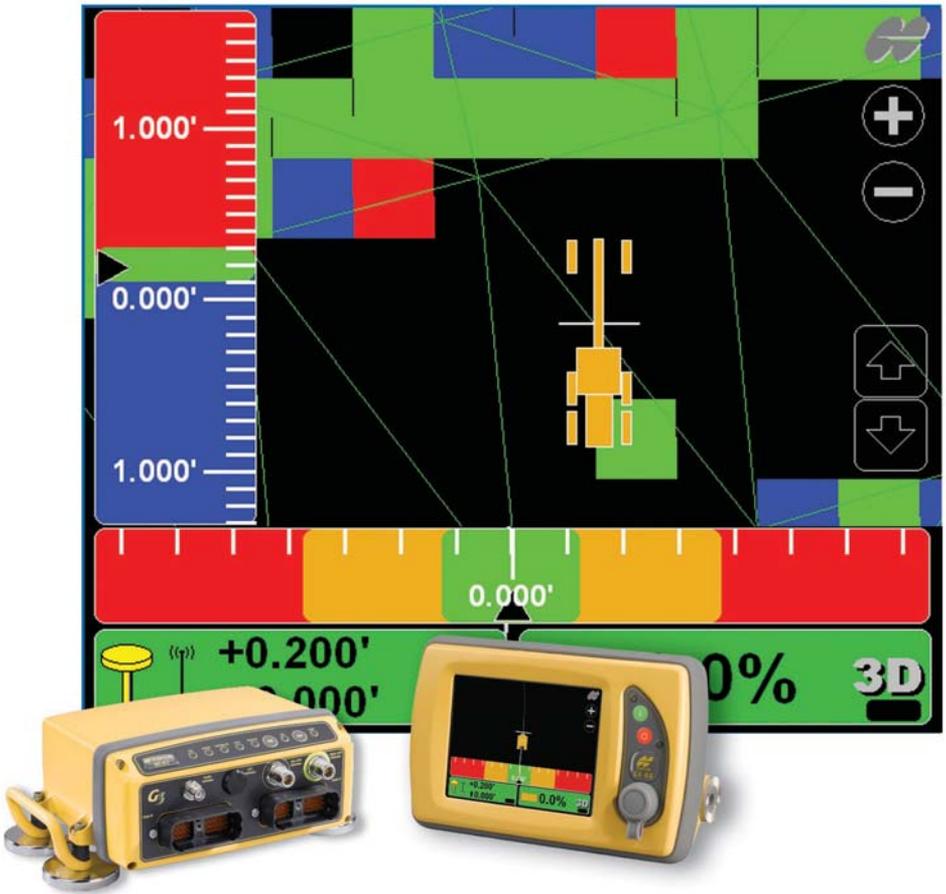




3DMC[®]

Motor Grader and Dozer



Quick Reference Guide



3DMC

Motor Grader and Dozer

Quick Reference Guide

Part Number 7010-0911

Rev. A

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October, 2008

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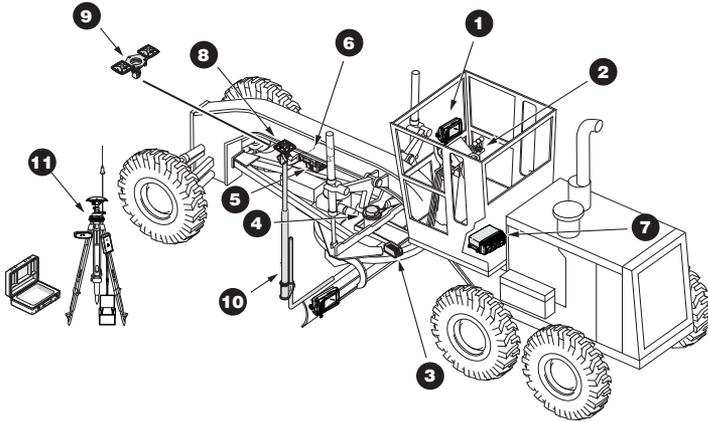
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GPS+

GPS+ applications use satellite signals to determine location. A radio connection between a GPS Base Station and the GPS machine allows the GX-60 Display and the MC-R3 Controller to receive GPS corrections from the Base Station. With the corrections, the GX-60 and the MC-R3 can accurately determine the difference between the cutting edge and the design surface and control the blade to move just the right amount of material.

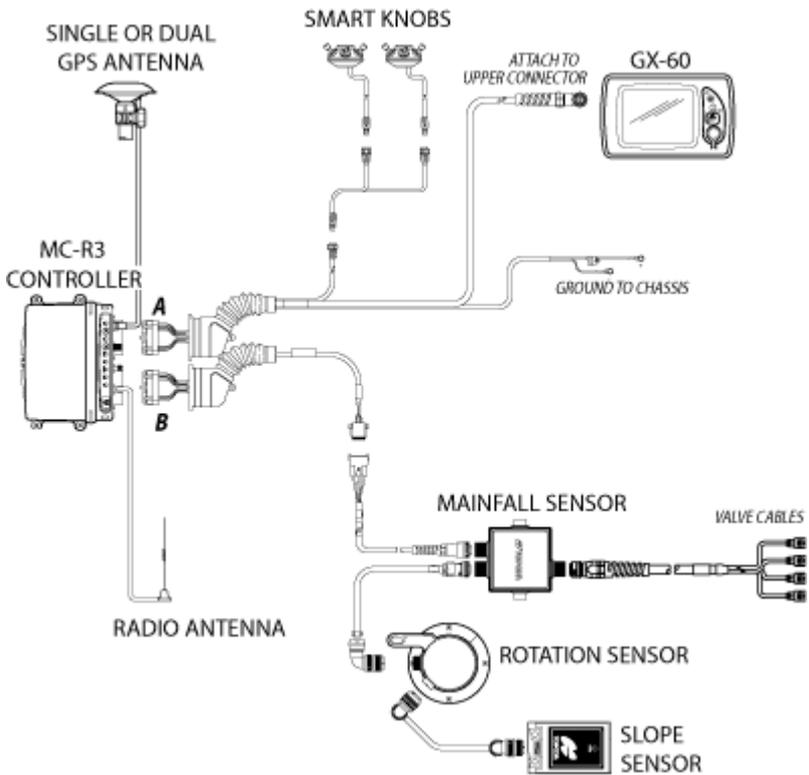
GPS+ Components

Motor Grader

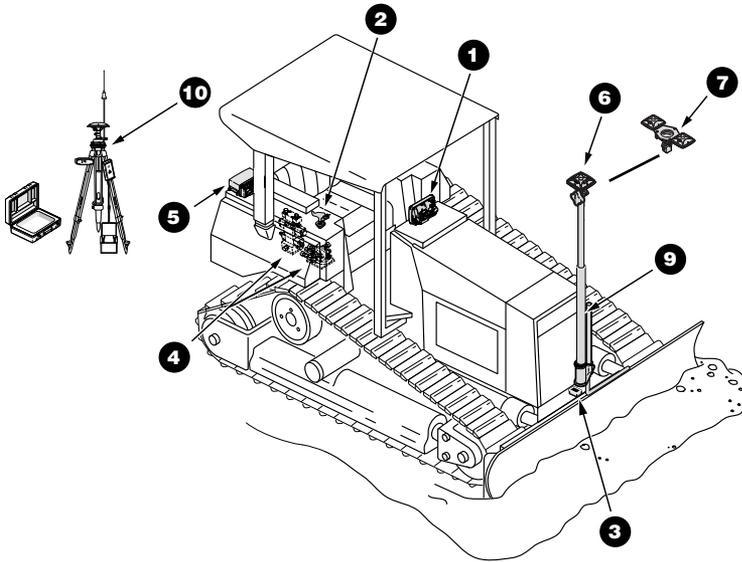


1. GX-60 Display
2. Remote Smart Knobs™
3. Blade Slope Sensor
4. Rotation Sensor
5. Mainfall Sensor
6. Hydraulic Manifold Assembly
7. MC-R3 Controller
8. MC-G3 Single Antenna
9. MC-G3 Dual Antenna
10. GPS Vibration Pole

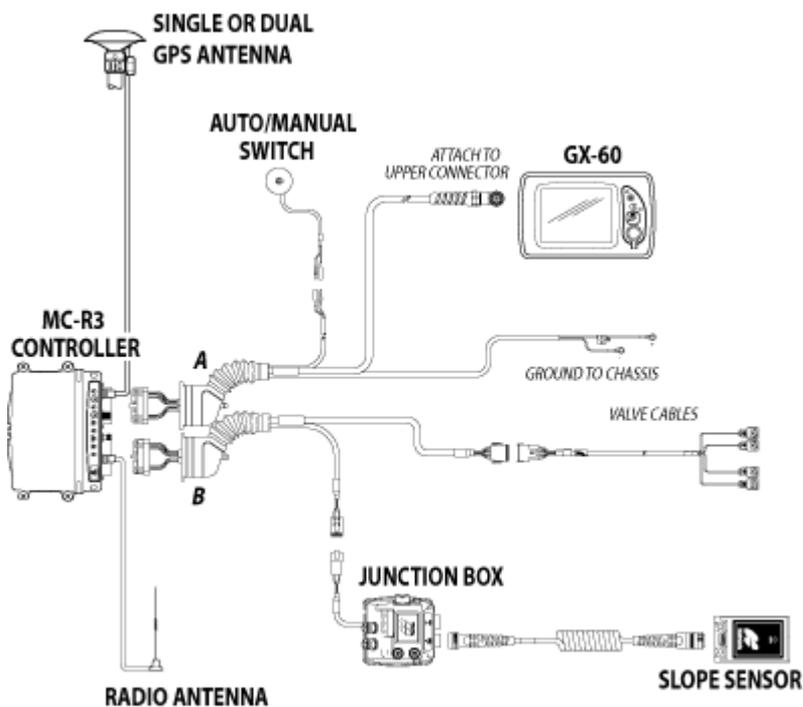
11. Base Station Kit



Dozer

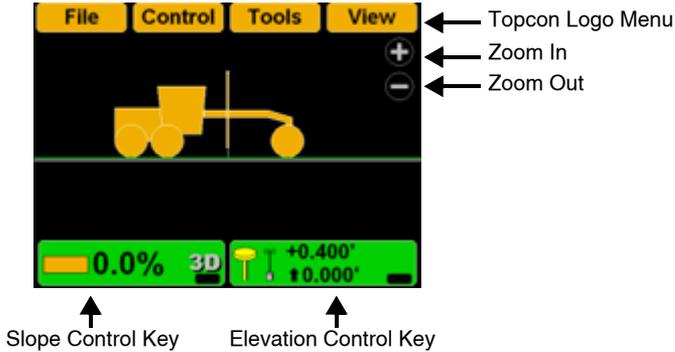


1. GX-60 Display
2. Simple Auto/Manual Knob
3. Blade Slope Sensor
4. Hydraulic Valves
5. MC-R3 Controller
6. MC-G3 Single Antenna
7. MC-G3 Dual Antenna
8. GPS Vibration Pole
9. Base Station Kit



3DMC GPS+ Introduction

3DMC Main Screen

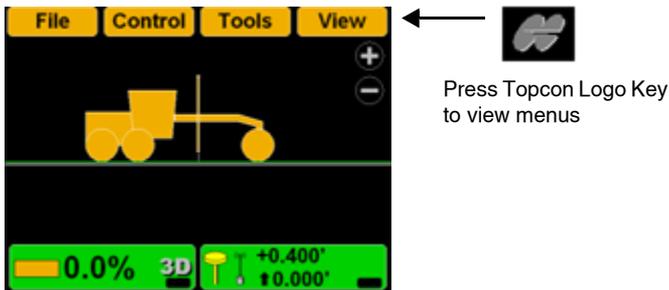


Topcon Logo Key

The Topcon Logo key at the top right corner of the Main Screen displays a pop-up bar of four menus: File, Control, Tools, and View.

To access the Topcon Logo menus, tap the **Topcon Logo** in the far right corner.

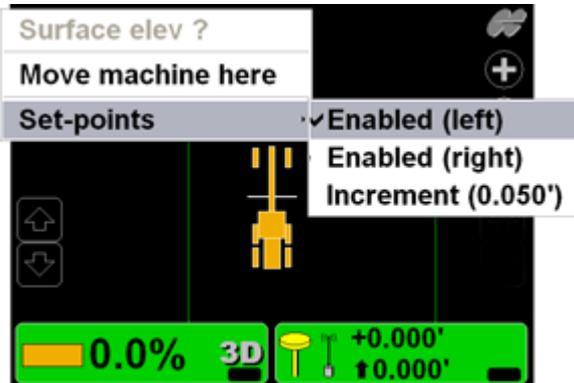
Unless used, the menus disappear after 10 seconds.



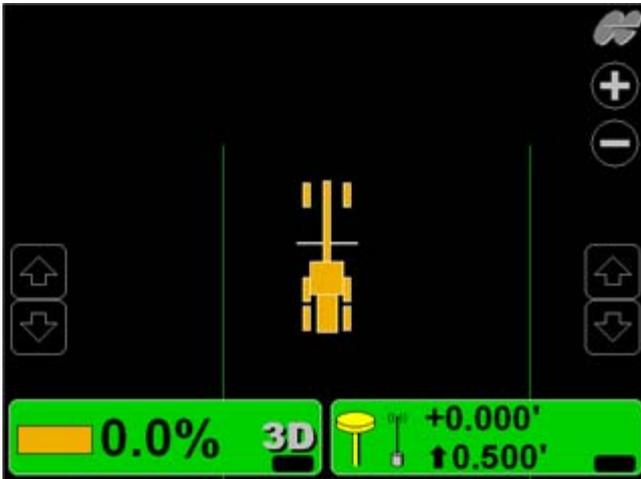
Set-Points Pop-Up Menu

The Set-points pop-up menu allows quick adjustment of the elevation set-points from the main screen.

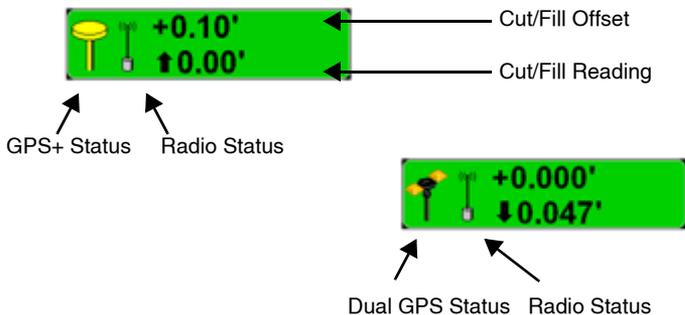
1. To access the Set-points pop-up menu, press and hold anywhere on the main screen.
2. Press **Set-points** ▶ **Enabled (left)** or **Enabled (Right)** to display the set-point adjustment arrows.
3. Press **Set-points** ▶ **Increment** to adjust the set-points increment.



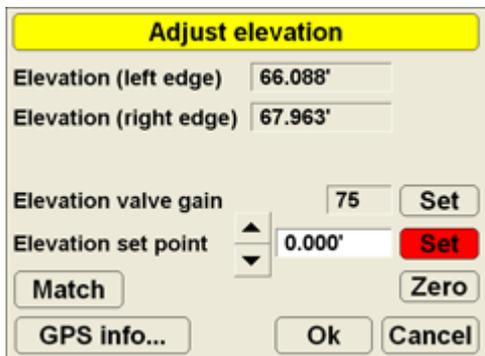
4. Press the arrows to adjust the elevation set-points.



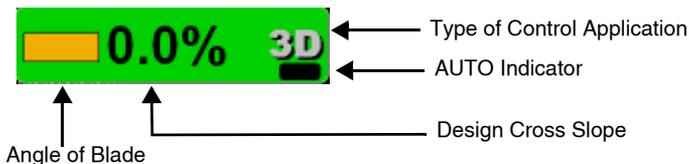
Elevation Control Key



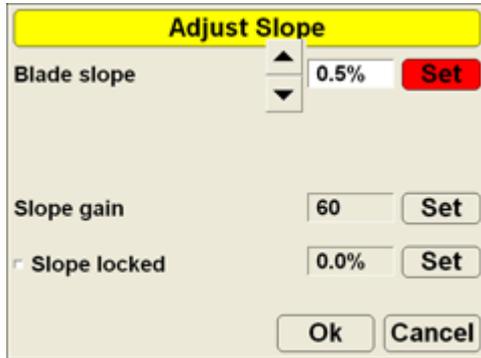
Adjust Elevation Screen



Slope Control Key



Adjust Slope Screen



The screenshot shows a dialog box titled "Adjust Slope" with a yellow header. It contains three settings:

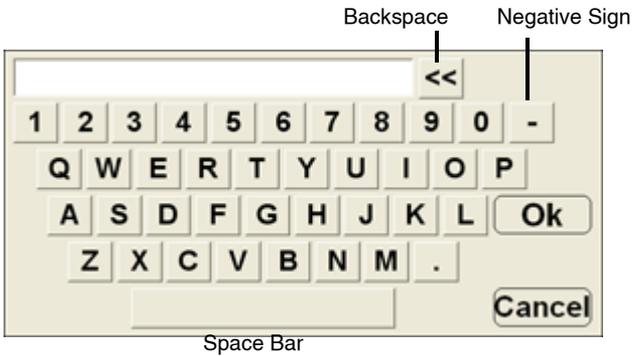
- Blade slope:** A vertical slider control with up and down arrows, currently set to 0.5%. A red "Set" button is to its right.
- Slope gain:** A text input field containing the number 60, with a "Set" button to its right.
- Slope locked:** A checkbox that is currently unchecked, followed by a text input field containing 0.0% and a "Set" button to its right.

At the bottom of the dialog are "Ok" and "Cancel" buttons.

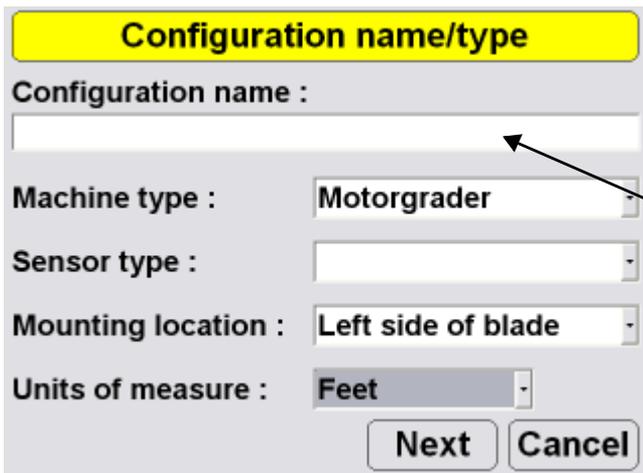
Keyboard Functions

When entering text or numbers, one of the following two pop-up keyboards displays:

Alphanumeric Keyboard



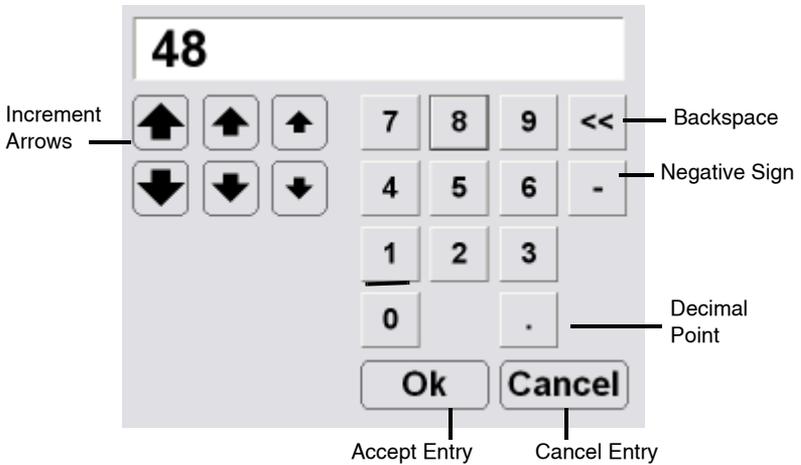
1. To access the keyboard from any field requiring an alphanumeric input, press the field.



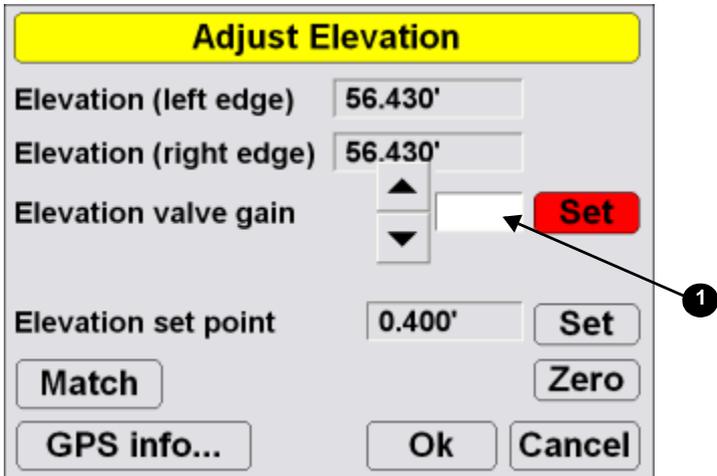
2. Press the letters or numbers on the keyboard to type.



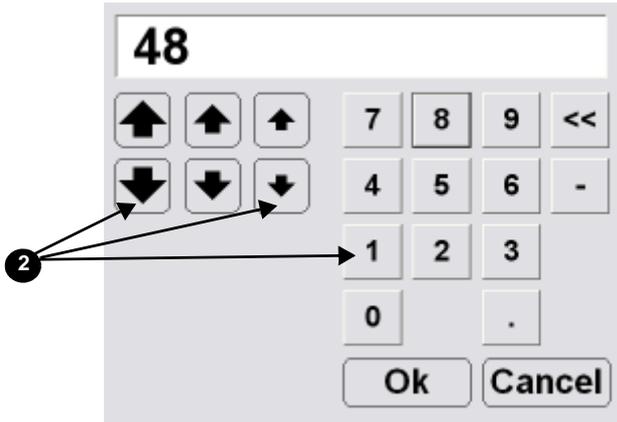
Numeric Keyboard



1. To access the keyboard from any field requiring an numeric input, press the field.



2. Press the numbers on the keyboard to type in a value, or use the arrow keys to increase the value incrementally.

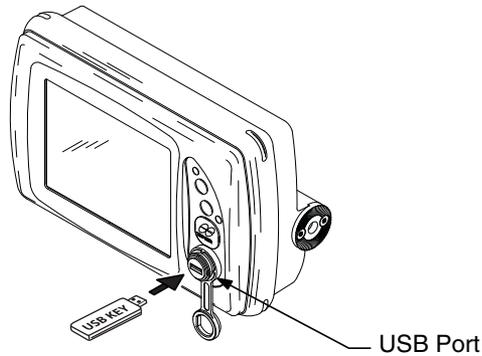


GPS+ Setup and Usage

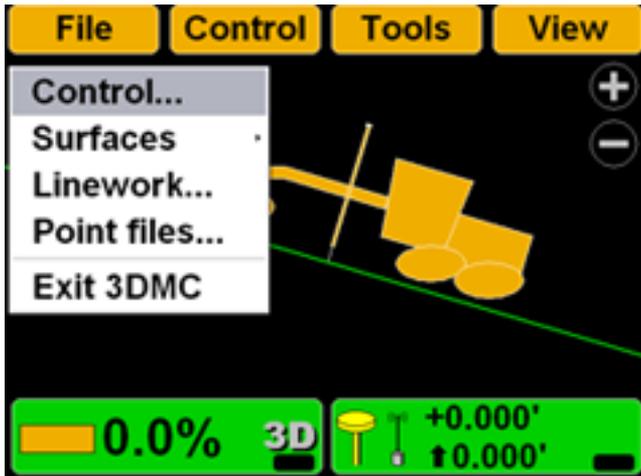
Copying 3DMC Files

To copy files from a USB key:

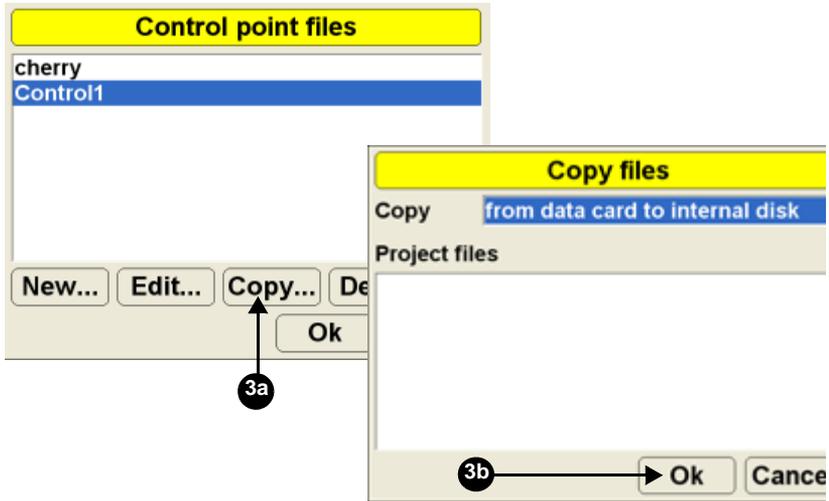
1. Press the green power button to turn on the display and insert the USB key into the GX-60 USB port.



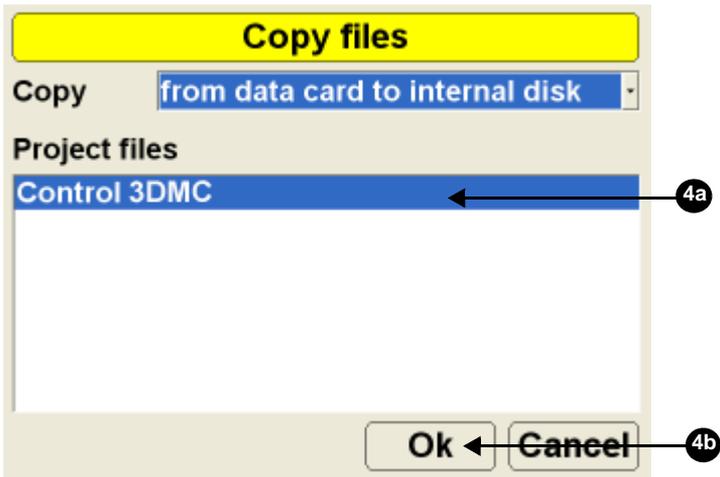
2. Press **Topcon Logo** ▶ **File** ▶ **Control**.



3. Press **Copy** and select the location of the file to copy from.



4. Select the file to copy and press **Ok**.

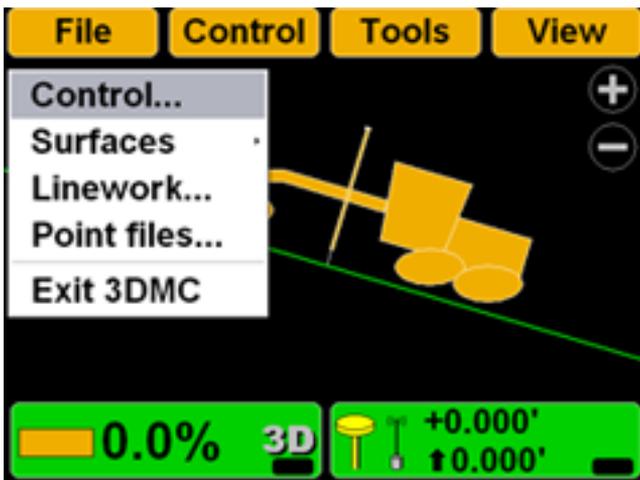


5. Select the files and press **Ok** to apply the data to the current job.

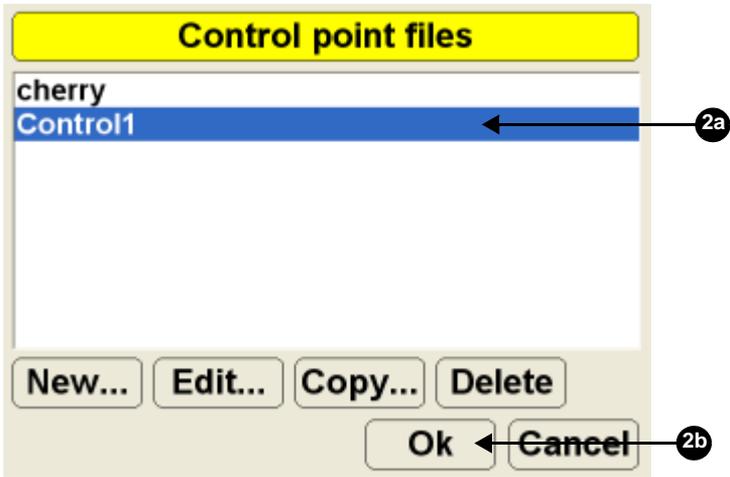
Control Point Files

Selecting a Control Point File

1. Press **Topcon Logo** ▶ **File** ▶ **Control**.

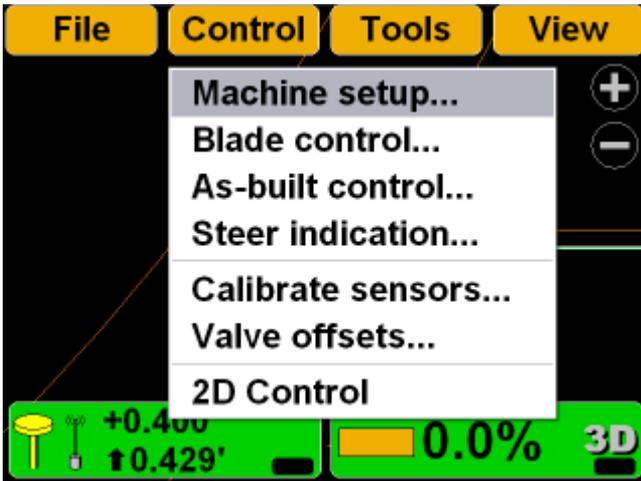


2. Select the control point file for the jobsite and press **Ok**.

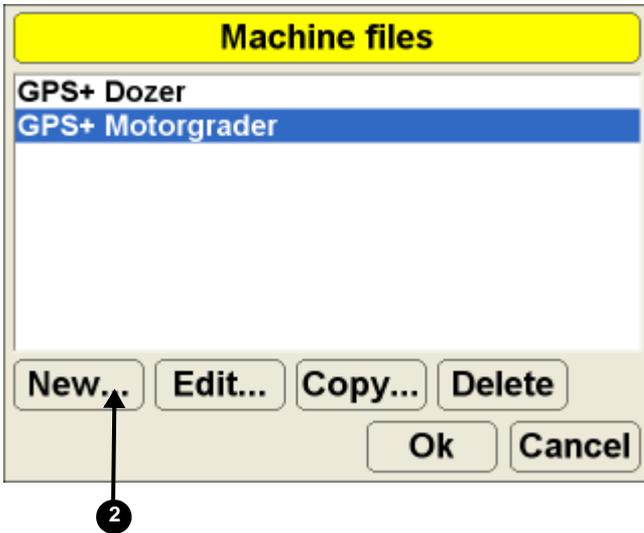


Creating a Machine Configuration File

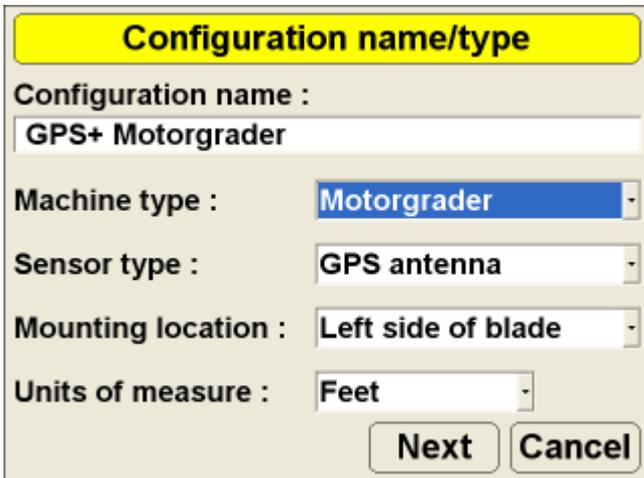
1. When the main screen displays, press **Topcon Logo ▶ Control ▶ Machine setup**.



2. Press **New**.



3. Enter the machine information.



4. Press **Next**.

5. Select and enter antenna information.

Motorgrader (GPS)

Antenna :



Above (1)

Inside (2)

Behind (3)

Width (4)

6. Press **Next**.

7. Select the GPS precisions for measuring static points. Press **Next**.

GPS Precisions

Max. GPS errors (roving) :

Max. Horizontal RMS :	0.20'
Max. Vertical RMS :	0.30'

Max. GPS errors (point measurement) :

Max. Horizontal RMS :	0.10'
Max. Vertical RMS :	0.20'

Back **Next** **Cancel**

Low Precisions...



Position Check

Point of interest : **Left cutting edge**

North

East

Elev

Cut to design surfac

Alignment stationing

Measure...

Number of sats used	8
H.Precision	0.033'
V.Precision	0.066'
Duration (secs)	0
Measurements	1

Initialized !

■■■■■■

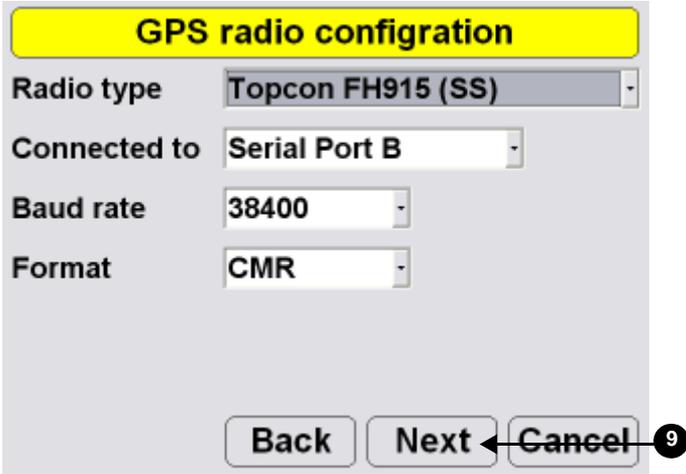
Cancel

8. Enter the information for GPS Comms Configuration and press **Next**.

The image displays two screenshots of the 'GPS Comms Configuration' screen. The top screenshot shows the 'Serial Port' configuration. The 'Connection' dropdown is set to 'Serial Port' and the 'Com Port' dropdown is set to 'COM1'. At the bottom, there are three buttons: 'Back', 'Next', and 'Cancel'. A circled '8' points to the 'Next' button. The bottom screenshot shows the 'TCP/IP' configuration. The 'Connection' dropdown is set to 'TCP/IP'. The 'IP Address' is entered as '192 . 168 . 0 . 100'. The 'Port' is entered as '8002'. The 'Password' is entered as 'TPS'. There is a 'Defaults' button and 'Back', 'Next', and 'Cancel' buttons at the bottom.

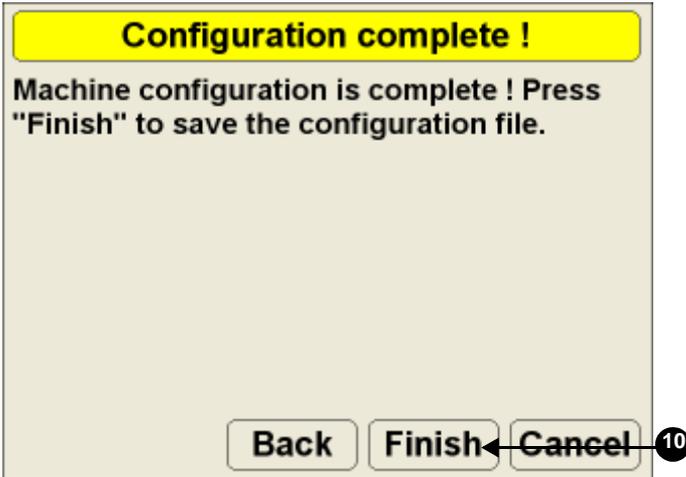
9. Select and enter radio information and press **Next**. Refer to the serial number/radio label on the MC-R3 controller to determine the correct radio type.

The radio type selection must match the radio contained in the MC-R3.



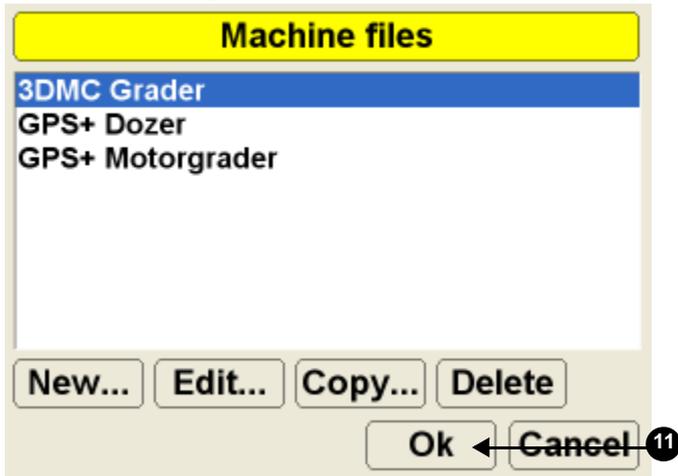
The image shows a screen titled "GPS radio configuration" with a yellow header. It contains four dropdown menus: "Radio type" set to "Topcon FH915 (SS)", "Connected to" set to "Serial Port B", "Baud rate" set to "38400", and "Format" set to "CMR". At the bottom are three buttons: "Back", "Next", and "Cancel". A circled number "9" points to the "Cancel" button.

10. Press **Finish** to save the machine configuration file.



The image shows a screen titled "Configuration complete !" with a yellow header. The text below reads: "Machine configuration is complete ! Press 'Finish' to save the configuration file." At the bottom are three buttons: "Back", "Finish", and "Cancel". A circled number "10" points to the "Finish" button.

11. Select a machine configuration file on the *Machine files* dialog box and press **Ok** to set this as the machine for the job.



Selecting Surface Files

Surface File Types



Flat Plane Surface/Sloping Plane Surface:

A planar (flat) surface with a 0% crossslope and mainfall. This surface is primarily used for building pads.

A sloping surface with cross slopes and mainfall based on a reference elevation.



As-built Surface File:

A color map of the graded surface.

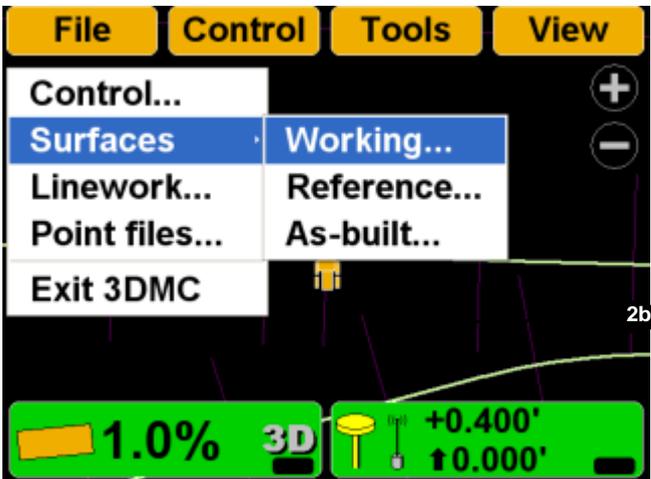


TIN Surface File:

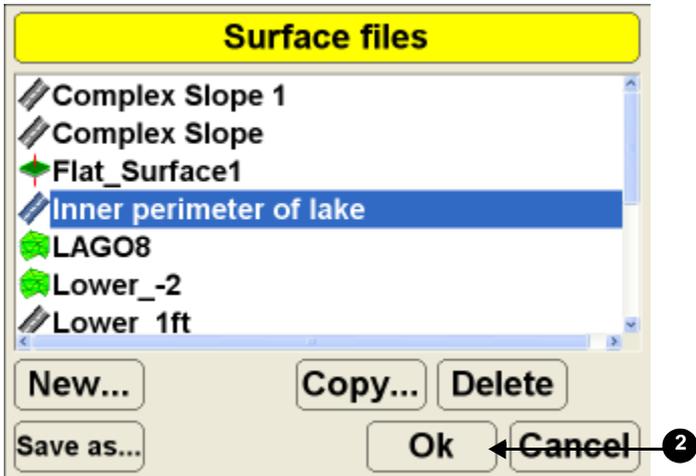
A TIN surface represents a surface as a network of non-overlapping triangles. Within each triangle the surface is represented by a plane. The triangles are made from a set of points called mass points.

Selecting a Working Surface File

1. Press **Topcon Logo** ▶ **File** ▶ **Surfaces** ▶ **Working**.



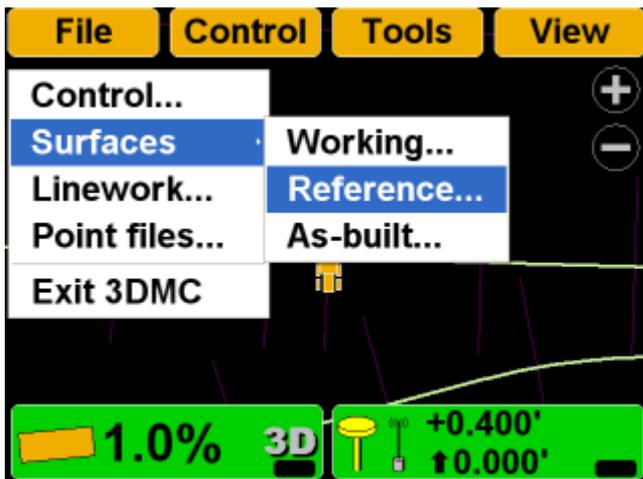
2. Select the working surface file for the jobsite and press **Ok**.



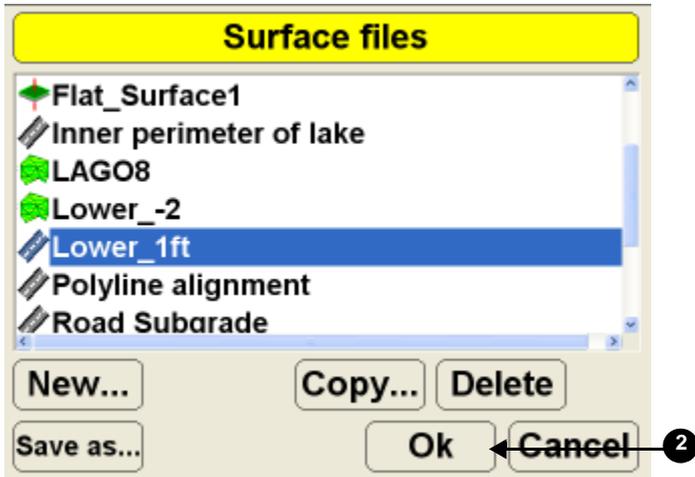
Selecting a Reference Surface File

A reference file is used as a visual reference only.

1. Press **TopconLogo** ▶ **File** ▶ **Surfaces** ▶ **Reference**.



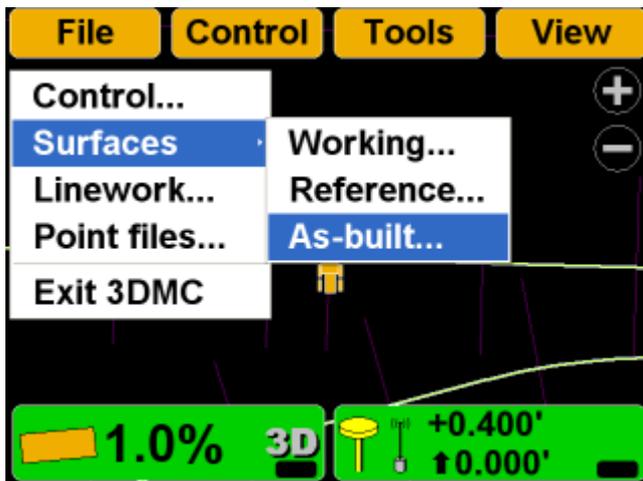
2. Select the reference surface file for the jobsite and press **Ok**.



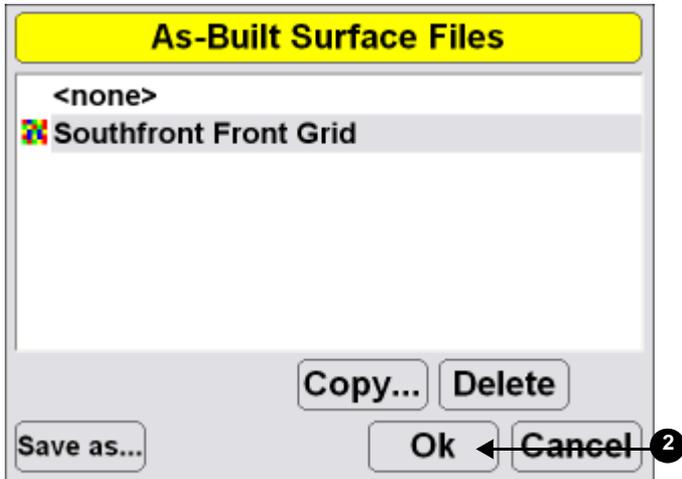
Selecting an As-built Surface File

As-built surface files display a colored map of the graded surface.

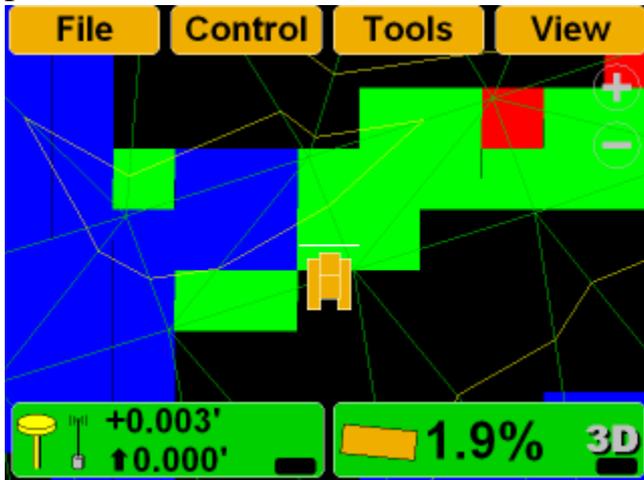
1. Press **TopconLogo** ▶ **File** ▶ **Surfaces** ▶ **As-built**.



2. Select the as-built surface file for the jobsite and press **Ok**.



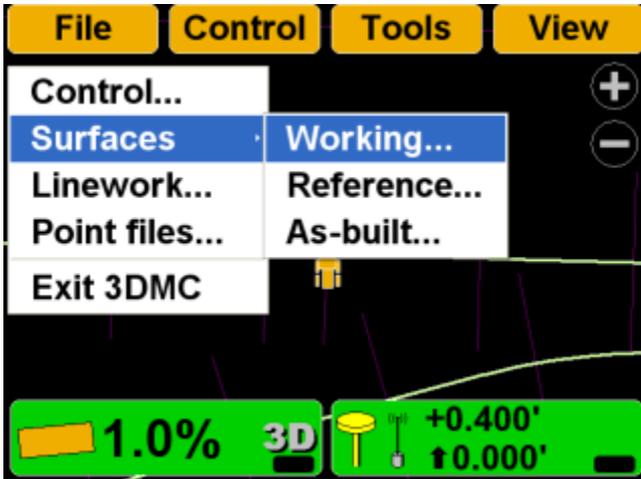
Example:



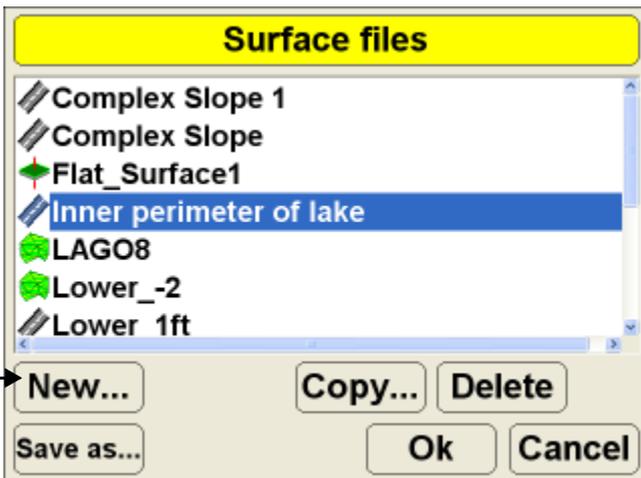
Creating Surface Files

Creating a New Plane Surface File

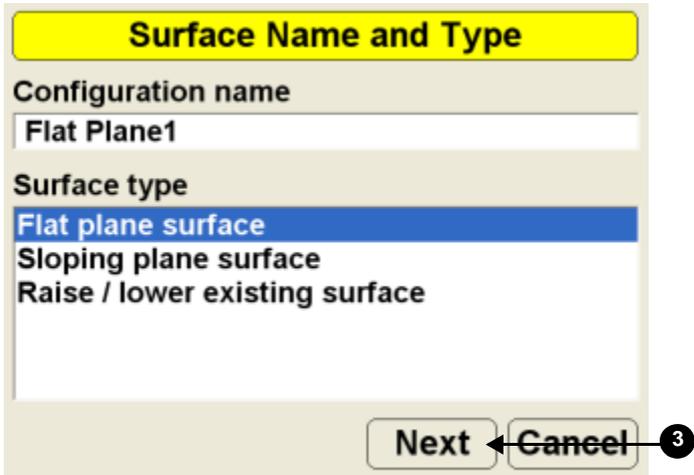
1. Press **Topcon Logo** ▶ **File** ▶ **Surfaces** ▶ **Working**, **Reference**, or **As-built**.



2. Press **New**.

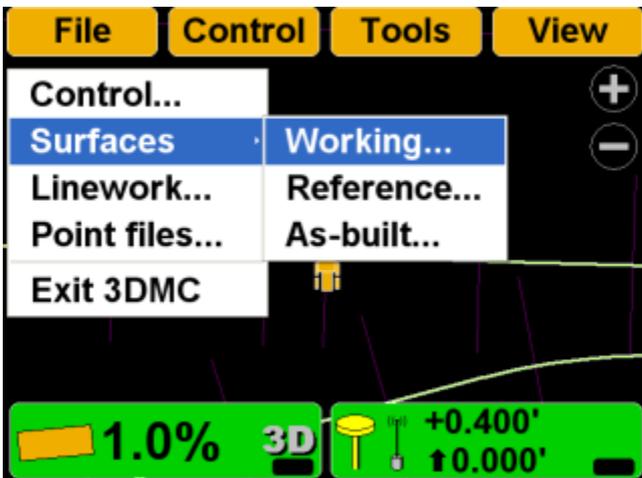


3. Enter the name of the surface. Press **Next**.

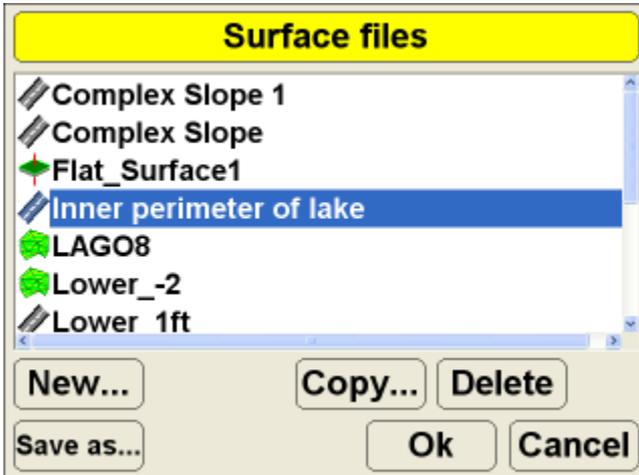


Creating a Flat Plane Surface

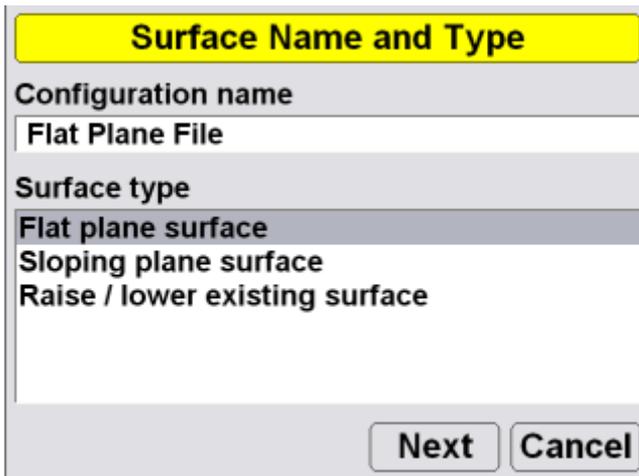
1. Press **Topcon Logo** ▶ **File** ▶ **Surfaces** ▶ **Working** or **Reference**.



2. Press **New**.

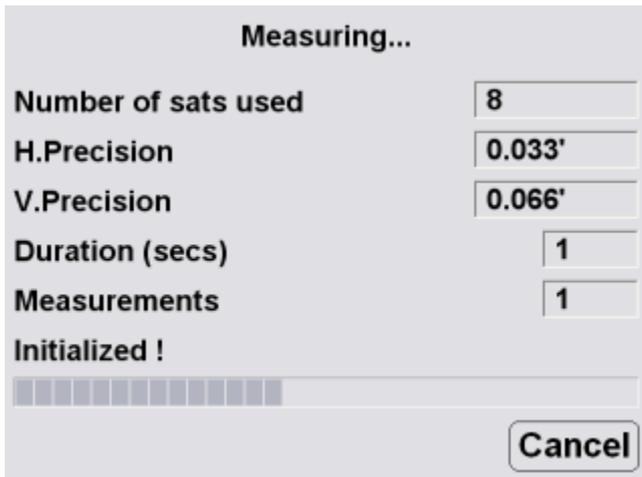
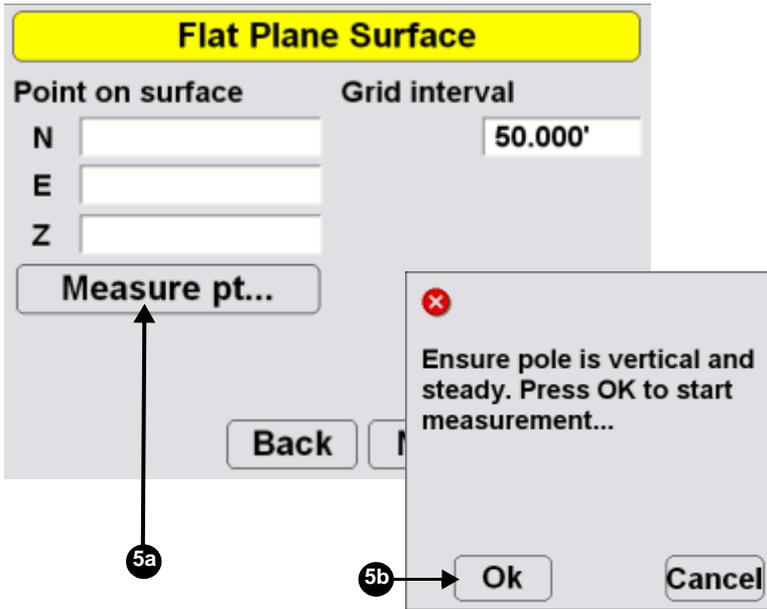


3. Enter the name of the new surface file. Press **Next**.



4. Move the machine to the elevation reference point.

5. When the sensor is over the point, press **Measure pt** to measure the elevation reference point, and then Press **Ok**.



6. Enter a grid interval for the main screen. Press **Next**.

Flat Plane Surface

Point on surface	Grid interval
N 11376.490'	50.000'
E 8873.210'	
Z 56.430'	

Measure pt...

Back Next Cancel

7. Press **Finish** to save the new surface file.

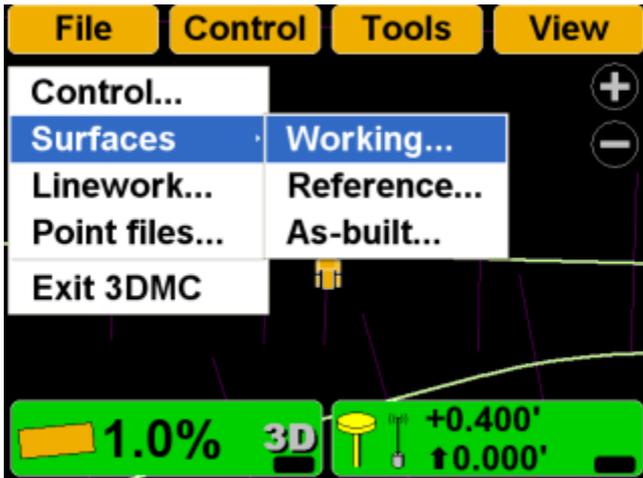
Surface Complete

Surface is complete ! Press "Finish" to save surface...

