- when it has to be **right**

Leica Geosystems

Leica MC1 v6.5.0.1
Software Release Notes

Product	**Leica MC1**
Date	01st December, 2022
From	Tony Case, PM SW
	Morten Nissen PM earthmoving
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These release notes contain essential information about:

Software	**Version**
Leica MC1	6.5.0.1
Download	https://myworld.leica-geosystems.com/irj/portal

Leica MC1 Software is protected and can only be loaded onto instruments with a valid software maintenance date.

Notes:

- Versions prior to Leica MC1 6.3 will not be supported by iCON gps80 instruments running v6.7.10.
- General rule regarding backups: please always make sure to back up every time you upgrade or downgrade versions of MC1.
- Calibration dimensions have changed from 6.4.2/6.5.0.1 Excavator, downgrading from a new machine to 6.4.1 or below will require re-calibration
- Download file of MC1 has increased to 340 MB. You will now only be able to have a maximum of 3 versions saved on the panel.
- Please avoid using special characters for naming of Create Model, Point codes etc. We cannot guarantee these special characters won't damage/affect your USB and ConX synchronization.
- Please note that semi-auto excavators will require re-calibration of hydraulics after updating to 6.5.0.1
- Version on CB14 is 2.91

Please take your time to read these release notes!

The release notes contain information about the new Leica MC1 machine software.
Please read the release notes in conjunction with the user's manual delivered with every instrument.

1. Platform new features and improvements

1.1 Surface logging for earthmoving

Machines affected:

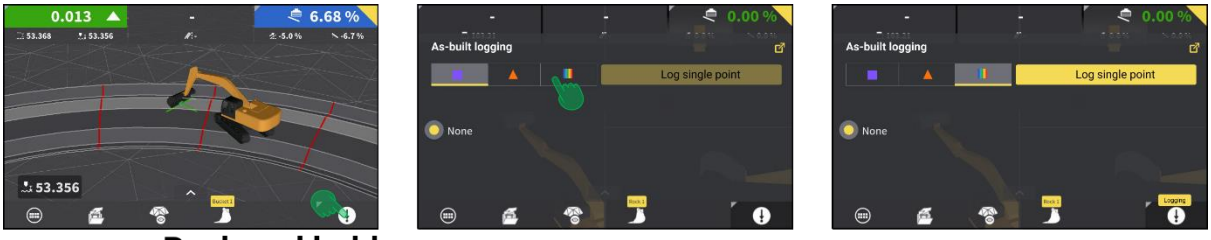
- Excavator
- Dozer
- Grader

Surface logging brief description:

- When activated, MC1 will log the machine's tool path resulting in a surface log
- The surface log can be displayed on the 3D and top view run-screens
- Surface log to target height will be indicated by using a heatmap style colouring on the surface log (portions of the surface log that are outside the height reference boundary will be displayed in grey)
- The operator can change surface log colours and the distance between colour changes
- The surface log can be displayed as:
    - Large grid
    - Small grid
    - Surface
- Surface logs can be synced to and exported from ConX
- Machine to machine sharing of surface logs is currently not supported
- The last pass is logged and will overwrite any previous surface log (in the same area)

1.1.1 Activation workflow

- Put surface logging into standby



- Manual activation of surface logging, F6 (Note; Excavator can have an external button configured for a surface logging trigger)

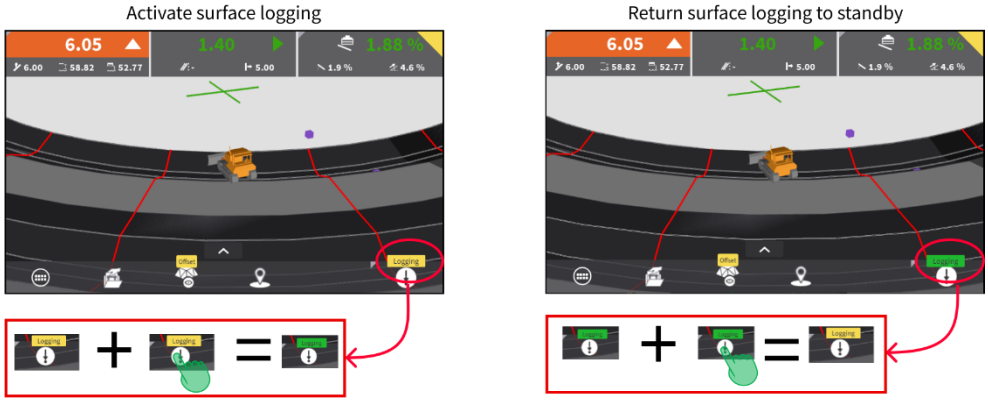


Figure 1: Manual activation workflow

- Activation of surface logging when in auto/semi auto

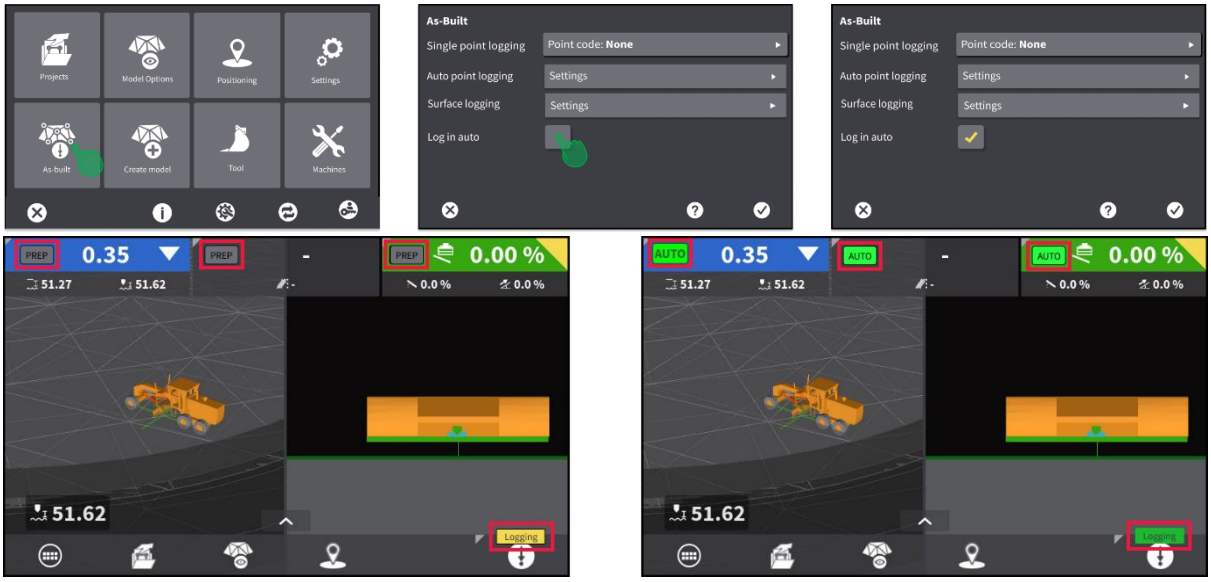


Figure 2: AUTO activation workflow

Note:

- Surface logging will pause when the tool is outside the hydraulic control window
- The “Log in auto” option will only be shown on panels that are licensed for auto/semi auto
- The same method used to activate logging is the only method to return logging to standby (for example, log in auto can’t be deactivated manually or manual activation won’t be influenced by auto activation/de-activation)
- Surface logging can be used with surfaces created on MC1

1.1.2 Surface log display options

- Visualisation (ON/OFF) of surface log is done in the command centre

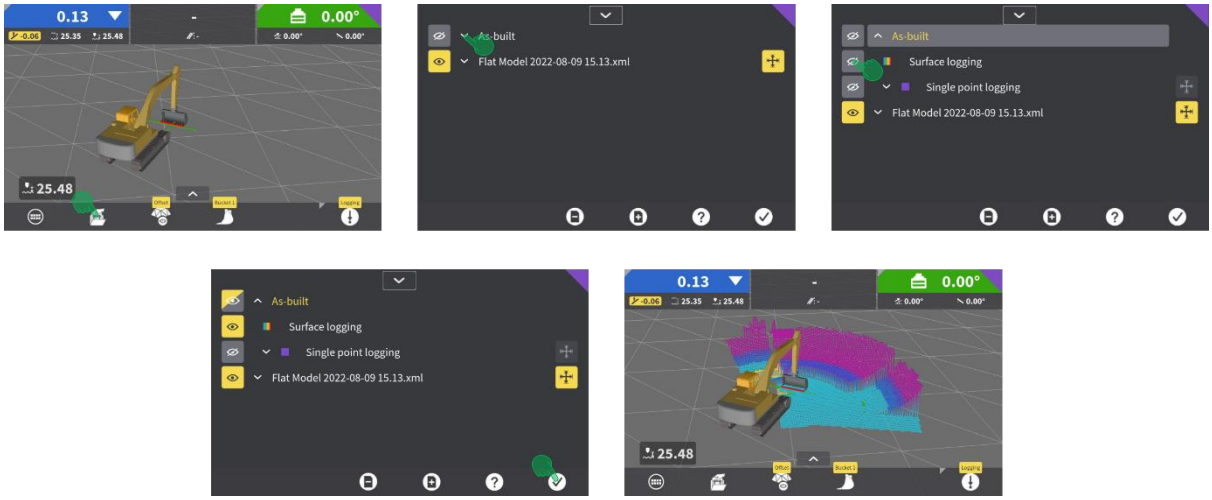


Figure 3: Surface log display workflow

Note:

- Surface logging can be active with visualisation OFF

- Only one surface log will be displayed on the MC1 runscreen at a time

- Display options of the surface log in the 3D and top view run-screens (Main menu >> As-built >> Surface logging)

