FARMDROID

Field Setup Tool

Version 1.0 – Valid from February 2024

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EU Declaration of Conformity

Manufacturer

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Equipment:	RTK Survey Rod
Brand:	Farmdroid
Marketing Name:	**Field Setup Tool**
Model Name:	FST v1.0
	101011070(Rxx)

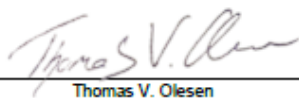Example photo, setup may vary

Accessories: FST Controlbox, GNSS antenna, Survey Rod, Powerbank, Transportation case

We, Farmdroid ApS, declare under our sole responsibility that the abovementioned product is in conformity with the relevant Union harmonization legislation:

- Radio Equipment Directive (RED) 2014/53/EU
- RoHS 2 Directive 2011/65/EU with Directive (EU) 2015/863
- REACH SVHC Regulation (EC) No. 1907/2006

The following harmonized standards and technical specifications have been applied:

Safety	EN 62368-1:2014 +AC:2015+A11:2017
EMC	ETSI EN 301 489-1 V2.2.0
	ETSI EN 301 489-17 V3.1.1
	ETSI EN 301 489-19 V2.1.0
Radio	ETSI EN 303 413 V1.1.1 (2017-6)
	EN 300 328 V2.2.2
Health	EN 62479:2010

(signature) Thomas V. Olesen

Head of R&D
Position

20-02-2024, Vejen
Date / Place

Ver. 1.0 20-02-2024

1   General Information

This user manual is exclusively for the FarmDroid ApS Field Setup Tool and the associated GPS-antenna.

In this manual, two different symbols are used to indicate sections and paragraphs of special attention to the user.

🛈   Used to draw special attention to important **operational** related information.

⚠   Used to draw special attention to important **safety** related information.

For more detailed guidance and support, please refer to the FarmDroid Guidelines which can be found in the knowledge base or contact your local distributor.

FarmDroid Knowledge Base:

https://knowledge.farmdroid.io/

Manufacturer contact information:

FarmDroid ApS
Industrisvinget 5
DK - 6600 Vejen

Web: www.farmdroid.com
Mail: info@farmdroid.com

2   Prior to use

The Field Setup Tool (FST) is a product to survey fields where you are planning to operate with the FD20 robot. The FST registers the coordinates of the field borders through RTK-based surveying equipment and send the information directly to the robot via the FarmDroid App.

2.1   Important disclaimer on the use of the Field Setup Tool

The Field Setup Tool is not intended to be used when the robot has started an autonomous operation in the field, and it is required that the robot is standing still while the operator is surveying a new area.

The reason for this is that once the procedure of creating a field with the FST has been completed, the data will be pushed to the robot, generating a calculation of the surveyed field and therefore losing the temporary data for the specific field where the FD20 is operating. While this is not an issue while the robot is weeding, as the operation can be simply restarted, it is more severe when seeding, as the robot will lose the position of the seed which have been drilled in that seeding session. **Therefore, FarmDroid strongly recommend surveying a field either before the robot starts a seeding operation or once the operation has been completed.**

2.2   Requirements

To be able to use the FST, you need:

1. A Smartphone (IOS or Android) with at least Bluetooth 4.0
2. The FarmDroid App installed in your smartphone and an active account
3. An FD20 robot and a Base Station
4. The Field Setup Tool

2.3   Install the FarmDroid App on your smartphone

The FarmDroid App can be found on both Google Play and the Apple Store. Install and follow your phone instructions throughout the process. After a successful installation, the App can be started from your smartphone.

2.4   Assembly the Field Setup Tool

The surveying pole comes pre-assembled at FarmDroid, eliminating the need for additional tooling upon delivery. However, you are still able to adjust the height of the bubble level and mobile phone holder by untightening the two screws located at the side of the holder and adjusting its position before retightening the screws.