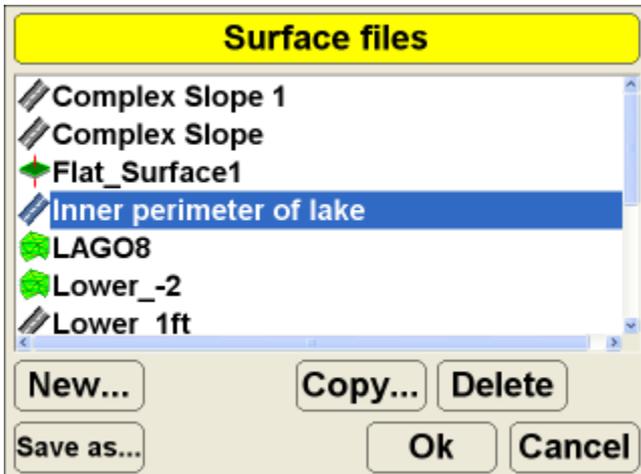
Back Finish Cancel

Creating a Sloping Plane Surface

1. Press **Topcon Logo** ▶ **File** ▶ **Surfaces** ▶ **Working** or **Reference**



2. Press **New**.



3. Enter the name of the new surface file. Press **Next**.

Surface Name and Type

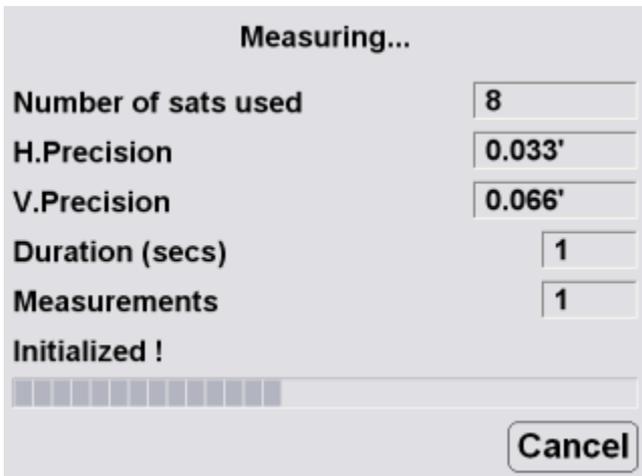
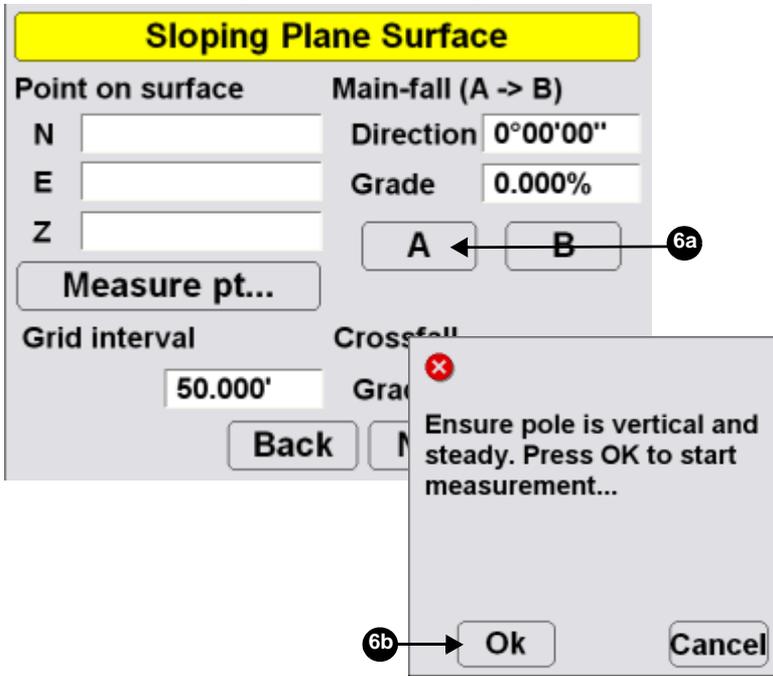
Configuration name
Sloping Plane File

Surface type
Flat plane surface
Sloping plane surface
Raise / lower existing surface

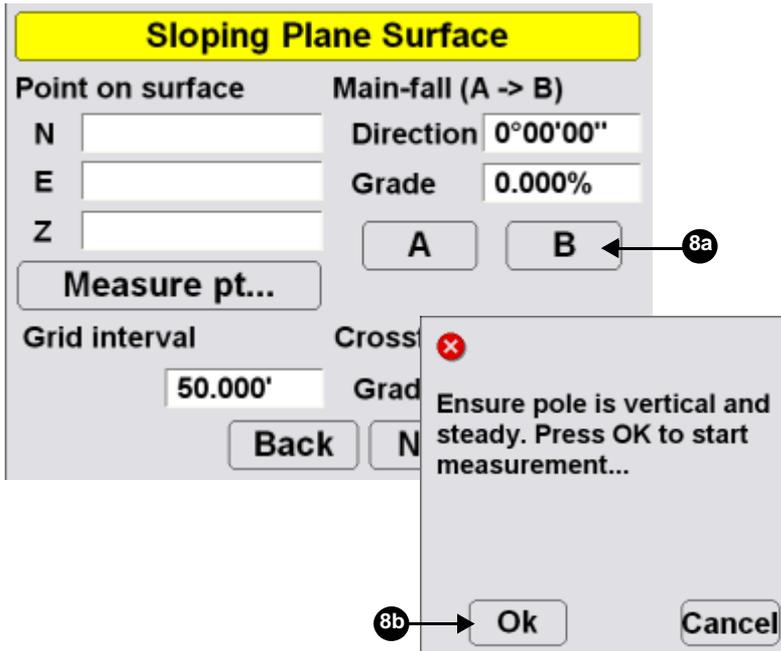
Next Cancel

4. Move the machine to the elevation reference point.
5. Move the machine to point A and position the sensor on the cutting edge on the selected point.

- When the cutting edge rests on the point, press **A** to measure the point, and then press **Ok**.



7. Move to point B and position the sensor on the cutting edge on the selected point.
8. When the cutting edge rests on the point, press **B** to measure the point, and then press **Ok**.



9. Press the *Crossfall Grade* entry box and enter a crossfall.

Sloping Plane Surface

Point on surface Main-fall (A -> B)

N Direction

E Grade

Z

Grid interval Crossfall

 Grade

10. Move the machine to the elevation reference point.

11. Press **Measure pt.** and then press **Ok.**

Sloping Plane Surface

Point on surface Main-fall (A -> B)

N Direction

E Grade

Z

Grid interval Crossfall

 Grade

5a →

5b →

Ensure pole is vertical and steady. Press OK to start measurement...

12. Enter a grid interval and crossfall. Press **Next**.

Sloping Plane Surface

Point on surface Main-fall (A -> B)

N 11376.490' Direction 0°00'00"

E 8873.210' Grade 0.000%

Z 56.430'

Measure pt... A B

Grid interval Crossfall

50.000' Grade 1.000%

Back Next Cancel

13. Press **Finish** to save the new surface file and end the process.

Surface Complete

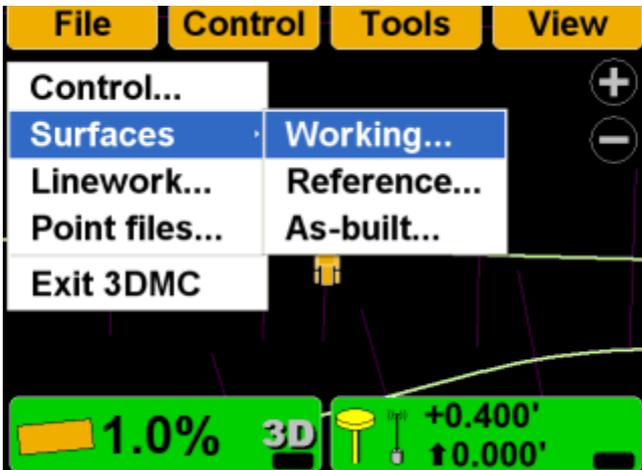
Surface is complete ! Press "Finish" to save surface...

Back Finish Cancel

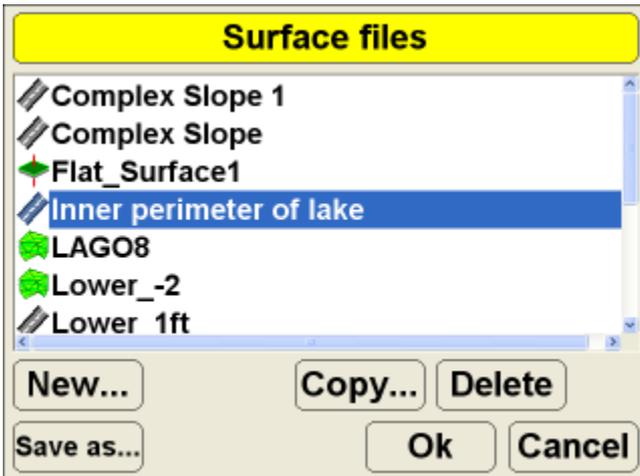
Raising or Lowering the Existing Surface

Raise/Lower the existing surface creates a new surface file based on an existing file.

1. Press **Topcon Logo** ▶ **File** ▶ **Surfaces** ▶ **Working** or **Reference**.



2. Press **New**.



3. Enter the name of the new Raise/lower existing surface file. Press **Next**.

Surface Name and Type

Configuration name
Raise +1

Surface type
Flat plane surface
Sloping plane surface
Raise / lower existing surface

Next Cancel

4. Select the surface to use as the reference from which to raise or lower the new surface.
5. Enter an elevation adjustment. Press **Next**.

Raise / Lower Surface

Existing surface :
Inner perimeter of lake

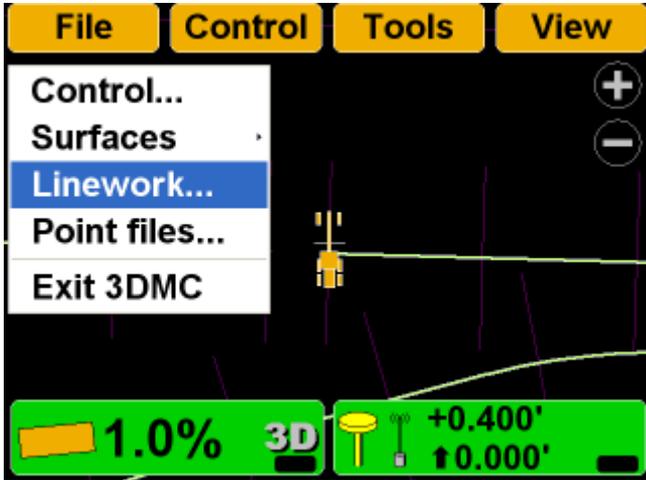
Elevation adjustment : 1.000'

Back Next Cancel

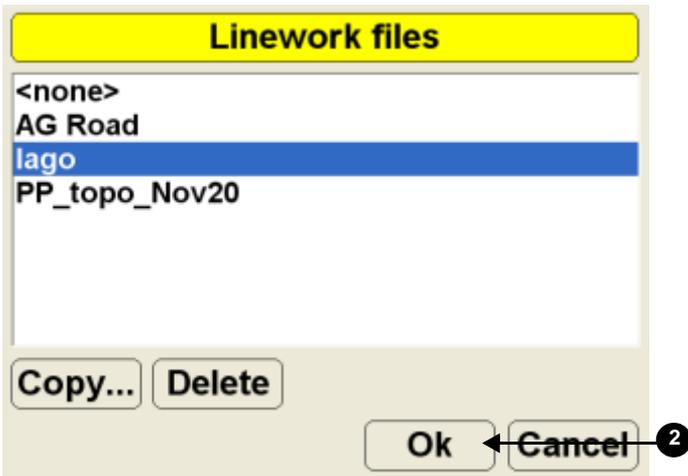
6. Press **Finish** to save the new surface file.

Selecting Jobsite Files

1. From the main screen, navigate to the file type dialog box.
 - **Topcon Logo ▶ File ▶ Linework**
 - **Topcon Logo ▶ File ▶ Point files**



2. On the Linework/Point files dialog box, select the file for the jobsite and press **Ok**.

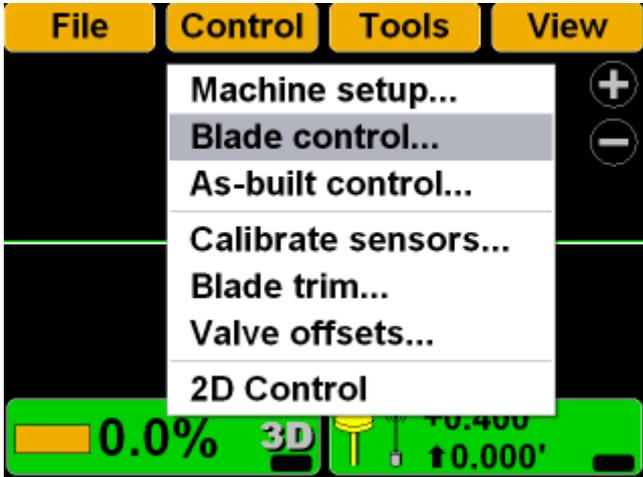


Setting Blade Control

Automatic Best-Fit Blade Control

When using the automatic best-fit method, 3DMC uses the entire cutting edge of the blade as the elevation reference.

1. Press **Topcon Logo** ▶ **Control** ▶ **Blade control**.



2. Select *Automatic best-fit (whole blade)*.

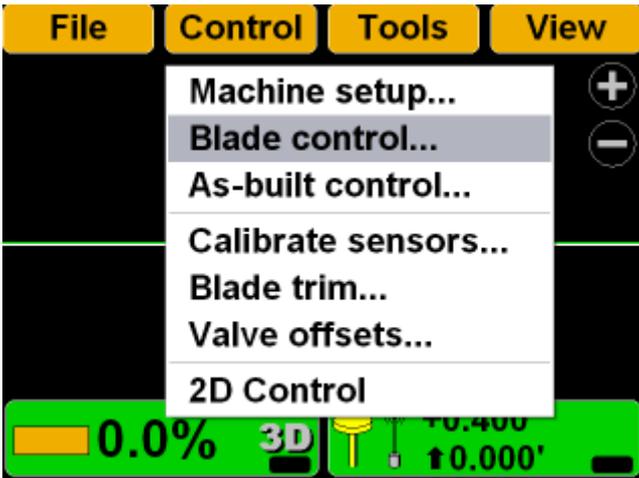


Control Using Single Point on Blade

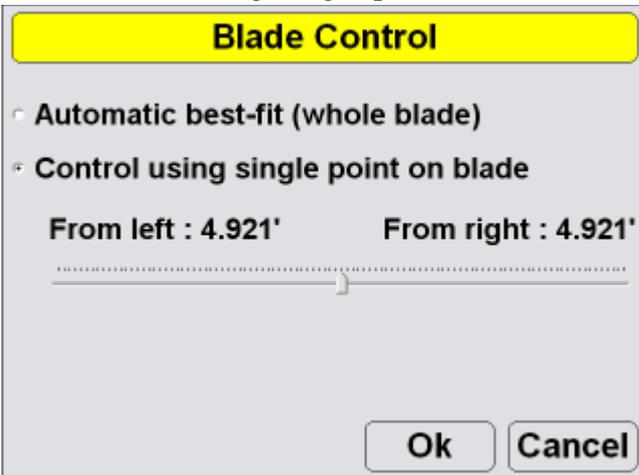
When using the control using single point on blade method, 3DMC uses a selected point on the blade to

use as the elevation reference rather than the entire cutting edge of the blade.

1. Press **Topcon Logo** ▶ **Control** ▶ **Blade control**.

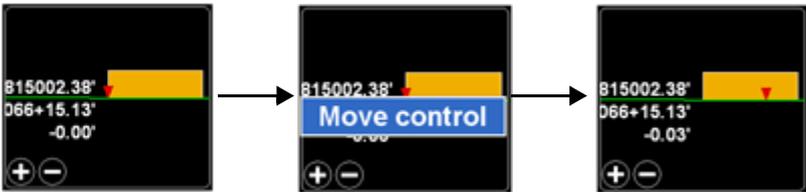


2. Select *Control using single point on blade*.



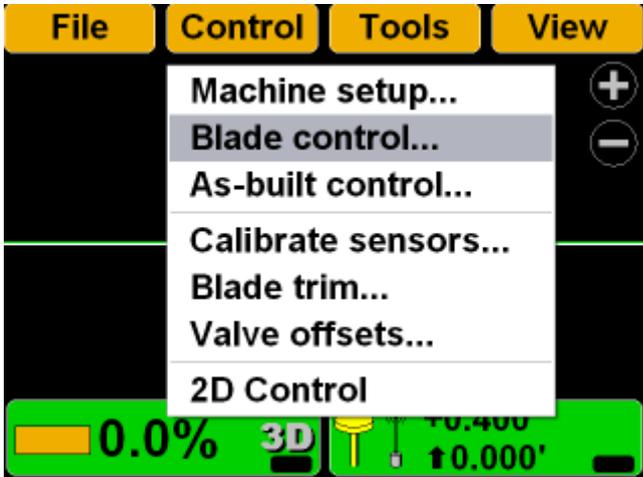
To quickly change the blade control point using the section view:

- To move to the far left or far right edge of the blade, press and hold the edge of the blade for one second. On the pop-up menu, tap **Move control left** or **Move control right**.
- Press and hold a point on the blade for one second. On the pop-up menu, tap **Move control**.



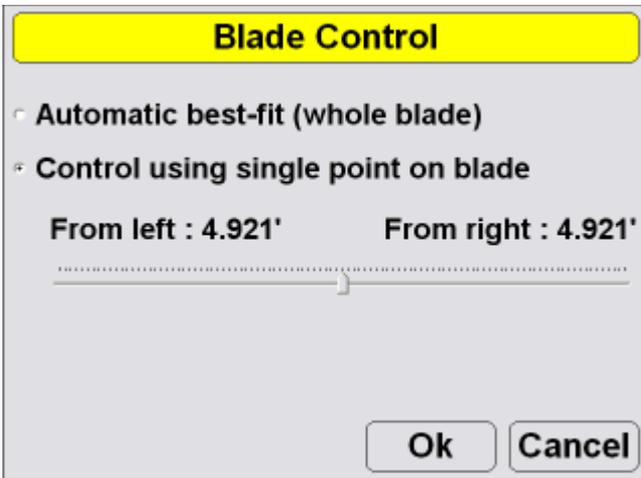
To change the blade control point using the Control menu:

1. Press **Topcon Logo** ▶ **Control** ▶ **Blade control**.



2. With *Control using single point on blade* selected, hold the slider button and move it left or right to

select a point at a distance from the left/right side of the blade.

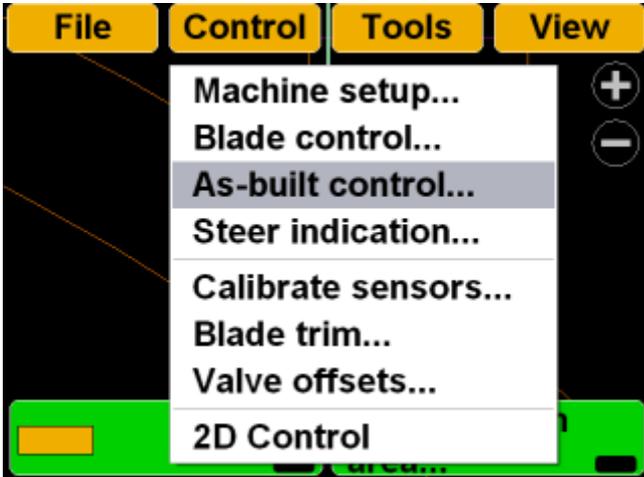


3. Press **OK** to apply this blade control point to the machine.

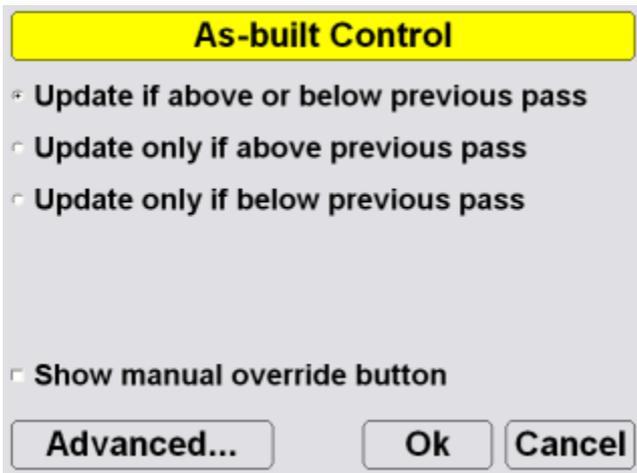
Setting As-built Control Options

As-built surface files display a colored map of the graded surface.

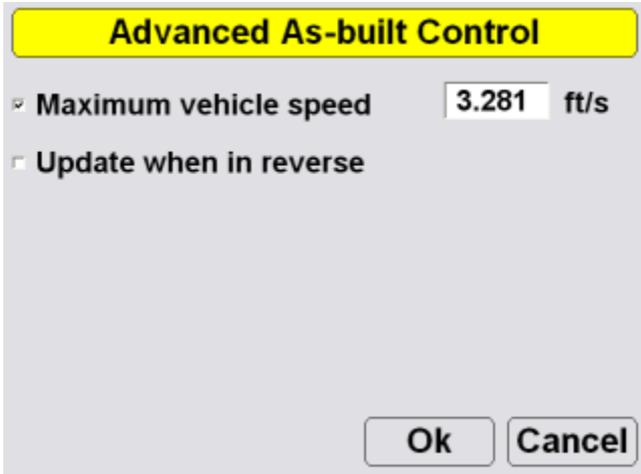
1. Press **Topcon Logo** ▶ **Control** ▶ **As-built control**.



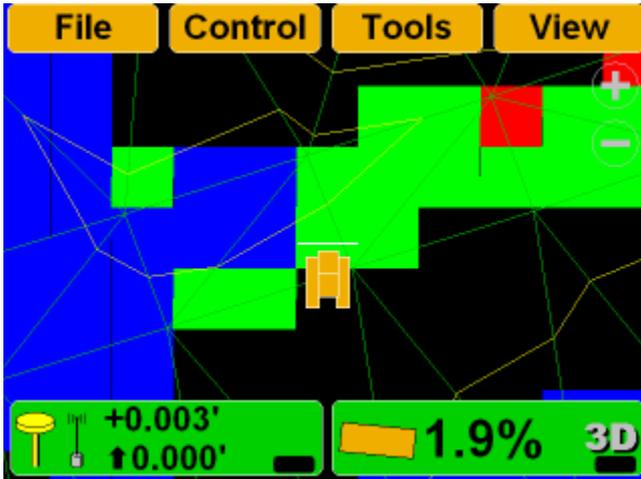
2. Select the As-built options. Then press **Advanced** to view the advanced options.



3. Select advanced options, and press **Ok**.

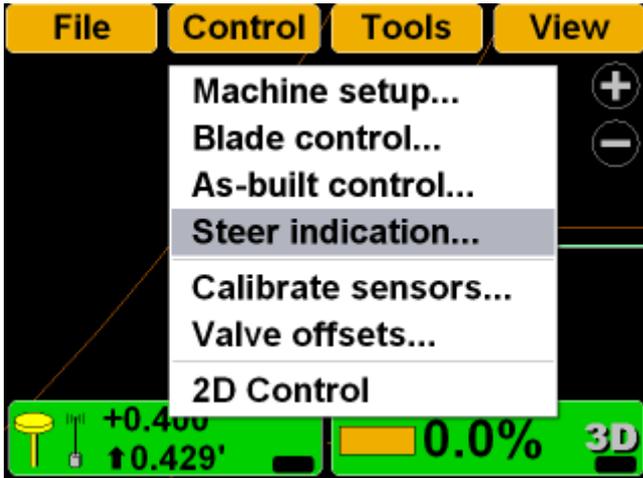


Example:



Setting Steer Indication Options

1. Press **Topcon Logo** ▶ **Control** ▶ **Steer indication**.

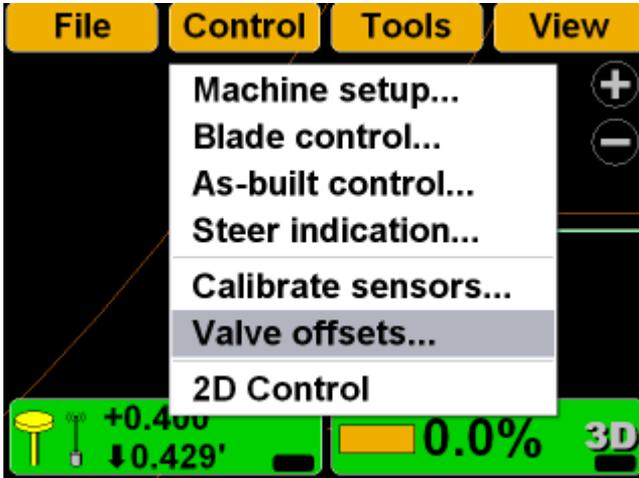


2. Set the steer indication options, and press **OK**.



Valve Offset Calibration

1. Raise the machine blade so that both sides of the cutting edge rest a few inches above the ground.
2. At the display, tap **Topcon Logo ▶ Control ▶ Valve offsets.**



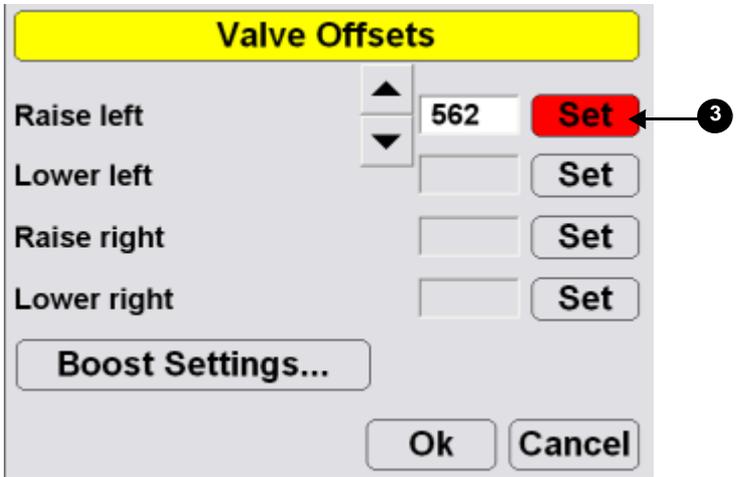
WARNING

Since the blade is about to move, automatically, **HANDS and FEET** should be clear of the blade!

3. Press *Raise left Set* and tap the arrows to increase or decrease the valve offsets.

NOTICE

Boost Setting adjustments are not recommended and may cause poor machine performance.

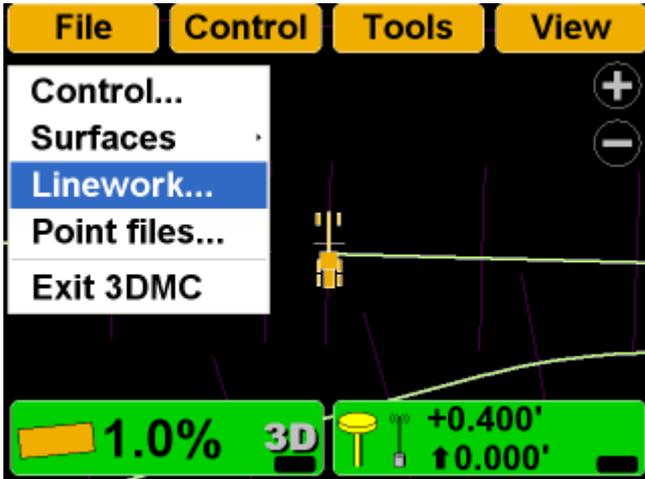


4. Repeat Step 3 for each of the selections.
5. Press **OK**.

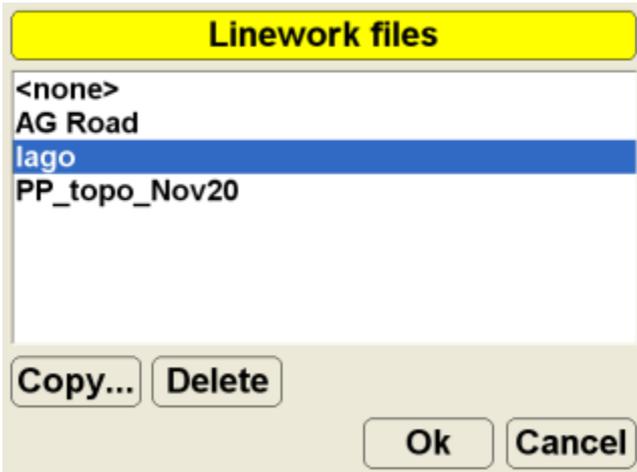
Steering or Grading to Polyline

Steer to Polyline

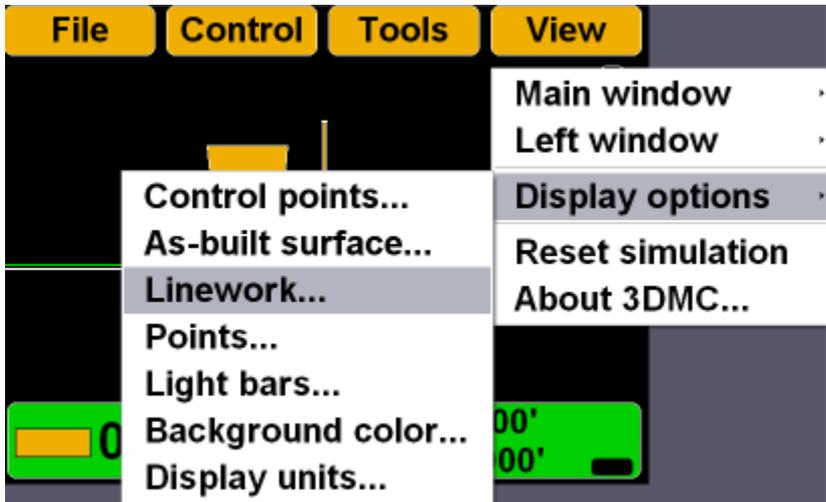
1. Press **Topcon Logo** ▶ **File** ▶ **Linework**.



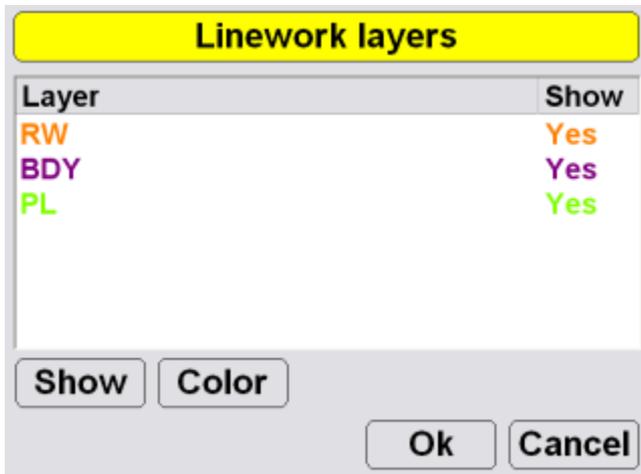
2. Select the Linework file for the job, and Press **Ok**.



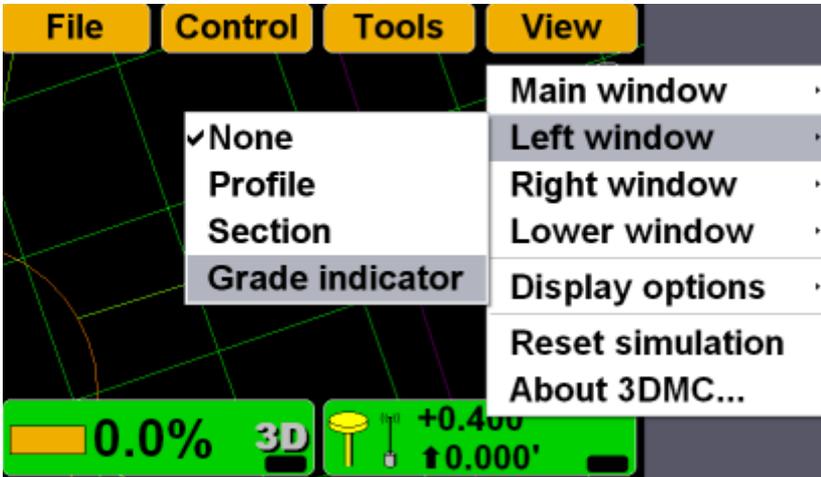
3. Press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Linework**.



4. Select the polylines to display.



5. Press **Topcon Logo** ▶ **View** ▶ **Left Window** ▶ **Grade Indicator**.

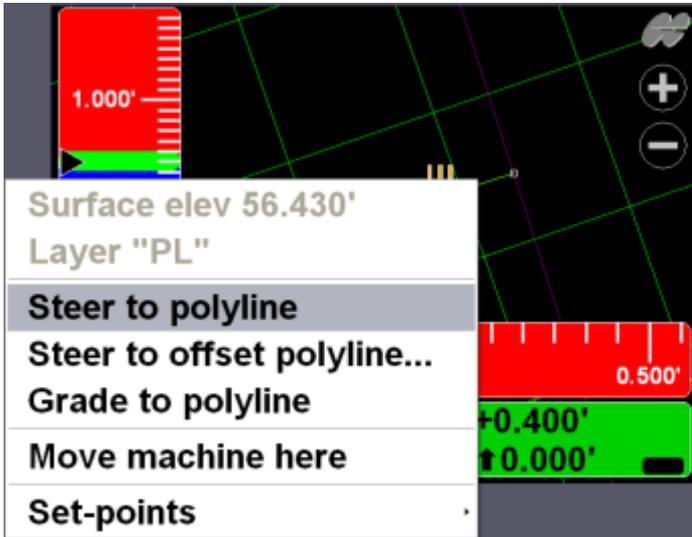


6. Press **Topcon Logo** ▶ **View** ▶ **Lower Window** ▶ **Lightbar**.



7. Press and hold the polyline to use for steering, then press **Steer to polyline** on the pop-up menu;

graphical cross lines display along the selected polyline.



8. Press **Topcon Logo** ▶ **Control** ▶ **Steer indication** to change the steer indication settings.

Steer Indication

Alignment :

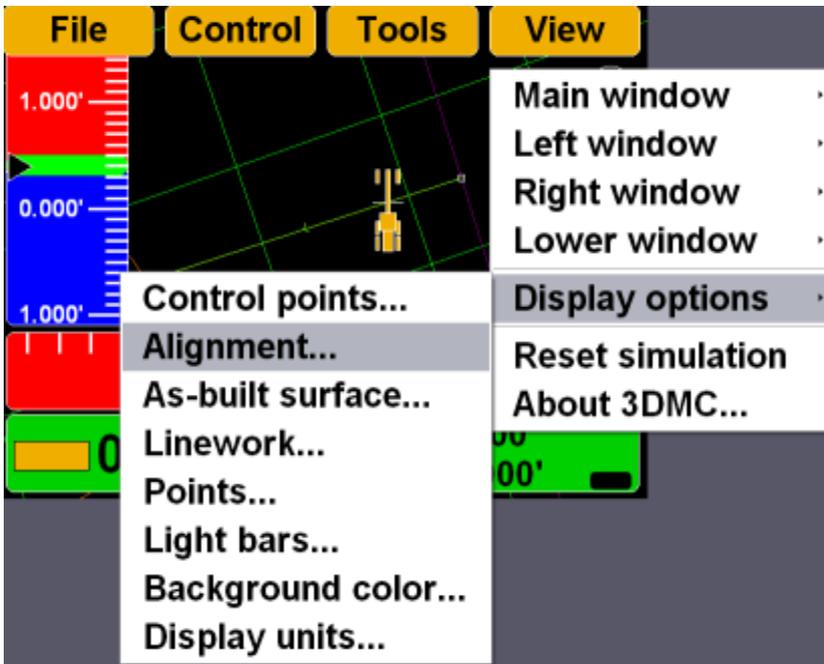
Point of interest :

Alignment feature :

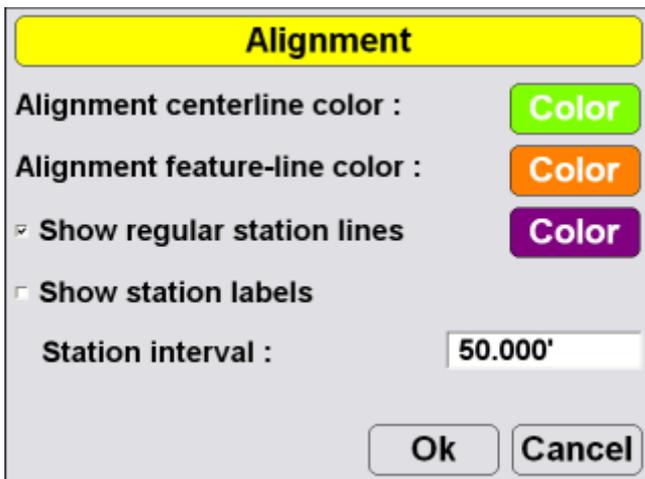
Additional steer offset :

Override machine direction :

9. Press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Alignment**.



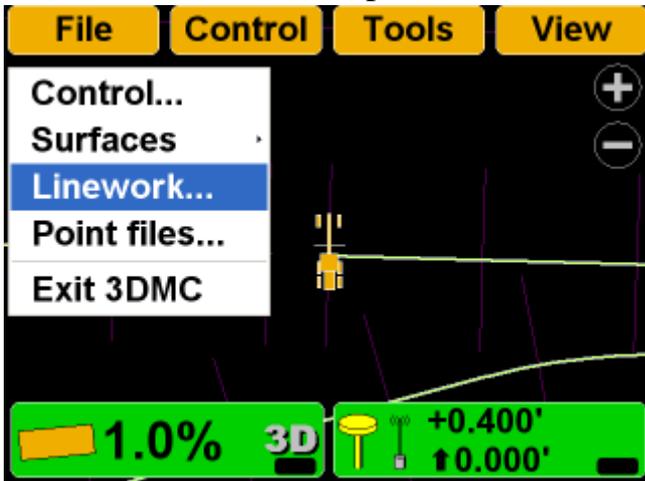
10. Change the alignment settings, and press OK.



11. Begin steering.

Grading to Polyline

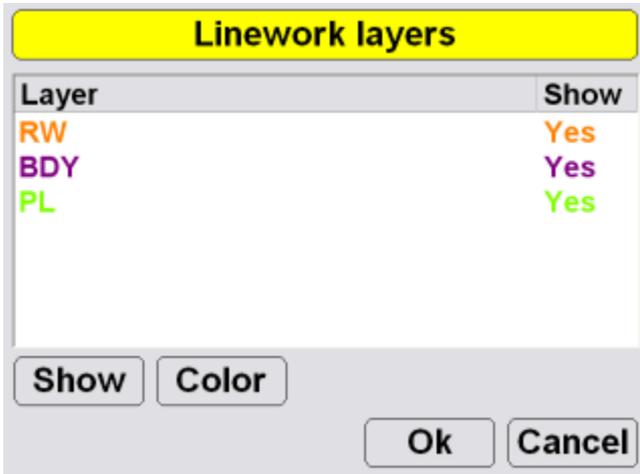
1. Press **Topcon Logo** ▶ **File** ▶ **Linework**, select the correct Linework file, and press **Ok**.



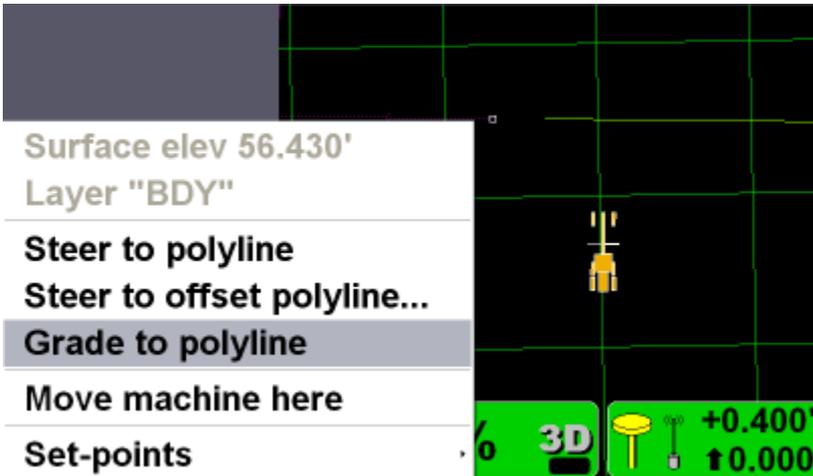
2. Press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Linework**.



3. Select the polylines to display, and press **Ok**.



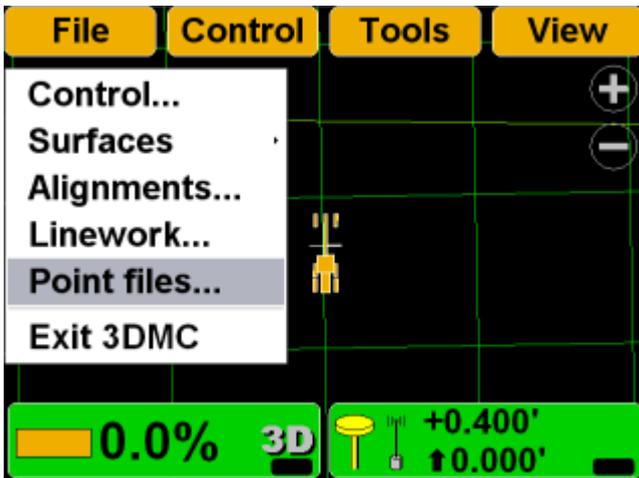
4. On the main screen, press and hold the polyline to use for grading to, then press **Grade to polyline** on the pop-up menu. Graphical cross lines display along the polyline.



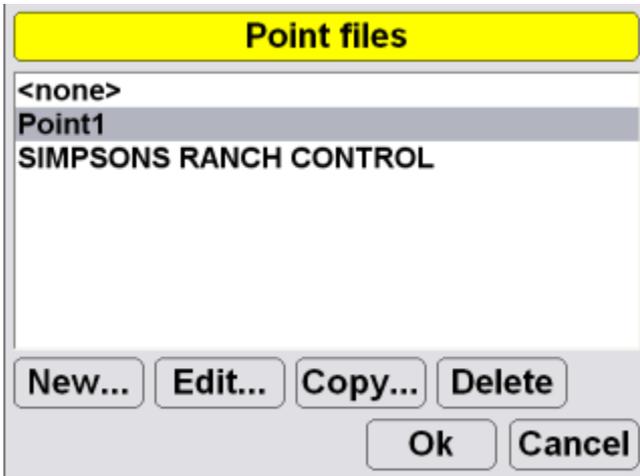
5. Begin grading. As needed, repeat Step 4 above to grade to another polyline.

Performing Topographic Surveys

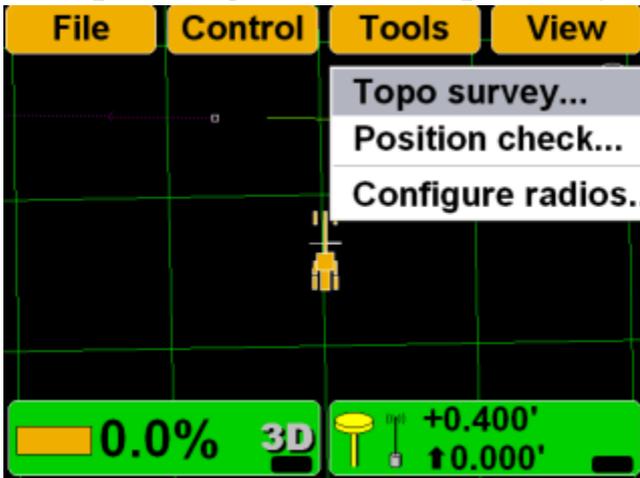
1. press **Topcon Logo** ▶ **File** ▶ **Point files**.



2. Create a new point file or select an existing point file. Press **Ok** to return to the Main Screen.



3. Press **Topcon Logo** ▶ **Tools** ▶ **Topo survey**.



4. Enter or select the information. Press **Ok** when done.

Topo survey

Log by

Minimum distance

Log to layer

Log at

Lower all elevations by

5. Press **Ok** to start the topo survey function.
6. Begin driving. When the machine begins to move, 3DMC will begin measuring and logging the data.

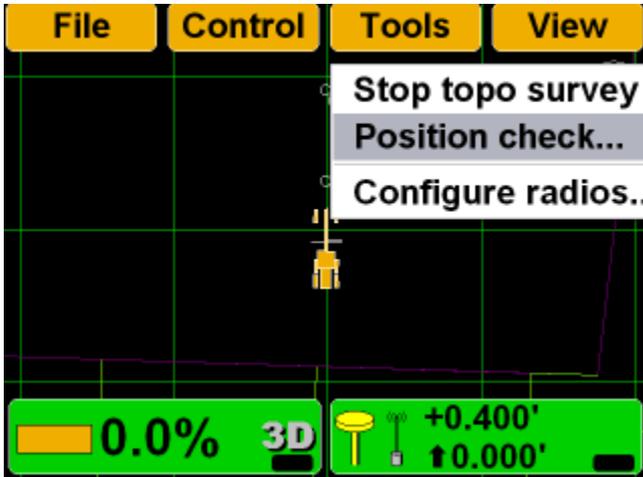
- To stop topo measurements, press **Topcon Logo** ▶ **Stop topo survey**. Otherwise, 3DMC continues logging measurements.



Checking the Blade's Position

Use position check to obtain an accurate position check of the blade.

1. To check the position of the blade, press **Topcon Logo** ▶ **Tools** ▶ **Position check**.



2. On the *Position Check* dialog box, select the *Point of interest* (either left edge or right edge of blade), and press **Measure**.

The image shows a software dialog box titled "Position Check". The title bar is yellow. Below the title, there are several input fields and buttons. A callout "2a" points to the "Point of interest" dropdown menu, which is currently set to "Left cutting edge". Below this are three input fields for "North", "East", and "Elev". Further down are two more input fields for "Cut to design surface" and "Alignment stationing". At the bottom of this section are two buttons: "Measure..." and "Cancel". A callout "2b" points to the "Measure..." button. Below this section is another section with five rows of data, each with a label and a text input field: "Number of sats used" (8), "H.Precision" (0.033'), "V.Precision" (0.066'), "Duration (secs)" (0), and "Measurements" (1). Below this is a label "Initialized !" followed by a progress bar with five empty slots. At the bottom right of the dialog is a "Cancel" button.

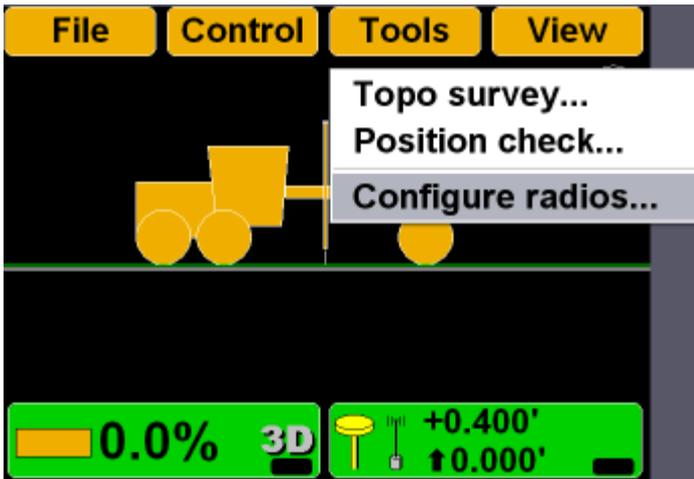
3. When finished, the *Position Check* dialog box displays the point on the job at the selected edge of

the blade. Press **Cancel** to return to the Main Screen.

Position Check	
Point of interest :	Left cutting edge
North	11580.394'
East	8878.787'
Elev	56.430'
Cut to design surface :	0.000'
Alignment stationing :	1+41.856'
Measure...	Cancel

Changing Radio Channels

1. Press **Topcon Logo** ▶ **Tools** ▶ **Configure radios**.



2. Select the *Radio type* that matches the radio type in the MC-R3, and then press **Configure**. 3DMC will connect to the radio after several second.

GPS Radio Configuration

Radio type: Topcon FH915 (SS)

Connected to: Serial Port B

Baud rate: 38400

Format: CMR

Configure... Ok Cancel

GPS Radio Configuration

Radio type: Topcon FH915 (SS)

Connected to: Serial Port B

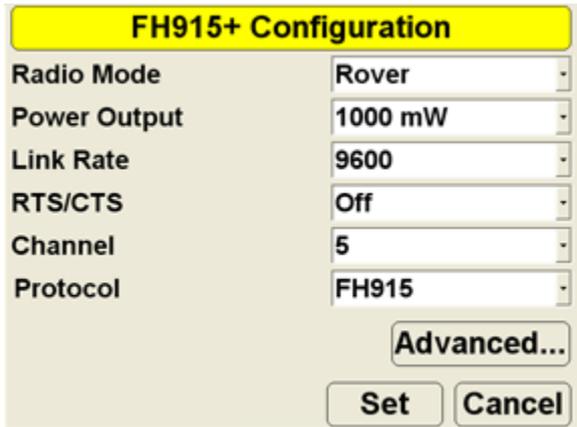
Baud rate: 38400

Format: CMR

Connecting to radio at 38400bps

Configure... Ok Cancel

3. Enter radio configuration information, and select the channel. The channel must match the channel of the base station.



The image shows a dialog box titled "FH915+ Configuration" with a yellow header. It contains several configuration options, each with a dropdown menu:

Radio Mode	Rover
Power Output	1000 mW
Link Rate	9600
RTS/CTS	Off
Channel	5
Protocol	FH915

At the bottom right of the dialog box, there are three buttons: "Advanced...", "Set", and "Cancel".

4. Press **Advanced** to select the country of operation, and then press **Ok**.

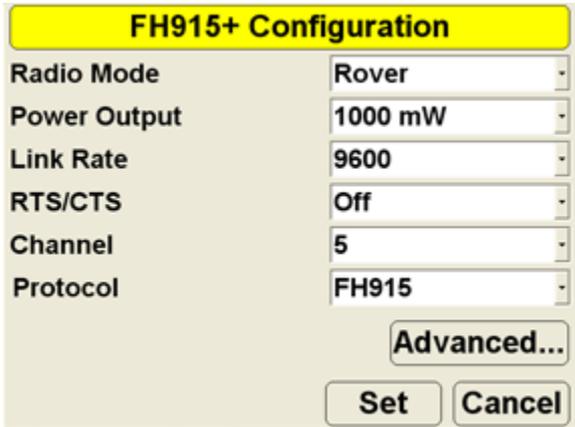


The image shows a dialog box titled "Advanced Settings" with a yellow header. It contains a "Country" dropdown menu with a list of options:

Country	US / Canada
	US / Canada
	Australia
	New Zealand

At the bottom of the dialog box, there are two buttons: "Ok" and "Cancel".

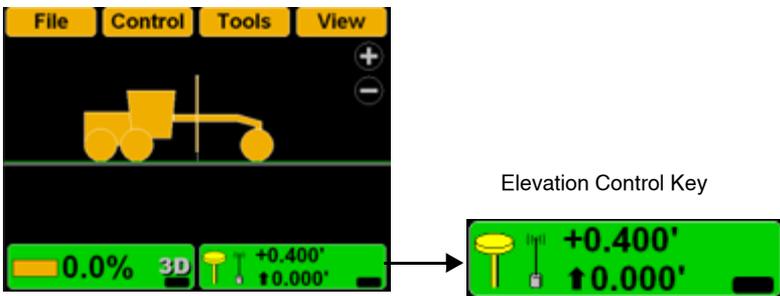
5. Press **Set** to save the radio configuration settings and return to the GPS Radio Configuration screen.



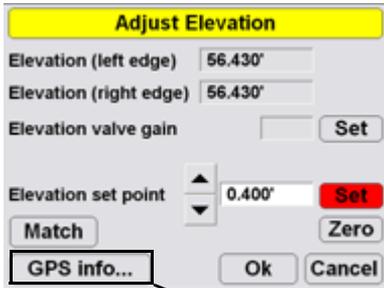
6. Press **Ok** to save the radio configuration settings and return to the main screen.

Viewing GPS Information

1. To view the *GPS information* dialog box and tabs, press the **Elevation control** key.



2. Press the **GPS info** button.



The "Adjust Elevation" dialog box features a yellow title bar. It contains several input fields and buttons: "Elevation (left edge)" and "Elevation (right edge)" both set to 56.430'; "Elevation valve gain" with an empty field and a "Set" button; "Elevation set point" with a spinner set to 0.400' and a red "Set" button; "Match" and "Zero" buttons; and "GPS info...", "Ok", and "Cancel" buttons at the bottom.



The "GPS info" dialog box has tabs for "Fix", "Position", "Satellites", "Info", and "Planning", with "Info" selected. It displays "Initialized !" and the following data:

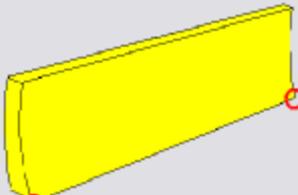
Total sats tracked	16
GPS sats used	9
GLONASS sats used	5
Horizontal RMS	0.049'
Vertical RMS	0.066'

Buttons for "Ok" and "Cancel" are at the bottom.

GPS Status and Quality (Fix)

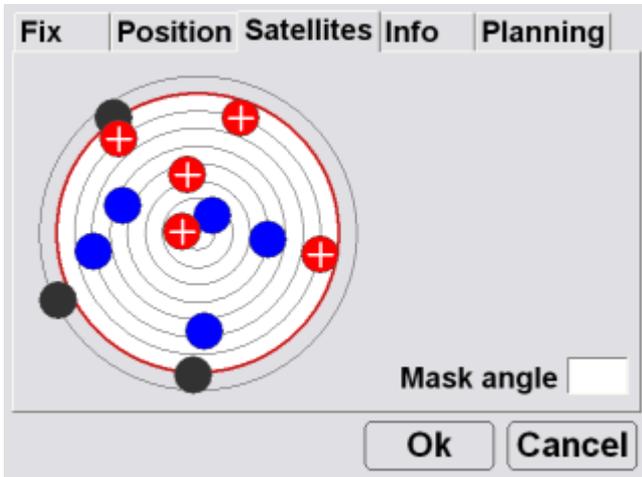
Fix	Position	Satellites	Info	Planning
Initialized !				
Total sats tracked		<input type="text" value="16"/>		
GPS sats used		<input type="text" value="9"/>		
GLONASS sats used		<input type="text" value="5"/>		
Horizontal RMS		<input type="text" value="0.049'"/>		
Vertical RMS		<input type="text" value="0.066'"/>		
		<input type="button" value="Ok"/>	<input type="button" value="Cancel"/>	

Cutting Edge Position (Position)

Fix	Position	Satellites	Info	Planning
				
N=11216.755' E=8462.889' Z=-11.872'		N=11216.755' E=8453.047' Z=-11.872'		
		<input type="button" value="Ok"/>	<input type="button" value="Cancel"/>	

Monitor Satellites and Enter Mask Angle

(Satellites)

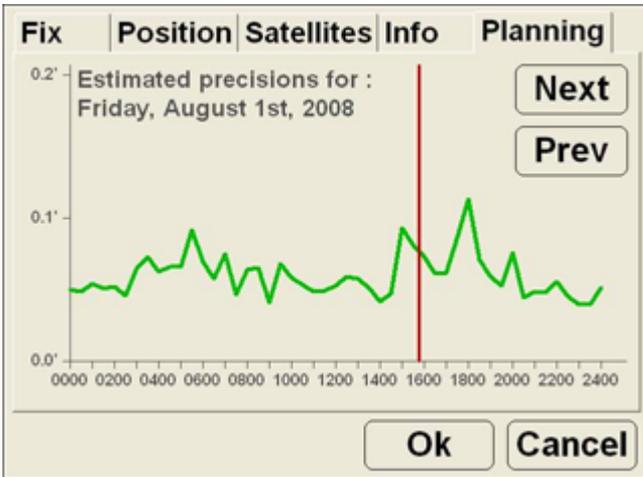


View Receiver Information or Reset Receiver (Info)



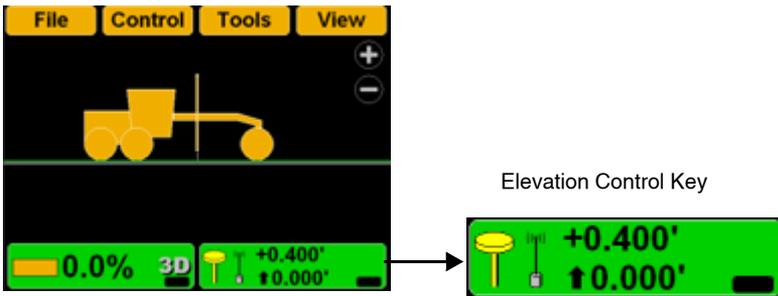
Satellite Planning Information (Planning)

The red vertical line marks the current time.



Adjusting Valve Gain

1. On the 3DMC Main Screen, press the **Elevation Control** key.



2. Press the *Elevation valve gain* **Set** key, changing it to red.

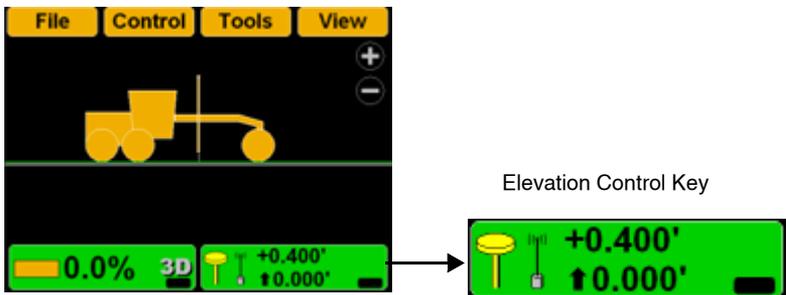
Adjust Elevation

Elevation (left edge)	<input type="text" value="56.430'"/>	
Elevation (right edge)	<input type="text" value="56.430'"/>	
Elevation valve gain	<input type="button" value="▲"/> <input type="button" value="▼"/>	<input style="width: 50px; height: 20px;" type="text"/> <input style="background-color: red; color: white; padding: 5px 10px;" type="button" value="Set"/>
Elevation set point	<input type="text" value="0.400'"/>	<input type="button" value="Set"/>
<input type="button" value="Match"/>		<input type="button" value="Zero"/>
<input type="button" value="GPS info..."/>		<input type="button" value="Ok"/> <input type="button" value="Cancel"/>

3. Change the offset using the up/down arrow.
4. Press **Ok**.

Changing Cut/Fill Offsets

1. On the 3DMC Main Screen, press the **Elevation Control** key.



2. Press *Elevation set point* **Set**, changing it to red.

Adjust Elevation

Elevation (left edge) 56.430'

Elevation (right edge) 56.430'

Elevation valve gain **Set**

Elevation set point **Set**

Match **Zero**

GPS info... **Ok** **Cancel**

3. Change the offset using the up/down arrows.
4. Press **Ok**.

Changing the Display View

Main Window Views

To access the main window view, press **Topcon Logo** ▶ **View** ▶ **Main window**, then press the

necessary view; a check mark indicates the active view.



Plan View

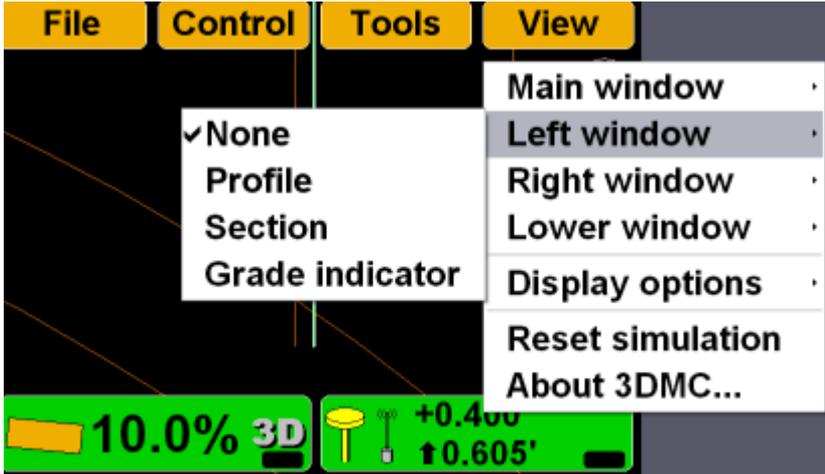
Section View



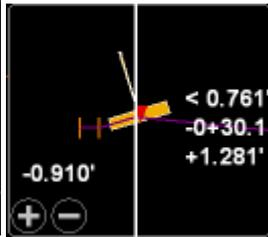
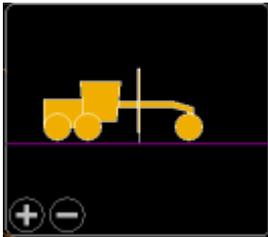
Profile View

Left Window Views

To access the lower window view, press **Topcon Logo** ▶ **View** ▶ **Left window**, then select a view.



