

User Manual

TinyLineMarker Sport

Version 1.0
Published 20 January 2021



Contents

1	Introduction.....	1
1.1	TinyLineMarker Sport robot.....	1
1.2	Reading instructions.....	1
1.3	Safety.....	2
2	Robot overview.....	4
2.1	Included in the box.....	4
2.2	TinyLineMarker Sport components.....	5
2.3	Technical specifications.....	6
3	Getting started.....	7
3.1	Batteries.....	7
3.1.1	Charging the robot battery.....	7
3.1.2	Attach the robot battery and power ON.....	8
3.1.3	Detach the robot battery and power OFF.....	8
3.1.4	Charging the tablet battery.....	8
3.2	Turn ON/OFF.....	9
3.2.1	Turning ON the robot and tablet.....	9
3.2.2	Turning OFF the robot and tablet.....	9
3.2.3	Restarting the robot and tablet.....	9
3.3	Spray tool.....	10
3.3.1	Mounting of nozzle.....	10
3.3.2	Height adjustment.....	10
3.4	Prime pump system before use.....	11
3.5	Clean pump system after use.....	11
4	Functionality of TinyLineMarker Sport.....	12
4.1	Automatic and manual mode.....	12
4.2	Control panel and status light.....	12
4.3	TinyLineMarker tablet and app overview.....	13
4.3.1	Top bar of tablet.....	14
4.3.2	Top bar of app.....	14
4.3.3	Background map and joystick.....	16
4.3.4	Bottom bar of app.....	16
4.4	TinyLineMarker app.....	16
4.4.1	Sports templates.....	16

4.4.2	New field by collecting points	17
4.4.3	New field using the map.....	18
4.5	Selecting/deselecting fields.....	19
4.5.1	How to select an existing field on the map	19
4.5.2	How to deselect a field on the map.....	19
4.6	Modify templates	19
4.6.1	Editing a field.....	19
4.6.2	Copy a field.....	20
4.6.3	Delete a field	20
4.7	Start/Test template.....	21
4.7.1	Start marking a field with paint.....	21
4.7.2	Test field without paint	21
4.8	Add templates	21
5	Cleaning after every use	22
6	Maintenance	23
6.1	Robot cover	23
6.2	Motor wheels	23
6.3	Caster wheels.....	24
6.4	Hose system	24
6.5	Pump	25
6.6	Spray tool.....	25
6.7	Battery.....	26
6.8	GNSS/Bluetooth/Cellular Antenna	26
6.9	Cleaning TinyLineMarker Sport.....	27
7	Trouble shooting	28
8	Warranty	30
9	Environmental information.....	31
10	Other Information.....	31

1 Introduction

Welcome to the user manual for TinyMobileRobots' TinyLineMarker Sport.

1.1 TinyLineMarker Sport robot

Congratulations on your purchase of TinyLineMarker Sport. With this machine, marking fields will be easier than it's ever been before!

TinyLineMarker Sport is an automotive robot that performs the same job as an old-fashioned line marker; but with new position technology and smart integrated software, it makes marking autonomous!

TinyLineMarker Sport can perform first-time field markings easily and quickly—and when a field needs to be repainted, the saved fields can be found on the TinyLineMarker app and marking can begin right away.

1.2 Reading instructions

Being aware of TinyLineMarker Sport's functions can help you obtain the best marking result and the most effective use of TinyLineMarker Sport. We recommend that you thoroughly read this user manual to gain a better understanding of TinyLineMarker Sport's capabilities.

For more information and FAQ about TinyLineMarker Sport, visit the TinyLineMarker Sport website:
www.tinylinemarker.com.

IMPORTANT INFORMATION

Be aware that you are responsible for any accidents or risks involving other people or their property.

At TinyMobileRobots, we are constantly working to improve and develop our products; hence, TinyMobileRobots reserves the right without notice to change the appearance and/or features of the device and/or software.

To make this user manual easy to use, we are employing the following system.

- Text with *Italic font* is used when referring to names in the TinyLineMarker app or referring to other sections in the manual.
- To describe a menu path in the TinyLineMarker app, following convention is used: *Settings>Robot Settings>Joystick speed*.



Indicates useful information and tips about the use of the product.



Indicates a warning that must be understood and followed.

1.3 Safety

For the safety of you and TinyLineMarker Sport's working environment, the listed safety instructions must be followed:

IMPORTANT INFORMATION

Read the user manual thoroughly before using TinyLineMarker Sport in order to understand the content and the way in which TinyLineMarker Sport operates.

WARNINGS

Incorrect operation and misuse of TinyLineMarker Sport can create dangerous situations!

The battery must be fully charged when stored.

The battery must be charged every third month if stored for a longer period.

TinyMobileRobots can never be held responsible for any harm or damage done by TinyLineMarker Sport.

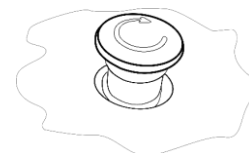
TinyLineMarker Sport must be fully stopped if children, animals or objects enter the workspace.

Never use TinyLineMarker Sport to transport people, animals or objects. Never place any objects on TinyLineMarker Sport—doing so could lead to the fatal damage of TinyLineMarker Sport, people, animals or other objects.

A STOP button is placed on the top of TinyLineMarker Sport. This button will stop all TinyLineMarker Sport driving activity. Push the STOP button if a dangerous situation is about to occur.

Whenever TinyLineMarker Sport is in automatic driving mode, a STOP button will appear in the TinyLineMarker app. Use this STOP button to stop TinyLineMarker Sport if a dangerous situation is about to occur.

Both the STOP button on the robot and the STOP button on the tablet will force TinyLineMarker Sport into manual mode,



Emergency STOP button



STOP button in TinyLineMarker app

and you must ensure that the situation is safe before restarting operation.

The TinyLineMarker app enables the remote control of TinyLineMarker Sport. The app must never be let out of your sight. You are always responsible for the safety of all persons, animals and objects within TinyLineMarker Sport's workspace.

TinyLineMarker Sport must only be used outside in open areas, e.g., a football field. Ensure that no obstacles are nearby when operating TinyLineMarker Sport in manual or automatic mode.

Always turn off TinyLineMarker Sport when performing inspections or maintenance. To turn off TinyLineMarker Sport, turn the battery key counterclockwise.

Only an authorized technician may open and conduct service inside TinyLineMarker Sport's electronic box.

TinyLineMarker Sport must be turned off when not in use and during transportation.

TinyLineMarker Sport is designed to be water resistant to rain and other weather conditions. Never cover the entire robot, or parts of the robot, with water, as this may cause fatal damage to the device.

Do not use high-pressure cleaning devices on the robot, as this will damage the robot.

WARNING

Do not use high-pressure cleaning devices on the robot, as this will damage the robot.



