Makin’ Compactor User Guide

Version 2.33

MAKIN' 3D
MACHINE CONTROL

Copyright and disclaimer

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1. Introduction

1.1. Congratulations on your new product

You are now ready to work more efficiently and keep the precision at an optimum level. Besides that, you will be more eco-friendly by doing the same amount of work in less time.

The system is designed to show you the information you need on the screen with the greatest accuracy.

At the construction site, you are the expert - Makin’ 3D is the best work companion you can get.

We at Team Makin wish you all the best with the use of your new system.

1.2. Maintenance

It is recommended to check the system's accuracy regularly.

1.3. Storage

Keep the equipment safe when it's not installed in the machine. The use of a protective case is recommended if the tablet and antennas are removed from the machine to secure the devices from external stresses such as knocks and bumps.

1.4. Cleaning

The equipment must be cleaned regularly to ensure full functionality over time.

Cleaning is done by blowing to remove dust, you can also choose to use a damp cloth to wipe the tablet.

Under no circumstances should the equipment be high-pressure washed - neither inside nor outside the engine compartment.

2. Responsibility

2.1. Installation

All installation of the system must be carried out by Makin approved technical personnel. Failure caused by unauthorized installation or repair could cause a void of warranty.

It is important to follow the machine manufacturer's instructions for installing the Makin machine control system to avoid violating any machine supplier's warranty regulations.

The user is responsible for using the product in accordance with the given instructions. The user is also responsible for ensuring that the reference models used are correct and that the drum is properly controlled.

Broken cables on the system may cause short circuits, system errors, and defective components. Ensure that no cables have external damage; damage must be repaired immediately before further use.

Errors in measurement results may occur if the equipment has been subjected to impact, abuse, modification, or transport damage. Control of the system after such events is important to ensure an optimum result.

Warranty: For further details, visit www.Makin3D.com for more information.

2.2. Limitations

The product is intended as a control tool, and any use beyond this is not permitted. The supplier or manufacturer cannot be held responsible for any use that goes beyond the given limits.

2.3. End-user license agreement

License: The system is preloaded with software, which can also be downloaded with permission from Makin. The software is protected by copyright and other laws. The use of the software is governed by the license agreement entered into with the Makin' 3D system when purchasing the product.

For further legal terms and conditions, including but not limited to the applicable End User License Agreement between you and Makin, we refer you to visit Makin's website, www.Makin3D.com.

2.4. Warranty disclaimer

Makin provides this documentation without warranty, term, or condition of any kind, either implied or expressed, including, but not limited to, the implied warranties, terms, or conditions of merchantability, satisfactory quality, and fitness for a particular purpose.

Makin, its employees, and agents will not be responsible for any loss, however arising, from the use of, or reliance on this information.

For further legal terms and conditions, including but not limited to the applicable End User License Agreement between you and Makin, we refer you to visit Makin's website, www.Makin3D.com.

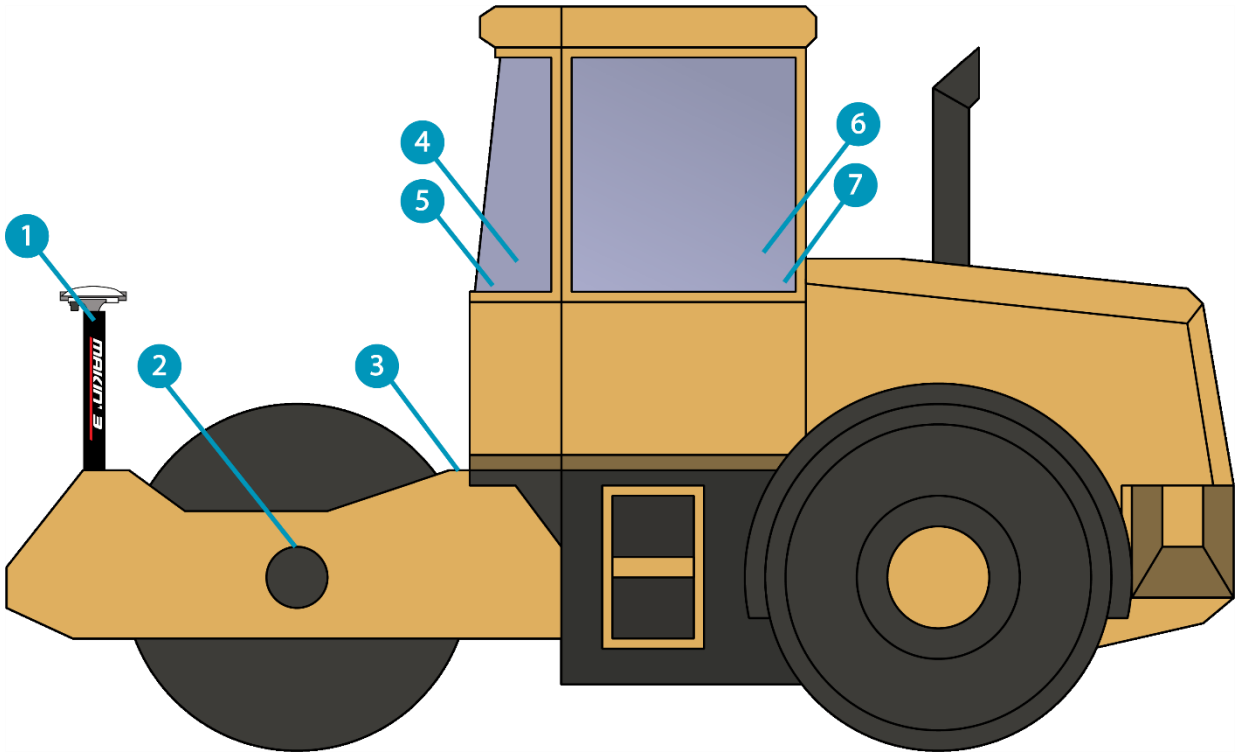
2.5. Software update

Software will be automatically and frequently updated, and users will get a notification on the screen. Software updates require a valid maintenance license. To start downloading an updated software version, users will be asked to agree before the download starts.

3. Product overview

3.1. Hardware Compactor

Hardware overview



1. GNSS antenna
2. CMV sensor
3. Body sensor
4. Tablet w. machine control software
5. Docking station for the tablet.
6. GNSS receiver
7. Interface Box for system power and data communication.

3.2. Tablet buttons and light indicators (Panasonic FZ-A3)

1.	On/Off button	4.	Quick access to tablet's menu
2.	Volume up	5.	Not in use. The button can be programmed (more info below).
3.	Volume down	6.	Not in use. The button can be programmed (more info below).

Additionally, screenshots can be taken by pressing the '**On/Off button**' and '**Volume down**' (simultaneously holding down buttons 1 and 3 for about two seconds). This can be useful in the unfortunate case where assistance is required. Find the screenshots via the '**Photos**' app.

3.3. Software

3.3.1. How to turn the system on

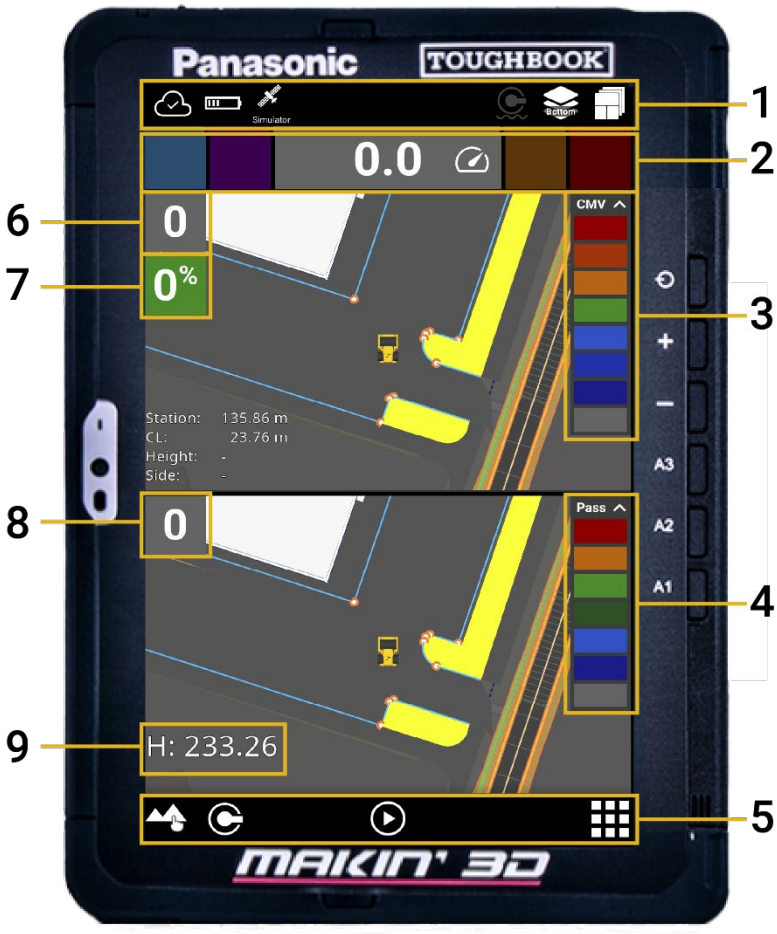
1) Turn on your Makin' 3D system by pressing the on/off button on the tablet. Android will start up and present the **'Lock screen'**.

2) Swipe upwards with one finger on the touchscreen to access Makin' 3D.

3) If no project has been previously loaded, you will be prompted to do so. See Chapter *4.1: Open or create a project*.

3.3.2. Elements of the work screen

Makin' 3D offers a variety of screens to choose from. Below is a description of one that includes most of the available visual features.

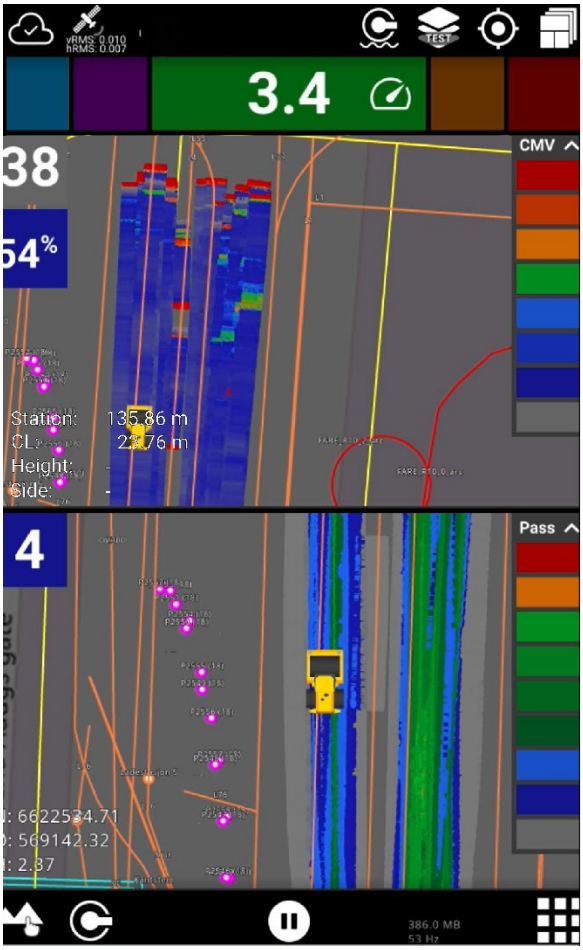


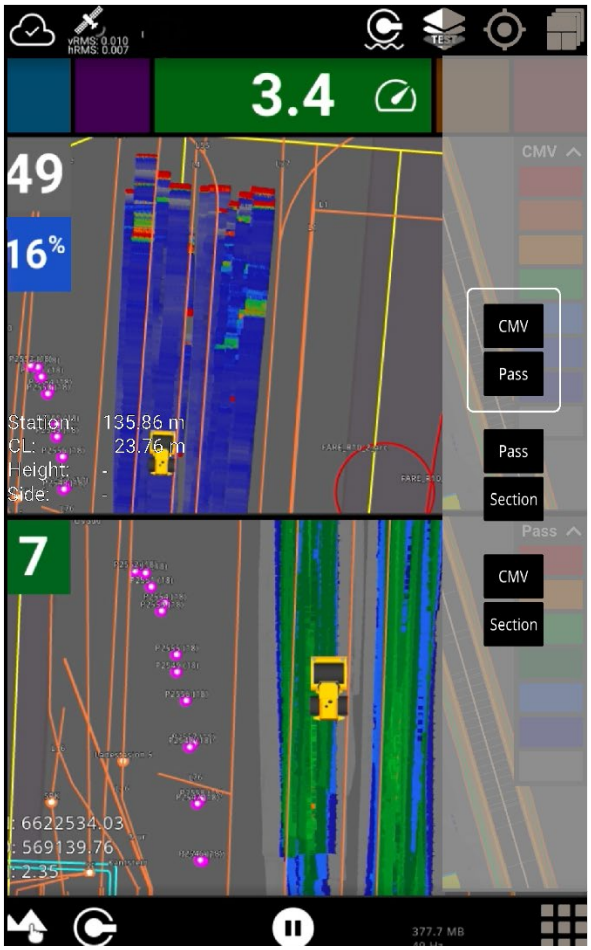
1. Top bar with status indicators for connectivity. It also contains selected quick keys.
2. Shows the current speed. The box is color coded, indicating whether the operator is keeping the correct speed.
3. Color codes for the CMV. The colors will match the heatmap created on the screen.
4. Color codes for the passes. The colors will match the heatmap created on the screen.
5. Quick key bar. Quick keys are shortcuts to features found in the menu.
6. Actual CMV value.
7. Actual delta CMV value in %.
8. Actual passes.
9. Height indicator/Tool coordinates. Depending on settings set, see chapter *5.6: Tool point coordinates* for more information.

3.3.2.1. Work screen views

The work screen is divided into two sections. It is possible to choose which two views you wish to display during your work:

- CMV and Pass
- Pass and Section
- CMV and Section

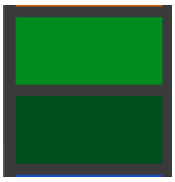
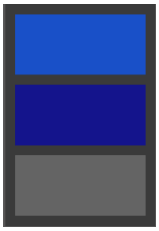




3.3.2.2. Heatmap

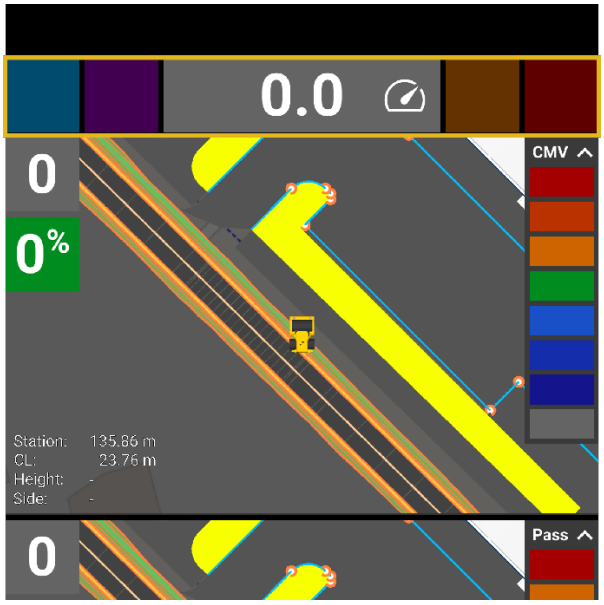
Displayed above is the heatmap produced during the compaction operation. The color scheme reflects real-time values and enables monitoring of the process, as it evolves alongside the work process.

Please note that the number of colors in the heatmap can vary depending on the overviewed displayed. The table below shows the outermost points of the color ranges.

Color codes	Relation to the target value
	Above target
	On target
	Below target

3.3.2.3. Machine speed

The feature '**Machine speed**' shows the speed of the machine, working like a speedometer. The speed is displayed in kilometers per hour (km/h).



The speed is color coded, to help the operator stay within the target speed. The table below shows examples of the colors seen when the machine is in motion.

Color codes	Relation to the target speed
	Below the target speed.
	A little below the target speed.
	Within the target speed.
	A little above the target speed.
	Above the target speed.

3.3.2.4. Compaction settings

The compaction settings menu is used to set relevant values for the compactor. Please note that these settings should be set on the tablet, and not on in the cloud.

Target CMV:

The target CMV, the value set will affect the color codes on the heatmap.

Target Delta CMV:

The target Delta CMV is displayed in percentage, and the value set will affect the color codes on the heatmap.

Minimum/Maximum passes:

The passes are displayed in the number of passes. If the compactor has moved forwards and backwards over an area, this counts as 2 passes. The values set will affect the color codes on the heatmap.

Minimum/Maximum speed:

The speed is displayed in kilometers per hour (km/h). The values set will affect the color codes on the speedometer.

CMV calibration:

Press the CMV calibration button in top of the menu, and follow the steps stated on the screen to calibrate the CMV sensor.

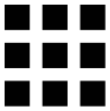
3.3.3. Touch gestures

Gesture	Action
	Use one finger to rotate a 3D View.
	Use two fingers to pan a Top View or 3D View.
	Spread or pinch two fingers to respectively zoom in or out of a Top View or 3D View.
	Tap to select.
	Sometimes it is possible to long-press for further options.

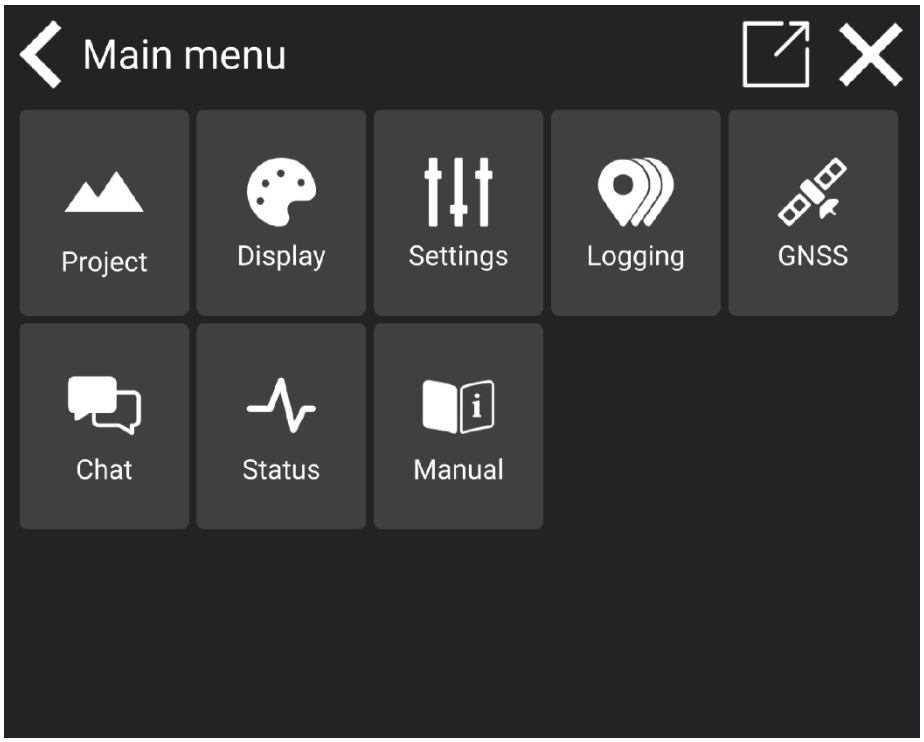
3.3.4. Symbols in the top bar

Symbol	Function
	Indicating a connection to the internet. The symbol appears white when a connection is established and gray if there is no connection.
	Indicates the number of visible satellites. hRMS (Horizontal Root Mean Square) and vRMS (Vertical Root Mean Square) indicate the current GNSS accuracy. Tapping the icon will bring you to the GNSS status menu.
	Indication of synchronization of data between server and machine.
	An indication that you have remote support from Makin. This will usually be in connection with a remote support case where you will be notified.
	Bring your machine back to the center of your screen after zooming and panning.
	Placed in the upper right corner. Tap for a change of screen, depending on the work you are doing and what you want to have in focus.
	Indicating project offset. The symbol appears when a project offset is applied to the active project.
	The tablet is connected to the cloud.
	Synchronize to the cloud.
	The tablet is not connected to the cloud.
	The tablet is disconnected from the cloud because of a secret project.
	This symbol is a sensor status indicator. See the pop-up notification for more information.

3.3.5. Quick keys on work screen

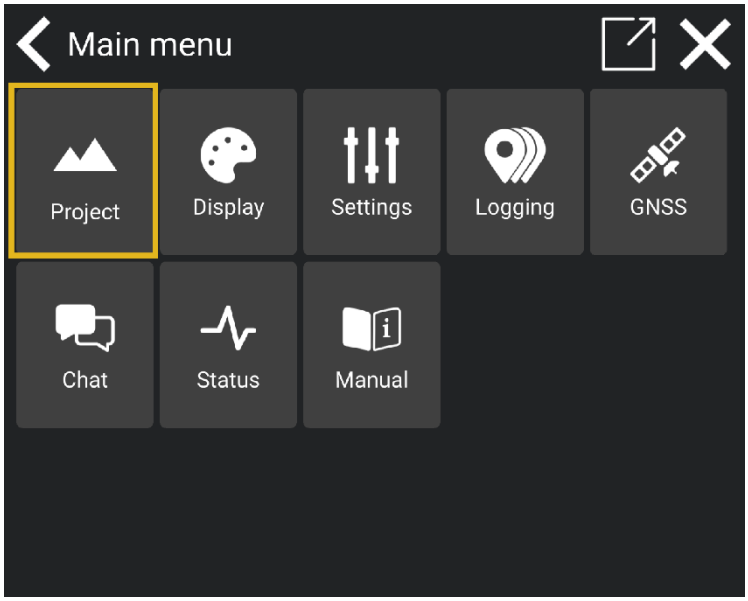
Illustration	Menu ID	Function
	References	Tap to access the *References menu*. Another way to access this menu is to select an element in the 3D model. **NB!** Long hold to access the *Project menu*.
	Compaction Config	Tap to access the compaction settings.
	Start logging	When pressed, the logging starts with the requirement set by the operator.
	Stop logging	When pressed, the logging stops.
	Main menu	Menu from where you can access all features of the system.
	Compactor logging status	Shows that the Compactor logging status is on. **NB!** When the color of the icon is faded, the function is not activated.
	Layers menu	Opens the *Layers menu*.

Main menu


Main menu
Project
Display
Settings
Logging
GNSS
Chat
Status
Manual

4. Project

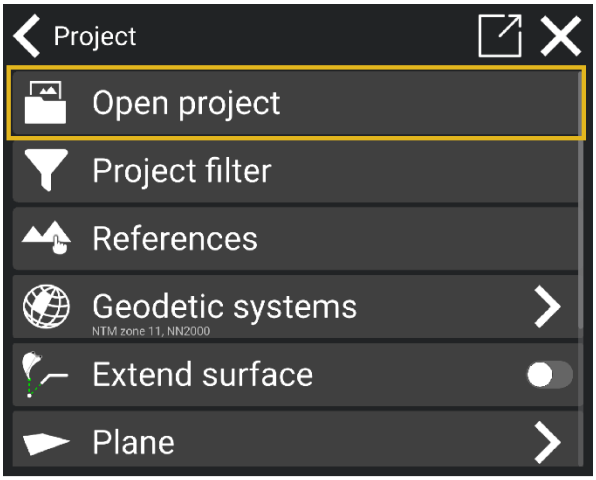
Working according to any kind of design is considered a project, whether it is a simple relative plane or referencing lines and surfaces in more complex 3D models.



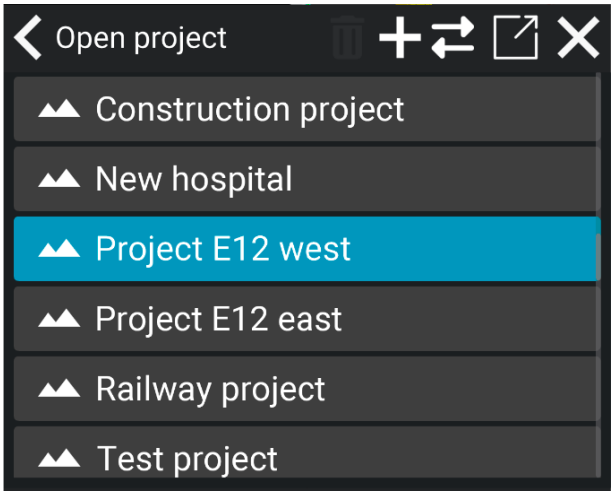
4.1. Open or create a project

To open an existing project:

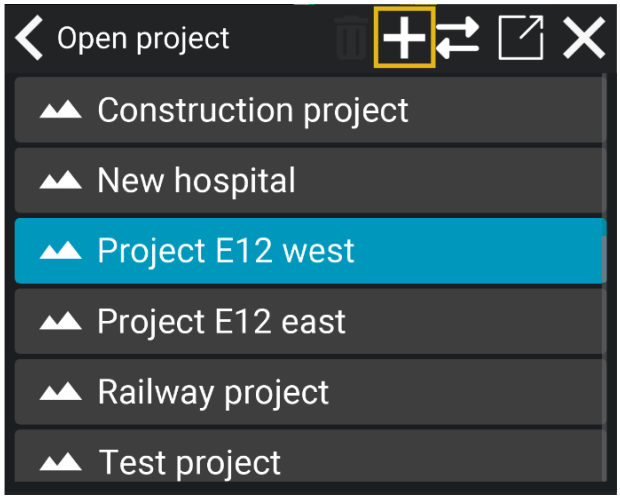
1) In '**Project**' tap '**Open project**' to see all the projects stored. This dialog is automatically opened if no project is loaded.