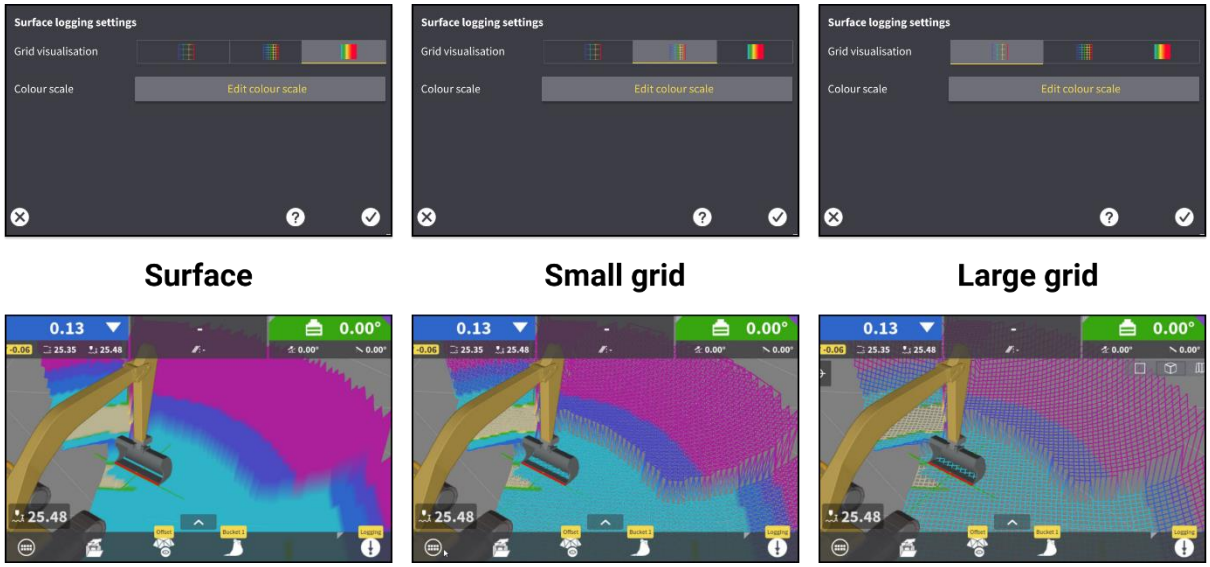


Figure 4: Surface log grid visualization options

- Operator setting for surface logging (Main menu >> As-built >> Surface logging)

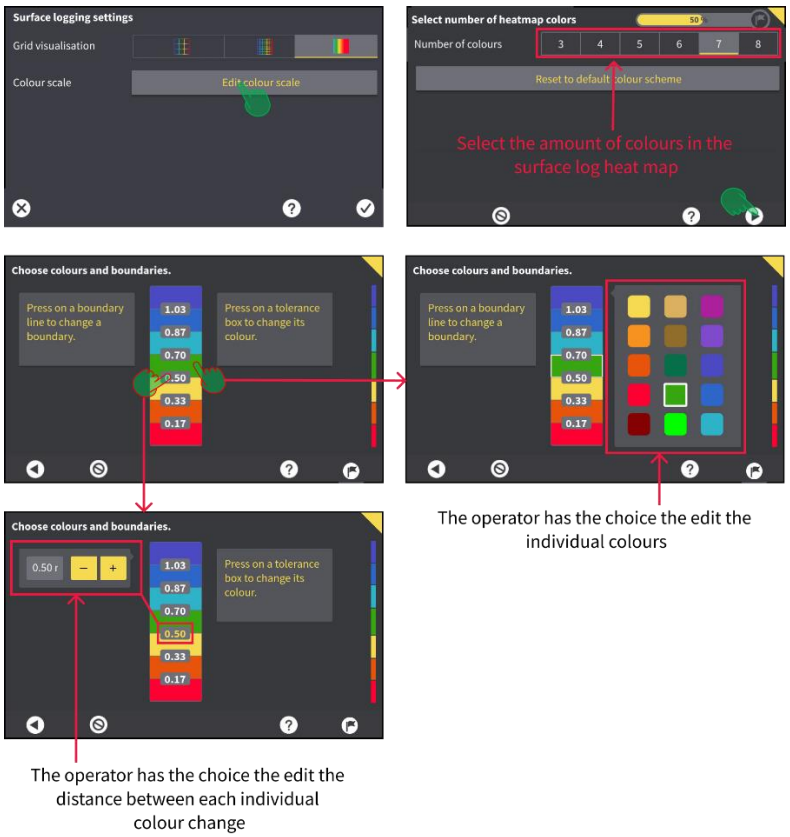


Figure 5: Surface log colouring options

1.2 Managing log files

- Surface log and auto point log files can be found in; Main menu >> Projects >> Expand the project >> Logging
- Both auto point log files and surface log files are listed here
- Files can be deleted from MC1 on this page
- Surface log files will be stored for a maximum of 3 weeks on MC1
- Surface logs are unique to the height reference model they are created on and named with the reference model name
- Only one surface log can be made per height reference model
- ConX will merge all surface logs from multiple dates and multiple machines for the same height reference

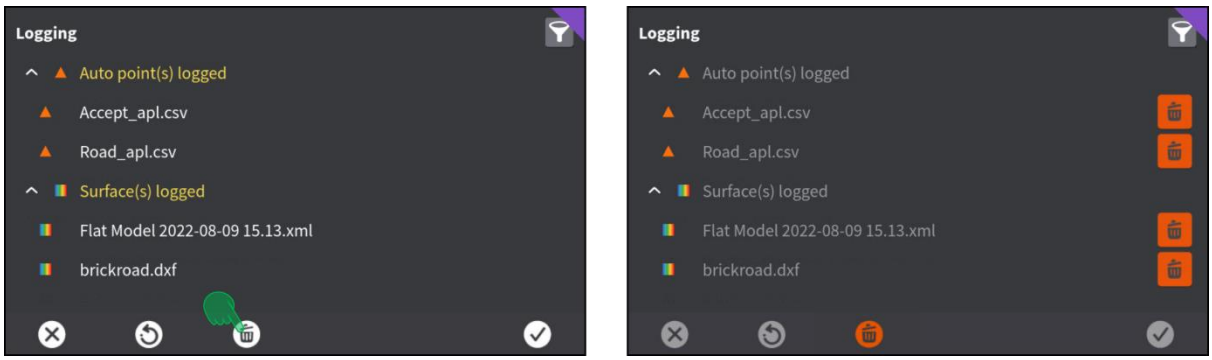


Figure 6: New log files deletion option

1.3 Surface logging in ConX

- Surface log files are synced to ConX
- The surface log will show heat map colours to display either:
  - Elevation
  - Comparison height (logged surface to reference model)
- Surface logs can be filtered by:
  - Reference model
  - Time
  - Unit
- Surface logs from all machines working on the same height reference can be seen on the same screen in ConX
- Surface logs can be exported from ConX as a LandXml
- Surface logging can be used with surfaces created on MC1; the created surface and surface log can be synced to ConX

1.4 *New auto point logging workflow*

1.4.1 *Put auto point logging in standby*

- The activation of auto point logging follows the same concept as surface logging
- Auto point logging will need to be put into standby and then triggered either manually or when the machine enters auto mode
- Auto point logging is greyed out (cannot be put into standby) until the minimum criteria to log auto points had been met (such as tool points etc found in; Main menu >> As-built >> Auto point logging)

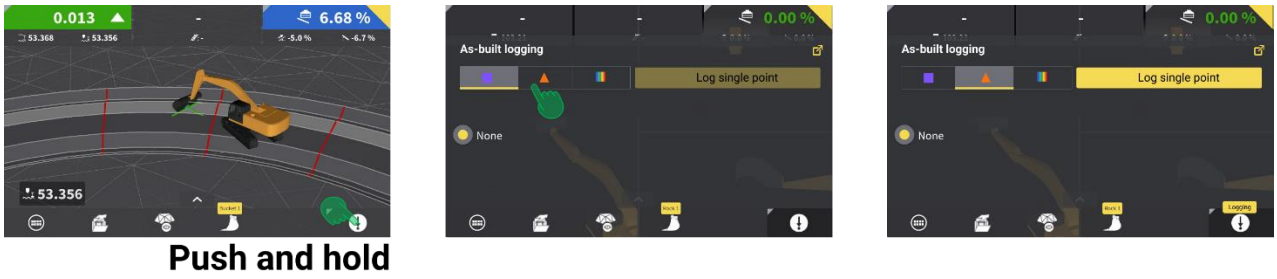


Figure 7: Standby workflow for auto point logging

1.4.2 *Manual activation of auto point logging*

- With logging in standby a single press of the F6 button will activate/deactivate auto point logging (note; excavators can have an external button configured to trigger logging)

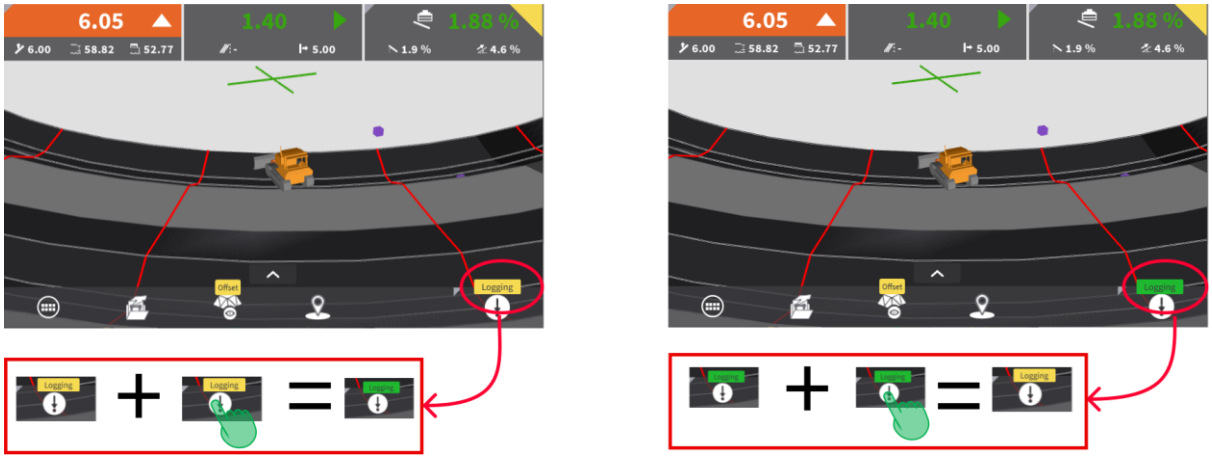


Figure 8: Manually activate auto point logging

1.4.3 *Auto point logging in auto mode*

- Logging can be set to active when the tool is controlled by MC1 in auto/semi auto mode
    - The same method used to activate logging is the only method to return logging to standby (for example, log in auto can't be deactivated manually or manual activation won't be influenced by auto activation/de-activation)