2 Robot overview

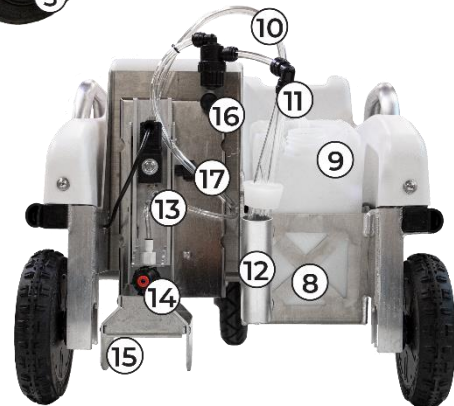
2.1 Included in the box

In the box with your new TinyLineMarker Sport, you will find:

- 1x TinyLineMarker Sport robot
- 1x Tablet with preinstalled TinyLineMarker App
- 1x Tablet charger and charger cable
- 1x TinyLineMarker Sport battery
- 1x Battery charger and power cable
- 1x Paint container, 5 liters
- 1x Plug for paint container
- 1x Nozzle package
- 1x User manual
- 1x Quick start guide

2.2 TinyLineMarker Sport components

- 1) TinyLineMarker Sport
- 2) Control panel
- 3) Handles for lifting
- 4) Safety bumper
- 5) Caster wheel
- 6) 2x motor wheels
- 7) Battery rack
- 8) Container support
- 9) Paint container, 5 liters
- 10) Return hose
- 11) Suction hose
- 12) Case for suction hose and return hose
- 13) Spray tool
- 14) Spray nozzle
- 15) Line width plates, 10 cm
- 16) Grip for height adjustment of spray tool
- 17) Finger screw for height adjustment of nozzle
- 18) Tablet with TinyLineMarker app
- 19) Battery with key
- 20) Battery charger



2.3 Technical specifications

Specification	Value	
Dimensions		
Weight (without battery)	23.5 kg	51.8 lbs
Height	465 mm	18.3 in
Length	710 mm	28.0 in
Width	525 mm	20.7 in
Electrical components		
Battery type	Li-ion	
Battery weight	3.4 kg	7,5 lbs
Capacity	36 V, 11 Ah, 396 Wh	
Charger voltage	Input: 100-240 VAC, 50/60 Hz, Output: +42 VDC, 2A	
Charging time	Approx. 3 hours	
Battery operation time*	5 hours	
Voltage range inside robot	12-24 VDC	
Performance		
Maximum driving speed	7 km/h	4.5 mph
Maximum spraying speed	2.5 km/h	1.6 mph
Pump capacity	Max 3.8 l/min	1 gpm
Pump pressure	4.1 bar	60 PSI
Spray equipment		
Line width	100 mm	3.9 in
Container support height	300 mm	11.7 in
Container support depth	200 mm	7.8 in
Container support width	160 mm	6.3 in
Safety		
Obstacle detection range	Max 2.5 m	Max 8.2 ft
Obstacle brake distance	1 m	3.3 ft
Remote control tablet		
Remote control software	TinyLineMarker App	
Tablet range (Bluetooth)	Max 100 m	Max 328 ft
Certifications		
TinyLineMarker Sport	FCC, CE	
Battery	UN38.3 Approved	

3 Getting started

This section will go through the basic setup and functions needed to start using TinyLineMarker Sport.

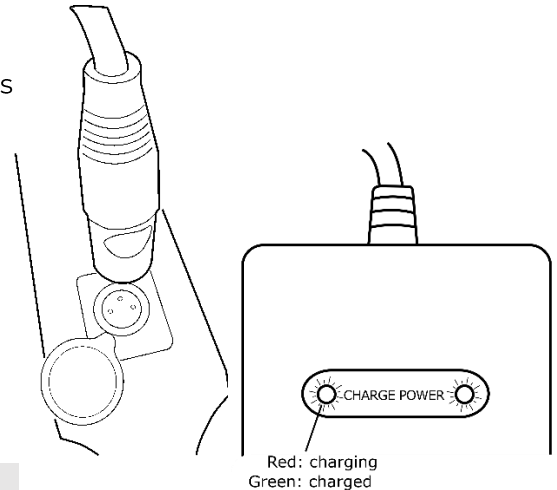
3.1 Batteries

Two batteries are necessary to operate TinyLineMarker Sport: one removable robot battery and one internal tablet battery.

3.1.1 Charging the robot battery

Before using TinyLineMarker Sport, ensure that the battery is charged. Follow these steps to charge the battery:

1. Plug the round charging jack into the battery and connect the charger to an electrical socket. The connector is located next to the battery handle.
2. When fully charged, disconnect the battery. First remove the power jack from the electrical socket; then, remove the round charging jack from the battery.



INFO

The battery charger shows red when the battery is charging and green when the battery is fully charged.

Please contact your distributor if you need a spare battery.

Please contact your distributor for information about safe disposal of the battery.



WARNINGS

Only charge the battery with the supplied charger. The charger must be connected to 100–240 VAC, 50-60 Hz.

The battery must not be charged while it is connected to the robot.

The battery must only be charged indoors at normal room temperature, and it should always be supervised while recharging. Do not charge the battery unattended or overnight.

Do not charge batteries that have been exposed to blows, shocks and other forms of external damage. There is a risk that the battery could explode if this safety measure is not obeyed.

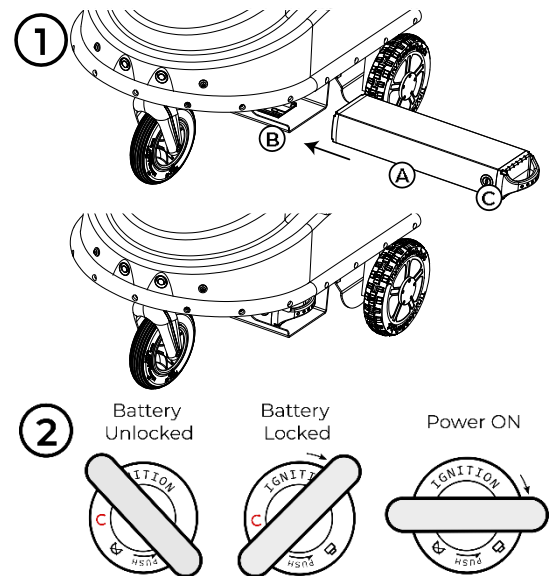
The battery must be fully charged when stored.



The battery must be charged every third month if stored for a longer period.

3.1.2 Attach the robot battery and power ON

1. Slide the battery (A) into the battery rack (B) and insert the battery key (C).
2. Lock the battery by turning the key 90 degrees clockwise, it makes a “click” sound. Power ON TinyLineMarker Sport by turning the key 45 degrees clockwise. The status light on top of TinyLineMarker Sport will turn on.



INFO

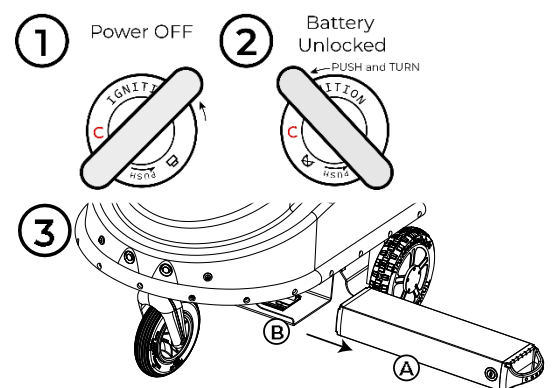
Make sure the battery rack is cleared, i.e. no grass, dirt or objects are blocking inside the rack.