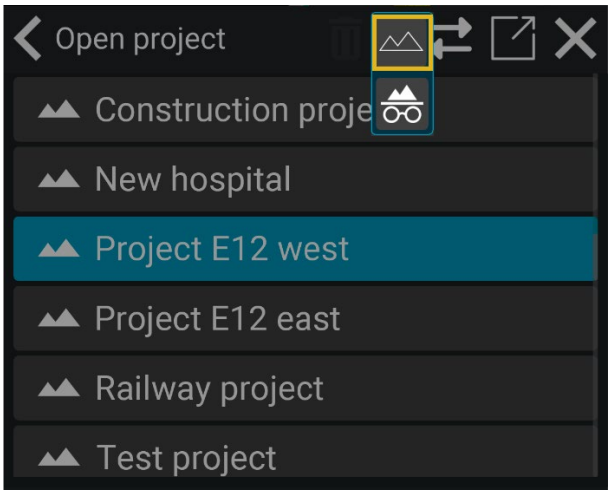
2) Tap on the project you want to open, and the download starts.



3) If you want to create your own local project, tap the '**+**' icon.



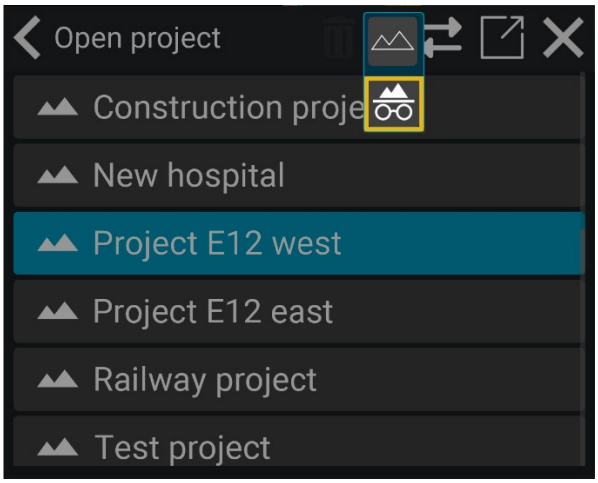
4) Tap on the **local project** icon.



4.1.1. Create a secret project

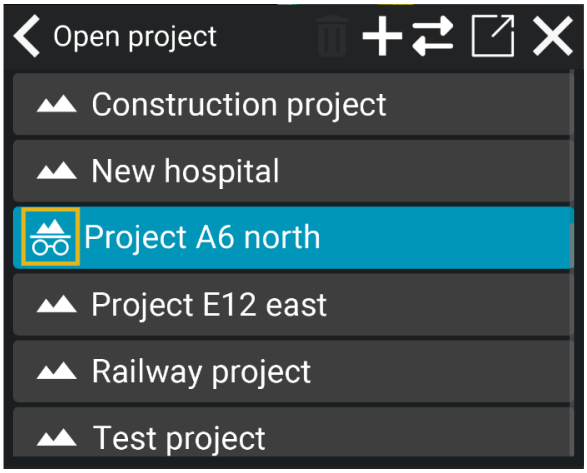
You can create a secret project that will only be available on your tablet and will not synchronize to the Makin' Cloud. Secret projects are useful for construction projects needing confidentiality due to security, critical infrastructure, or competitive advantages.

1) Go to *project > Open project*
2) Tap on the '**+**'-symbol
3) Tap on the '**secret project**' icon



4) Name the secret project

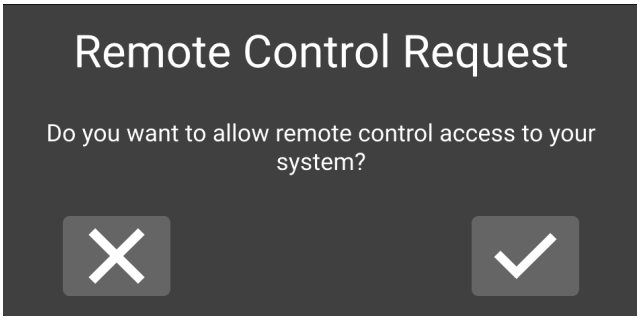
The icon in front of the project name indicates that it is a secret project:



4.1.1.1. Remote control for secret projects

If you need support while working on a secret project, you must grant support access to your tablet during remote control. The secret project will be disconnected and will not synchronize to the Makin' Cloud, as indicated by this icon:

The support staff can see that your system is online on the Makin' Cloud, but they will not have access to any details about the secret project. To get support while working on a secret project, you need to give access to the support staff. When the support staff initiates remote control, a notification will pop up on your tablet:

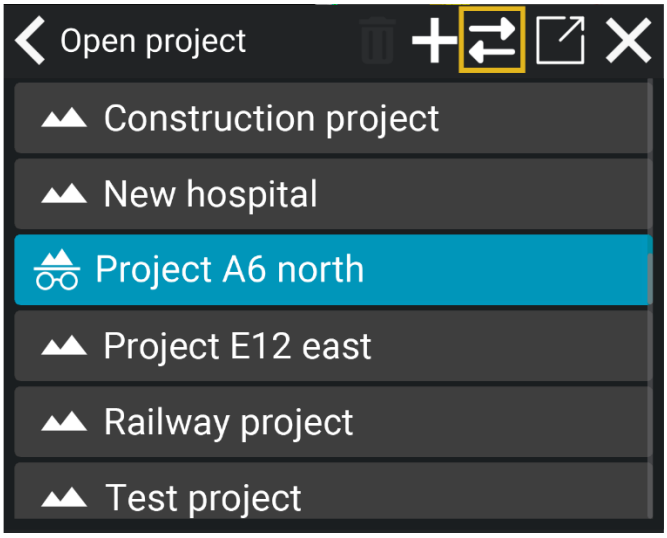


To allow remote control access, tap on the check mark.

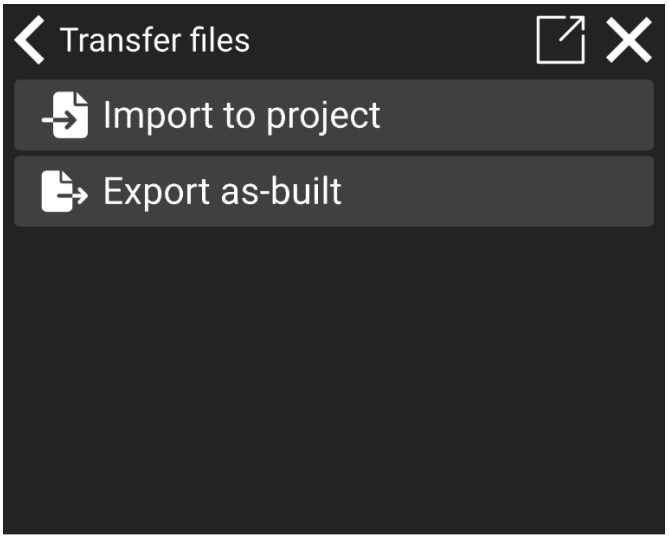
4.2. Transfer files

You can transfer files via USB flash drive to secret projects, local projects and cloud projects. You can import files to the project and export as-built data from the project. *Please note:* If you import files to a local project or a cloud project, those files will be available on Makin' Cloud. For more details, see section *4.2.1.1: Imported files on Makin' Cloud*.

1) Tap on the '**transfer files**' icon.



2) Choose between **import to project** or **export as-built** data from the project. Learn more about importing and exporting in the sections below.



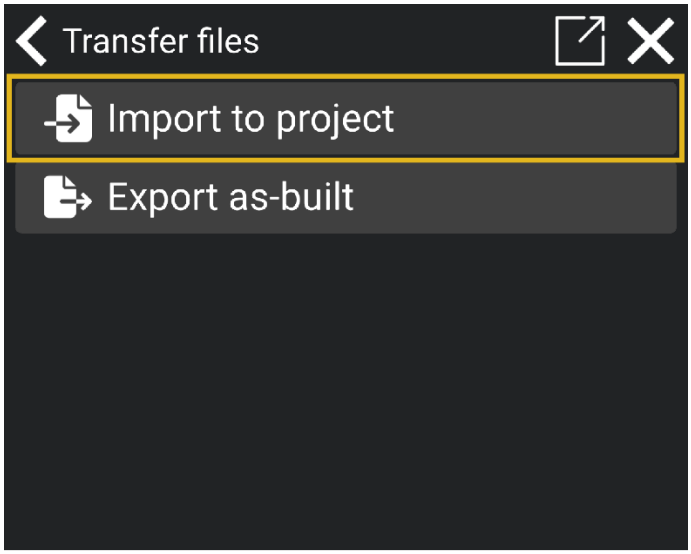
4.2.1. Import to project

You can import files to the project via a USB flash drive. You cannot import single files but only folders from the USB flash drive. *Please note:* If you import a file with the exact same name as an existing file in the project, the new file will overwrite the existing one.

How to import files to the project:

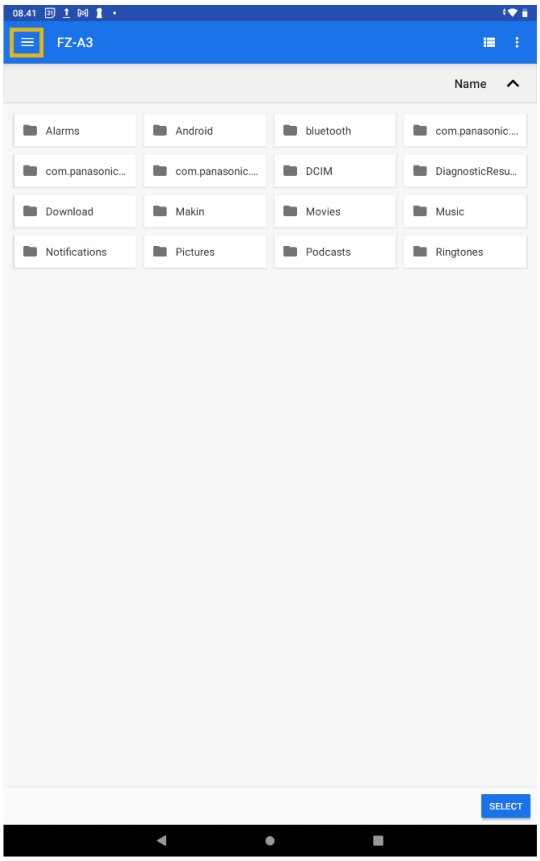
1) Important: Insert the USB flash drive into the tablet first.

2) Tap on '**Import to project**'.

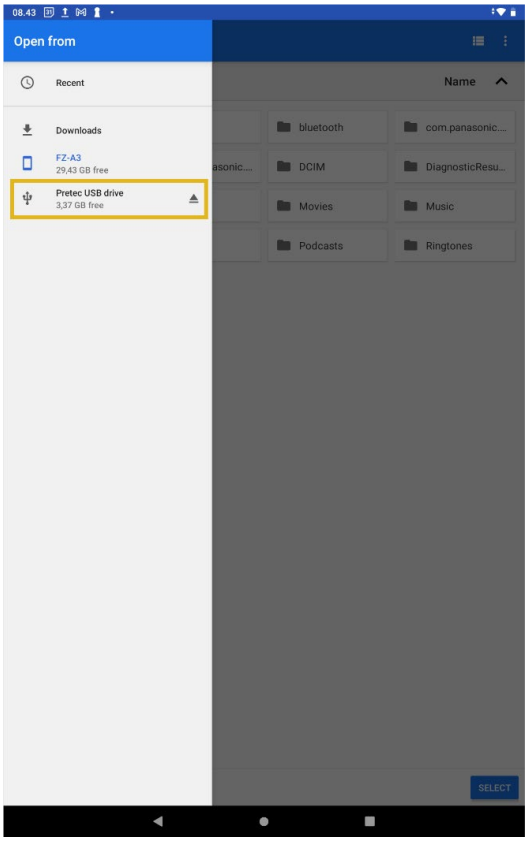


3) You will now be directed to Android's dialog.

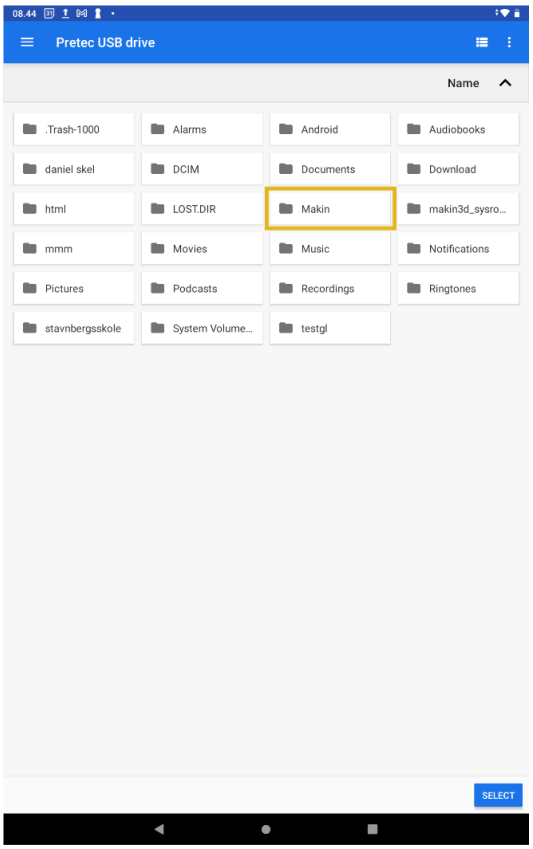
4) The first time you insert the USB flash drive you need to make sure that the USB flash drive is selected. Tap on the 'three stripes' icon in the top left corner.



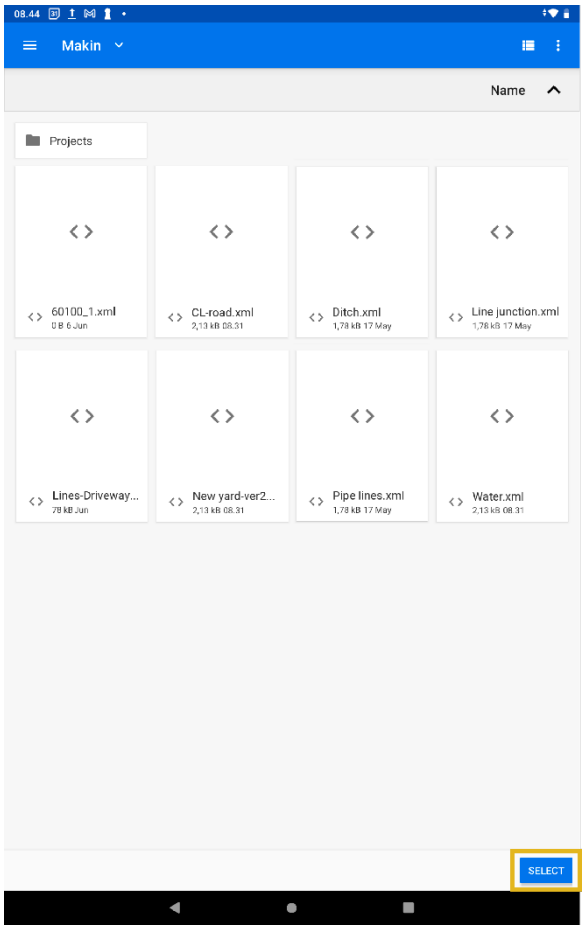
5) Tap on the name of the USB flash drive to open it.



6) Tap on the folder you want to import files from.



7) Tap on '**select**'. *Please note:* All the files in the folder will be imported. You cannot import single files.



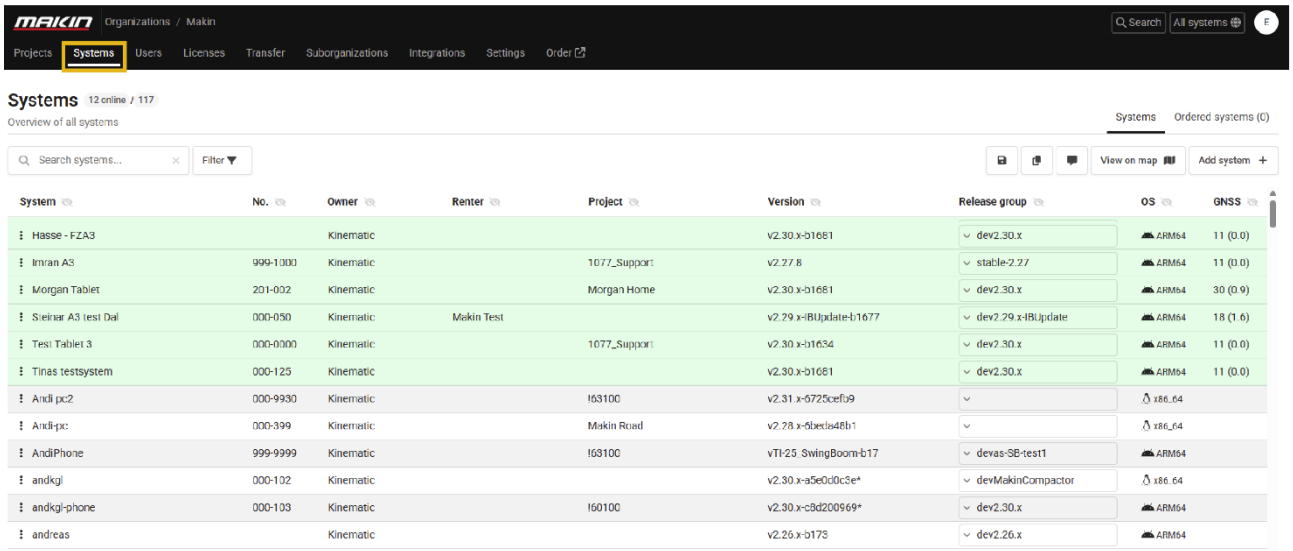
8) Import of files is completed. You can view the files under *References* on the tablet.

4.2.1.1. Imported files on Makin' Cloud

When you import files to a local or cloud project, they will be available on Makin' Cloud. However, these files will be stored in your system's project folder, and not as part of a global project within your organization.

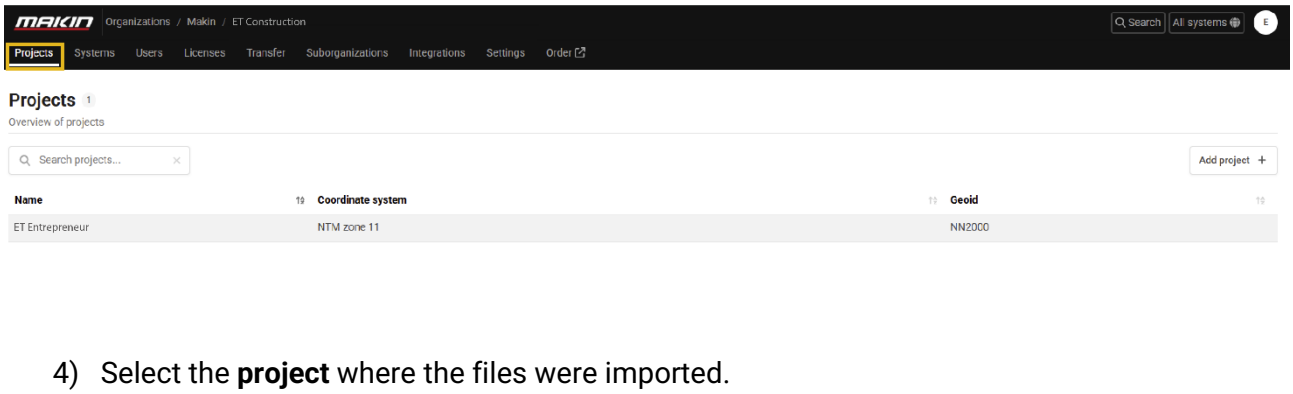
How to find imported files on Makin' Cloud:

1) Go to *Makin' Cloud > Choose organization > Systems*

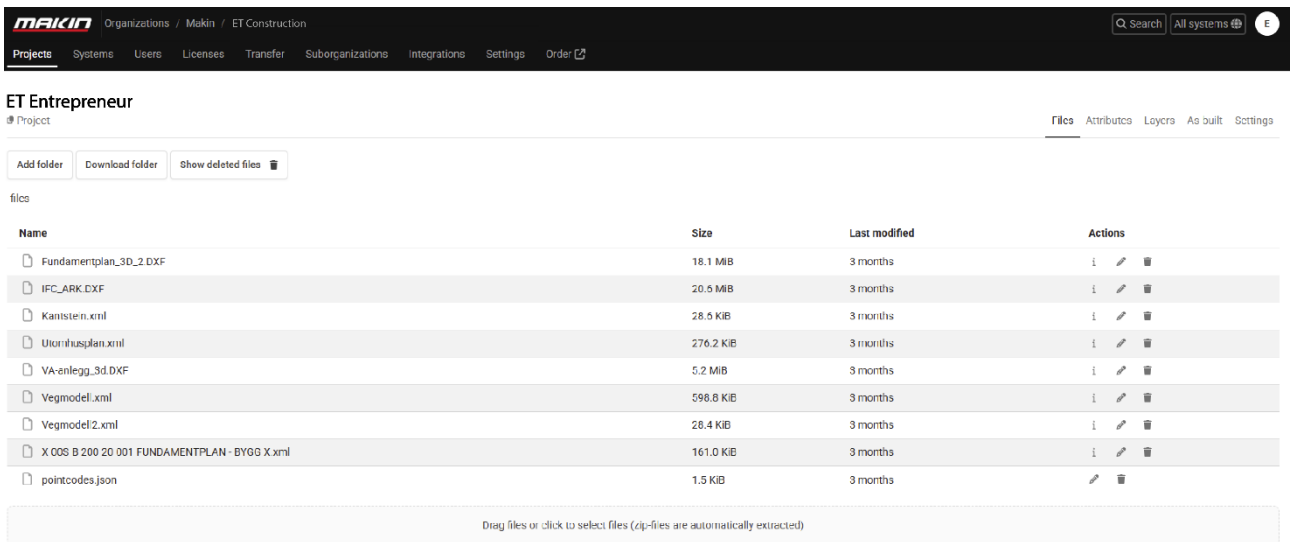


2) Select the system that imported the files.

3) Open the **project folder** under that system.



4) Select the **project** where the files were imported.



5) The imported files will be available in this folder.

4.2.2. Export as-built

The USB export function allows you to export locally logged *as-built* data directly to a USB stick. This makes it possible to transfer project data without requiring access to the cloud.

Note: Only the as-built data logged by the current user can be exported.

When performing a USB export, the following files are generated:

- LandXML file: Contains points and lines from the as-built logging.
- ZIP file (*attachments*): Photo documentation for all images linked to the logged points.
- Compaction data *(Only for secret projects, otherwise the data is stored directly in the cloud):*
    - Final compaction data: The most recently logged data for each layer.
    - Historical compaction data: All compaction data logged during the project.

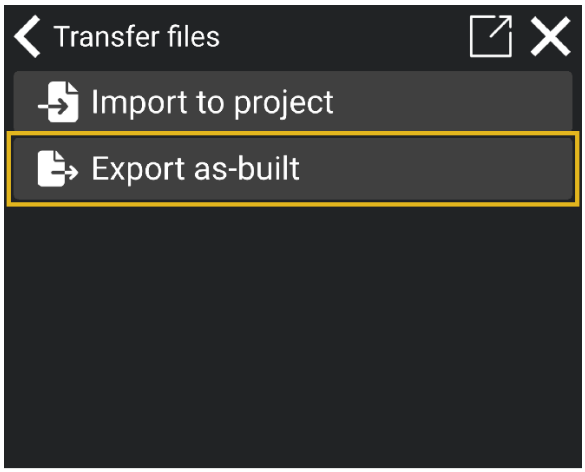
Steps to Export As-Built Data via USB:

1) Insert the USB flash drive into the tablet. Please note that it is very **important** that this is done as the first step.

2) Open the menu *Open project*.

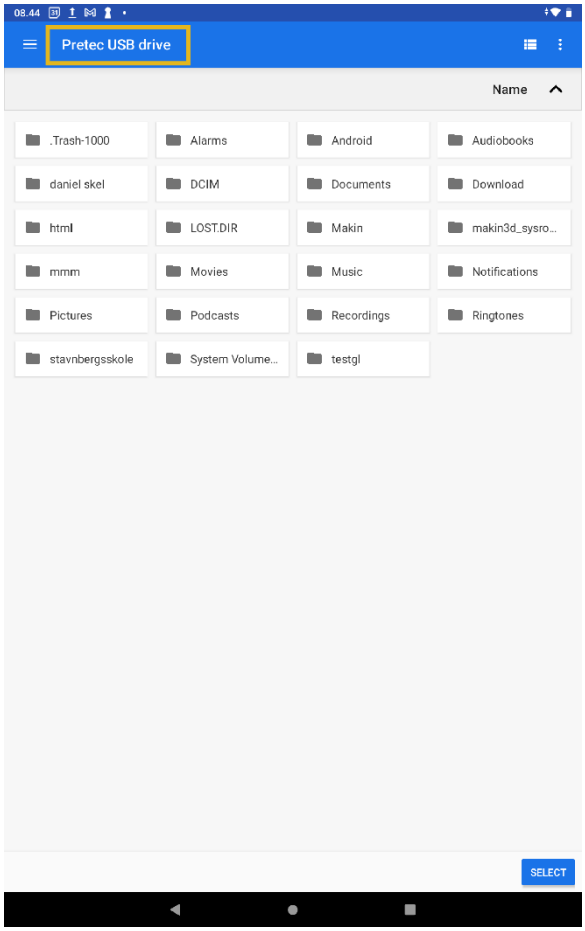
3) Tab the icon displaying the two arrows (Transfer symbol)

4) Tap on '**Export as-built**'.