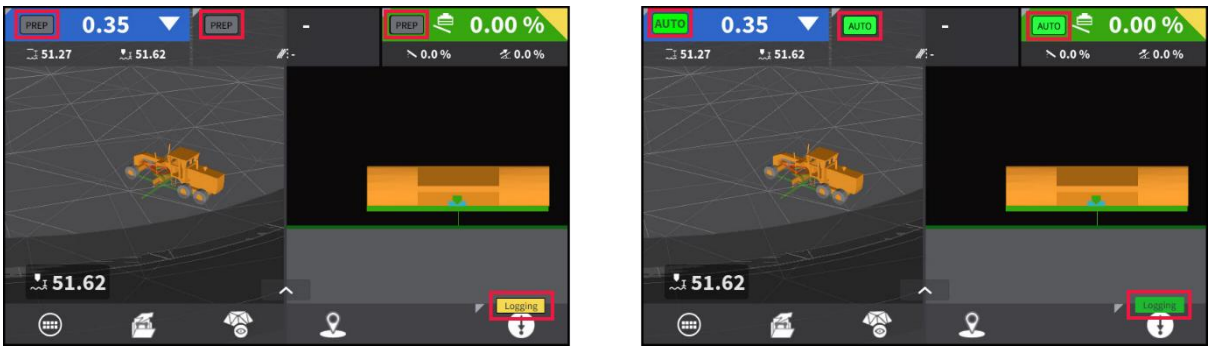


Figure 9: Activate auto point logging in AUTO

1.4.4 Display options for auto point logging

- Visibility (ON/OFF) of auto points is made in the command centre under “As-built”
- The setting is a global visualisation ON/OFF for auto point logs

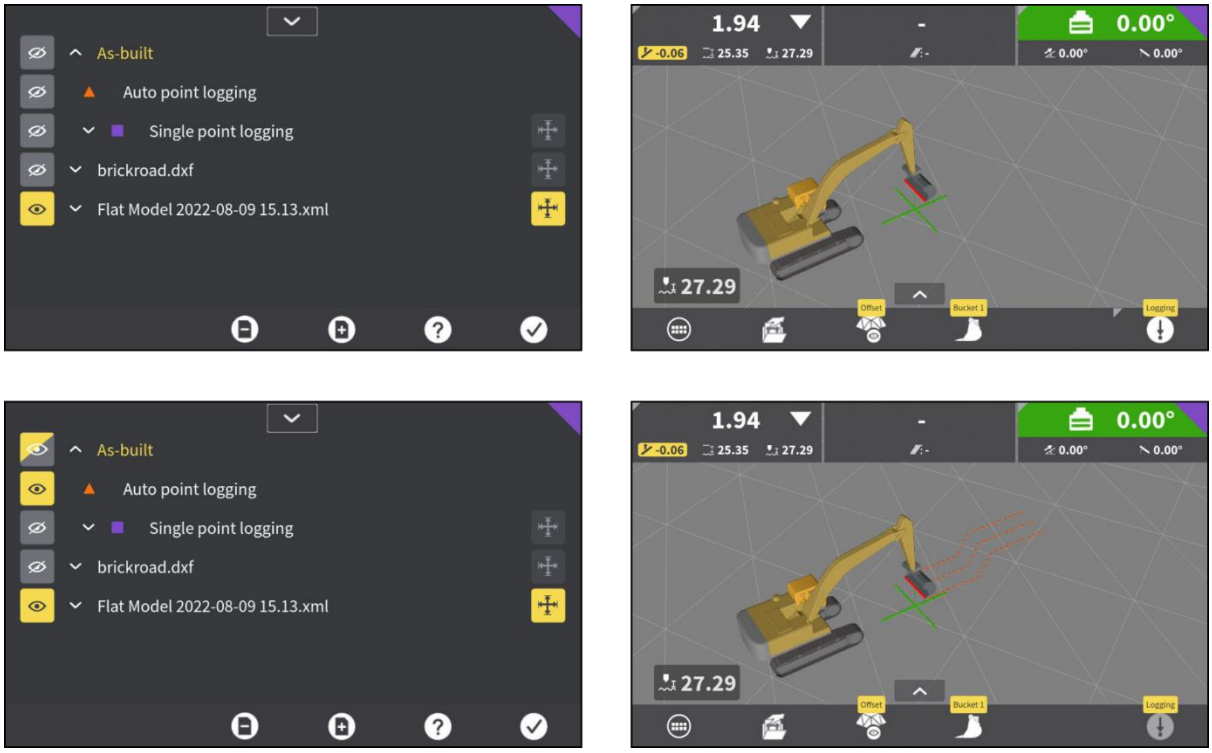


Figure 10: Visualize/hide auto point logging

1.5 *Single point logging*

1.5.1 *Single point logging when surface logging and auto point logging are in standby*

- When surface logging or auto point logging are in standby, the function of the F6 key changes to activate/deactivate logging. In this standby state:
  - Press and hold F6
  - Press the “Log single point” button to log a single point
  - The normal pop-up information comes up to inform the operator that the point is logged

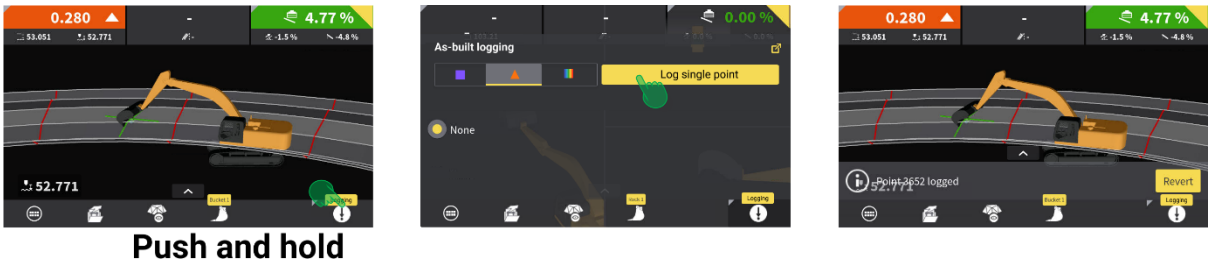


Figure 11: Log single point while being in standby mode

1.5.2 *Display options for single point logging*

- Single point visualisation (ON/OFF) is done in the command centre
- My own single points can be set as referenceable
- Visualisation (ON/OFF) setting can be made for:
  - Global (all points)
  - Imported points
  - Individual point codes

Note: points without code are shown as; ---

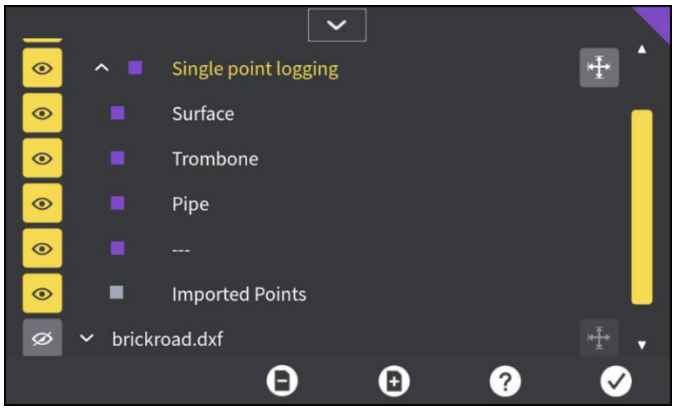


Figure 12: Single point logging hide/visualize

1.6 Points in night mode improvement

- Points were not clearly visible in the run-screen when using night mode
- Point colours have changed to yellow
- Changes are only for night mode

Figure 13: Points shown in yellow during night mode to be seen better

1.7 As-built menu improvements

- These changes are platform wide

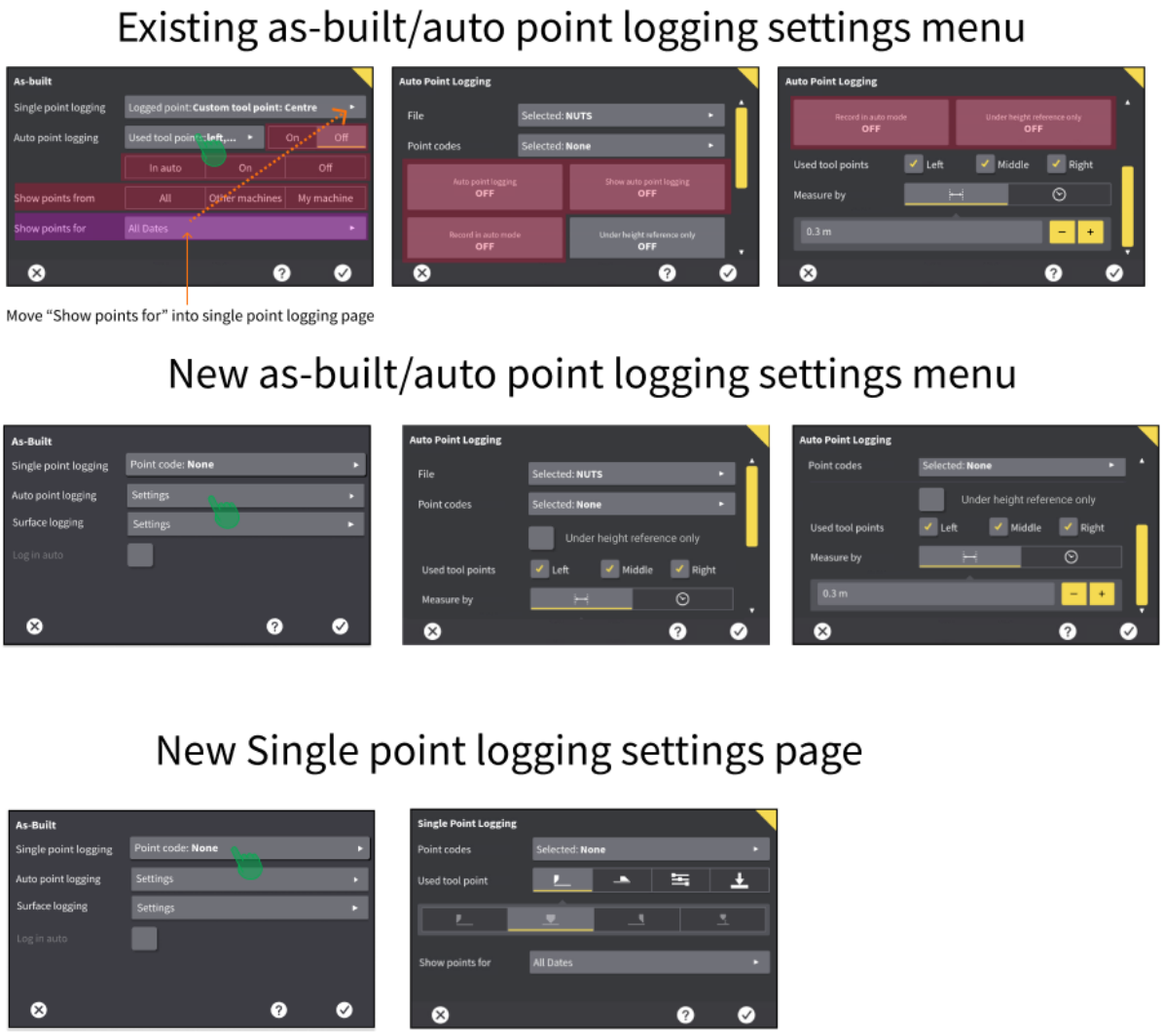


Figure 14: Changes in As-built menus

1.8 Other improvements

- **VA80** -- Camera view added to runscreen view
  - When camera has been enabled under **Settings>Connectivity>Ethernet Mode**, a camera view option will be available in the runscreen, and the current camera stream can be selected for different views.