Ensure that the following items are present in the bundle and assembled according to the specifications reported below:

- GPS antenna
- Antenna cable
- Electrical box
- Power-bank
- USB to USB-C cable
- Smartphone holder with bubble level

Ensure that the GPS antenna is connected to the GNSS converter using the GPS antenna cable, and that the GNSS converter is connected to the power-bank using the USB to USB-C cable. For convenience, the power-banks led indicator can show the amount of power left.

It is advisable to charge the power bank to its full capacity using the provided charger, before proceeding with the following steps.

2.5   FST assigned to your account in the FarmDroid App

Scroll down in the FarmDroid App main page to the section "Tools", you should be able to see that a FST has been assigned to your account.

The identification code of each FST is based on this scheme: **YYYY 004 XXXX** (for example 20240040001)

Where:

- **YYYY** stands for the production year
- **004** is the internal code for the FST
- **XXXX** stands for the 4-digit production serial number
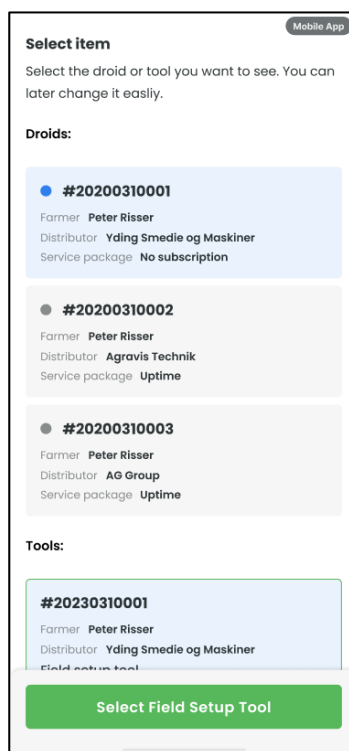
IMAGE 1

If you can't see any Field Setup Tool assigned to your account, you need to contact your local FarmDroid Distributor or the FarmDroid Care team before proceeding further.

3 Create a new field

3.1 Select the correct Field Setup Tool S/N

To begin the process of creating a new field using the Field Setup Tool (FST), please navigate to the FST module under the section "TOOLS" at the bottom of the page (IMAGE 2). Choose the FST and tap the green button "Select Field Setup Tool" at the bottom of the screen.

Subsequently, select "Start setup" to proceed to the next page (IMAGE 3).

3.2 Write the field name and select the droid

The field name entered is not required to be unique, although it is recommended to choose a recognizable name, as it will serve as the identifier for the field.

Tap on "*Select droid*" to select the droid from the list that is intended to receive the field. It's important to note that while these settings can be modified later, they will be used as identifiers for where to send the field (IMAGE 4).
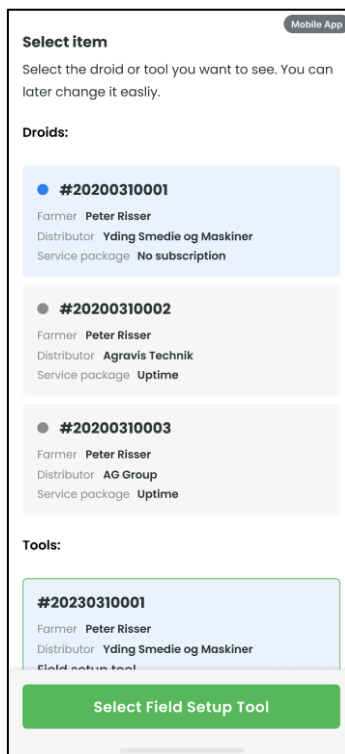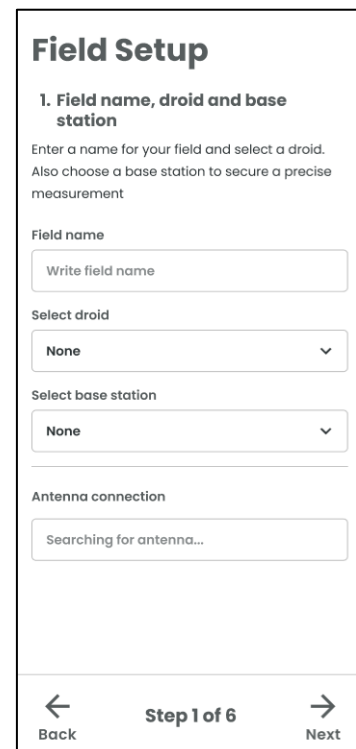