If the battery is not pushed sufficiently into the battery rack, the key cannot lock the battery correctly.



3.1.3 Detach the robot battery and power OFF

1. Power OFF TinyLineMarker Sport by turning the battery key.
2. Unlock the battery by pushing the key inwards while turning it 90 degrees counterclockwise.
3. Pull out the battery (A). The key can stay in, while it is charging/stored.



3.1.4 Charging the tablet battery

Use the included charger to charge the tablet.

1. Connect the USB charger cable to the tablet and power adaptor.
2. Plug in the power adaptor to an electric socket.
3. When fully charged, disconnect the tablet from the charger. First, unplug the micro-USB from the tablet.

Then, unplug the USB power adaptor from the electrical socket.

WARNINGS

The cap covering the micro USB connector must be closed correctly to guarantee water resistance.

Always use chargers, cables and batteries approved by TinyMobileRobots when charging the robot battery and tablet. Unapproved chargers may cause the battery to explode or damage the devices.



3.2 Turn ON/OFF

3.2.1 Turning ON the robot and tablet

TinyLineMarker Sport will turn on, when the robot battery is attached and powered on with the battery key. The status light will turn on when TinyLineMarker Sport starts. It can take up to several minutes from turning on TinyLineMarker Sport before it is ready to navigate in automatic mode. This is because the robot must retrieve sufficient satellite connection. The status light will turn green when TinyLineMarker Sport is ready to work, i.e. tablet is connected and satellite connection is OK.

Turn on the supplied tablet by pressing and holding the power key until the tablet briefly vibrates. The TinyLineMarker app automatically starts when the tablet is turned on.

3.2.2 Turning OFF the robot and tablet

Turn off TinyLineMarker Sport by turning the battery key counterclockwise.

Turn off the tablet by pressing and holding the Power button until the shutdown screen appears. Then press Shut down on the tablet screen. Shutting down the tablet while TinyLineMarker Sport is not in use will preserve the battery.

WARNING

The tablet must always be turned on when TinyLineMarker Sport is operating in automatic mode.



3.2.3 Restarting the robot and tablet

If an unexpected error occurs, it may be resolved by restarting the software. To restart the software, restart the robot. Restarting the tablet may also resolve the error.

Restart the robot by turning it off using the battery key. Wait two seconds, and then turn the robot on again.

Restart the tablet by pressing and holding the Power button for three seconds. Then press Restart on the tablet screen when the option appears.

3.3 Spray tool

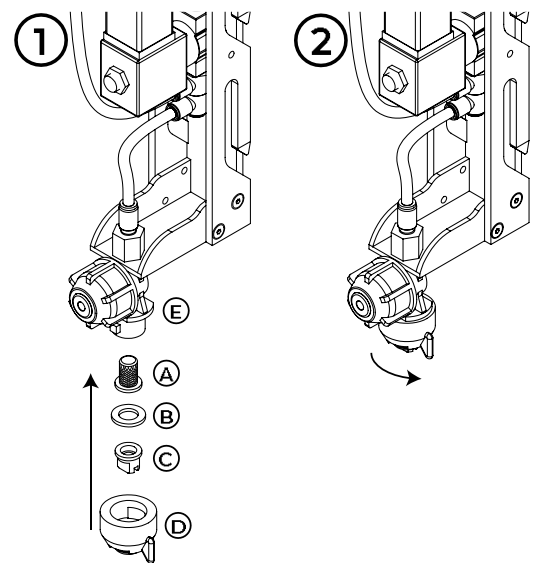
The spray tool must be adjusted prior to marking a sports field. This is done to obtain the best marking result. This section will describe:

- Mounting of nozzle
- Height adjustment of nozzle and line width plates

3.3.1 Mounting of nozzle

A nozzle package is shipped with TinyLineMarker Sport. Assemble the nozzle parts:

- 1) Stack the filter (A), rubber ring (B) and nozzle (C), and put these parts into the cap (D)
- 2) Place the nozzle parts into the pressure valve (E), and turn the cap until its wings are perpendicular to the line width plates



INFO

A nozzle package delivered by your distributor or paint manufacturer might be assembled differently.



3.3.2 Height adjustment

The height adjustment is important for achieving the best marking result. Both the line width plates and the nozzle can be adjusted:

- 1) Pull the handle (A) and slide the entire spray tool up or down (B). Adjust the height so the bottom of the line width plates (C) is just touching the tip of the grass.
- 2) Loosen the finger screw (D) and slide the inner part (E). Adjust the nozzle so the paint is just briefly touching the edges of the line width plates. See

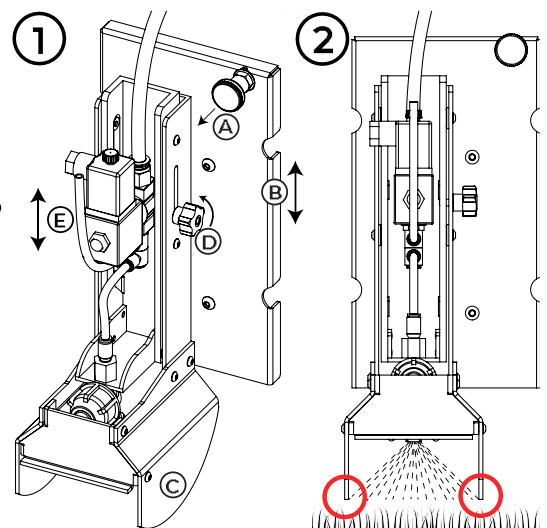


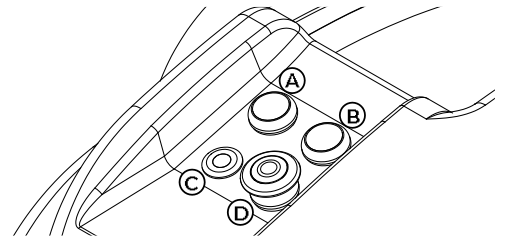
illustration with correctly adjusted plate and spray height.

3.4 Prime pump system before use

The pump system should be primed with paint before marking a field. This will ensure that no air is stuck inside the pump system and give the best marking result.

After inserting the paint container, follow these steps to prime the pump:

- 1) Press the button (A) to activate the pump
- 2) Paint will now be sucked into the pump from the suction tube and returned to the paint container by the return hose. Let the paint flow for a few seconds.



3.5 Clean pump system after use

Be sure to clean TinyLineMarker Sport properly after use to ensure the best performance for future markings.

Follow the guidelines given in this user manual or use the guide found in the TinyLineMarker app.

WARNING

The pump and spray system might get blocked or even get seriously damaged because of dry paint if you do not clean the pump and spray system sufficiently after use.