Section View

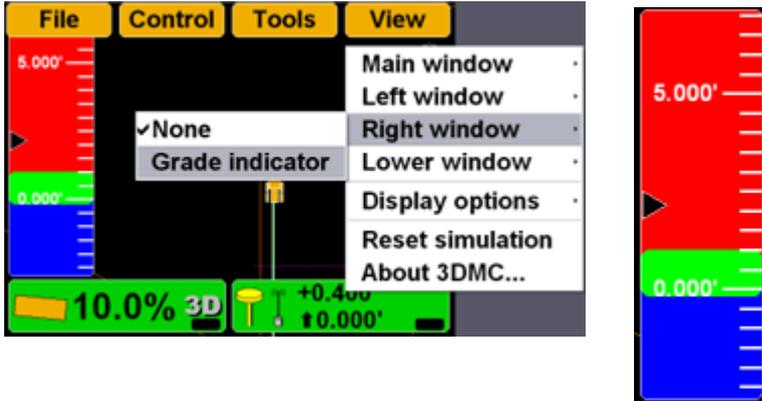


Grade Indicator



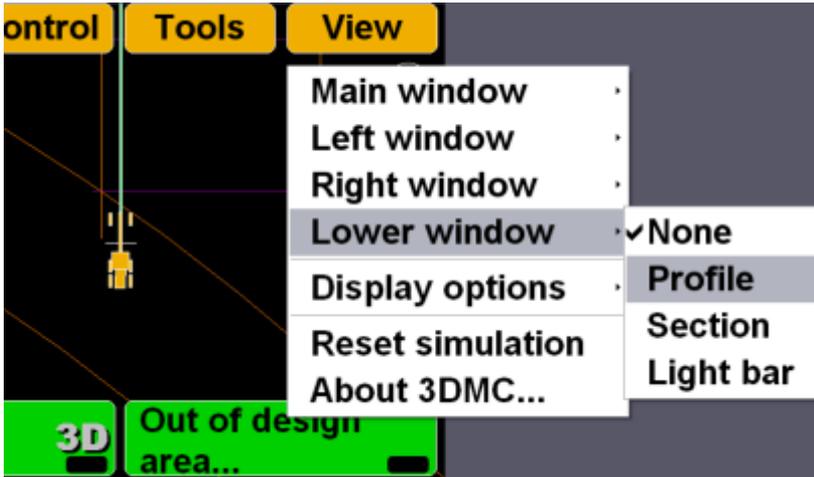
Right Window View

To access the right window view, have the Plan view visible and press **Topcon Logo ▶ View ▶ Right window**, then select **Grade indicator**.

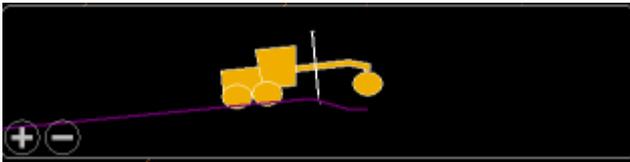


Lower Window Views

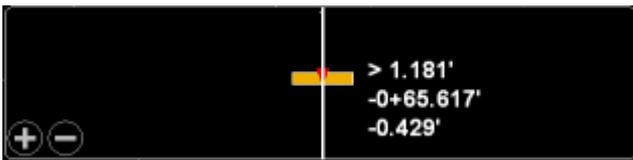
To access the lower window view, press **Topcon Logo** ▶ **View** ▶ **Lower window**, then select a view.



Profile View



Section View

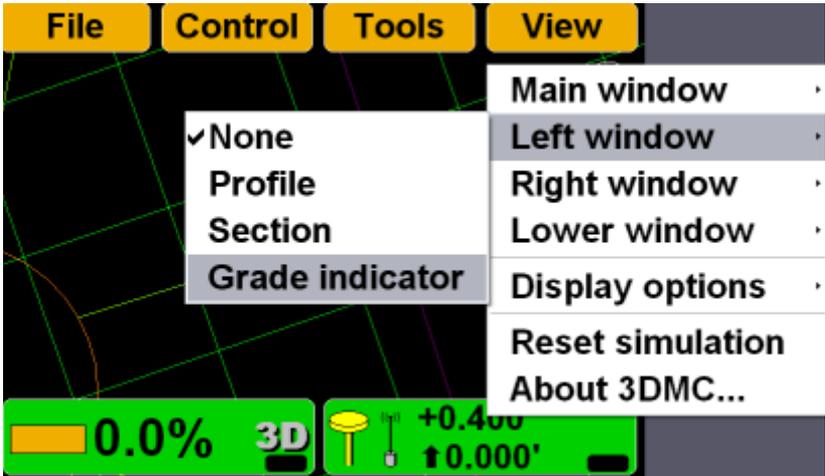


Lightbar

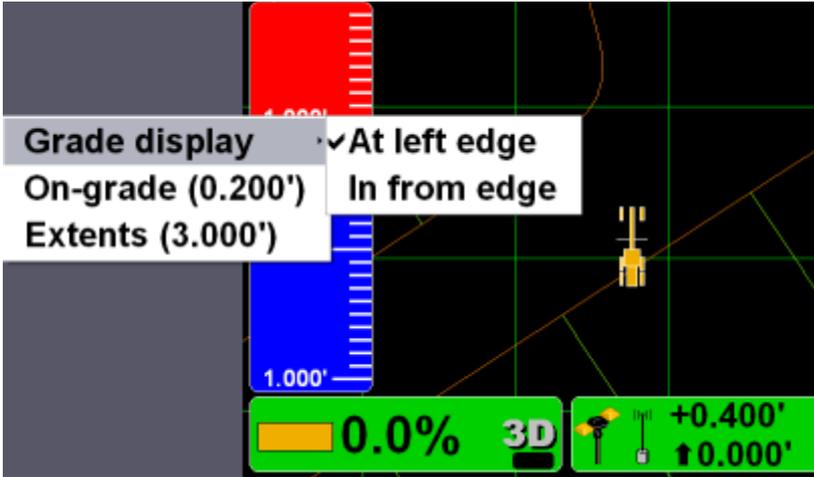


Changing the Grade Indicator Scale

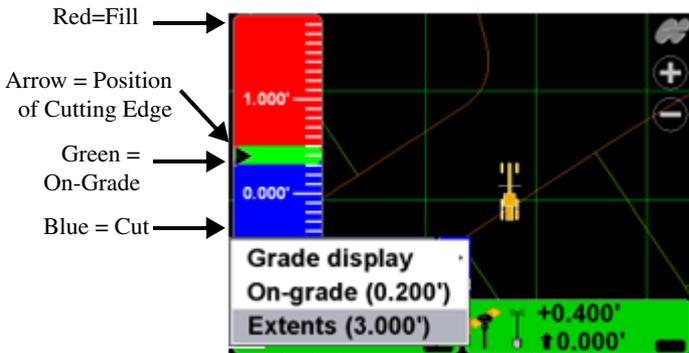
To view the grade indicator, press **Topcon Logo** ▶ **View** ▶ **Left window** ▶ **Grade indicator**.



To change the grade display, press and hold the grade indicator for one second, press **Grade display**, then the necessary option.

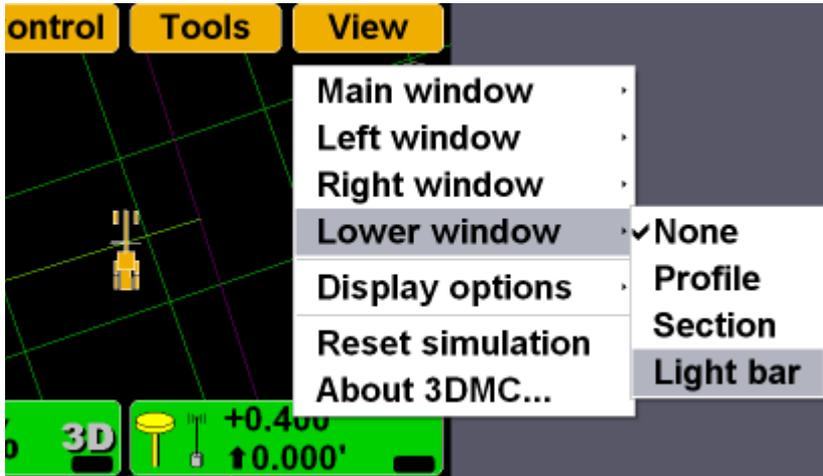


To change the on-grade or extents, press and hold the grade indicator for one second, then press the necessary menu option.



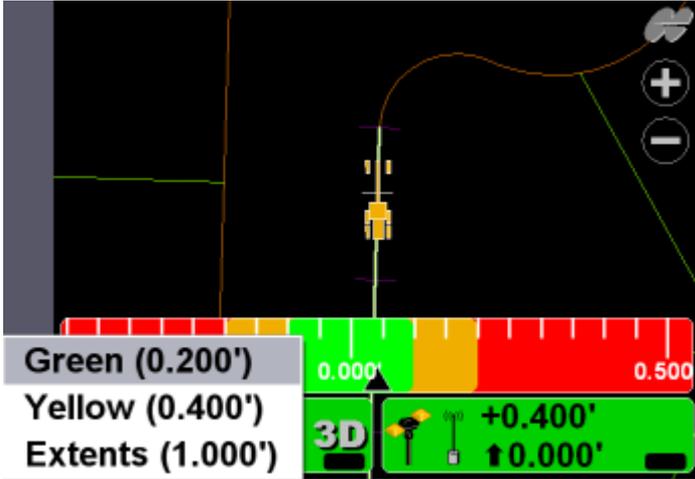
Changing the Light Bar Scale and Extents

To view the light bar scale, press **Topcon Logo** ▶ **View** ▶ **Lower window** ▶ **Light bar**.



To change the light bar scale and extents:

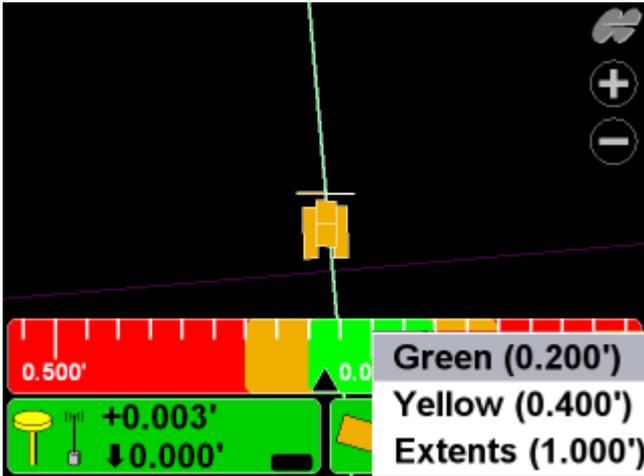
Press and hold the light bar scale for one second, then press **Green**, **Yellow**, or **Extents** to change the scale.



Changing the Steer Indication Scale and Extents

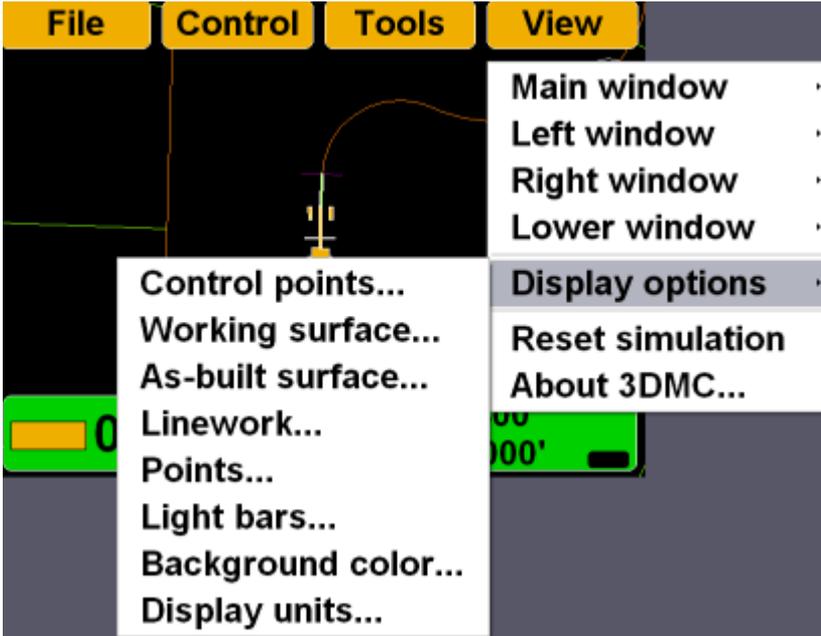
This function is only available while in Steer Indication mode. See “Steering or Grading to Polyline” for details on enabling steer indication.

To change the steer indication scale and extents: Press and hold the light bar scale for one second, then press **Green**, **Yellow**, or **Extents** to change the scale.



Changing Display Options

To view available options, press
TopconLogo ▶ View ▶ Display options.

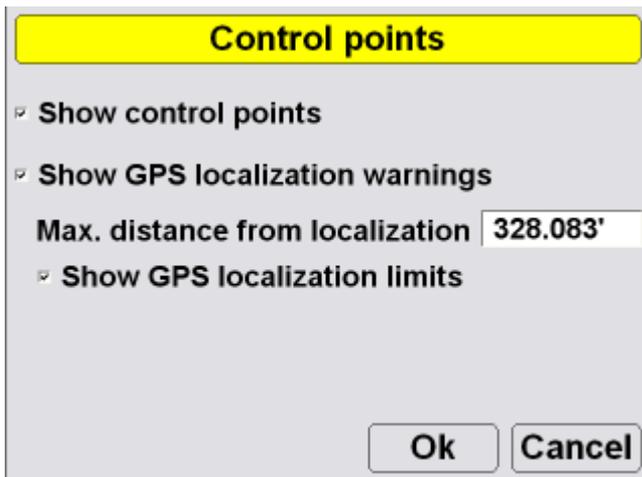


Control Points

1. To view information about the control points, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Control Points**.

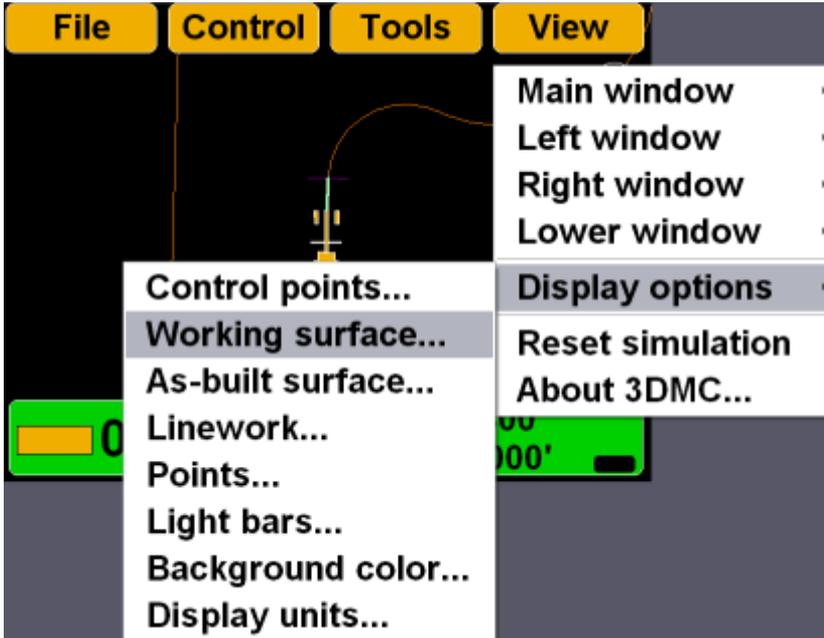


2. Enable (check mark) or enter the necessary options, then press **Ok**.

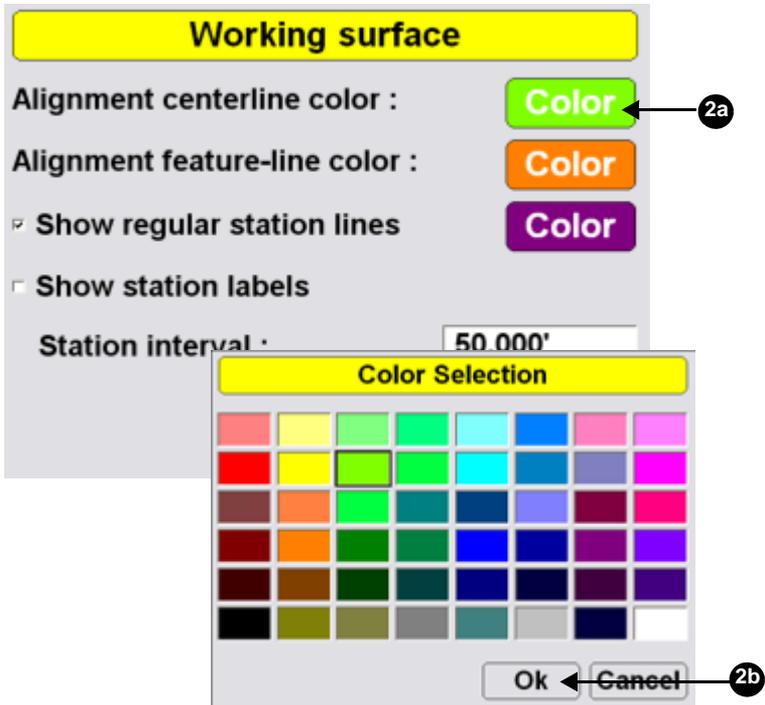


Working Surface Display Options

1. When using a TIN surface model file, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Working Surface**.



2. Press **Color** to change the color of the alignment and station lines. Select a color and press **Ok**.



3. Enable (check mark) or enter the necessary options, then press **Ok**.

Working surface

Alignment centerline color : **Color**

Alignment feature-line color : **Color**

Show regular station lines **Color**

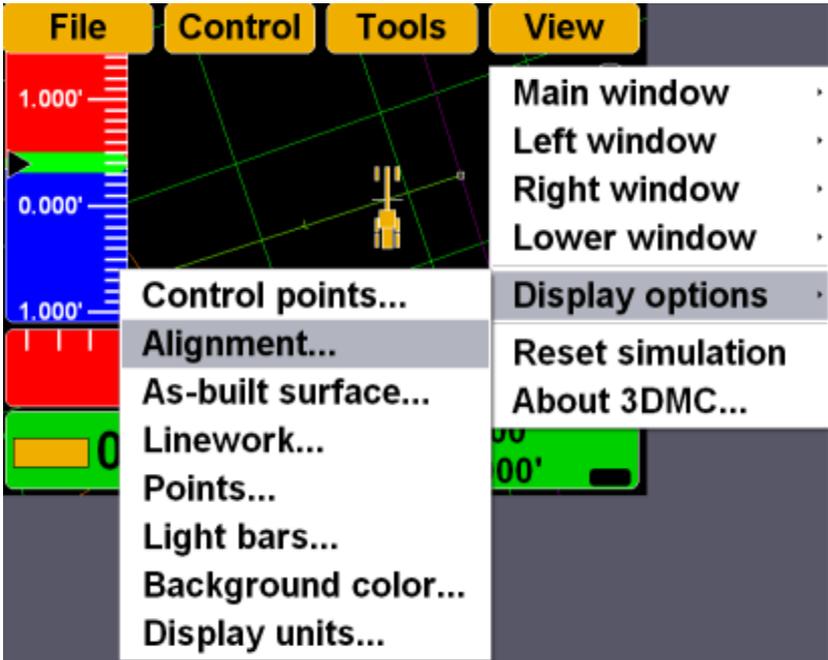
Show station labels

Station interval : 50.000'

Ok **Cancel**

Alignment Display Options

1. When using either a road surface model or an alignment file, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Alignment**.



2. Change the alignment settings, and press OK.

Alignment

Alignment centerline color : **Color**

Alignment feature-line color : **Color**

Show regular station lines **Color**

Show station labels

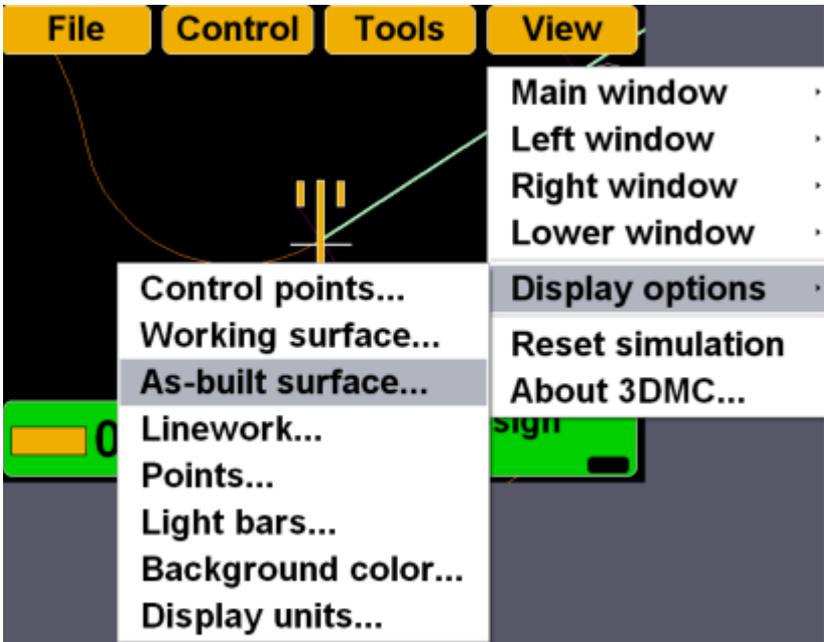
Station interval : 50.000'

Ok Cancel

As-built Surface Display Options

As-built surface files display a colored map of the graded surface.

1. Press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **As-built Surface**.



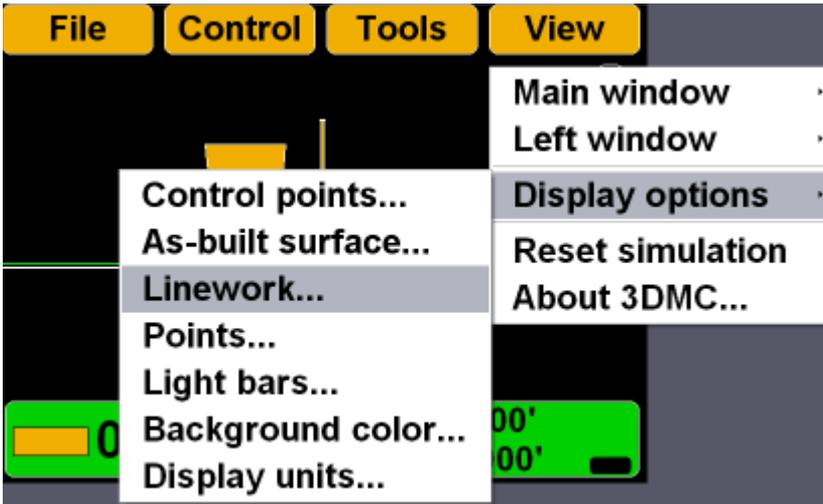
2. Select and/or enter the necessary options and press **Ok**.

As-built Surface

- Multi-color cut/fill @ interval:
- Tri-color cut/fill : Cut Grade Fill
- On-grade tolerance (+/-) :
- Number of passes : 1 2 3 4+
- Pass variation : <0.050' <0.100' <0.150' >0.150'
- Step :

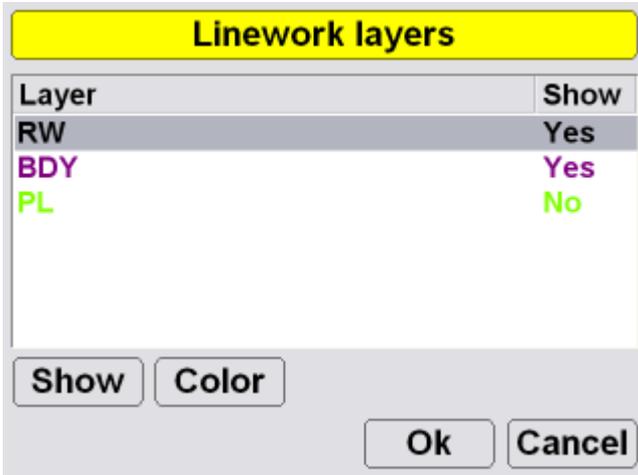
Linework Display Options

1. When using a Linework file, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Linework**.



2. To display layers on the Main Screen, select the layer and press **Show**, “Yes” displays in the *Show* column. Press **Show** again to not display the layer on the Main Screen; “No” displays in the *Show* column.

3. Press **Ok** to return to the Main Screen.

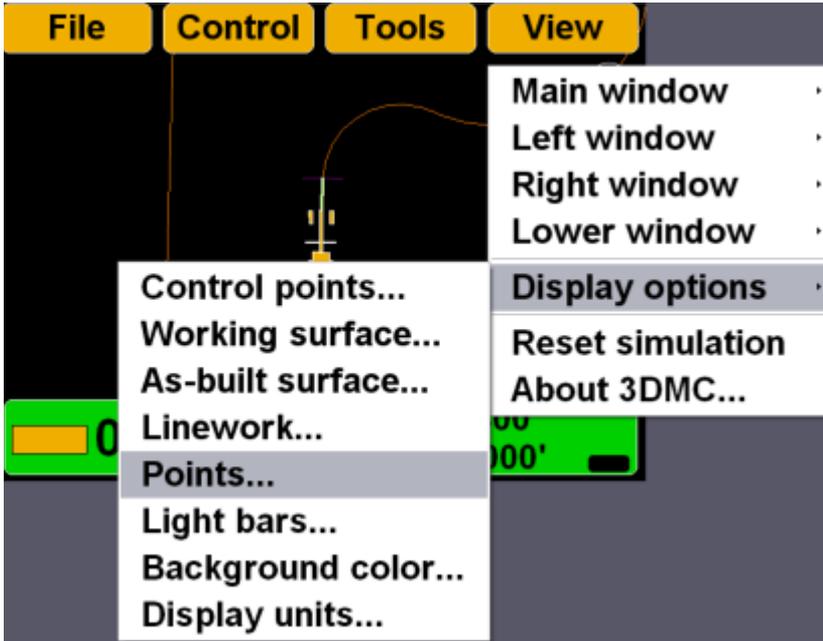


The image shows a dialog box titled "Linework layers" with a yellow header. It contains a table with two columns: "Layer" and "Show". The table lists three layers: "RW" (grey), "BDY" (purple), and "PL" (green). The "Show" column indicates whether each layer is visible: "Yes" for RW and BDY, and "No" for PL. Below the table are four buttons: "Show", "Color", "Ok", and "Cancel".

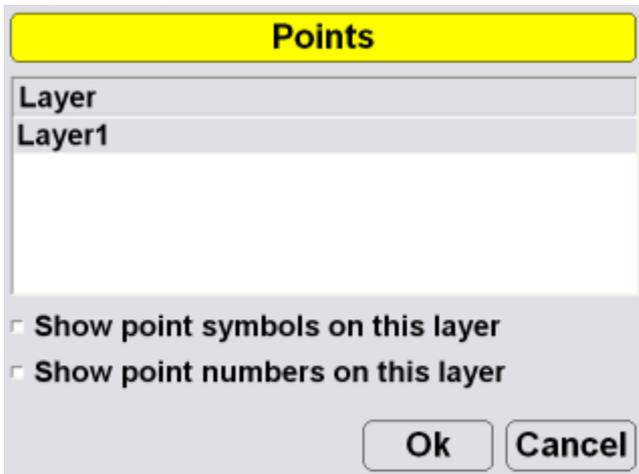
Layer	Show
RW	Yes
BDY	Yes
PL	No

Point Display Options

1. When using a Point file, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Points**.

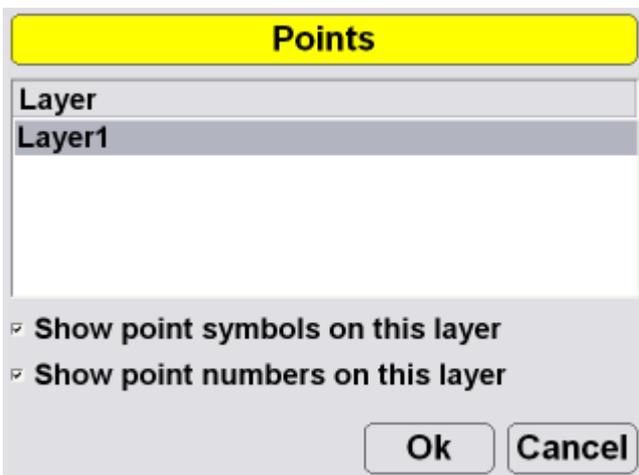


2. To display a points layer on the main screen, select the layer and press **Ok**.



The screenshot shows a dialog box titled "Points" with a yellow header. Below the header is a list box labeled "Layer" containing "Layer1". At the bottom of the dialog, there are two unchecked checkboxes: "Show point symbols on this layer" and "Show point numbers on this layer". "Ok" and "Cancel" buttons are located at the bottom right.

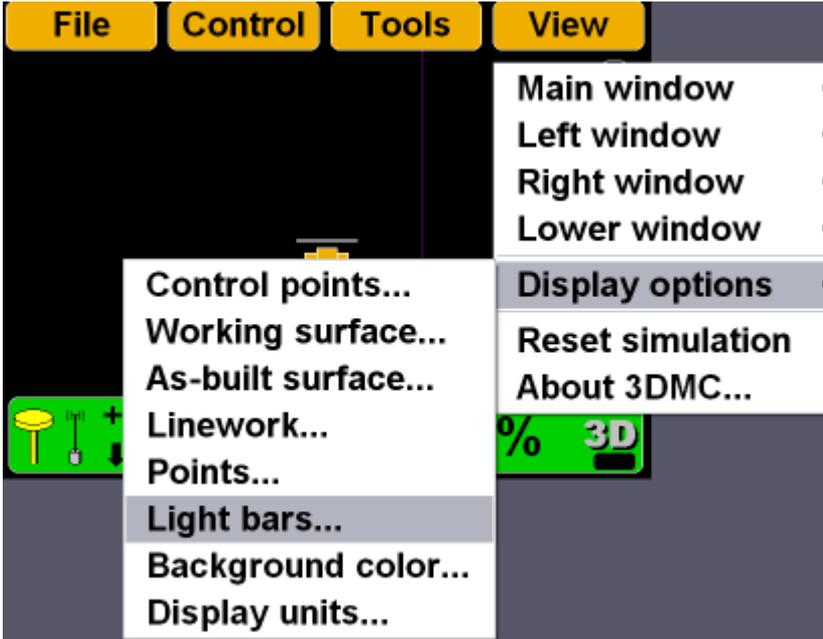
3. To display points symbols and/or point numbers during a topographic survey, select the corresponding check box and press **Ok**.



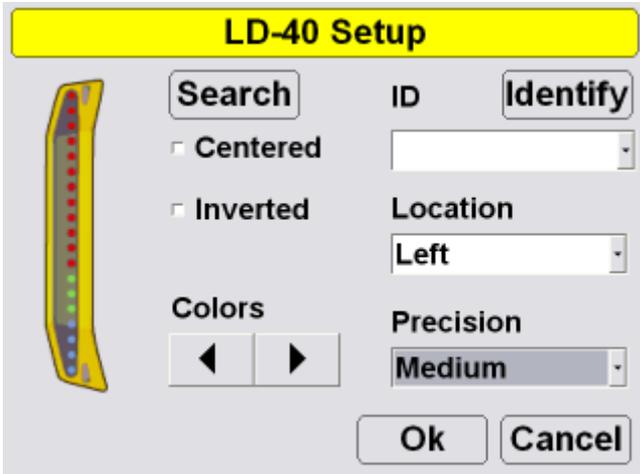
The screenshot shows the same "Points" dialog box as above, but with the checkboxes "Show point symbols on this layer" and "Show point numbers on this layer" now checked. The "Ok" and "Cancel" buttons remain at the bottom right.

Lightbar Display Options

1. To set the lightbar display options, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Light bars**.

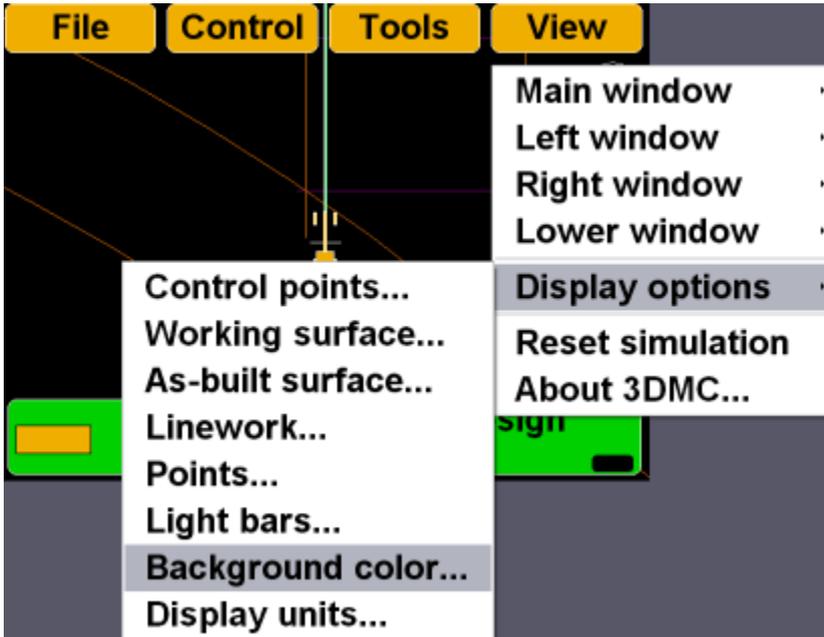


- Set the LD-40 options, and press **Ok**.



Changing the Background Color

1. To change the background color of the Main Screen, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Background color**.

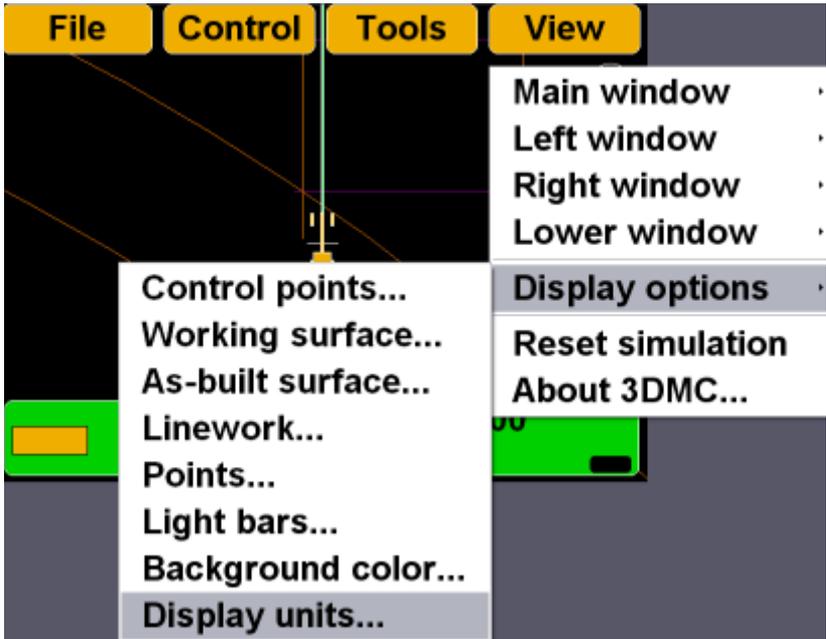


2. Select a color and press **Ok**.



Display Units Options

1. To set the type of units used in the job, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Display units**.



2. Select the display unit options and press **Ok**.

Display Units	
Distances	US Survey feet 3 d.p.
Angles	DD°MM'SS"
Grades	Percent (%)
Stations	1+00.000
Volumes	Cubic yards
Coordinates	North-East-Elev
<input type="button" value="Ok"/> <input type="button" value="Cancel"/>	

Viewing and Updating 3DMC

To view information about 3DMC, press **Topcon Logo ▶ View ▶ About 3DMC**.



3DMC : 7.06

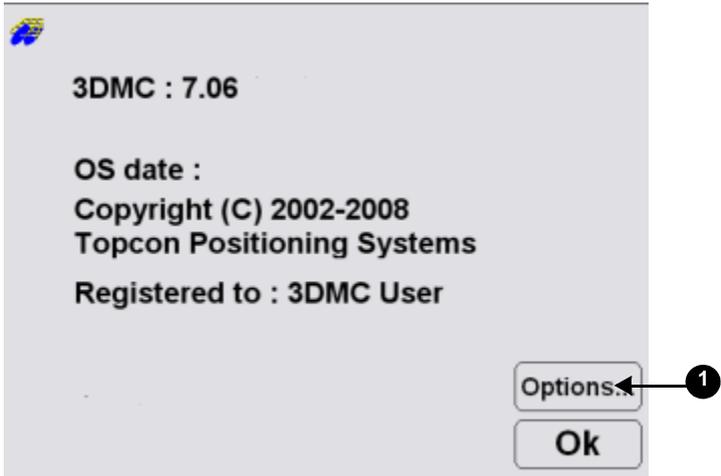
OS date :

Copyright (C) 2002-2008
Topcon Positioning Systems

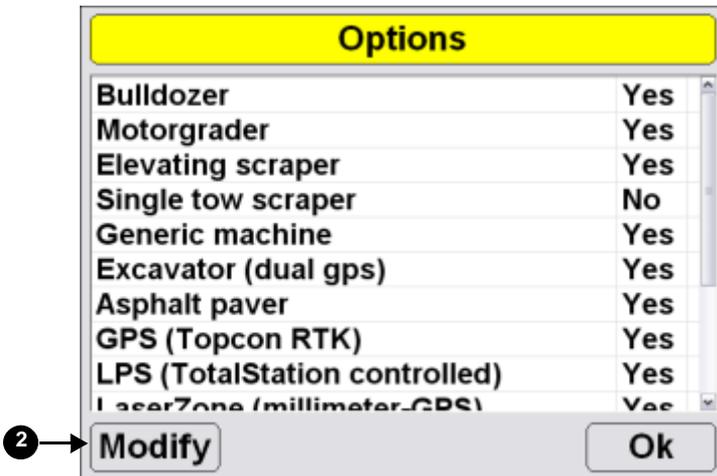
Registered to : 3DMC User

Options

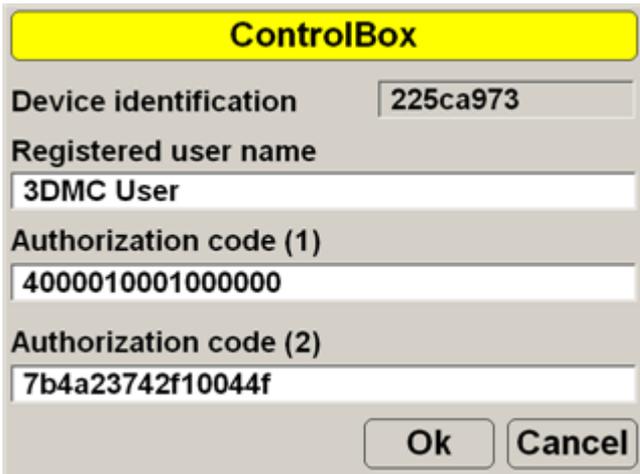
1. To view the enabled options, press **Options** on the *about 3DMC* dialog box.



2. To modify 3DMC options, press **Modify** on the *Options* dialog box.



- Record the *Device identification* number to give to your Topcon representative. Contact your Topcon representative to obtain new authorization codes for the necessary applications.



The image shows a dialog box titled "ControlBox" with a yellow header. It contains four text input fields and two buttons. The first field is labeled "Device identification" and contains the text "225ca973". The second field is labeled "Registered user name" and contains "3DMC User". The third field is labeled "Authorization code (1)" and contains "4000010001000000". The fourth field is labeled "Authorization code (2)" and contains "7b4a23742f10044f". At the bottom right, there are two buttons labeled "Ok" and "Cancel".

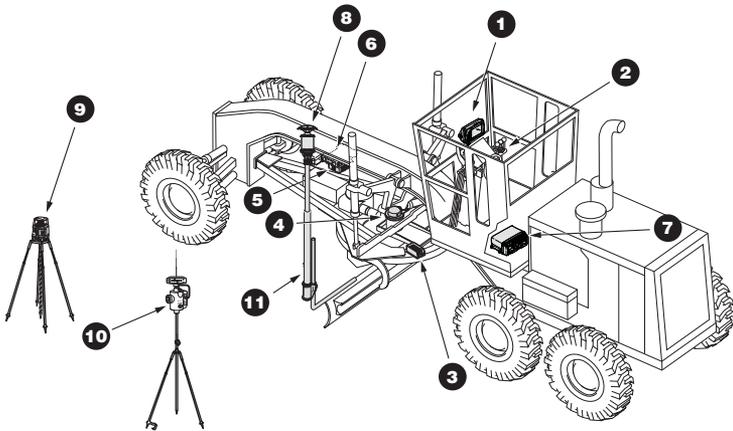
- When you have received the new authorization codes, enter the codes in the *ControlBox* dialog box.
- Press **Ok** to apply the new codes and options. Press **Ok** on each screen to return to the main screen.
- Turn off the display, wait a couple seconds, and then turn on the display to activate the new passwords.

mmGPS

Millimeter GPS (mmGPS) combines the elevation accuracy of a laser with the horizontal and vertical accuracy of GPS+ receivers to provide millimeter accuracy while grading or surveying. The system provides multiple rover support for machine and pole mounted sensors.

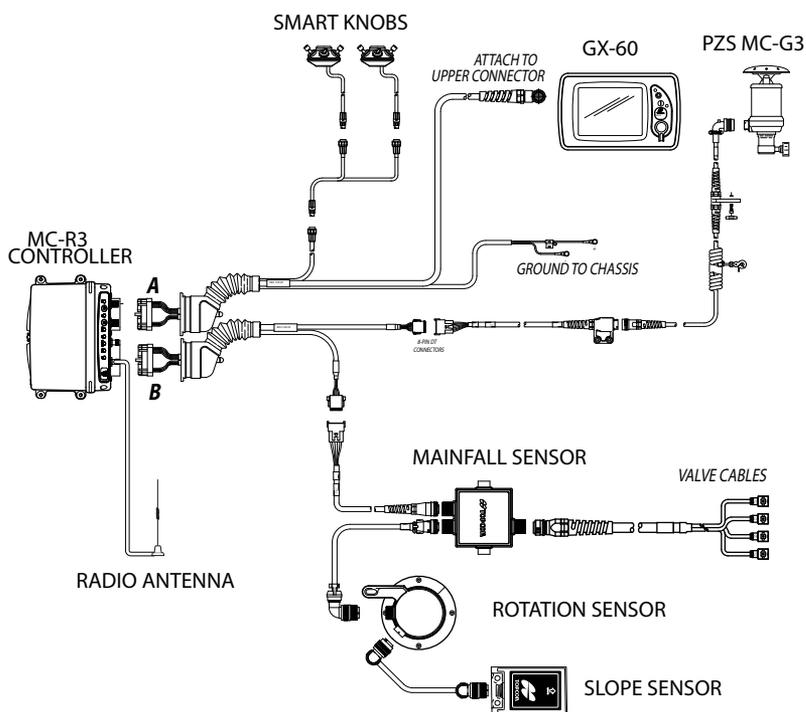
mmGPS Components

Motor Grader

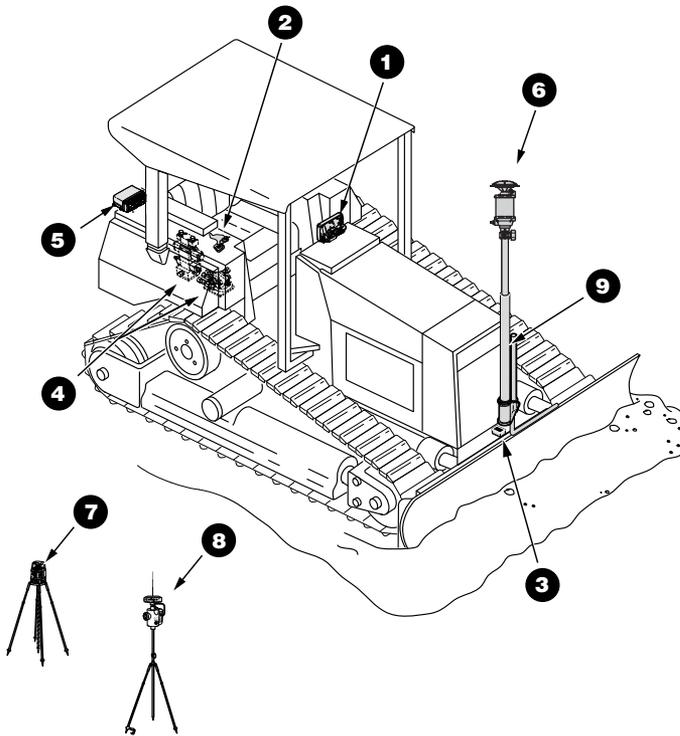


1. GX-60 Display
2. Remote Smart Knobs™
3. Blade Slope Sensor

4. Rotation Sensor
5. Mainfall Sensor
6. Hydraulic Manifold Assembly
7. MC-R3 Controller
8. PZS MC-G3 Sensor
9. PZL-1 Transmitter
10. PZS-1 with GPS+ Receiver
11. GPS Vibration Pole

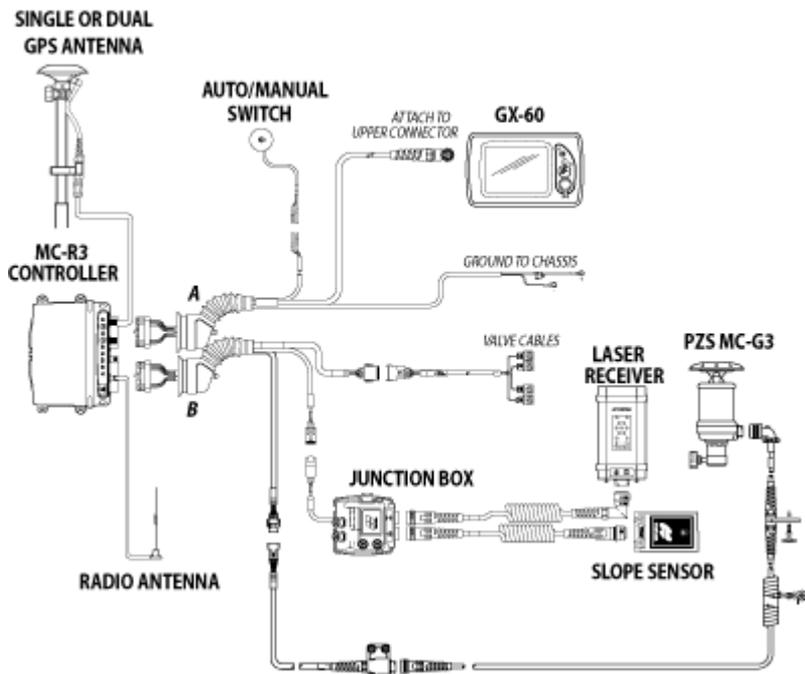


Dozer



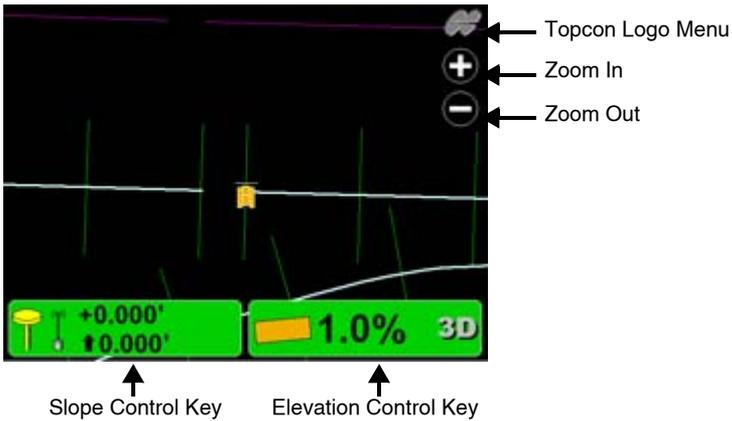
1. GX-60 Display
2. Simple Knob
3. Blade Slope Sensor
4. Hydraulic Manifold Assembly
5. MC-R3 Controller
6. PZS MC-G3 Sensor
7. PZL-1 Transmitter
8. PZS-1 with GPS+ Receiver

9. GPS Vibration Pole



3DMC mmGPS Introduction

3DMC Main Screen

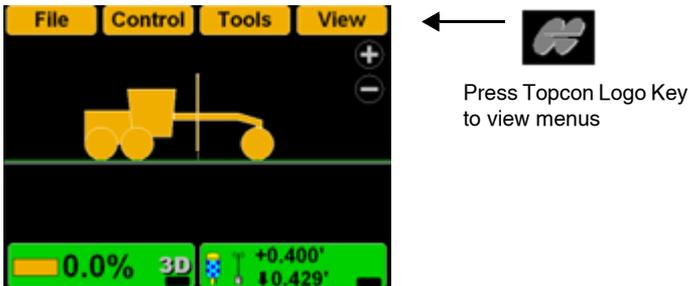


Topcon Logo Key

The Topcon Logo key at the top right corner of the Main Screen displays a pop-up bar of four menus: File, Control, Tools, and View.

To access the Topcon Logo menus, tap the **Topcon Logo** in the far right corner.

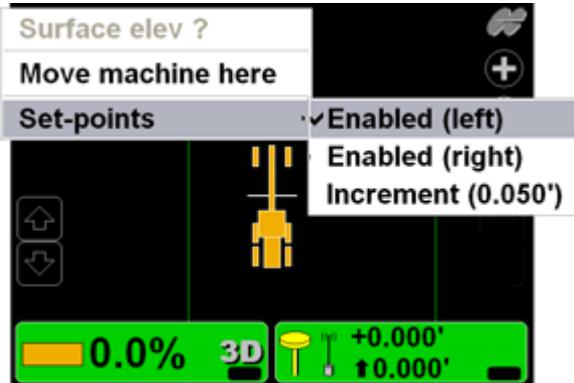
Unless used, the menus disappear after 10 seconds.



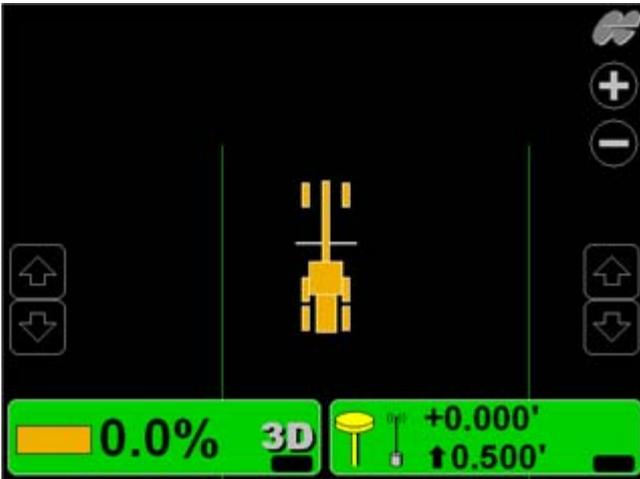
Set-Points Pop-Up Menu

The Set-points pop-up menu allows quick adjustment of the elevation set-points from the main screen.

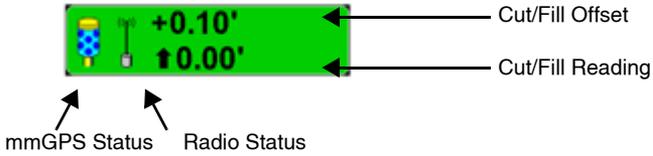
1. To access the Set-points pop-up menu, press and hold anywhere on the main screen.
2. Press **Set-points** ▶ **Enabled (left)** or **Enabled (Right)** to display the set-point adjustment arrows.
3. Press **Set-points** ▶ **Increment** to adjust the set-points increment.



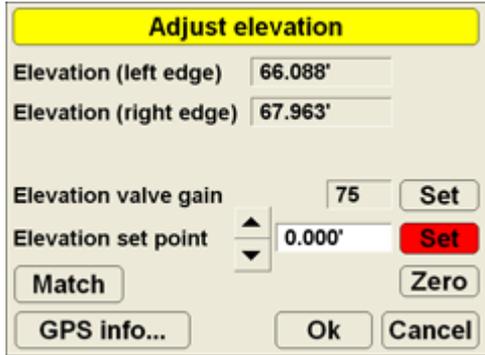
4. Press the arrows to adjust the elevation set-points.



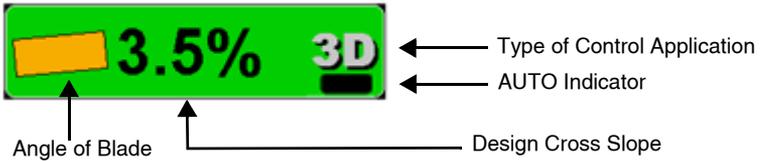
Elevation Control Key



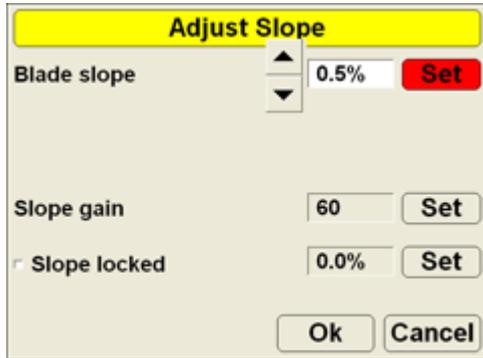
Adjust Elevation Screen



Slope Control Key



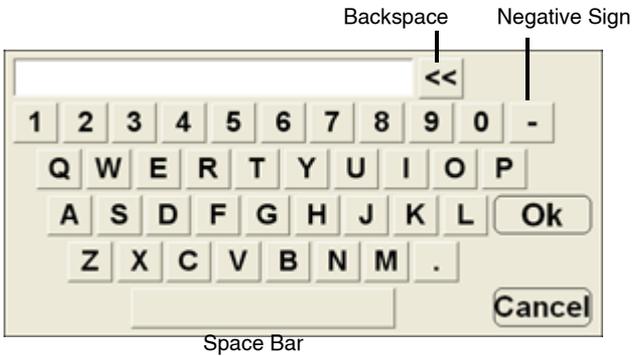
Adjust Slope Screen



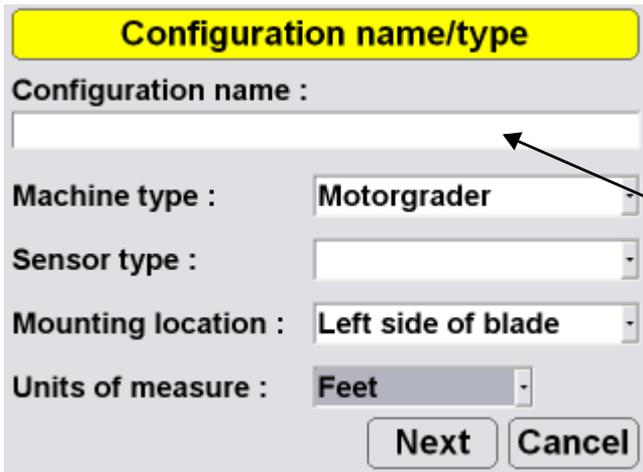
Keyboard Functions

When entering text or numbers, one of the following two pop-up keyboards displays:

Alphanumeric Keyboard



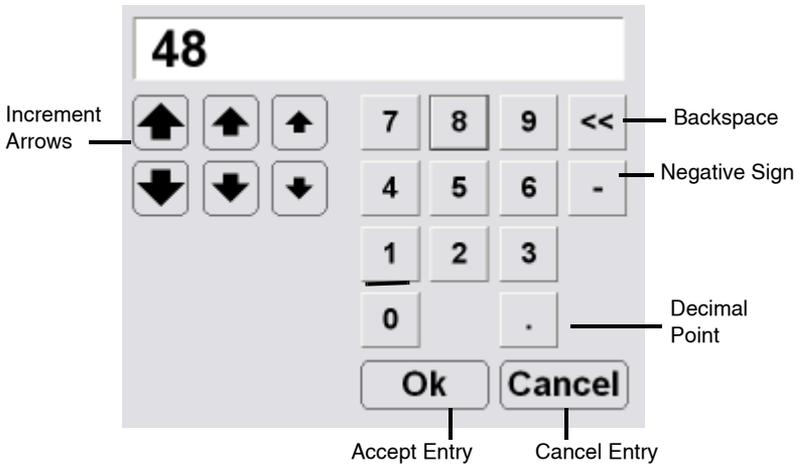
1. To access the keyboard from any field requiring an alphanumeric input, press the field.



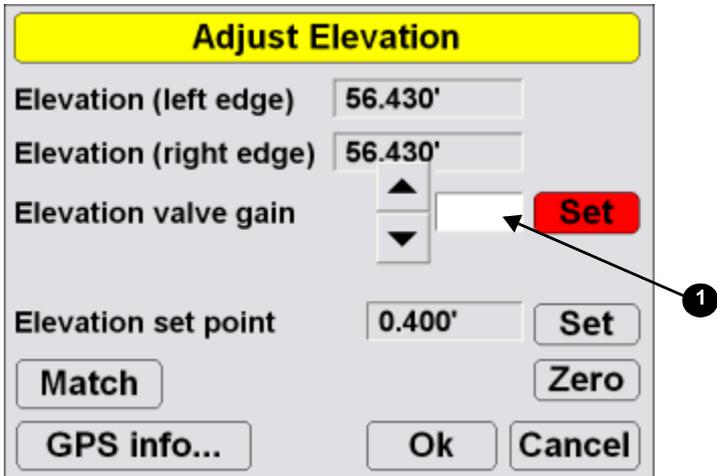
2. Press the letters or numbers on the keyboard to type.



