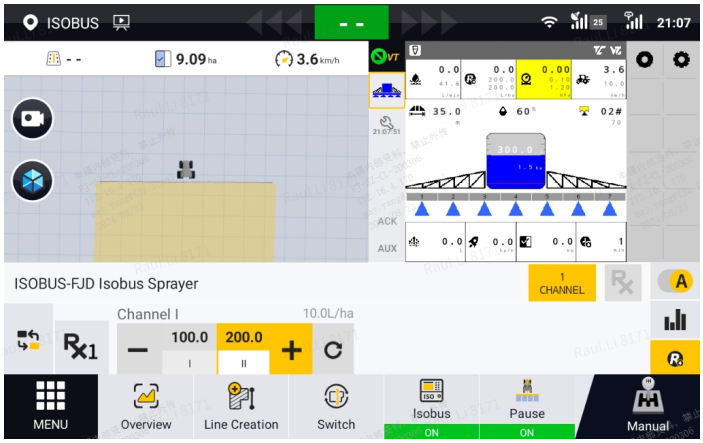
Overlap settings for other materials

Description	Interface
Boundary Switching Overlap **Boundary Start Overlap (a)** **Boundary End Overlap (b)**	 
Coverage Switching Overlap **Coverage Start Overlap (a)** **Coverage End Overlap (b)**	

5.4.1.2 Special section control strategy

5.4.2 Rate control 速率控制

Once material is configured for each channel, the implement will follow the target rate set with the selected material. You may also adjust the target rate by pressing the "+" and "-" button during operation, the adjustment step is determined by "Rate increment" and adjustment range by "Rate range".

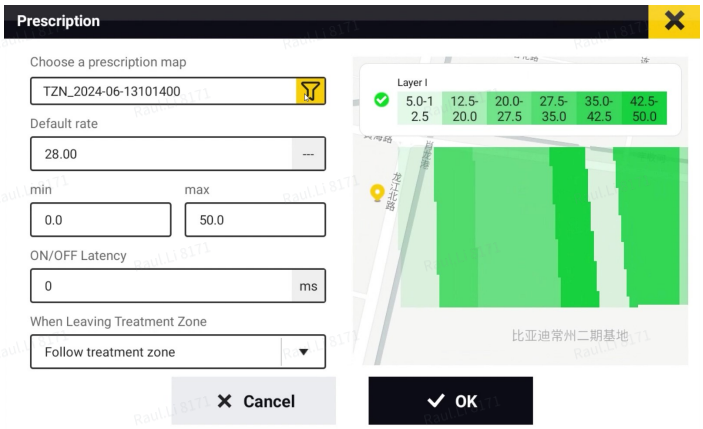


5.4.3 GEO (Variable rate) 处方图可变速率

> **Video:** TC-GEO application.mp4

Click on the Rx button and select a prescription map for the current channel. Configure the necessary parameters such as default rate and latency.

When there is a prescription map selected, you may switch to Rx mode and apply a certain prescription map.

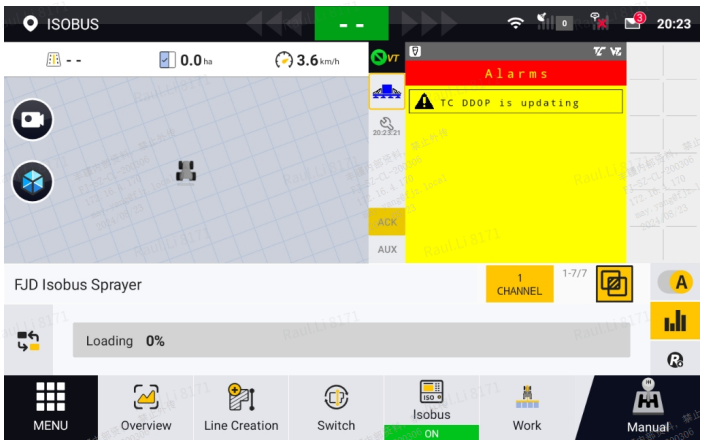


> When Leaving Treatment Zone
>
> --Follow treatment zone: the target rate remains the same as it leaves the treatment zone
>
> --Default rate: the target rate switches to the default rate when it leaves the treatment zone
>
> --Stop operation: sections will be all off (operation is stopped) when it leaves the treatment zone