Insufficient cleaning will affect warranty on related parts.



4 Functionality of TinyLineMarker Sport

4.1 Automatic and manual mode

TinyLineMarker Sport has two operation modes:

Manual mode: TinyLineMarker Sport will always start in manual mode when it is first turned on. In manual mode, you can manually drive the robot and control its action (e.g., *Test spray*).

Automatic mode: TinyLineMarker Sport switches to automatic mode when it is programmed to do an action autonomously (e.g., using *Drive to*, *Test field* and *Start* functions in the TinyLineMarker app). You can stop the robot at any time in automatic mode by using either the TinyLineMarker app or the STOP button placed on top of the robot.

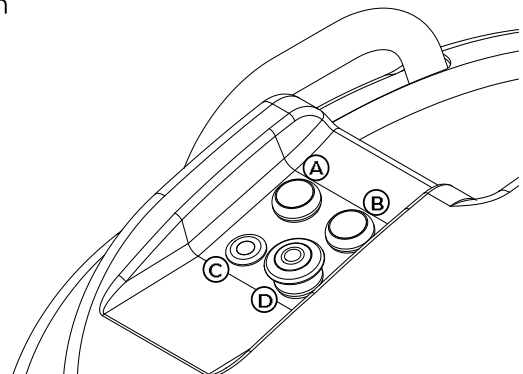
WARNING No people, animals or objects must be within the workspace when TinyLineMarker Sport is being operated in manual or automatic mode.



4.2 Control panel and status light

A control panel with buttons and a status light is found on top of TinyLineMarker Sport.

- A) Pump activation button - Press once to start/stop pump
- B) Spray activation button - Press once to open/close spray valve
- C) Status light - Indicates current state of TinyLineMarker Sport
- D) STOP button – Press to stop current action



Pump and spray activation buttons are useful when priming the pump, cleaning the hose system and testing the spray. See more about cleaning in section 5 *Cleaning after every use*.

The STOP button will stop the current action performed by TinyLineMarker Sport. You will need to confirm on the tablet that TinyLineMarker Sport can continue operation safely.

The below table describes how to understand colors and behavior of the status light.




Status light	Description
Green light	TinyLineMarker is operating without any errors and the GPS signal is good.
Yellow light	TinyLineMarker is operating without any errors, but the GPS signal is weaker. TinyLineMarker can still be used for marking.
Red light	Operation stopped because of an error (the error message is shown in the TinyLineMarker app) or a weak GPS signal. The GPS signal can often be retrieved and automatic driving will continue.
Blue light	The robot has received a command from the TinyLineMarker app and has begun executing it. The light also briefly turns blue when the robot has finished a job.
Constant light	Indicates manual driving mode
Blinking light	Indicates automatic driving mode

4.3 TinyLineMarker tablet and app overview

All maneuvering and controlling of TinyLineMarker Sport is done using the TinyLineMarker app, which is preinstalled on the included tablet. This section explains the main features of the included tablet.

This user manual only addresses features important for the use of the tablet with the TinyLineMarker app.

The included tablet has three keys:

Tablet Keys	Location	Function
Power key 	On the side	Press to turn on/off screen. Press and hold three seconds to turn on/off or restart tablet.
Volume-up key 	On the side	Press to turn up the sound level.
Volume-down key 	On the side	Press to turn down the sound level.

INFO

Press and hold *Power* key and *volume-down* key to take a screenshot of the tablet screen. Screenshots can be sent to support by e-mail in *Settings>Help>Screenshot*.



The tablet screen and the main screen of the TinyLineMarker app consist of four areas listed below.

- 1) Top bar of tablet (black)
- 2) Top bar of app (green)
- 3) Background map
- 4) Bottom bar of app



4.3.1 Top bar of tablet

The tablet information is found in the top bar of the tablet (black). An explanation of each symbol is available in the table below.






Function	Symbol
Tablet GPS activated	
Tablet Bluetooth activated	
Tablet internet service activated	Can also be H+, H, 3G, E or G, depending on the internet speed.
Mobile network signal strength	
Tablet battery power level	

4.3.2 Top bar of app

Different buttons are found in the top left of the TinyLineMarker app. An explanation of each symbol is available in the table below.














Function	Symbol	Explanation
Settings		Press to enter settings. You can change robot settings, app settings and organize templates.

Position		Press  to locate the tablet position on the map.
Fit to screen		Press to fit the screen to all visible jobs and the position of the robot.
Robot position		Press  to locate the robot position on the map. The button and icon are only available when the robots knows its position with centimeter accuracy.

In the top right corner of the TinyLineMarker app, a series of symbols provide status information for TinyLineMarker Sport.



Function	Symbol	Explanation
Battery power level		Indicates TinyLineMarker Sport battery status.
Communication way		Indicates the current communication way between TinyLineMarker Sport and the tablet: <i>None</i> – Robot and tablet do not communicate. No interaction is possible. <i>Bluetooth</i> – Robot and tablet communicate via Bluetooth. Creating fields and editing can be limited. <i>Cloud</i> – Robot and tablet communicate via an internet connection. Manual control with the joystick is not possible. <i>Good</i> – Robot and tablet communicate via both Bluetooth and an internet connection. The system can operate without any limitations.
GNSS signal		Indicates the strength of the GNSS signal: <i>None</i> – TinyLineMarker Sport has no connection to the satellite and cannot operate. <i>Bad</i> – TinyLineMarker Sport can operate, but inaccuracy can occur. <i>Good</i> – TinyLineMarker Sport operates with highest accuracy.
Pump status	 	The icon  indicates that the pump is active. The icon  indicates that the pump is inactive.
Spray status	 	The icon  indicates that the spray is active. The icon  indicates that the spray is inactive.

4.3.3 Background map and joystick

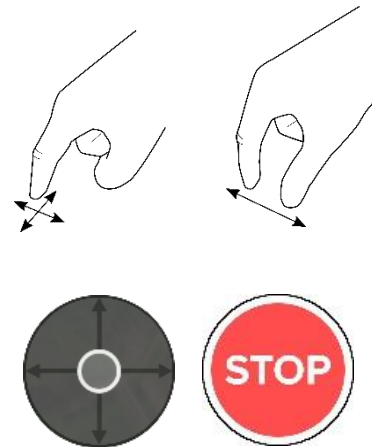
The background map enables you to verify the position of the field. When placing a field manually on the map, please be aware that the background map has an accuracy of 5-10 meters. The background map is downloaded via the tablet's data connection. If no map is downloaded, the background will become black.

Use one finger to drag the map around.

Use two fingers to zoom in and out on the map.

When in manual mode, the joystick is available and can be used to manoeuvre TinyLineMarker Sport. The joystick appears when the tablet and TinyLineMarker Sport have a Bluetooth connection.

When in automatic mode, a STOP button is shown instead of the joystick. Press the STOP button to make TinyLineMarker Sport stop driving and go into manual mode.



4.3.4 Bottom bar of app

When the tablet is connected to the robot, you can see the name of the robot in the lower left corner. The options available in the bottom bar of the app will change according to the action you choose, e.g. selecting a field or deselecting a field.