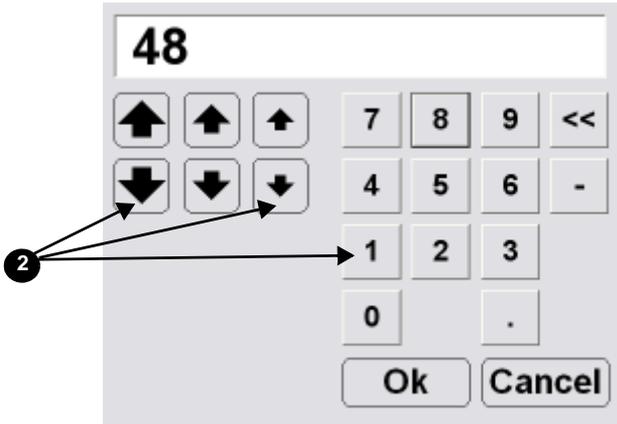
Numeric Keyboard



1. To access the keyboard from any field requiring an numeric input, press the field.



2. Press the numbers on the keyboard to type in a value, or use the arrow keys to increase the value incrementally.

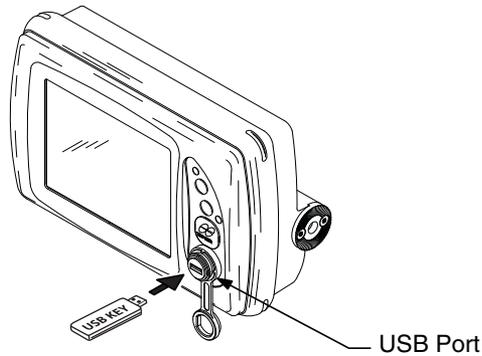


mmGPS Setup and Usage

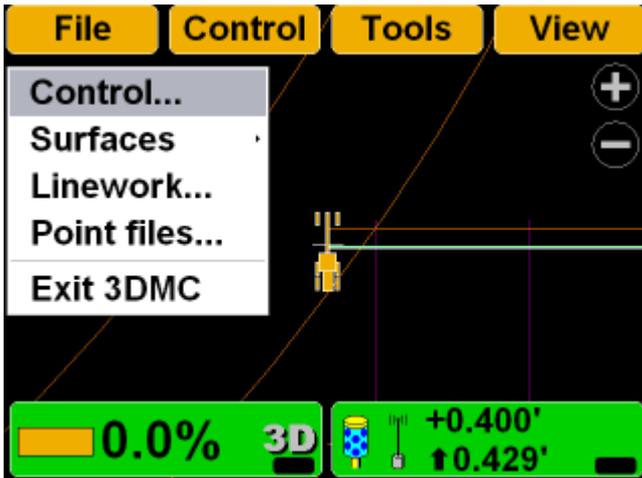
Copying 3DMC Files

To copy files from a USB key:

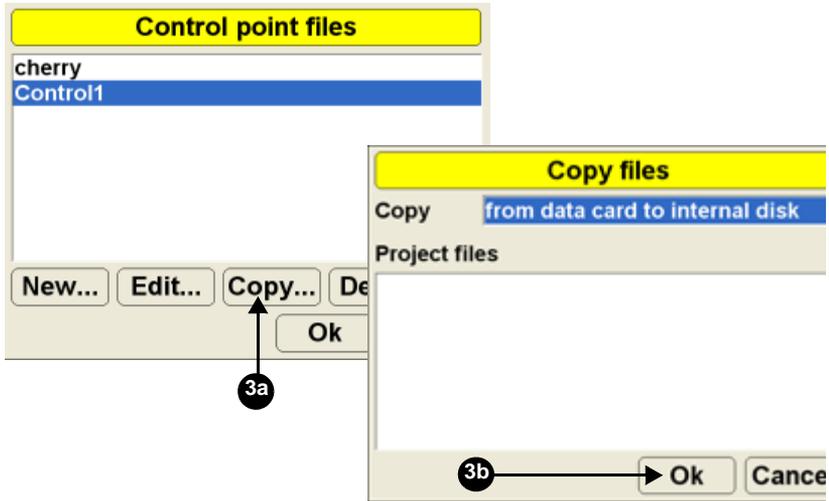
1. Press the green power button to turn on the display and insert the USB key into the GX-60 USB port.



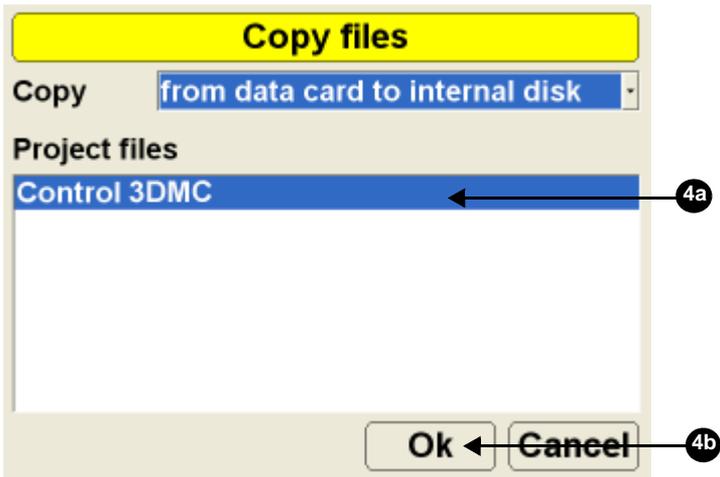
2. Press **Topcon Logo** ▶ **File** ▶ **Control**.



3. Press **Copy** and select the location of the file to copy from.



4. Select the file to copy and press **Ok**.

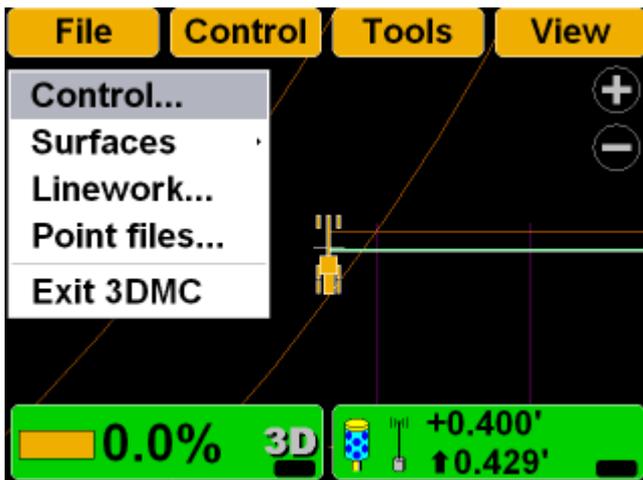


5. Select the files and press **Ok** to apply the data to the current job.

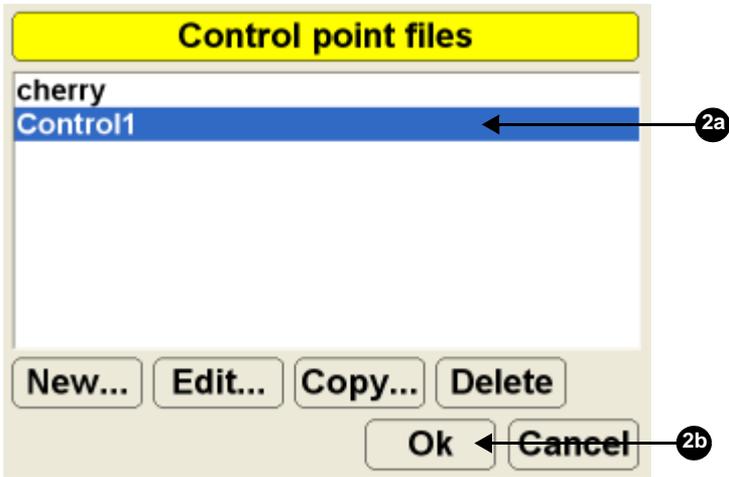
Control Point Files

Selecting a Control Point File

1. Press **Topcon Logo** ▶ **File** ▶ **Control**.



2. Select the control point file for the jobsite and press **Ok**.

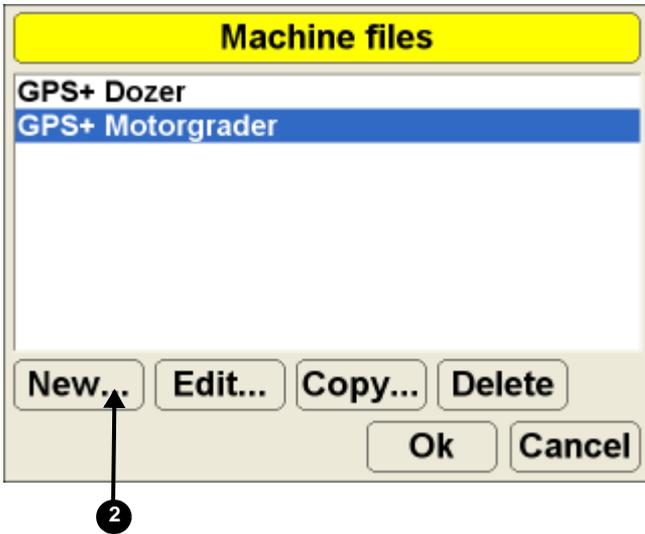


Creating a Machine Configuration File

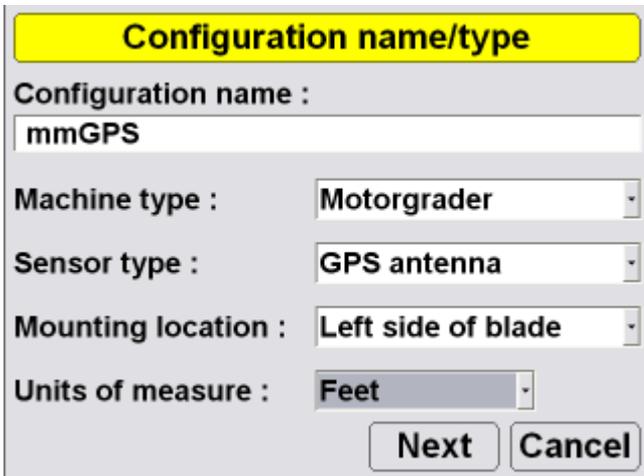
1. When the main screen displays, press **Topcon Logo ▶ Control ▶ Machine setup**.



2. Press **New**.



3. Enter the machine information.



4. Press **Next**.

5. Select and enter antenna information.

Motorgrader (GPS)

Antenna :



Above (1)

Inside (2)

Behind (3)

Width (4)

5

6. Press **Next**.

7. Select the GPS precisions for measuring static points. Press **Next**.

GPS Precisions

Max. GPS errors (roving) :

Max. Horizontal RMS :	0.20'
Max. Vertical RMS :	0.30'

Max. GPS errors (point measurement) :

Max. Horizontal RMS :	0.10'
Max. Vertical RMS :	0.20'

Back Next Cancel

Low Precisions...



Position Check

Point of interest : Left cutting edge

North

GPS Comms Configuration

Connection: TCP/IP

IP Address 192 . 168 . 0 . 100

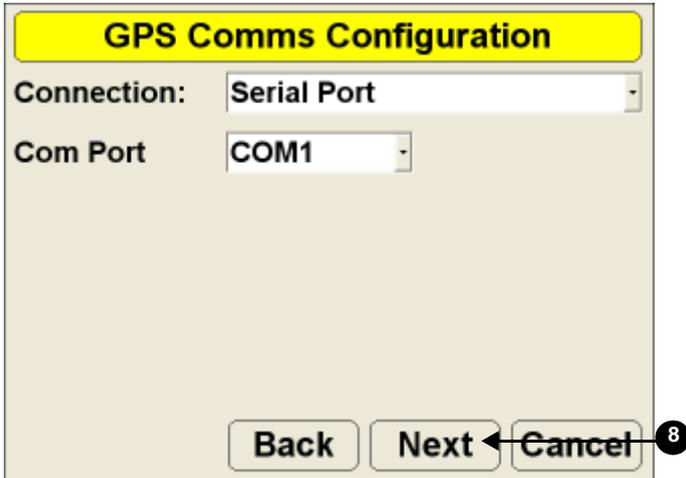
Port: 8002

Password: TPS

Defaults

Back Next Cancel

8. Enter the information for GPS Comms Configuration and press **Next**.



GPS Comms Configuration

Connection: Serial Port

Com Port COM1

Back Next Cancel 8

9. Select and enter radio information and press **Next**. Refer to the serial number/radio label on the MC-R3 controller to determine the correct radio type.

The radio type selection must match the radio contained in the MC-R3.

GPS radio configuration

Radio type: Topcon FH915 (SS)

Connected to: Serial Port B

Baud rate: 38400

Format: CMR

Buttons: Back, Next, Cancel (9)

10. Select and enter LaserZone Receiver information and press **Next**.

LazerZone Receiver

GPS port : Serial Port C

Sensitivity : Auto

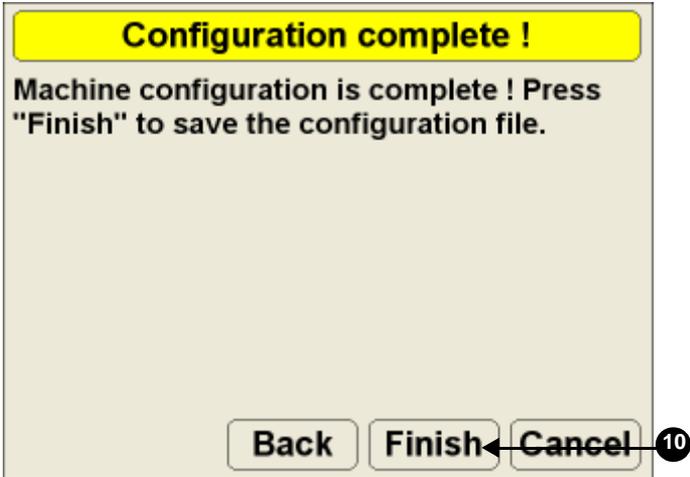
Channels : All

Advanced

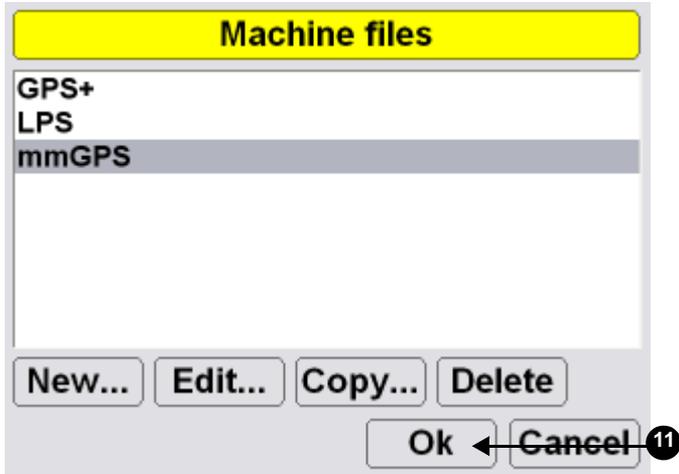
- LazerZone aided initialization
- Calc. LazerZone/GPS weighted elevations

Buttons: Back, Next, Cancel (9)

11. Press **Finish** to save the machine configuration file.



12. Select a machine configuration file on the *Machine files* dialog box and press **Ok** to set this as the machine for the job.



Selecting Surface Files

Surface File Types



Flat Plane Surface/Sloping Plane Surface:

A planar (flat) surface with a 0% crossslope and mainfall. This surface is primarily used for building pads.

A sloping surface with cross slopes and mainfall based on a reference elevation.



As-built Surface File:

A color map of the graded surface.

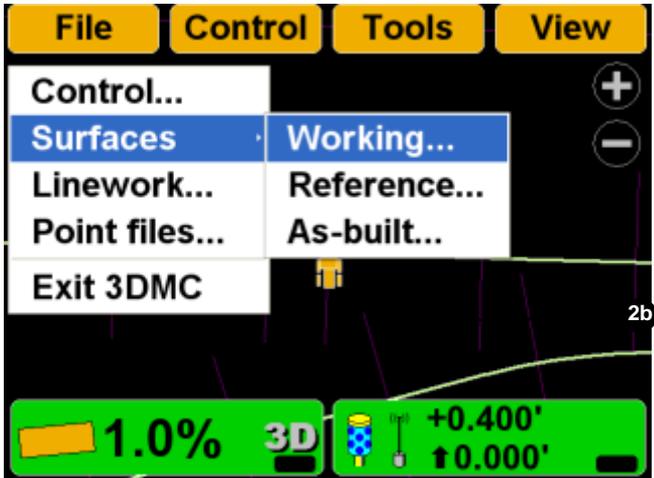


TIN Surface File:

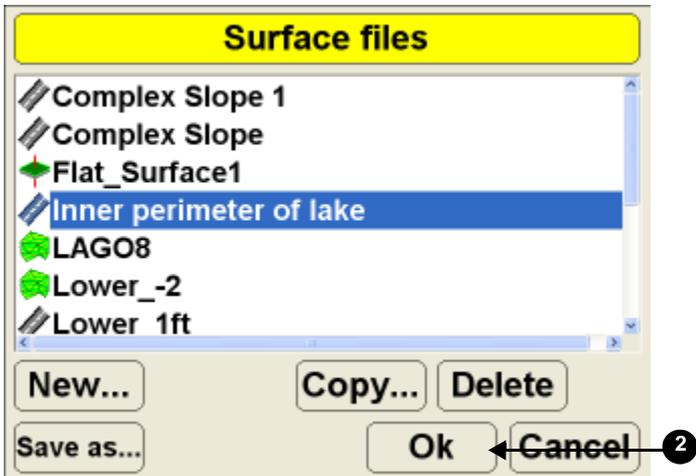
A TIN surface represents a surface as a network of non-overlapping triangles. Within each triangle the surface is represented by a plane. The triangles are made from a set of points called mass points.

Selecting a Working Surface File

1. Press **Topcon Logo** ▶ **File** ▶ **Surfaces** ▶ **Working**.

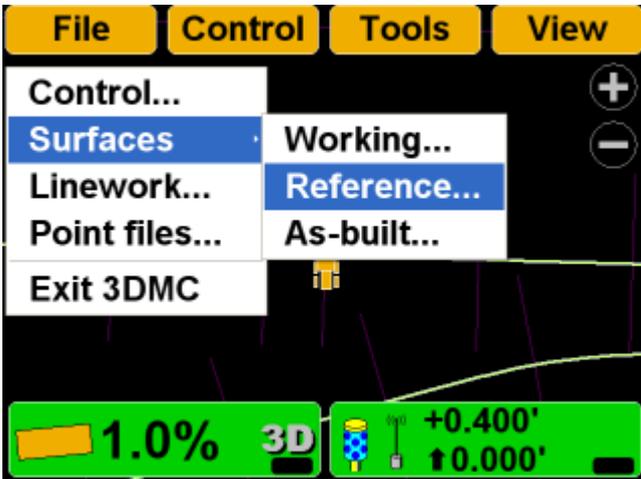


2. Select the working surface file for the jobsite and press **Ok**.

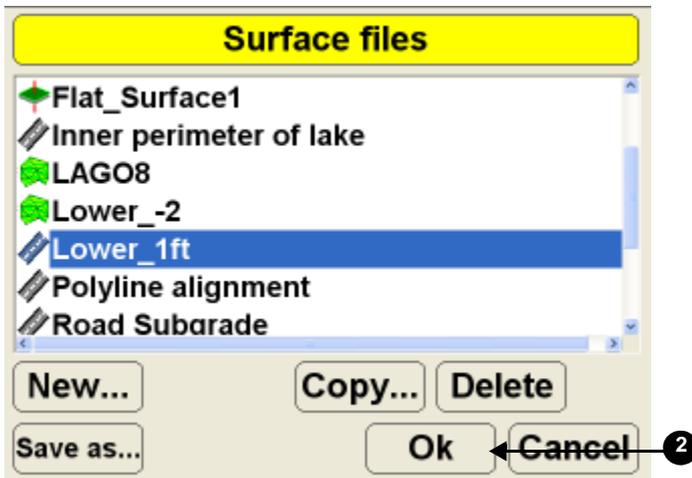


Selecting a Reference Surface File

1. Press **TopconLogo** ▶ **File** ▶ **Surfaces** ▶ **Reference**.



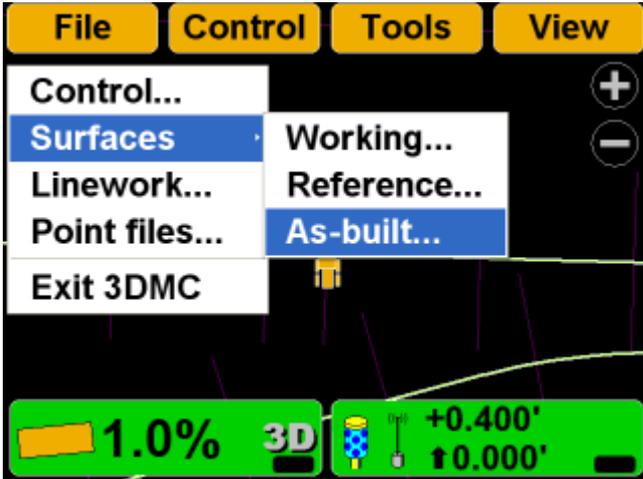
2. Select the reference surface file for the jobsite and press **Ok**.



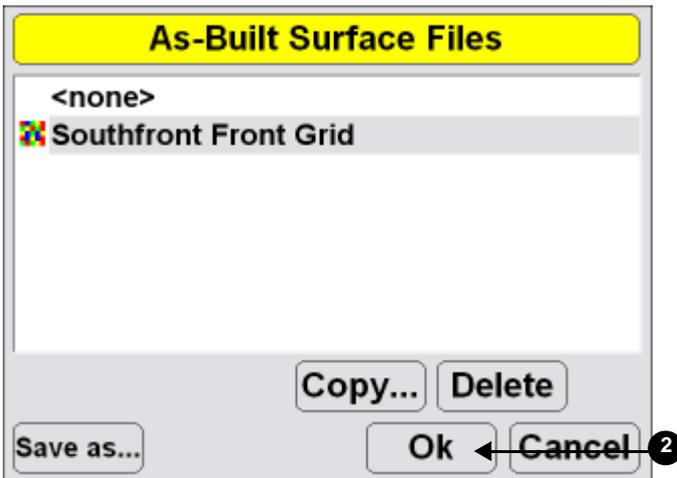
Selecting an As-built Surface File

As-built surface files display a colored map of the graded surface.

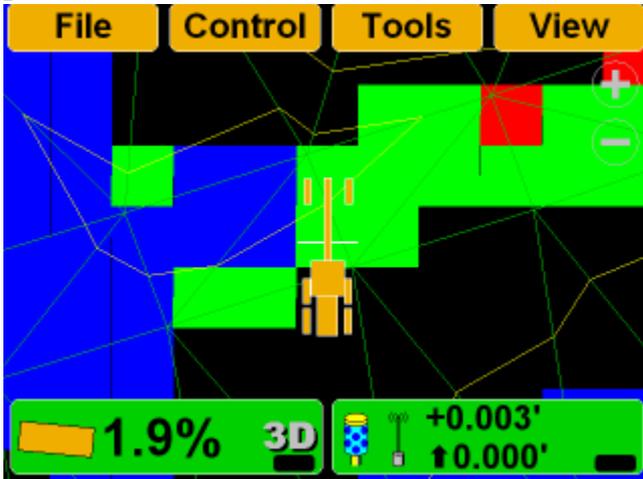
1. Press **TopconLogo** ▶ **File** ▶ **Surfaces** ▶ **As-built**.



2. Select the as-built surface file for the jobsite and press **Ok**.



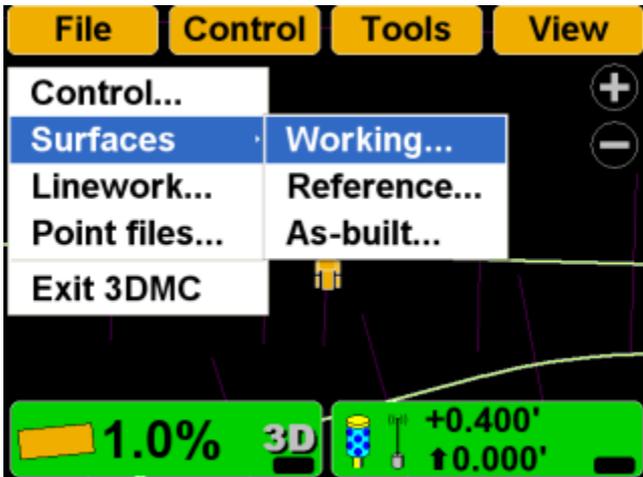
Example:



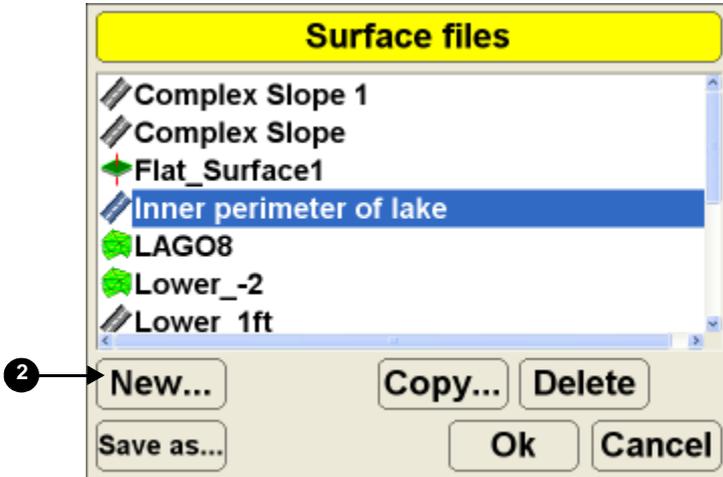
Creating Surface Files

Creating a New Plane Surface File

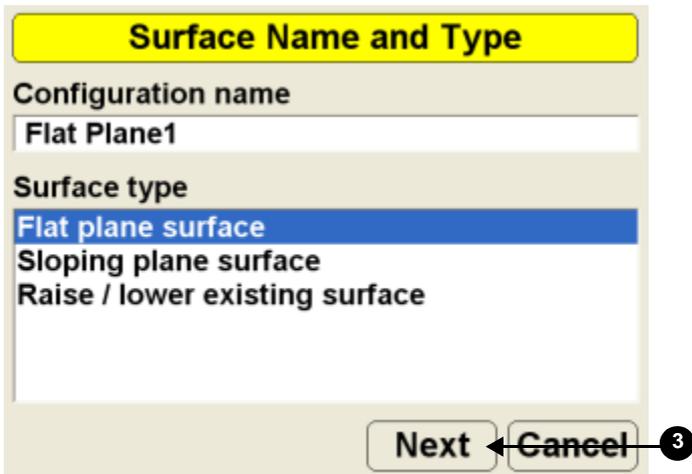
1. Press **Topcon Logo** ▶ **File** ▶ **Surfaces** ▶ **Working**, **Reference**, or **As-built**.



2. Press **New**.

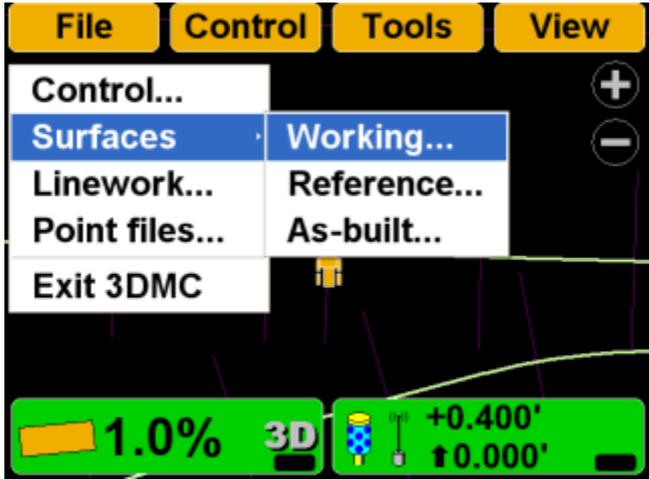


3. Enter the name of the surface. Press **Next**.

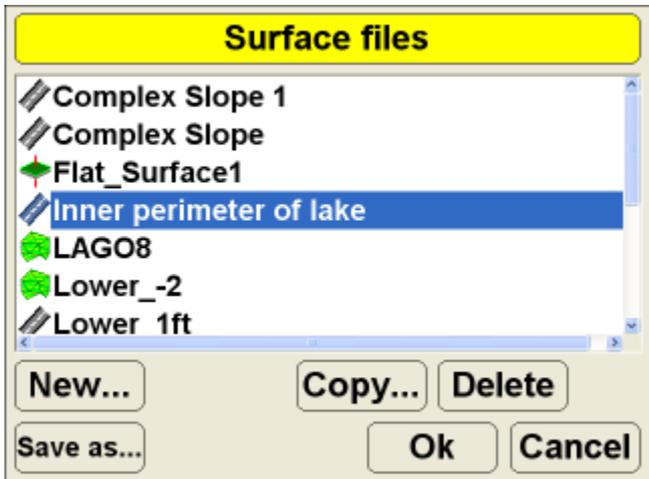


Creating a Flat Plane Surface

1. Press **Topcon Logo** ▶ **File** ▶ **Surfaces** ▶ **Working** or **Reference**.



2. Press **New**.



3. Enter the name of the new surface file. Press **Next**.

Surface Name and Type

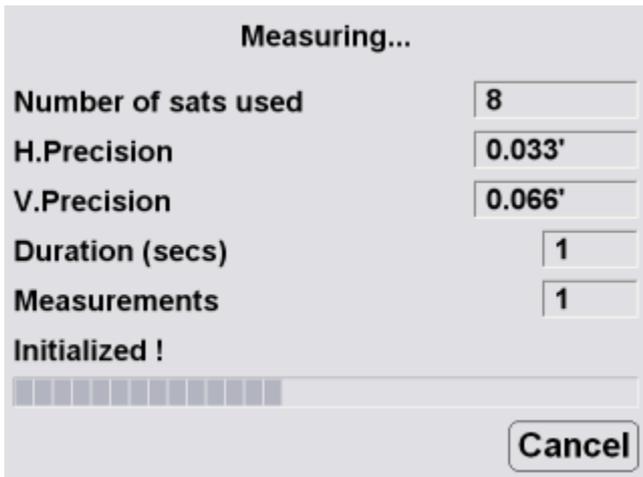
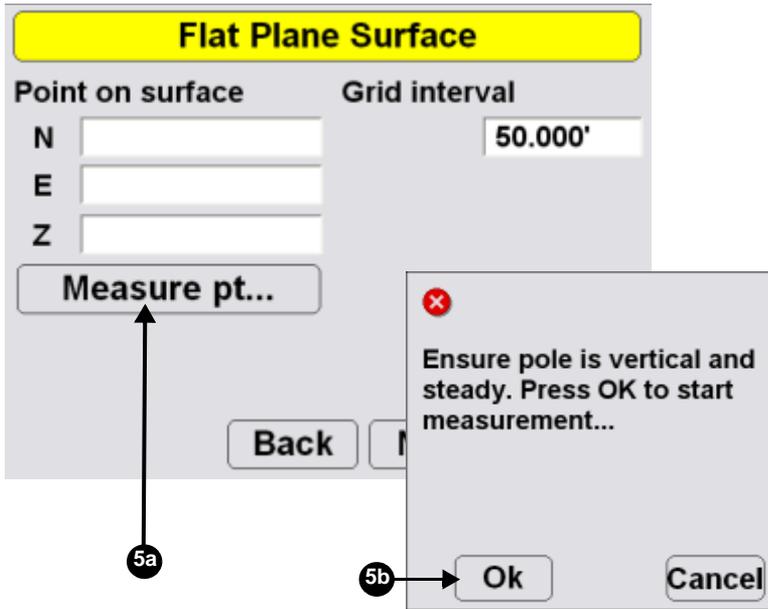
Configuration name
Flat Plane File

Surface type
Flat plane surface
Sloping plane surface
Raise / lower existing surface

Next Cancel

4. Move the machine to the elevation reference point.

- When the sensor is over the point, press **Measure pt** to measure the elevation reference point, and then Press **Ok**.



6. Enter a grid interval for the main screen. Press **Next**.

Flat Plane Surface

Point on surface	Grid interval
N 11376.490'	50.000'
E 8873.210'	
Z 56.430'	

Measure pt...

Back Next Cancel

7. Press **Finish** to save the new surface file.

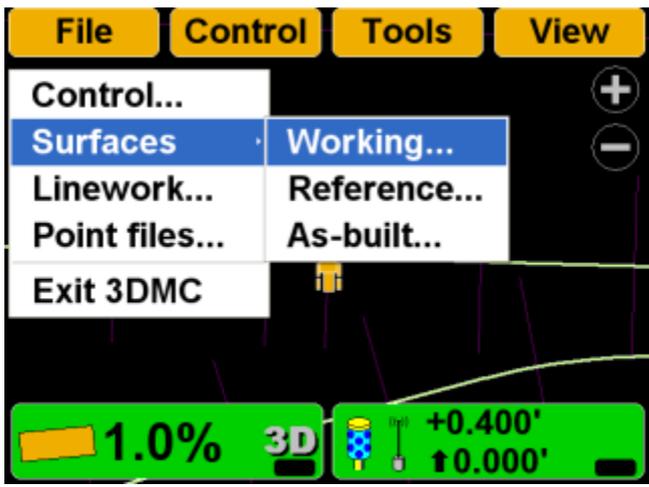
Surface Complete

Surface is complete ! Press "Finish" to save surface...

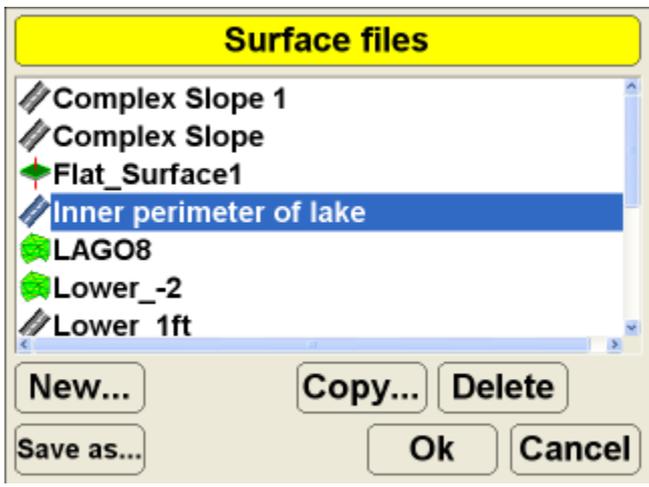
Back Finish Cancel

Creating a Sloping Plane Surface

1. Press **Topcon Logo** ▶ **File** ▶ **Surfaces** ▶ **Working** or **Reference**



2. Press **New**.



3. Enter the name of the new surface file. Press **Next**.

Surface Name and Type

Configuration name
Sloping Plane File

Surface type
Flat plane surface
Sloping plane surface
Raise / lower existing surface

Next Cancel

4. Move the machine to the elevation reference point.
5. Move the machine to point A and position the sensor on the cutting edge on the selected point.

- When the cutting edge rests on the point, press **A** to measure the point, and then press **Ok**.

The screenshot shows the 'Sloping Plane Surface' menu with the following fields and buttons:

- Point on surface:** N, E, Z (input fields)
- Main-fall (A -> B):** Direction (0°00'00"), Grade (0.000%)
- Buttons:** A, B (with callout 6a), Measure pt..., Back, M
- Grid interval:** 50.000'
- Cross-fall:** Grad (input field)

An overlaid dialog box contains the following text:

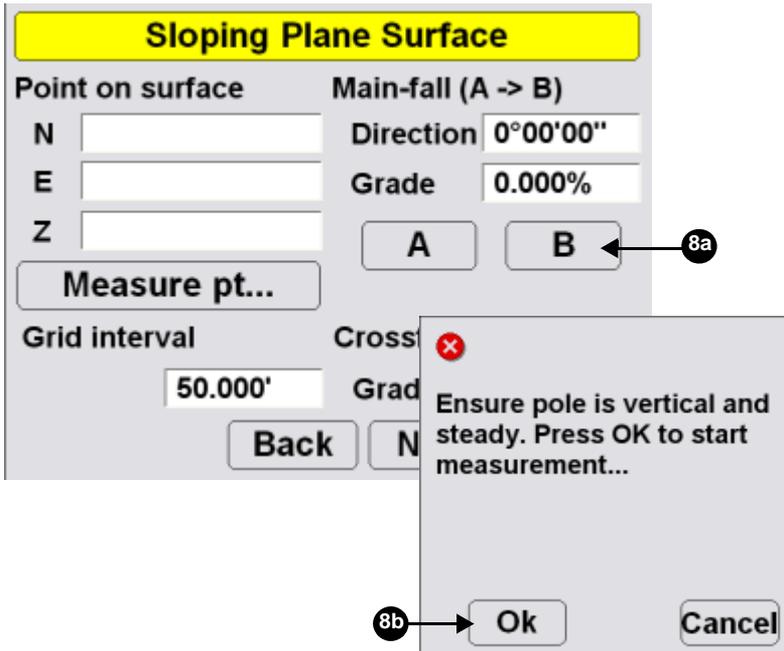
Ensure pole is vertical and steady. Press OK to start measurement...

Buttons: Ok (with callout 6b), Cancel

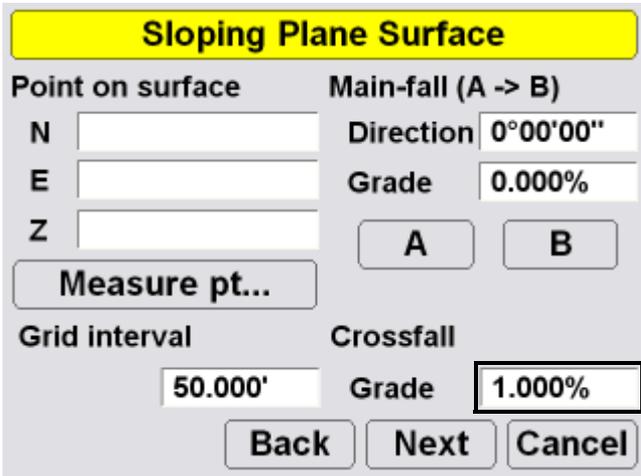
The 'Measuring...' dialog box displays the following information:

- Number of sats used:** 8
- H.Precision:** 0.033'
- V.Precision:** 0.066'
- Duration (secs):** 1
- Measurements:** 1
- Initialized !** (with a progress bar)
- Buttons:** Cancel

7. Move to point B and position the sensor on the cutting edge on the selected point.
8. When the cutting edge rests on the point, press **B** to measure the point, and then press **Ok**.

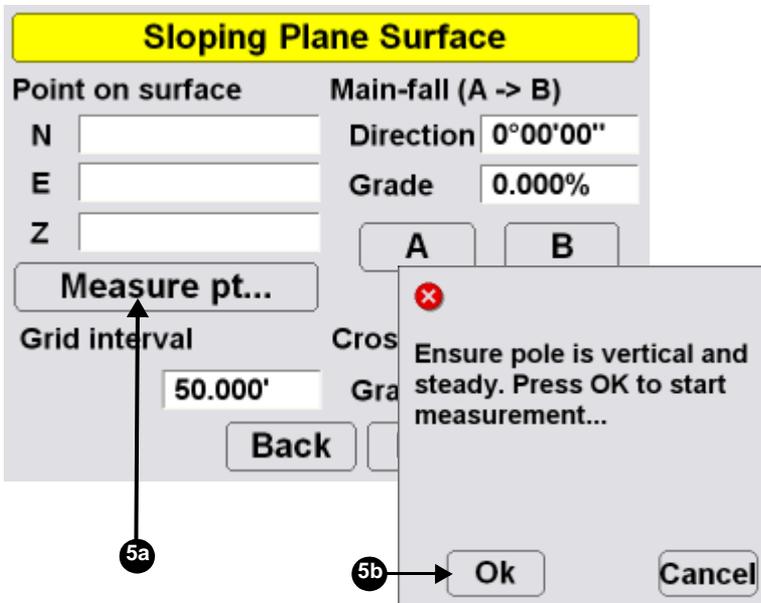


9. Press the *Crossfall Grade* entry box and enter a crossfall.



10. Move the machine to the elevation reference point.

11. Press **Measure pt.** and then press **Ok.**



12. Enter a grid interval and crossfall. Press **Next**.

Sloping Plane Surface

Point on surface Main-fall (A -> B)

N 11376.490' Direction 0°00'00"

E 8873.210' Grade 0.000%

Z 56.430'

Measure pt... A B

Grid interval Crossfall

50.000' Grade 1.000%

Back Next Cancel

13. Press **Finish** to save the new surface file and end the process.

Surface Complete

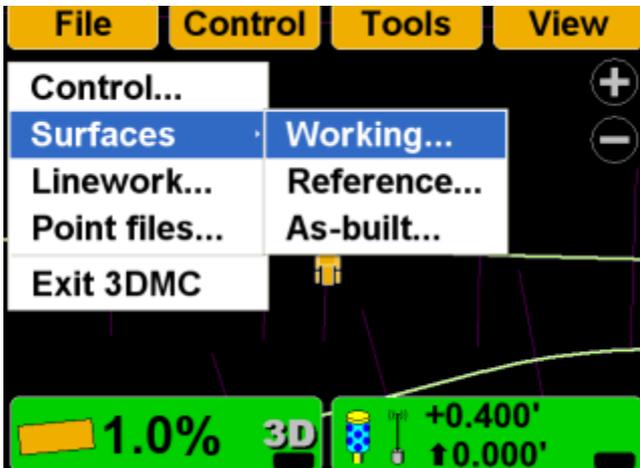
Surface is complete ! Press "Finish" to save surface...

Back Finish Cancel

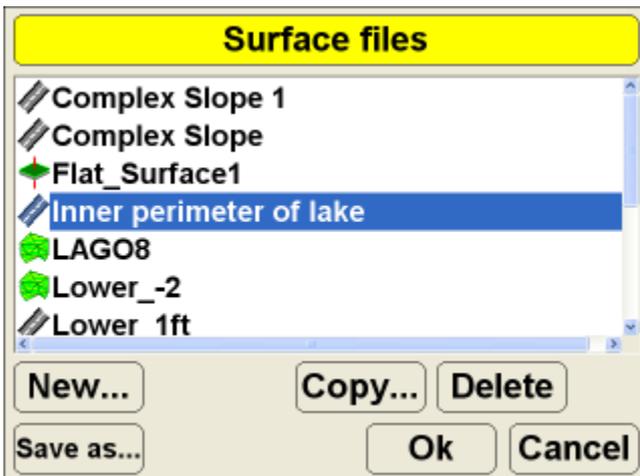
Raising or Lowering the Existing Surface

Raise/Lower the existing surface creates a new surface file based on an existing file.

1. Press **Topcon Logo** ▶ **File** ▶ **Surfaces** ▶ **Working** or **Reference**.



2. Press **New**.



- Enter the name of the new Raise/lower existing surface file. Press **Next**.

Surface Name and Type

Configuration name
Raise +1

Surface type
Flat plane surface
Sloping plane surface
Raise / lower existing surface

Next Cancel

- Select the surface to use as the reference from which to raise or lower the new surface.
- Enter an elevation adjustment. Press **Next**.

Raise / Lower Surface

Existing surface :
Inner perimeter of lake

Elevation adjustment : 1.000'

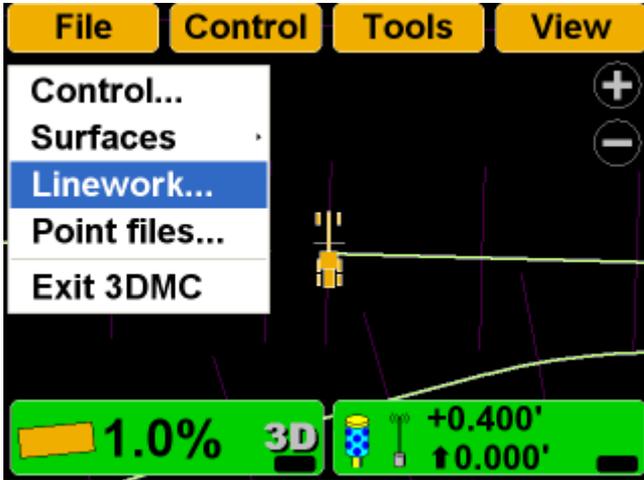
Back Next Cancel

4 5a 5b

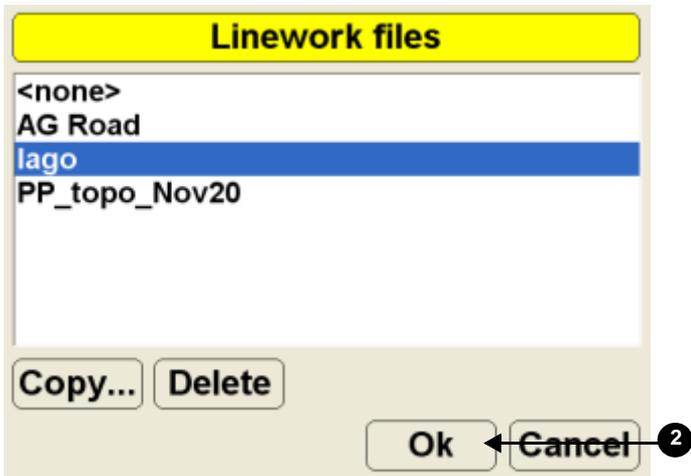
- Press **Finish** to save the new surface file.

Selecting Jobsite Files

1. From the main screen, navigate to the file type dialog box.
 - **Topcon Logo ▶ File ▶ Linework**
 - **Topcon Logo ▶ File ▶ Point files**



2. On the Linework/Point files dialog box, select the file for the jobsite and press **Ok**.

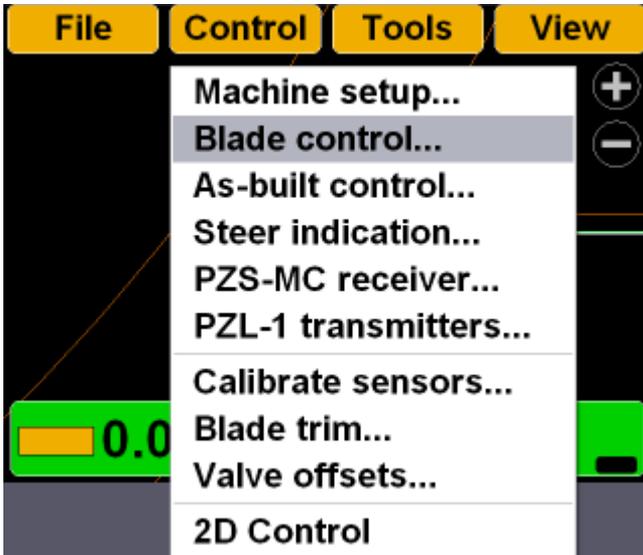


Setting Blade Control

Automatic Best-Fit Blade Control

When using the automatic best-fit method, 3DMC uses the entire cutting edge of the blade as the elevation reference.

1. Press **Topcon Logo** ▶ **Control** ▶ **Blade control**.



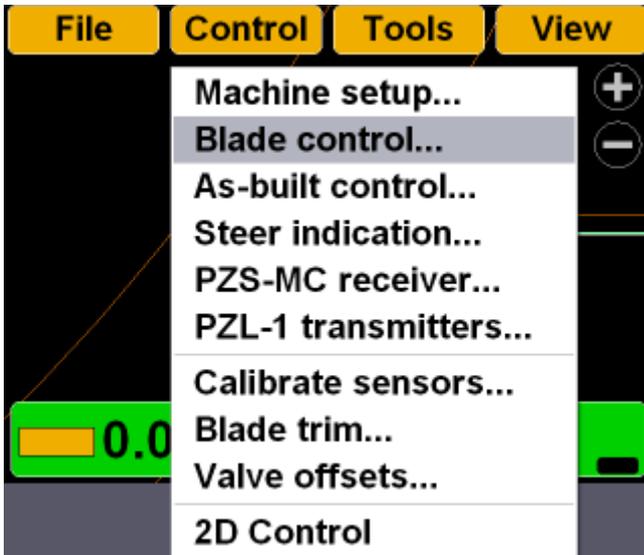
2. Select *Automatic best-fit (whole blade)*.



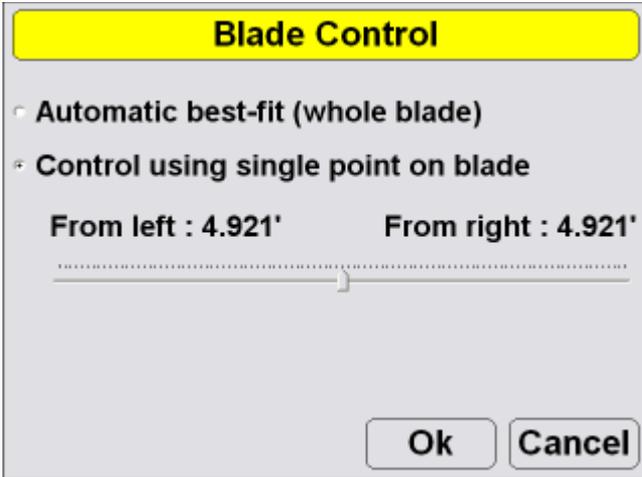
Control Using Single Point on Blade

When using the control using single point on blade method, 3DMC uses a selected point on the blade to use as the elevation reference rather than the entire cutting edge of the blade.

1. Press **Topcon Logo** ▶ **Control** ▶ **Blade control**.

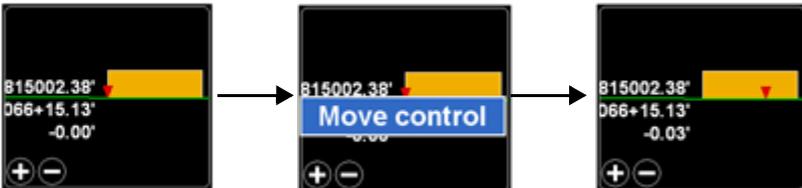


2. Select *Control using single point on blade*.



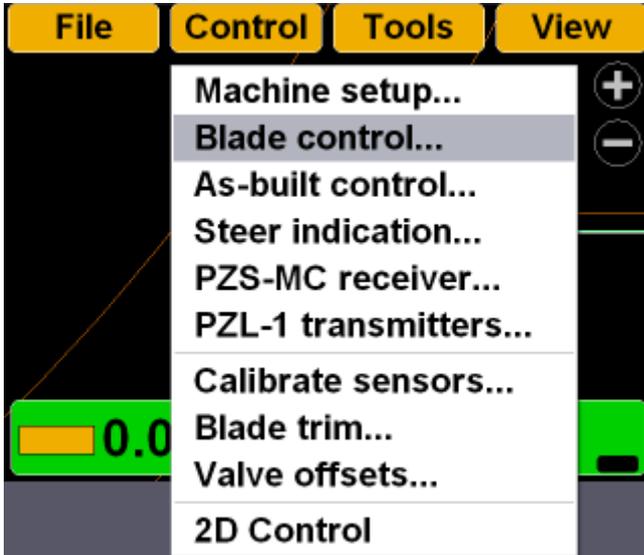
To quickly change the blade control point using the section view:

- To move to the far left or far right edge of the blade, press and hold the edge of the blade for one second. On the pop-up menu, tap **Move control left** or **Move control right**.
- Press and hold a point on the blade for one second. On the pop-up menu, tap **Move control**.

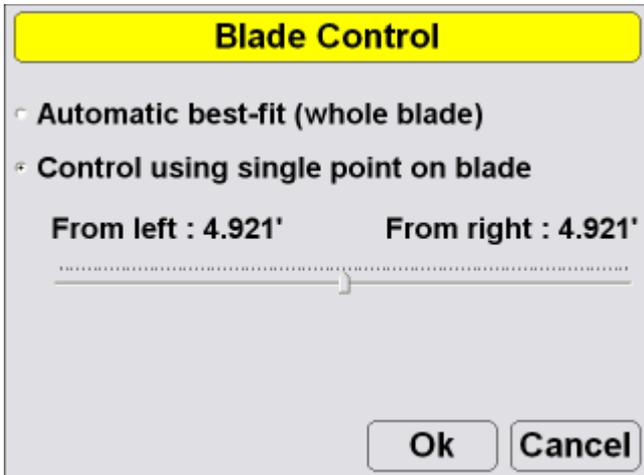


To change the blade control point using the Control menu:

1. Press **Topcon Logo** ▶ **Control** ▶ **Blade control**.



2. With *Control using single point on blade* selected, hold the slider button and move it left or right to select a point at a distance from the left/right side of the blade.

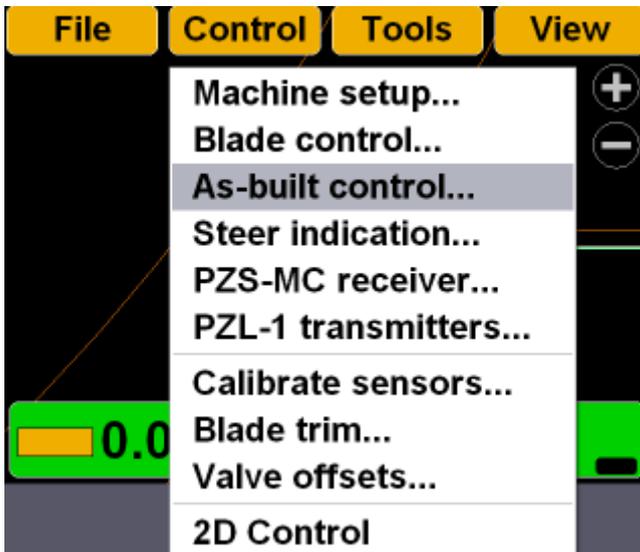


3. Press **OK** to apply this blade control point to the machine.

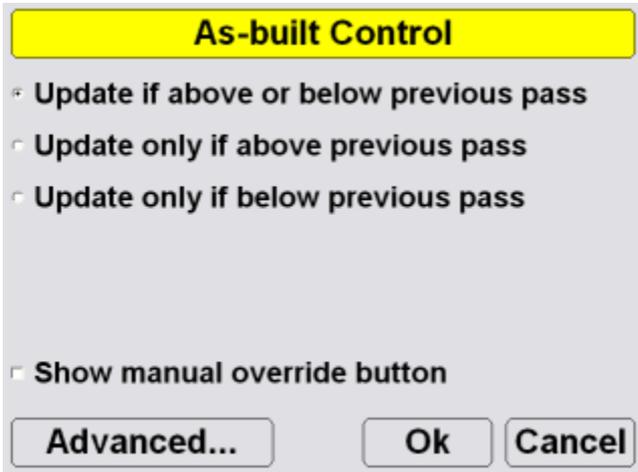
Setting As-built Control Options

As-built surface files display a colored map of the graded surface.

1. Press **Topcon Logo** ▶ **Control** ▶ **As-built control**.



2. Select the As-built options. Then press **Advanced** to view the advanced options.



The screenshot shows a dialog box titled "As-built Control" with a yellow header. It contains three radio button options for updating based on previous pass results, and a checkbox for a manual override button. At the bottom are three buttons: "Advanced...", "Ok", and "Cancel".

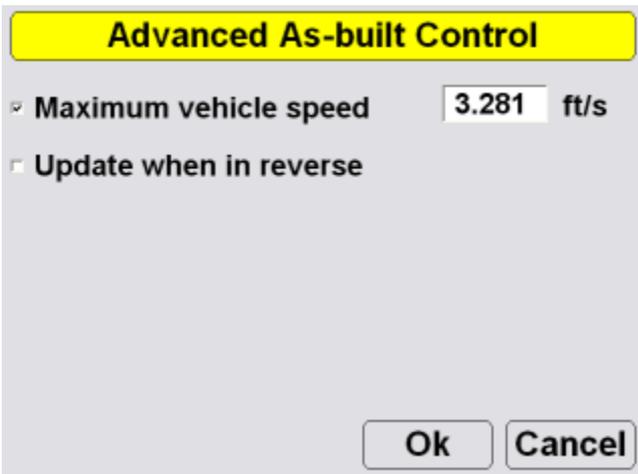
As-built Control

- Update if above or below previous pass
- Update only if above previous pass
- Update only if below previous pass

Show manual override button

Advanced... Ok Cancel

3. Select advanced options, and press **Ok**.



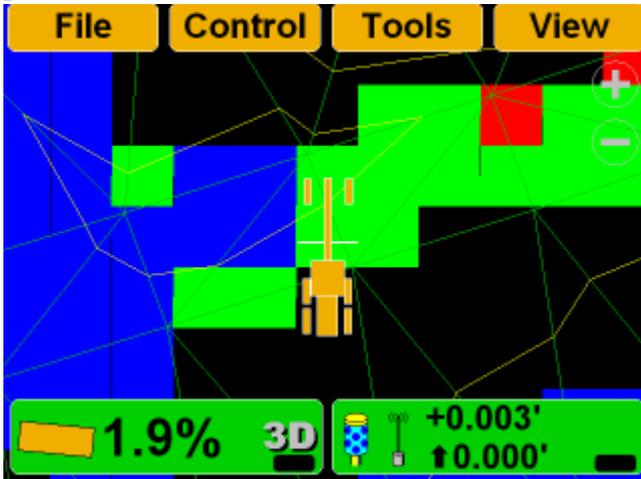
The screenshot shows a dialog box titled "Advanced As-built Control" with a yellow header. It contains a checked radio button for maximum vehicle speed with a text input field showing "3.281 ft/s", and an unchecked radio button for updating when in reverse. At the bottom are two buttons: "Ok" and "Cancel".

Advanced As-built Control

- Maximum vehicle speed ft/s
- Update when in reverse

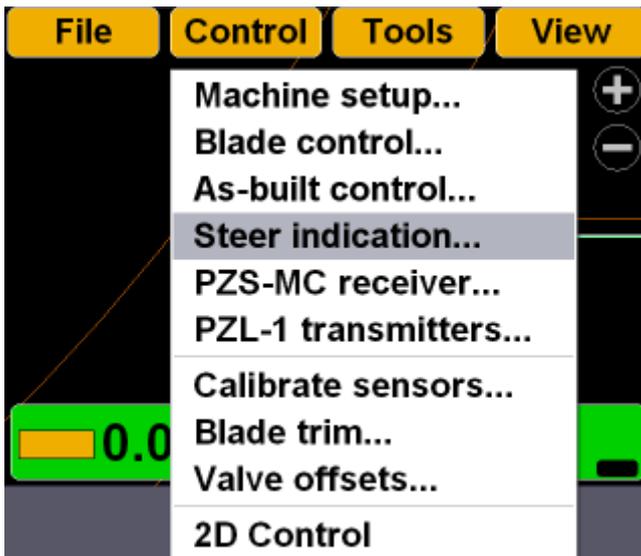
Ok Cancel

Example:

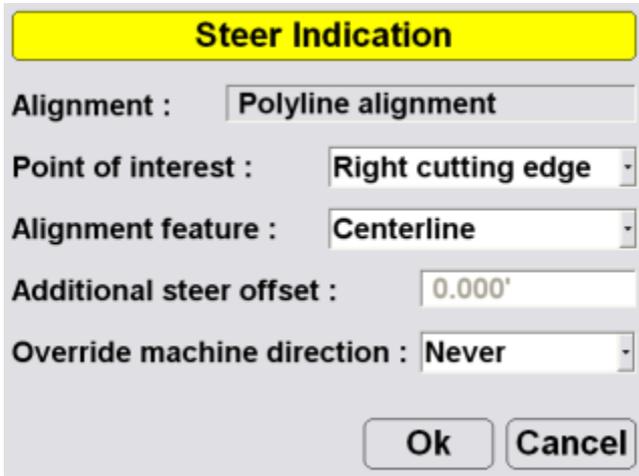


Setting Steer Indication Options

1. Press **Topcon Logo** ▶ **Control** ▶ **Steer indication**.



2. Select the steer indication options. Then press **Ok**.



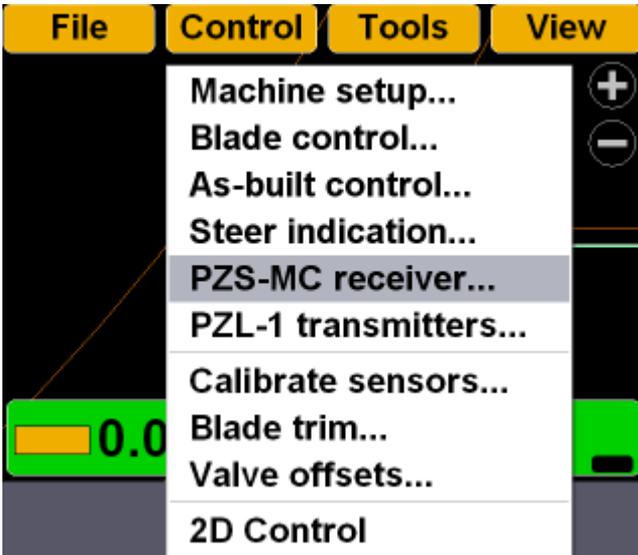
The image shows a dialog box titled "Steer Indication" with a yellow header. It contains five settings:

- Alignment :** Polyline alignment
- Point of interest :** Right cutting edge
- Alignment feature :** Centerline
- Additional steer offset :** 0.000'
- Override machine direction :** Never

At the bottom right, there are two buttons: "Ok" and "Cancel".