IMAGE 2
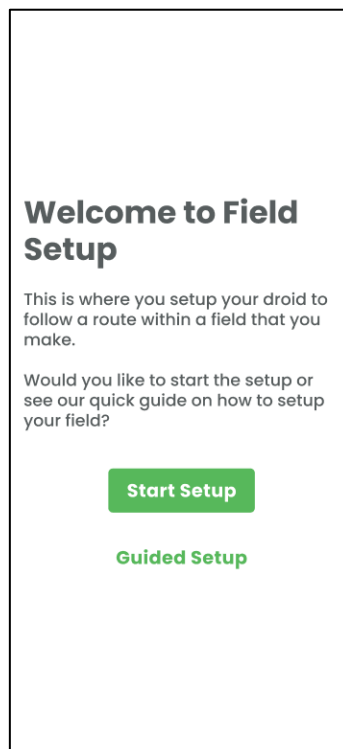
IMAGE 3

IMAGE 4

ℹ️ ***Once the FST is activated, all progress is automatically saved locally on the smartphone**. This allows users to initiate FST, close the smartphone, or exit the app without losing any data. **However, it's essential to be aware that once the field has been successfully sent to the droid, the progress is reset.** Subsequently, it will no longer be possible to fetch the temporary data from the phone or the FST.*

3.3 Connect to a Base Station v3.0

To achieve a centimetre-level degree of accuracy with the FST, just select your Base Station v3.0 from the drop-down menu in the FarmDroid App (IMAGE 4).

This procedure is suitable only for users connecting to the new generation of Base Station (v3.0 – from year 2024)

ⓘ *If you wish to use the Field Setup Tool with a Base Stations v2.0 (IMAGE 5), please contact your local Distributor or FarmDroid Care for being guided in the set-up.*
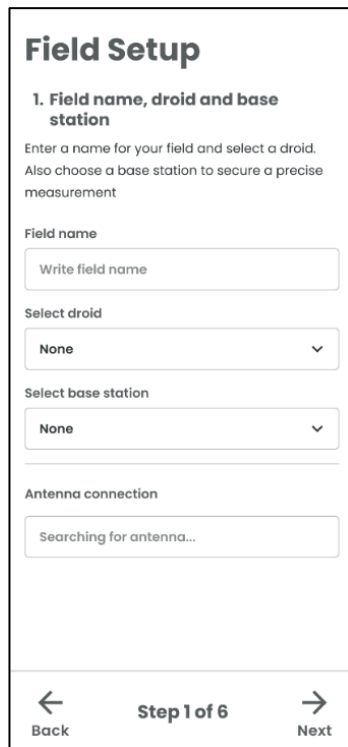

IMAGE 5 Base Station v2.0

3.4   Connect the FST to the App

The Field Setup Tool (FST) operates independently of the smartphone's internal GPS. Instead, it utilizes Bluetooth to establish a connection between the mobile phone App and the GNSS receiver. The App seamlessly searches and connects to Bluetooth automatically.

This process can be observed on the setup page, where a box with the text "searching for antenna" is located at the bottom. Upon a successful connection, the box will turn green, indicating "antenna connected."

In the event of a connection failure, the box will turn red, and a retry button will appear for reconnection attempts. If the FD App receives no signal from the FST, a message will be displayed to inform the user of the absence of signal.