4.4 TinyLineMarker app

The TinyLineMarker app allows you to interact with and program TinyLineMarker Sport. When connected to the robot, the app allows you to change various robot settings, create new fields, steer the robot manually and much more.

Main options and features are described in this section.

4.4.1 Sports templates

The key feature of TinyLineMarker Sport is to mark sports fields. The TinyLineMarker app allows you to create new sports fields using various field templates.

Start creating a new field by pressing **+ New field** found in the bottom bar. Select the appropriate sports template and choose between **With robot** or **On map**.

With robot Allows you to accurately position the field. Each type of field will have one or more options for collecting points. E.g. an American football field can be positioned by collecting the four corner points.

On map

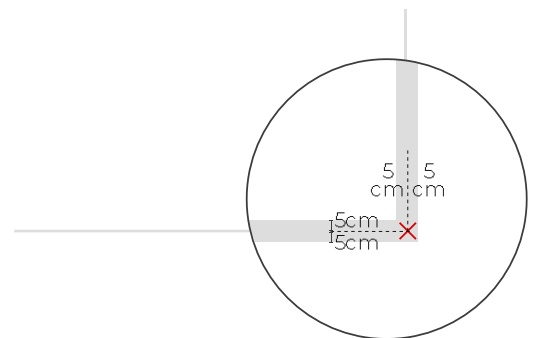
Allows you to freely place the field on the map. The background map is only accurate down to 5-10 meters. This mode can be used when accurate position of the field is not necessary.

4.4.2 New field by collecting points

- 1) Press **With robot** and then press **Next**. A new window will appear where you can choose how many points are to be collected. The number of points and their positions depend on the knowledge you have about the new field.
Select the number of points and press **Next**.
- 2) You can now use the joystick to navigate TinyLineMarker Sport. Follow the instructions on the screen to collect the points in the correct order. When you press **Next**, the position beneath the nozzle is collected.
- 3) When all points have been collected, the new field will appear on the map and can be marked.

Guidelines for collecting corner points:

- 1) Drive the robot to the corner of the field.
- 2) Position the robot so that the nozzle is right above the point where the middle of the two lines meet (illustrated with red cross).
- 3) Collect the point using the tablet.



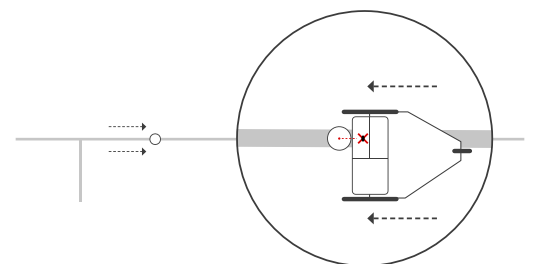
Guideline for collecting fixed goal points:

- 1) Drive to the goal post or socket from the outside of the goal along the goal line.
- 2) Drive as near to the goal post as possible without the robot touching the post (the robot will ensure a safe space around the poles when it marks the lines).

If there is no goal post in the socket, drive to the outside of the goal socket as illustrated.

Note: Never position the robot on top of the goal socket.

- 3) Collect the point using the tablet.

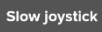


WARNING

Do not lift or push TinyLineMarker when collecting points as that would disturb the position sensors and could make the collected position incorrect.









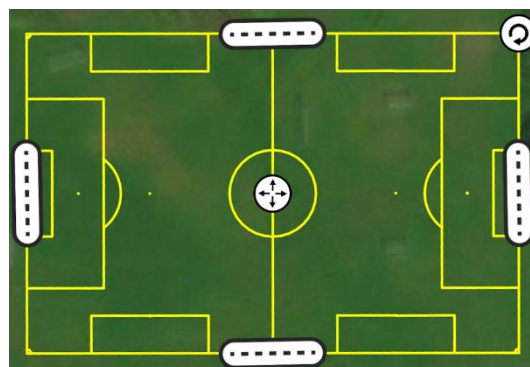
INFO

When collecting points, you can press . This feature slows down the driving speed and allows more precise point collection.




4.4.3 New field using the map

1. Press  and then press . The pop-up window will disappear and a new field will appear on the map. The new field is equipped with handles to rotate, move and adjust the field dimensions.
2. Press one of the side-line handles . You can now enter the field width in the bottom bar.
3. Press one of the end-line handles . You can now enter the field length in the bottom bar.
4. Press  and input rotation angle in the bottom bar.
5. Press  and input values in the bottom bar to move the field.
6. Alternatively, press and drag the handles to move, rotate or adjust the field dimensions.

**INFO**

A snap feature is available for easy alignment of new fields. When the new field is close to an existing field, it will snap to the existing field when you rotate, move or adjust dimensions using the handles.

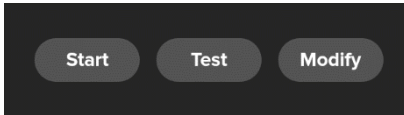
Distance between fields can be adjusted. Place a line of the new field on top of a line of the existing field. Press  and input the desired distance between the two lines at the bottom of the screen.



4.5 Selecting/deselecting fields

4.5.1 How to select an existing field on the map

You can select a previously designed field by pressing anywhere inside the desired field. When a field is selected, the following options become available:



A selected field will appear with yellow lines on the map.

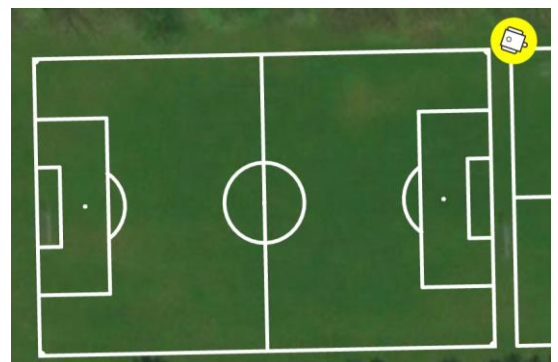
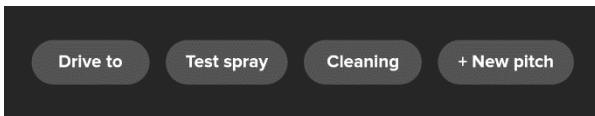
If multiple fields are stacked on top of each other, you will be able to choose which field you wish to select from a list of fields.

4.5.2 How to deselect a field on the map

You can deselect a field by pressing anywhere outside the selected field area. Press another field to select it.

An unselected field will appear with white lines on the map.

When a field is deselected, the following options become available:



4.6 Modify templates


You can do several modifications of a field. A description of each modification option is found in the following.

Modify a field by selecting the field and pressing



4.6.1 Editing a field

You can edit the position, dimensions, name, etc. of a field using the *Edit* feature. *Advanced* editing is also found in this feature.

- 1) Press .
 - a. Several options are available in the bottom bar, amongst others the button to enter the *Advanced* menu. The options in the bottom bar and in the

Advanced menu depend on the chosen template.