Figure 15: Camera view added as option for runscreen view

- **Hold slope Menu --** under Model options, will only show design models that have been set as visible in the command centre.
- **ConX –** mouse cursor is now shown when running a remote-control session of the panel, so that someone on ConX remote view can point to something on the panel for the operator to see.

Figure 16: Mouse cursor icon shown on panel screen

- **Machine colors –** the machine colors can be reset to default:

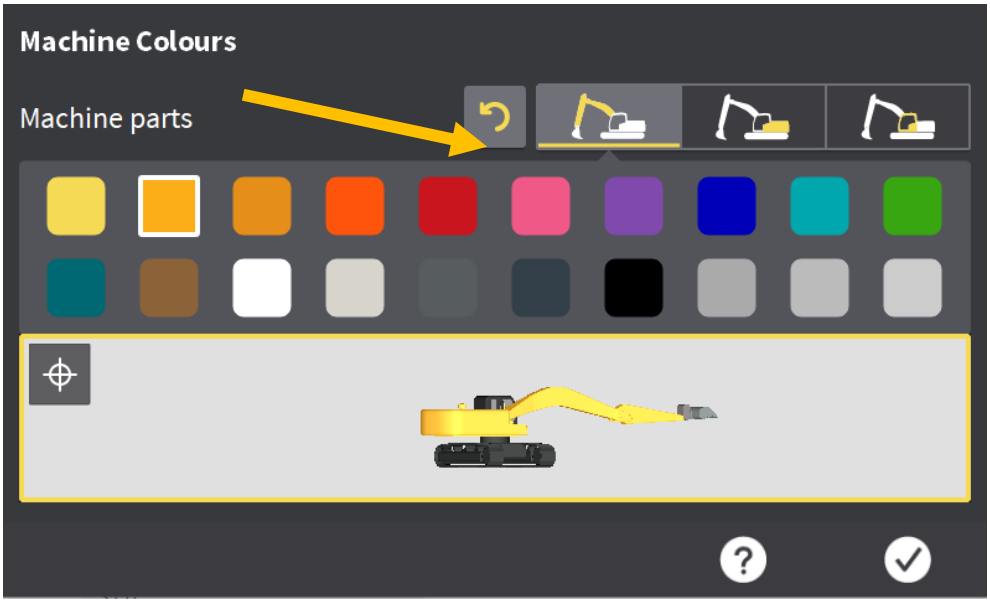


Figure 17: Reset colors to default button added

- **Dynamic slope icon runscreen (only earthmoving)**
  - The cross-slope icon in runscreen will now show the tilt value compared to the design model.

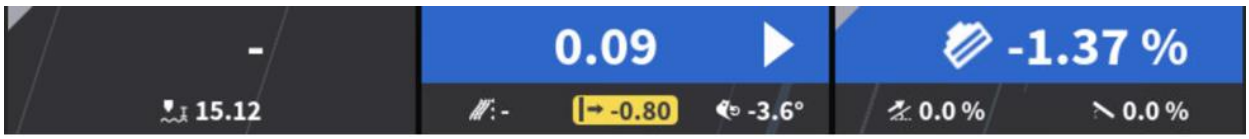


Figure 18: Dynamic cross slope icon (to the right side)

2. Earthmoving improvements

2.1 DMC for MSS400 pitch/roll sensor

The MSS400 system currently uses accelerometer averaging to calculate the roll and pitch angles. For further improvement of the accuracy in certain machine movements such as rotation of the machine. calibration values (Sensor Position X+Y) have been added under **Machine Calibration -> Dimensions** for Pitch and Roll length.
Here is the MC1 calibration input dialog:

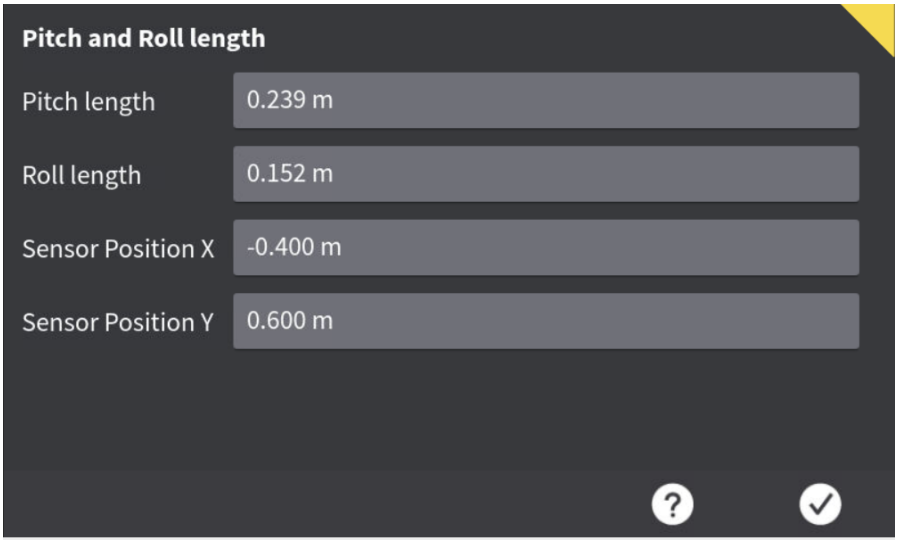


Figure 19: Calibration dialogue for MSS400 sensor

Here is how to measure X position:

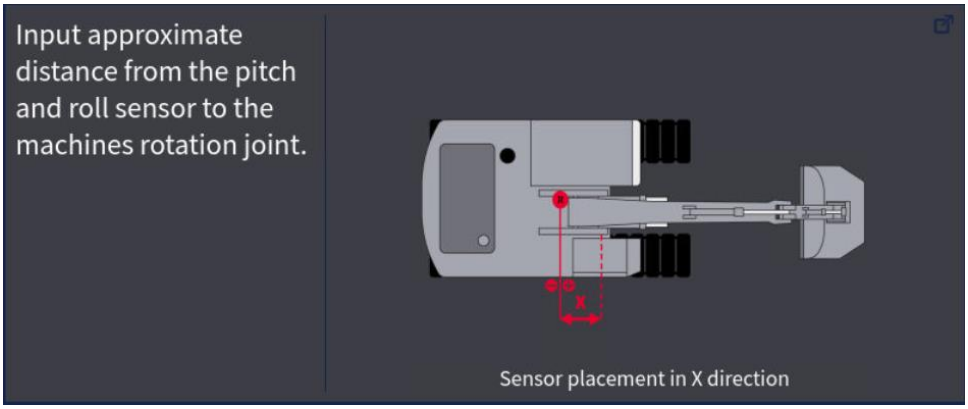


Figure 20: X position measurement

Here is how to measure Y position:

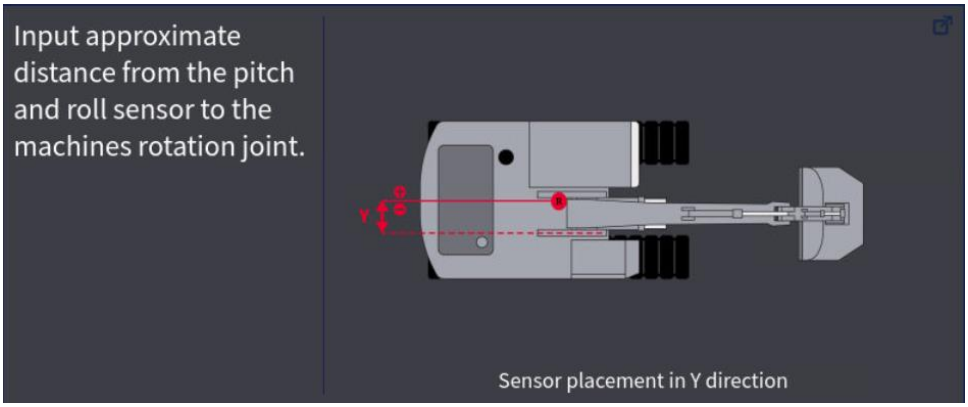


Figure 21: Y position measurement

2.2 Semi-auto update

2.2.1 Improvements

- Faster system: 10-12 sec from max reach position.
- Robust system: stability and smooth performance.
- Advanced control modes: auto rise, gentle engage, and ramp up/down gives the system advanced control for different use cases.
- New calibration method: the calibration method goes from linear to non-linear along with providing a hydraulic model diagram and that will be a great tool for the installer.

2.2.2 What is required to upgrade to Semi-Auto 2.0

- There is no change related to the installation.
- Upgrade to MC1 6.5.0.1
- Recalibrate the hydraulics.

Notes

- A new hydraulic calibration is required when updating to MC1-6.5.0.1 Semi-Auto.
- Semi-Auto button: start logging semi-auto data, enables extra data and should used with discretion, button must be manually turned off to stop logging the extra data.
- No extra cost or new licenses.
- OEM interface (Liebherr G8) will be available at a later version.