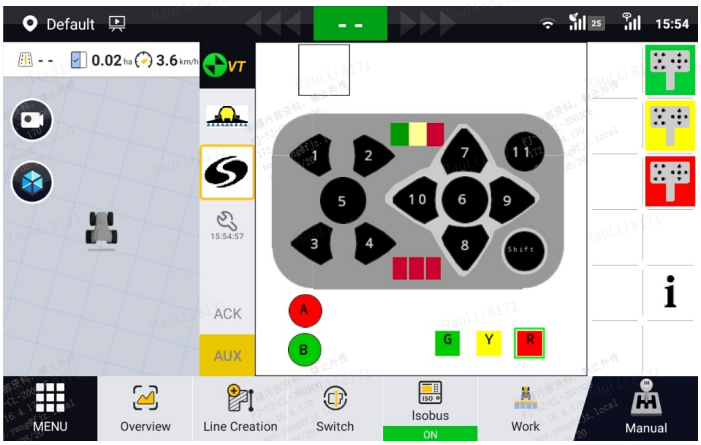
You may see the legend above the navigation map that indicates the relationship between the rate and the rendering color.

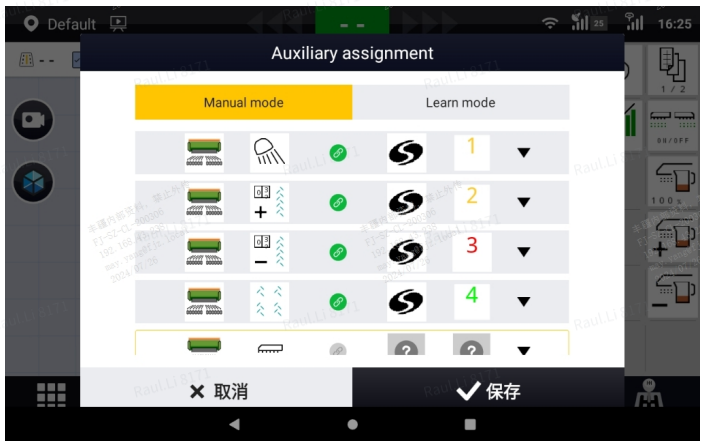
5.5 TC object pool updated

The implement ECU might update its TC object pool when the implement geometry is edited in VT. The task will be paused until the new TC object pool finishes the transition.



5.6 AUX-N





6. ISOBUS Module ISOBUS模块

> MENU>>APPLICATIONS>>ISOBUS

ISOBUS Module provides the buttons to activate and enable ISOBUS functions.

Basic information of the implement ECU and the operating parameters is displayed at the

top right.

The main interface of the ISOBUS module also provides three other entrances, which are described in details below.

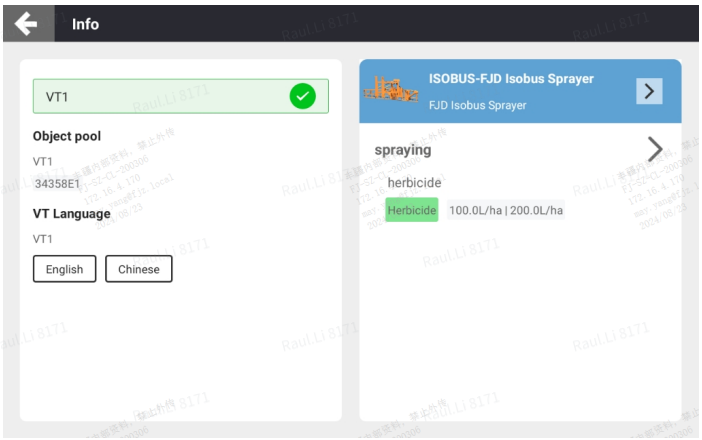
6.1 Implement Info 机具信息

> MENU>>APPLICATIONS>>ISOBUS>>Info
>
> **Video: Implement configuration.mp4**

The Info sector is split into two parts.

The left column contains VT information, such as the loading progress, object pool file and supported language of each VT.

The right column shows the implement bound with implement TC and the material used for the channel. The arrow on the right is provided to quickly jump to the material library to switch to other materials.