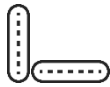
- b. Handles appear on the field. Use these handles to change the field. Drag the handle or press the handle and input an exact value at the bottom bar:



Position



Rotation



Dimensions (width and length)

- 2) When done editing the field, press **Save**. To exit the *Edit* menu without saving the changes, press **Cancel**.



Info

The *Advanced* editing menu enables you to select lines which TinyLineMarker Sport should not paint on a field. Ignored lines will be shown in red.



4.6.2 Copy a field

You can create a new field by copying an existing field. This may be helpful when fields are placed next to each other.

- 1) Press **Copy**. Four new fields will appear next to the existing one.
- 2) Press on the field closest to the final position. Only one copy will now be visible. The new field will keep its alignment and size during copy mode.
- 3) Press . Now you can enter the distance between the existing field and the new field in the bottom bar.
Alternatively, press and drag  to adjust the distance.
- 4) When done copying the field, press **Save**. To exit the *Copy* menu without saving the changes, press **Cancel**.
- 5) If needed, enter the *Edit* menu to change the field.


4.6.3 Delete a field

A field can be deleted from the TinyLineMarker app by pressing **Delete**. You will have to confirm the action.

4.7 Start/Test template

4.7.1 Start marking a field with paint

You can select and mark all previously designed fields appearing on the map.

To start marking an existing field, you must first select the field. When selected, you can press  and TinyLineMarker Sport will begin to mark the selected field.

4.7.2 Test field without paint

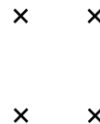
You can test drive your field to ensure it is located in the right position.

Select the field you would like to test and Press .

There are three ways to test your field:

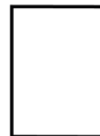
1: Fast speed

- Will test drive the outline of the field in fast speed following the points. This is a fast way to test if any objects are in the robot's path.



2: Normal speed

- Will also test drive the outline of the field, however it will drive as if it was painting the outline in order to ensure that the GPS signal is strong enough.



3: Full test

- Will test drive the entire field as if the robot was painting it.



WARNING

Full test must be used when testing a field with fixed goal posts!

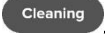


4.8 Add templates

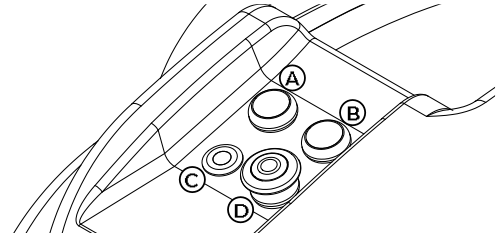
The TinyLineMarker app comes with a basic template group preinstalled. You can purchase new template groups in the TinyLineMarker app by going to *Settings>Templates*. This allows you to install the template groups needed in your area.

5 Cleaning after every use

It is important to clean the pump system and nozzles after using TinyLineMarker Sport with paint. Fatal damage to the pump may occur if paint is allowed to dry inside the pump system.

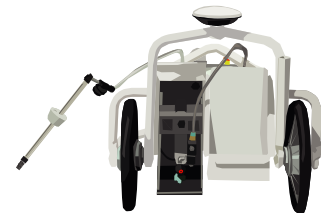
The cleaning procedure described below will help avoid problems with dry paint in the pump system. The cleaning procedure can be followed using the pump and spray activation buttons on top of TinyLineMarker Sport. The cleaning procedure can also be found on the main screen in the TinyLineMarker app by pressing .

The following steps describe how to use the pump and spray activation button found on top of TinyLineMarker Sport.



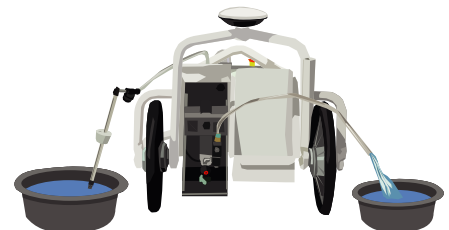
1) Empty system

Remove the suction filter from the paint canister and place it so that it sucks in air. Let the return hose stay in the paint can. Press (A) to start the pump. When there is no more paint in the system, press (A) again to stop the pump.



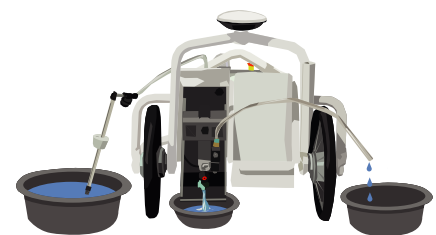
2) Rinse system

Place the suction filter in water and the return hose in a residual container. Press (A) to start the pump. Rinse until clean water is coming out of the return hose. When the system has rinsed, press (A) again to stop the pump.



3) Clean nozzle

Keep the suction filter in the water tank and place the residual container under the nozzle. Press (A) to start the pump, then Press (B) to start the nozzle. Let the water flow through the nozzle for 10 seconds, then Press B and A again to stop the spray valve and pump.



4) Clean nozzle and filter

Dismount nozzle parts and filter. Clean the parts with a soft brush and water.



6 Maintenance

TinyLineMarker Sport is designed to complete line marking tasks for a long time. Thorough and continuous maintenance will help ensure a long lifetime of TinyLineMarker Sport.

In this chapter, maintenance of different parts is explained.

INFO Contact the local distributor to acquire spare parts for TinyLineMarker Sport. Original spare parts must always be used!

6.1 Robot cover

TinyLineMarker Sport has a cover giving extra protection to the robot parts. Parts beneath the cover can be accessed by dismounting the cover. Follow these steps to remove the cover:

- 1) Unscrew and remove the four bolts (A) attaching the cover to the frame of TinyLineMarker Sport.
- 2) The cover (B) can now carefully be lifted.
Be aware that some cables are attached to the cover.

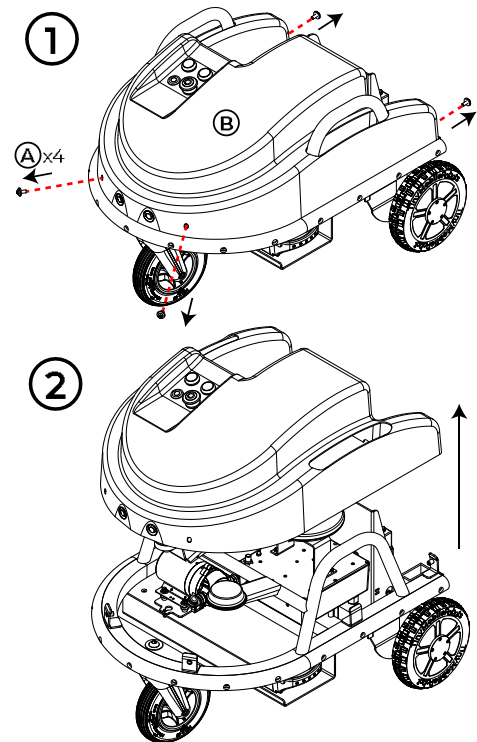
When the cover is lifted, you can access the following parts:

- Computer box
- GNSS antenna
- Bluetooth antenna
- Cellular antenna
- Pump
- Caster wheel bolt

6.2 Motor wheels

Two motor wheels are placed in the rear of TinyLineMarker Sport. The wheels are airless.