IMAGE 6

IMAGE 7

IMAGE 8

3.5   Check for stable RTK correction

When your device receives a GNSS signal the FD App checks for a stable RTK accuracy. Upon achieving it, a confirmation message appears as an additional green colour indicator next to the "GNSS fix" line, in the top left corner of the map view, and your current position is displayed as a dot. (IMAGE 9)

ℹ️ *A coordinate cannot be recorded unless the precision accuracy is minimum RTK fixed. If the GNSS precision is less, a message informs that RTK accuracy is low and asks to wait or relocate to improve signal strength. When GNSS precision is RTK fixed the user can record a coordinate, and that coordinate will be added to the layer.*
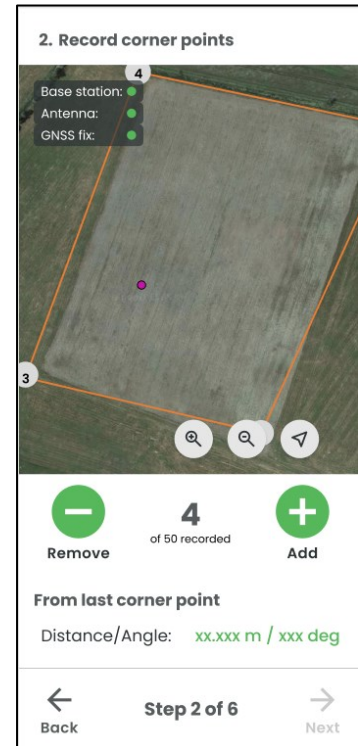

IMAGE 9

3.6   Record the field coordinates

When using the Field Setup Tool (FST) you can record the coordinates of two different elements: field and obstacles.

In the FarmDroid App, you are provided a step-by-step guide to record both the field as well as potential obstacles. The procedure is divided into three subsequent steps:

1. **Record the coordinates of the field boundaries**. It requires a minimum of 3 coordinates before proceeding to the next step. (IMAGE 10)
2. **Record the coordinates of any obstacle**. This step is not mandatory, but if you are creating an obstacle, it requires a minimum of 3 coordinates before proceeding to the next step. (IMAGE 11)
3. **Select the AB line from any of the recorded coordinates**. It is now possible to see the GPS coordinates of the AB line to eventually insert them manually in a third party equipment (IMAGE 12 and IMAGE 13)

The FST facilitates an organized data storage and will continuously save the progress as coordinates are being recorded. It is therefore safe to close the app during recording of the field or the obstacle.

3.6.1 Survey the correct position

1. Place the surveying pole on the ground and use the bubble level to have true vertical position
2. In the FarmDroid App press the add (+) button. If done correctly, a round icon with a number will appear in the map.
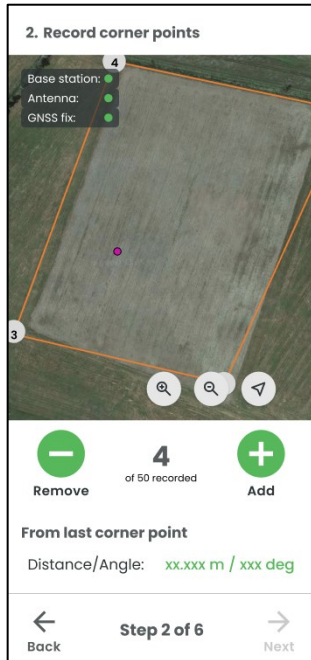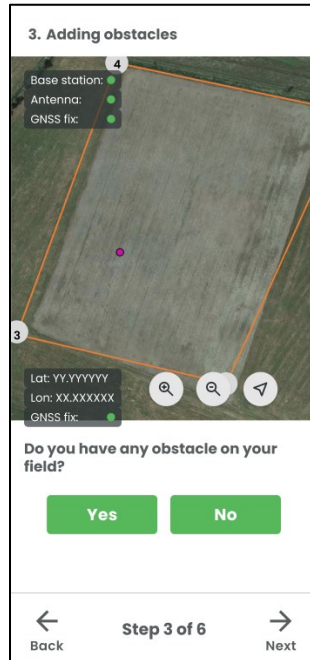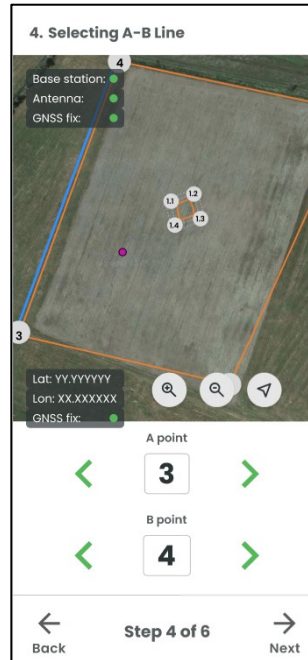