Setting PZS MC-G3 Receiver Options

1. Press **Topcon Logo** ▶ **Control** ▶ **PZS-MC receiver**



2. Set the PZS MC-G3 options. Then press **Ok**.



Setting PZL-1 Transmitter Options

1. Press **Topcon Logo** ▶ **Control** ▶ **PZL-1 transmitter**.

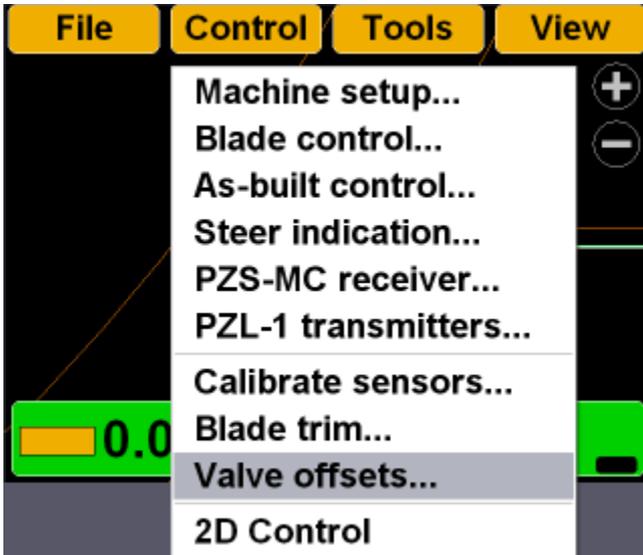


2. Set the PZL-1 transmitter options. Then press **Ok**.

 A screenshot of the 'PZL-1 Transmitters' configuration screen. The title 'PZL-1 Transmitters' is in a yellow header. Below the header are five tabs: 'Ch-1', 'Ch-2', 'Ch-3', 'Ch-4', and 'Transmitters'. The 'Transmitters' tab is selected. The screen contains several input fields: 'Transmitter S/N :' with a dropdown menu showing 'Channel not active'; 'Control point :' with an empty text box; 'Height of transmitter :' with a text box containing '0.000''; and 'Measured to :' with a dropdown menu showing 'Mark/Slant'. At the bottom right, there are two buttons: 'Ok' and 'Cancel'.

Valve Offset Calibration

1. Raise the machine blade so that both sides of the cutting edge rest a few inches above the ground.
2. At the display, tap **Topcon Logo ▶ Control ▶ Valve offsets.**



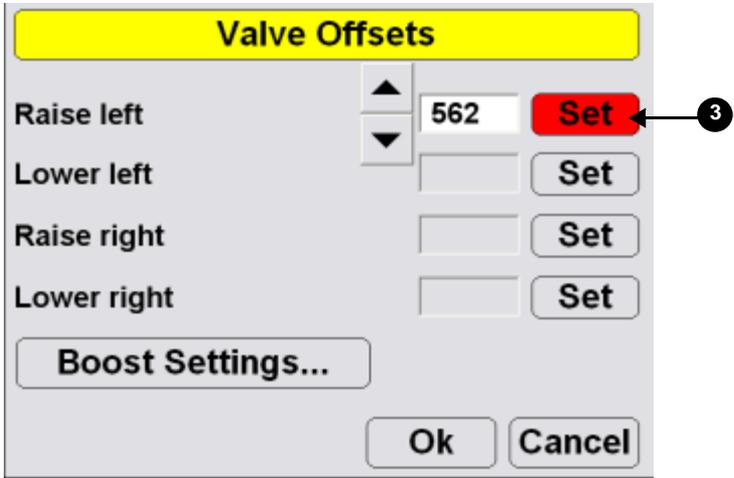
WARNING

Since the blade is about to move, automatically, **HANDS and FEET** should be clear of the blade!

3. Press *Raise left Set* and tap the arrows to increase or decrease the valve offsets.

NOTICE

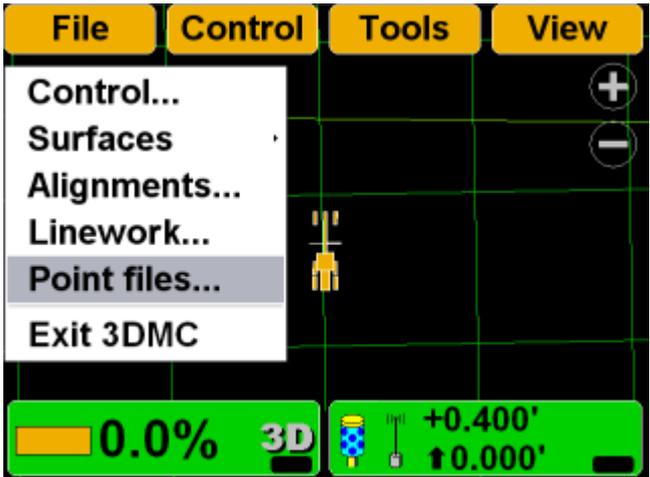
Boost Setting adjustments are not recommended and may cause poor machine performance.



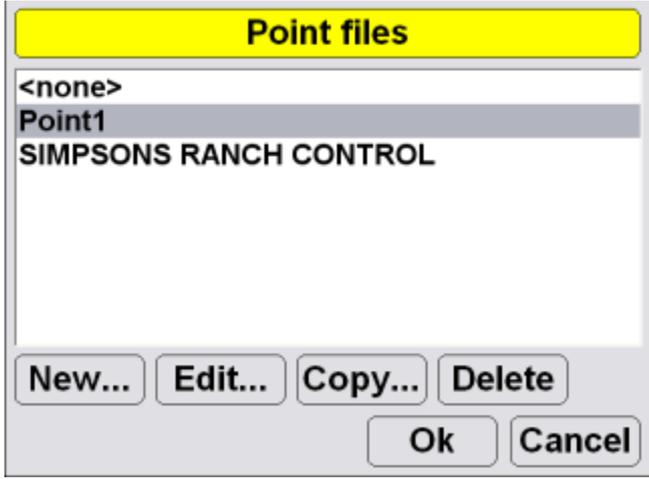
4. Repeat Step 3 for each of the selections.
5. Press **OK**.

Performing Topographic Surveys

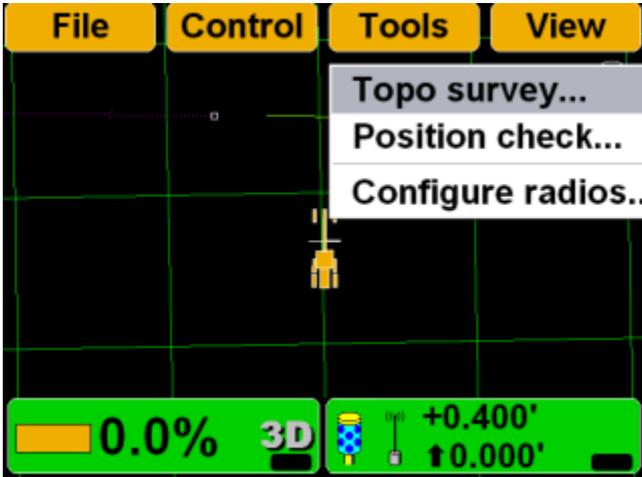
1. Press **Topcon Logo** ▶ **File** ▶ **Point files**.



2. Create a new point file or select an existing point file. Press **Ok** to return to the Main Screen.



3. Press **Topcon Logo** ▶ **Tools** ▶ **Topo survey**.



4. Enter or select the information. Press **Ok** when done.

Topo survey

Log by minimum distance -

Minimum distance 30.000'

Log to layer Layer1 -

Log at Mid cutting edge -

Lower all elevations by 0.000'

Ok
Cancel

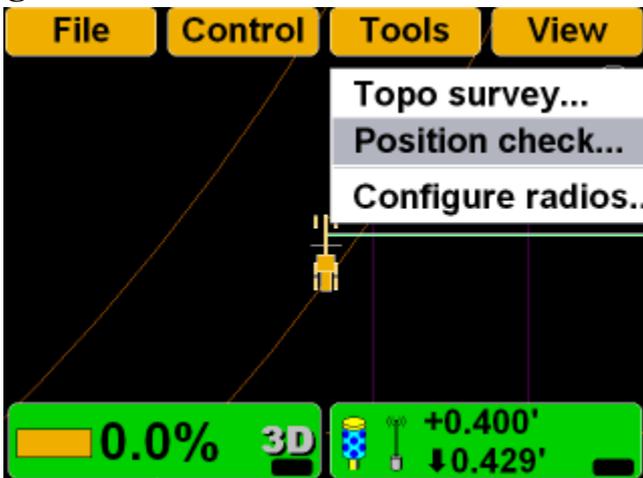
5. Press **Ok** to start the topo survey function.
6. Begin driving. When the machine begins to move, 3DMC will begin measuring and logging the data.

7. To stop topo measurements, press **Topcon Logo** ▶ **Stop topo survey**. Otherwise, 3DMC continues logging measurements.



Checking the Blade's Position

1. To check the position of the blade, press **Topcon Logo** ▶ **Tools** ▶ **Position check**.



2. On the *Position Check* dialog box, select the *Point of interest* (either left edge or right edge of blade), and press **Measure**.

Position Check

Point of interest : **Left cutting edge** ← 2a

North

East

Elev

Cut to design surface :

Alignment stationing :

Measure... ← **Cancel** 2b

Number of sats used

H.Precision

V.Precision

Duration (secs)

Measurements

Initialized !

Cancel

3. When finished, the *Position Check* dialog box displays the point on the job at the selected edge of

the blade. Press **Cancel** to return to the Main Screen.

Position Check

Point of interest :

North

East

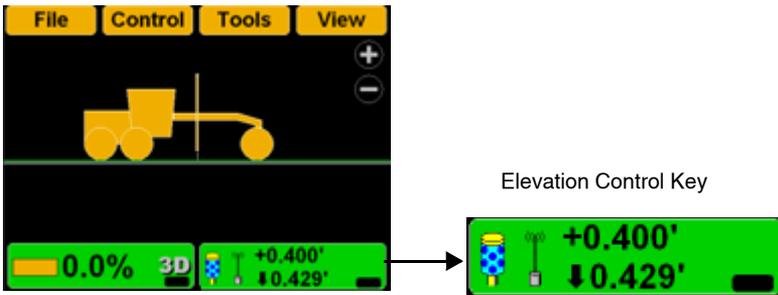
Elev

Cut to design surface :

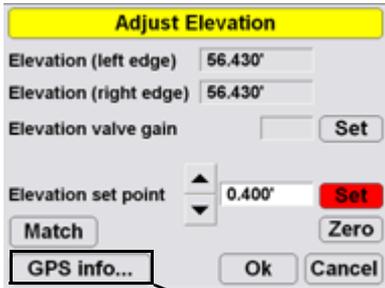
Alignment stationing :

Viewing GPS Information

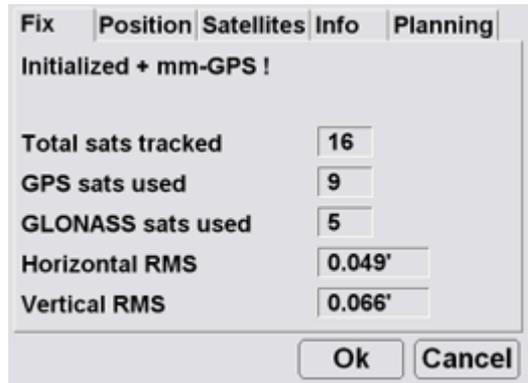
1. To view the *GPS information* dialog box and tabs, press the **Elevation control** key.



2. Press the **GPS info** button.



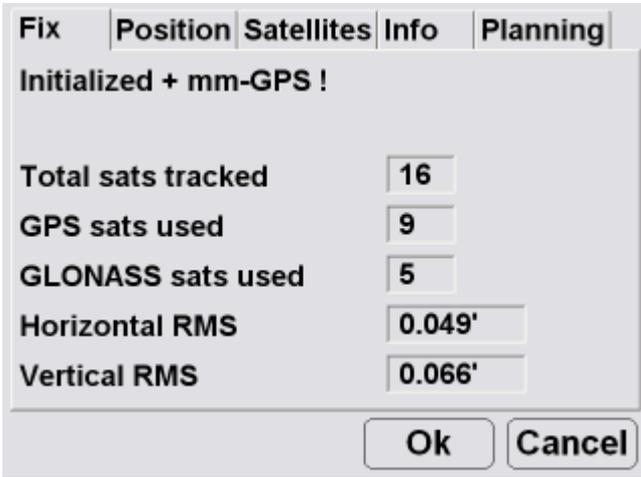
The 'Adjust Elevation' dialog box has a yellow title bar. It contains several input fields and buttons. The 'Elevation (left edge)' and 'Elevation (right edge)' fields both show '56.430''. The 'Elevation valve gain' field is empty, with a 'Set' button to its right. The 'Elevation set point' field shows '0.400'' and has a red 'Set' button to its right. Below this are 'Match' and 'Zero' buttons. At the bottom, there are 'Ok' and 'Cancel' buttons. The 'GPS info...' button is highlighted with a black border and a black arrow points from it to the second dialog box.



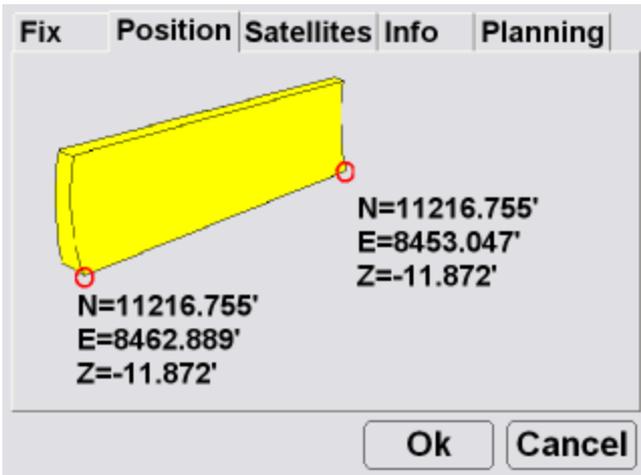
The 'GPS Info' dialog box has a title bar with tabs for 'Fix', 'Position', 'Satellites', 'Info', and 'Planning'. The 'Info' tab is selected. The text 'Initialized + mm-GPS !' is displayed. Below this are several data points with corresponding input fields: 'Total sats tracked' (16), 'GPS sats used' (9), 'GLONASS sats used' (5), 'Horizontal RMS' (0.049'), and 'Vertical RMS' (0.066'). At the bottom are 'Ok' and 'Cancel' buttons.

Fix	Position	Satellites	Info	Planning
Initialized + mm-GPS !				
Total sats tracked			16	
GPS sats used			9	
GLONASS sats used			5	
Horizontal RMS			0.049'	
Vertical RMS			0.066'	
		Ok		Cancel

GPS Status and Quality (Fix)

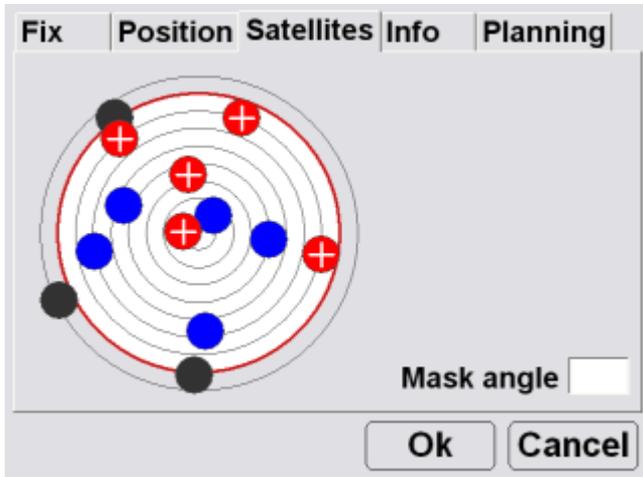


Cutting Edge Position (Position)



Monitor Satellites and Enter Mask Angle

(Satellites)

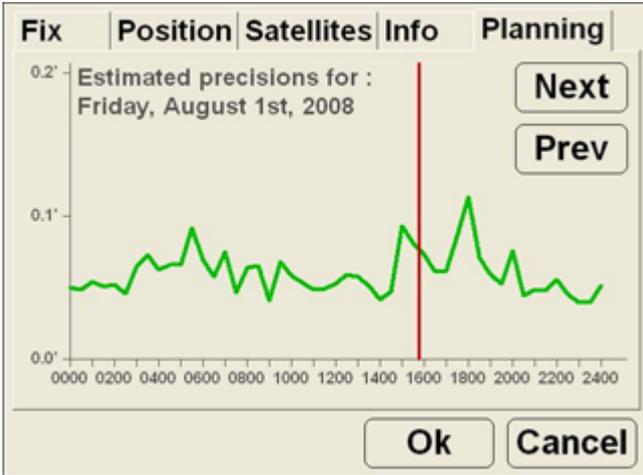


View Receiver Information or Reset Receiver (Info)



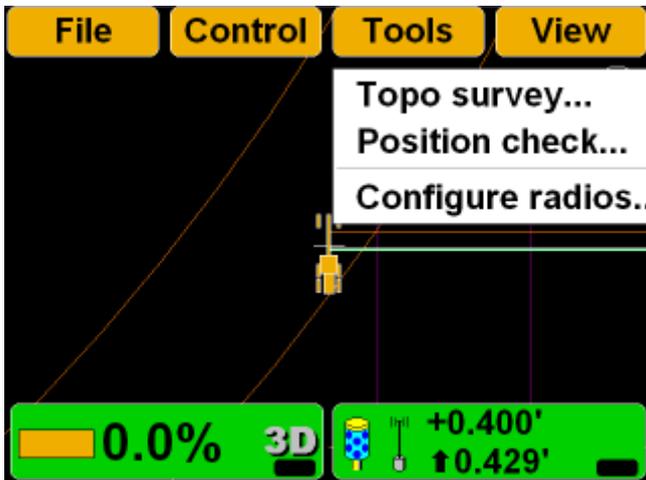
Satellite Planning Information (Planning)

The red vertical line marks the current time.



Changing Radio Channels

1. Press **Topcon Logo** ▶ **Tools** ▶ **Configure radios**.



2. Select the *Radio type* that matches the radio type in the MC-R3, and then press **Configure**. 3DMC will connect to the radio after several second.

GPS Radio Configuration

Radio type: Topcon FH915 (SS)

Connected to: Serial Port B

Baud rate: 38400

Format: CMR

Configure... Ok Cancel

GPS Radio Configuration

Radio type: Topcon FH915 (SS)

Connected to: Serial Port B

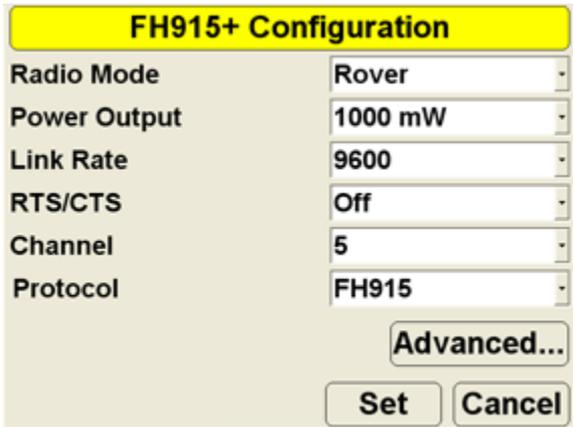
Baud rate: 38400

Format: CMR

Connecting to radio at 38400bps

Configure... Ok Cancel

3. Enter radio configuration information, and select the channel. The channel must match the channel of the base station.



The image shows a dialog box titled "FH915+ Configuration" with a yellow header. It contains several configuration options, each with a dropdown menu:

Radio Mode	Rover
Power Output	1000 mW
Link Rate	9600
RTS/CTS	Off
Channel	5
Protocol	FH915

At the bottom right of the dialog box, there is an "Advanced..." button, and at the bottom center, there are "Set" and "Cancel" buttons.

4. Press **Advanced** to select the country of operation, and then press **Ok**.

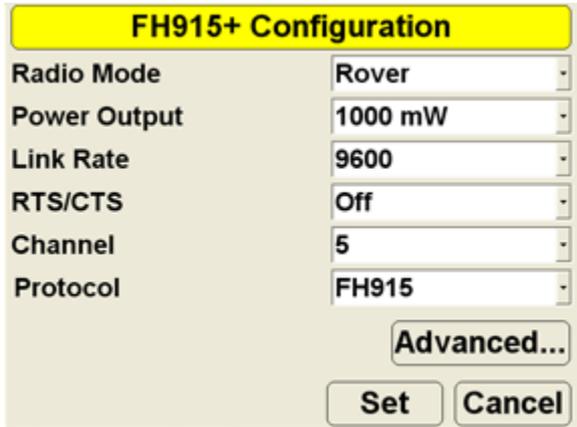


The image shows a dialog box titled "Advanced Settings" with a yellow header. It contains a "Country" dropdown menu with a list of options:

Country	US / Canada
	US / Canada
	Australia
	New Zealand

At the bottom of the dialog box, there are "Ok" and "Cancel" buttons.

5. Press **Set** to save the radio configuration settings and return to the GPS Radio Configuration screen.



The screenshot displays the 'FH915+ Configuration' screen with the following settings:

Setting	Value
Radio Mode	Rover
Power Output	1000 mW
Link Rate	9600
RTS/CTS	Off
Channel	5
Protocol	FH915

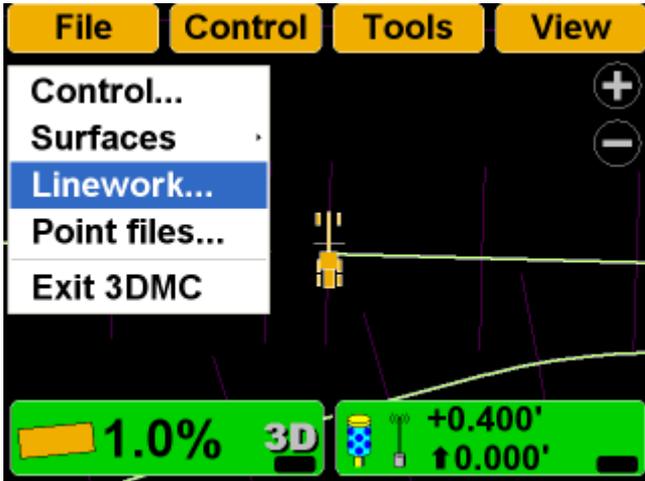
Additional controls include an 'Advanced...' button and 'Set' and 'Cancel' buttons at the bottom.

6. Press **Ok** to save the radio configuration settings and return to the main screen.

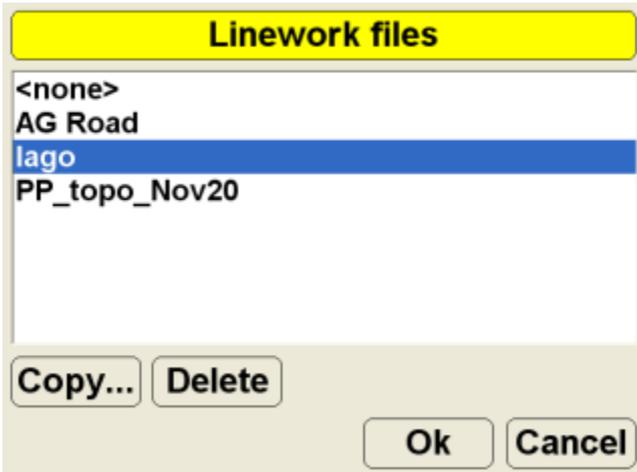
Steering or Grading to Polyline

Steering to Polyline

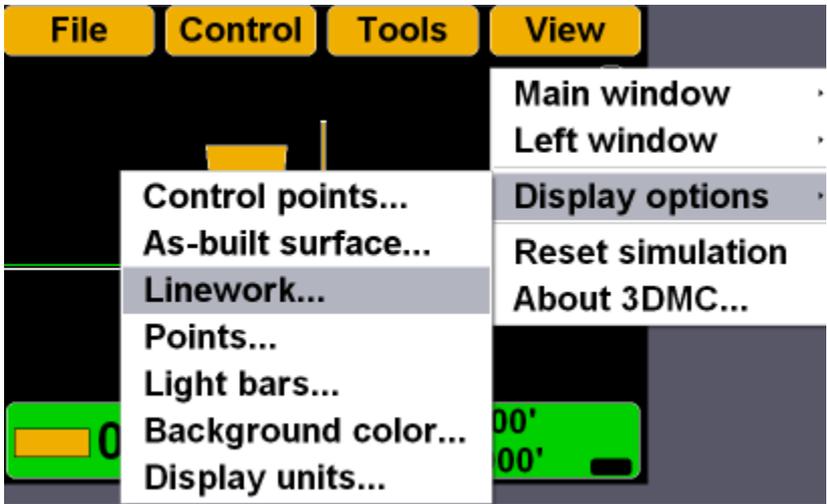
1. Press **Topcon Logo** ▶ **File** ▶ **Linework**.



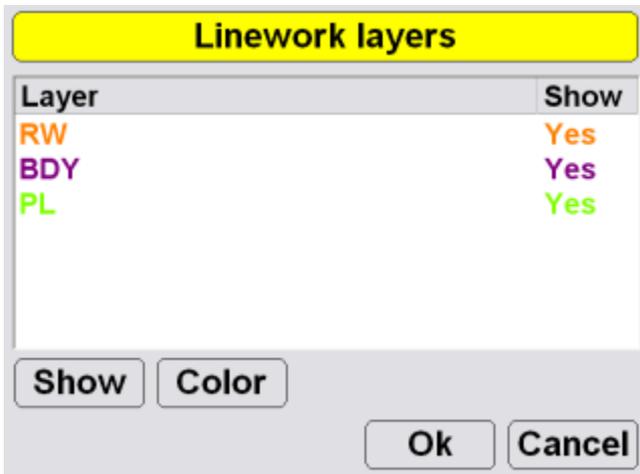
2. Select the Linework file for the job, and Press **Ok**.



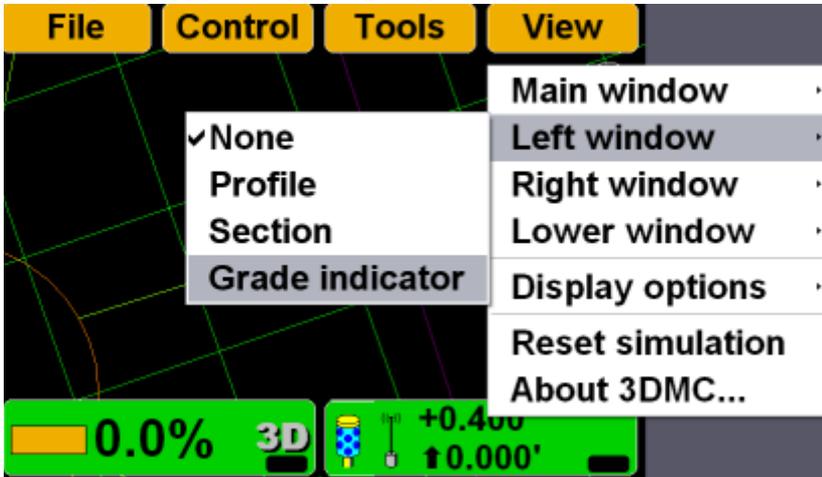
3. Press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Linework**.



4. Select the polylines to display.



5. Press **Topcon Logo** ▶ **View** ▶ **Left Window** ▶ **Grade Indicator**.

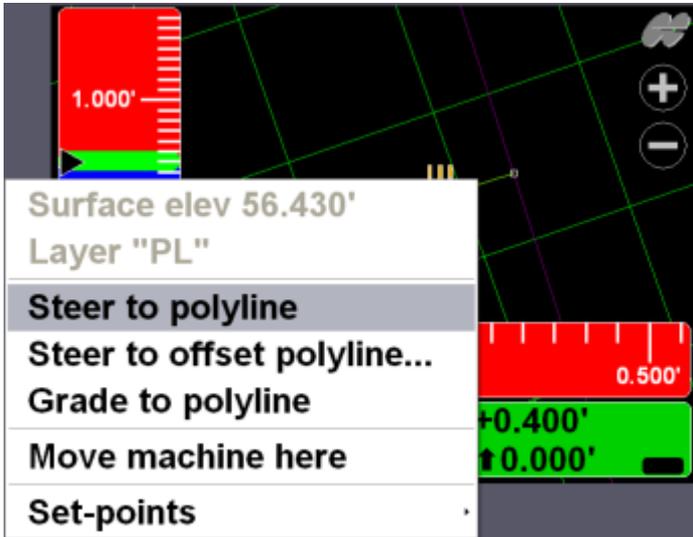


6. Press **Topcon Logo** ▶ **View** ▶ **Lower Window** ▶ **Lightbar**.



7. Press and hold the polyline to use for steering, then press **Steer to polyline** on the pop-up menu;

graphical cross lines display along the selected polyline.



8. Press **Topcon Logo** ▶ **Control** ▶ **Steer indication** to change the steer indication settings.

Steer Indication

Alignment :

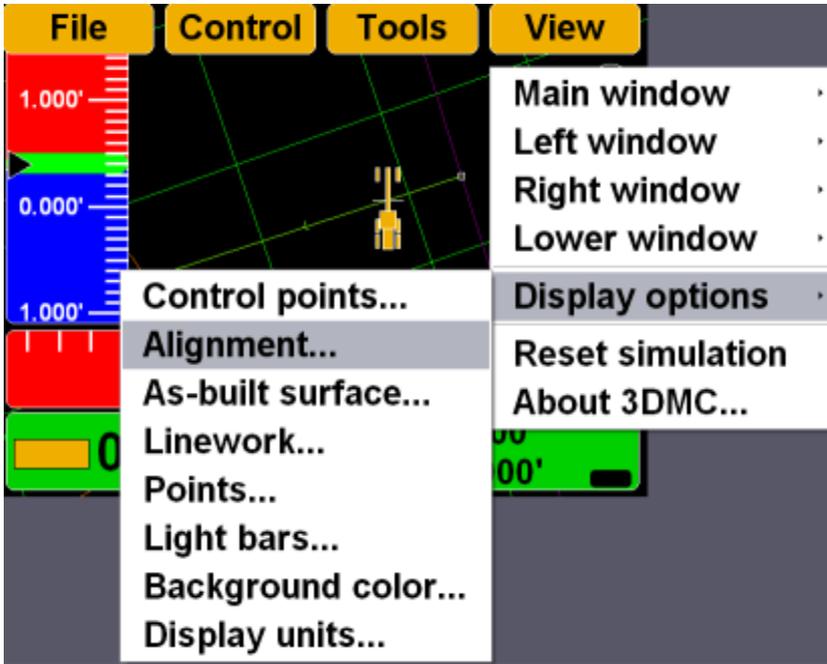
Point of interest :

Alignment feature :

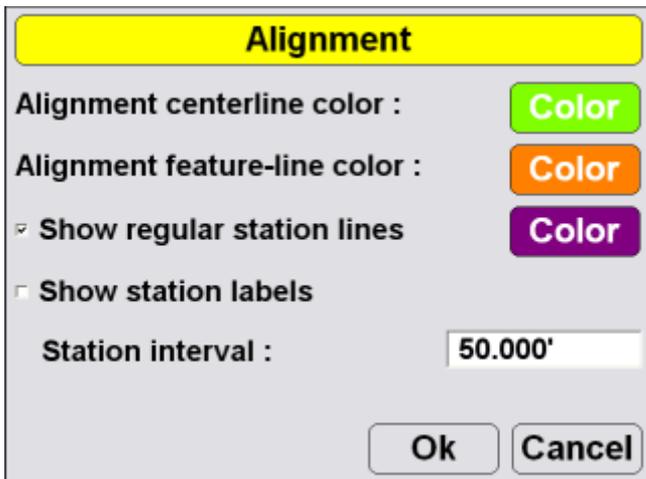
Additional steer offset :

Override machine direction :

9. Press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Alignment**.



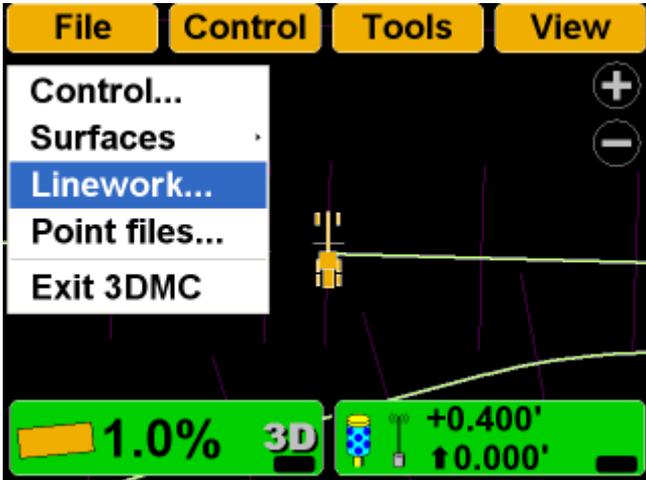
10. Change the alignment settings, and press OK.



11. Begin steering.

Grading to Polyline

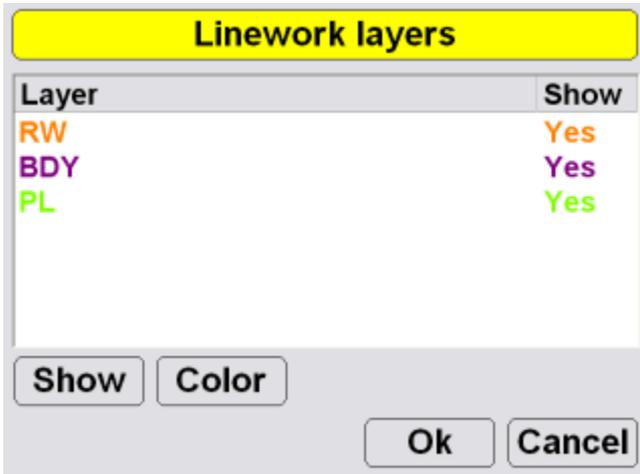
1. Press **Topcon Logo** ▶ **File** ▶ **Linework**, select the correct Linework file, and press **Ok**.



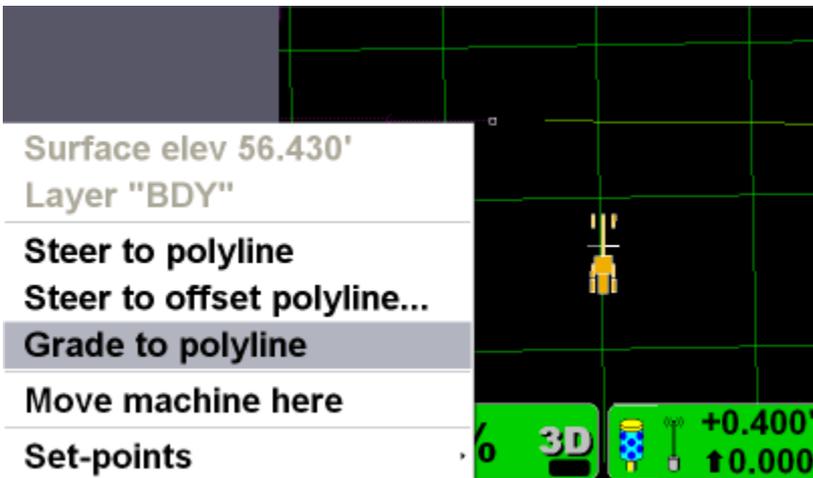
2. Press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Linework**.



3. Select the polylines to display, and press **Ok**.



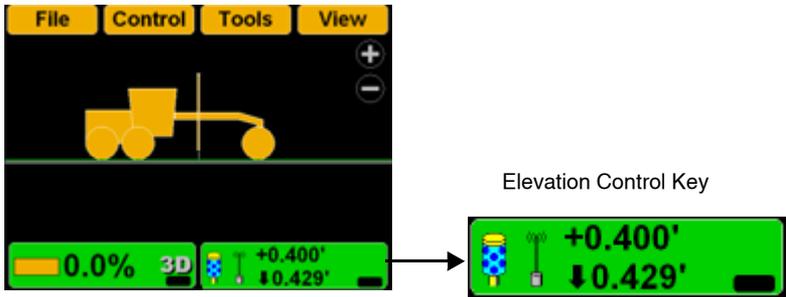
4. On the main screen, press and hold the polyline to use for grading to, then press **Grade to polyline** on the pop-up menu. Graphical cross lines display along the polyline.



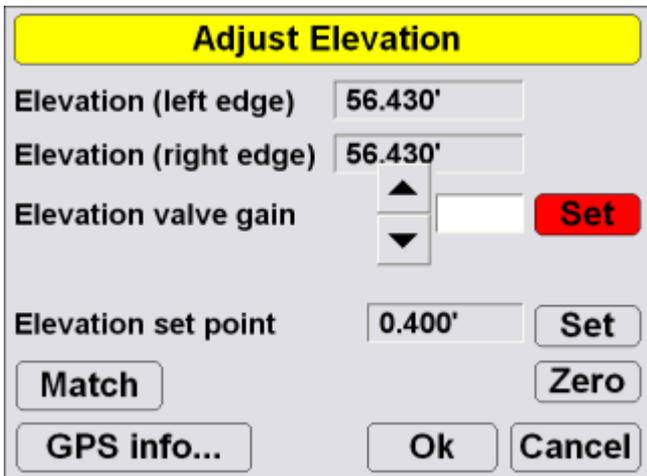
5. Begin grading. As needed, repeat Step 4 above to grade to another polyline.

Adjusting Valve Gain

1. On the 3DMC Main Screen, press the **Elevation Control** key.



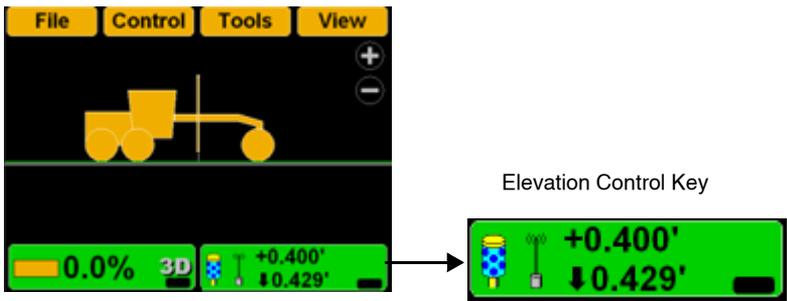
2. Press the *Elevation valve gain Set* key, changing it to red.



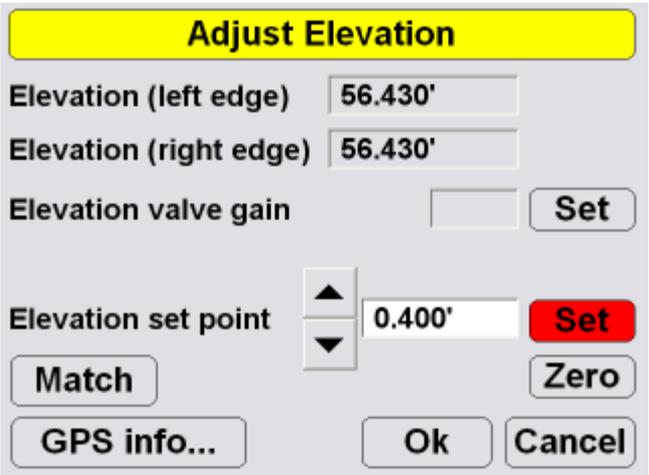
3. Change the offset using the up/down arrow.
4. Press **Ok**.

Changing Cut/Fill Offsets

1. On the 3DMC Main Screen, press the **Elevation Control** key.



2. Press *Elevation set point* **Set**, changing it to red.

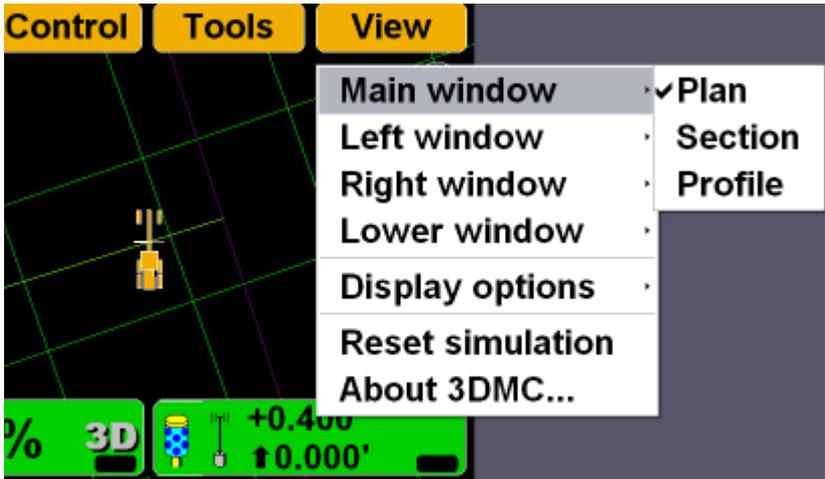


3. Change the offset using the up/down arrows.
4. Press **Ok**.

Changing the Display View

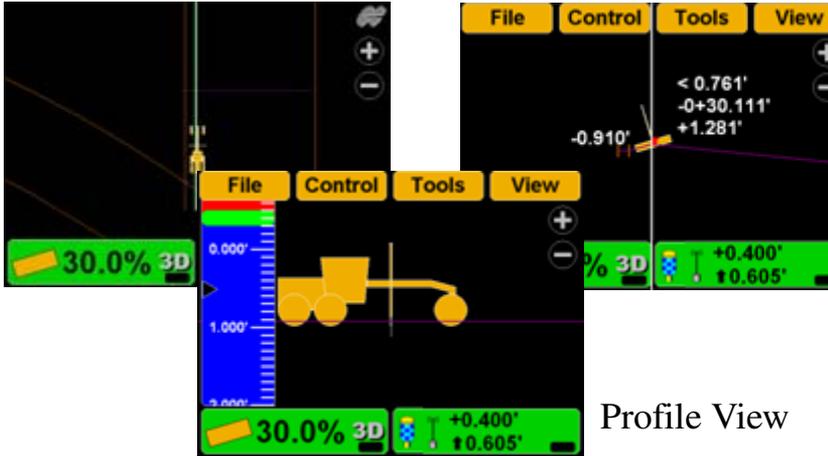
Main Window Views

To access the main window view, press **Topcon Logo** ▶ **View** ▶ **Main window**, then press the necessary view; a check mark indicates the active view.



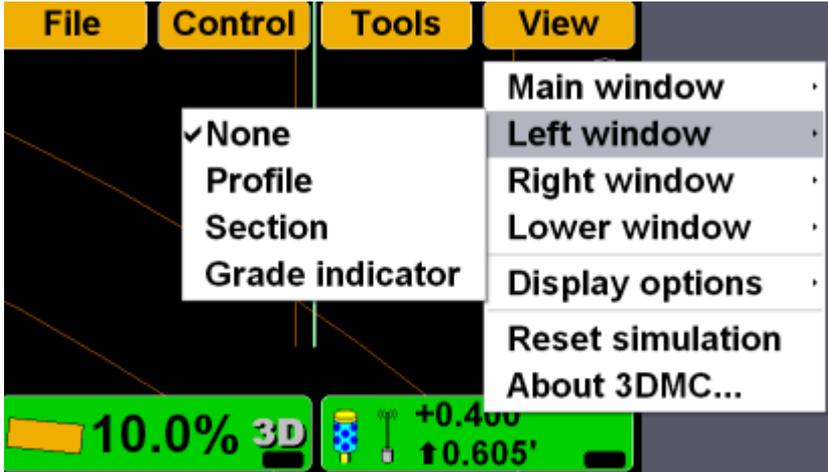
Plan View

Section View



Left Window Views

To access the lower window view, press **Topcon Logo** ▶ **View** ▶ **Left window**, then select a view.



Section View

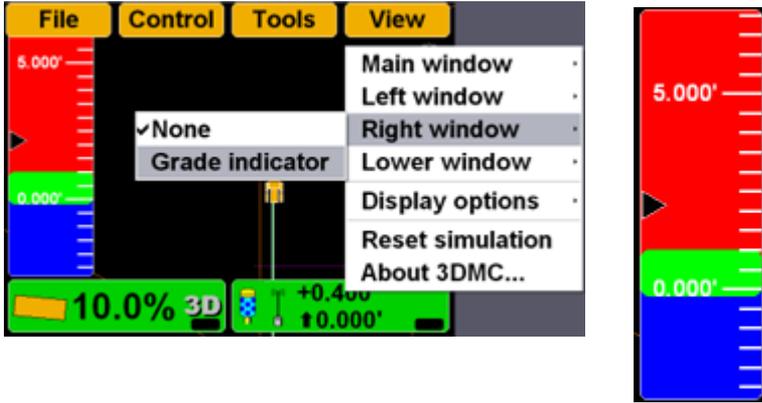


Grade Indicator



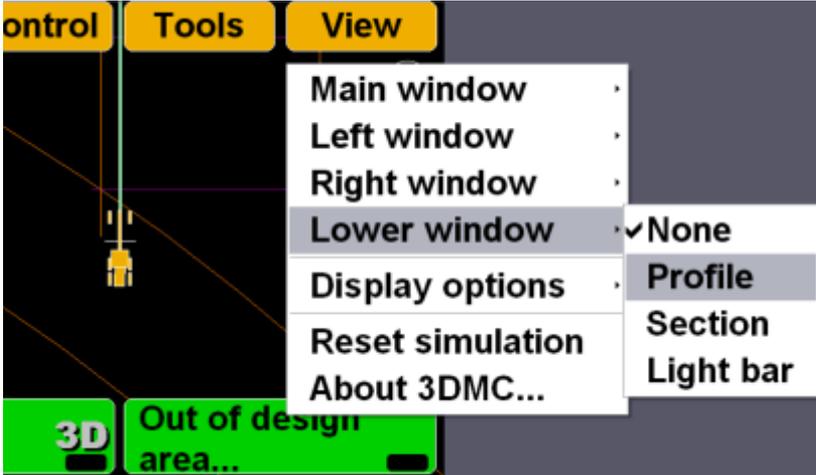
Right Window View

To access the right window view, have the Plan view visible and press **Topcon Logo ▶ View ▶ Right window**, then select **Grade indicator**.

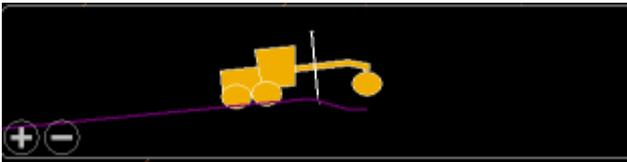


Lower Window Views

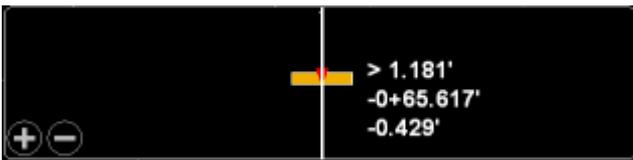
To access the lower window view, press **Topcon Logo** ▶ **View** ▶ **Lower window**, then select a view.



Profile View



Section View

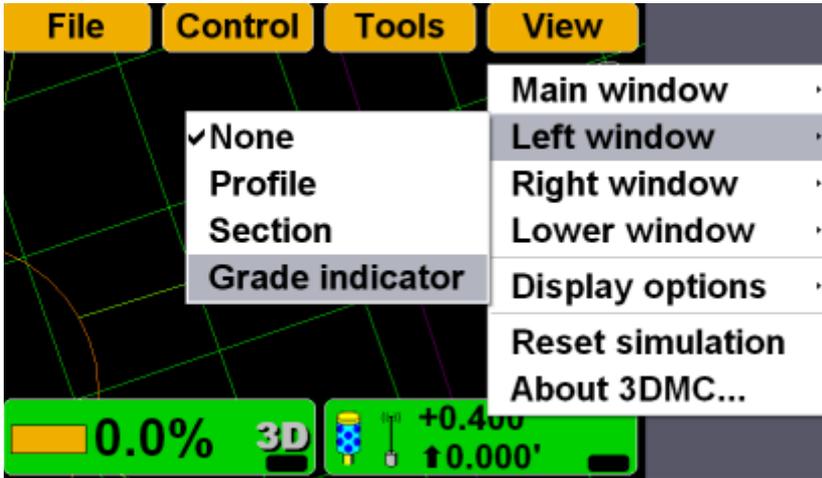


Lightbar

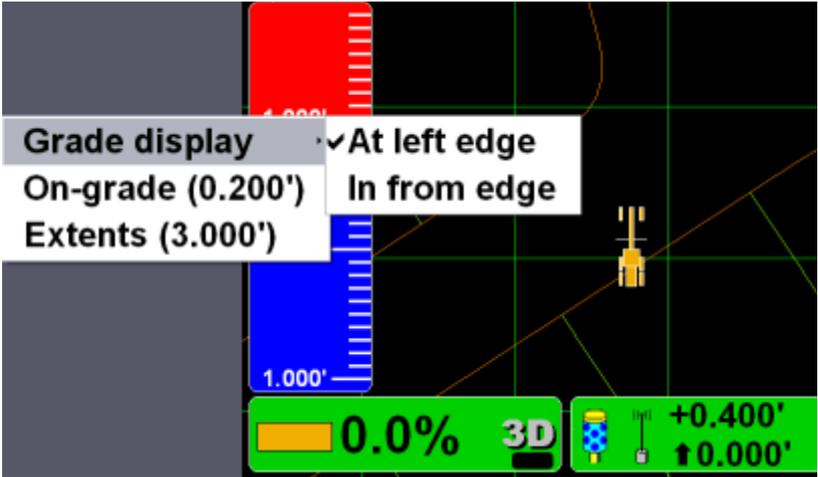


Changing the Grade Indicator Scale and Extents

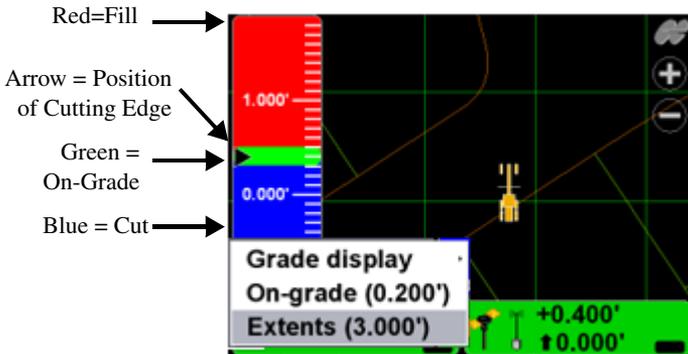
To view the grade indicator, press **Topcon Logo** ▶ **View** ▶ **Left window** ▶ **Grade indicator**.



To change the grade display, press and hold the grade indicator for one second, press **Grade display, then the necessary option.**



To change the on-grade or extents, press and hold the grade indicator for one second, then press the necessary menu option.



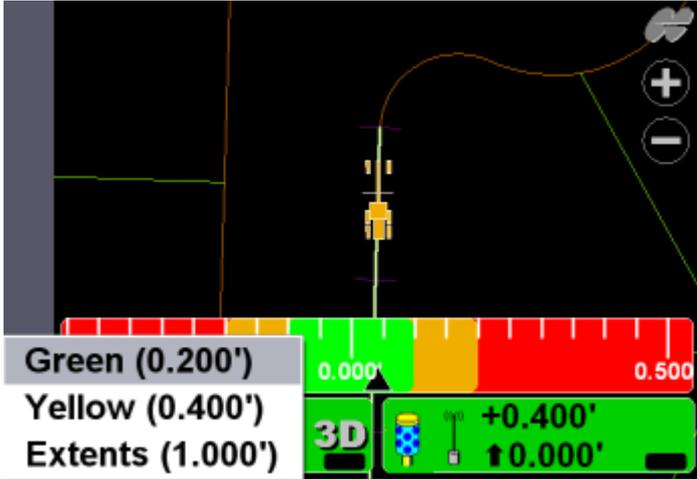
Changing the Light Bar Scale and Extents

To view the light bar scale, press **Topcon Logo** ▶ **View** ▶ **Lower window** ▶ **Light bar**.



To change the light bar scale and extents:

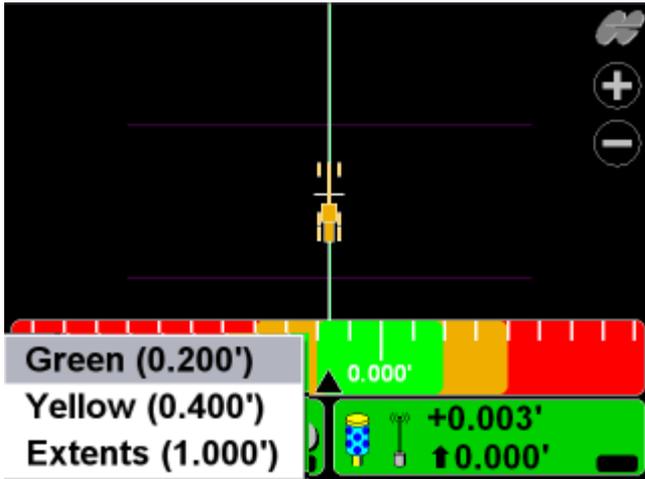
Press and hold the light bar scale for one second, then press **Green**, **Yellow**, or **Extents** to change the scale.



Changing the Steer Indication Scale and Extents

This function is only available while in Steer Indication mode. See “Changing Radio Channels” for details on enabling steer indication.

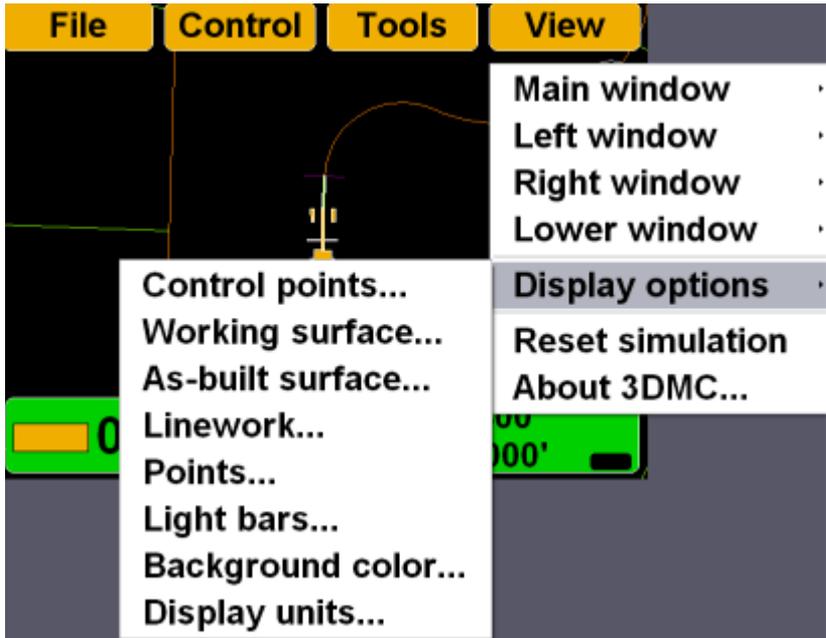
To change the steer indication scale and extents: Press and hold the light bar scale for one second, then press **Green**, **Yellow**, or **Extents** to change the scale.



Changing Display Options

To view available options, press

TopconLogo ▶ **View** ▶ **Display options**.