The wheels must be rinsed regularly from grass and dirt to ensure best possible contact between the wheels and the grass surface.



6.3 Caster wheels

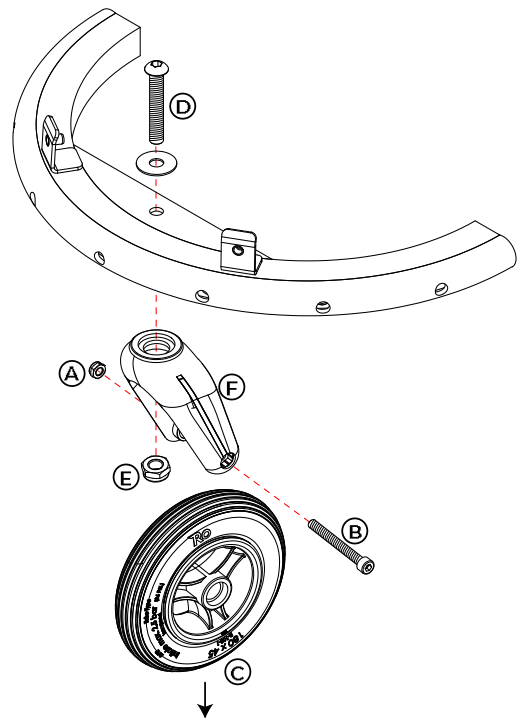
A caster wheel is placed in the front of TinyLineMarker Sport. The mount of the caster wheel can rotate freely around one axis, which makes the robot able to turn on the spot.

Before every operation with TinyLineMarker Sport, you must check the following:

- The air pressure of the caster wheel must always be 2.5 bar (36 PSI).
- The caster wheel must be securely fastened and not be loose in any way.

To disassemble the caster wheel, follow these steps:

- 1) Unscrew (A) and (B).
- 2) Remove the wheel (C).
- 3) Unscrew (D) and (E).
- 4) The wheel mount (F) can now be removed.
- 5) Now tighten or replace the caster wheel:
 - a. Replace the parts of or the entire caster wheel.
 - b. Or, if the caster wheel has come loose, tighten (D) and (E).



6.4 Hose system

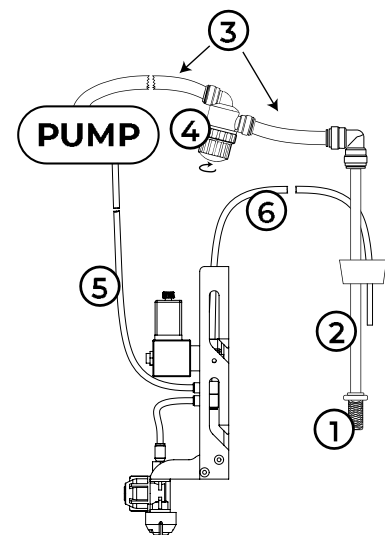
The hose system consists of six pieces:

- 1) Suction filter
- 2) Suction pipe
- 3) Suction hose (two pieces)
- 4) Lump filter (disassemble to clean)
- 5) Hose leading from pump to spray nozzle
- 6) Return hose

Clean the hose system after use according to the cleaning guide in section 5 *Cleaning after every use*.

Hoses must never be bent. Bent hoses can limit marking performance.

The hose system is pressure equipment. Therefore, it is important to ensure that all connections are correctly fastened. Leakage could result in unsatisfactory line marking.



WARNING

Ensure that no hoses hang loose, as they could damage TinyLineMarker Sport and its environment.



INFO

Clean the lump filter after each marked field to avoid blocking the filter.

Avoid lumps in the paint container to keep a satisfactory flow in the hose system.



6.5 Pump

The pump is essential for the entire spray system and must be handled with care. The pump is located underneath the cover.

Daily maintenance is required to keep the pump in the best condition and ensure that no dry paint is getting stuck. Daily maintenance is done by following the cleaning procedure in the TinyLineMarker app immediately after the robot is done operating with paint.

If the pump is not sucking in paint, it might be due to dry paint inside the pump or air may be lodged in the hose system. To troubleshoot this, you can do one or all of the following:

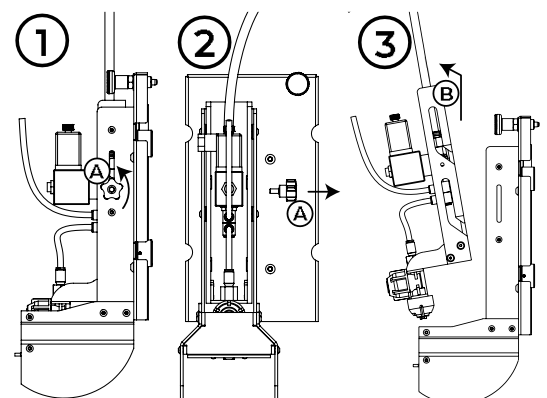
- Ensure that all connections are correctly fastened to prevent air from entering the hose system.
- Use water instead of paint to prime the pump. If successful, keep the water circulating inside the pump for 10 minutes.

6.6 Spray tool

The spray tool consists of many individual parts. Continuous cleaning of the spray tool area is very important to ensure TinyLineMarker Sport performs well every time it is used.

The inner slider of the spray tool can be detached for easier cleaning and maintenance. Follow these steps to detach the inner slider:

- 1) Unscrew the finger screw (A).
- 2) Remove the finger screw (A).
- 3) Pull the inner slider (B) upwards until it can be pulled out of the spray tool.



6.7 Battery

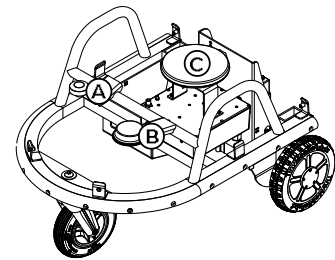
The battery is TinyLineMarker Sport's only energy source. Consequently, careful maintenance is crucial for prolonged performance. The battery will drop capacity over time and depending on the way it is used. After two years, the battery will have 70% capacity or greater if you abide by the listed guidelines.

- The battery must be fully charged when stored.
- The battery must be charged every third month if stored for a longer period.
- The battery must be stored at room temperature (20-27°C / 68-80°F).
- If the battery has not been used for a long period of time, recharge it completely before connecting it to the robot.

6.8 GNSS/Bluetooth/Cellular Antenna

TinyLineMarker Sport is equipped with three different antennas.

- A) GNSS antenna:
Receives signals from the satellites.
- B) Bluetooth antenna:
Enables communication between
TinyLineMarker Sport and tablet.
- C) Cellular Antenna:
Enables TinyLineMarker Sport to establish a
data connection via the cellular network.



The three antennas are attached to the top of TinyLineMarker Sport's computer box. The antennas are essential for TinyLineMarker Sport's functionality and must be handled with care.