IMAGE 10

IMAGE 11

IMAGE 12

IMAGE 13

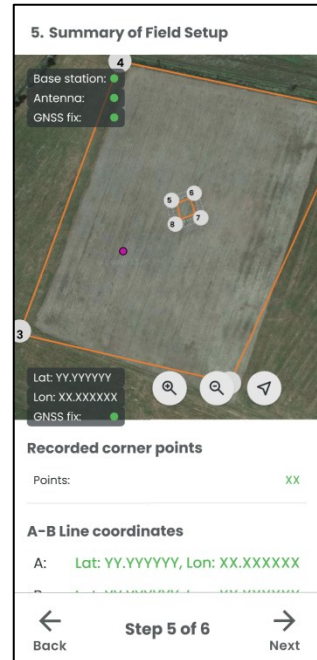⚠️ **When surveying a position, regardless of whether you are creating a field or an obstacle, it is of utmost importance not to survey a position that is either above, inside or below an obstacle (**IMAGE 14**). Instead, make sure to survey a position that is next to that obstacle or, in case of a tall obstacle (e.g. a tree) to keep a distance, so that the obstacle won't disturb the signal of the GPS (**IMAGE 15**).**
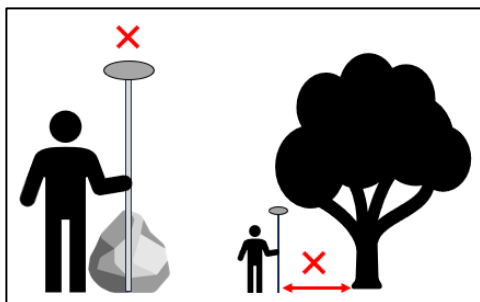

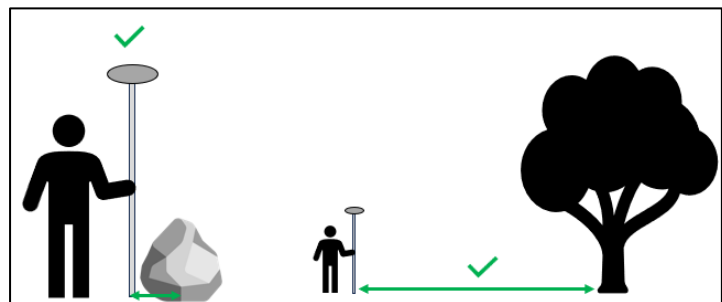*IMAGE 14*

IMAGE 15

DO NOT SURVEY A POSTION ABOVE, INSIDE OR BELOW AN OBSTACLE

YOU CAN SURVEY A POSITION NEXT TO AN OBSTABLE AND YOU MUST KEEP A DISTANCE FROM TALL OBSTACLES (e.g. trees)

ℹ️ *If an obstacle layer is closed without any recorded coordinates, it is not saved.*

ℹ️ *Longitude and latitude are by default set to display according to the datum WGS-84.*

3.6.2 Delete a recorded coordinate

It is only possible to delete points in reverse order that they have been created (last in, first out principle). To delete the last created coordinate in the FST app press the add (-) button.

3.7 Send the field to the droid

The FD20 has the capacity to store up to 20 fields simultaneously.