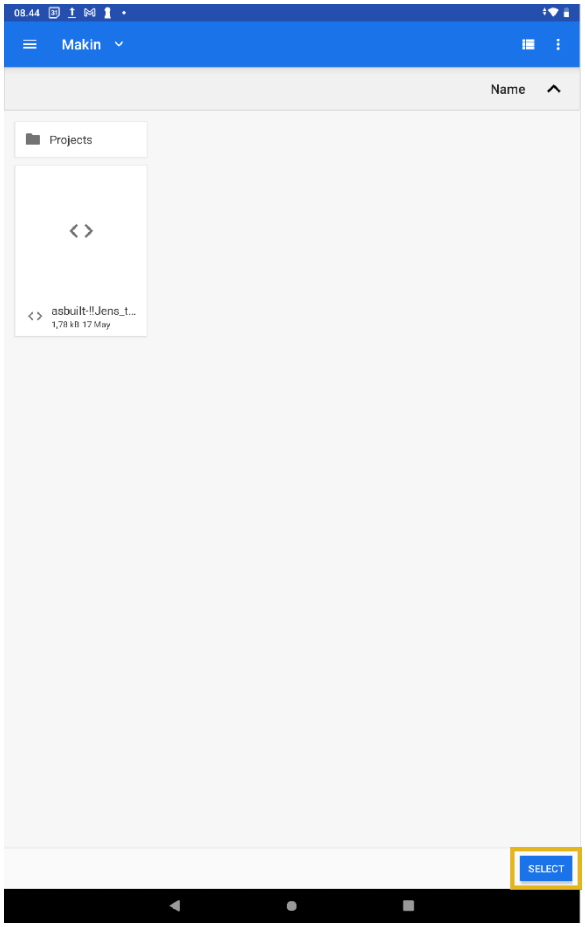
5) You will now be directed to Android's dialog.

6) Make sure that the USB flash drive is selected. If not, tap the 'three stripes' icon in the top left corner and select the USB flash drive.



7) Tap on the folder where you want to save the as-built data.

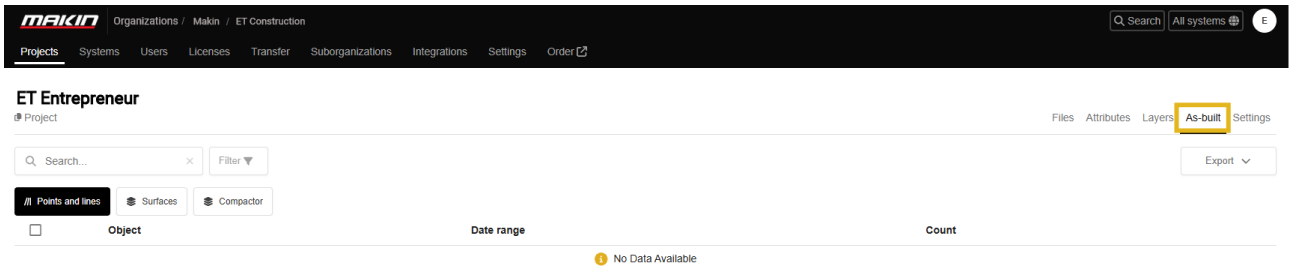
8) Tap on '**Select**'. This will export the project's as-built data to the chosen folder. A pop-up notification will indicate that the export is in progress.
   - Please note that in most cases, the process is completed so quickly that this notification may not appear.



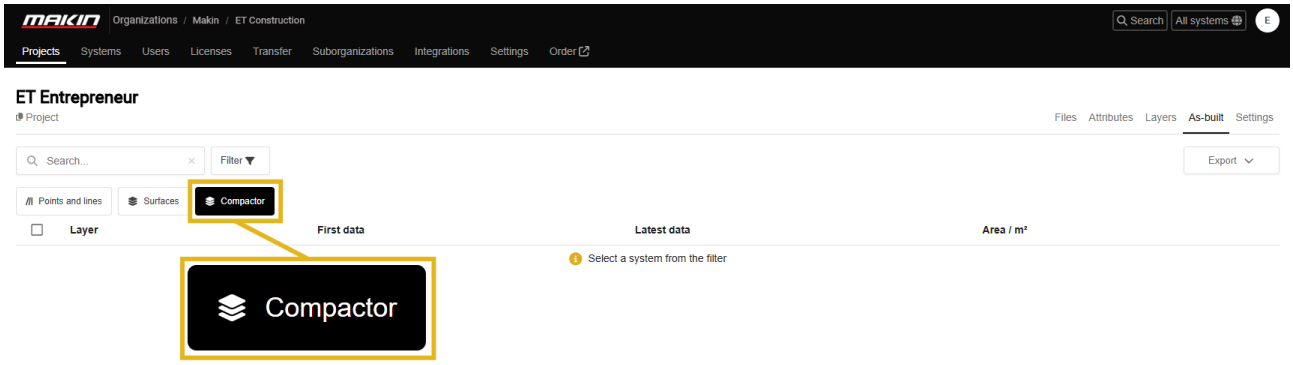
9) The project's as-built data is now saved in the selected folder on the USB flash drive. When the export is complete, a confirmation pop-up will be displayed on the screen.

4.2.2.1. Export as-built from Makin' Cloud

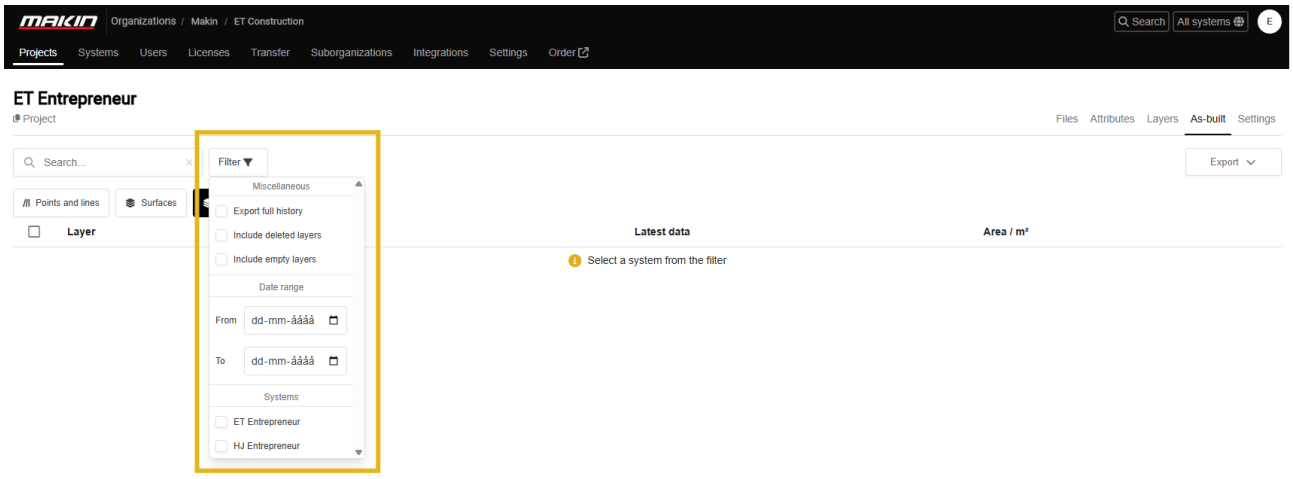
1) Go to the as-built section within the project.



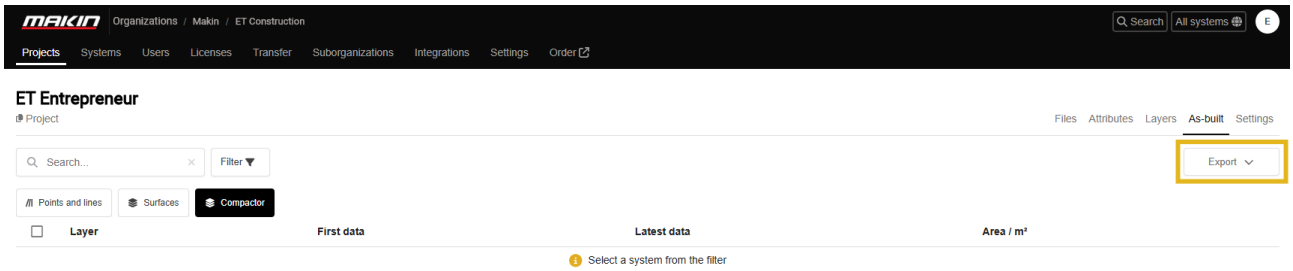
2) Open the compactor section



3) Use the filter function to find the relevant data.



4) Select the data and click the Export button. This will give you the option of choosing the format you wish to export your data into.



5) Select the CSV format to download the data to your computer. Exporting the data will generate the file *Compaction Data*. The file *Historical Data* will only be generated if you click “Export Full History”.

4.3. Supported file types

When creating a project, the following file types are supported:

- LandXML Roadrunner format (XML)
- Drawing eXchange Format (DXF)
- Norwegian coordinate and observation format (KOF)

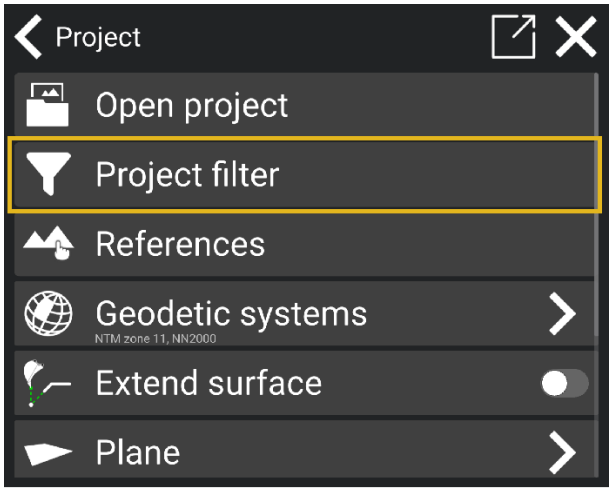
New projects are stored in LandXML format.

4.3.1. Project filter

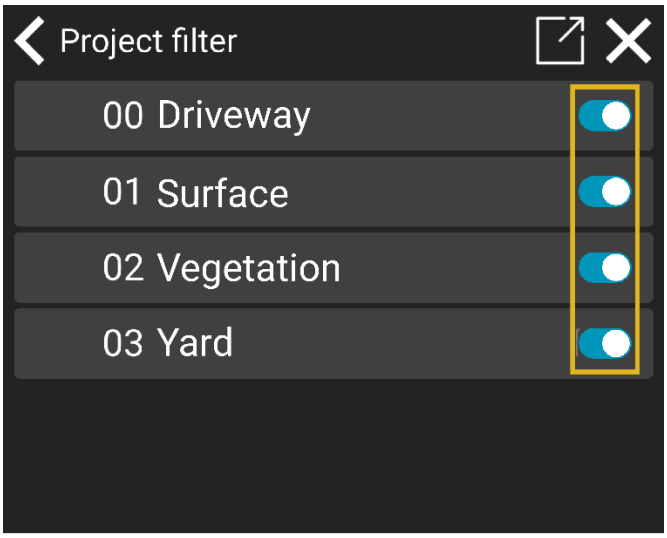
Note: When Makin' 3D reaches 170 MB data in size, a warning will pop up, informing you that the project is large. This can reduce performance. The file size depends on the complexity and the details in the model.

If the project reaches 170 MB data in size, part of the model will be shown on your tablet screen near the application, while the rest remains hidden. As you move the application around, the visible part of the model will adjust to stay aligned with where your application is.

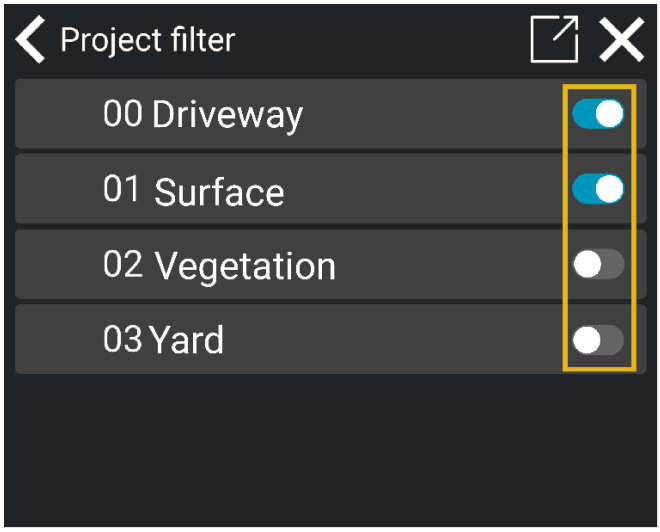
You can choose to load a part of the project file under *Project* > *Project filter* or click '**Filter**' in the notification.



1) Select the folder you want to activate and load by clicking on the button. When the folder is activated, the button will turn blue.



2) Deselect the folders you do not want to load by clicking on the button in front of the folder's name. When deselecting the folder, the button will turn off.



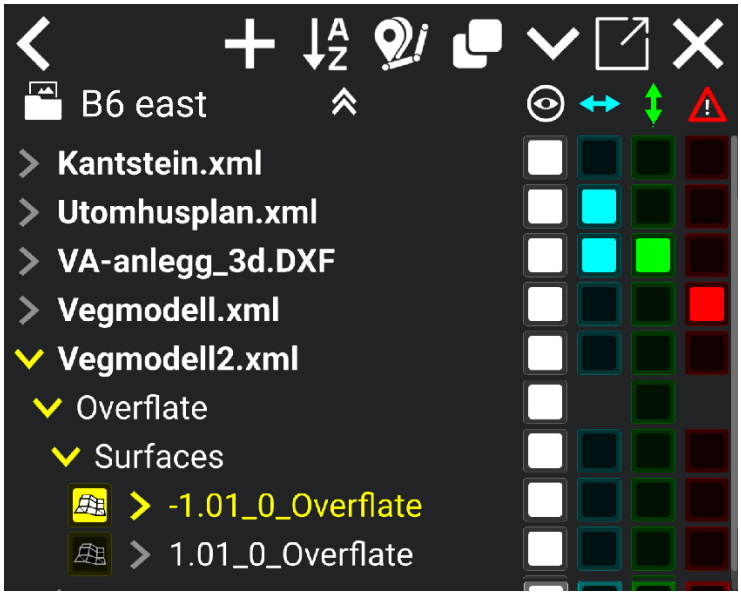
The activated folders will be loaded and displayed under 'References' in a petrol blue color, along with the files from the folders.

You can create folders on Makin' Cloud and then drag your project files into these folders: *Makin' Cloud > Project > Choose your project > New folder*.

4.4. References

In the ‘References’ dialog, you can choose which part of the 3D model should be active/inactive and what should be selected as height references, side references, and alert references.

- Height references can be points, lines, and surfaces.
- Side- and alert references can be points and lines.

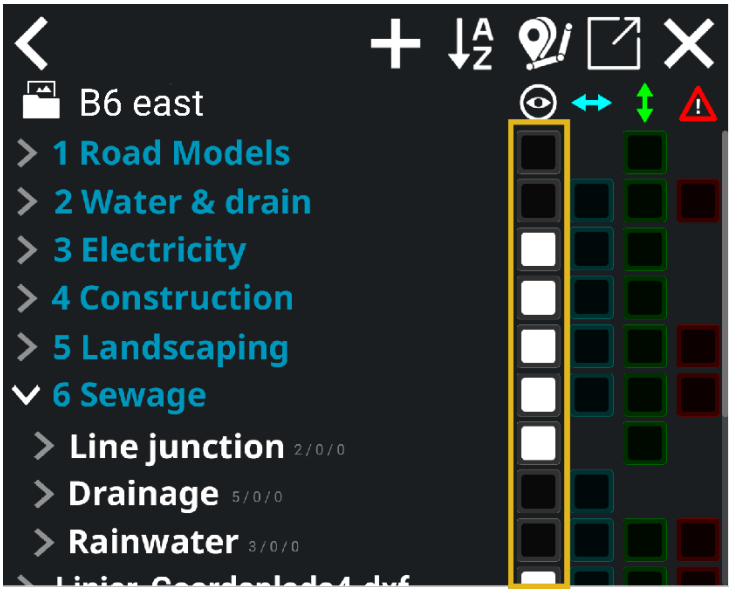


- Click and element symbol to select and deselect it. When selected the element will be highlighted with yellow.
- White means an element is visible and activated.
- Blue indicates an element used as a side reference. Press to select as reference. Long press will deselect all other side references selected.
- Green is used for elements that may reference the height. Press to select as reference. Long press will deselect all other height references selected.
- Red is an alert reference, which gives a warning when the tool is too close to the element. Not applicable for surfaces.

As an alternative to going via the menu, you can also find this feature in the **Quick Keys menu** or by selecting any element in the 3D model.

4.4.1. Visible reference

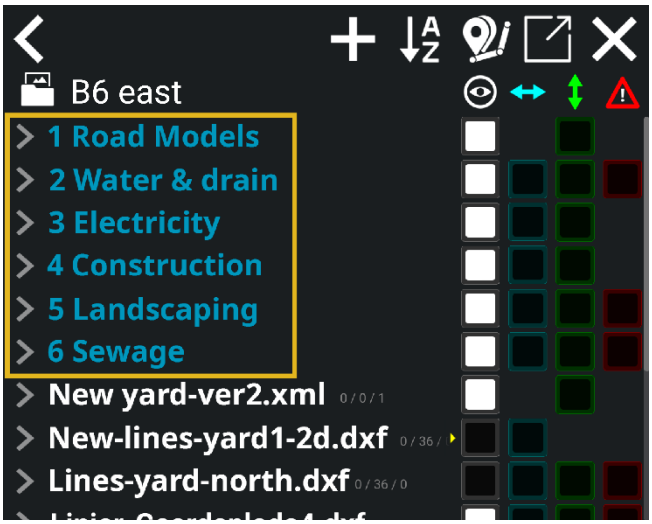
All geometries are visible by default and can be hidden by deselecting the white square next to them, beneath the eye symbol. Calculations are only performed according to visible layers.



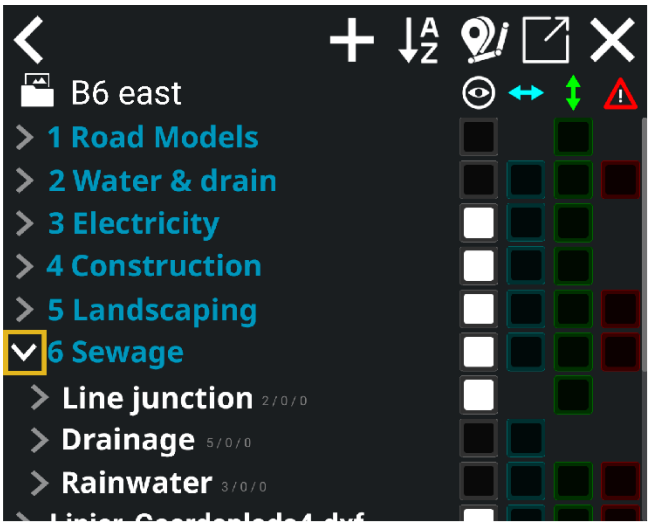
For example, if we want to make all roads visible in a group of models, simply check the white box to the right of its folder. It will make all roads visible on the screen. If we only want to see one road, just activate the white box to the right of the particular road file.

4.4.2. Folders

In the reference examples below, we see all folders containing the project data. In this example, we have six folders:



If you enable options (i.e., set visible, side reference, height reference, alert reference) for a folder, you enable the option for all models in the entire folder. For example, if you have many road models, you may want to open the folder with the small arrow to the left of the folder and only activate the road models that you need.



Folders are shown in blue text and model files are white. File and folder names are scrollable.

In the above example, we have opened a folder, which contains several individual files. You can turn on all elements of a folder or turn on some details by expanding individual folders. Within the folders, you can select specific data to make visible and choose what to actively work against.

To get an indication of the different model files, side and/or height must be activated. As with viewing, you do this by tapping the respective blue and/or green boxes. By enabling visibility, side, and height in combinations, you can customize what information you want on the screen.

4.4.3. Side reference

Side references are geometries used for side calculations. When models are activated, they have a blue color next to them, beneath the symbol with the horizontal arrow in the ‘Reference’ dialog. The closest geometry, activated for side reference, will automatically be used. Lines and points can be selected as side references - not surfaces. The calculated side distance is the horizontal distance to the geometry.

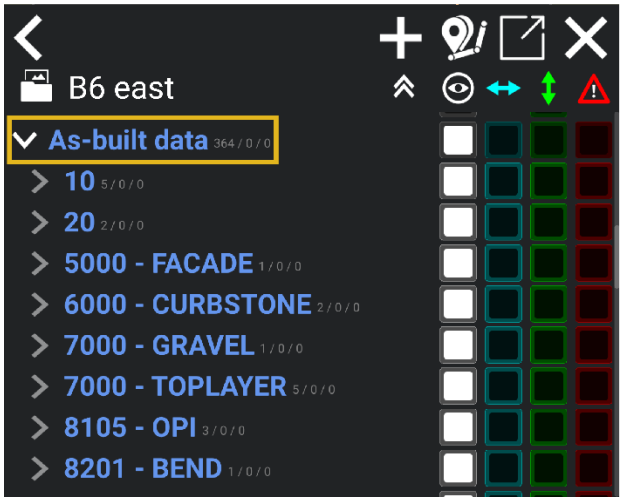
4.4.4. As-built data

As-built data is data used for documentation of the performed task. As-built data can be used in different ways: to document that the project is built the same way as it was originally designed or to document if extra work has been performed, e.g., how much soil is being removed from an area.

The as-built data is collected when the machine works, and the data is logged by the operator. This data can be used later in the process to assure the quality of the project. As-built points will be saved in the overview if it is necessary to navigate to the points at a later stage of the project.

As-built data can be used as references in a similar way as other references. The green points are your own points, and the purple points are points from other applications. The lines and points are

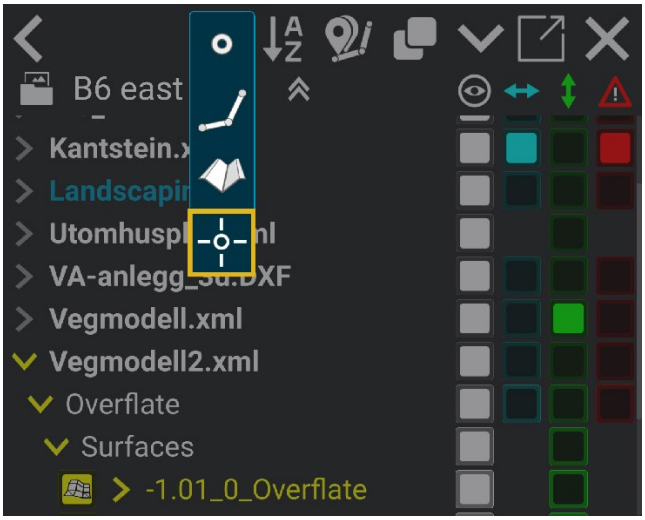
continuously saved and synchronized to the Makin' Cloud, where they can be downloaded as .CSV format.



4.5. Infield Design

To open the Infield Design function, go to the *Reference menu*.

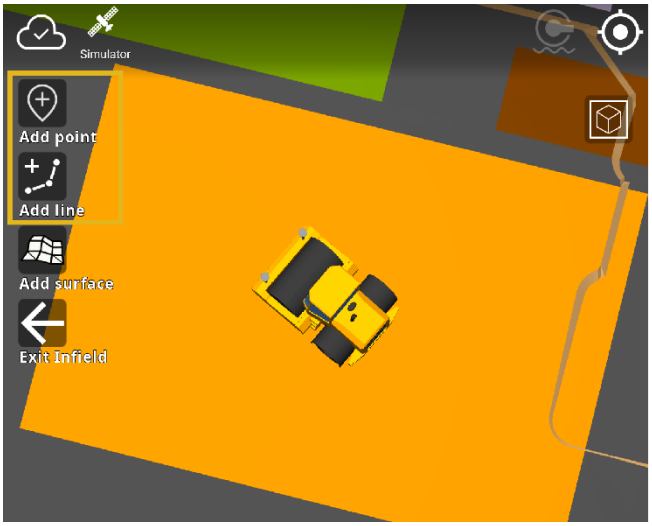
1. Click the + icon on the menu bar in top of the *Reference menu*.
2. This will open a drop-down menu. Select the Infield Design icon.



3. Wait for the Infield Design section to open.

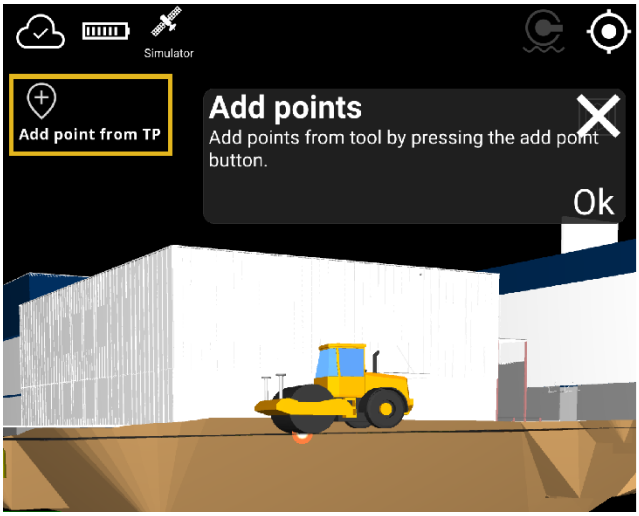
4.5.1. Points and lines in Infield Design

The Infield Design is equipped with an *Add point*- and an *Add line*-button.



Use these to add the needed data or work from already logged data. The workflow when logging points and creating lines in Infield Design is almost the same as when logging regular as-built data.

1. Click the icon for the data you need to log.
2. Place the tool point in the correct position.
3. Click the *Add point from TP*-button on the screen. This will log a point.