The three antennas can be unplugged if an antenna needs replacing.

INFO

Do not cover the GNSS/Bluetooth/Cellular antennas while operating TinyLineMarker Sport.

Keep a distance from tall objects (e.g., trees, buildings) while operating TinyLineMarker.

Do not drive the robot underneath roofs or indoors.



6.9 Cleaning TinyLineMarker Sport

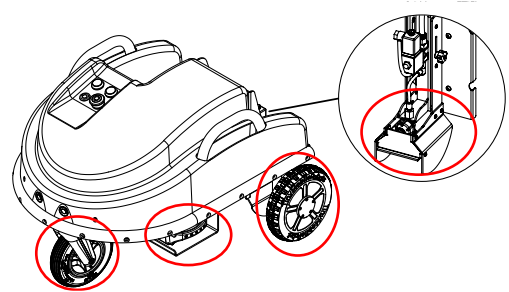
In addition to the cleaning procedure that must be performed at the end of each marking job, you must regularly make sure that the robot is clean of paint, grass and dirt. Paint, grass and dirt may reduce TinyLineMarker Sport's performance and the lifetime of spare parts.

For best results, use a soft dish brush and clean water to clean TinyLineMarker Sport.

During use, grass and dirt can accumulate inside the battery rack. This can make battery attachment difficult or impossible. Regularly empty the battery rack of grass and dirt to ensure easy battery attachment.

Always clean the wheels to ensure the best grip between wheels and ground. Remove any grass and dirt that is sticking to the wheels.

Regularly clean off any paint, grass and dirt accumulated around the spray tool (for best results, clean right after use). Detach the spray tool if necessary and use a soft dish brush to remove grass and dirt.



Components to clean after every use

WARNING

Never clean TinyLineMarker Sport with a high-pressure cleaner.



7 Trouble shooting

Symptoms	Possible cause	Possible solution
During a marking job, TinyLineMarker Sport stops and the status light turns red.	The GPS/correction signal is weak in the area in which the field is placed.	Wait a few minutes to see if the signal is retrieved and the marking job continues. On a field with poor position signal, TinyLineMarker Sport might stop several times and the marking job may take longer than usual.
TinyLineMarker Sport stops driving and the error message <i>Right/Left motor amp error</i> appears on the tablet screen.	A mechanical issue is making TinyLineMarker Sport use more energy than needed, resulting in a faulty error message.	Check that the caster wheel and motor wheels are sufficiently tightened with a torque of 30 N m and use of mild Locktite. Also, check for other loose components that are incorrectly placed.
The marking has a small continuous and regular wave.	The grass field is cut perpendicular to the wave-shaped line, meaning that the grass alternately lies to the right and the left of the line. This causes the marked line to alternate with the grass.	Cut the grass to a shorter length or wait a few days after cutting the grass to mark the lines.
The line is unevenly sprayed or is not as clearly visible as desired.	The nozzle height may not correspond to the width of the nozzle. The nozzle may be inappropriate for the desired line or the driven speed.	Adjust the nozzle's height and width so the settings correspond and paint is not sprayed on the width adjustment plates. Try using another nozzle spraying more or less paint per second.
Nozzle does not spray correctly.	Dry paint inside the nozzle could be blocking the opening. Nozzle could be broken. Paint lumps could be stuck inside the hose system or pump, making the flow uneven.	Try to rinse the nozzle with a small dish brush and clean water. Clean the hose system with clean water to rinse out paint lumps. If the nozzle still sprays incorrectly, it may be broken and must be replaced.
The battery cannot lock. The key cannot be turned clockwise.	Grass, dirt or objects inside the battery rack may be blocking the battery.	Check for grass, dirt and objects inside the battery rack. Regularly empty

	Battery is not being pushed far enough into the battery rack.	grass, dirt and objects from the battery rack. Make sure the battery is correctly inserted into the battery rack.
Connection between the battery and the socket is loose.	The battery clamps may have come loose during use.	Use an appropriate tool to tighten the clamp grip.
The TinyLineMarker app is not open on the tablet.	A button may have been pressed that leads the user to the tablet home screen. Application may have unexpectedly shut down.	Open the TinyLineMarker app by pressing once on the app icon. Alternatively, restart the tablet and the TinyLineMarker app will open automatically after the tablet starts.
The joystick appears on the tablet but TinyLineMarker does not move when the user tries to navigate.	An unexpected software error could be affecting the joystick.	Restart TinyLineMarker Sport and the tablet.
While marking a straight line, TinyLineMarker Sport suddenly deviates from the desired path.	The GPS signal may have temporarily become imprecise or unstable, which may be caused by tall tree(s) or building(s) close to the marked line.	Move the field further away from the tall tree(s) or building(s).
The symptoms listed above do not correspond to the problems I'm experiencing.	The symptom may be yet unknown or uncommon.	Restart TinyLineMarker Sport using the battery key and restart the tablet. If the problem still persists after restart or is experienced multiple times, please contact your local distributor .

8 Warranty

TinyMobileRobots ApS guarantees that this product will work correctly for one year from the day of purchase. The warranty covers serious errors in components and manufacturing errors. During the time covered by the warranty, we will repair or replace the product if the following is fulfilled:

- The product has been handled according to the instructions described in this manual.
- The user or any unauthorized technician must not attempt to repair the product.
- In case of a claim regarding the robot battery, TinyMobileRobots' support team will connect to the battery and analyze its use history. Warranty is not applicable for the battery if instructions provided in this user manual were not followed.

Examples of situations where the warranty would not apply:

- Damage due to large amounts of water, e.g. the use of high-pressure cleaner, a prolonged stay in rain, or other exposure to large amounts of water.
- Damage caused by lightning.
- Damage due to misuse or incorrect use of product. Instructions provided in this user manual must be followed.
- Use of spare parts not approved by TinyMobileRobots ApS.
- Use of battery and adaptors not approved by TinyMobileRobots ApS.
- Faults due to wear or wearing of parts caused by a failure to replace in time.
- Lack of cleaning of spray parts after usage.

Please contact your local distributor to make use of the warranty. Remember to provide the distributor with the serial number (found on the robot) and documentation of the purchase date.

9 Environmental information

TinyLineMarker consists of a robot, a removable battery and a tablet. Please recycle all product parts according to the laws applicable in your region.

Detach the removable robot battery and recycle it separately according to the laws applicable in your region.

The robot contains electronic components. Recycle them according to the applicable laws in your region.

The tablet contains electronic components and a removable battery. Please recycle them according to the laws applicable in your region.

The owner is responsible for recycling the product correctly. Proper recycling will ensure that negative impact on the environment is minimized. Incorrect recycling may have negative environmental impact.

10 Other Information

Serial number:	Can be found on the label attached to TinyLineMarker Sport
Manufacturer details:	TinyMobileRobots ApS Sofienlystvej 9 8340 Malling Denmark
Support:	Please contact your local distributor.

Tiny**Mobile**Robots[®]

tinymobilerobots.com