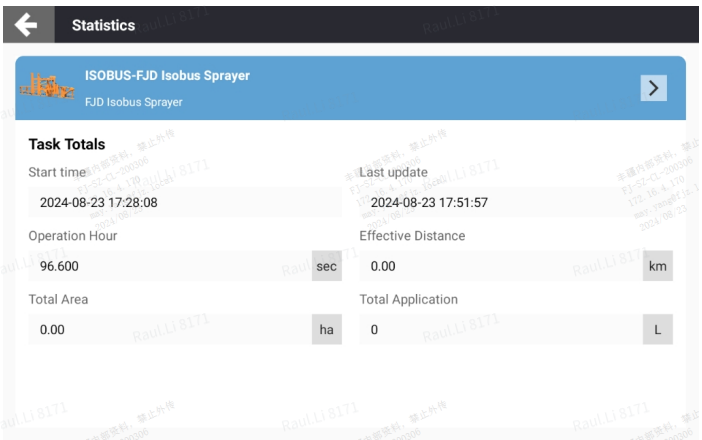


6.2 Statistics 数据

> MENU>>APPLICATIONS>>ISOBUS>>Statistics

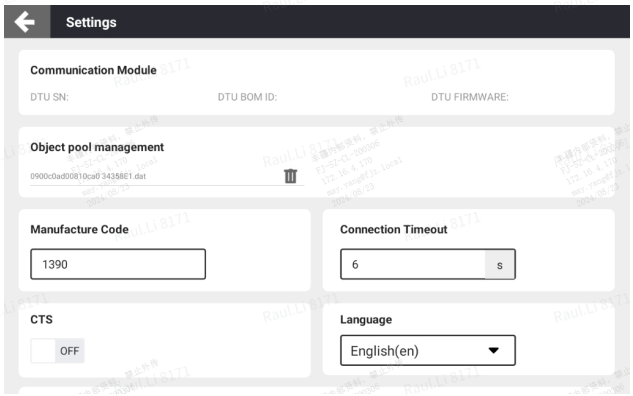
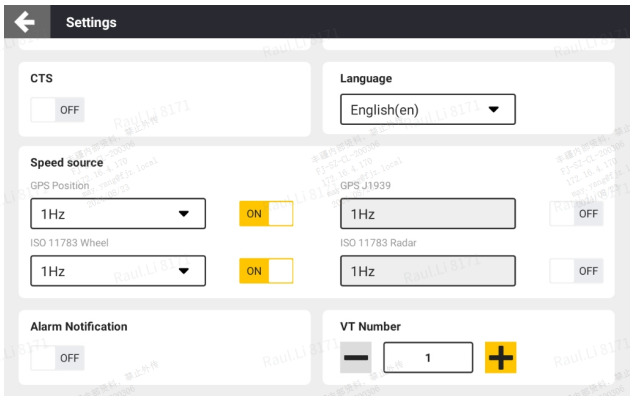
Statistics of the current task such as operation time and operation area can be checked in the Statistics sector.

You may check the statistics of the current task here. If the implement doesn't report task totals, the relative data will go blank.



6.3 Settings 设置

> MENU>>APPLICATIONS>>ISOBUS>>Settings
>
> **Video: Diagnosis.mp4**

ISOBUS related settings are displayed in the Settings sector. There is also a fast entrance to these settings in the VT window, below all the VT tabs.

Description	Interface
Communication Module Reporting of version information is supported by new DTUs with firmware version 2.2.0.0 and above. **Object pool management** Please be careful when deleting the VT object pool that is currently in use. Once deleting it, you need to wait for the VT object to be loaded next time you turn on the system. **Manufacturer Code** 1390 is the manufacturer code of FJDynamics. Please do not change it unless instructed by the dealers or service people. **Connection Timeout** If the heartbeat signal of the implement is not detected for a while, it is seen as disconnected. Please do not change it unless instructed by the dealers or service people. **CTS** Retransfer will be attempted when VT object pool transfer is interrupted by CTS mechanism. **Language** All language options provided by VT are presented in the pull-down list. Select the intended language and it will take effect on all connected VTs. **Speed source** Refer to the chapter "Speed source setup". **Alarm Notification** Once enabled, the terminal will produce an alarm sound when there is an alarm mask in VT. **VT Number** VT number is recommended to be set to 1. Please do not change it unless instructed by the dealers or service people.