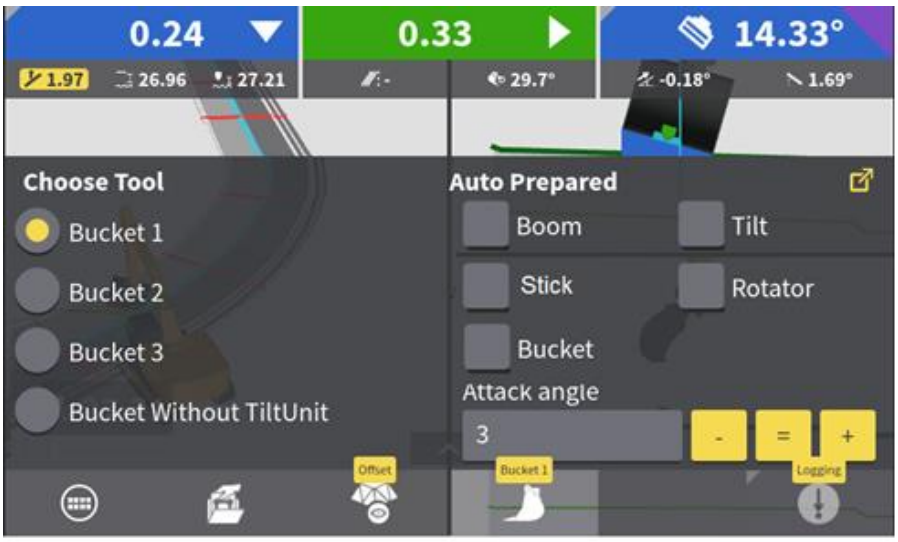


Figure 22: Updated Semi-auto Excavator runscreen

3. Paving Improvements

3.1 Paving production logging

- New features will allow key parameters to be Auto logged in production.
- Access from Main menu\\ As-Build tab
- Set for; Distance or Time or None
- Key parameters logged, Time, Model, speed, E, N, H(s), Stop/Run…
- Settings are predefined for each Pave solution
- Files are stored and managed in MCP80
- ConX - Files synced to Files and 3D area
- Can be downloaded or exported for use in 3rd partly Tools
- Offline Export to USB in a File name “PaveProd”

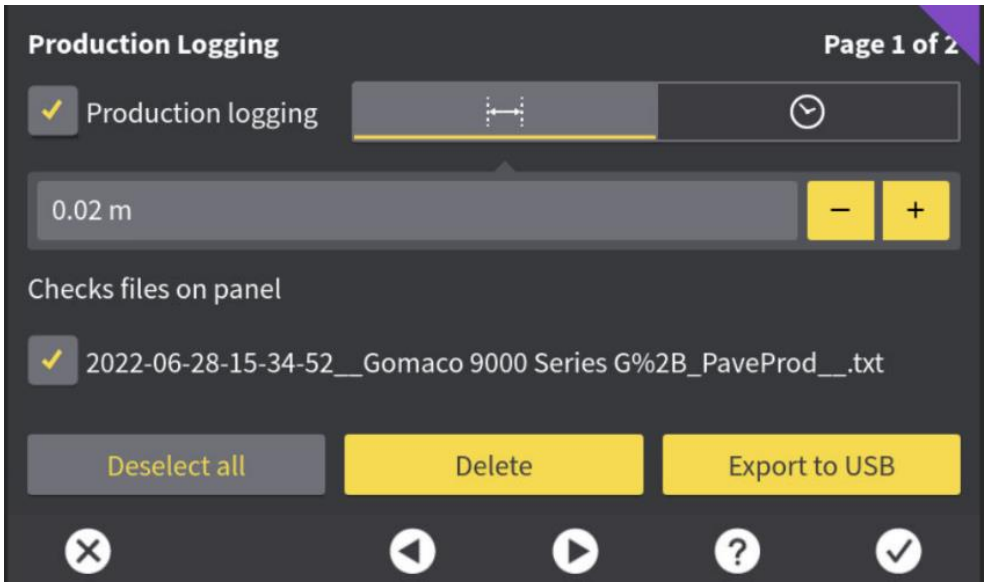


Figure 23: Production log to export from MC1 to USB

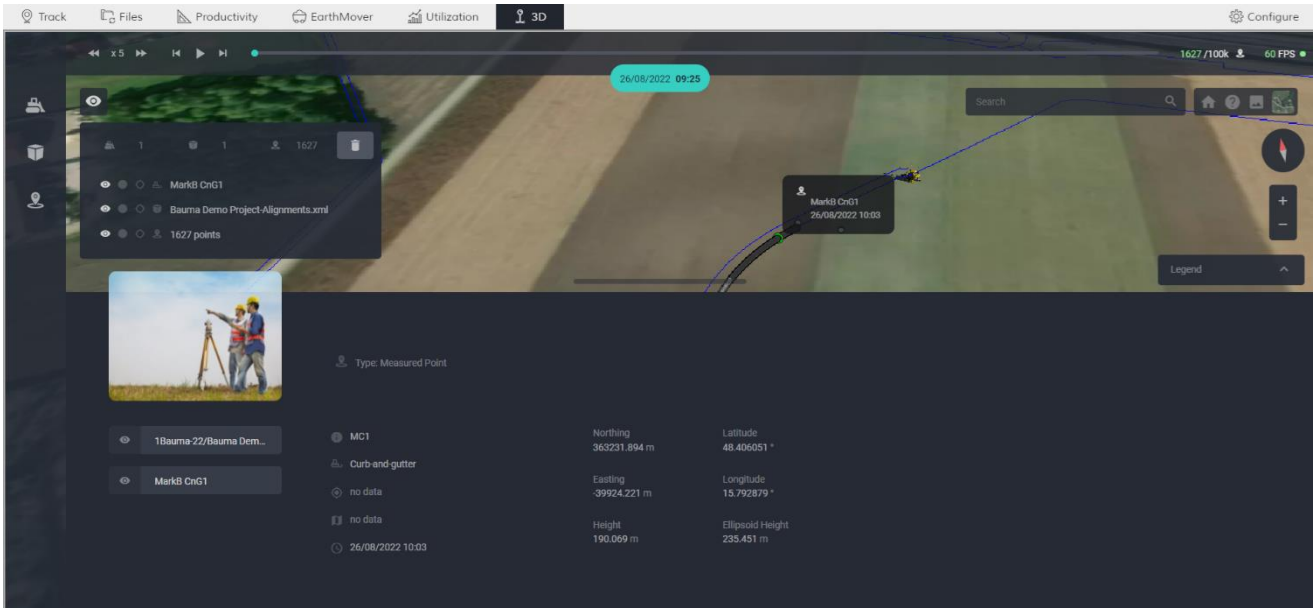


Figure 24: Snail-track of the machine using Production logging

3.2 PA80 Active machine alerts for Mill + Asphalt pave

- PA80 Red alerts are now actively handled and sent to the machine CAN 3D interface
- Stop message and/or alarms on machine
- Red zones / man down / panic alerts
- Collision alerts for other vehicles with anchors
- Operator “safe” zone
- Auto-active in run mode, and when alert is active 3D Run is blocked

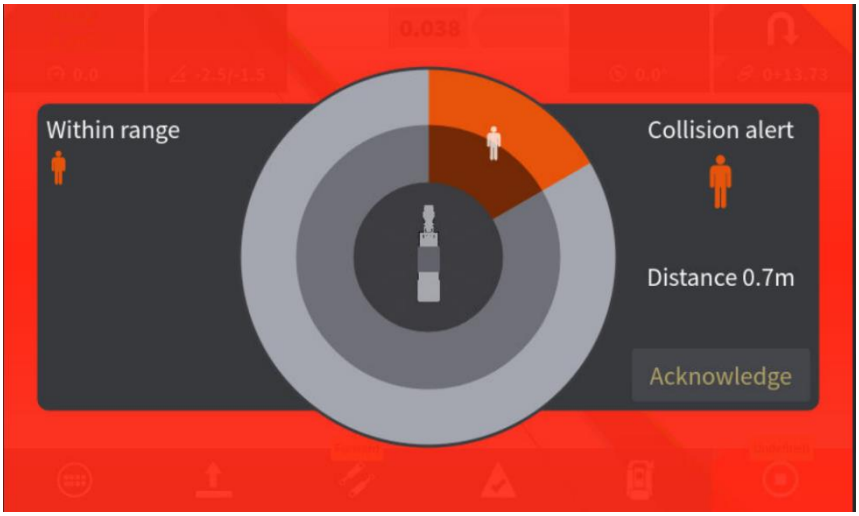


Figure 25: Collision alert in MC1 for paving machine

3.3 XMCG – MC1 3D Roadpaver and Cold Mill support

- **New 3D interface MC1 for XMCG Roadpavers**
- **Supported 3D Height + Steer + Edge control**
  - Licence; 969703 MSW2154 OEM Interface XCMG Roadpaver
  - Interface Cable 972669 MYC M12F/M12M to MIL 18 10s P, 3.0m
- **XCMG Cold Mill Support.**
  - Use with - MOBAmatic Mill profile with MLS-508 controller
  - Interface with MOBA- Mill, see wiring diagrams
- **Note**: Currently XCMG Road 3D only for supported for the CHN region. For more information, please contact Mark Bryant.

3.4 Gomaco Pavers new features

3.4.1 Transverse mode Auto select slope sensor direction

When changing mode from Curb & Gutter >> Offset mode the slope-sensor(s) auto updates to the new forward (Y-n) direction
For use with the Gomaco G+ Multipurpose “Xtreme” steer pavers.
Supported for Gomaco-machine or MSS405 slope-sensors

3.4.2 Gomaco- Smart mould control

- When active the mould TBC (top back curb) position >> MRP offsets is auto-updated from the G+ CAN “smart side shift system”
- Supported for the TBC control - // Y // Z (offset/ / length // height)
- User is informed in the MC1 runscreen when active
- Multiple options can be selected to be read from the machine >> Mould adjustment page
- Machine calibration is still needed and is caried out with the Mould in the retracted home position
  - **Note**: these options need to be enabled on the machine by the OEM-Gomaco, contact your Gomaco dealer for more information.