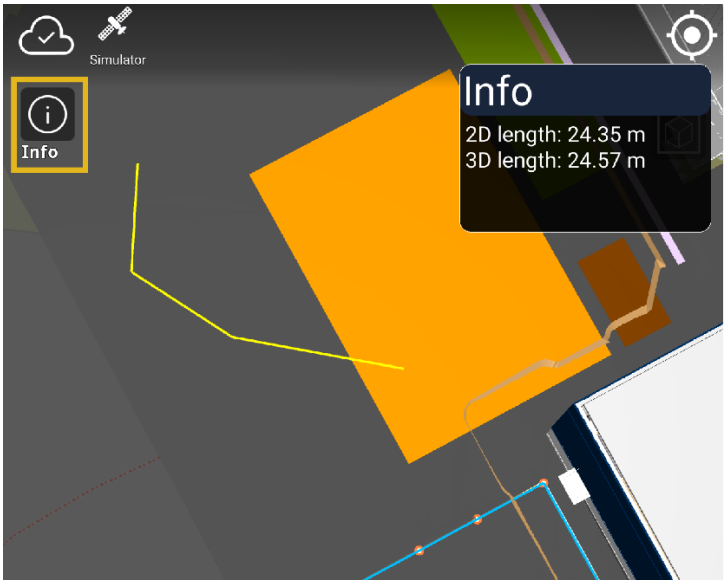


4. Move the tool point to the next position.
5. Repeat until all desired points are placed and click the *OK* button.

Please note: If you close the pop-up window by pressing the *X*, all data created before pressing *OK* will be deleted, and it is not possible to recover it.

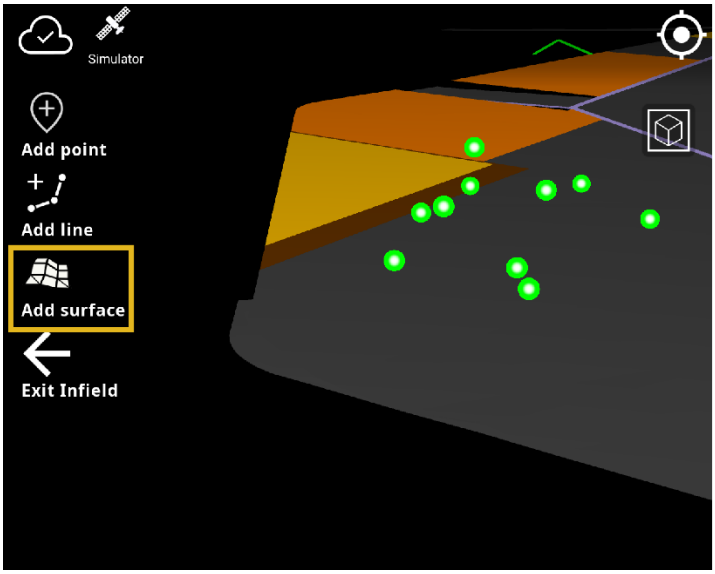
4.5.2. Info box for line

When a line is created, you can access its relevant information. Simply select the line and click the *Info*-button on the left-hand side of the screen. This will open a pop-up window.

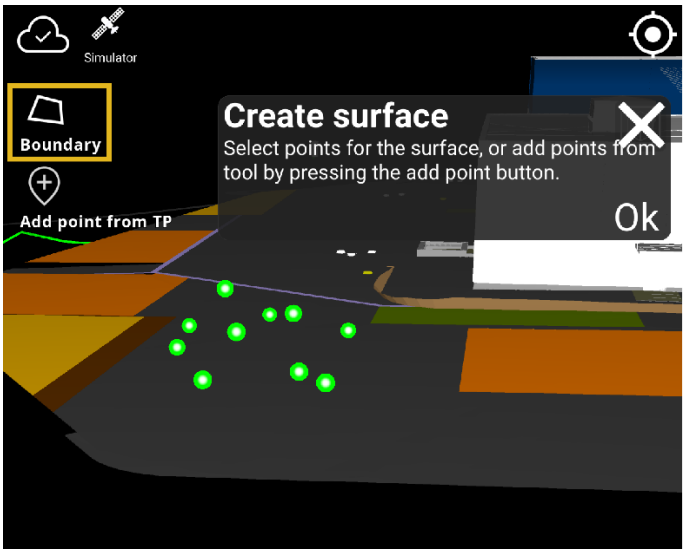


4.5.3. Create a boundary

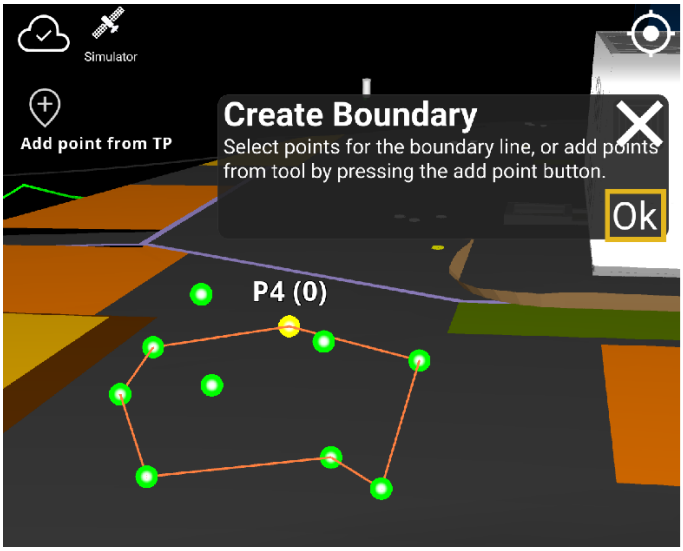
1. When the points are logged, click the *Add surface*-button.



2. Click the *Boundary*-button.



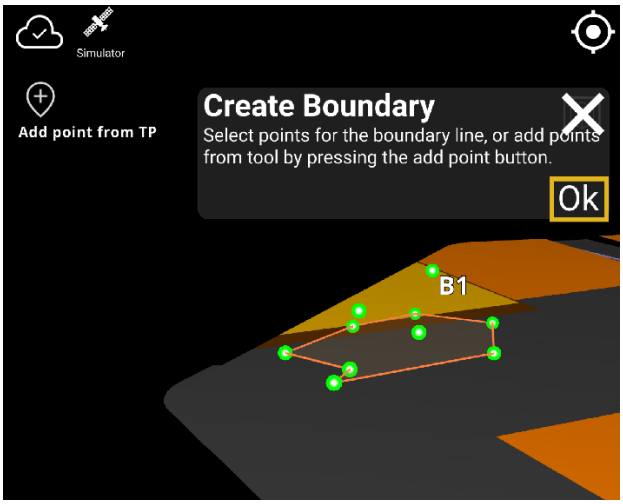
3. Select the points there are a part of the boundary and click *OK*.



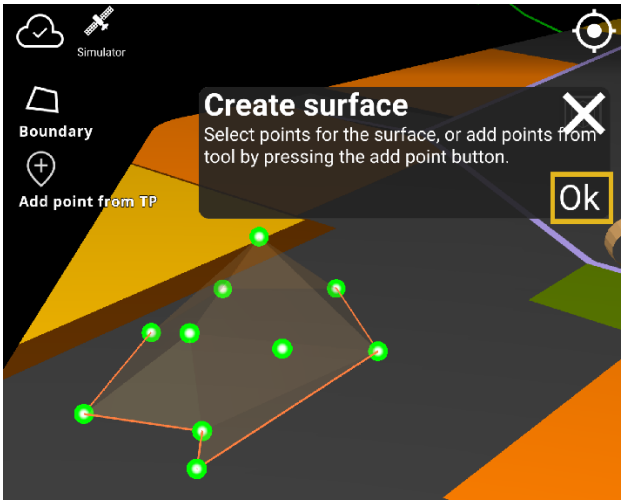
4. A boundary has been created.

4.5.4. Calculate volume

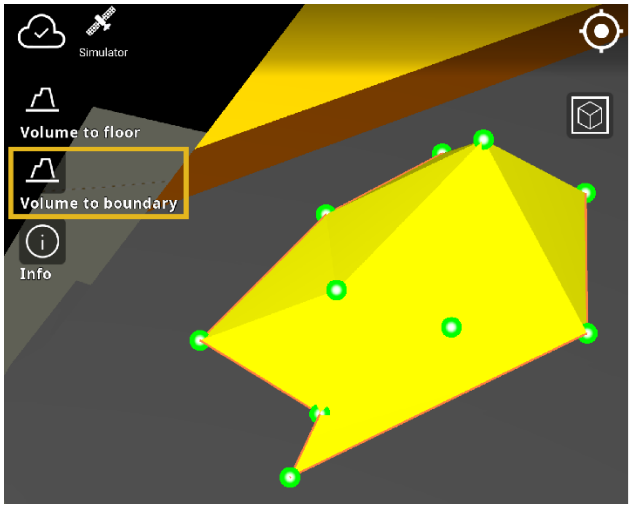
1. Start by creating a surface based on your boundary.
2. Click the *Add surface*-button.
3. Click the *Boundary*-button and select the created boundary. When selected press *OK*.



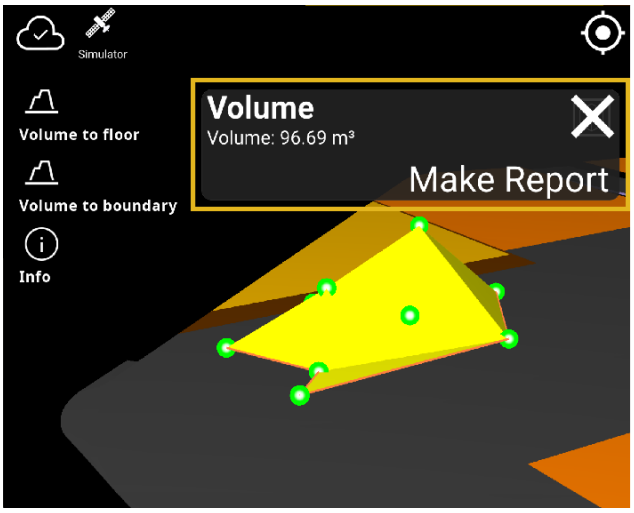
4. Select the top points to create the surface. When the points are selected, click *OK* to create the surface.



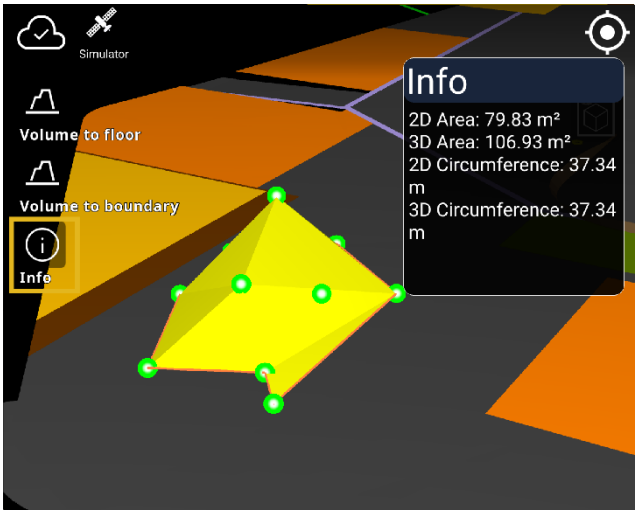
5. Select the surface and click the *Volume to boundary*-button to calculate the volume.



6. This will open a pop-up window showing the volume.

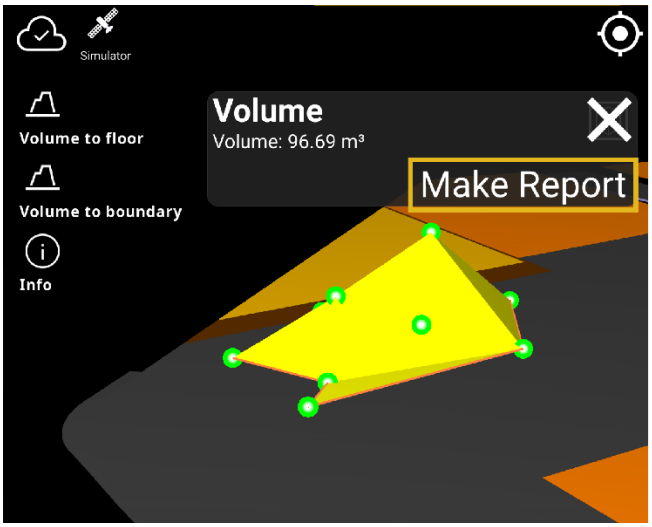


7. If more information is needed, click the *Info*-button to open the info box.



4.5.5. Infield Design report

It is possible to create an Infield Design report with all the relevant measurements. Create the report by clicking the *Make report*-button, this will export the data to Makin' Cloud. Please note that the report can only be generated once the volume has been calculated and Infield Design has collected all the relevant data.



Go to the cloud and open the PDF. Please note that the image in the report is a screenshot taken at the moment when 'Make Report' is clicked. It is therefore important to be aware that the screen displays the measured area if you want to have the correct area shown in the report.

4.5.6. Exiting Infield Design

To exit the Infield Design click the *Exit Infield* -button or the Infield Design icon at the bottom of the screen.

4.6 Geodetic systems

Only in rare cases should the machine operator be concerned about selecting the correct coordinate system and geodetic model. With Makin' 3D these matters are handled in a central place - e.g., the construction office. When made available, the geodetic system cannot be changed on the compactor. It is possible though, to handle the geodetic system locally when required by simply not having it preselected for a particular project.

4.7. Project offset

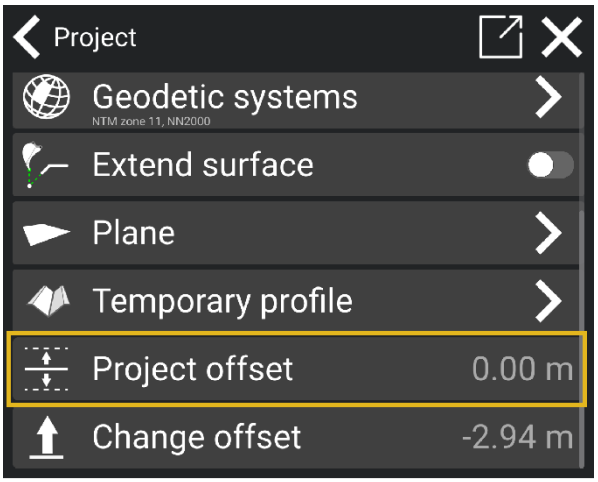
Project offset is designed to adjust a machine's height to match the height of the design project you are working on. Even if a machine is correctly calibrated, the height measured by the tool point in the application can differ from the height of a known point on the project. These differences can occur as a result of differing reference systems, e.g.: localized coordinate projections vs. official coordinate projections. Other sources include small variations between GNSS manufacturers as well as incorrect heights used in the initial project design.

To mitigate this, we have added the project offset functionality, which adjusts the received GNSS height (not the antenna height) to match the height of the known point on the project.

Note:

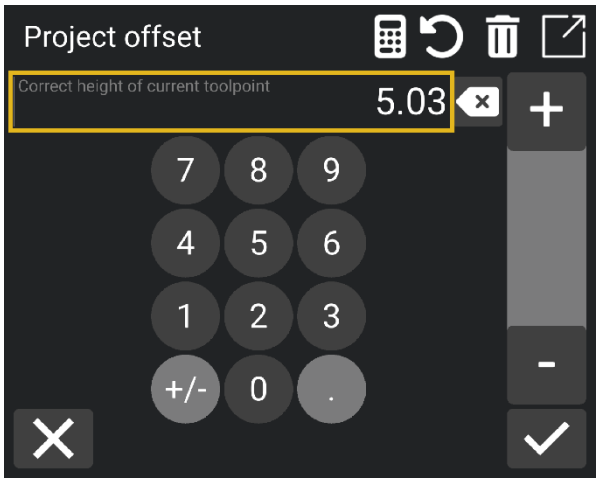
Project offset is limited to adjustments of +/- 50 cm.

Project offset can be adjusted in: *Main Menu > Project > Project offset*



How to use:

1) Inside the project offset menu, you will see the tool point height of your application in the value area.



2) Enter the correct height of the known point in the value area to calculate a project offset.

3) It is also possible to adjust the project offset using the +/- buttons, increasing or decreasing the value by 1 cm per tap.

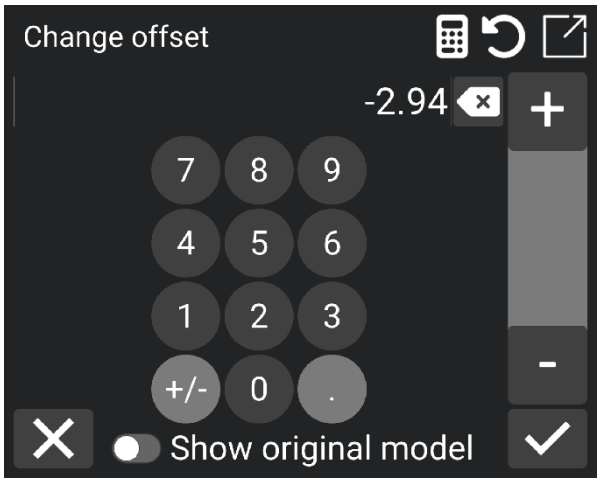
4) A project offset is calculated and visible in the project menu. When you have a project offset, the icon will be visible on the work screen.

To remove the project offset, go into the **Project Offset menu** and tap the **trash can icon**.

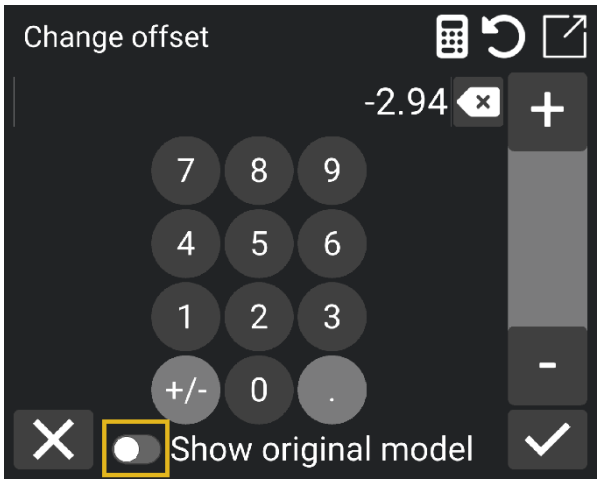
4.8. Change offset

Entering this menu adjusts the height offset you want to have for the whole project. Typical uses are where you have only been given the surface of a road and should dig for a ditch or other layers beneath the surface. If the ditch is known to be 0.85 meters under the finished road, then adjust the offset value to -0.85. A parallel surface/line will then be created 0.85 meters beneath the theoretical model. The whole model will be offset.

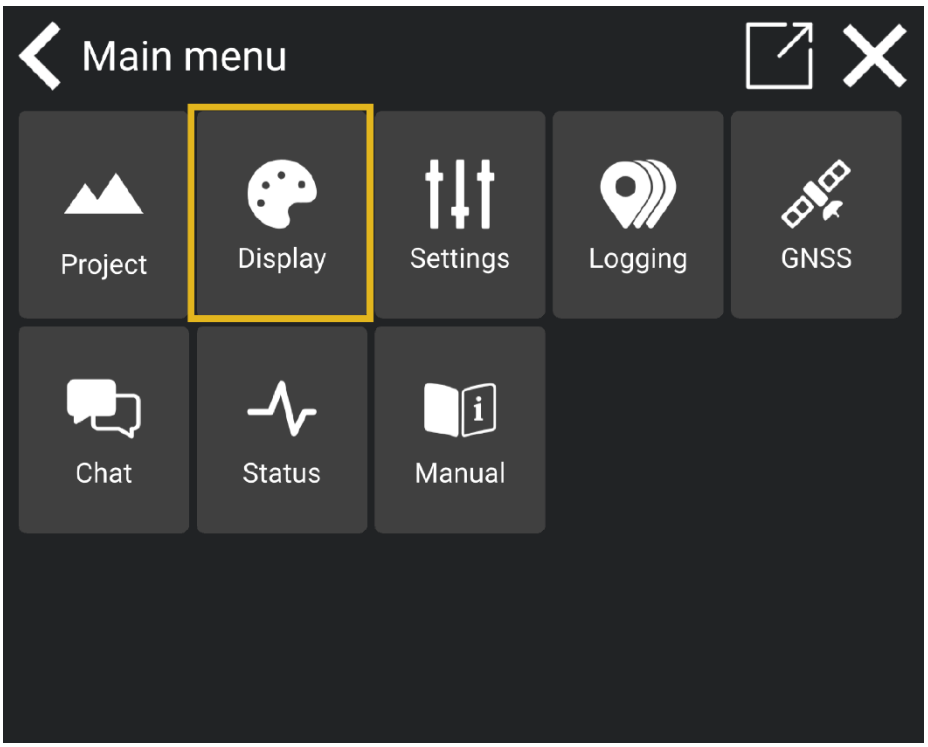
You can enter the desired value manually or move your finger up or down in the vertical field.



If you have applied an offset but want to view the model with its original offset, enable '**Show Original Model**'.



5. Display

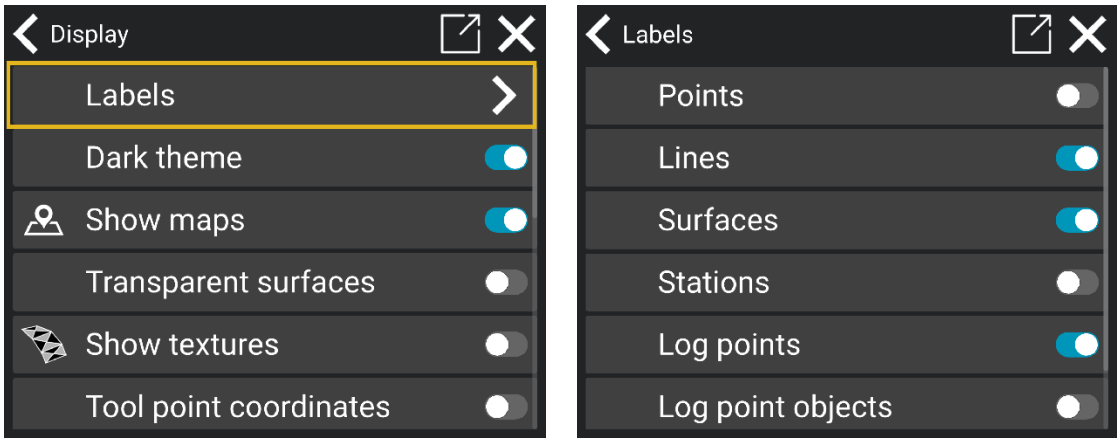

Main menu
Project
Display
Settings
Logging
GNSS
Chat
Status
Manual

5.1. Labels

A label is the name of a geometry object of the following type:

- Points
- Lines
- Surfaces
- Stations
- Log Points
- Log Objects
- Texts

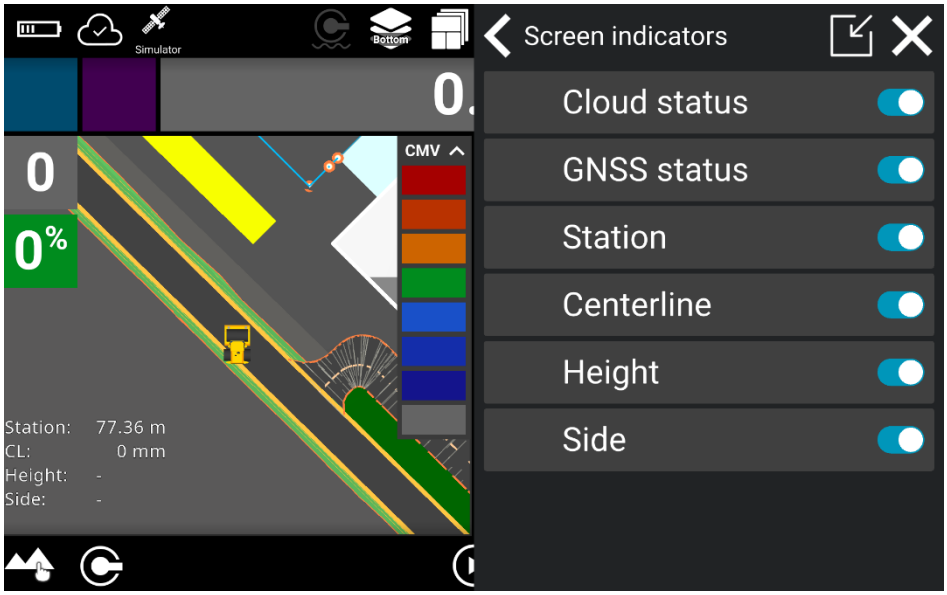
It is possible to choose which type of label should be visible by selecting/deselecting it on the list.



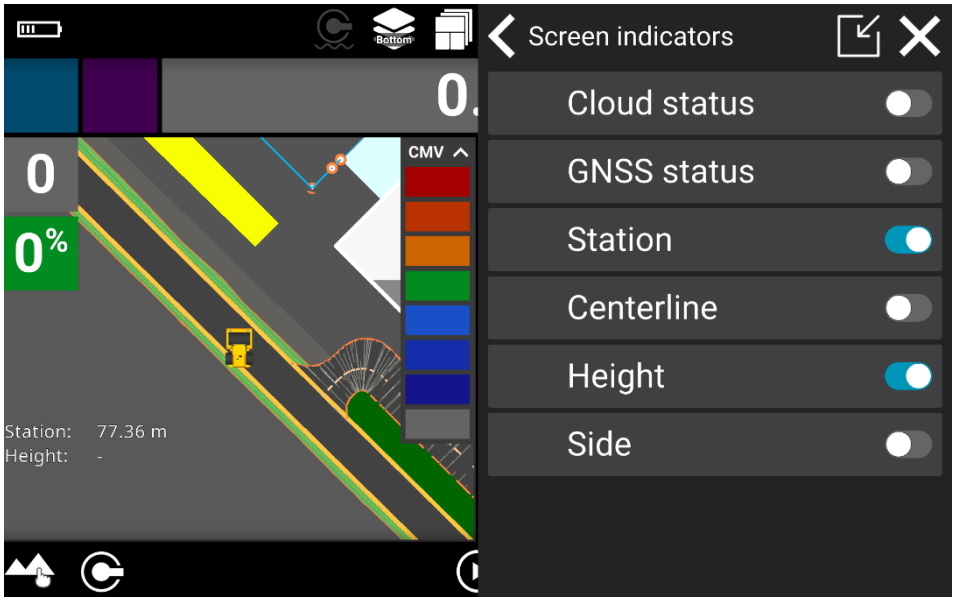
5.2. Screen indicators

It is possible to hide some of the screen indicators in the work screen area. This function is designed to let you remove non-essential features, that could be distracting on the screen.