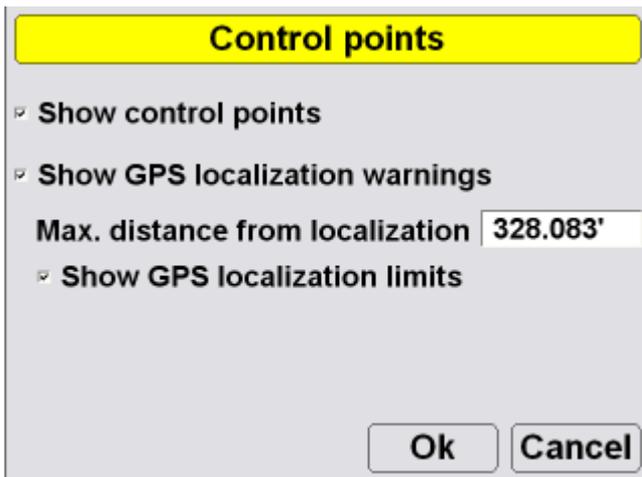


Control Points

1. To view information about the control points, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Control Points**.

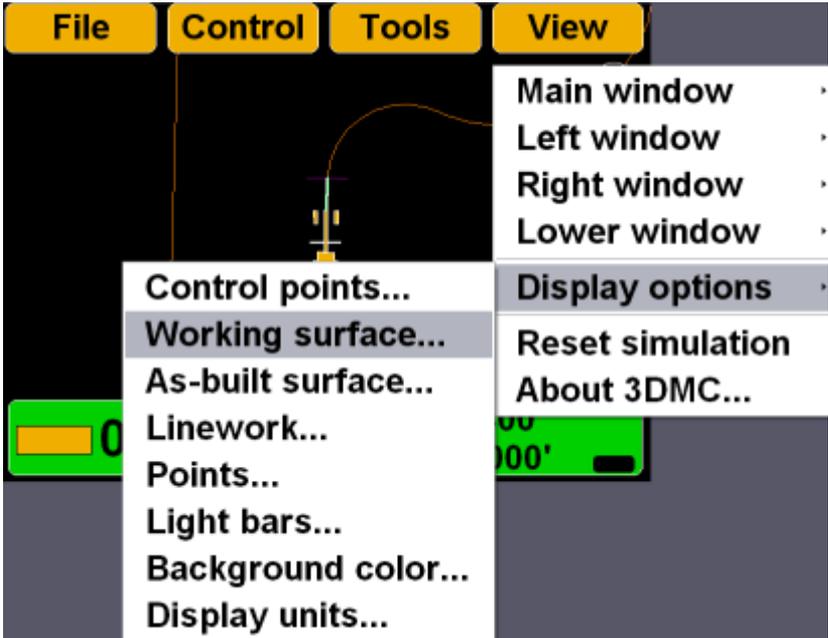


2. Enable (check mark) or enter the necessary options, then press **Ok**.

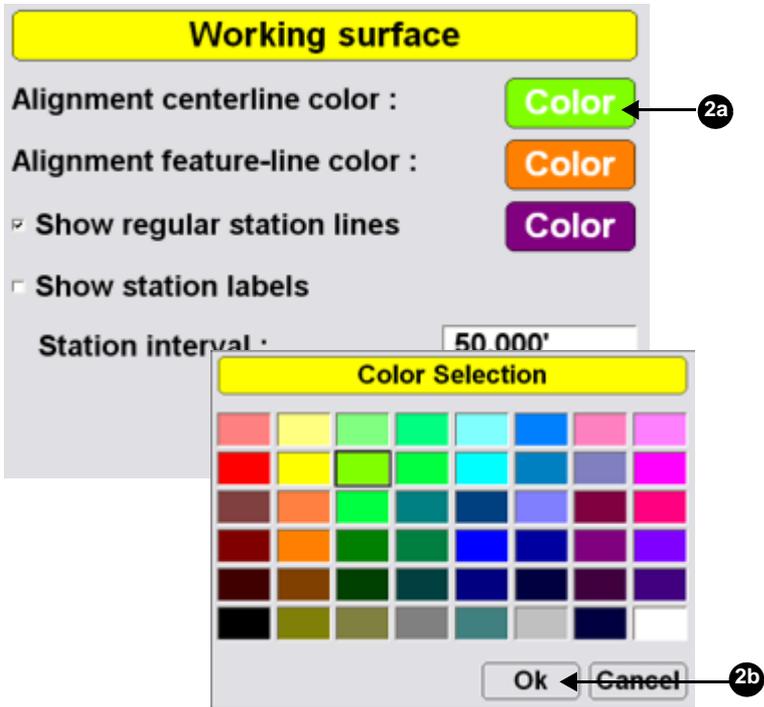


Working Surface Display Options

1. When using a TIN surface model file, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Working Surface**.



2. Press **Color** to change the color of the alignment and station lines. Select a color and press **Ok**.



3. Enable (check mark) or enter the necessary options, then press **Ok**.

Working surface

Alignment centerline color : **Color**

Alignment feature-line color : **Color**

Show regular station lines **Color**

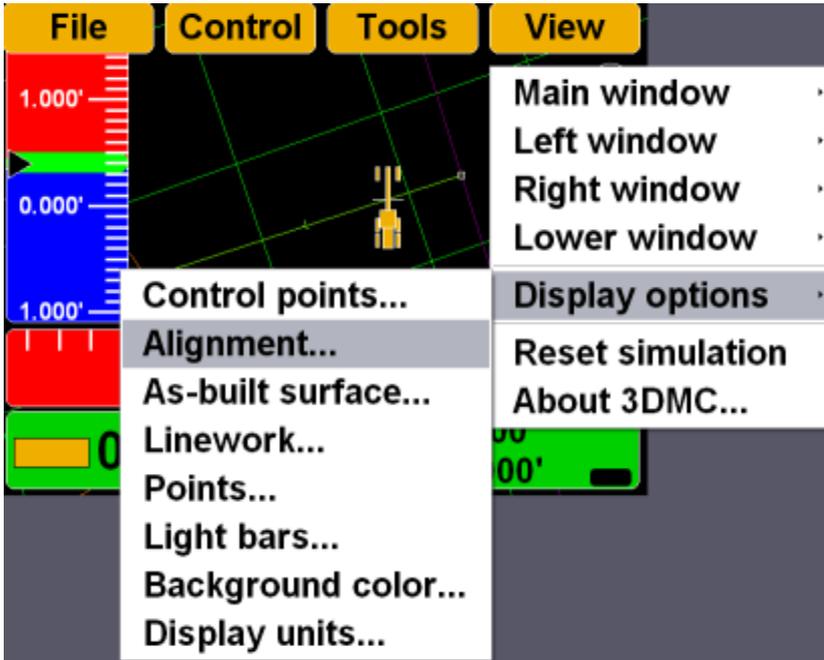
Show station labels

Station interval : 50.000'

Ok **Cancel**

Alignment Display Options

1. When using either a road surface model or an alignment file, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Alignment**.



2. Change the alignment settings, and press OK.

Alignment

Alignment centerline color : **Color**

Alignment feature-line color : **Color**

Show regular station lines **Color**

Show station labels

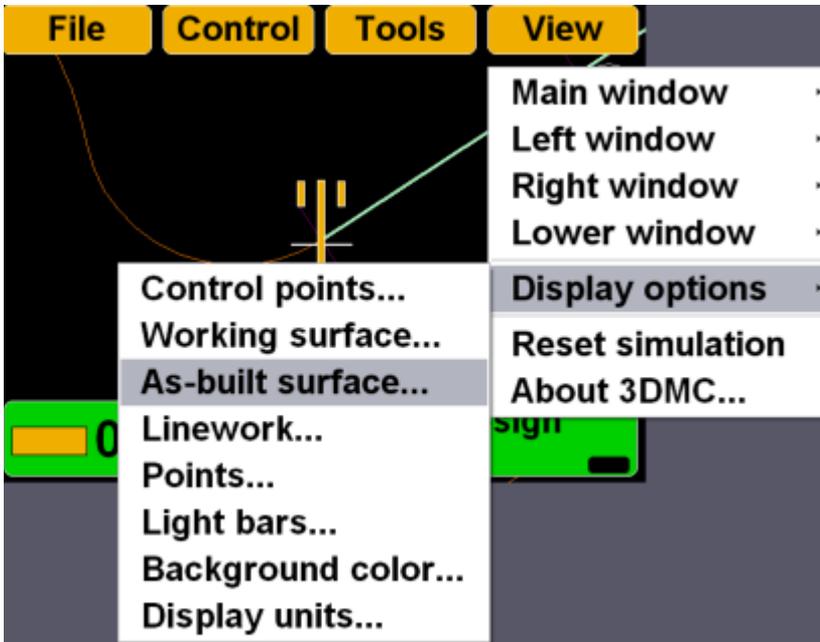
Station interval : 50.000'

Ok Cancel

As-built Surface Display Options

As-built surface files display a colored map of the graded surface.

1. Press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **As-built Surface**.



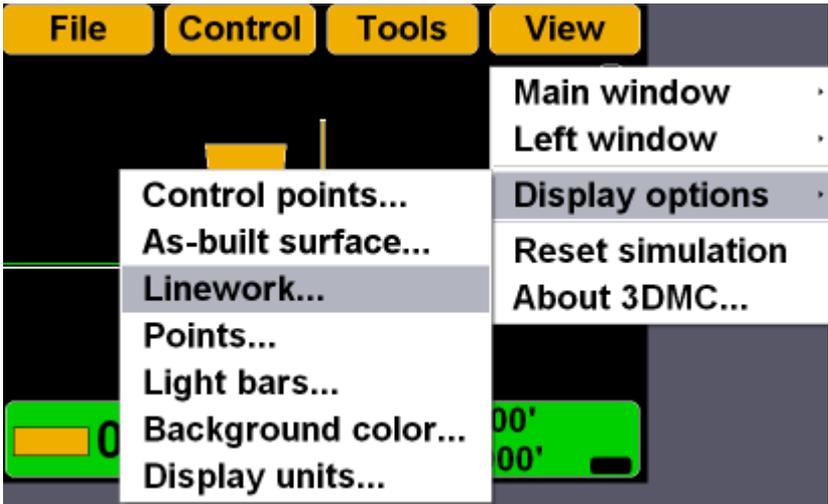
2. Select and/or enter the necessary options and press **Ok**.

As-built Surface

- Multi-color cut/fill @ interval:
- Tri-color cut/fill : Cut Grade Fill
- On-grade tolerance (+/-) :
- Number of passes : 1 2 3 4+
- Pass variation : <0.050' <0.100' <0.150' >0.150'
- Step :

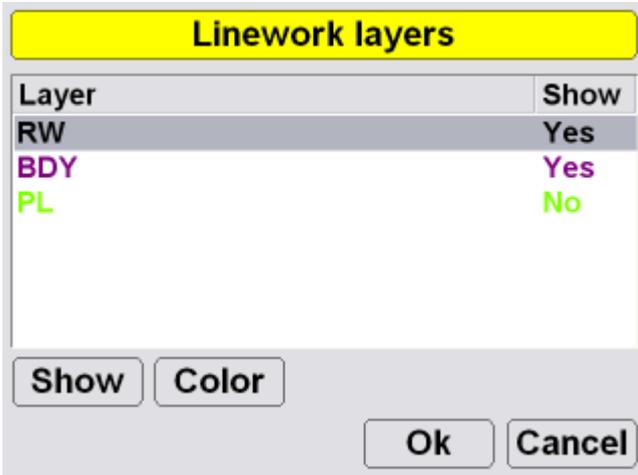
Linework Display Options

1. When using a Linework file, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Linework**.



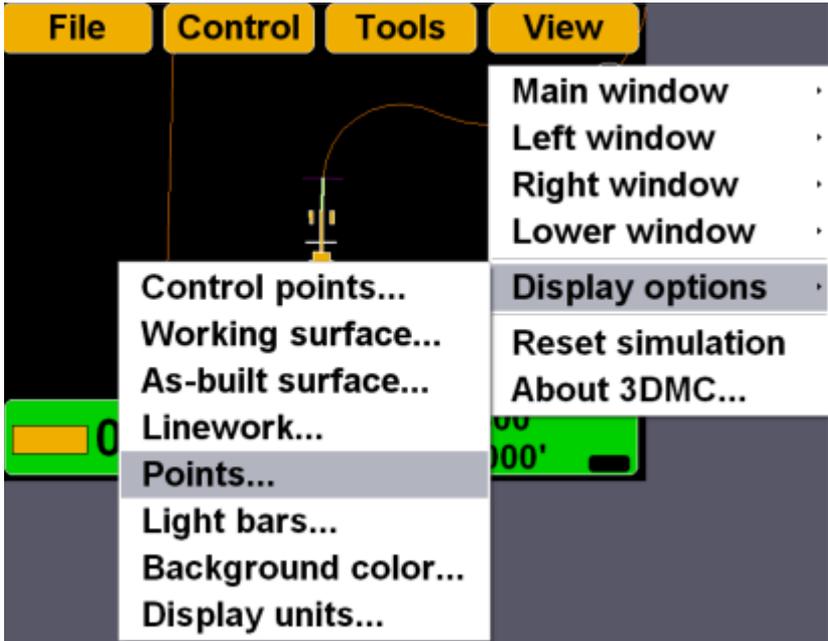
2. To display layers on the Main Screen, select the layer and press **Show**, “Yes” displays in the *Show* column. Press **Show** again to not display the layer on the Main Screen; “No” displays in the *Show* column.

3. Press **Ok** to return to the Main Screen.

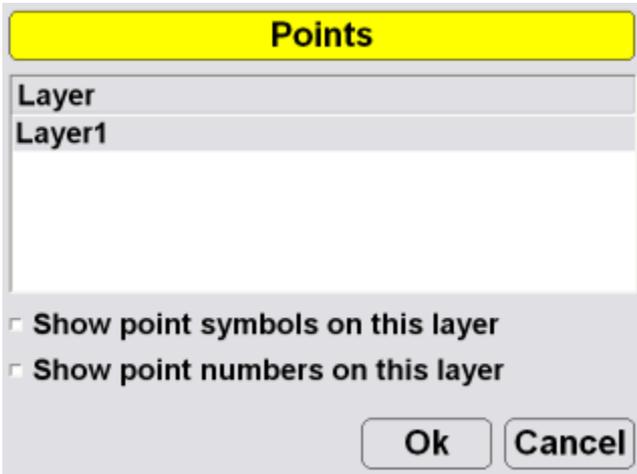


Point Display Options

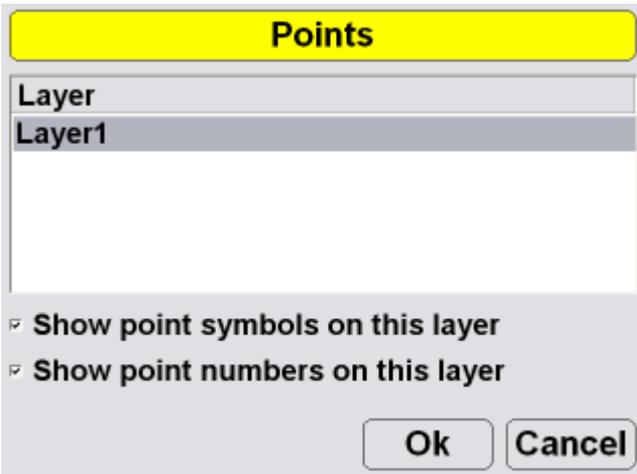
1. When using a Point file, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Points**.



2. To display a points layer on the main screen, select the layer and press **Ok**.

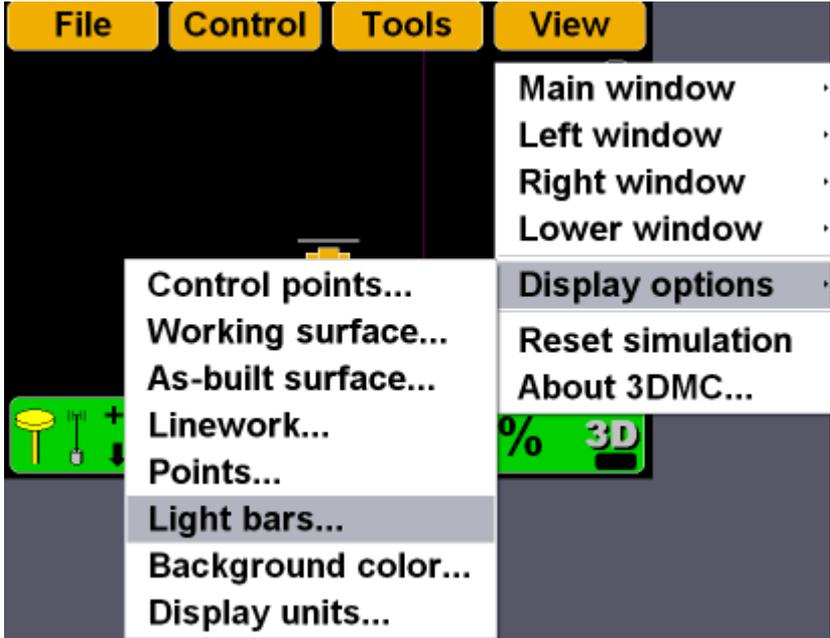


3. To display points symbols and/or point numbers during a topographic survey, select the corresponding check box and press **Ok**.

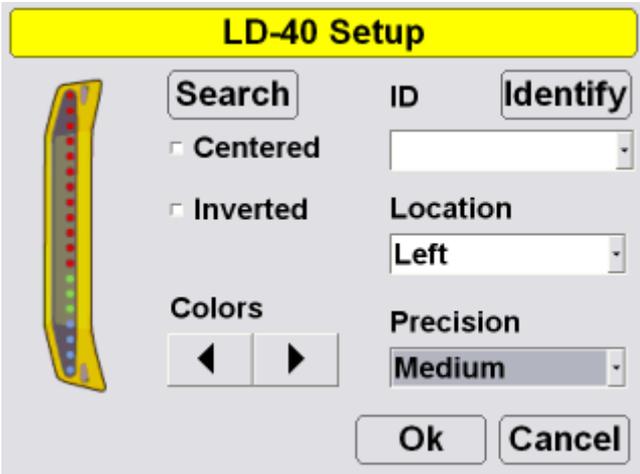


Lightbar Display Options

1. To set the lightbar display options, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Light bars**.

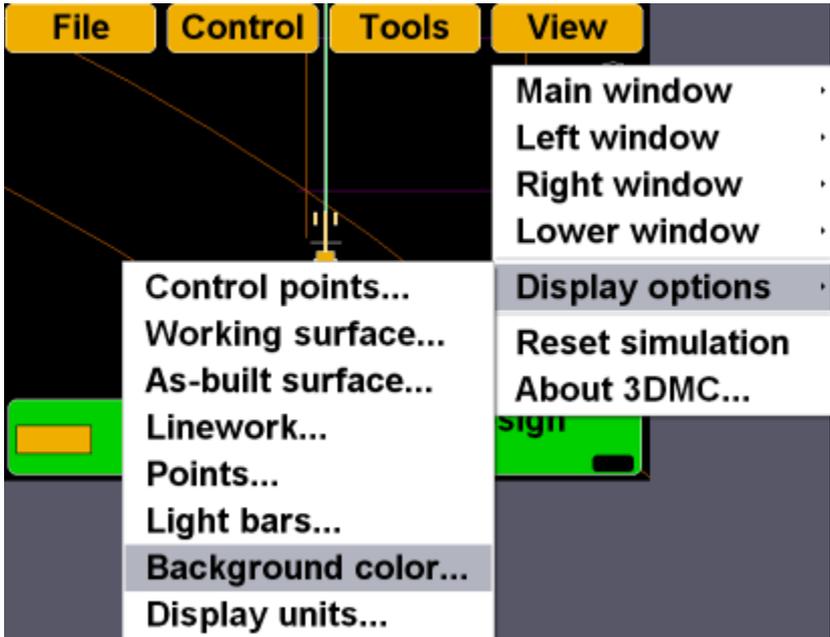


2. Set the LD-40 options, and press **Ok**.



Changing the Background Color

1. To change the background color of the Main Screen, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Background color**.

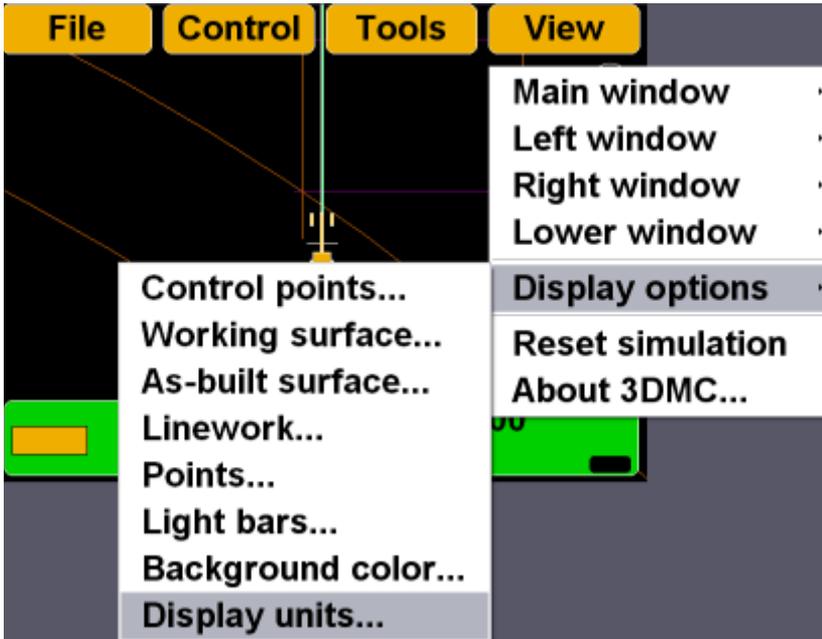


2. Select a color and press **Ok**.



Display Units Options

1. To set the type of units used in the job, press **Topcon Logo ▶ View ▶ Display options ▶ Display units**.



2. Select the display unit options and press **Ok**.

Display Units	
Distances	US Survey feet 3 d.p.
Angles	DD°MM'SS"
Grades	Percent (%)
Stations	1+00.000
Volumes	Cubic yards
Coordinates	North-East-Elev
<input type="button" value="Ok"/> <input type="button" value="Cancel"/>	

Viewing and Updating 3DMC

To view information about 3DMC, press **Topcon Logo** ► **View** ► **About 3DMC**.



3DMC : 7.06

OS date :

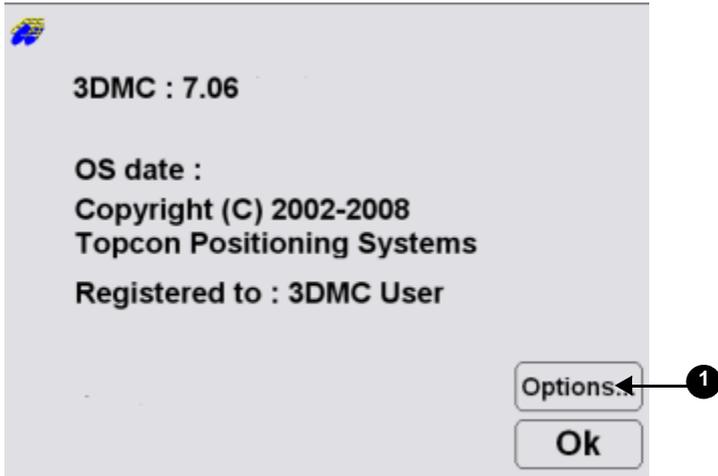
Copyright (C) 2002-2008

Topcon Positioning Systems

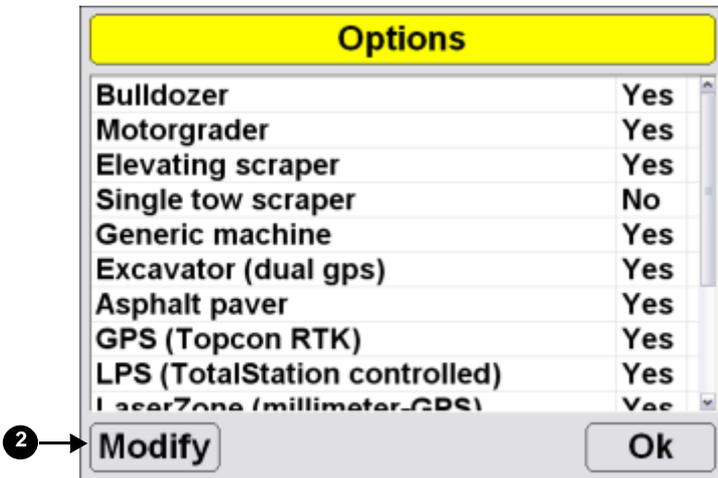
Registered to : 3DMC User

Options

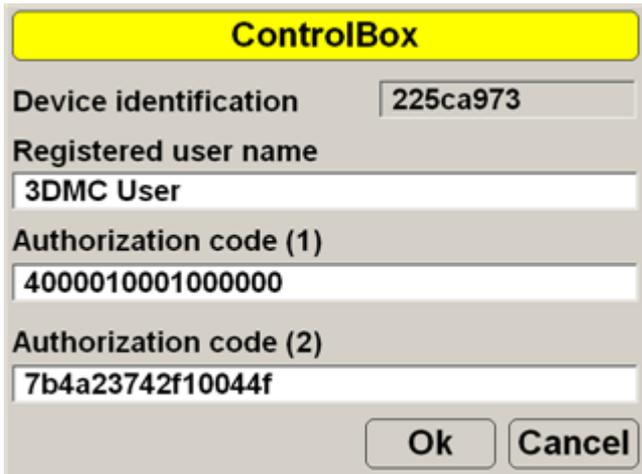
1. To view the enabled options, press **Options** on the *about 3DMC* dialog box.



2. To modify 3DMC options, press **Modify** on the *Options* dialog box.



- Record the *Device identification* number to give to your Topcon representative. Contact your Topcon representative to obtain new authorization codes for the necessary applications.



The image shows a dialog box titled "ControlBox" with a yellow header. It contains four input fields and two buttons. The first field is labeled "Device identification" and contains the text "225ca973". The second field is labeled "Registered user name" and contains "3DMC User". The third field is labeled "Authorization code (1)" and contains "4000010001000000". The fourth field is labeled "Authorization code (2)" and contains "7b4a23742f10044f". At the bottom right, there are two buttons labeled "Ok" and "Cancel".

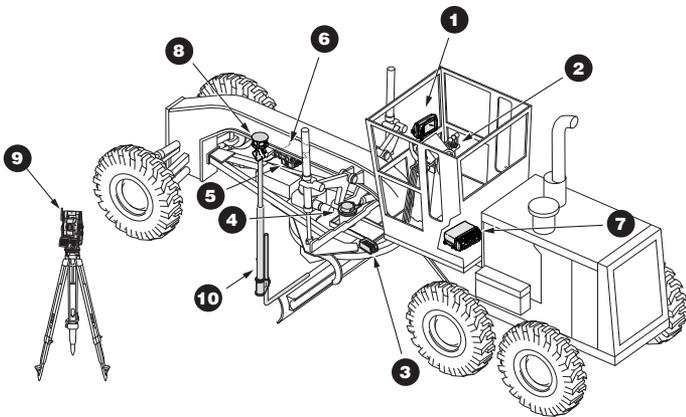
- When you have received the new authorization codes, enter the codes in the *ControlBox* dialog box.
- Press **Ok** to apply the new codes and options. Press **Ok** on each screen to return to the main screen.
- Turn off the display, wait a couple seconds, and then turn on the display to activate the new passwords.

LPS

LPS applications use a laser transmitter to transmit an optical laser beam at a pre-defined elevation, a “virtual stringline”, that represents the design surface. A laser sensor on the machine detects the beam and establishes the design elevation. Through the control box, the laser sensor keeps the cutting edge at the correct elevation.

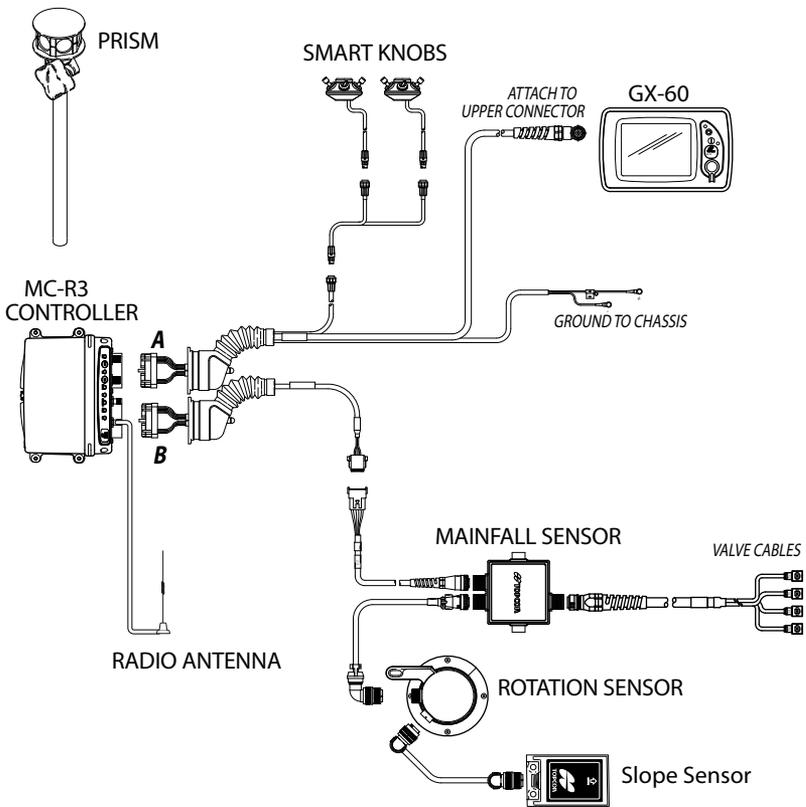
LPS Components

Motor Grader

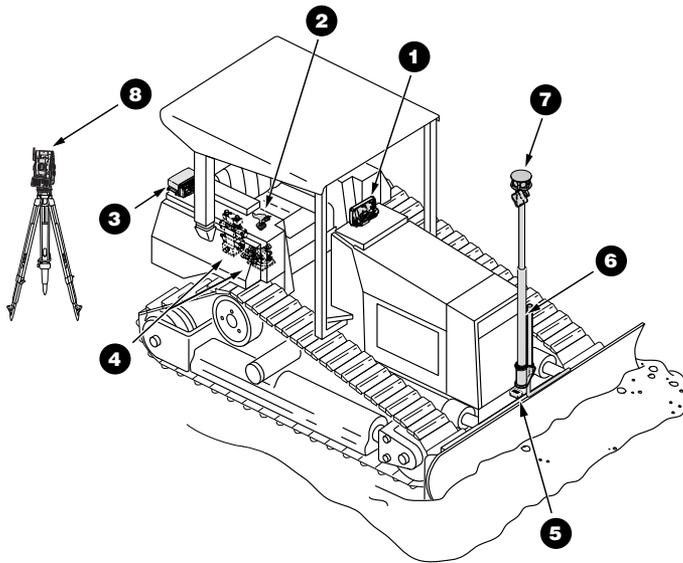


1. GX-60 Display
2. Remote Smart Knobs™

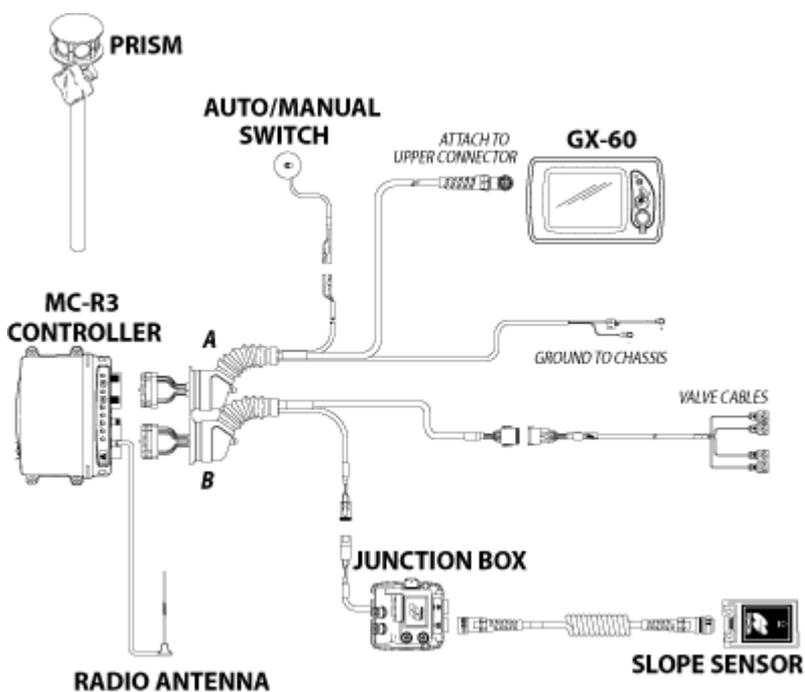
3. Blade Slope Sensor
4. Rotation Sensor
5. Mainfall Sensor
6. Hydraulic Manifold Assembly
7. MC-R3 Controller
8. Prism
9. Robotic Total Station
10. GPS Vibration Pole



Dozer

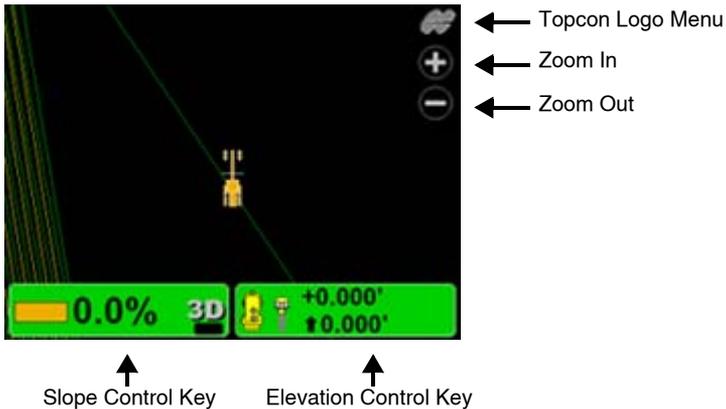


1. GX-60 Display
2. Simple Auto/Manual Knob
3. MC-R3 Controller
4. Hydraulic Manifold Assembly
5. Blade Slope Sensor
6. GPS Vibration Pole
7. Prism
9. Robotic Total Station



3DMC LPS Introduction

3DMC Main Screen

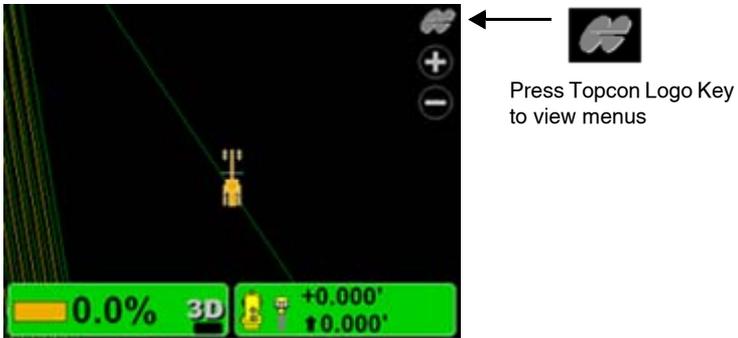


Topcon Logo Key

The Topcon Logo key at the top right corner of the Main Screen displays a pop-up bar of four menus: File, Control, Tools, and View.

To access the Topcon Logo menus, tap the **Topcon Logo** in the far right corner.

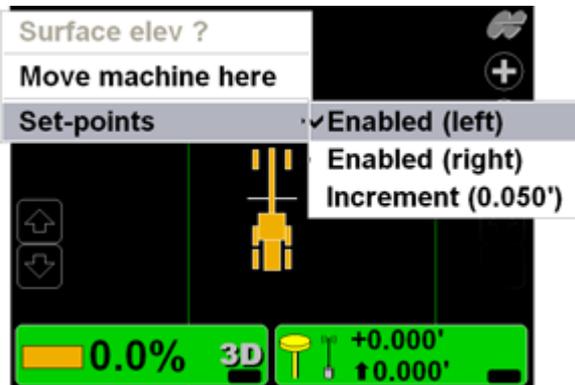
Unless used, the menus disappear after 10 seconds.



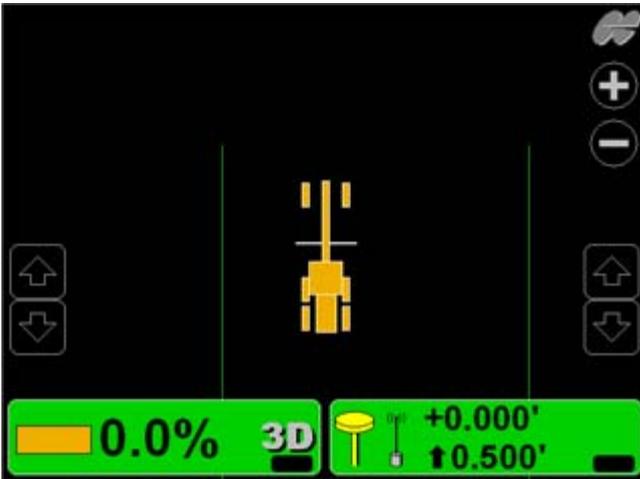
Set-Points Pop-Up Menu

The Set-points pop-up menu allows quick adjustment of the elevation set-points from the main screen.

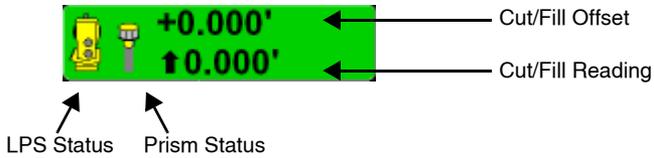
1. To access the Set-points pop-up menu, press and hold anywhere on the main screen.
2. Press **Set-points ▶ Enabled (left)** or **Enabled (Right)** to display the set-point adjustment arrows.
3. Press **Set-points ▶ Increment** to adjust the set-points increment.



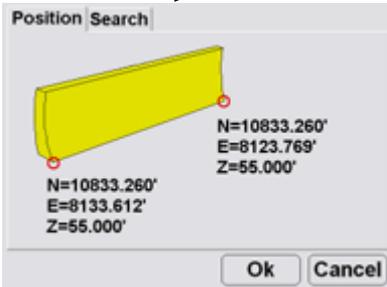
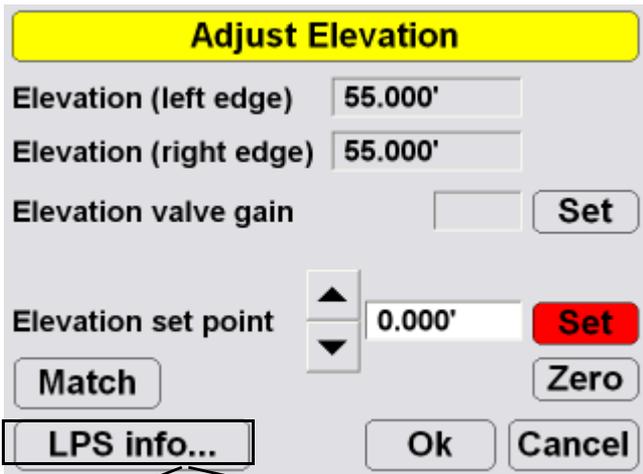
4. Press the arrows to adjust the elevation set-points.



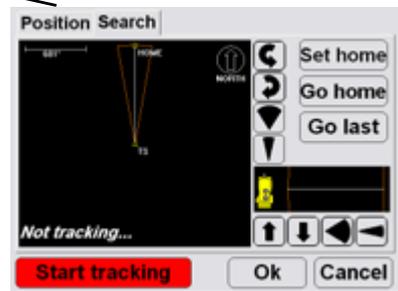
Elevation Control Key



Adjust Elevation Screen

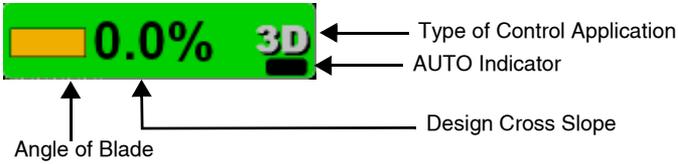


Position Tab



Search Tab

Slope Control Key



Adjust Slope Screen

Adjust Slope

Blade slope

Blade rotation

Mainfall slope

Slope gain **Set**

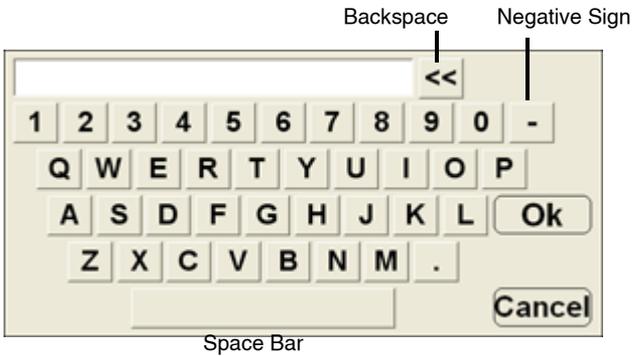
Slope locked **Set**

Change to Elev. **Ok** **Cancel**

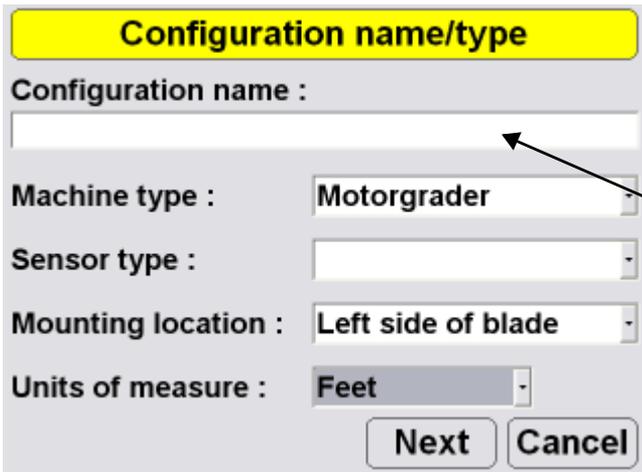
Keyboard Functions

When entering text or numbers, one of the following two pop-up keyboards displays:

Alphanumeric Keyboard



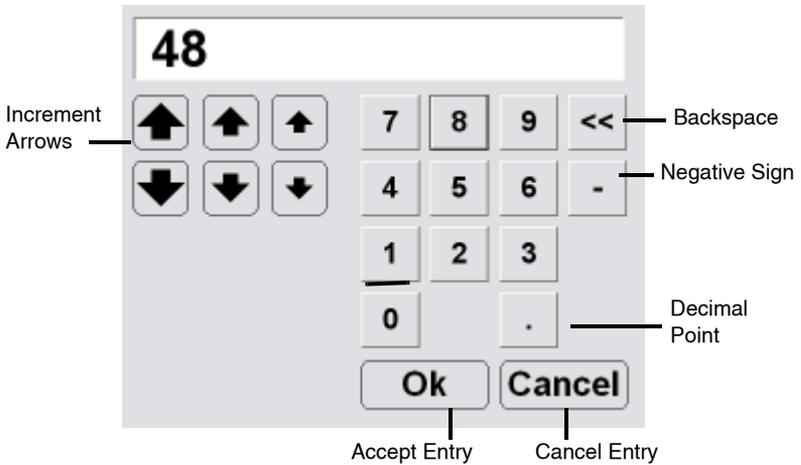
1. To access the keyboard from any field requiring an alphanumeric input, press the field.



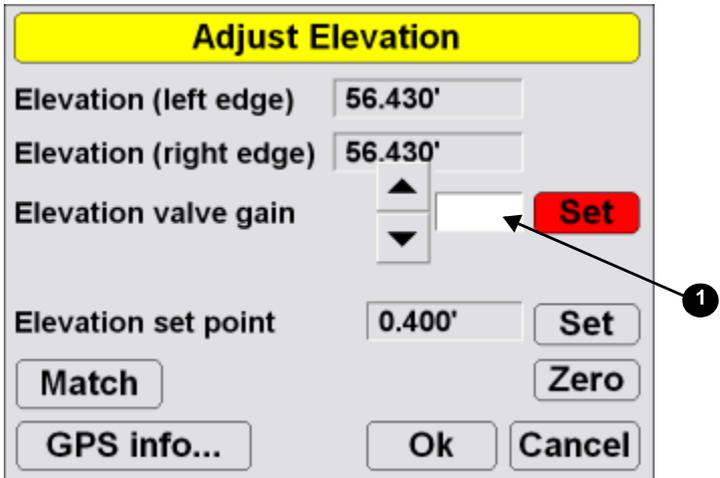
2. Press the letters or numbers on the keyboard to type.



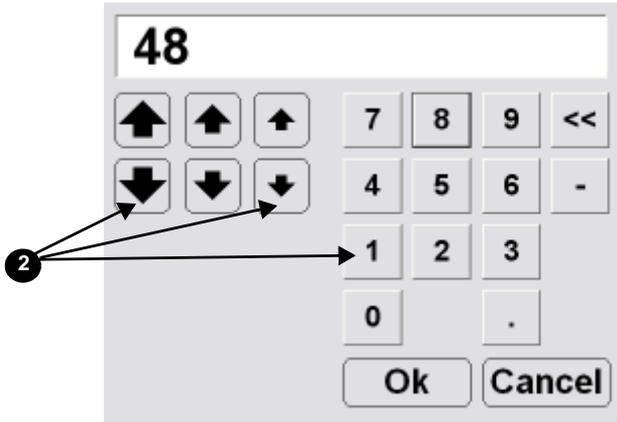
Numeric Keyboard



1. To access the keyboard from any field requiring an numeric input, press the field.



2. Press the numbers on the keyboard to type in a value, or use the arrow keys to increase the value incrementally.

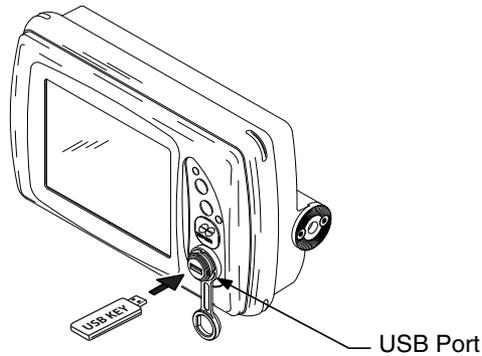


LPS Setup and Usage

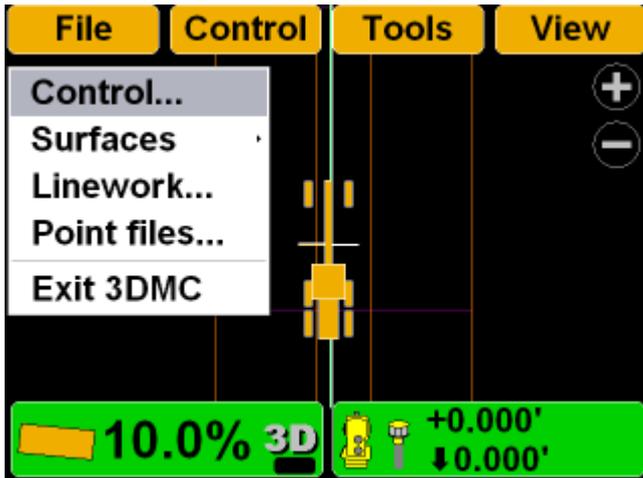
Copying 3DMC Files

To copy files from a USB key:

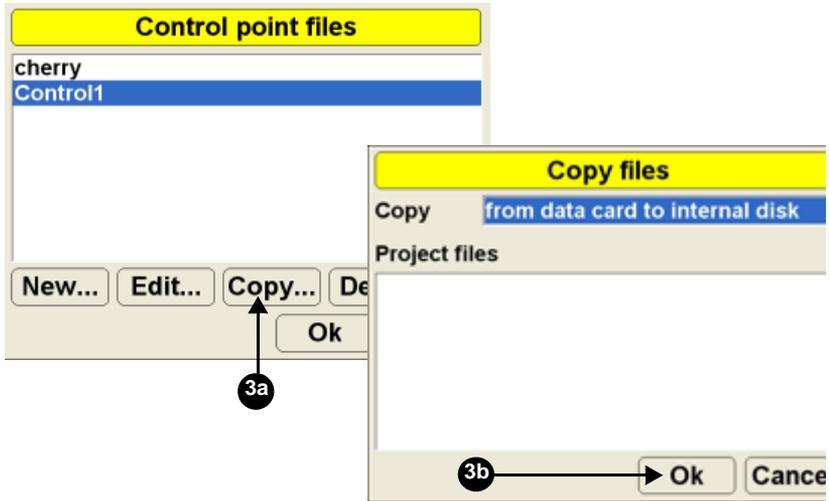
1. Press the green power button to turn on the display and insert the USB key into the GX-60 USB port.



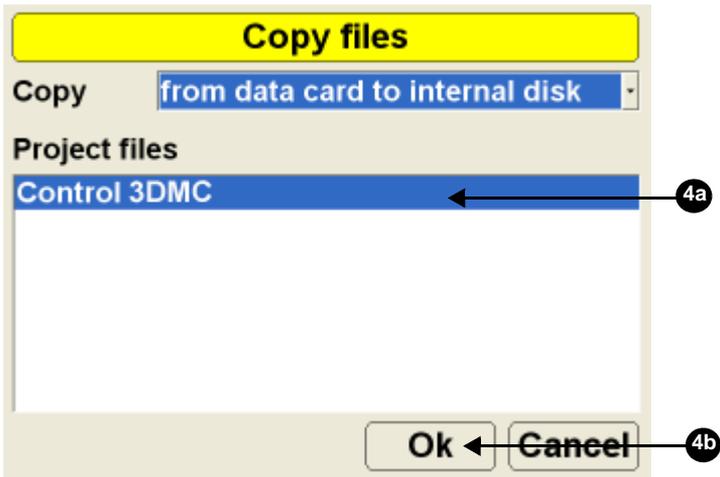
2. Press **Topcon Logo** ▶ **File** ▶ **Control**.



3. Press **Copy** and select the location of the file to copy from.



4. Select the file to copy and press **Ok**.

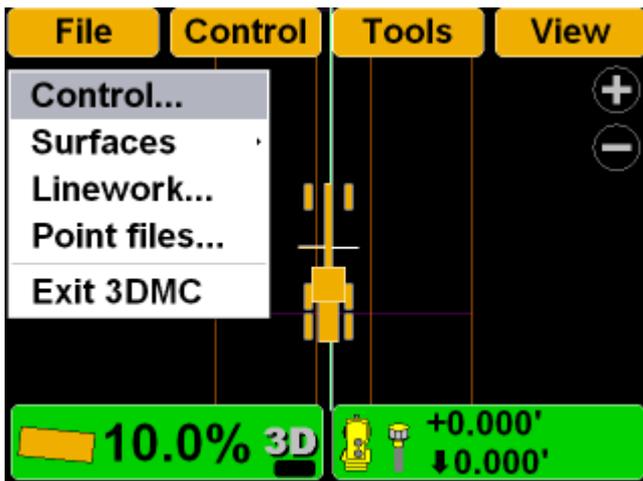


5. Select the files and press **Ok** to apply the data to the current job.

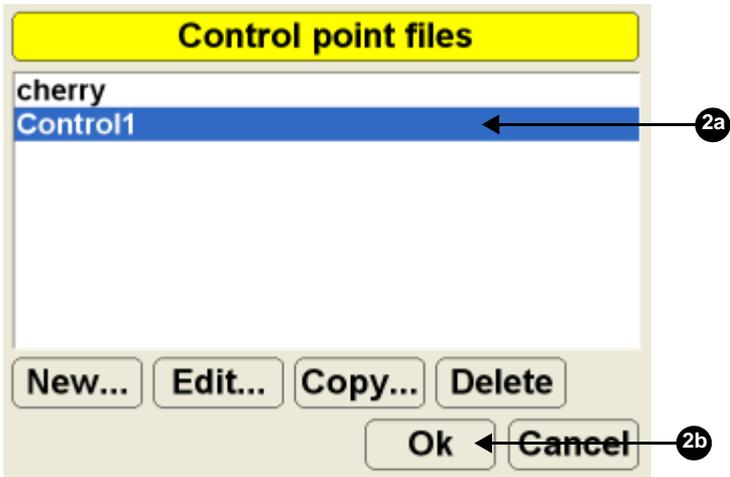
Control Point Files

Selecting a Control Point File

1. Press **Topcon Logo** ▶ **File** ▶ **Control**.

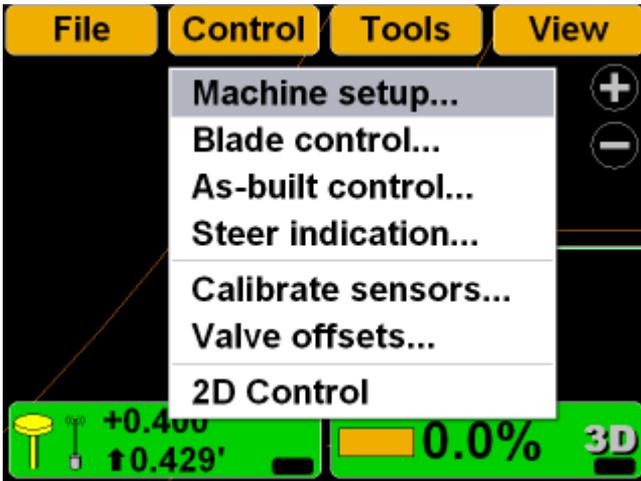


2. Select the control point file for the jobsite and press **Ok**.

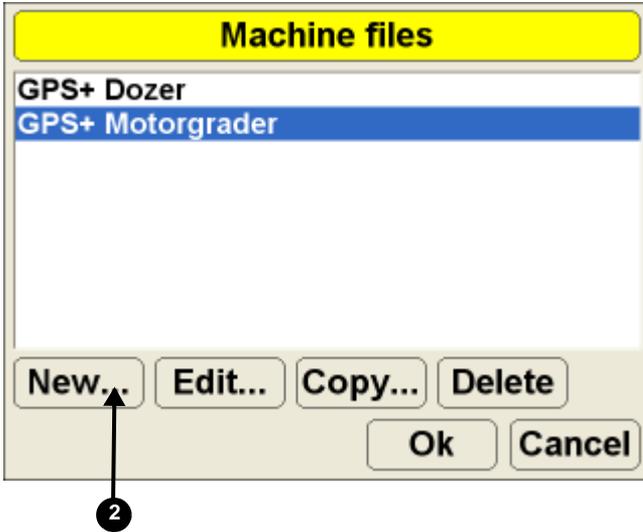


Creating a Machine Configuration File

1. When the main screen displays, press **Topcon Logo** ▶ **Control** ▶ **Machine setup**.



2. Press **New**.



3. Enter the machine information.

The image shows a dialog box titled "Configuration name/type". It has a yellow header bar with the title. Below the header, there are several fields and buttons. The "Configuration name" field contains the text "LPS". Below it are four dropdown menus: "Machine type" is set to "Motorgrader", "Sensor type" is set to "Prism", "Mounting location" is set to "Left side of blade", and "Units of measure" is set to "Feet". At the bottom right, there are two buttons: "Next" and "Cancel".

4. Press **Next**.

5. Enter prism information, and press **Next**.

Motorgrader (LPS)

Above (1) 11.87'

Inside (2) 4.92'

Behind (3) 0.00'

Width (4) 9.84'

Back Next Cancel 5

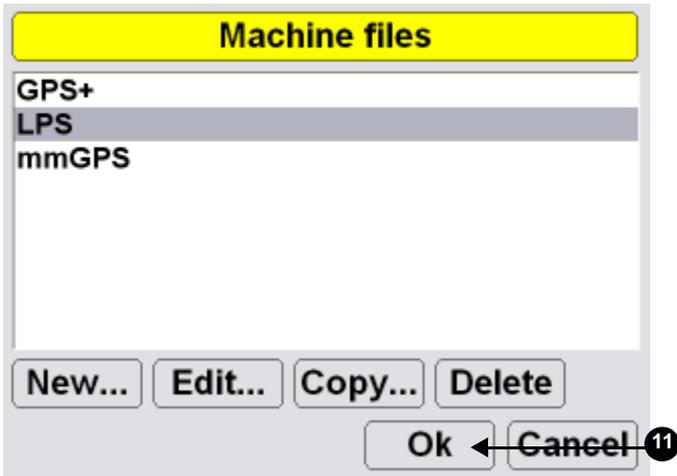
6. Press **Finish** to save the machine configuration file.

Configuration complete !

Machine configuration is complete ! Press "Finish" to save the configuration file.

Back Finish Cancel 6

7. Select a machine configuration file on the *Machine files* dialog box and press **Ok** to set this as the machine for the job.



Selecting Surface Files

Surface File Types



Flat Plane Surface/Sloping Plane Surface:

A planar (flat) surface with a 0% crossslope and mainfall. This surface is primarily used for building pads.

A sloping surface with cross slopes and mainfall based on a reference elevation.



As-built Surface File:

A color map of the graded surface.

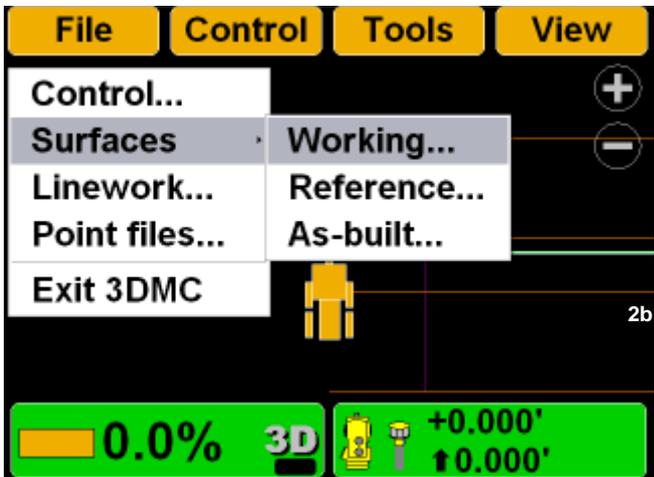


TIN Surface File:

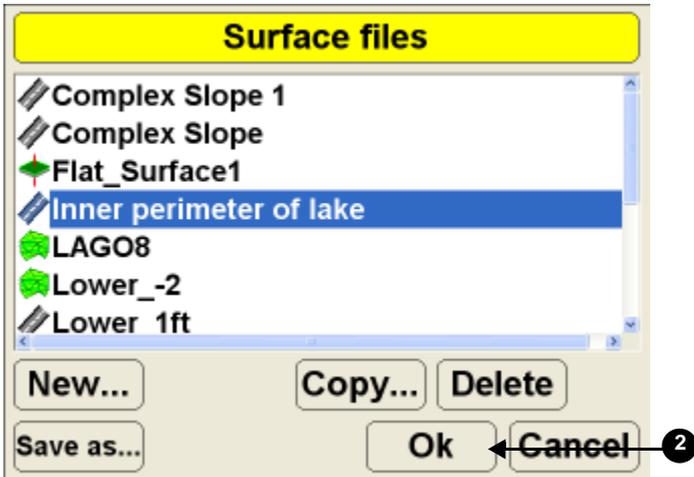
A TIN surface represents a surface as a network of non-overlapping triangles. Within each triangle the surface is represented by a plane. The triangles are made from a set of points called mass points.

Selecting a Working Surface File

1. Press **Topcon Logo** ▶ **File** ▶ **Surfaces** ▶ **Working**.

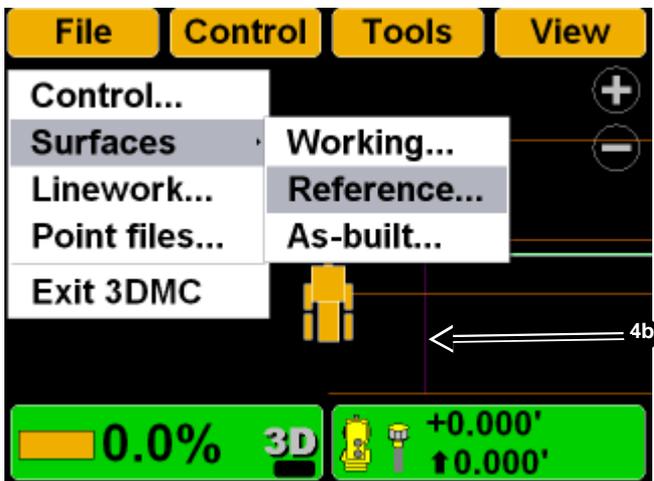


2. Select the working surface file for the jobsite and press **Ok**.

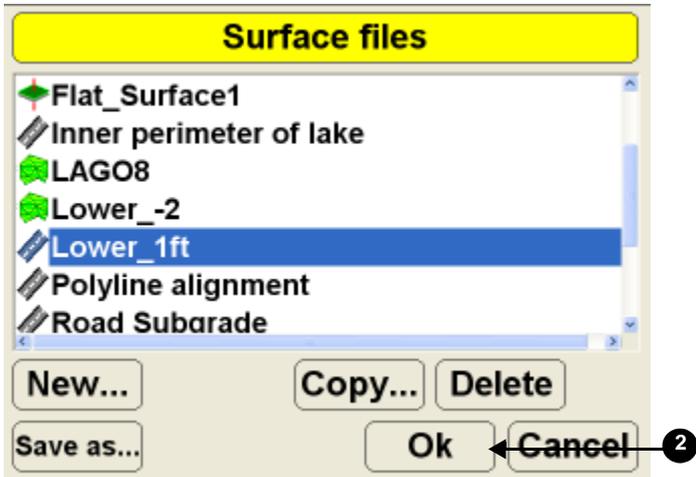


Selecting a Reference Surface File

1. Press **TopconLogo** ▶ **File** ▶ **Surfaces** ▶ **Reference**.



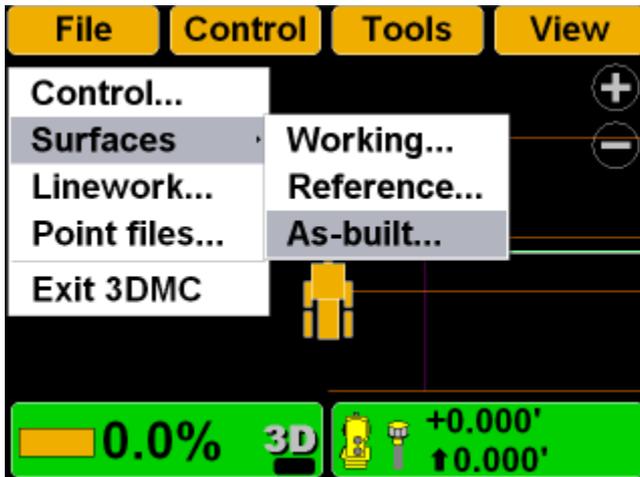
2. Select the reference surface file for the jobsite and press **Ok**.