To designate a storage location within the droid, choose a field number from the list ranging from 1 to 20. Once the field number is selected, press the green button labeled "send field to robot" (IMAGE 16). This action initiates the transmission of the field to the droid. (IMAGE 17)

In cases where the selected field number already has a stored field, a notification will prompt on the app, seeking confirmation to overwrite the existing data. If overwriting is not intended, press cancel and select an alternative field number. (IMAGE 18)

Upon the successful transfer of the field to the droid, a notification stating "Field Setup Completed" will be displayed. Pressing the "Close" button will navigate back to the main page. (IMAGE 19)
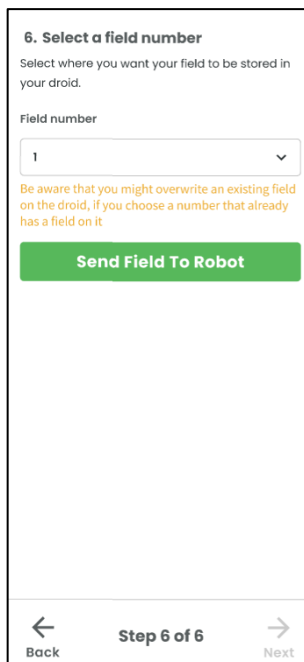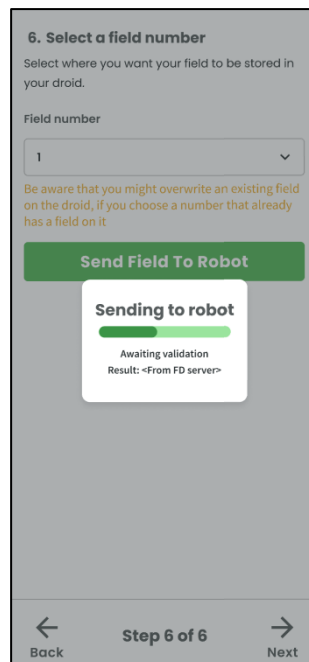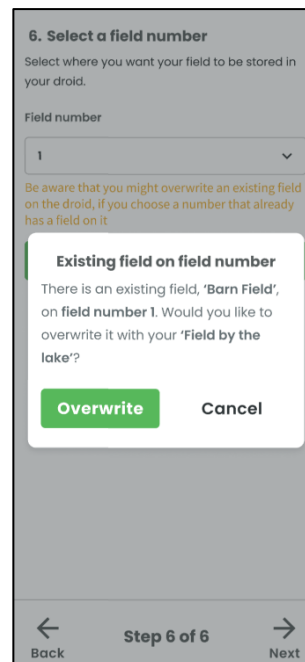
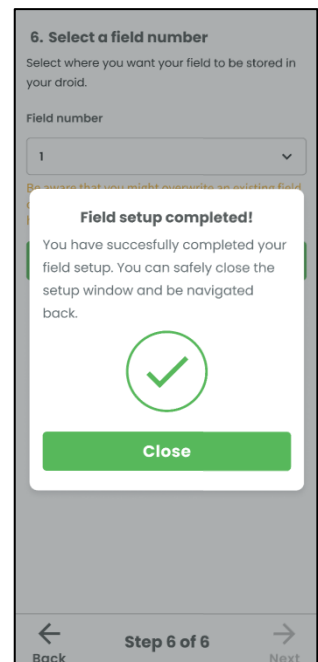

IMAGE 16   IMAGE 17   IMAGE 18   IMAGE 19

3.8   Validation of the field before sending to droid and error handling

Before it's possible to store a field in the droid. The FarmDroid App makes a validation test to search for and prevent errors from occurring in the droid. The validation will potentially result in messages being prompted about how the process is going, and potentially how actions are needed before the field can be sent to the droid.

When the app's initial validation has passed, the FD servers will handle and distribute to the specified droid. After a passed confirmation that the field has been received by the droid, the app informs that a successful transfer has been made. If the validation fails, FD server will respond with a failed validation and the app presents the recording view and a message of how to proceed.

Once the survey task has been completed, please remember to unplug the Power Bank from the Field Setup Tool in order to prevent the battery from draining.