With all screen indicators:



With selected screen indicators:



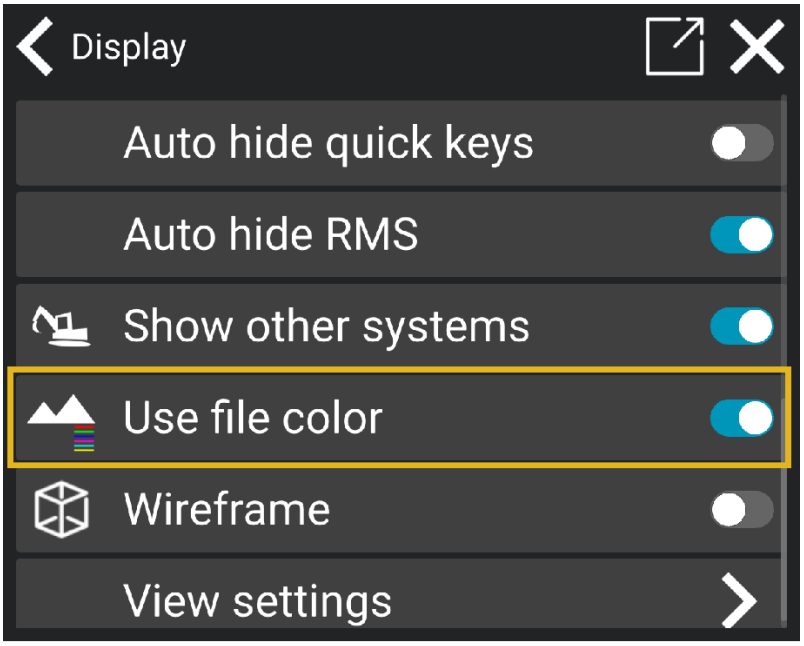
5.3. Use file color

This feature changes between using the colors stored on file or the default color scheme of Makin' 3D. In some situations, it gives a better overview using the colors of the model file and will make it easier to separate elements in a complex file.

If file color is not enabled, Makin' 3D will use default colors.

Be aware that some files can include black-colored lines or designs, and these will not be visible if the file color is selected.

- Tap to select/deselect file colors



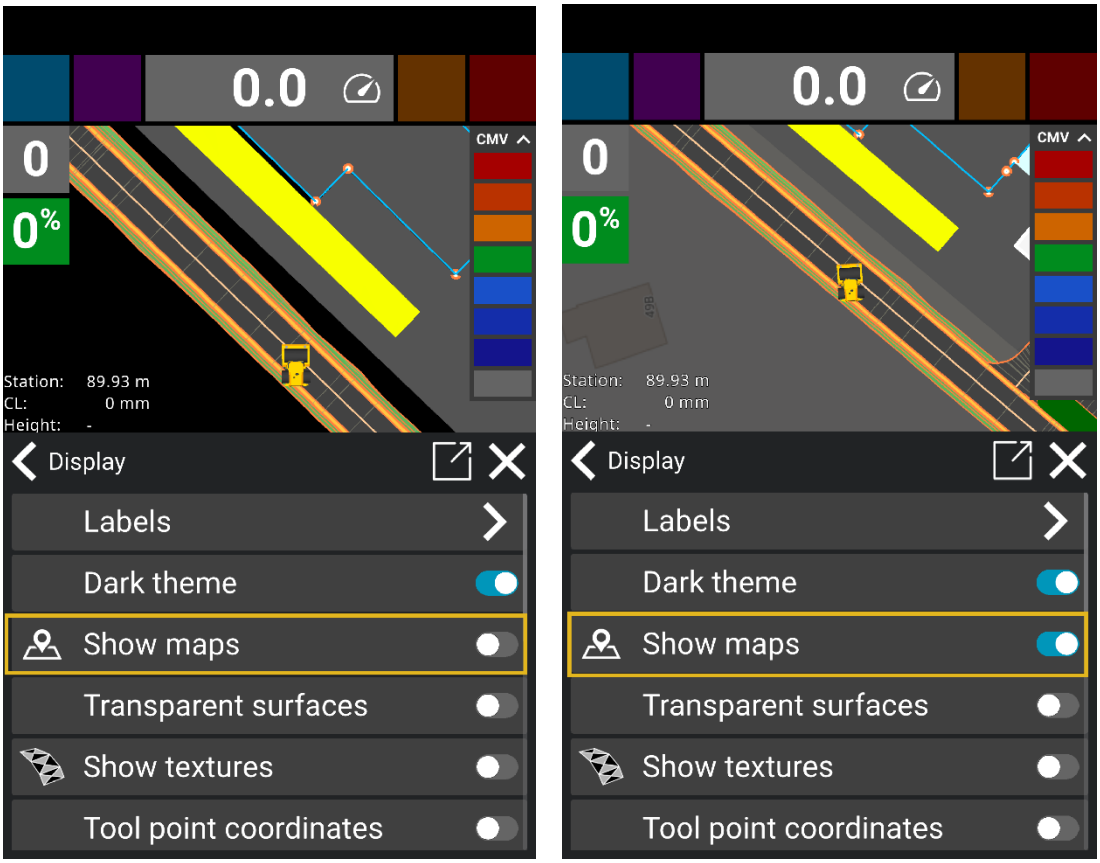
5.4. Show maps

The user can hide or show maps along with the project to get a better overview. The map will be shown below the lowest active 3D reference in the project.

The tool cuts are shown on the map in Top View. Otherwise, tool cuts are only shown on elements of the 3D model marked as a height reference.

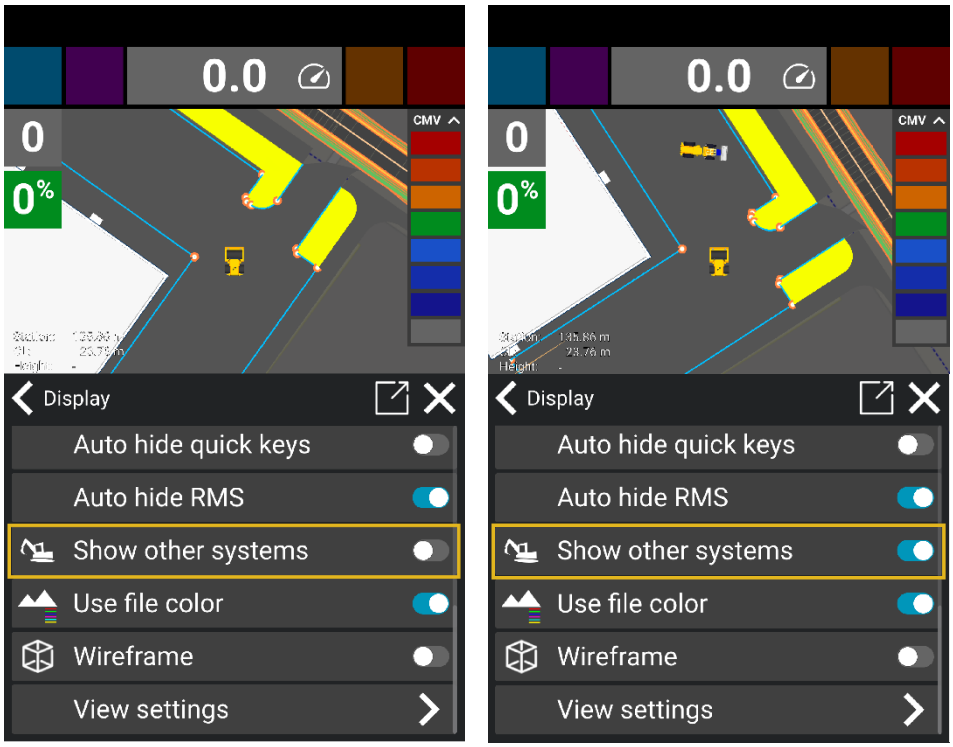
Note: In the 3D View, the map will be seen in a perspective view. If you want to see it straight from above, use the Top View instead.

- Tap to select/deselect visibility of map



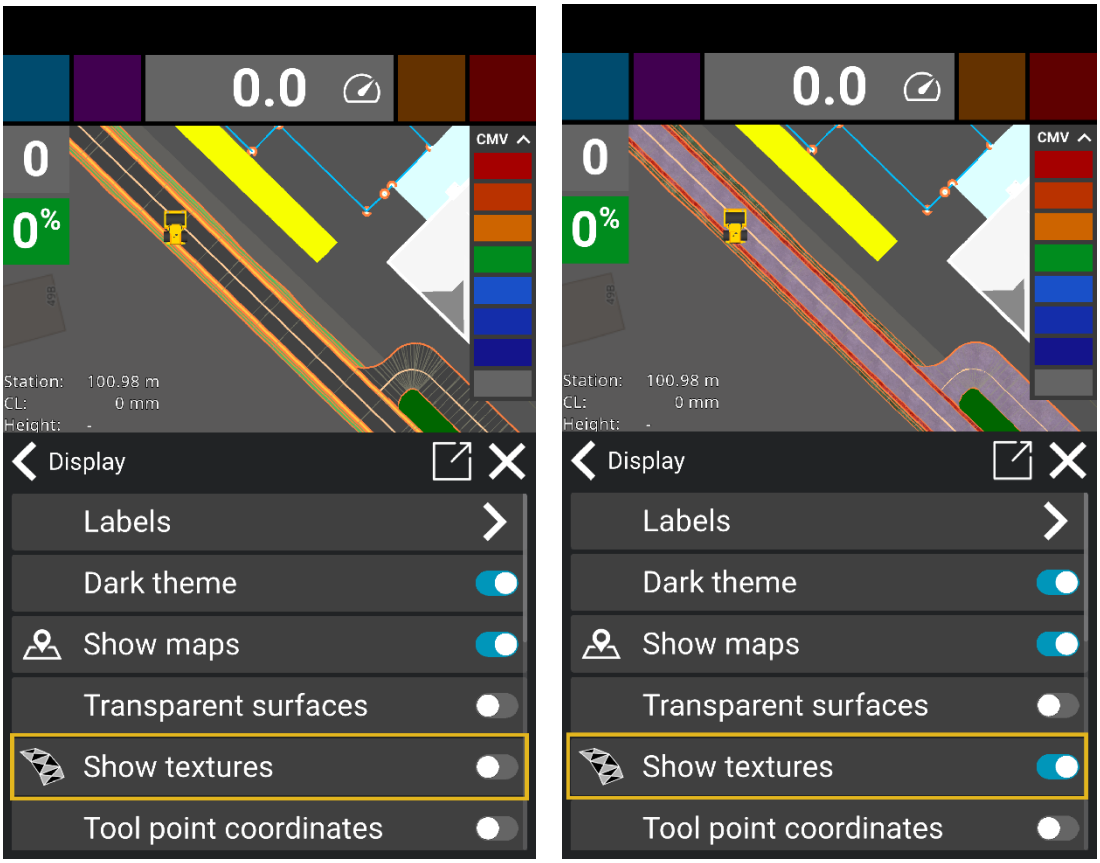
5.5. Show other systems

Other systems currently working on the same project—like machines, rovers, etc.—will show up.



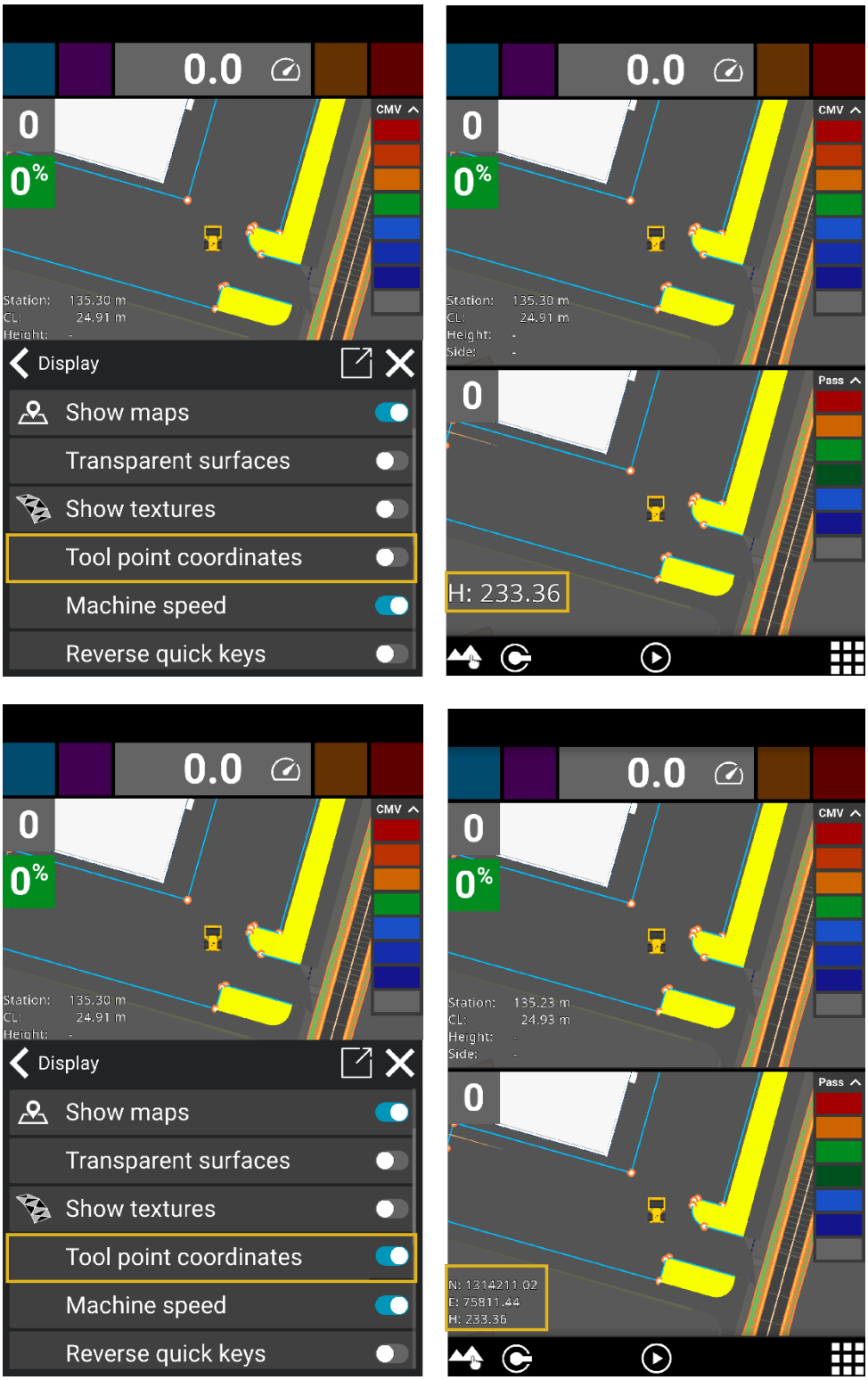
5.6. Show textures

Instead of using solid colors, you can have textures shown. This is only possible with road geometry.



5.7. Tool point coordinates

You have the option to show or hide the tool point coordinates in the app. When activated, the coordinates for north and east will be displayed along with the height. If deactivated, only the height will be shown.



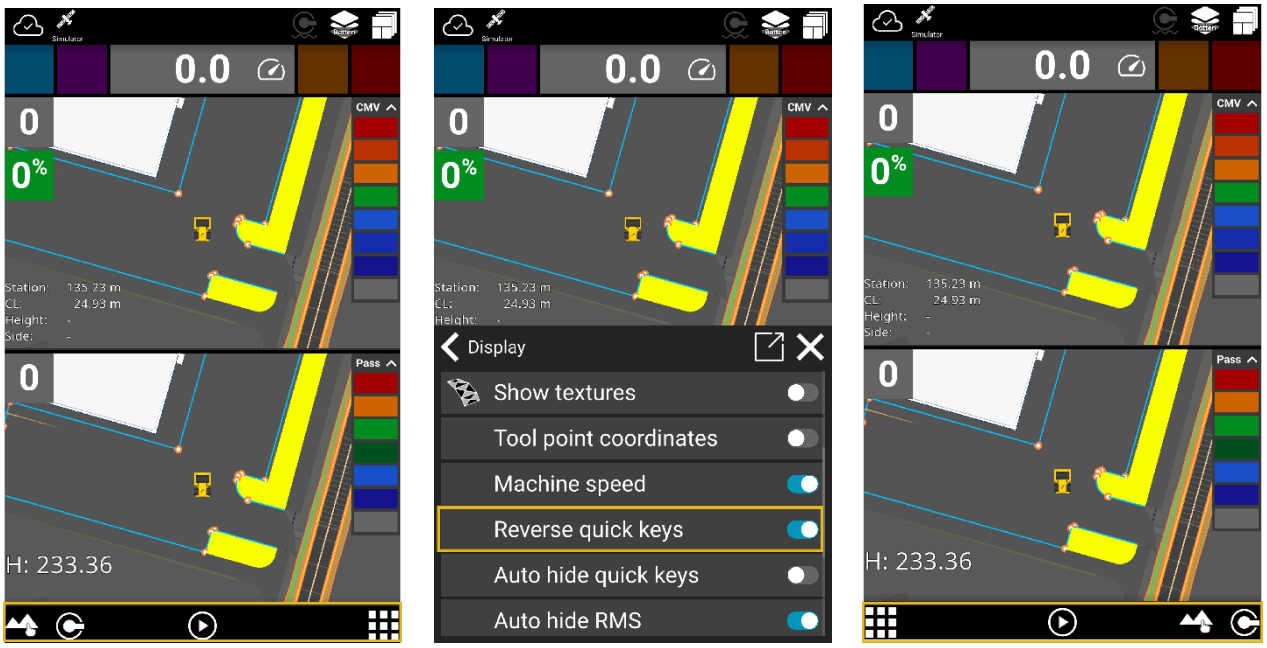
5.8. Auto hide quick keys

Auto Hide Quick Keys will hide the “quick keys” at the bottom of the screen after about 8 seconds of not touching the display.

When you touch the display, they become visible again. It will give you a clearer view of what you are working on when icons are hidden.

5.9. Reverse quick keys

This feature places the quick keys to the right of the menu button. It makes it more convenient to log points from the right-hand side of the screen without having to visually locate the point logging feature.

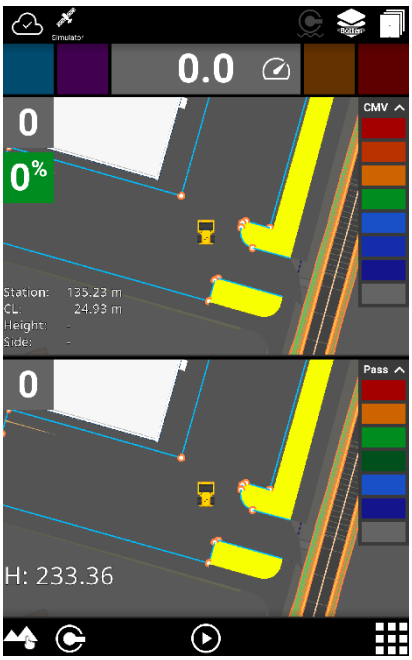


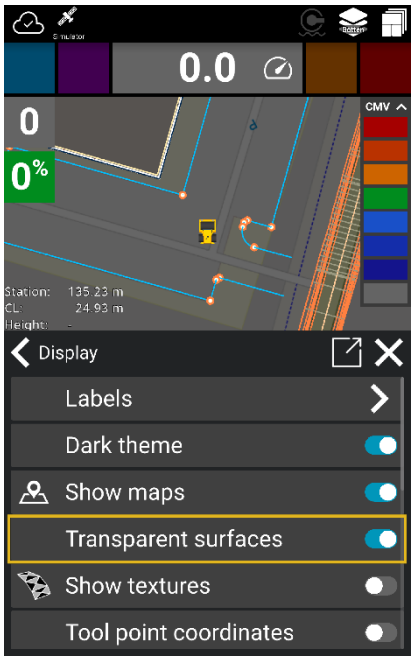
5.10. Transparent surfaces

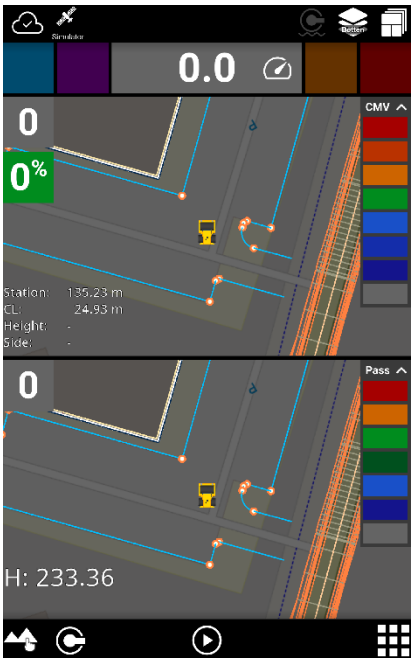
Hide the surfaces to be able to see lines and points beneath them.

Note: Surfaces with textures will not be transparent.

Warning: Reference selection is not visible when transparent surfaces are enabled.

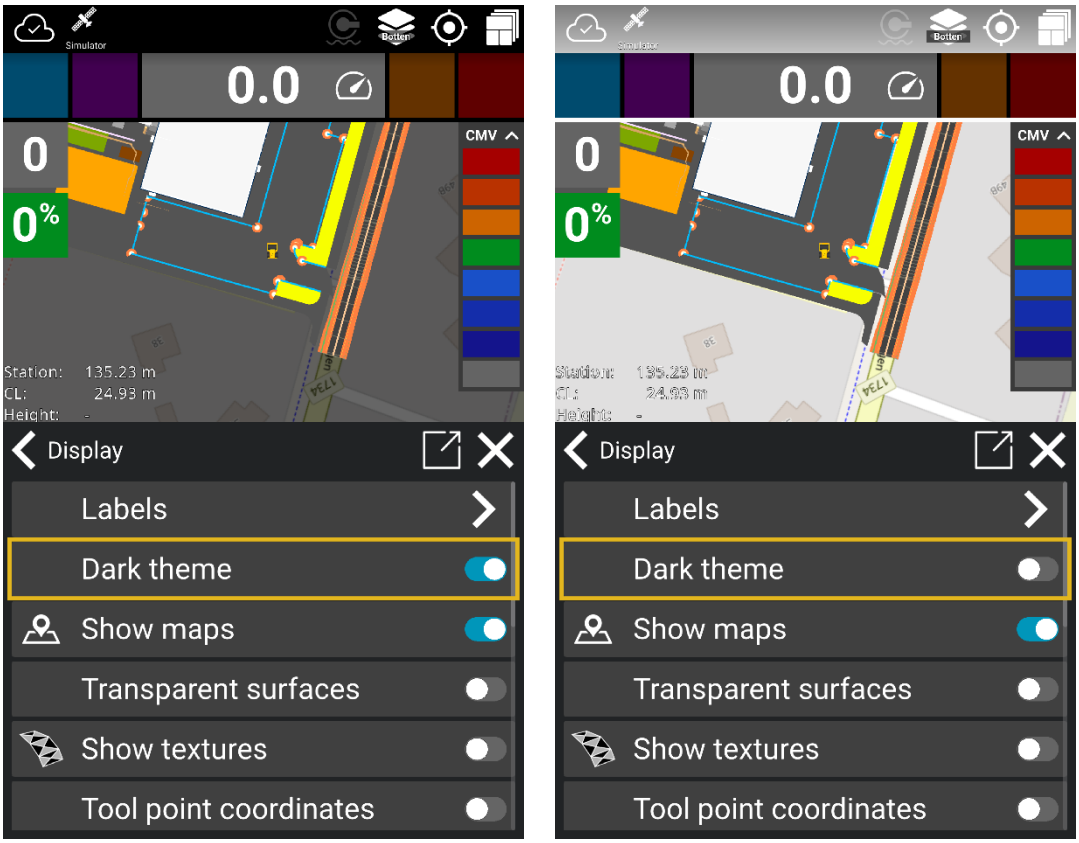






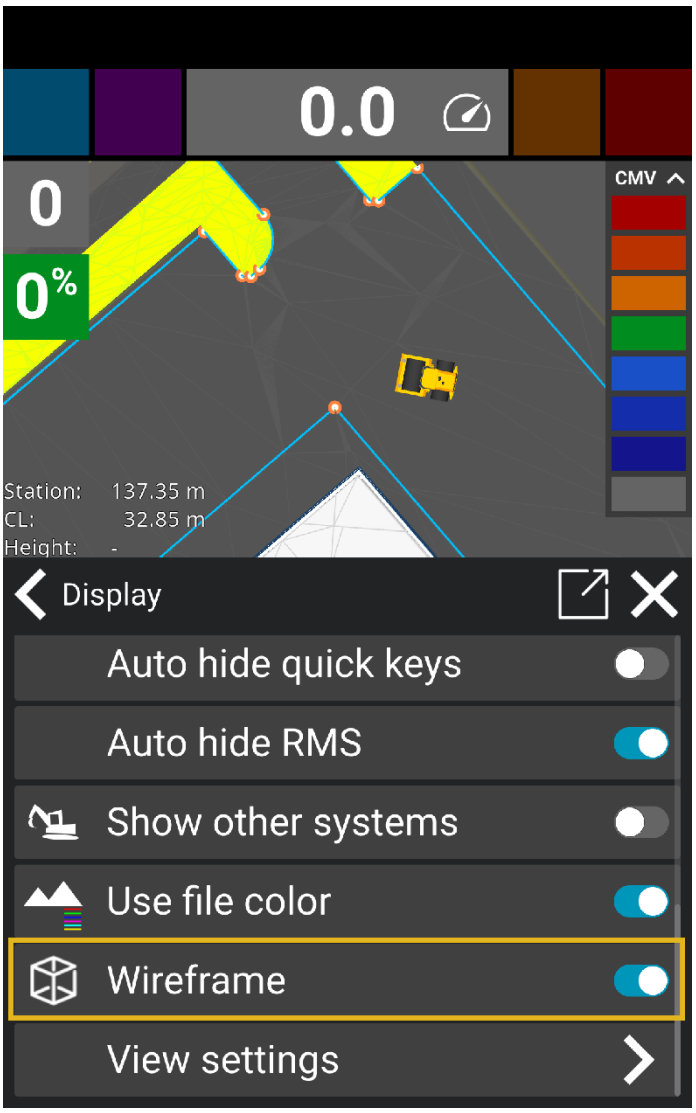
5.11. Dark theme

By default, the machine control system has the ‘Dark theme’ enabled, which is great at night time or when working in dimmed conditions. It is recommended to disable this feature when working in a bright environment, especially while working in direct sunlight when staking out points outside the cabin, etc.