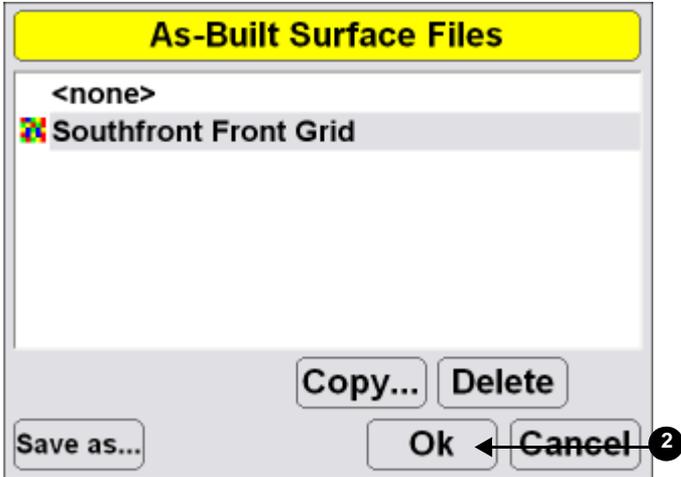
Selecting an As-built Surface File

As-built surface files display a colored map of the graded surface.

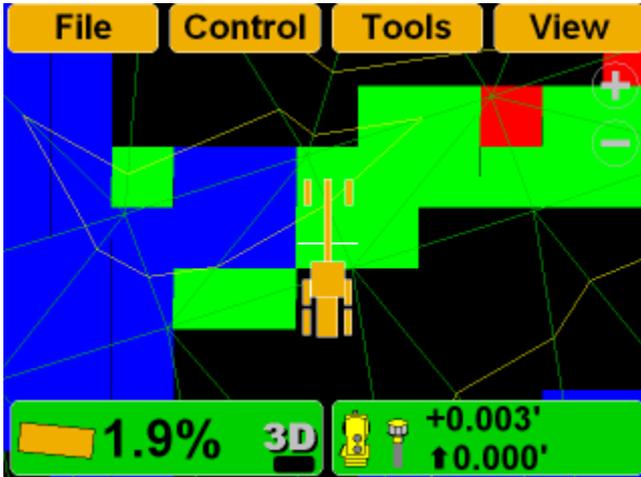
1. Press **TopconLogo** ▶ **File** ▶ **Surfaces** ▶ **As-built**.



2. Select the as-built surface file for the jobsite and press **Ok**.



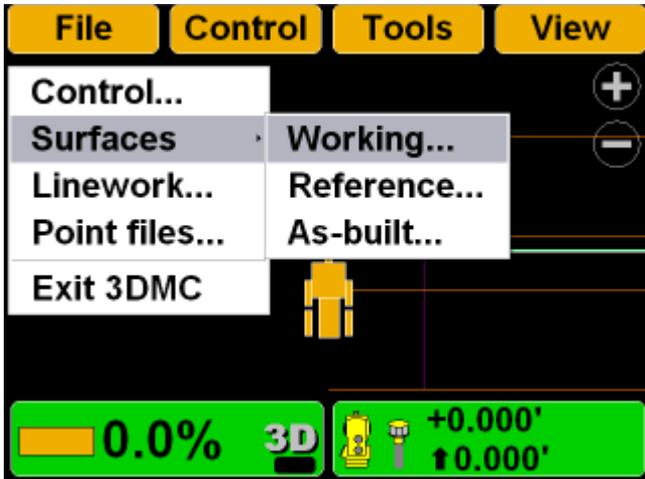
Example:



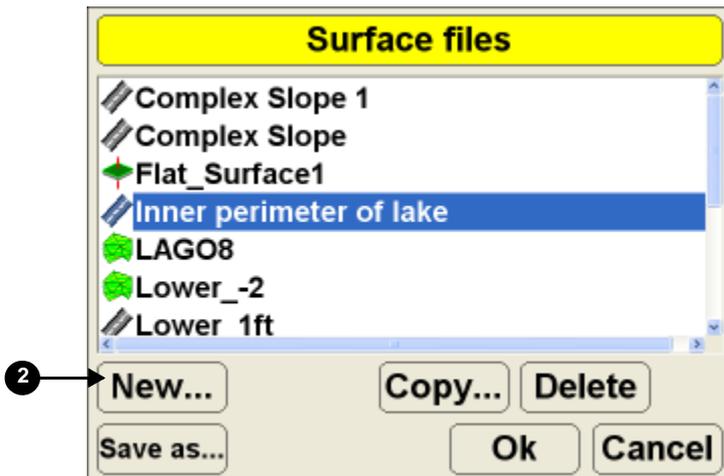
Creating Surface Files

Creating a New Plane Surface File

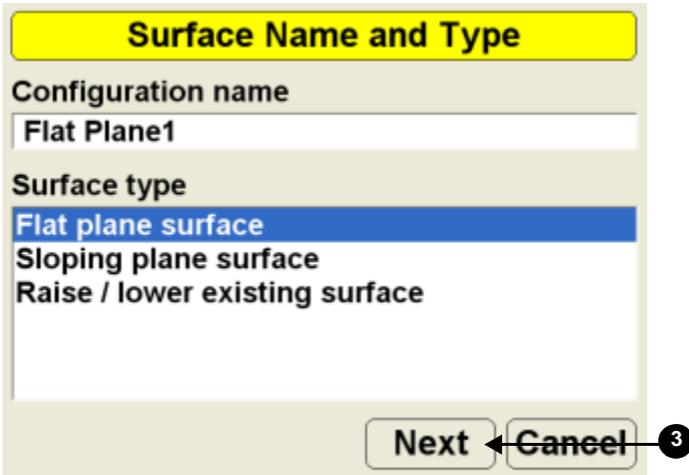
1. Press **Topcon Logo** ▶ **File** ▶ **Surfaces** ▶ **Working**, **Reference**, or **As-built**.



2. Press **New**.

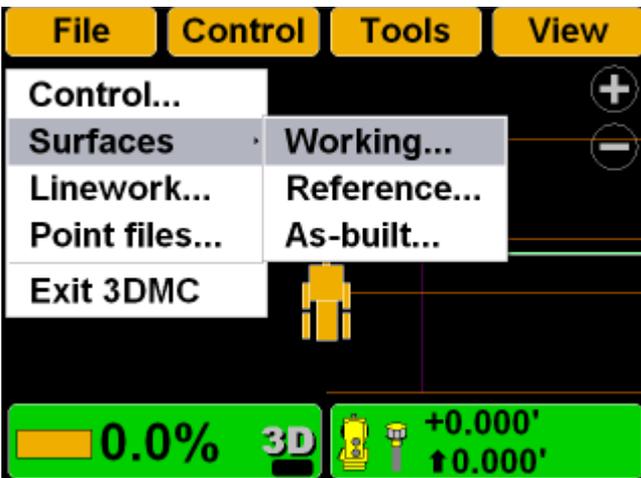


3. Enter the name of the surface. Press **Next**.

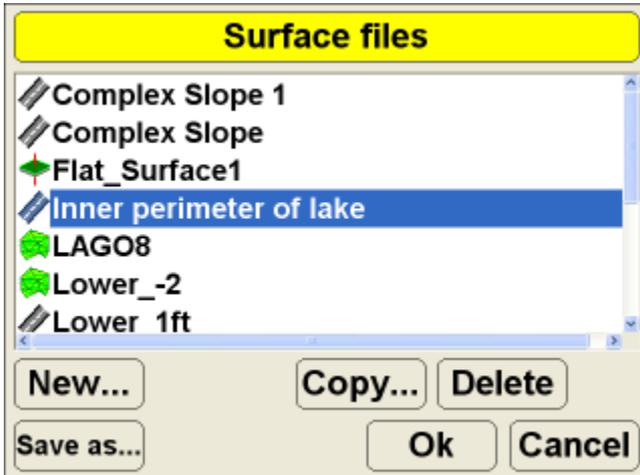


Creating a Flat Plane Surface

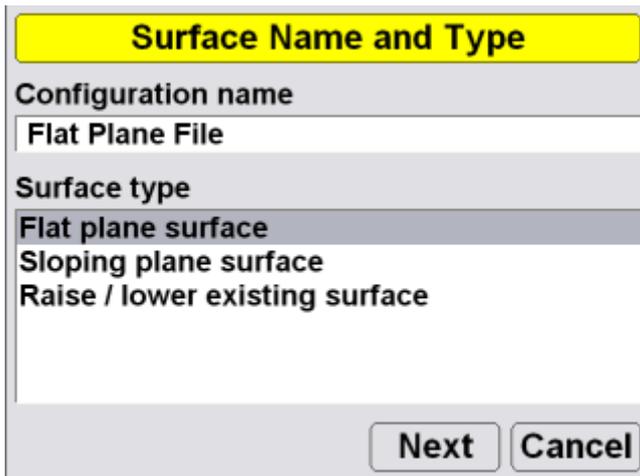
1. Press **Topcon Logo** ▶ **File** ▶ **Surfaces** ▶ **Working** or **Reference**.



2. Press **New**.

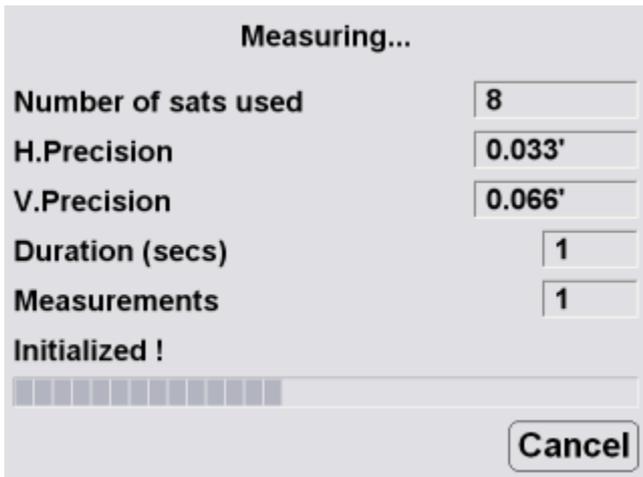
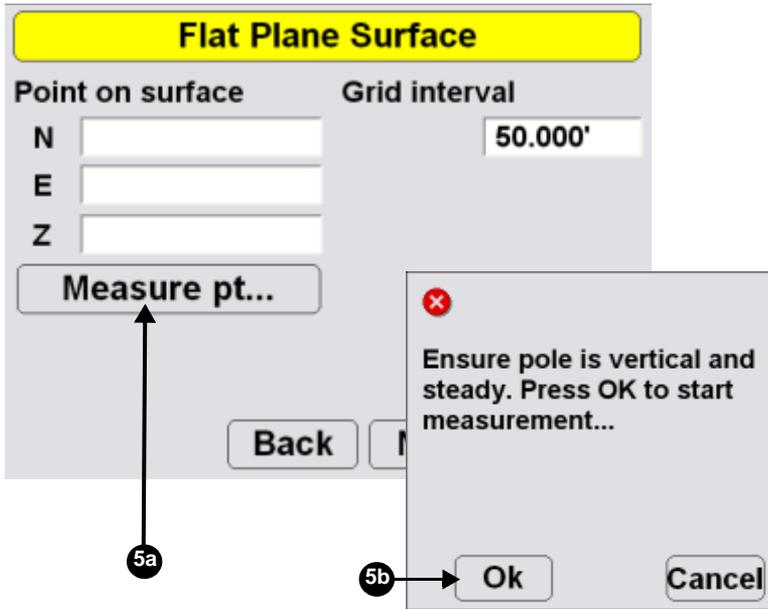


3. Enter the name of the new surface file. Press **Next**.



4. Move the machine to the elevation reference point.

- When the sensor is over the point, press **Measure pt** to measure the elevation reference point, and then Press **Ok**.



6. Enter a grid interval for the main screen. Press **Next**.

Flat Plane Surface

Point on surface	Grid interval
N 11376.490'	50.000'
E 8873.210'	
Z 56.430'	

Measure pt...

Back Next Cancel

7. Press **Finish** to save the new surface file.

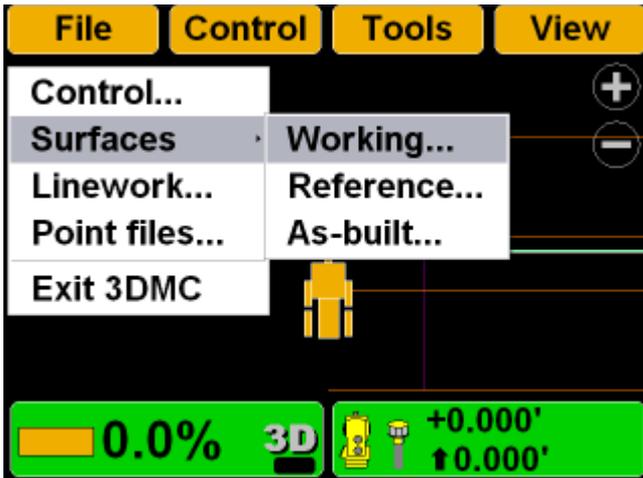
Surface Complete

Surface is complete ! Press "Finish" to save surface...

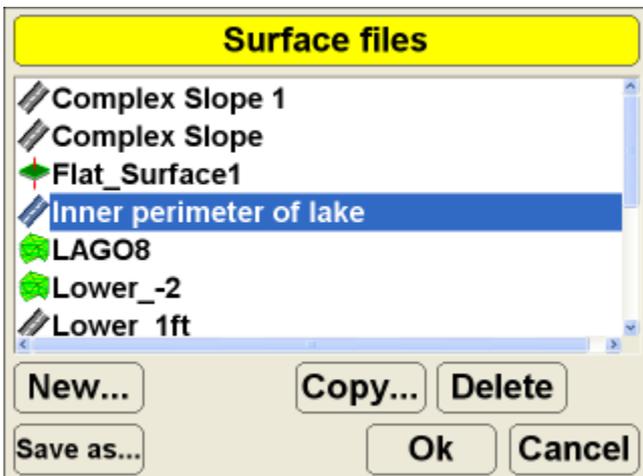
Back Finish Cancel

Creating a Sloping Plane Surface

1. Press **Topcon Logo** ▶ **File** ▶ **Surfaces** ▶ **Working** or **Reference**



2. Press **New**.



3. Enter the name of the new surface file. Press **Next**.

Surface Name and Type

Configuration name
Sloping Plane File

Surface type
Flat plane surface
Sloping plane surface
Raise / lower existing surface

Next Cancel

4. Move the machine to the elevation reference point.
5. Move the machine to point A and position the sensor on the cutting edge on the selected point.

6. When the cutting edge rests on the point, press **A** to measure the point, and then press **Ok**.

Sloping Plane Surface

Point on surface	Main-fall (A -> B)
N <input style="width: 80%;" type="text"/>	Direction <input style="width: 80%;" type="text" value="0°00'00''"/>
E <input style="width: 80%;" type="text"/>	Grade <input style="width: 80%;" type="text" value="0.000%"/>
Z <input style="width: 80%;" type="text"/>	<input type="button" value="A"/> ← <input type="button" value="B"/> 6a
<input type="button" value="Measure pt..."/>	
Grid interval	Cross-fall
<input style="width: 80%;" type="text" value="50.000'"/>	Grade <input style="width: 80%;" type="text"/>
<input type="button" value="Back"/>	<input type="button" value="M"/>

✖

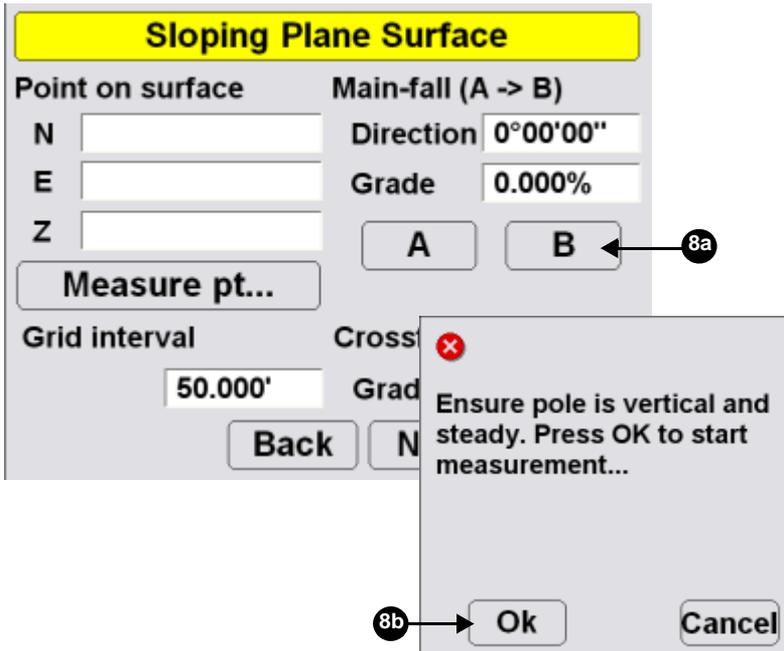
Ensure pole is vertical and steady. Press OK to start measurement...

6b →

Measuring...

Number of sats used	<input style="width: 90%;" type="text" value="8"/>
H.Precision	<input style="width: 90%;" type="text" value="0.033'"/>
V.Precision	<input style="width: 90%;" type="text" value="0.066'"/>
Duration (secs)	<input style="width: 90%;" type="text" value="1"/>
Measurements	<input style="width: 90%;" type="text" value="1"/>
Initialized !	
<div style="border: 1px solid gray; width: 100%; height: 20px; background-color: #cccccc; margin-bottom: 5px;"></div>	
<input type="button" value="Cancel"/>	

7. Move to point B and position the sensor on the cutting edge on the selected point.
8. When the cutting edge rests on the point, press **B** to measure the point, and then press **Ok**.



9. Press the *Crossfall Grade* entry box and enter a crossfall.

Sloping Plane Surface

Point on surface Main-fall (A -> B)

N Direction

E Grade

Z

Grid interval Crossfall

 Grade

10. Move the machine to the elevation reference point.

11. Press **Measure pt.** and then press **Ok.**

Sloping Plane Surface

Point on surface Main-fall (A -> B)

N Direction

E Grade

Z

Grid interval Crossfall

 Grade

5a →

5b →

Ensure pole is vertical and steady. Press OK to start measurement...

12. Enter a grid interval and crossfall. Press **Next**.

Sloping Plane Surface

Point on surface Main-fall (A -> B)

N 11376.490' Direction 0°00'00"

E 8873.210' Grade 0.000%

Z 56.430' A B

Measure pt...

Grid interval Crossfall

50.000' Grade 1.000%

Back Next Cancel

13. Press **Finish** to save the new surface file and end the process.

Surface Complete

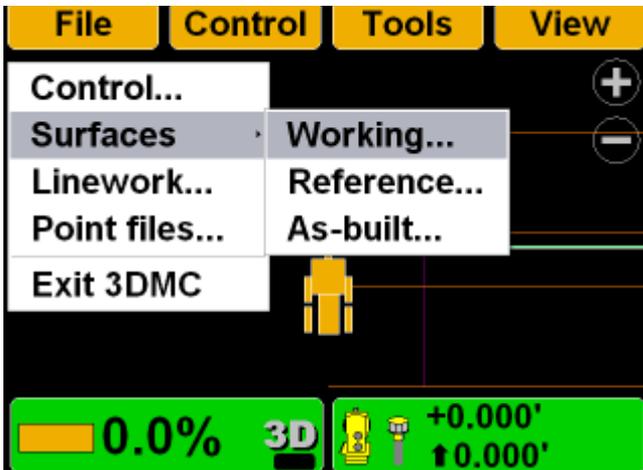
Surface is complete ! Press "Finish" to save surface...

Back Finish Cancel

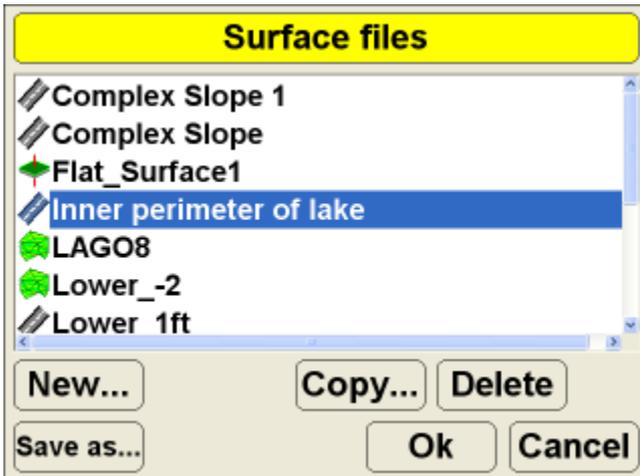
Raising or Lowering the Existing Surface

Raise/Lower the existing surface creates a new surface file based on an existing file.

1. Press **Topcon Logo** ▶ **File** ▶ **Surfaces** ▶ **Working** or **Reference**.



2. Press New.



- Enter the name of the new Raise/lower existing surface file. Press **Next**.

Surface Name and Type

Configuration name
Raise +1

Surface type
Flat plane surface
Sloping plane surface
Raise / lower existing surface

Next Cancel

- Select the surface to use as the reference from which to raise or lower the new surface.
- Enter an elevation adjustment. Press **Next**.

Raise / Lower Surface

Existing surface :
Inner perimeter of lake

Elevation adjustment : 1.000'

Back Next Cancel

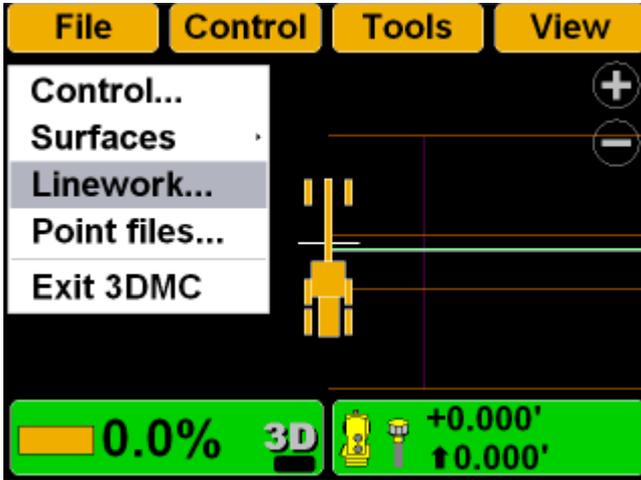
4 5a 5b

- Press **Finish** to save the new surface file.

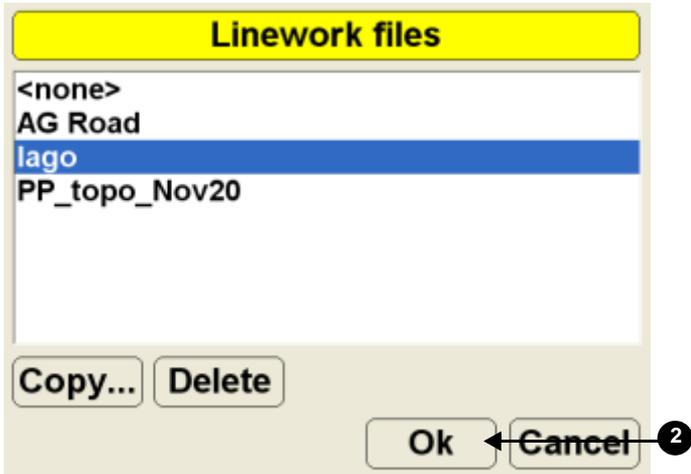
Selecting Jobsite Files

1. From the main screen, navigate to the file type dialog box.

- **Topcon Logo ▶ File ▶ Linework**
- **Topcon Logo ▶ File ▶ Point files**



2. On the Linework/Point files dialog box, select the file for the jobsite and press **Ok**.

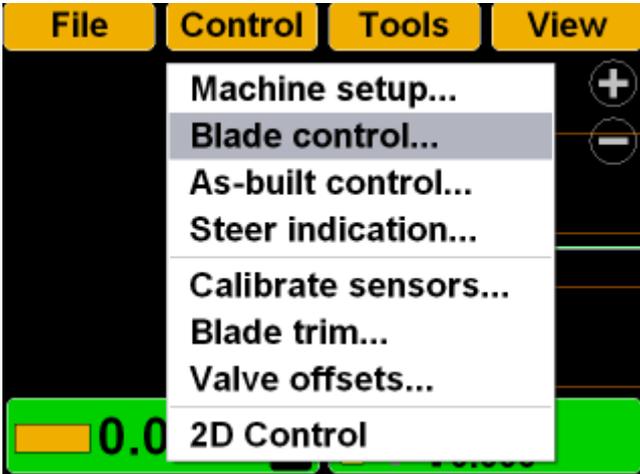


Setting Blade Control Options

Automatic Best-Fit Blade Control

When using the automatic best-fit method, 3DMC uses the entire cutting edge of the blade as the elevation reference.

1. Press **Topcon Logo** ▶ **Control** ▶ **Blade control**.



2. Select *Automatic best-fit (whole blade)*.

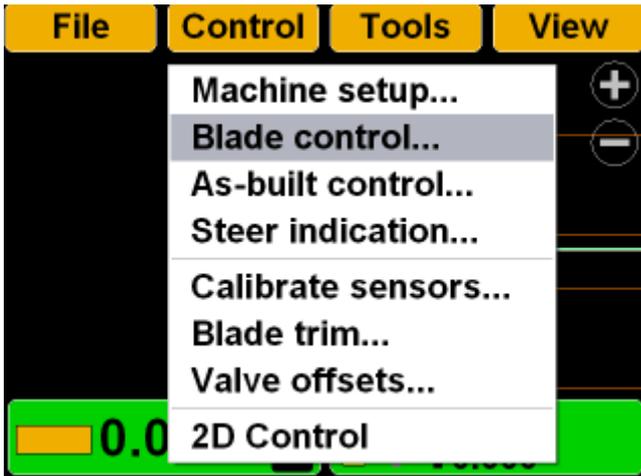


Control Using Single Point on Blade

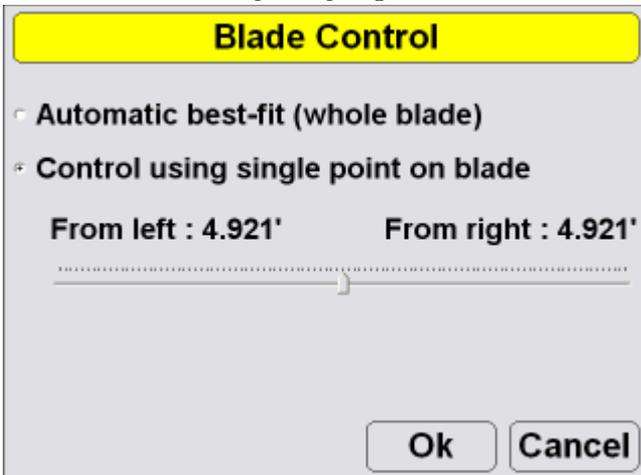
When using the control using single point on blade method, 3DMC uses a selected point on the blade to

use as the elevation reference rather than the entire cutting edge of the blade.

1. Press **Topcon Logo** ▶ **Control** ▶ **Blade control**.

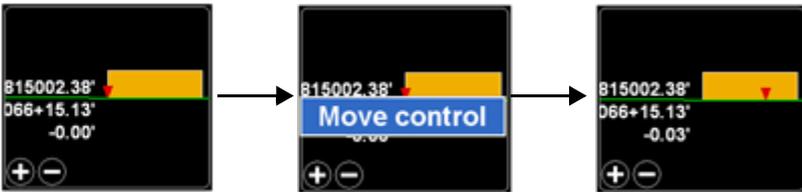


2. Select *Control using single point on blade*.



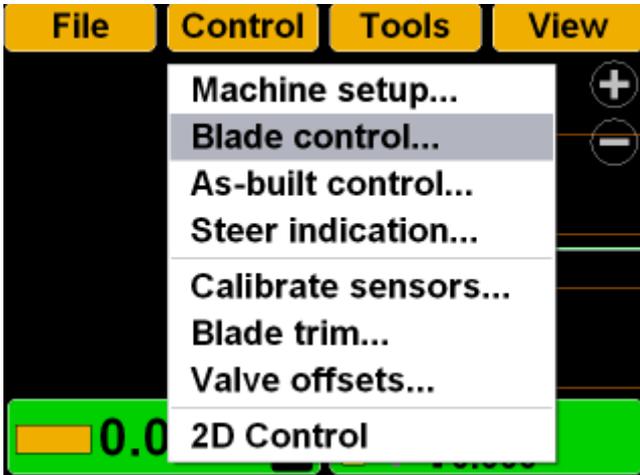
To quickly change the blade control point using the section view:

- To move to the far left or far right edge of the blade, press and hold the edge of the blade for one second. On the pop-up menu, tap **Move control left** or **Move control right**.
- Press and hold a point on the blade for one second. On the pop-up menu, tap **Move control**.



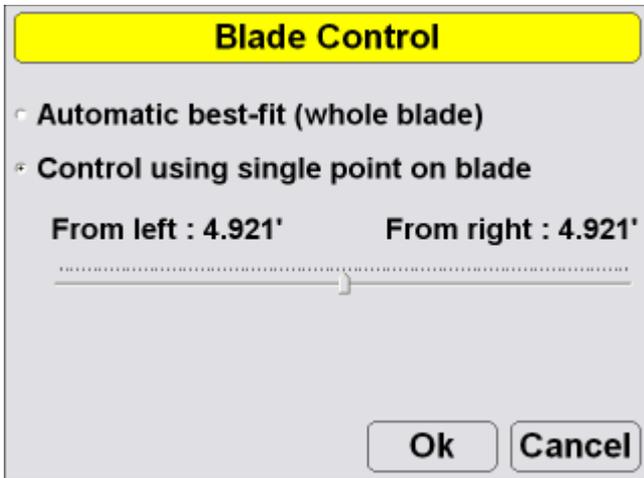
To change the blade control point using the Control menu:

1. Press **Topcon Logo** ▶ **Control** ▶ **Blade control**.



2. With *Control using single point on blade* selected, hold the slider button and move it left or right to

select a point at a distance from the left/right side of the blade.

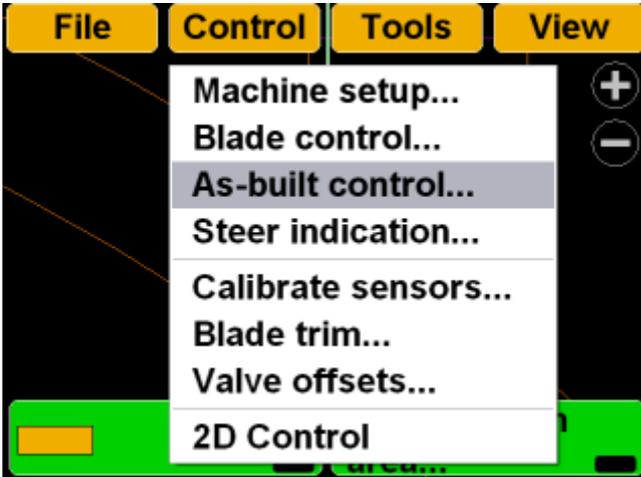


3. Press **OK** to apply this blade control point to the machine.

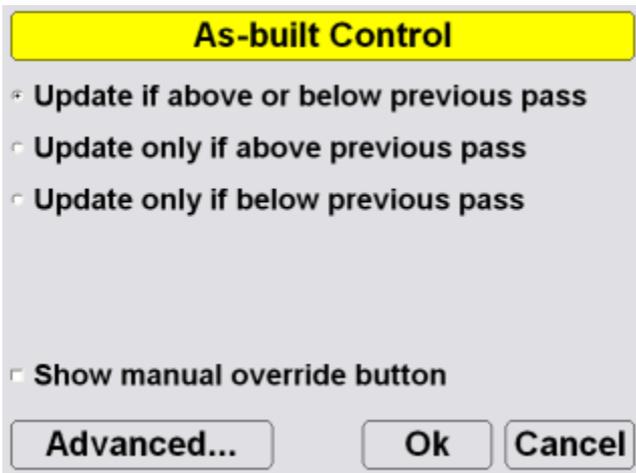
Setting As-built Control Options

As-built files display a color map of the graded working surface.

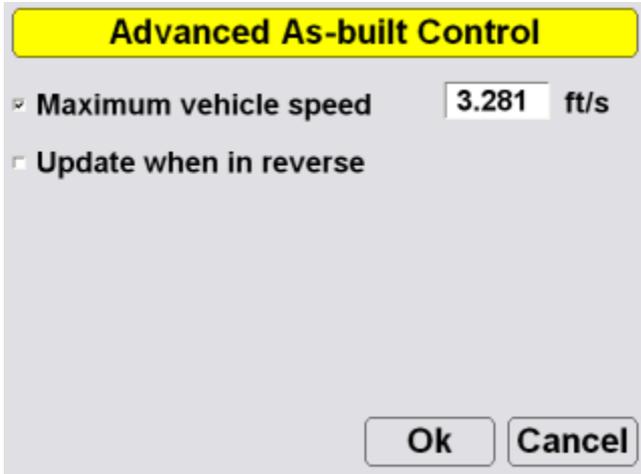
1. Press **Topcon Logo** ▶ **Control** ▶ **As-built control**.



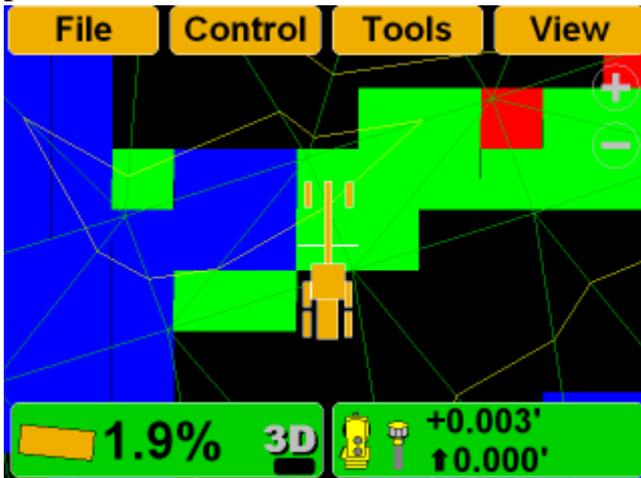
2. Select the As-built options. Then press **Advanced** to view the advanced options.



3. Select advanced options, and press **Ok**.

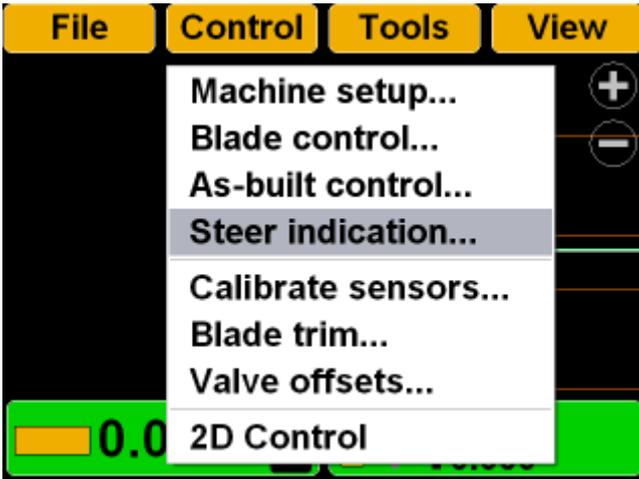


Example:



Setting Steer Indication Options

1. Press **Topcon Logo** ▶ **Control** ▶ **Steer indication**.

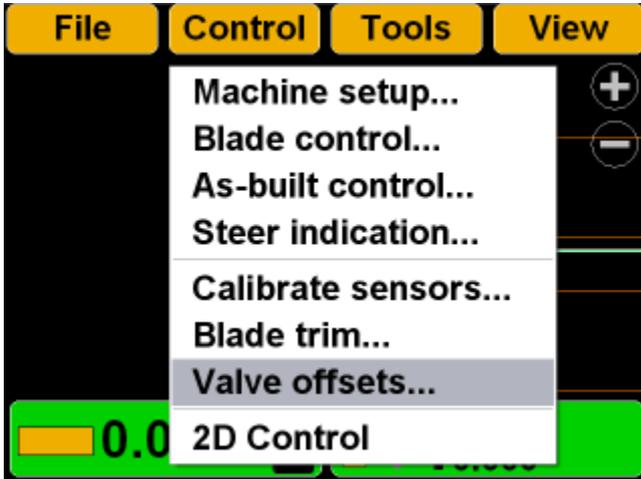


2. Set the steer indication options, and press **OK**.



Valve Offset Calibration

1. Raise the machine blade so that both sides of the cutting edge rest a few inches above the ground.
2. At the display, tap **Topcon Logo ▶ Control ▶ Valve offsets.**



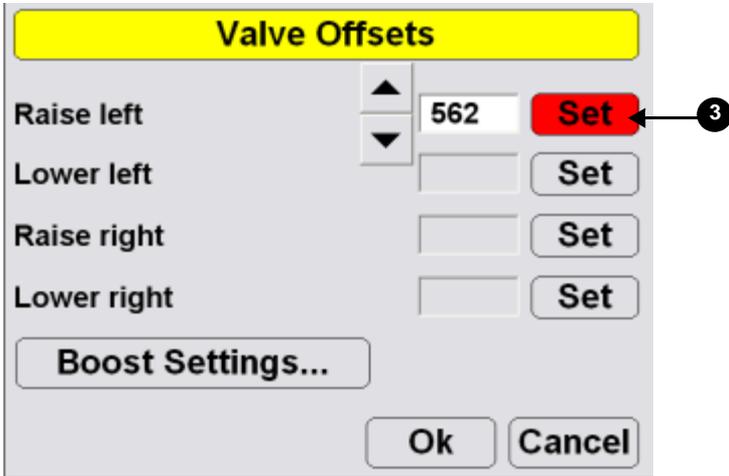
WARNING

Warning: Since the blade is about to move, automatically, **HANDS** and **FEET** should be clear of the blade!

3. Press *Raise left* **Set** and tap the arrows to increase or decrease the valve offsets.

NOTICE

Notice: Boost Setting adjustments are not recommended and may cause poor machine performance.

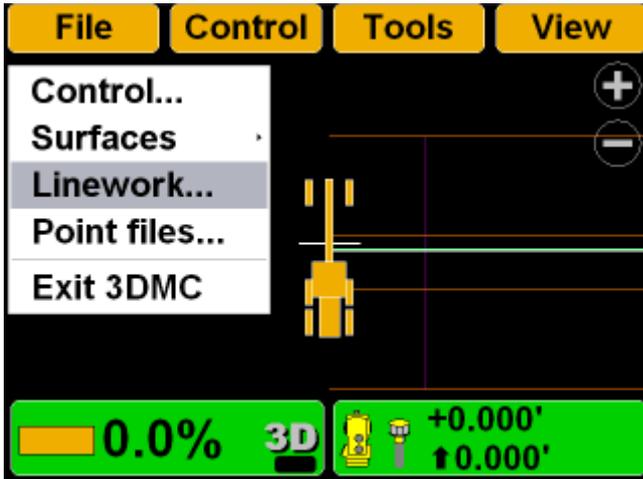


4. Repeat Step 3 for each of the selections.
5. Press **OK**.

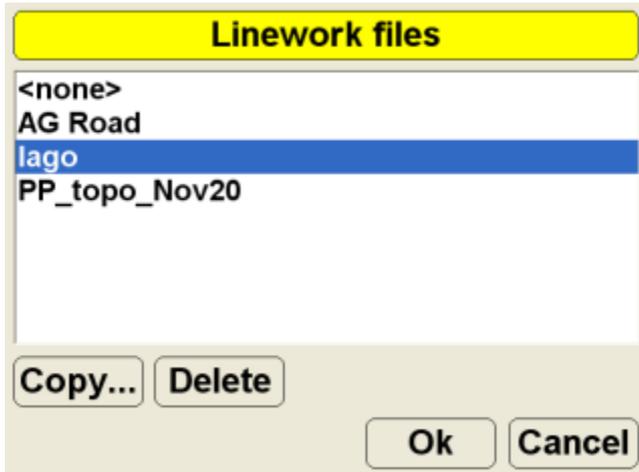
Steering or Grading to Polyline

Steer to Polyline

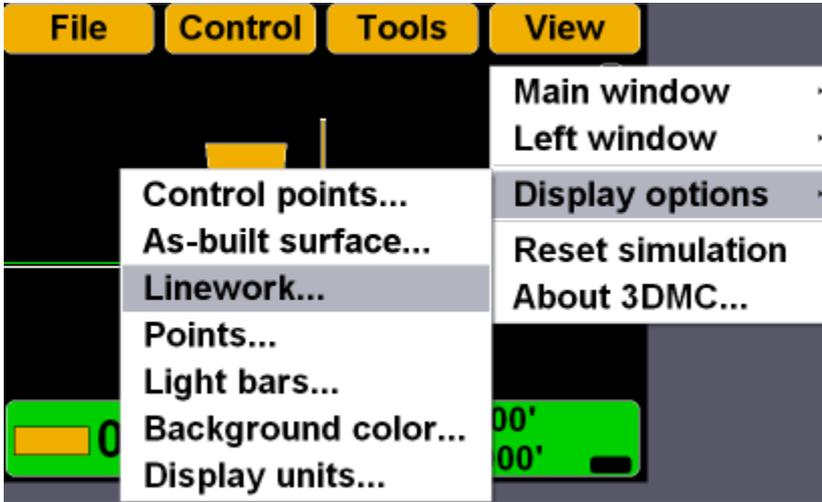
1. Press **Topcon Logo** ▶ **File** ▶ **Linework**.



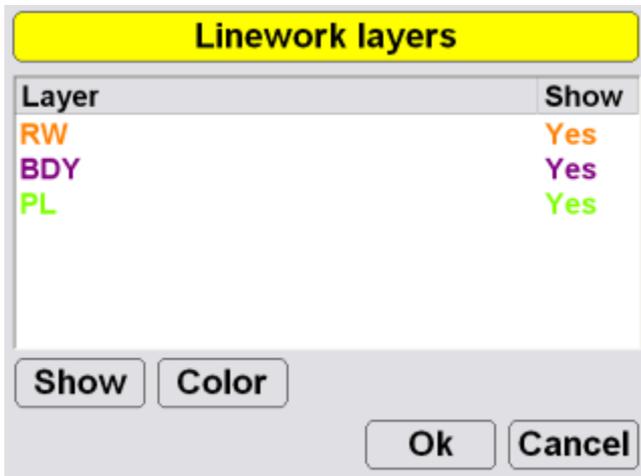
2. Select the Linework file for the job, and Press **Ok**.



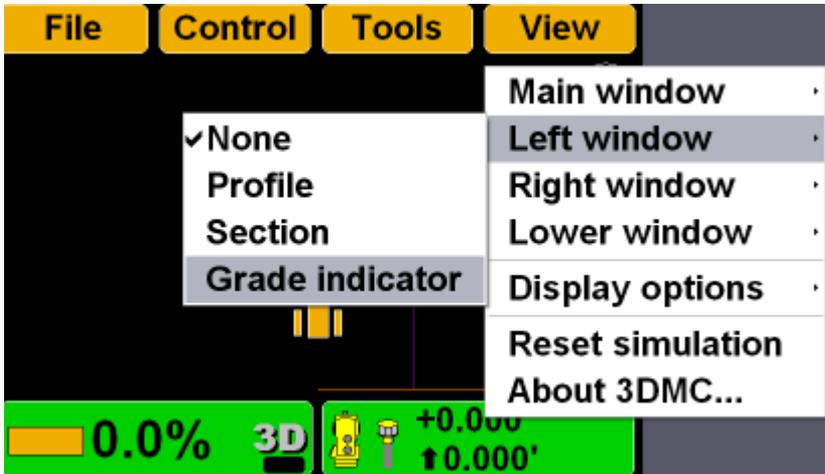
3. Press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Linework**.



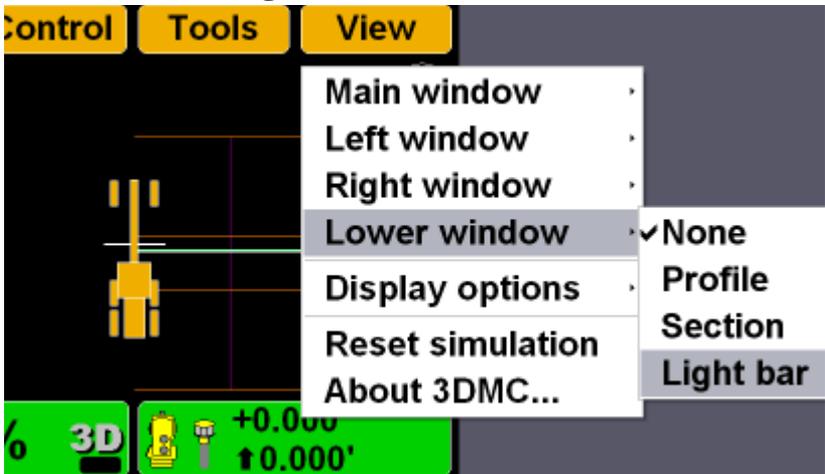
4. Select the polylines to display.



5. Press **Topcon Logo** ▶ **View** ▶ **Left Window** ▶ **Grade Indicator**.

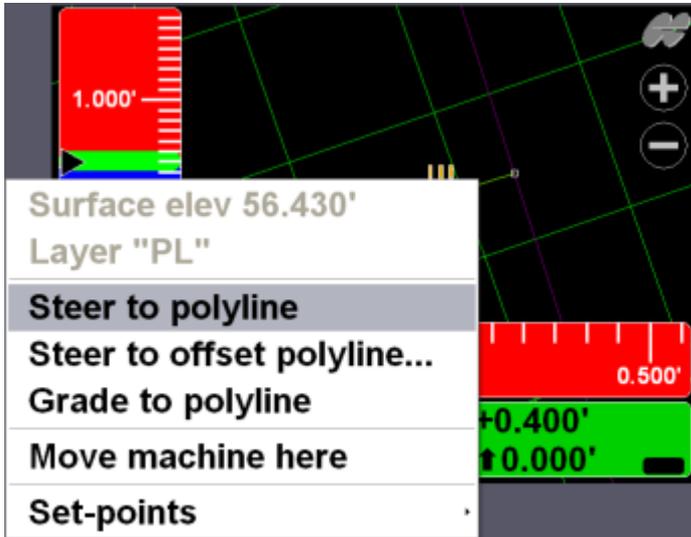


6. Press **Topcon Logo** ▶ **View** ▶ **Lower Window** ▶ **Lightbar**.

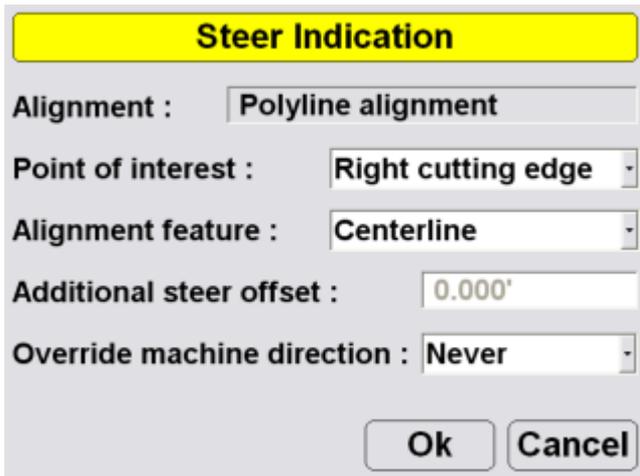


7. Press and hold the polyline to use for steering, then press **Steer to polyline** on the pop-up menu;

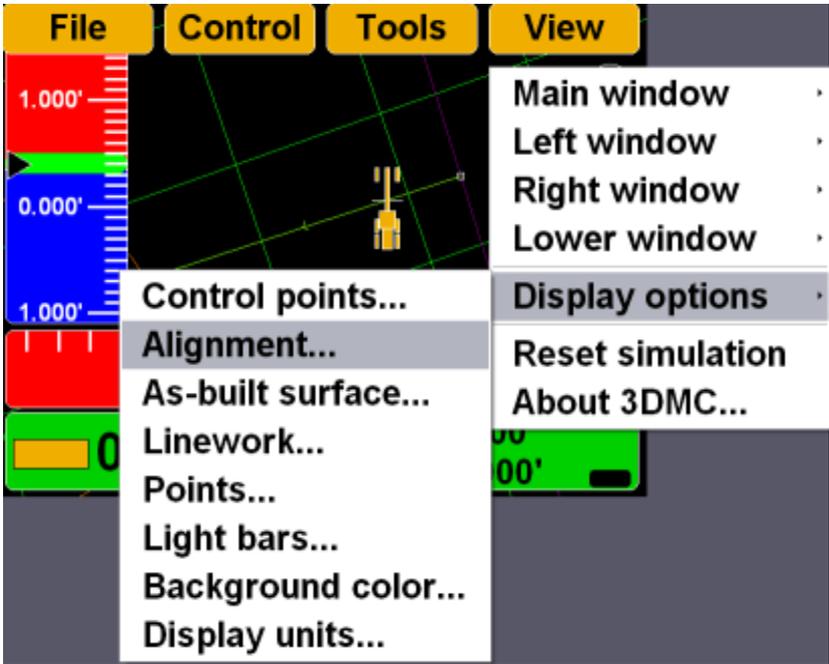
graphical cross lines display along the selected polyline.



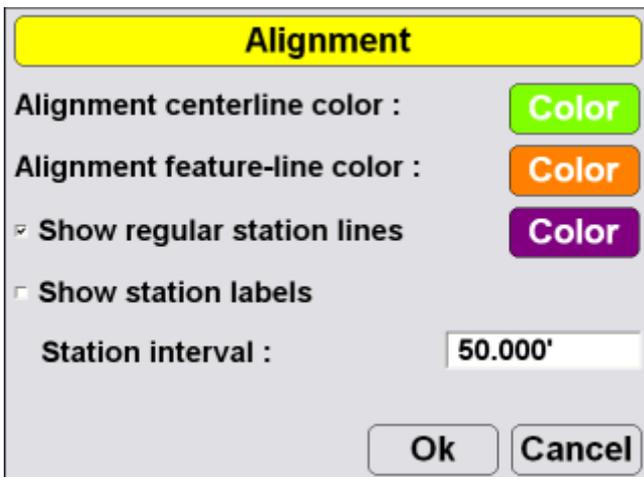
8. Press **Topcon Logo** ▶ **Control** ▶ **Steer indication** to change the steer indication settings.



9. Press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Alignment**.



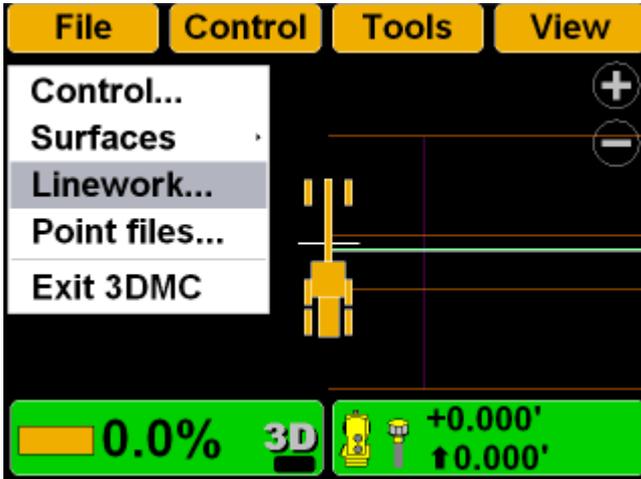
10. Change the alignment settings, and press OK.



11. Begin steering.

Grading to Polyline

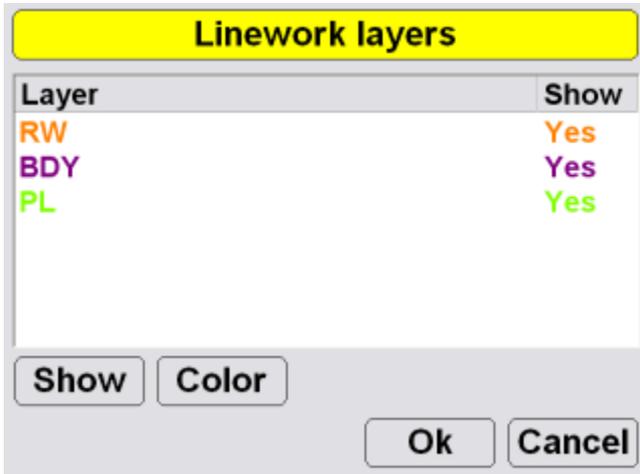
1. Press **Topcon Logo** ▶ **File** ▶ **Linework**, select the correct Linework file, and press **Ok**.



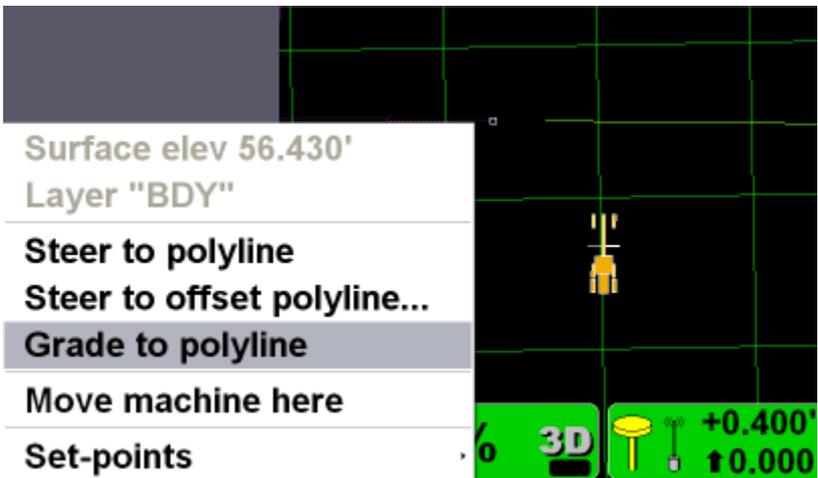
2. Press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Linework**.



3. Select the polylines to display, and press **Ok**.



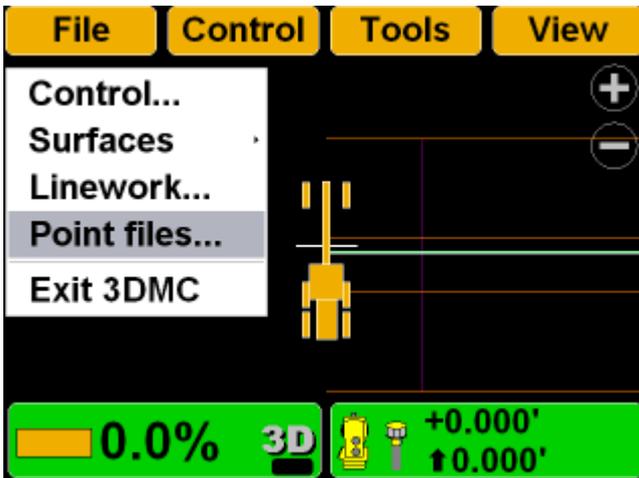
4. On the main screen, press and hold the polyline to use for grading to, then press **Grade to polyline** on the pop-up menu. Graphical cross lines display along the polyline.



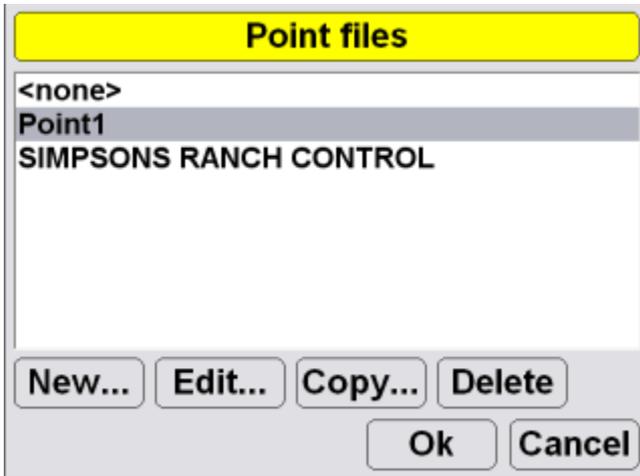
5. Begin grading. As needed, repeat Step 4 above to grade to another polyline.

Performing Topographic Surveys

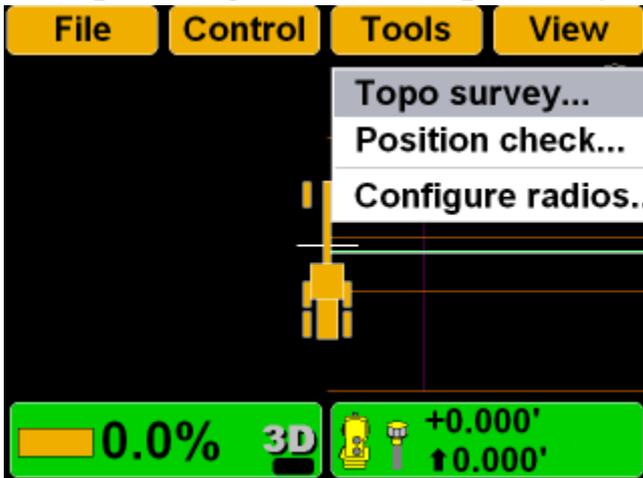
1. Press **Topcon Logo** ▶ **File** ▶ **Point files**.