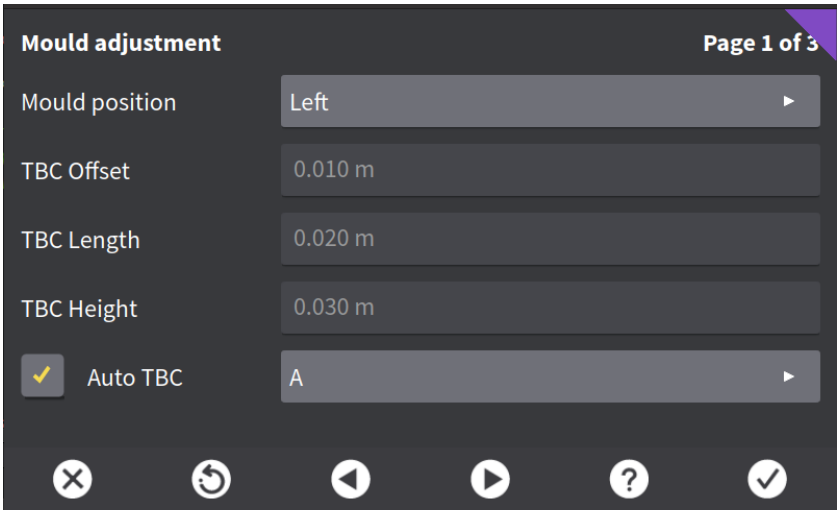


Figure 26: Mould control options

3.5 Slope corridor graphical improvements for Road-line models

New- Perpendicular lines indicating sectional changes in the Slope corridors
Shows key interval changes when going between tangent >> tangent or >> radius

Figure 27: Perpendicular lines added for slope corridors

3.6 Minor Improvements and Bug fixes

- **Wirtgen SP pavers** – Travel speed-locks, set to default OFF for all models for Offset and Mainline pavers.
- **Vogele Niveltronic** 3D bug fixes
  - Reported issues with the slope calculation when using single mast solution.
  - Now you will only get 2x heights when using Single mast & Slope
  - No change for Vogele Navitronic solutions.
- **Slipform paver** - now shows the Total Mould Width calculation in the machine Dimension's page
- **1up – GNSS** improved diagnostics information for hardware issues like poor or broken antenna/cables

For further information on the above Paving topics please contact Product Manager- Mark Bryant or alternativity write to LMC.support@leica-geosystems.com

4. Rig improvements

It is very important for drillers and pilers to make a backup before upgrading the software. Most of the machines with MC1 will be upgraded from 6.1.0.

4.1 New MC1 feature - Dual Bullseye run screen

- Driller and Piler new dual bullseye run screen option
- The current MC1 bullseye run screen design is unchanged. It remains how it is implemented today
- Improved operator view with top & bottom view when using an alternative drill angle e.g. due to obstacle like mud or big/hard rocks

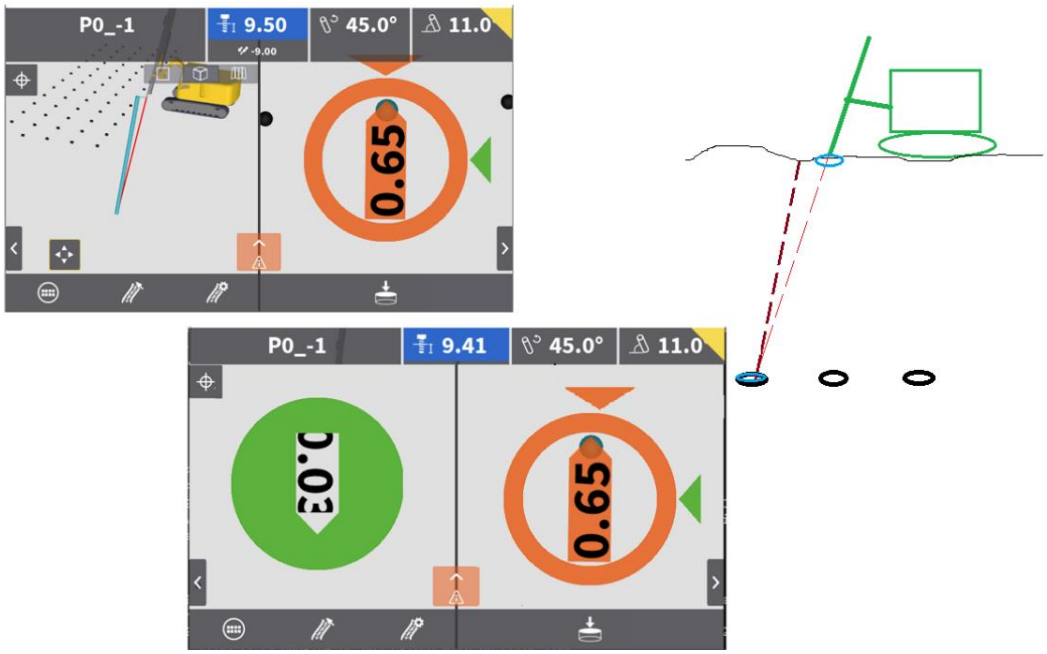


Figure 28: Top and bottom bullseye views in runscreen

4.2 Improved - Drilling ended deepest documentation

The feature is available only for pilers using Cast in Situ work mode.
With this feature we record the deepest position of the tool point for a successful or failed pile.

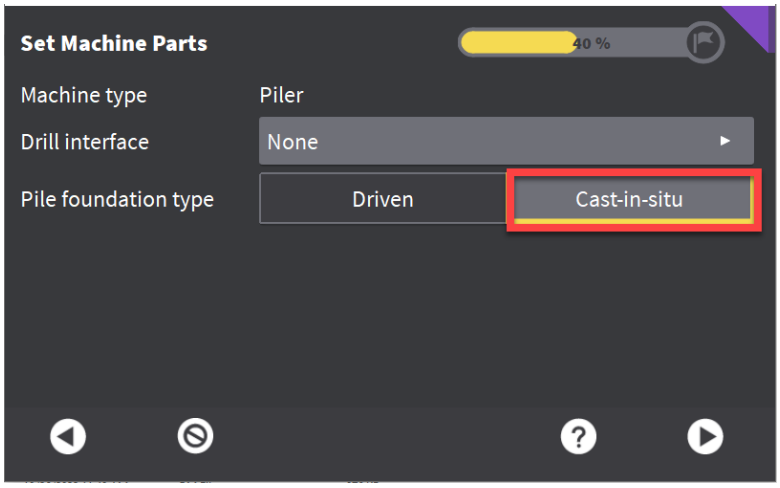


Figure 29: Location of the feature Cast-in-situ

The points/holes are logged in MC1 and visualized green when successful, and the as-built points are recorded.

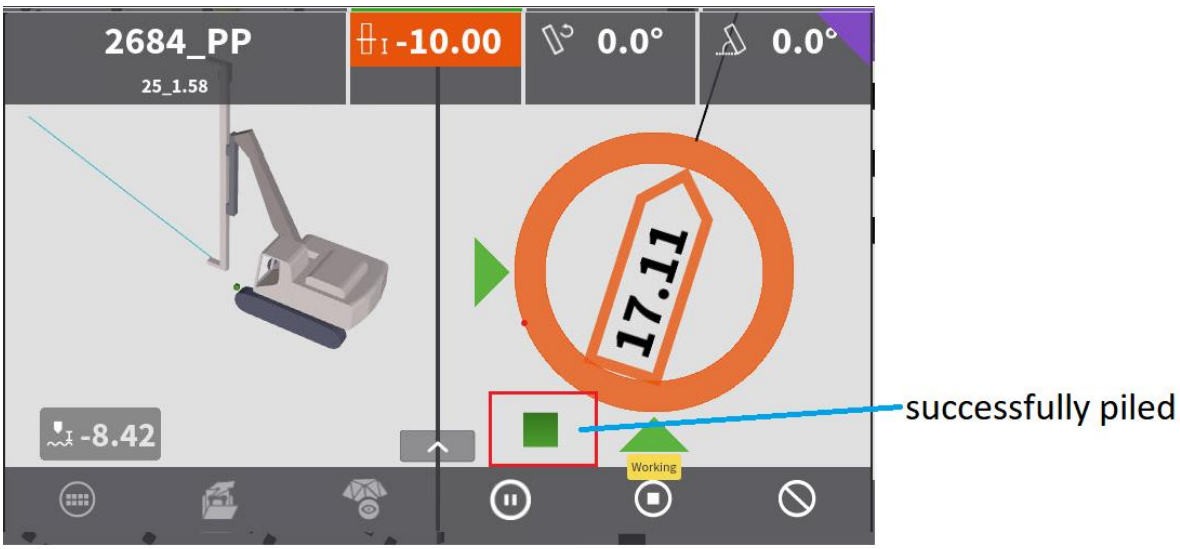


Figure 30: Successful pile, shown green

Point ID	Point Cod	Log Name	Easting	Northing	Height	DrillerPilerStatus
20	---	3324_PP	402214	1324290	-1	Entry
21	---	3324_PP	402214	1324290	-4	Start
22	---	3324_PP	402214	1324290	1.1	End

Figure 31: Recorded successful pile

If visualized red it has failed due to wrong depth:

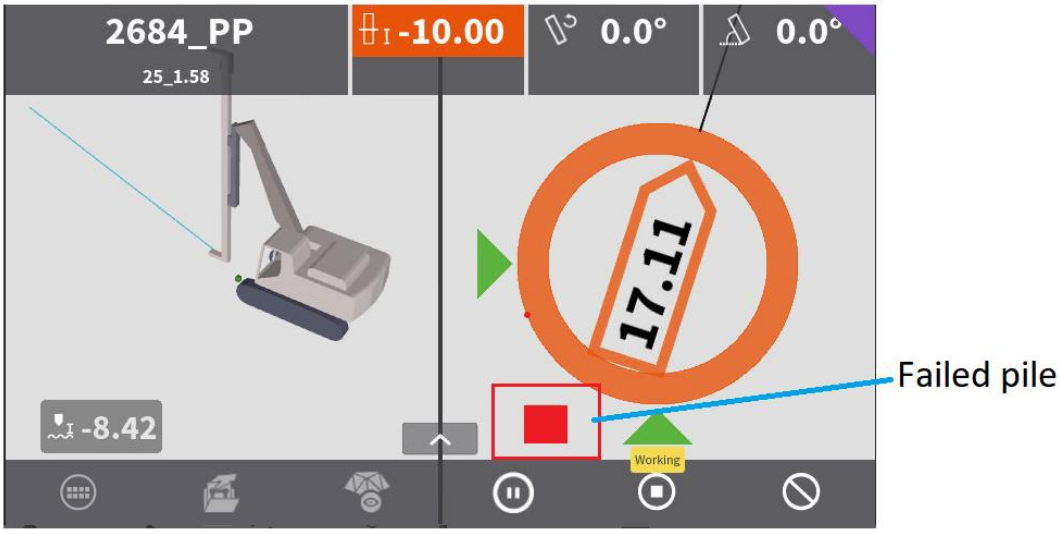


Figure 32: Failed pile, shown red

Point ID	Point Cod	Log Name	Easting	Northing	Height	DrillerPilerStatus
20	---	3324_PP	402214	1324290	-1	Entry
21	---	3324_PP	402214	1324290	-4	Start
22	---	3324_PP	402214	1324290	0.8	Failed