5.12. Wireframe

Tap **Wireframe** to enable the triangular design to be visible. This will show the edges of the triangles and might improve their visibility.

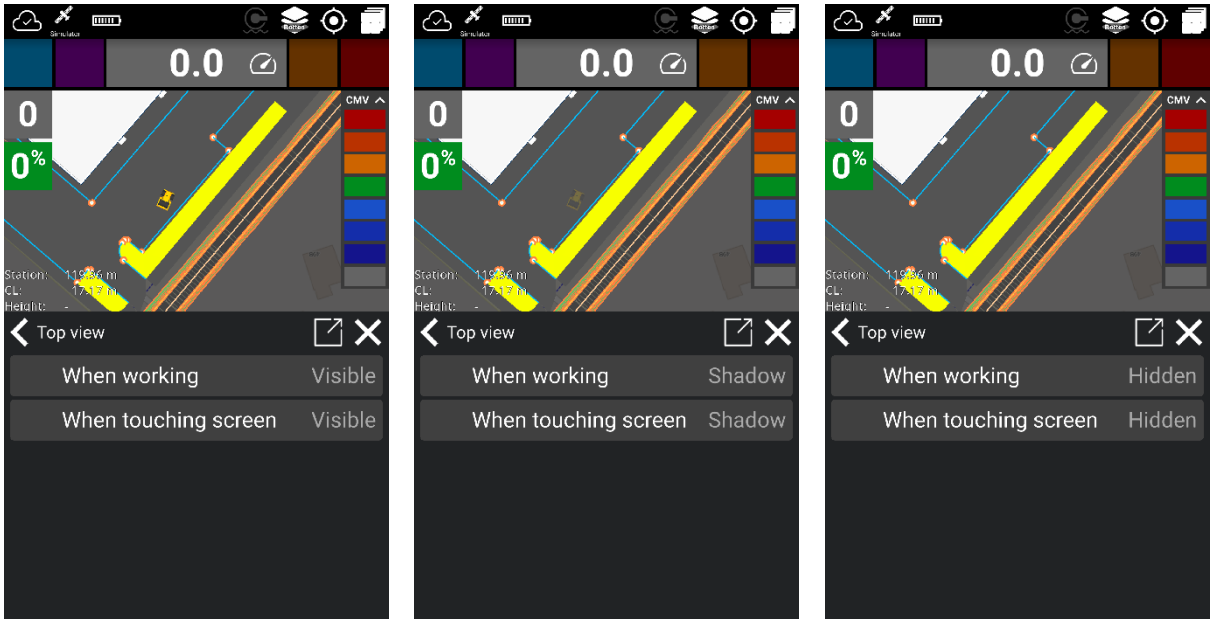


5.13. View settings

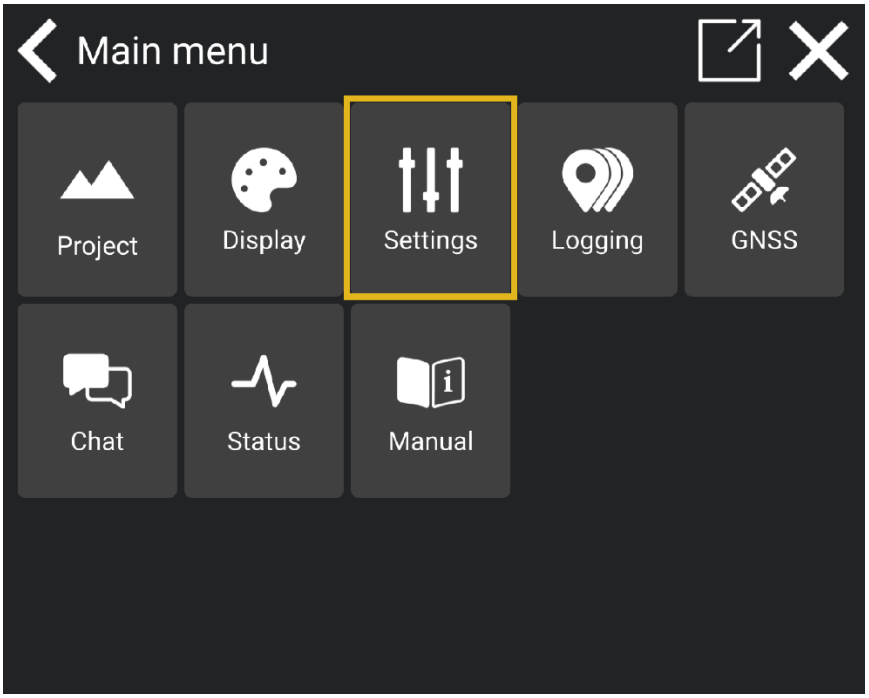
To obtain a better overview of your work, you now have the option of hiding the excavator or making it transparent.

Open the menu and select **Display**. Scroll down to **View settings**.

It is possible to set this individually for a work situation or when you touch the screen. You can also choose individual settings for work screens with 3D View or Top View.

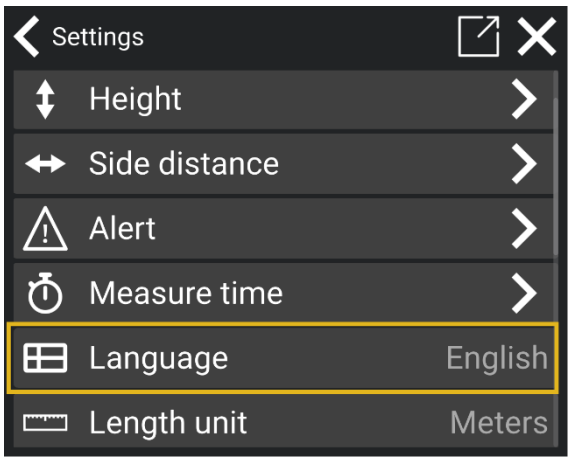


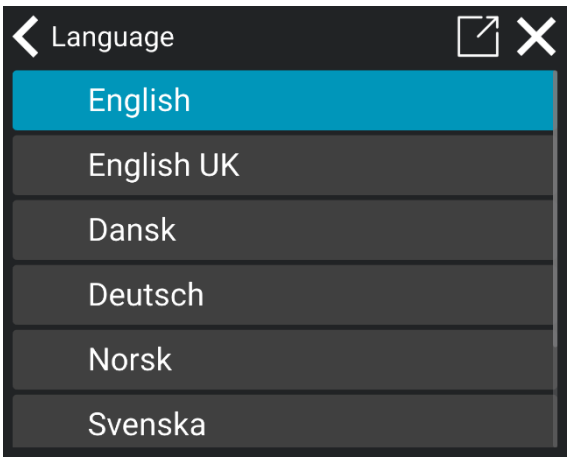
6. Settings



6.1. Language

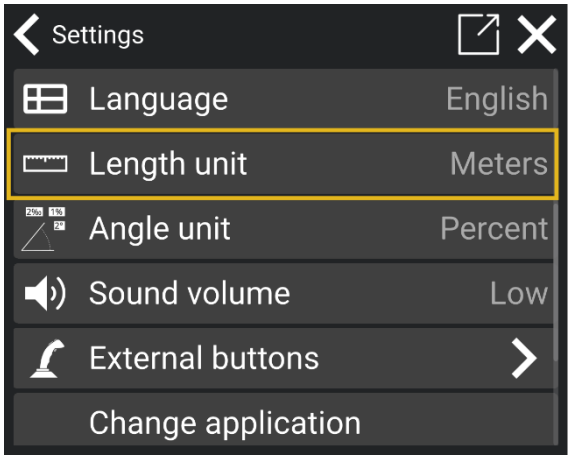
Select the language of your choice. The language is automatically changed and saved.

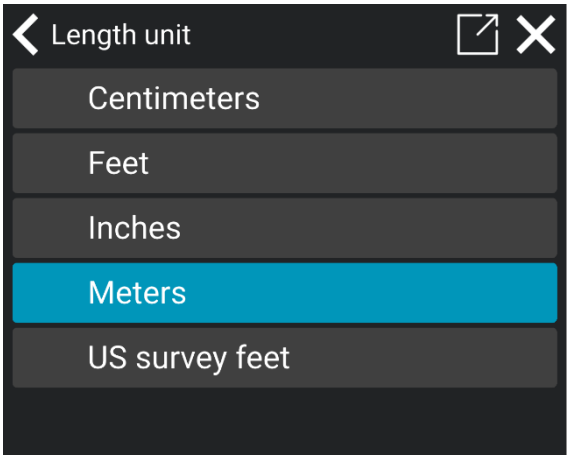




6.2. Length unit

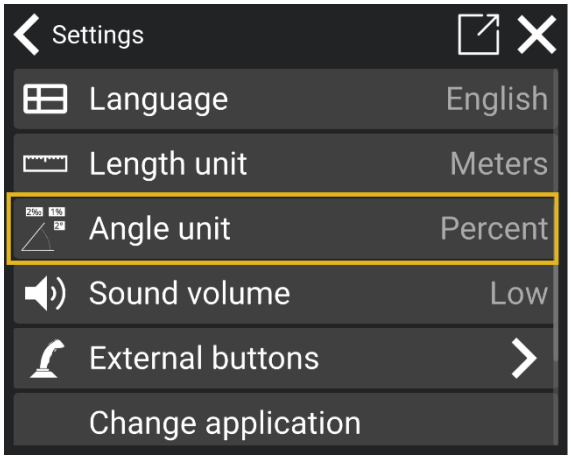
Tap to choose the length unit. It is automatically changed and saved.

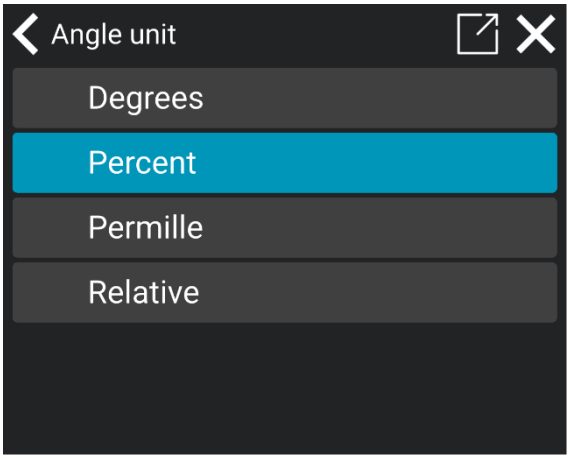




6.3. Angle unit

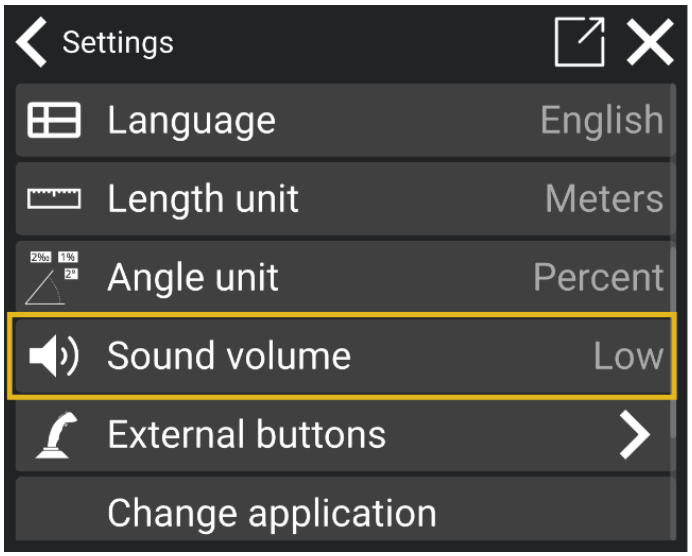
Tap to choose the angle unit. The angle unit is automatically changed and saved.





6.4. Sound Volume

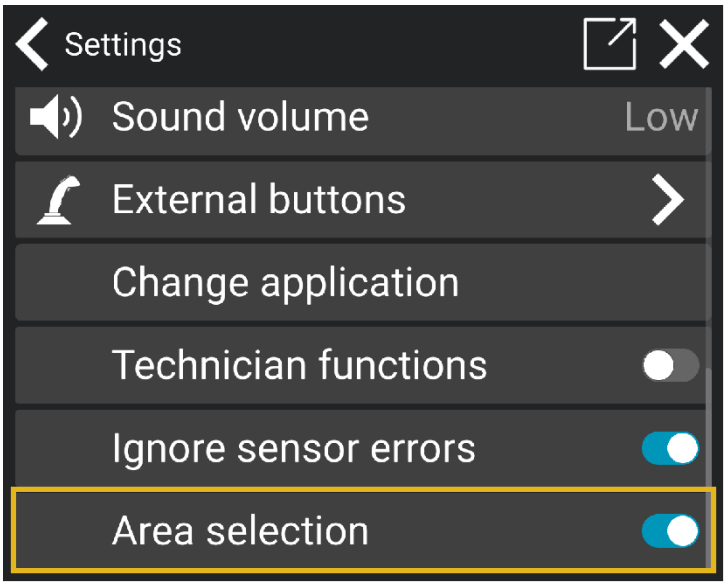
Tap the sound volume again and again to change the sound level. Choices are given: *Low*, *Medium*, *High*, *Highest*.



6.5. Area selection

The '**Area selection**' feature makes selecting objects in areas with many elements (such as points, lines, or surfaces) easier. When you tap on an area with multiple elements, a list of up to 7 nearby objects will appear on the screen, which you can choose from by tapping on the object you want to select. The objects listed are the ones closest to the spot you have most recently tapped. A ring will briefly appear on the screen to indicate the area you are selecting.

You can enable or disable this feature in the **Settings** menu. When ‘Area selection’ is disabled, only one object will be selected when you tap on the screen.



6.6. Calibration backup

You can save a backup of the machine's current calibration file. If the same tablet is used on different machines, you can also save each machine's calibration as a separate backup, making it easy to access the correct file.

6.6.1. Snapshots

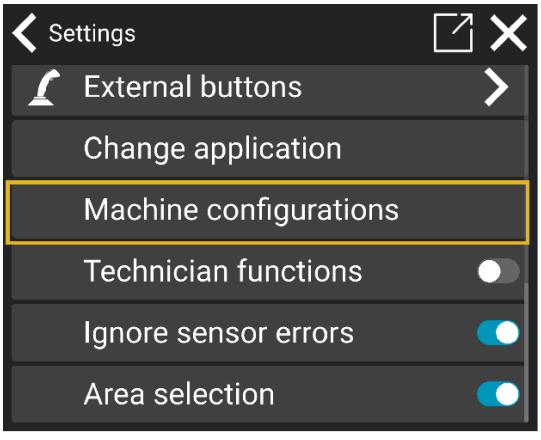
Every hour, the snapshot function automatically creates a backup file of the current calibration, or whenever changes are made to the calibration. Please note, however, that if multiple changes are made within the same hour, the previous file will be overwritten.

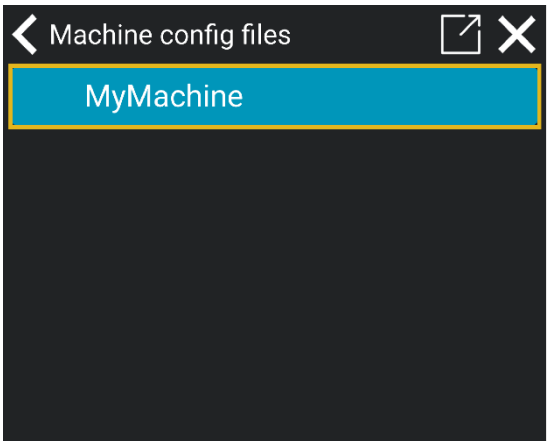
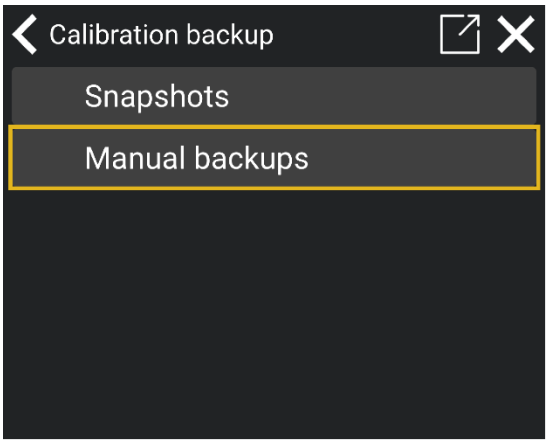
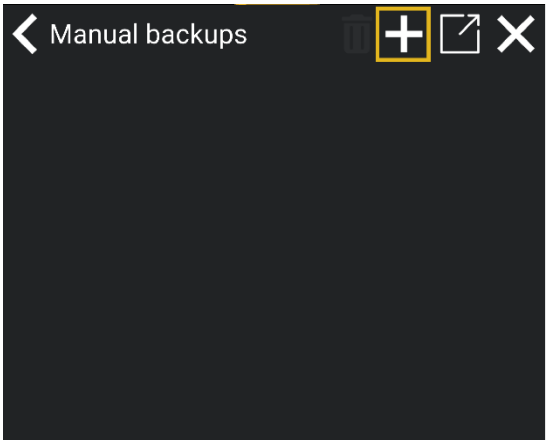
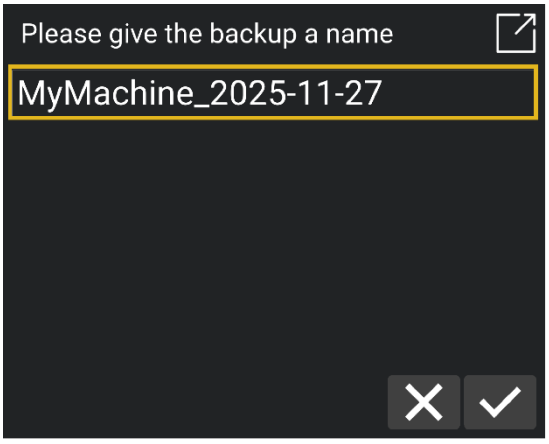
You can at any time change back to a previous calibration by selecting a backup file, as described in section *6.6.3: Select Backup File*.

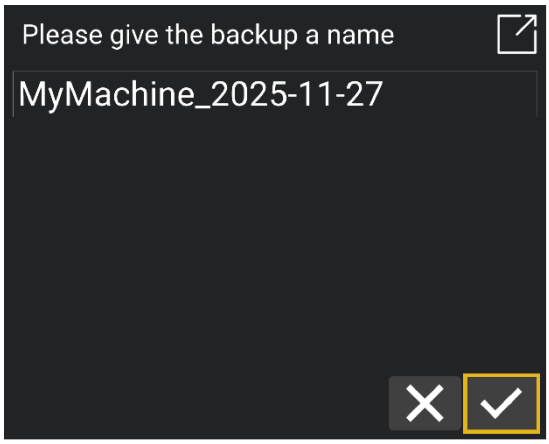
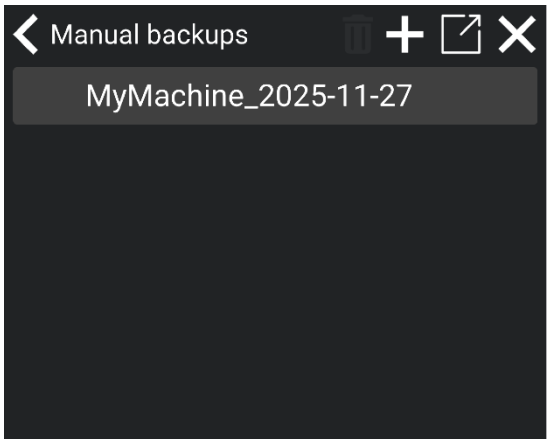
Please note that at the end of the day, the system automatically reviews the day's backup files and clears the list so that only the latest calibration remains available

6.6.2. Manual backups

To manually create a backup file, follow the description below.

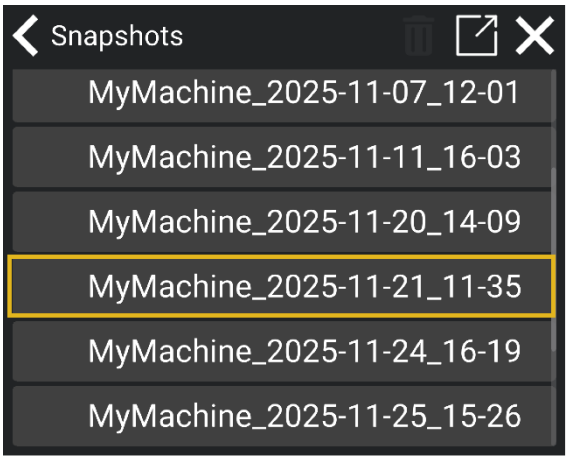
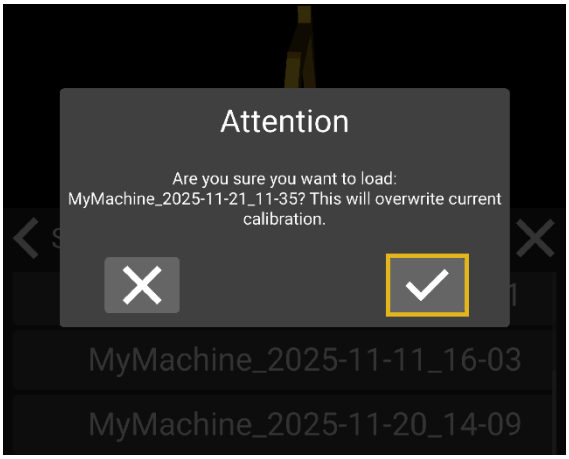
Step	Action	Illustration
1	Open *Machine configurations* in the *Settings menu*.	

2	Select *MyMachine*.	
3	Select *Manual backups*.	
4	Tap the + icon to create a new backup.	
5	Give the backup a name.	

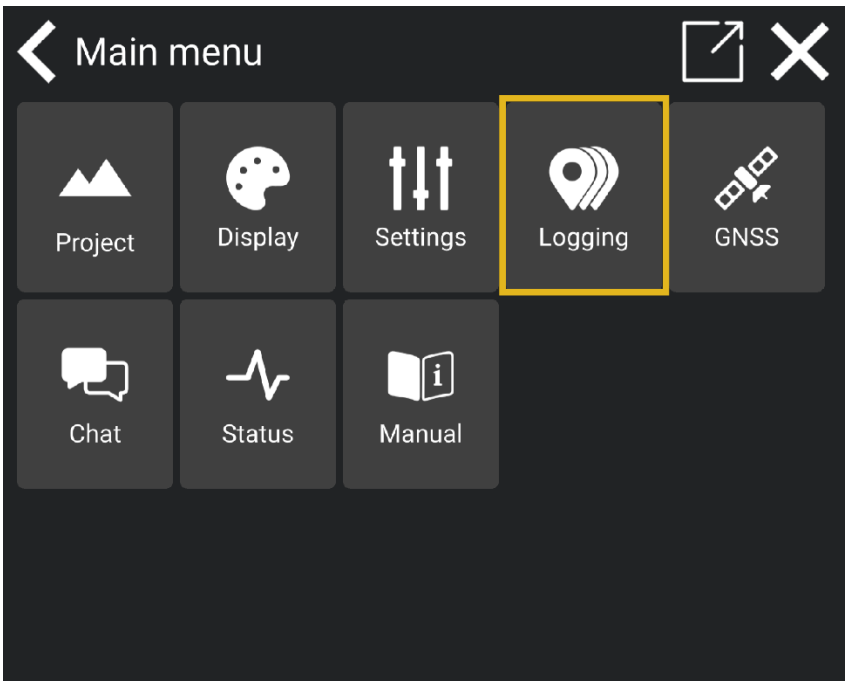
6	Save by tapping the check mark.	
NB!	The backup file will now be visible in the *Manual backups menu*.	

6.6.3. Select backup file

Please note that the procedure for selecting a backup file is the same for snapshots and manual backups.

Step	Action	Illustration
1	Tap on the calibration file you want to apply to your system.	
2	A notification appears on the screen. Tap on the check mark to confirm.	

7. Logging (As-built)

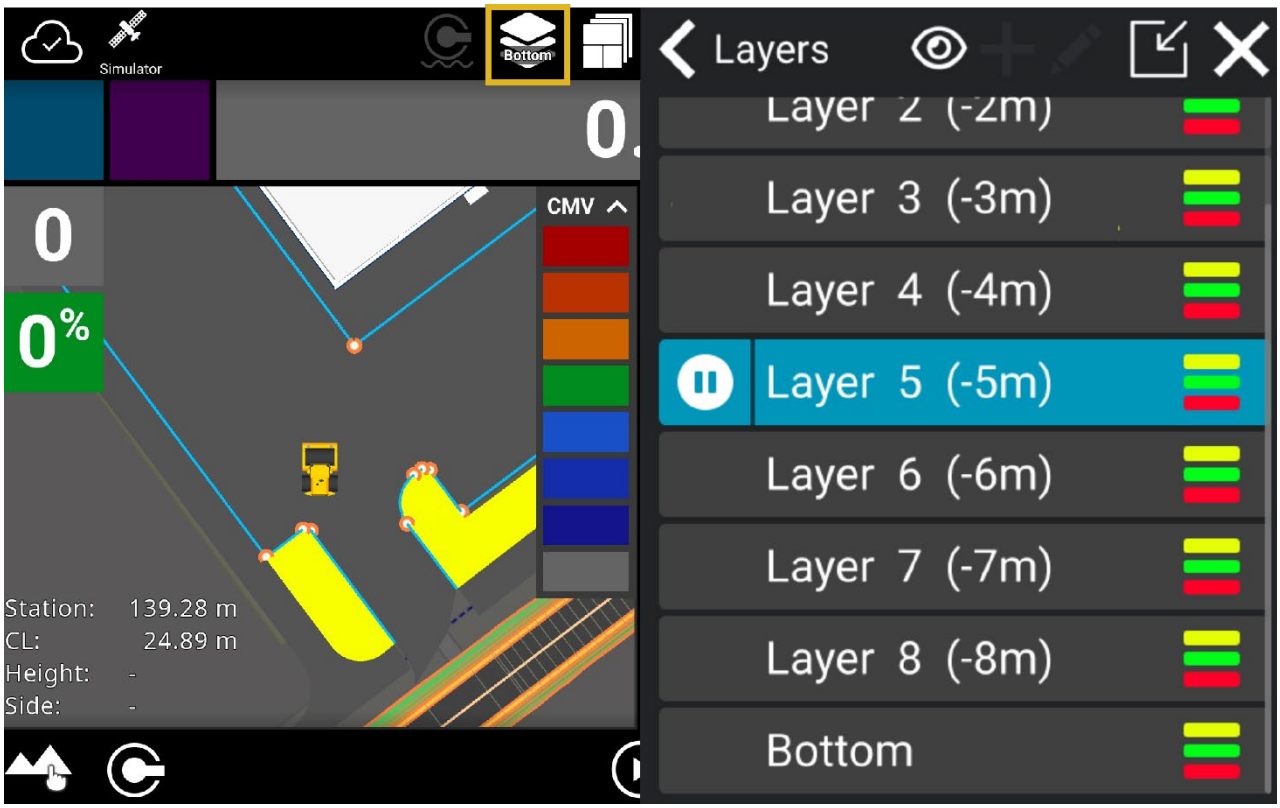


7.1. Log Point

1) Press the Layers icon to open the layer overview.

2) Select the layer that you want to log data into. Please note that if you do not choose a layer, the data will always be logged at the *Bottom* layer.

Note: It is very important to switch to the next layer once you have completed the compaction of a layer — meaning that the required values have been achieved.

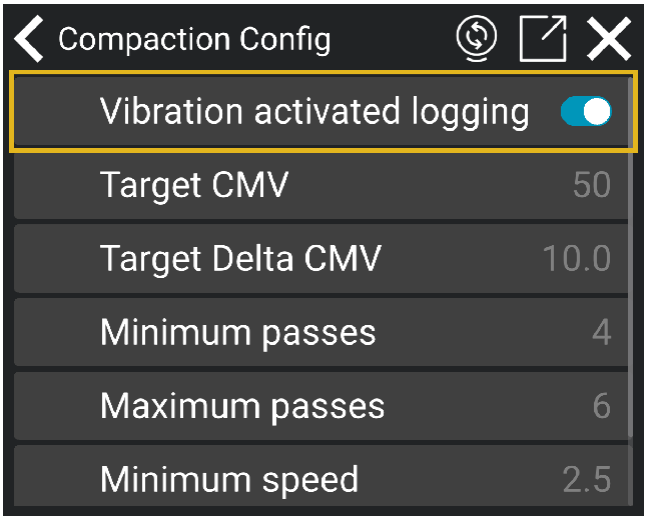


The color of the heatmap is, by default, determined by the reference height. The heatmap will be colored according to the height tolerance colors and will be updated when the height tolerances are changed.

When working outside the model, the coloring will be gray.

7.1.1. Vibrations

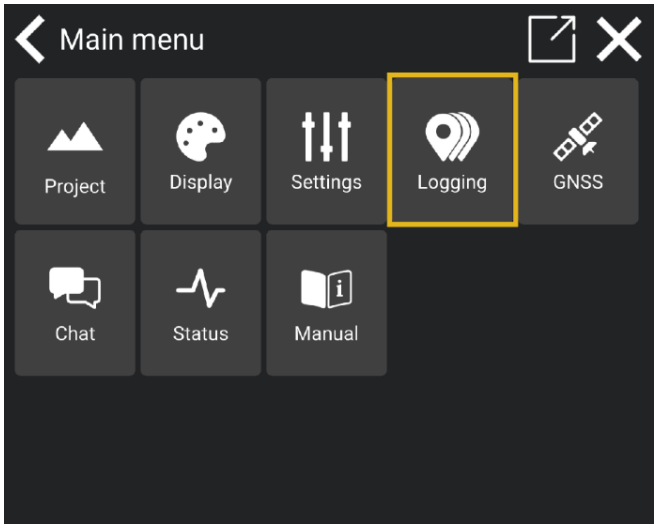
Please note that if *Vibration activated logging* is activated, the logging of the data will only occur when the vibration on the Compactor is turned on. This function is toggled on/off in the Compactor settings menu.



Please note that the final pass can be logged without vibration, provided that the *Vibration activated logging* function is disabled.

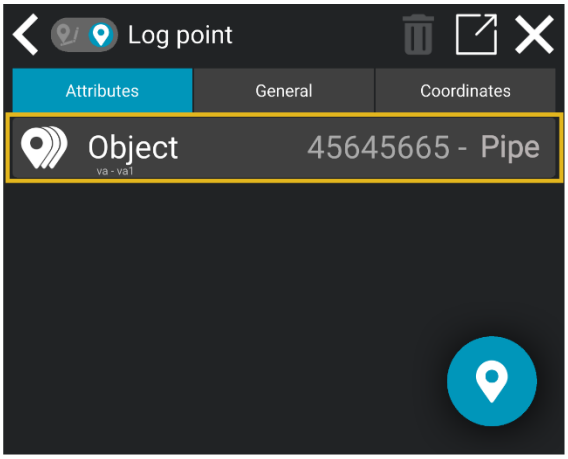
7.1.2. As-built

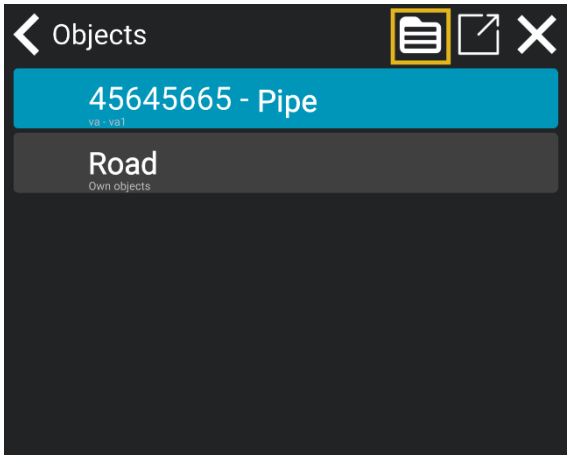
Log Point is an as-built feature used to document points. You can access it from the Logging menu.



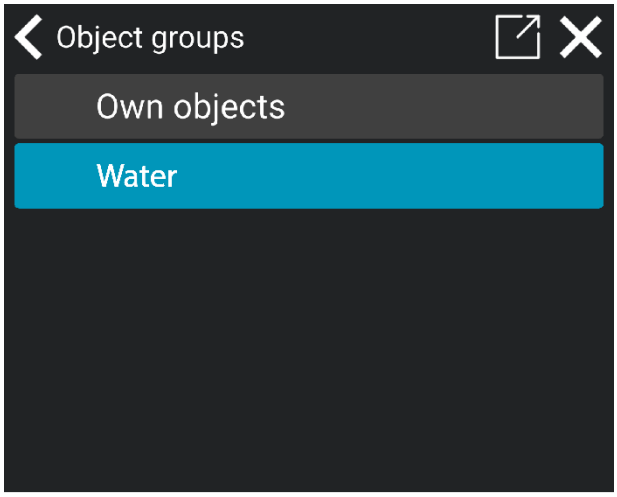
1) Tap '**Object**'. A list of your most recently used objects will appear.

   If no objects are shown, click the **folder icon**, then select a group of objects to find the one you need.

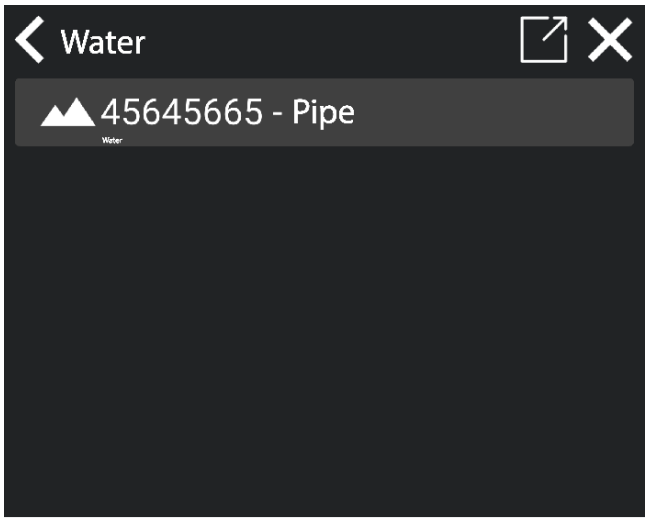




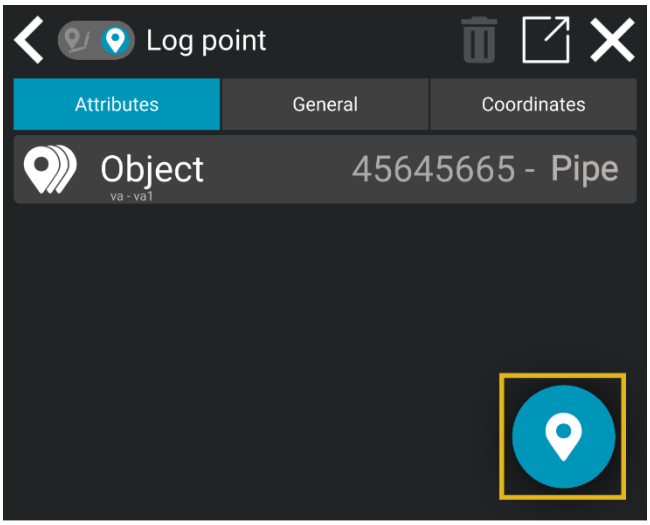
2) Choose the object group that suits your task.



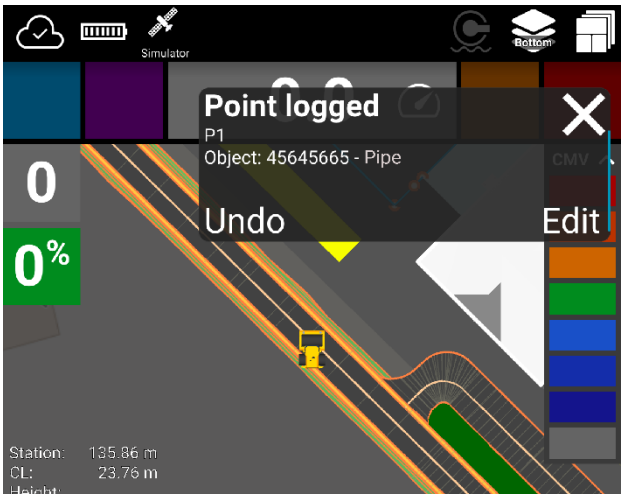
3) Select the relevant object from the list.



4) Once the object is selected, tap the **Log point** icon in the bottom right corner to log a point.



5) A notification will confirm the point has been logged, including the point number and object details.



You can press '**undo**' if you regret your last logging. The confirmation pop-up will disappear after approximately 10 seconds.

Note! The last used object will remain active until it is changed.

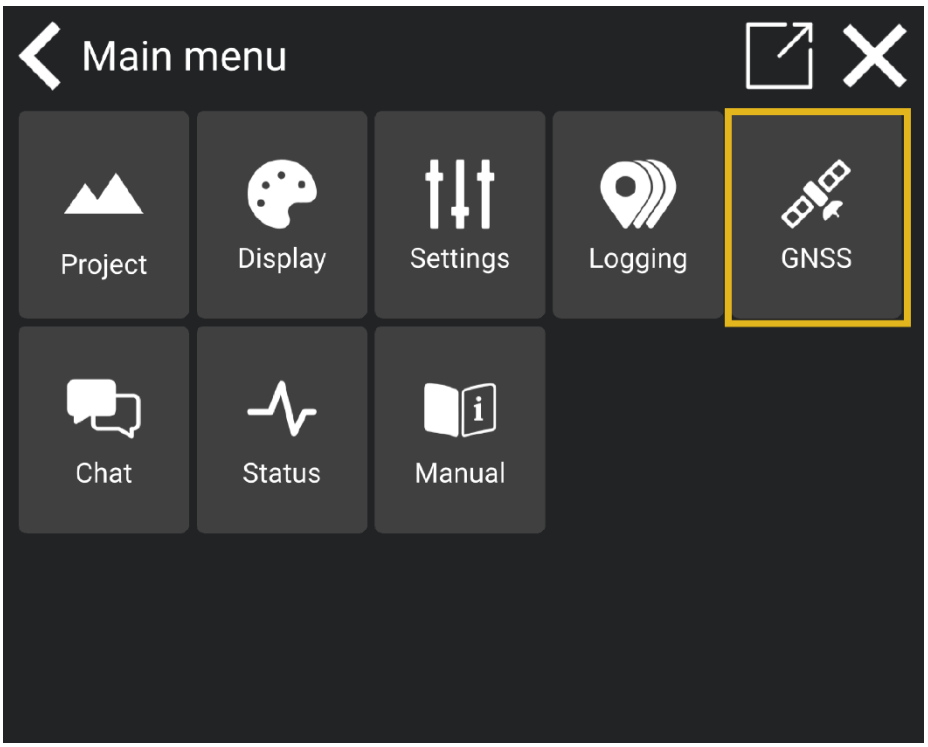
7.2. Object information and attributes

When a point is logged, several different pieces of information are logged together with the object and coordinates. Below, you can see a list of information with an explanation of the different values.

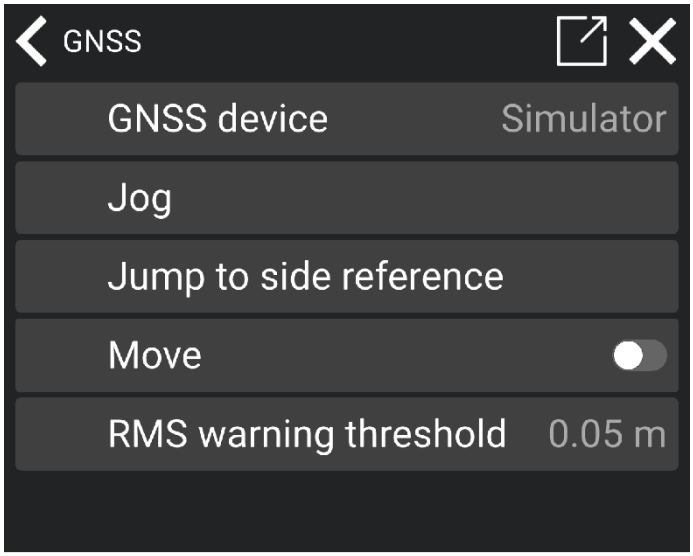
Point name: A unique name used to identify individual points	**N:** The measured points northern coordinate. This value is measured on the tool point
E: The measured points' eastern coordinate. This value is measured on the tool point	**H:** The measured points elevation. This value is measured on the tool point
VRMS: Shows the vertical accuracy of the GNSS when the point was logged. Accuracy is defined on the GNSS antenna, not the tool point	**HRMS:** Shows the horizontal accuracy of the GNSS when the point was logged. Accuracy is defined on the GNSS antenna, not the tool point
Mount point: Shows which mount point was chosen for the connected NTRIP server	**Project offset:** If an application has a project offset entered to adjust tool point elevation to match the elevation of a known point on the construction site.

ExtSurf: Showing if the point measured is done on an extended surface value can be 0(no) or 1(Yes)	**ToolHeight:** Shows the height offset applied to the measured tool point, e.g. Pole height for Makin' Survey, or Tablet height for Makin' PerFormans
Time: The time where the point was logged logged in a YYYY-mm-dd HH:MM:ss format Example: 2022-02-15 09:43:34	**SystemName:** Shows the name of the system that logged the point. This system name matches the system name on the Cloud
PDOP: Dilution Of Precision, indicates how errors in measurement will affect the absolute position calculation. Dop can be calculated in different variants. (HDOP, VDOP, PDOP, TDOP, GDOP) The DOP value logged in the as-built data is the PDOP value. (Position dilution of precision) This can be considered as the 3D DOP. The value is relative and not related to a specific measurement unit.	**Sats:** Showing how many satellites were visible when the point was logged. The value is the sum of satellites, and not divided into specific satellite constellations (GPS, Glonass, Beidou, Galileo)
LogOffset: Delta height. Shows if the operator has added an offset to the logged point. Often used if it is impossible to log the exact position due to limited space. E.g., logging the inlet in a manhole. Then the operator can log a point on the top of the manhole, measure the distance from the measured point to the inlet, and enter this as a delta height.measured. Value shows accuracy in meters	**SiderefFile:** Side reference file. Shows the name of the file used as active side reference when point was logged
App: Shows which system has logged this specific point.	**SiderefName:** Side reference name. Shows the name of the specific reference inside the reference file, used as an active side reference when a point was logged.
HeightOffset: If the operator has entered an offset, the value is documented in this field. This offset will have a direct effect on the Href value.	**Sidedist:** Shows the horizontal distance from the tool point to the side reference when the point was logged.
POI: This is set if the operator has marked a point as a **P**oint **O**f **I**nterest. The value can be 0 (no) or 1 (yes).	**HeightrefFile:** Height reference file. Shows the name of the file used as the active height reference when the point was logged.
Height: Shows the vertical distance from the tool point to the height reference when the point was logged.	**HeightrefName:** Height reference name. Shows the name of the specific reference inside the reference file, used as the active height reference when the point was logged.
	Comment: If the operator has written a comment for the point, it will be shown here.

8. GNSS

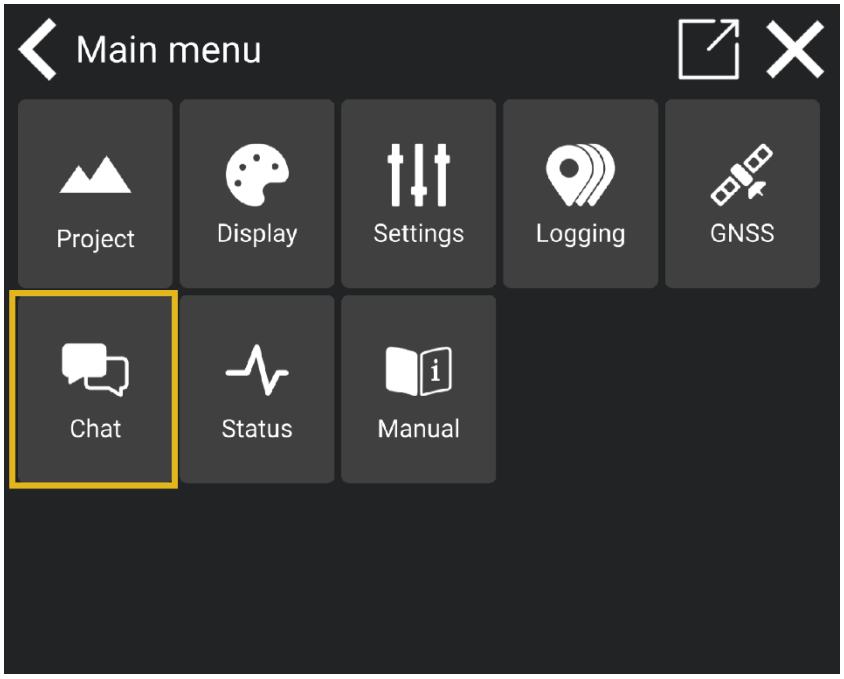


Settings related to GNSS can be viewed in this menu.



9. Chat

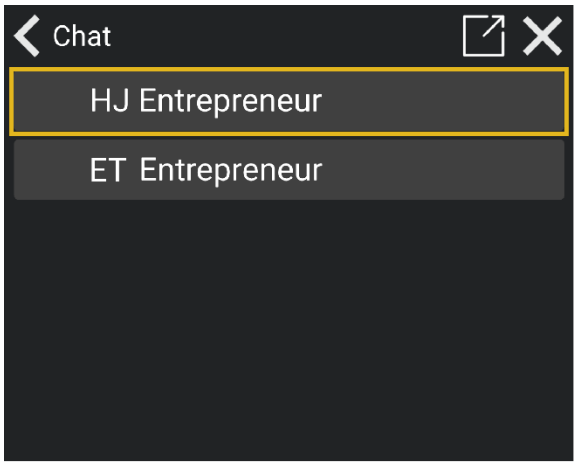
The chat feature helps you communicate with your colleagues about the project you are working on.

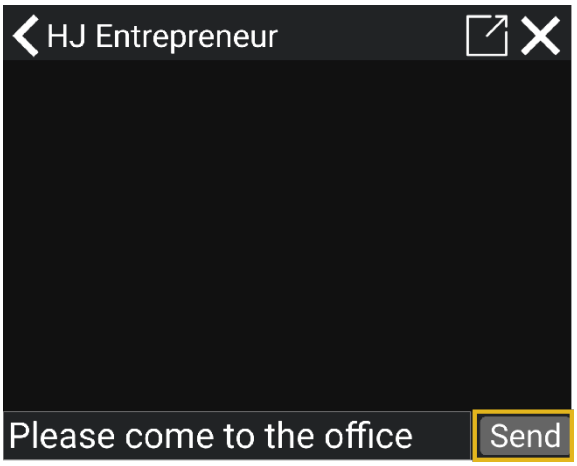


You will see all office personnel and coworkers from your company or project. This depends on the structure created by your management.

1. Tap a contact from the list to begin messaging.

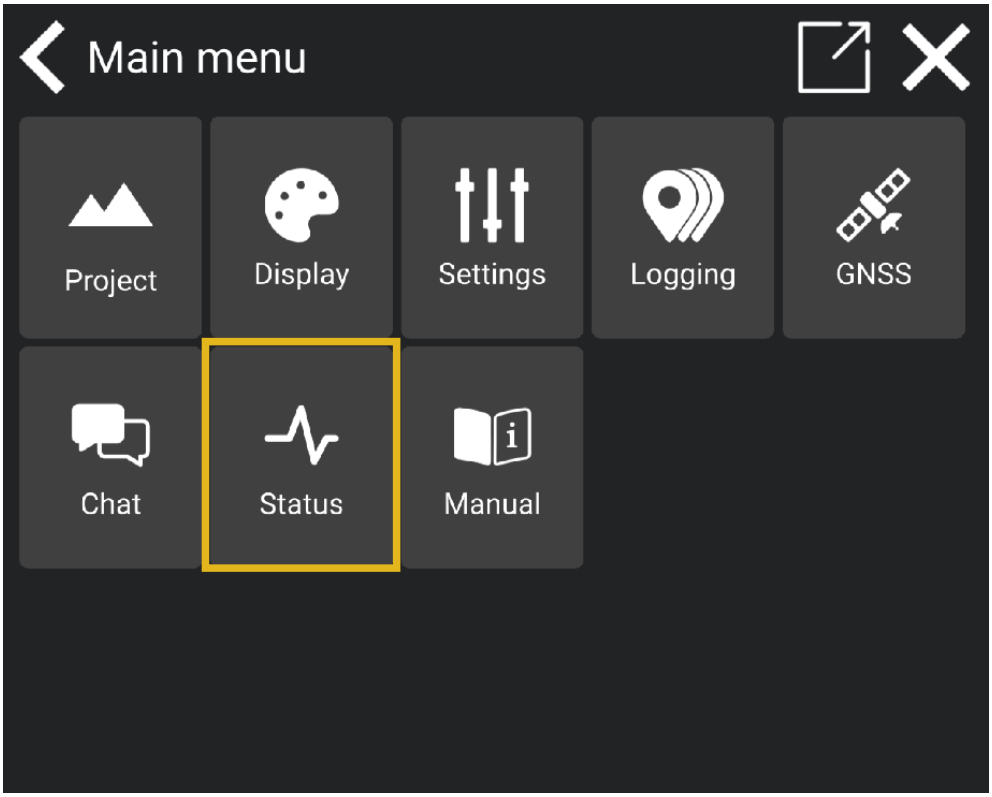
2. Write a message and tap '**Send**'.





10. Status

This is where you will find various details about the system information.