Figure 33: Recorded failed pile

Besides these two major Rig improvements, then **the general solution has been updated to the latest MC1 platform level**

4.3 Other fixes and improvements done for Rig v6.5.0.1:

- Improved the Advanced Drill pattern
- Improved the Junttan Piler support
- Corrected the Visualization of “cylinders” (drilled/piled holes)
- Improved handling for various OEM’s
- Creating drill patterns in IREDES file format. This makes possible to enter hole angle and heading while creating the hole pattern.
- The Advanced drill pattern is new for the 6.1.0 users (latest official released version. In advanced drill pattern we can create contour lines and help rows which can have different angle and heading than the main pattern

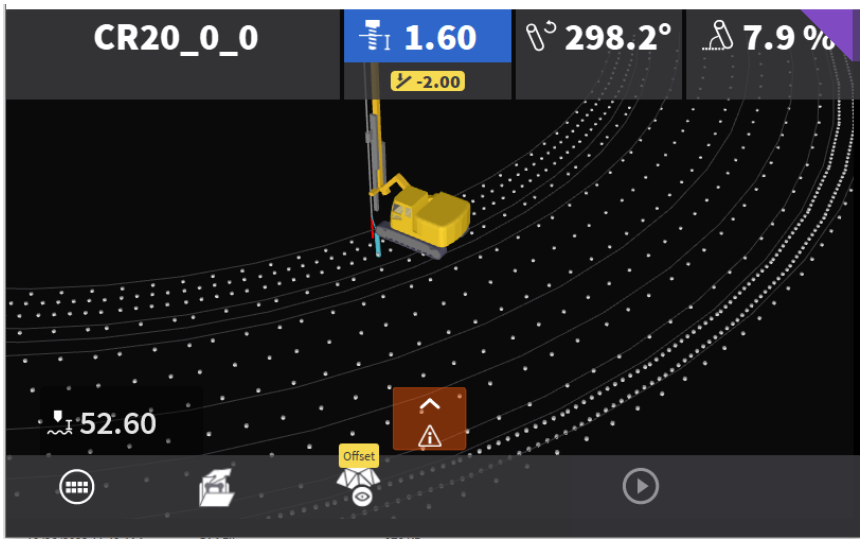


Figure 34: Runscreen view of the advanced drill pattern

5. Alpine improvements

5.1 Multiple referenceable models

The snow groomer can now also work with multiple models used as reference at the same time. This follows the functionality that was introduced for earth-moving machines in MC1 v.6.4. This includes the following functionality:

- Use separate reference models for height, side, and navigation.
- Automatic switching between referenceable models: With more than one model referenced, the machine can move its tool point from one referenced model to another, and MC1 will update its display and the height and/or side reference calculations automatically without operator interaction.
- Referenceable and visualized models are now displayed in 3D, cross section, and profile section views. In the 3D view, the current model will be highlighted a bit brighter than the other visualized models.

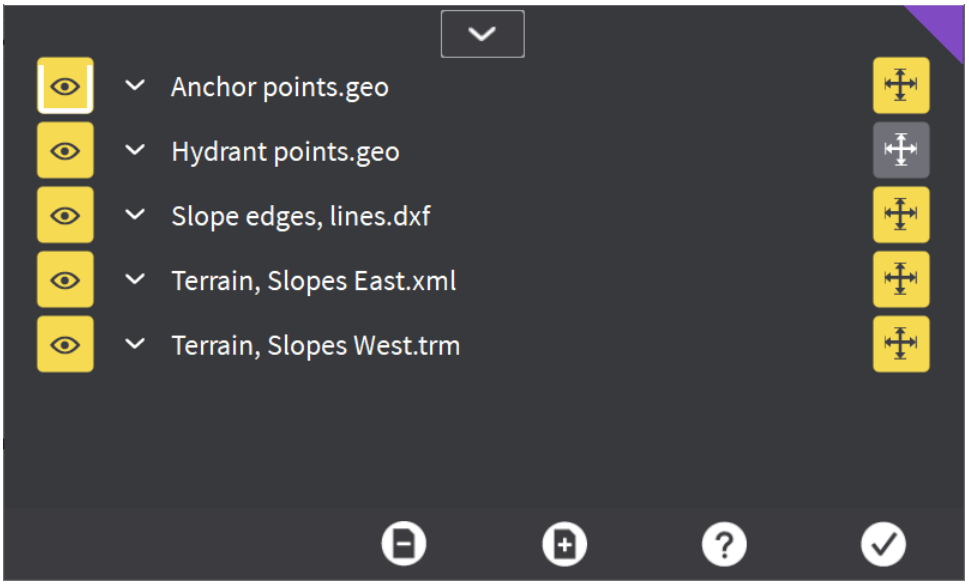


Figure 35: Multiple referenceable models for alpine

The project in the example above contains:

- 2 GEO-files with points (for *navigation to point*)
- 1 DXF-file with slope edges (for *side navigation*)
- 1 TRM- and 1 XML-file with terrain models for 2 parts of the ski resort (for *snow depth measurement*)

Note, that ***"Under tool point"*** must be selected to enable automatic shifting between referenceable models:

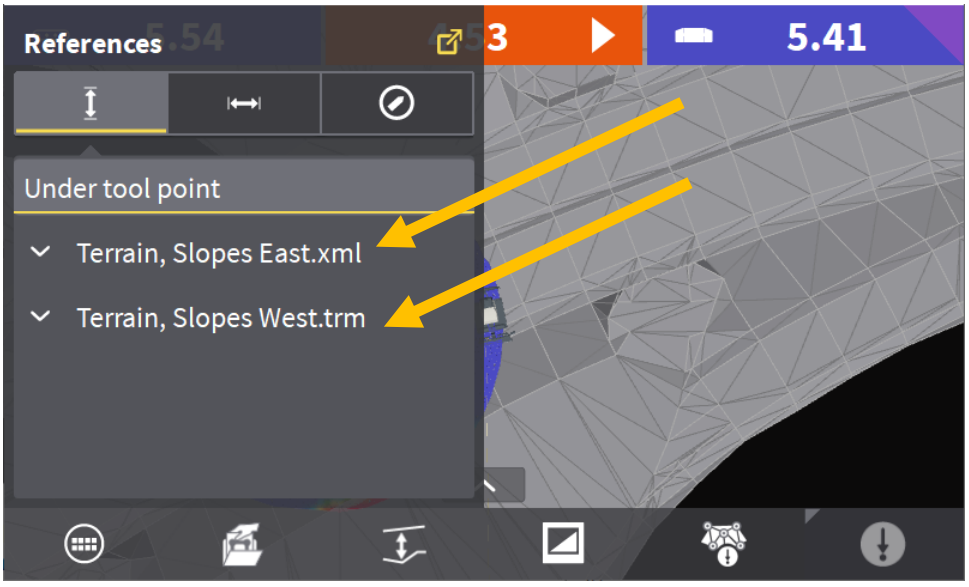


Figure 36: Reference tab displaying several referenceable models

Overlapping referenceable models – The highest elevated model will always be used for height calculations. For visualisation, all models **selected as referenceable** are displayed in all views (3D/cross section/profile section).

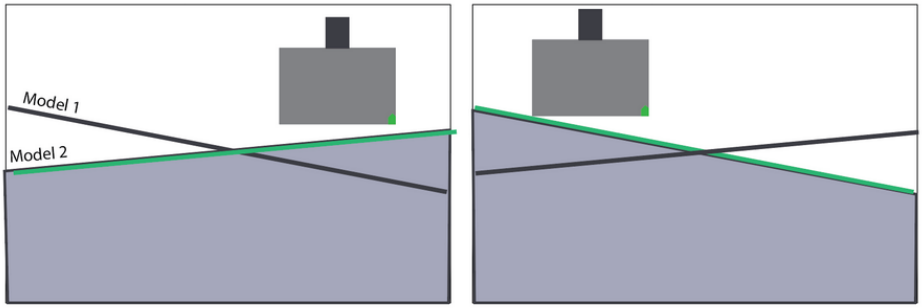


Figure 37: Overlapping models rules

Overlapping referenceable models (main logic)*: With "under tool point" selected, the model with the greatest elevation is used for height reference.*

The *Icon info bar* will show specific information on the current model/element used for height, side, or navigation reference:

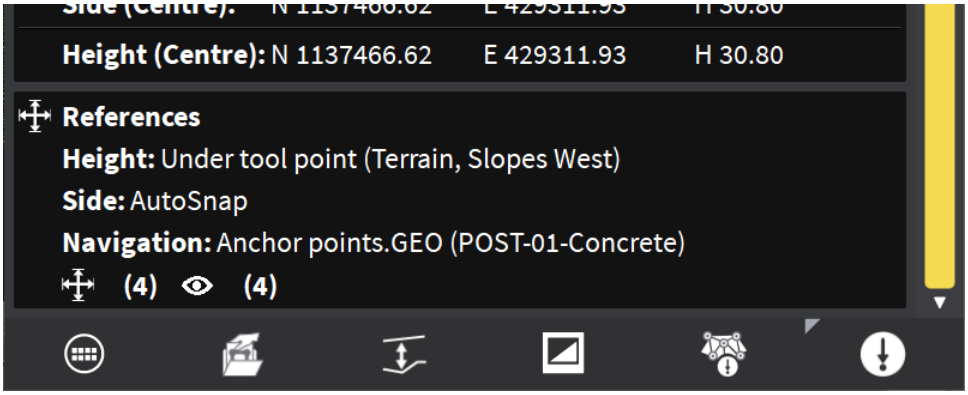


Figure 38: Icon info bar showing model used for each reference

5.2 As-built page improvements

To align the alpine logging settings to the platform some subtle changes have been implemented