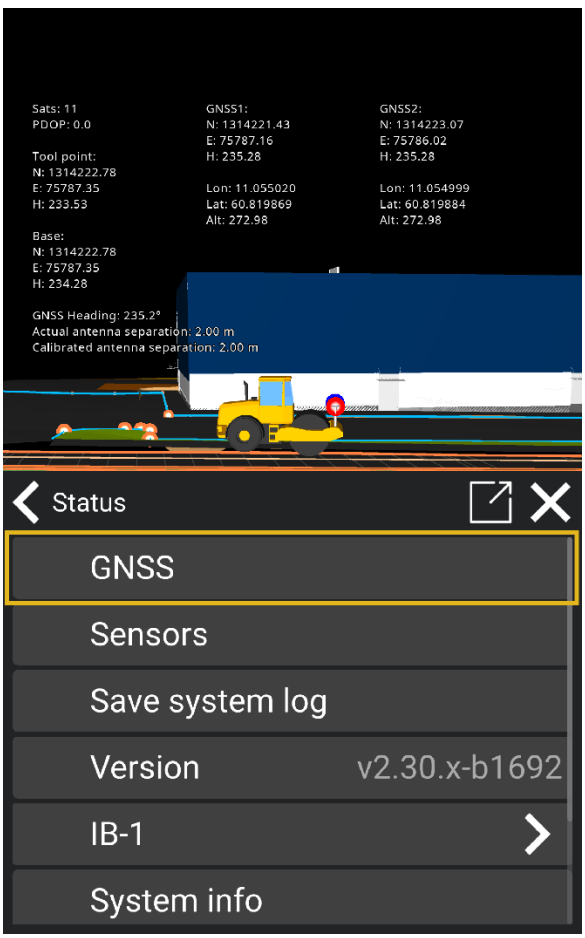


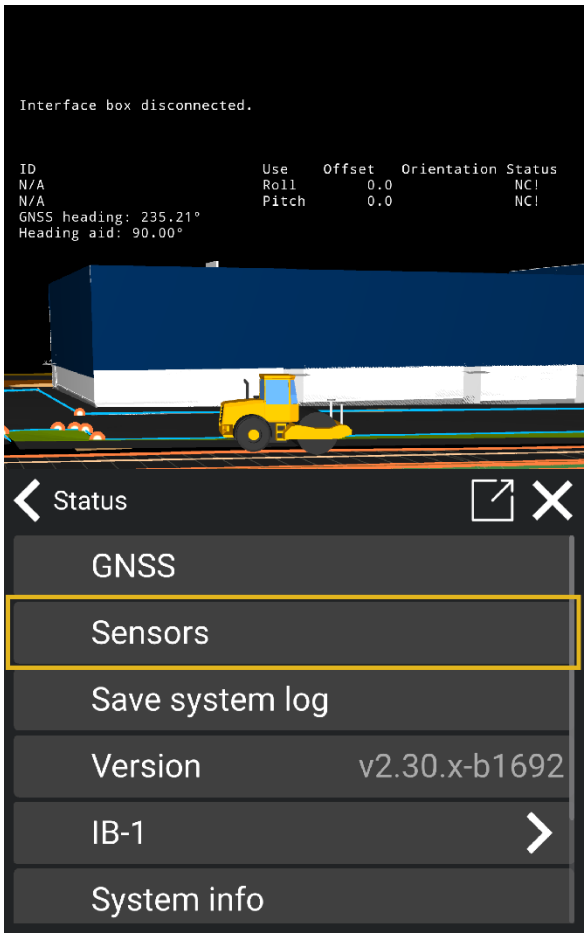
Tap '**GNSS**' to see the connection status and your location.

Tap '**Sensors**' to see detailed sensor information.

'**Version**' is the current Makin' 3D software version of the Android app running on your tablet.

'**IB-1 version**' is the firmware version of the interface box connecting all the sensors to the system.





System info: You can find all relevant information about your system by selecting 'System info'. Information such as System name, System number, System owner, and the associated licenses are shown here. When changes are made to the system, they will be shown under System info.

11. Troubleshooting

Error message	Possible cause	Possible Solution

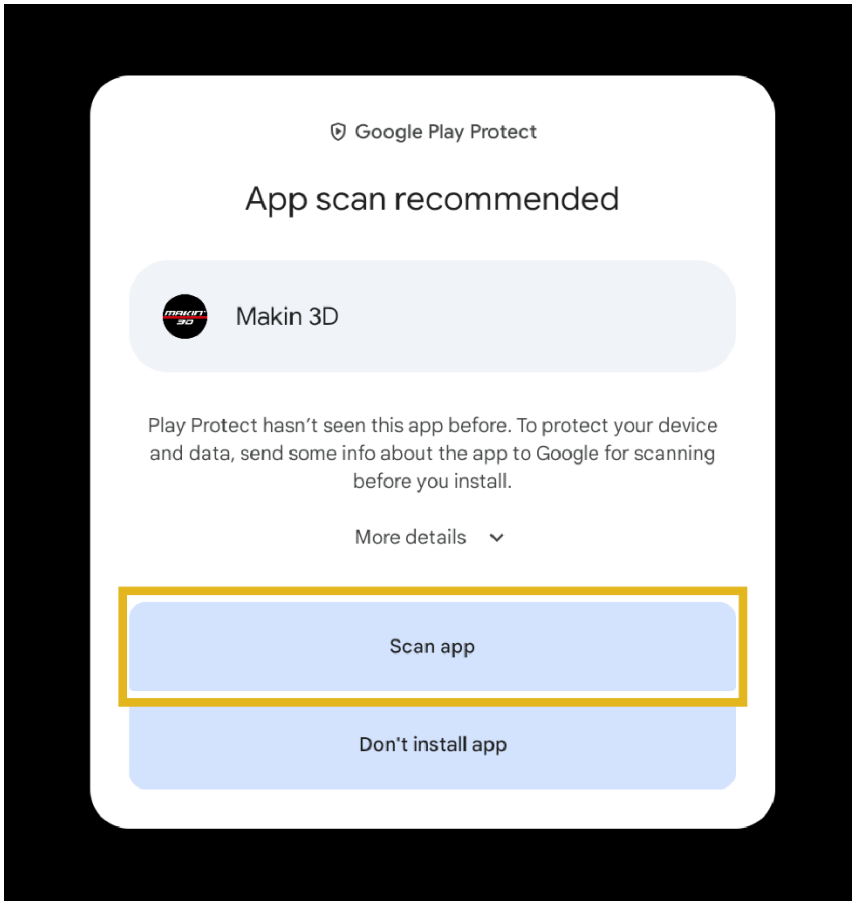
If you cannot solve the problem using the advice found in the above table, contact your reseller.

12. Appendix

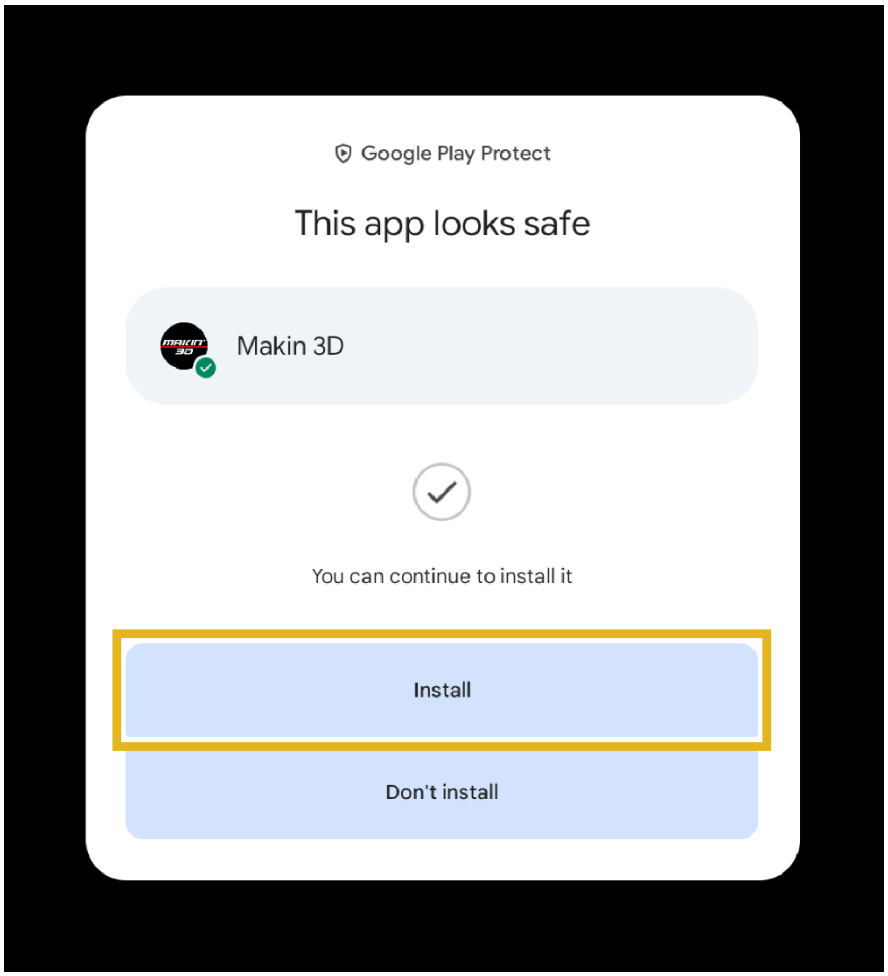
12.1. Software updates

When updating the Makin' 3D app to a new version, you might receive a notification from Google Play Protect. To proceed with the installation, allow Google Play Protect to scan the app. This ensures the new software version is safe to install.

1) Tap on '**Scan app**'.



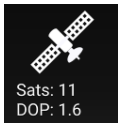
2) Tap '**Install**'.



3) The Makin’ 3D app is now updating to a new software version. Please wait while the update is installed.

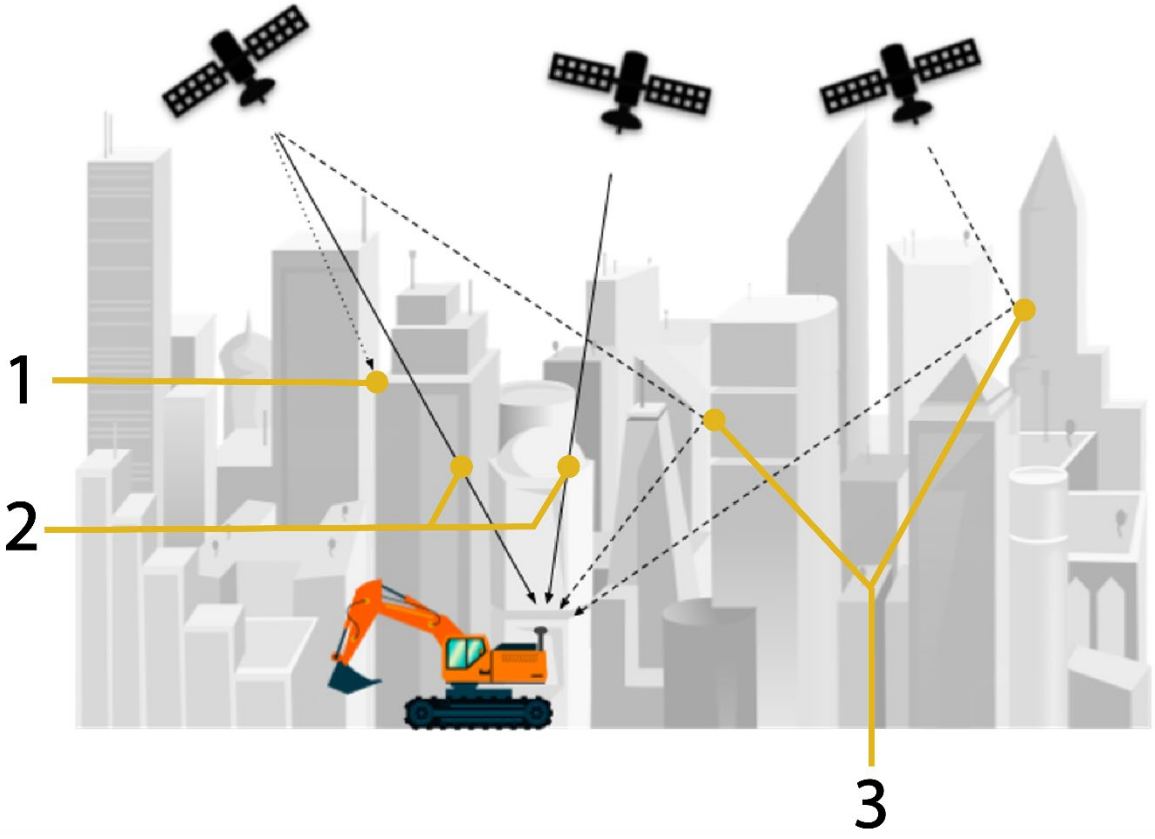
12.2. GNSS limitations

Always take into consideration where your machine is located. Especially when the construction site is within city limits with tall buildings or other obstacles.



Also, if working near forest and mountain areas, interference could block the signal from one or more satellites and cause poor precision. Reflections could also occur.

Makin’ 3D will inform you if there are not enough visible satellites or if your CQ/DOP is too high.



1. Direct signal blocked
2. Direct signals perfectly received
3. Multipath errors

12.3. Frequency

In situations where you have to specify the frequency according to a channel, refer to the table below for guidance. Channel 0 is the center frequency, and channels are distributed with a 25 kHz spacing (in this example).

Channel	Frequency (MHz)
0	446.6000
-1	446.5750
-4	446.5000
-5	446.4750

12.4. Compliance information

This product is intended to be mounted on earth-moving machinery exclusively for professional use, i.e. the product falls into the category: non-road vehicles exclusively for professional use. Makin hereby declares that the system and its components fulfill the requirements of the following EU directives applicable to this product category:

- 93/68/EEC - CE conformity marking
- 2014/53/EU - Radio Equipment Directive
- 2014/30/EU - EMC directive
    - DS/EN/ISO 13766-1:2018 - Earth-moving and building construction machinery — Electromagnetic compatibility (EMC) of machines with internal electrical power supply — Part 1: General EMC requirements under typical electromagnetic environmental conditions
    - DS/EN/ISO 13766-2:2018 - Earth-moving and building construction machinery — Electromagnetic compatibility (EMC) of machines with internal electrical power supply — Part 2: Additional EMC requirements for functional safety

The respective product category falls outside the scope of these directives:

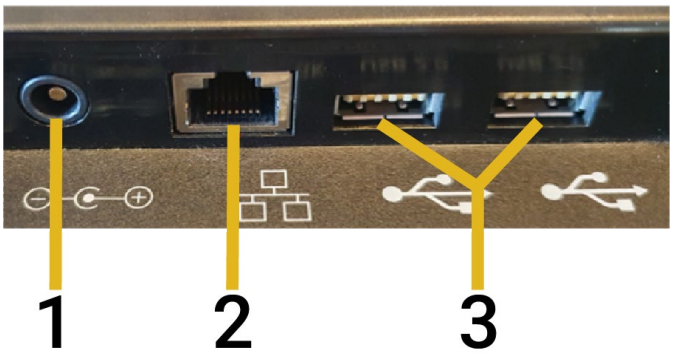
- 2011/65/EU - RoHS
- 2012/19/EU - WEEE

12.5. Tablet connections

The Panasonic FZ-A3 has connectors located in four places: on the top, on the side, inside the battery compartment, and at the bottom.

1.	Mini-jack audio output	4.	16 V DC input power for external charger
2.	Micro SIM card for broadband internet on both tablet and GNSS receiver	5.	USB-A
3.	Docking station connector for data and power transmission	6.	USB-C

12.6. Docking station connections



1. 16 V DC input power for external charger
2. RJ-45 Ethernet
3. 2x HighSpeed USB-A 2.0

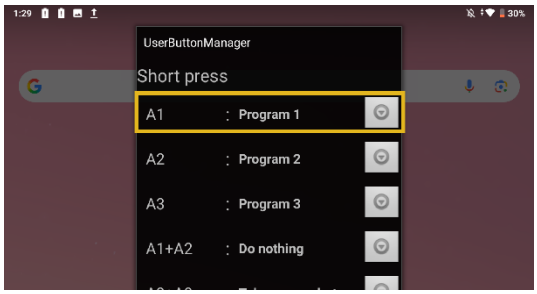
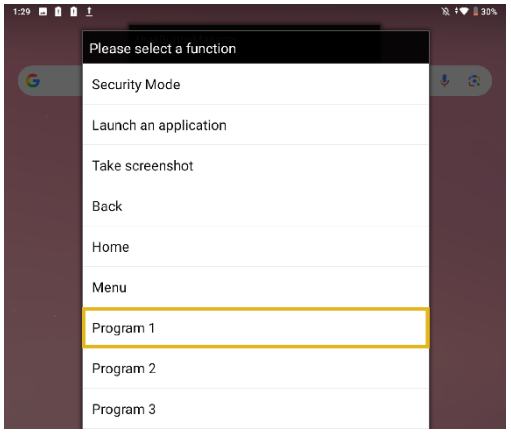
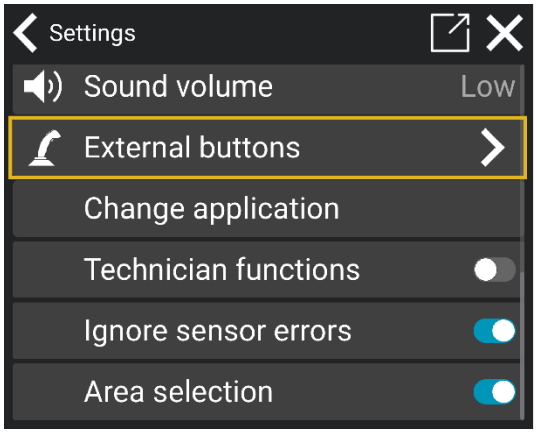
12.7. Interface Box – Status light indication

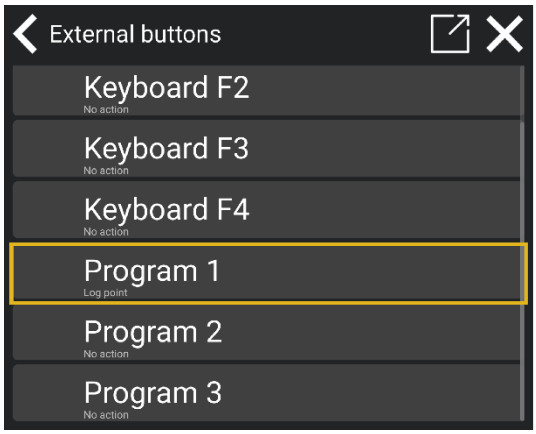
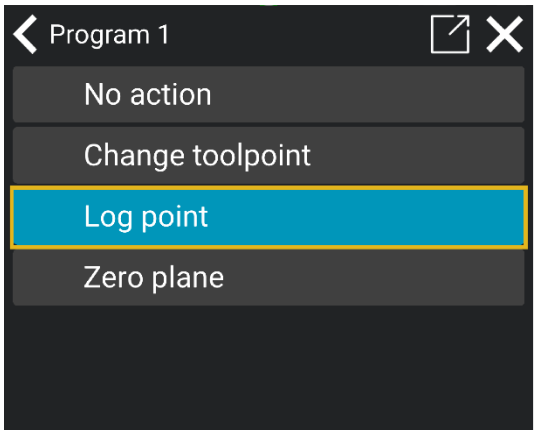
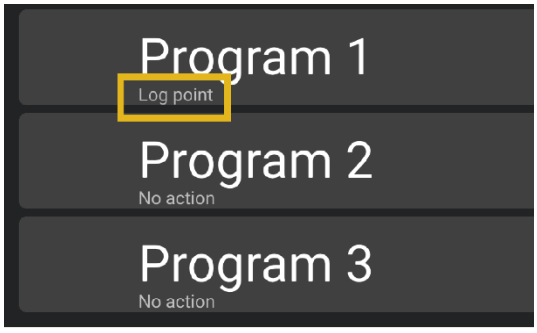
Status information on the interface module can be read out by watching the LED just next to the power connector.

Color	Indication
Green	ON - All ok
Flashing red	Firmware issue - Contact reseller
Yellow	Entering standby
White	System check of software
Blue	Updates to software are ongoing

12.8 Tablet set-up - Programming the physical tablet buttons (Panasonic FZ)

The Panasonic tablet has three user-programmable function keys, *A1*, *A2*, and *A3*. You can assign Makin' 3D functions to these keys.

Step	Action	Illustration
1	Open the app *UserButtonManager*.	
2	Select the physical button to which you want to assign the Makin' 3D function (*A1*, *A2* or *A3*).	
3	When clicked, a pop-up window will open. Select the desired function — it will be labelled *Program 1*, *Program 2* or *Program 3* depending on the button you select in the Makin' 3D app.	
4	Go to the *Settings menu* in the Makin' 3D app.	
5	Open the *External Buttons* menu.	

6	Click the button you want to program (*Program 1*, *Program 2* or *Program 3*). **Note:** If the button does not appear on the list, press the physical button, this will add the option to the list.	
7	Select the function you want to assign to the button.	
8	Check that the function has been assigned to the button. The function appears beneath the button name. If a button has not been programmed, it will show the description *No action*.	

12.9. Demo mode

You can use your Makin’ 3D system on Windows in demo mode to gain confidence in the user interface.

Please find below the shortcuts for the functions.

Keyboard	**Action**
Space	Start/stop automatic driving
+	Raise machine model
-	Lower machine model
.	Change view (sampling through options)
b	Rotate model left
Shift b / B	Rotate model right
m	Rotate model right
Shift m / M	Rotate model left
n	Drive forward (in direction of cab orientation)
Shift n / N	Drive backwards (in direction of cab orientation)
s	Drive forward along pre-determined line (centreline)
Shift s / S	Drive backwards along pre-determined line (centreline)
j	Jump around close to the project
Shift j /J	Jumps to the roundabout in Odense S
u	Jump to current side reference
p	Opens the Plan menu

o	Opens the offset menu
g	Opens the jog window
w	Activate/deactivate wireframe mode
r	Refresh / Finds the model
R	Reload / reset model orientation (undoes number key modifications)
1	Tilt model to the left (Roll)
Alt 1	Tilt model to the right (Roll)
2	Tilt model forward (Pitch)
Alt 2	Tilt model backwards (Pitch)

12.10. Xbox controller

You can use an Xbox controller to control the machine model in the Makin’ 3D app on your tablet. It is an easy way to gain confidence in the user interface. This feature is only available when you connect the Xbox controller to a Panasonic FZ-A3 tablet.

How to connect the Xbox controller to your tablet:

1. Go to *Settings* on your tablet.

2. Click on *Connected devices*.

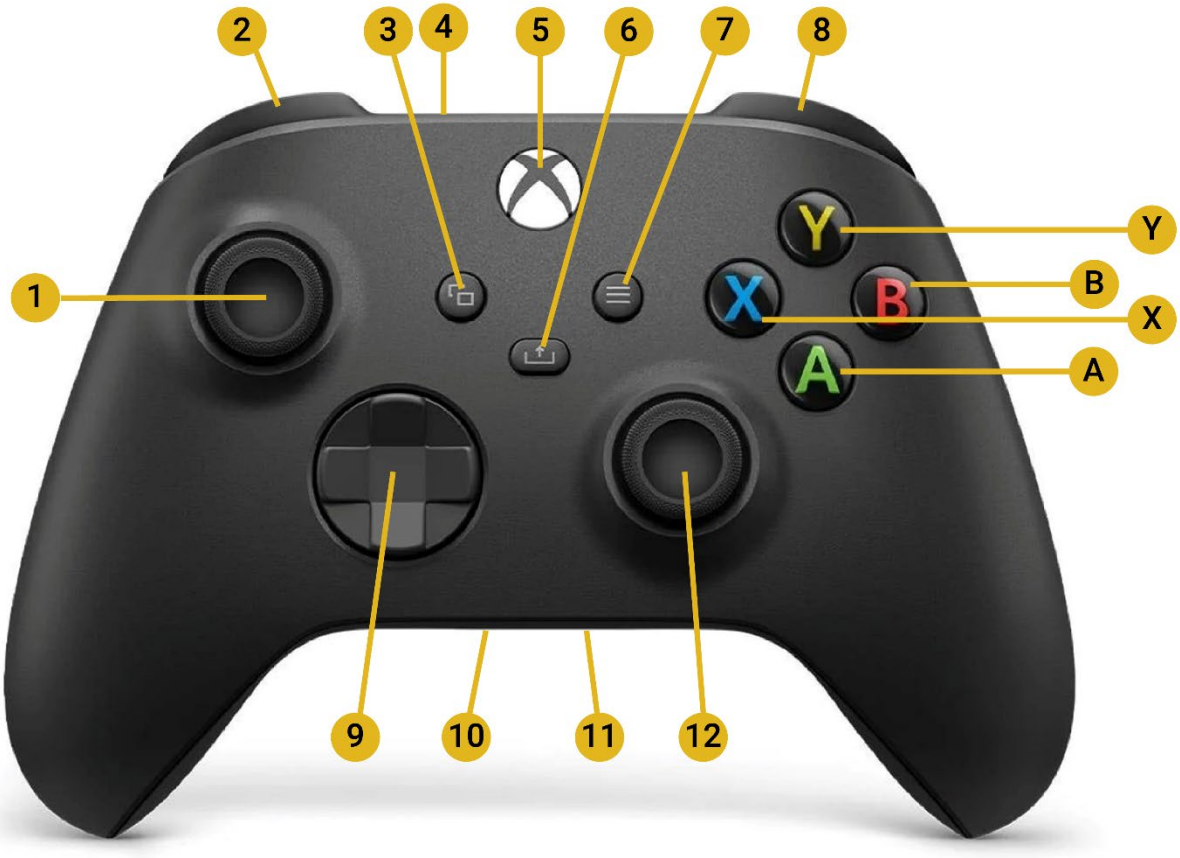
3. Press the connect button on the Xbox controller. The button is located on on top of the controller (Number 4 on the image below).

4. Click on *Pair new device*.

5. Click on the available Xbox Wireless Controller on the tablet screen. Wait for the devices to pair.

6. Your Xbox controller is now connected to the tablet and ready for use.

Please note:
The available functions depend on the machine model activated on the tablet. Use the table below to see the button functions for this model.



Button direction	Drive mode
1 Forward	Drive forward
1 Backwards	Drive backwards
1 left	Turn machine left
1 right	Turn machine right
2	Decrease turbo (stepwise)
3	-
4	Connect controller
5	Power on/off
6	-

7	-
8	Increase turbo (stepwise)
9	-
10	-
11	-
12 forward	-
12 backwards	-
12 left	-
12 right	-
A	Move machine down 1 meter
B	-
X	-
Y	Move machine up 1 meter