- Large grid, small grid, surface have been replaced with icons
- Colour scale setting is now accessible from the surface logging page (in the as-built menu)

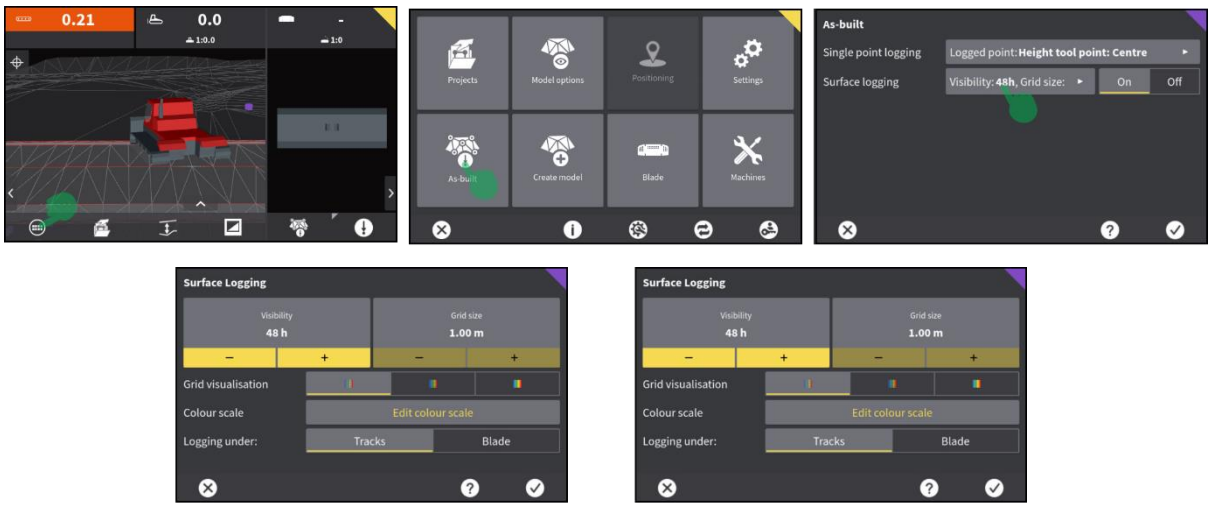


Figure 39: Changes in the UI for alpine for surface logging display settings

5.3 Snow groomer blade sensor can be mounted upside-down

It is now possible to mount the SP14 (dual slope) and MSS1300 (single slope) sensors upside-down on the snow groomer blade. It is important to set the correct mount directions for the *Blade tilt* and *Blade roll* in the MC1 machine calibration wizard:

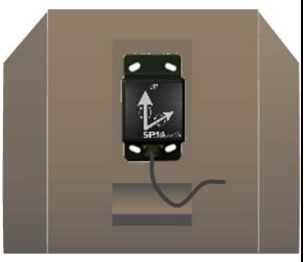
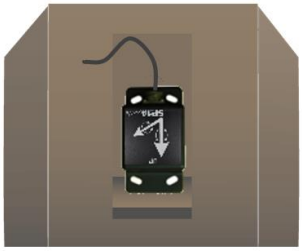
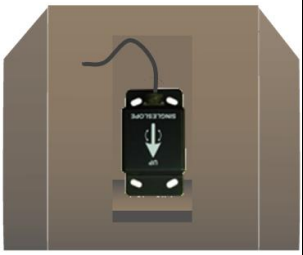
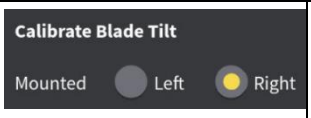
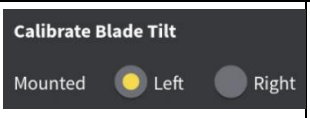
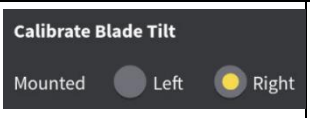
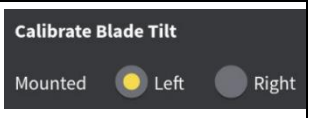
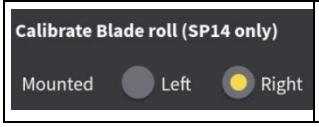
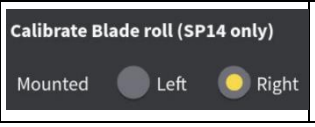
SP14	SP14 upside-down	MSS1300	MSS1300 upside-down
			
			
		(Blade roll not available with MSS1300)	(Blade roll not available with MSS1300)

Figure 40: Sensors mount for Alpine

5.4 *ConX Alpine licenses, 2-, 3- and 5-year*

After the introduction of the new ConX-MC1 *entitlements* in June 2022, there was only a **1-year** *subscription* available for the special (cheaper) ConX Alpine licenses.
The **2-, 3- and 5-year** ConX Alpine licenses have now been introduced again. The new article numbers are:

974314	Leica ConX Connection Alpine 2yr
974315	Leica ConX Connection Alpine 3yr
974313	Leica ConX Connection Alpine 5yr

Note, that the new 2-, 3- and 5-year licenses are still *time-limited* (expiring), same as they were before. Only the 1-year license is a *subscription* (auto-renewing).

5.5 *Direction values improved for snow groomer*

The default values for *Direction values* in the *Machine profile* have been updated to some more suitable for the most common snow groomer models: **Prinoth Leitwolf** and **PistenBully 600**. Existing machine profiles should also be updated to these values, as it will ensure a more stable machine heading while in Single GNSS fallback (when having Dual GNSS Lock = OFF).

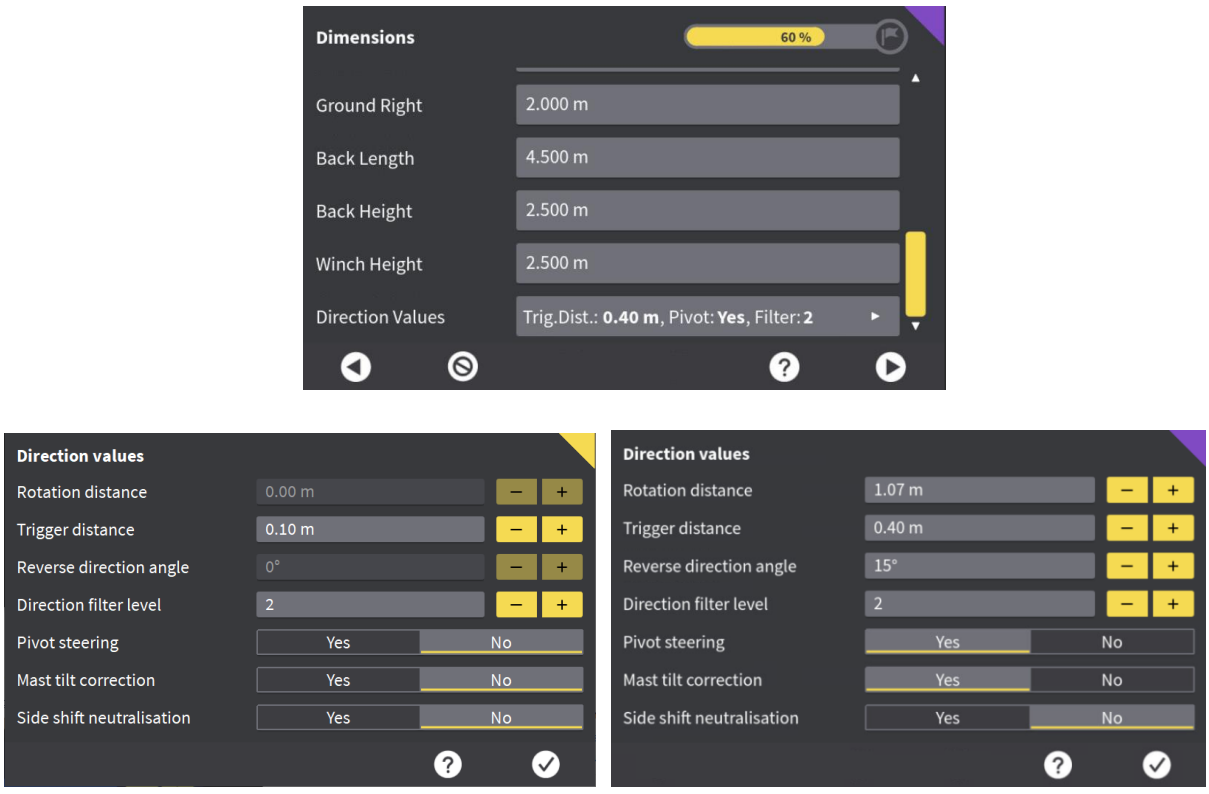


Figure 41: Changes in the default direction values for snow groomers (old values on the left, new values on the right)

6. Firmware support

		2022			
		6.5.0 29 Nov 2022	6.4.2 23 Aug 2022	6.4.1 14 Jun 2022	6.4.0 08 Mar 2022
Supported platforms					
MDSxx	Supported	1.5.41	1.5.41	1.5.41	1.5.33
libCassons	Supported	N/A	1.7.0	1.7.0	
iCG8x	Tested	6.7.10	6.7.10	6.7.10 6.7.20	6.7.10 6.7.0
	Supported	6.7.10	6.7.10	6.7.10	6.7.0 20 Dec 2021
iCA202	Tested		1.0.13	1.0.0 1.0.13	0.9.104 0.9.100 0.9.86 0.9.77
	Supported		1.0.0	1.0.0	1.0.0 08 Mar 2022
iCR80	Tested		7.0.0.384	7.0.0.384	
	Supported				
iCR80S	Tested		7.0.0.384	7.0.0.384	
	Supported				
iCR60	Tested				
	Supported				

Figure 42: Firmware support

7. Versions available on ConX

MC1

Panel	Machine	6.1.1	6.1.1-SG	6.4.0	6.4.1	6.4.2	6.5.0
	Excavator			AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE
	Dozer			AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE
	Grader			AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE
	Driller	AVAILABLE					AVAILABLE
	Piler	AVAILABLE					AVAILABLE
	Roller			AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE
	Paving			AVAILABLE	AVAILABLE	AVAILABLE	AVAILABLE
	Snow Groomer				AVAILABLE	AVAILABLE	AVAILABLE

Figure 43: MC1 versions available on ConX