2. Create a new point file or select an existing point file. Press **Ok** to return to the Main Screen.



3. Press **Topcon Logo** ▶ **Tools** ▶ **Topo survey**.



4. Enter or select the information. Press **Ok** when done.

Topo survey

Log by

Minimum distance

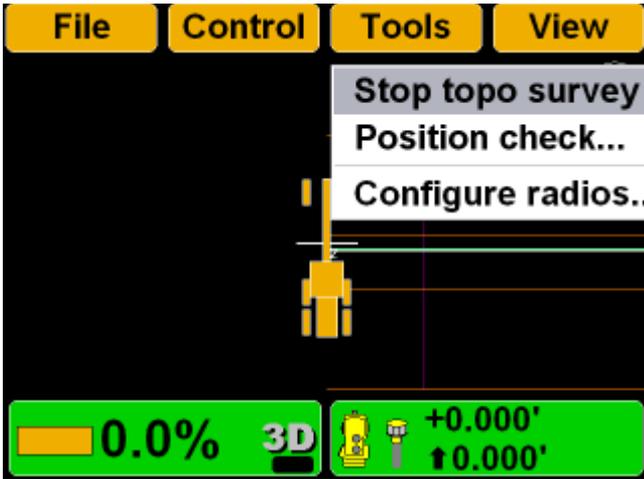
Log to layer

Log at

Lower all elevations by

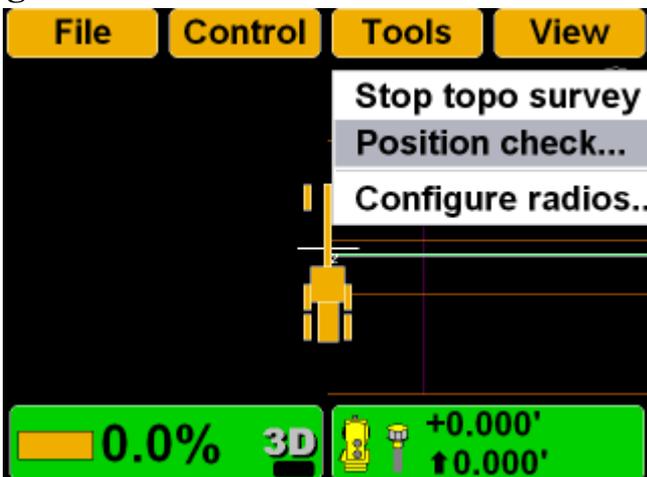
5. Press **Ok** to start the topo survey function.
6. Begin driving. When the machine begins to move, 3DMC will begin measuring and logging the data.

- To stop topo measurements, press **Topcon Logo ▶ Stop topo survey**. Otherwise, 3DMC continues logging measurements.



Checking the Blade's Position

- To check the position of the blade, press **Topcon Logo ▶ Tools ▶ Position check**.



2. On the *Position Check* dialog box, select the *Point of interest* (either left edge or right edge of blade), and press **Measure**.

The image shows a screenshot of the **Position Check** dialog box. The title bar is yellow and contains the text "Position Check". Below the title bar, there are several input fields and buttons. A callout "2a" points to the "Point of interest" dropdown menu, which is currently set to "Left cutting edge". Below this are input fields for "North", "East", and "Elev". Further down are input fields for "Cut to design surface" and "Alignment stationing". At the bottom of this section are two buttons: "Measure..." and "Cancel". A callout "2b" points to the "Measure..." button. Below this section is another section with input fields for "Number of sats used" (8), "H.Precision" (0.033'), "V.Precision" (0.066'), "Duration (secs)" (0), and "Measurements" (1). Below these fields is a section labeled "Initialized !" with a progress bar consisting of several small squares. At the bottom right of this section is a "Cancel" button.

3. When finished, the *Position Check* dialog box displays the point on the job at the selected edge of

the blade. Press **Cancel** to return to the Main Screen.

Position Check

Point of interest : Left cutting edge

North 11580.394'

East 8878.787'

Elev 56.430'

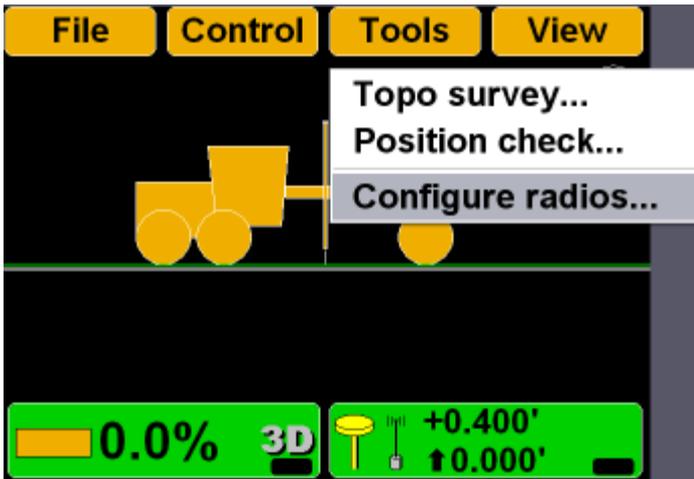
Cut to design surface : 0.000'

Alignment stationing : 1+41.856'

Measure...
Cancel

Changing Radio Channels

1. Press **Topcon Logo** ▶ **Tools** ▶ **Configure radios**.



2. Select the *Radio type* that matches the radio type in the MC-R3, and then press **Configure**. 3DMC will connect to the radio after several second.

GPS Radio Configuration

Radio type: Topcon FH915 (SS)

Connected to: Serial Port B

Baud rate: 38400

Format: CMR

Configure... Ok Cancel

GPS Radio Configuration

Radio type: Topcon FH915 (SS)

Connected to: Serial Port B

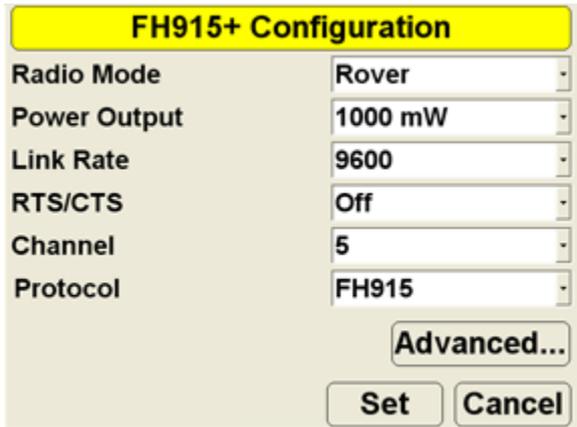
Baud rate: 38400

Format: CMR

Connecting to radio at 38400bps

Configure... Ok Cancel

3. Enter radio configuration information, and select the channel. The channel must match the channel of the base station.

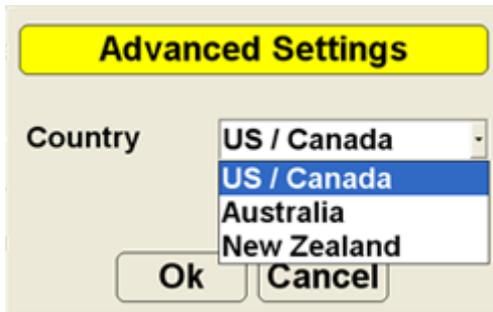


The image shows a dialog box titled "FH915+ Configuration" with a yellow header. It contains several configuration options, each with a dropdown menu:

Radio Mode	Rover
Power Output	1000 mW
Link Rate	9600
RTS/CTS	Off
Channel	5
Protocol	FH915

At the bottom right of the dialog box, there are three buttons: "Advanced...", "Set", and "Cancel".

4. Press **Advanced** to select the country of operation, and then press **Ok**.

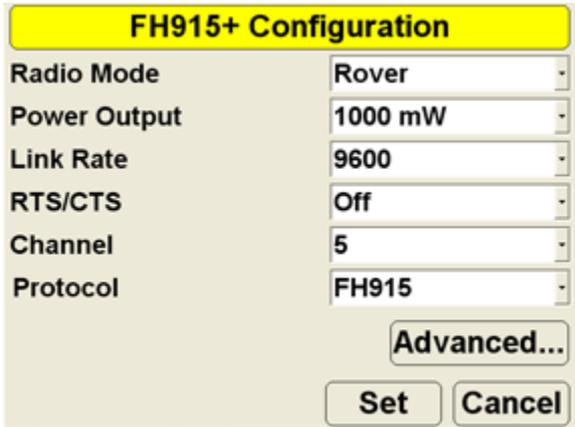


The image shows a dialog box titled "Advanced Settings" with a yellow header. It contains a "Country" dropdown menu with a list of options:

Country	US / Canada
	US / Canada
	Australia
	New Zealand

At the bottom of the dialog box, there are two buttons: "Ok" and "Cancel".

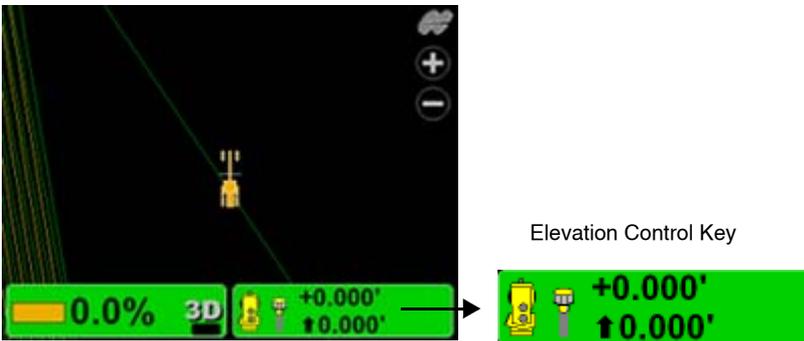
- Press **Set** to save the radio configuration settings and return to the GPS Radio Configuration screen.



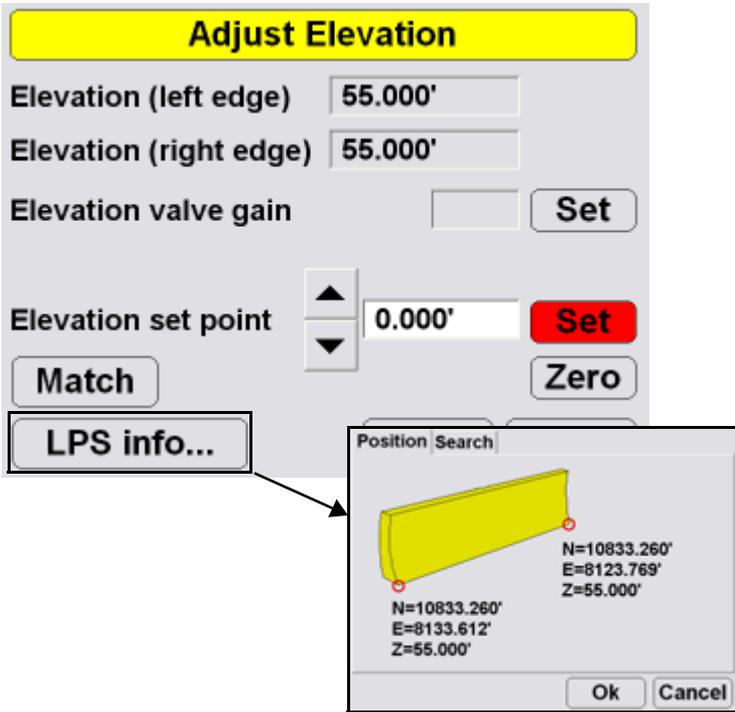
- Press **Ok** to save the radio configuration settings and return to the main screen.

Viewing LPS Information

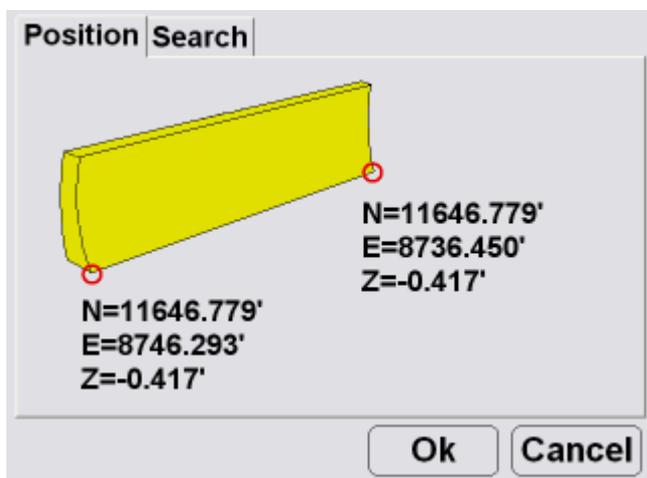
- To view the *LPS information* dialog box and tabs, press the **Elevation control** key.



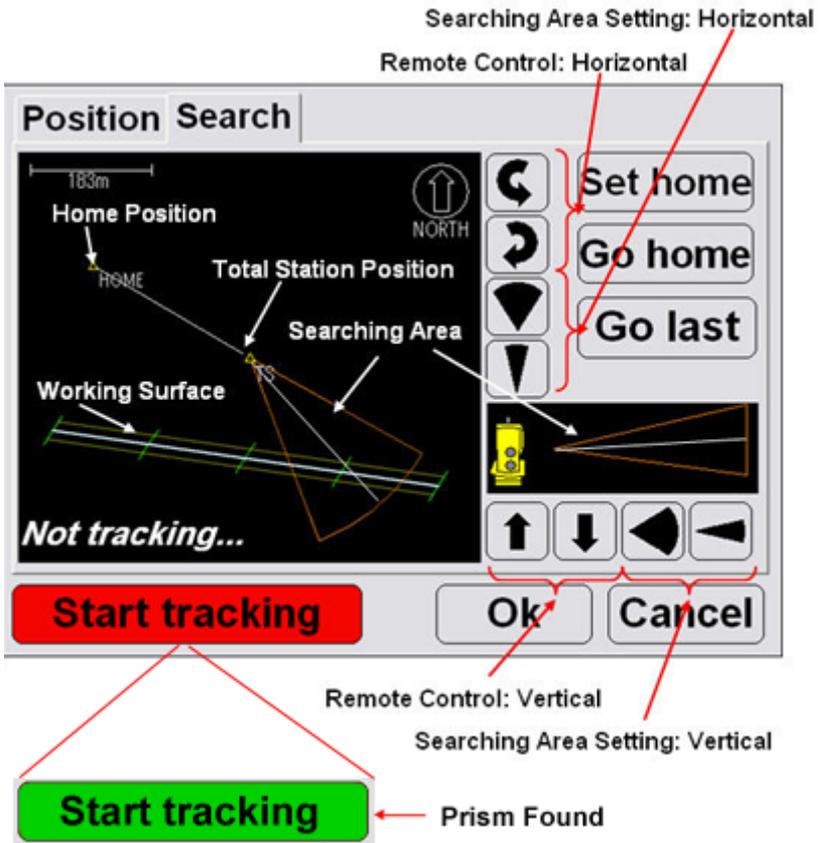
2. Press the **LPS info** button.



LPS Position



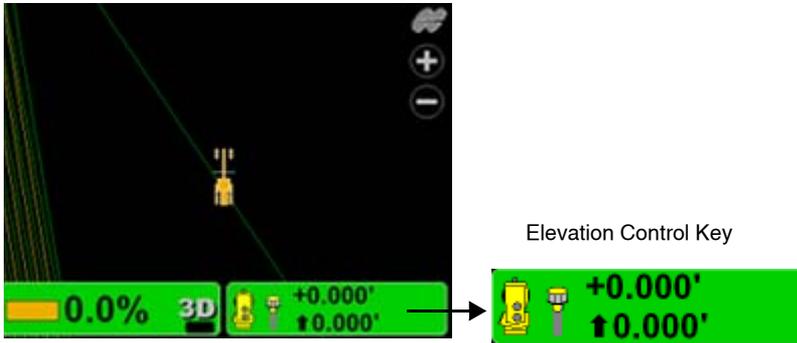
LPS Search



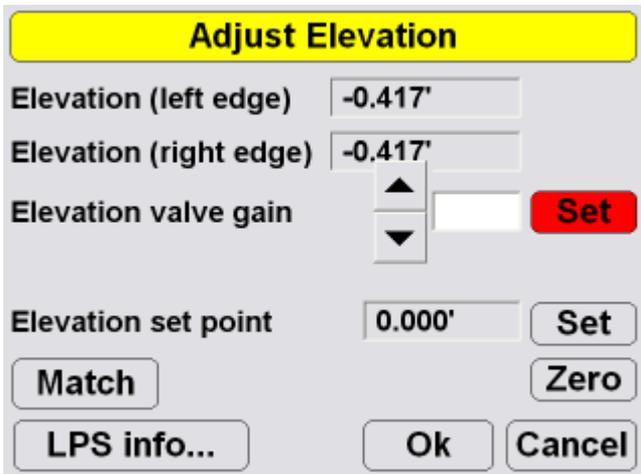
Adjusting Valve Gain

1. On the 3DMC Main Screen, press the **Elevation**

Control key.



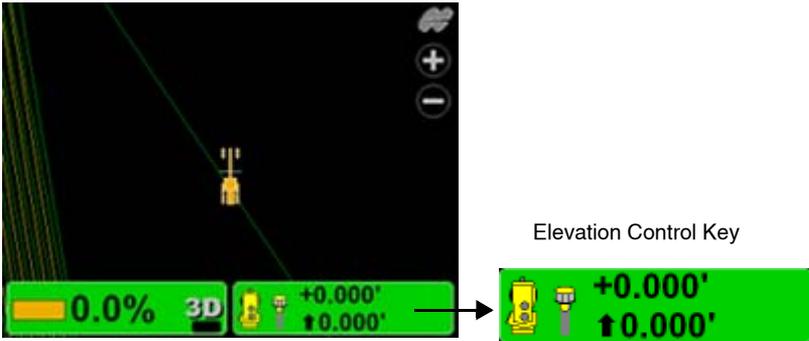
2. Press the *Elevation valve gain Set* key, changing it to red.



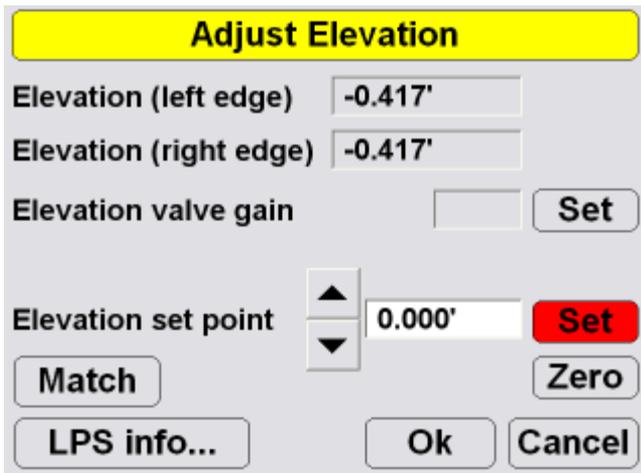
3. Change the offset using the up/down arrow.
4. Press **Ok**.

Changing Cut/Fill Offsets

1. On the 3DMC Main Screen, press the **Elevation Control** key.



2. Press *Elevation set point Set*, changing it to red.

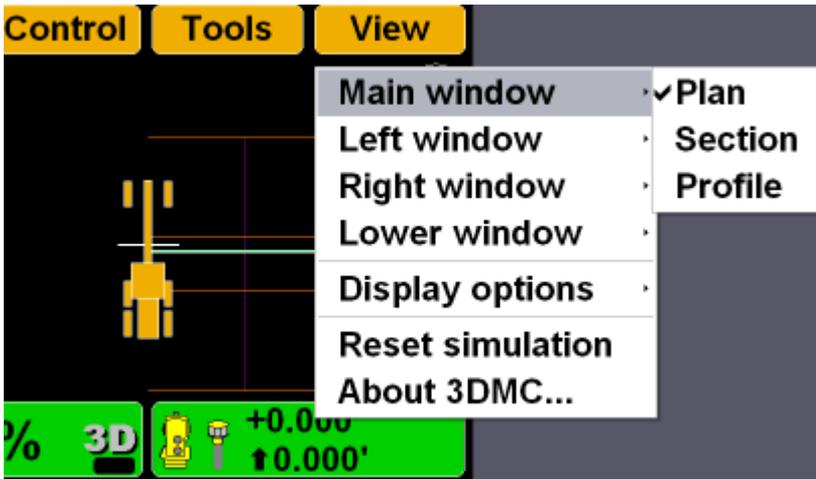


3. Change the offset using the up/down arrows.
4. Press **Ok**.

Changing the Display View

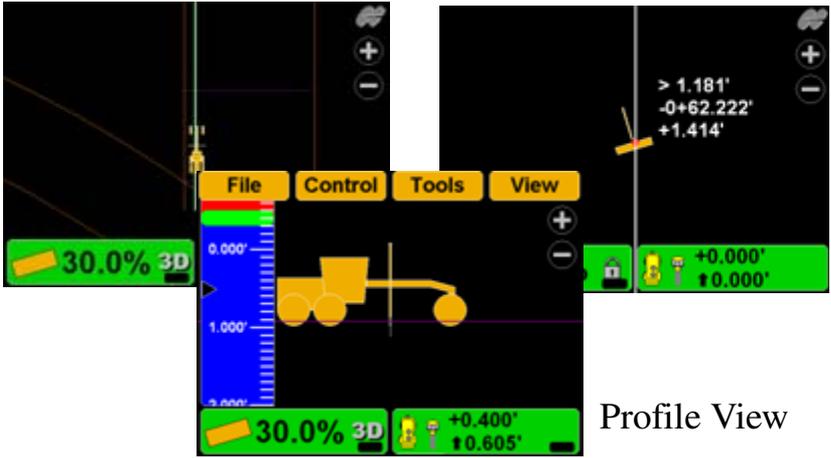
Main Window Views

To access the main window view, press **Topcon Logo ▶ View ▶ Main window**, then press the necessary view; a check mark indicates the active view.



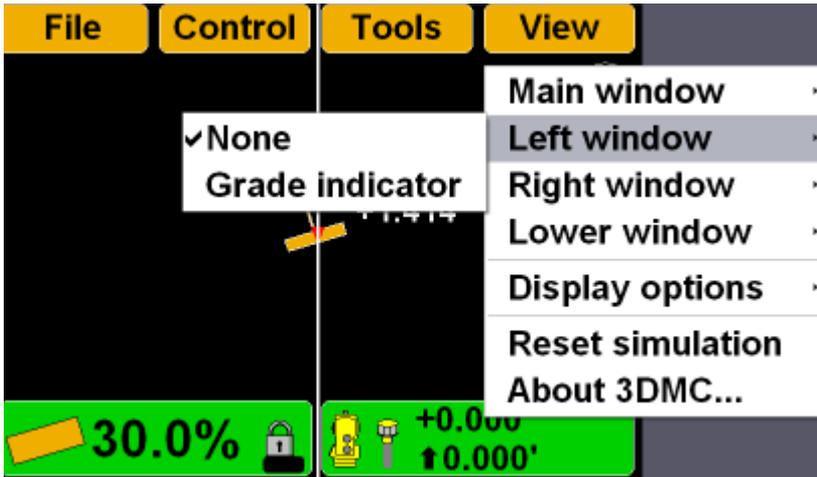
Plan View

Section View

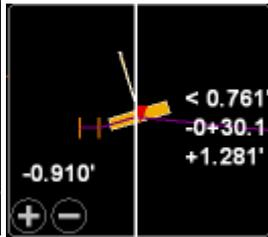
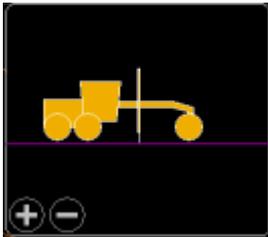


Left Window Views

To access the lower window view, press **Topcon Logo** ▶ **View** ▶ **Left window**, then select a view.



Section View

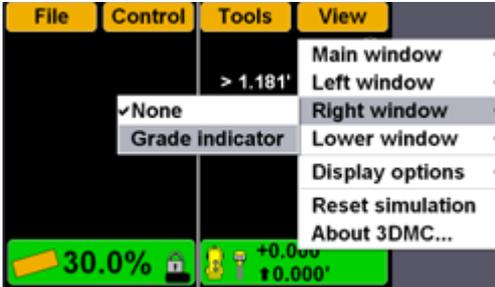


Grade Indicator



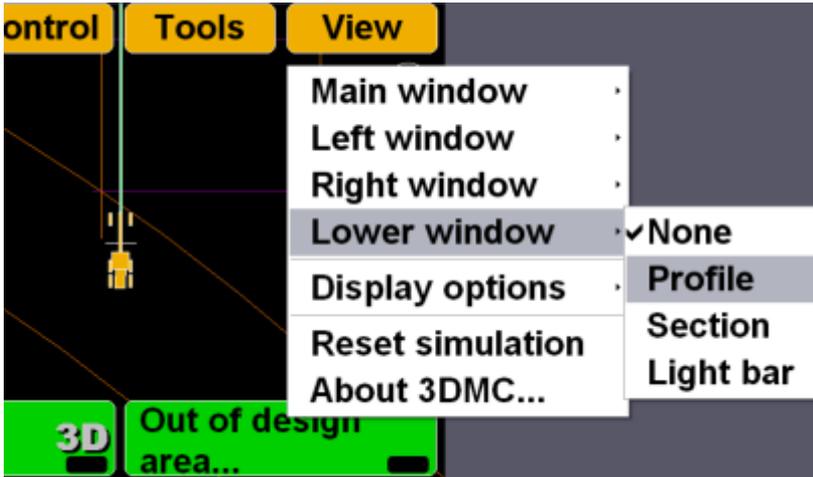
Right Window View

To access the right window view, have the Plan view visible and press **Topcon Logo** ▶ **View** ▶ **Right window**, then select **Grade indicator**.

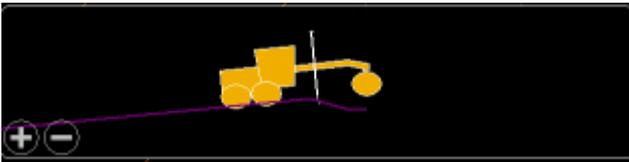


Lower Window Views

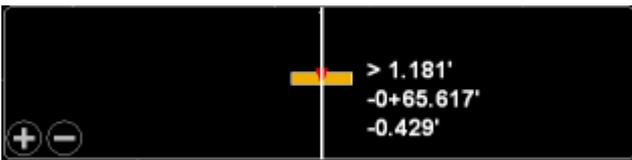
To access the lower window view, press **Topcon Logo** ▶ **View** ▶ **Lower window**, then select a view.



Profile View



Section View

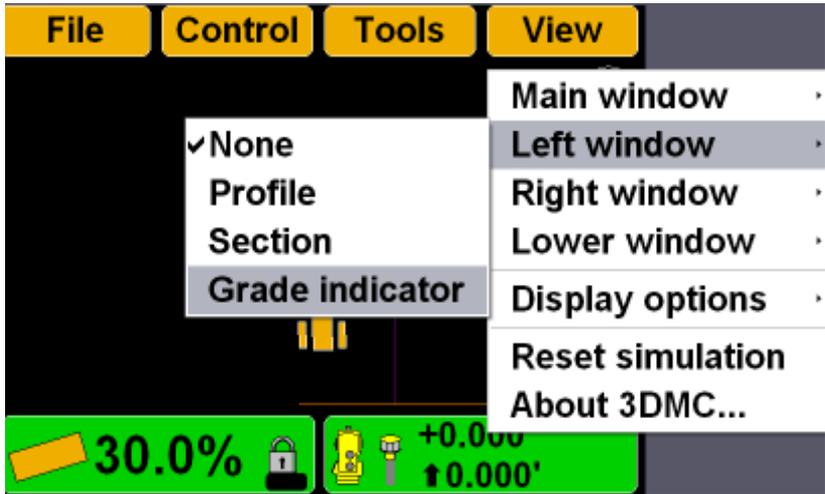


Lightbar

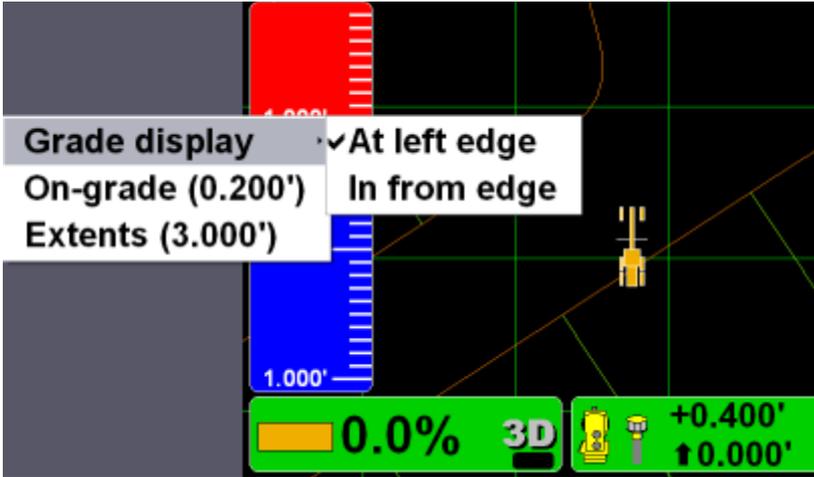


Changing the Grade Indicator Scale and Extents

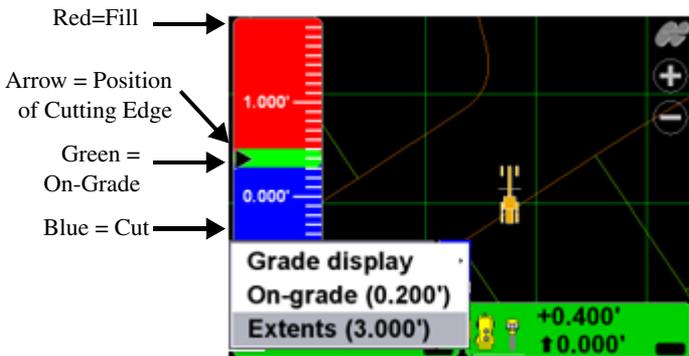
To view the grade indicator, press **Topcon Logo** ▶ **View** ▶ **Left window** ▶ **Grade indicator**.



To change the grade display, press and hold the grade indicator for one second, press **Grade display, then the necessary option.**



To change the on-grade or extents, press and hold the grade indicator for one second, then press the necessary menu option.



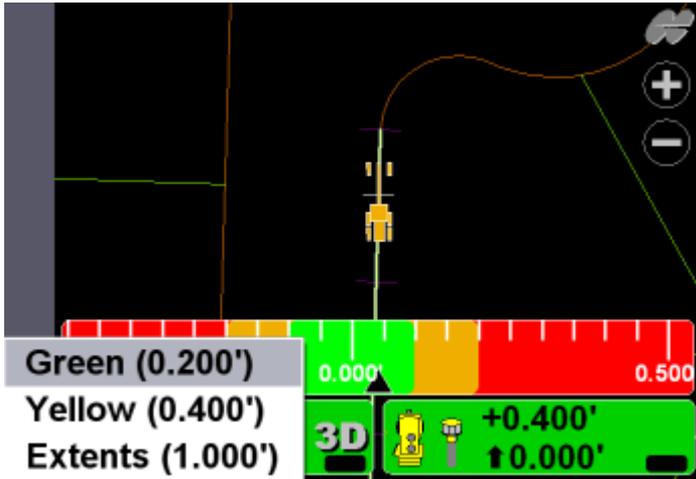
Changing the Light Bar Scale and Extents

To view the light bar scale, press **Topcon Logo** ▶ **View** ▶ **Lower window** ▶ **Light bar**.



To change the light bar scale and extents:

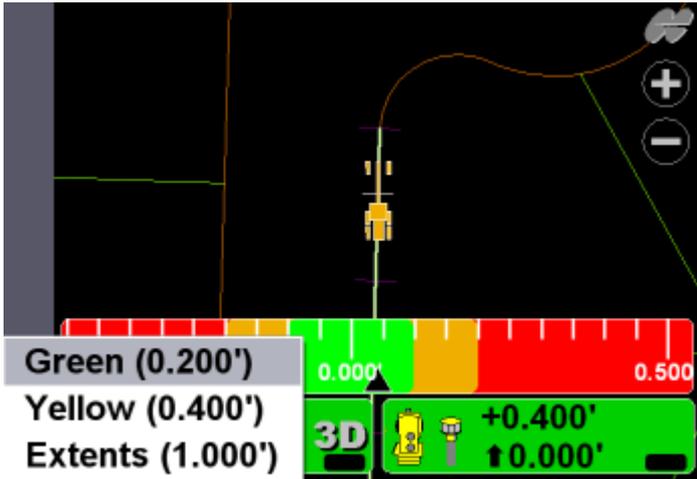
Press and hold the light bar scale for one second, then press **Green**, **Yellow**, or **Extents** to change the scale.



Changing the Steer Indication Scale and Extents

This function is only available while in Steer Indication mode. See “Steering or Grading to Polyline” for details on enabling steer indication.

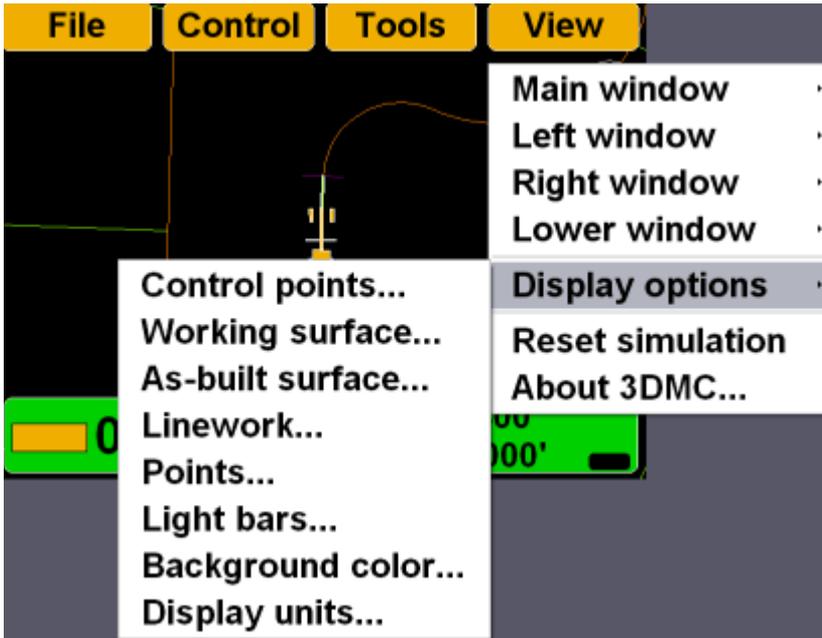
To change the steer indication scale and extents: Press and hold the light bar scale for one second, then press **Green**, **Yellow**, or **Extents** to change the scale.



Changing Display Options

To view available options, press

TopconLogo ▶ View ▶ Display options.

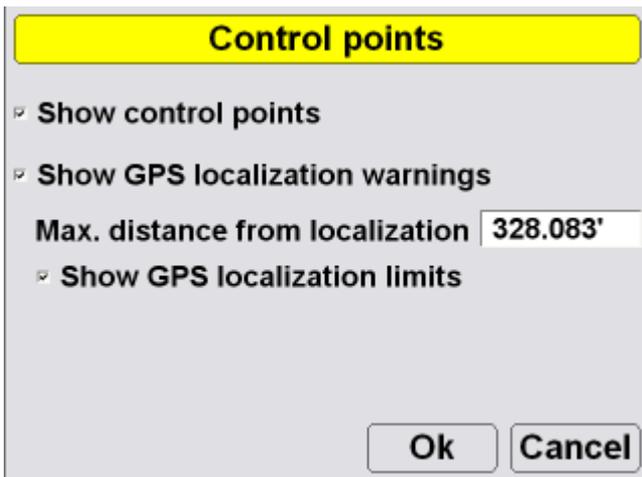


Control Points

- To view information about the control points, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Control Points**.

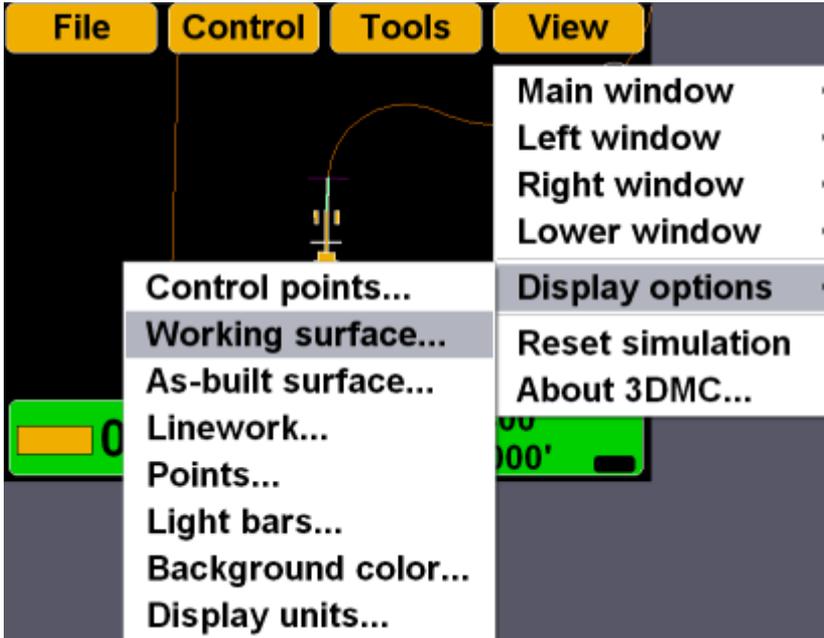


- Enable (check mark) or enter the necessary options, then press **Ok**.

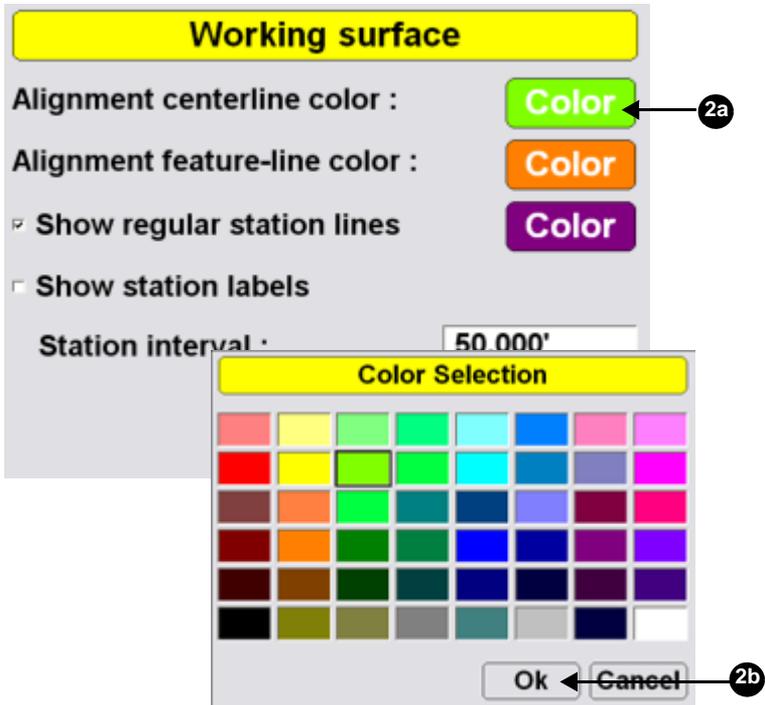


Working Surface Display Options

1. When using a TIN surface model file, press **Topcon Logo ▶ View ▶ Display options ▶ Working Surface**.



2. Press **Color** to change the color of the alignment and station lines. Select a color and press **Ok**.



3. Enable (check mark) or enter the necessary options, then press **Ok**.

Working surface

Alignment centerline color : **Color**

Alignment feature-line color : **Color**

Show regular station lines **Color**

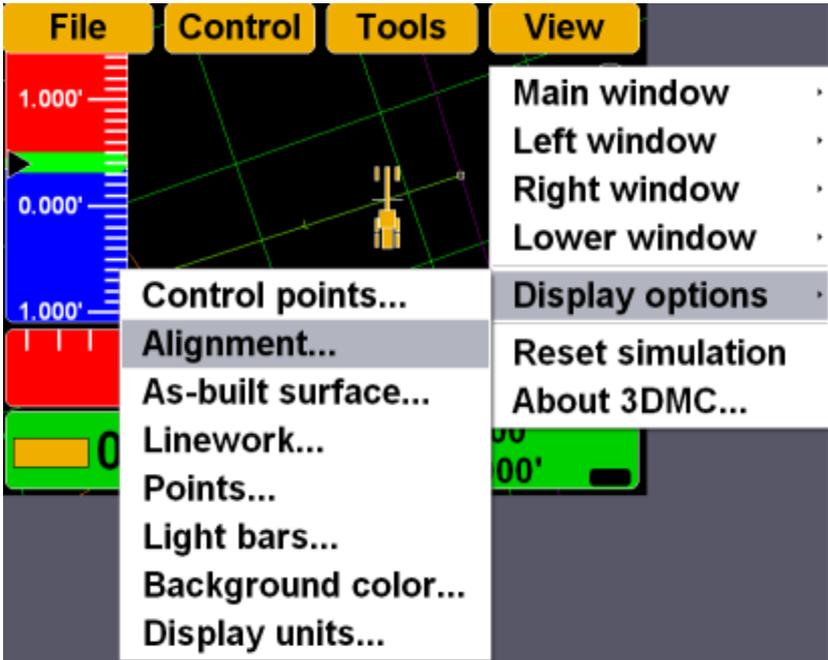
Show station labels

Station interval : 50.000'

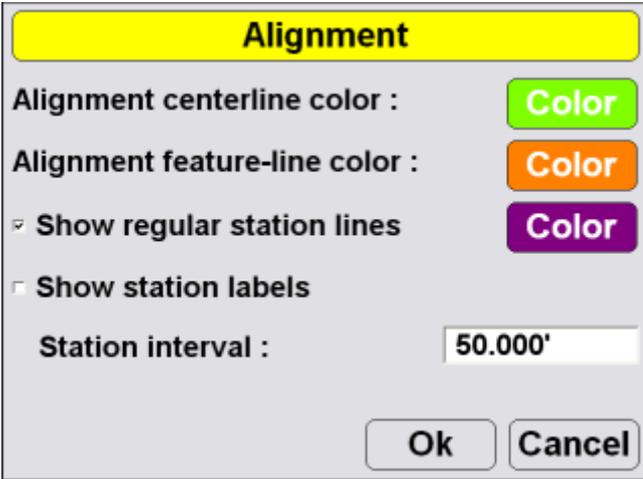
Ok **Cancel**

Alignment Display Options

1. When using either a road surface model or an alignment file, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Alignment**.



2. Change the alignment settings, and press OK.



Alignment

Alignment centerline color : **Color**

Alignment feature-line color : **Color**

Show regular station lines **Color**

Show station labels

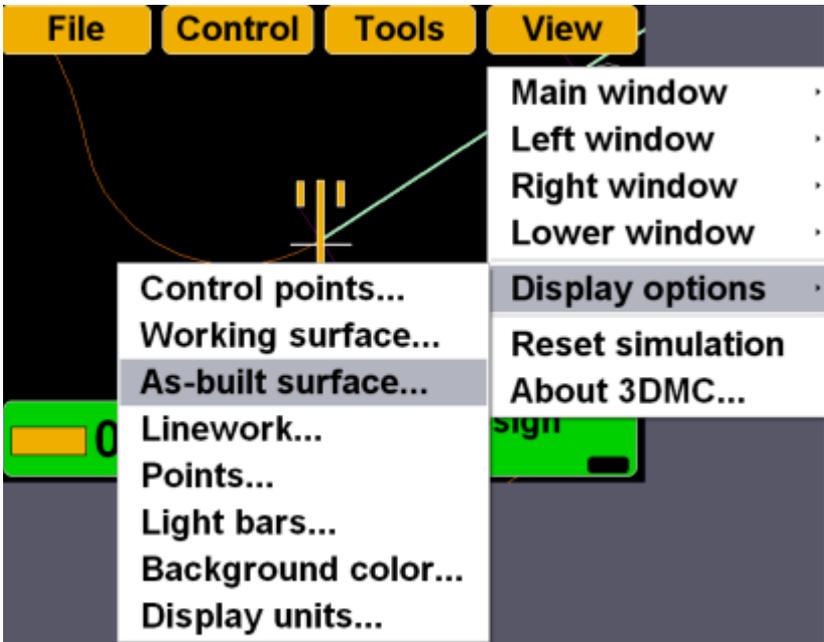
Station interval : 50.000'

Ok Cancel

As-built Surface Display Options

As-built files display a color map of the graded working surface.

1. Press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **As-built Surface**.



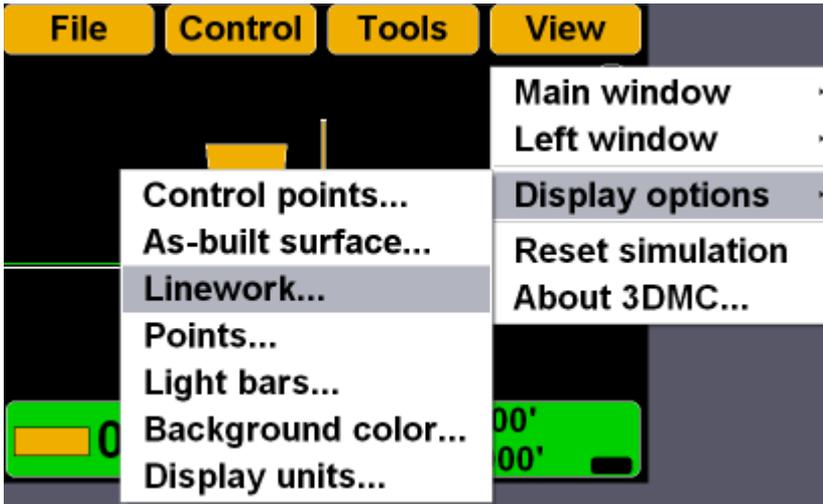
2. Select and/or enter the necessary options and press **Ok**.

As-built Surface

- Multi-color cut/fill @ interval:
- Tri-color cut/fill : Cut Grade Fill
- On-grade tolerance (+/-) :
- Number of passes : 1 2 3 4+
- Pass variation : <0.050' <0.100' <0.150' >0.150'
- Step :

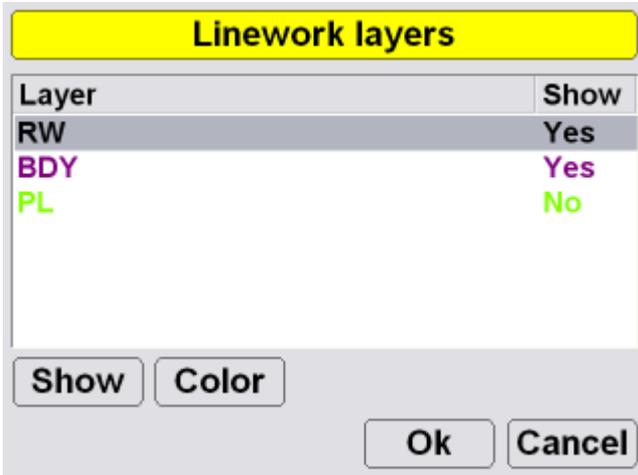
Linework Display Options

1. When using a Linework file, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Linework**.



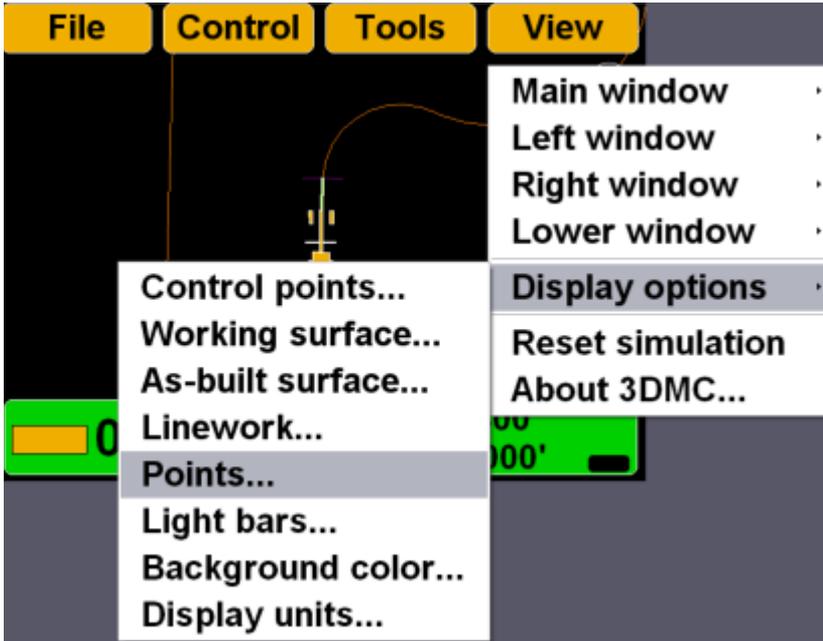
2. To display layers on the Main Screen, select the layer and press **Show**, “Yes” displays in the *Show* column. Press **Show** again to not display the layer on the Main Screen; “No” displays in the *Show* column.

3. Press **Ok** to return to the Main Screen.

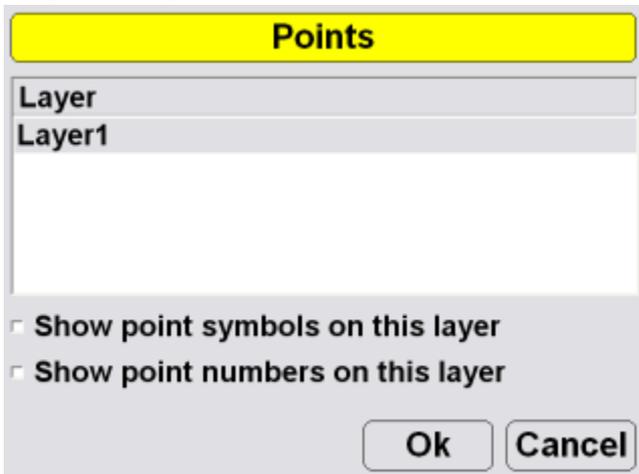


Point Display Options

1. When using a Point file, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Points**.

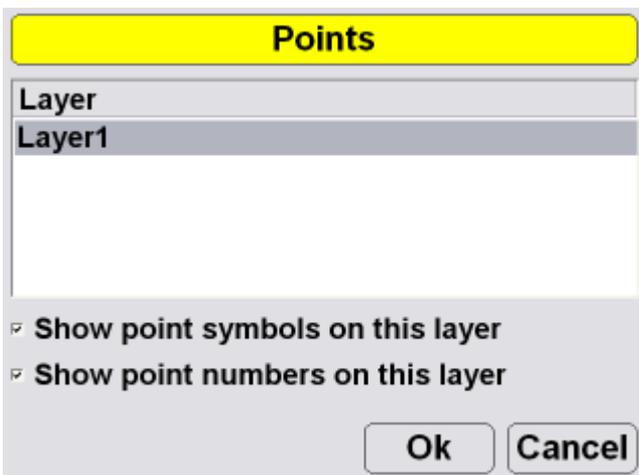


2. To display a points layer on the main screen, select the layer and press **Ok**.



The screenshot shows a dialog box titled "Points" with a yellow header. Below the header is a list box labeled "Layer" containing "Layer1". At the bottom of the dialog, there are two unchecked checkboxes: "Show point symbols on this layer" and "Show point numbers on this layer". "Ok" and "Cancel" buttons are located at the bottom right.

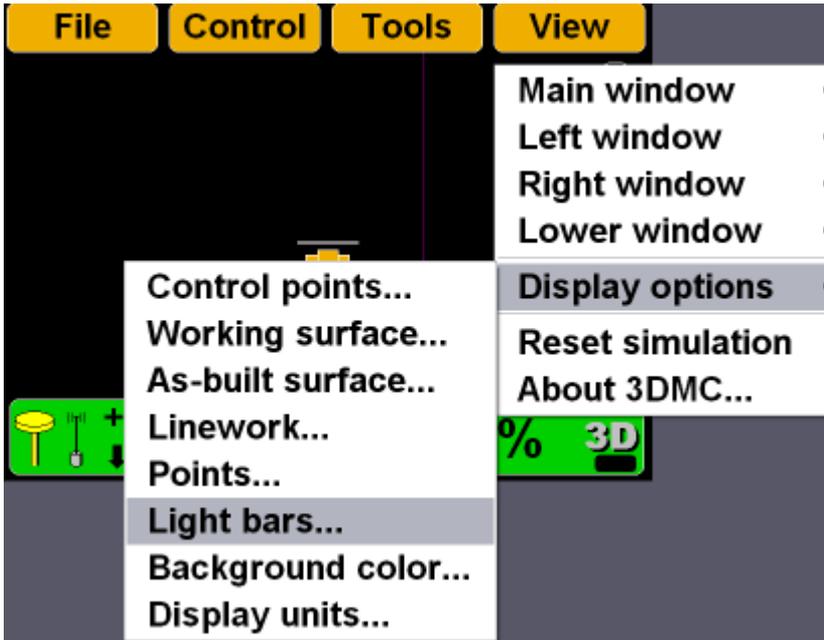
3. To display points symbols and/or point numbers during a topographic survey, select the corresponding check box and press **Ok**.



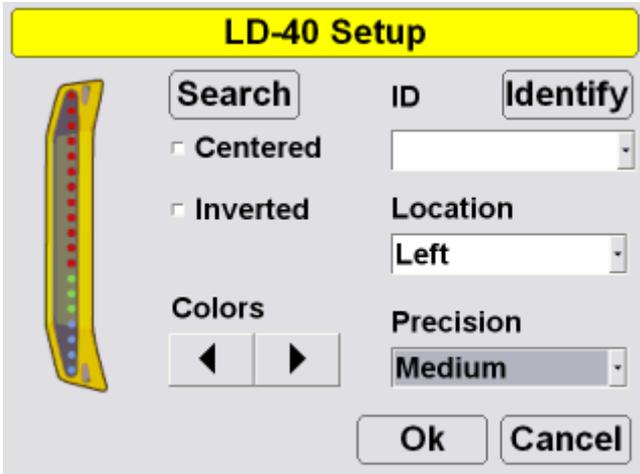
The screenshot shows the same "Points" dialog box as above, but with both checkboxes checked: "Show point symbols on this layer" and "Show point numbers on this layer". The "Ok" and "Cancel" buttons remain at the bottom right.

Lightbar Display Options

1. To set the lightbar display options, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Light bars**.

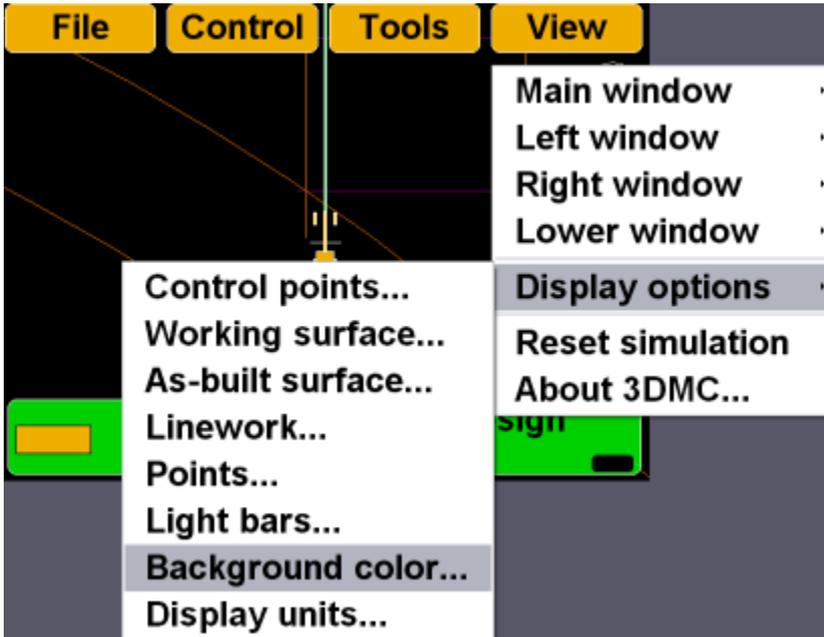


2. Set the LD-40 options, and press **Ok**.



Changing the Background Color

1. To change the background color of the Main Screen, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Background color**.

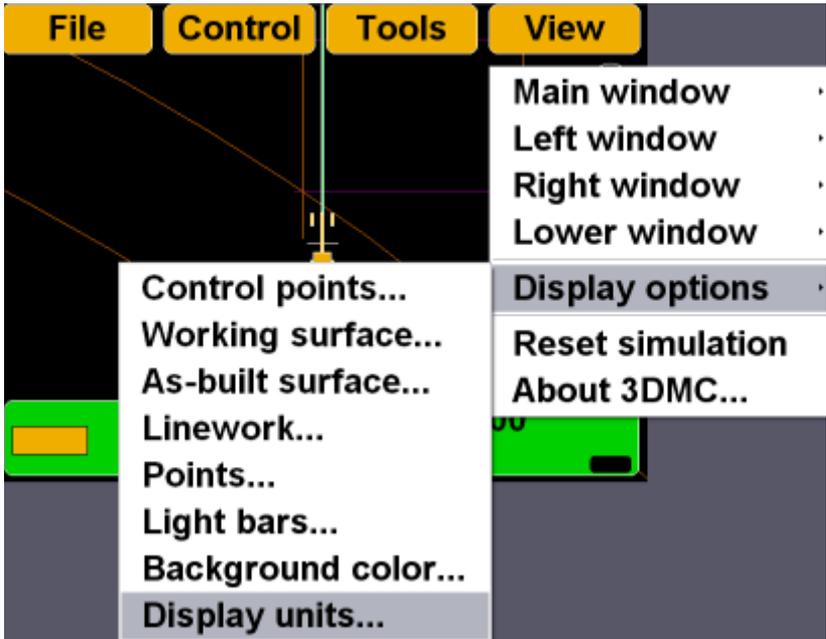


2. Select a color and press **Ok**.

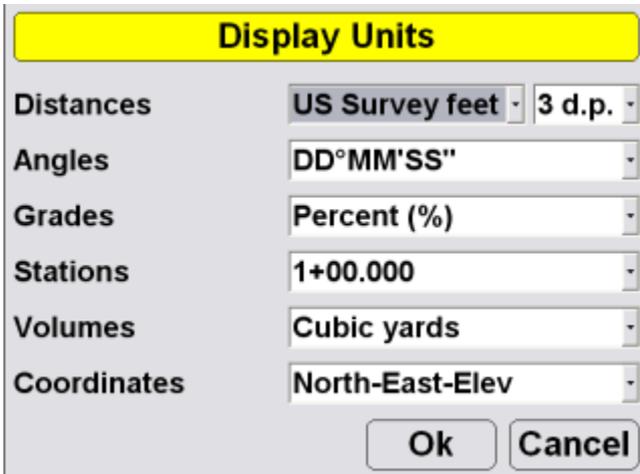


Display Units Options

1. To set the type of units used in the job, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Display units**.



2. Select the display unit options and press **Ok**.



Display Units	
Distances	US Survey feet 3 d.p.
Angles	DD°MM'SS"
Grades	Percent (%)
Stations	1+00.000
Volumes	Cubic yards
Coordinates	North-East-Elev

Ok Cancel

Viewing and Updating 3DMC

To view information about 3DMC, press **Topcon Logo** ► **View** ► **About 3DMC**.



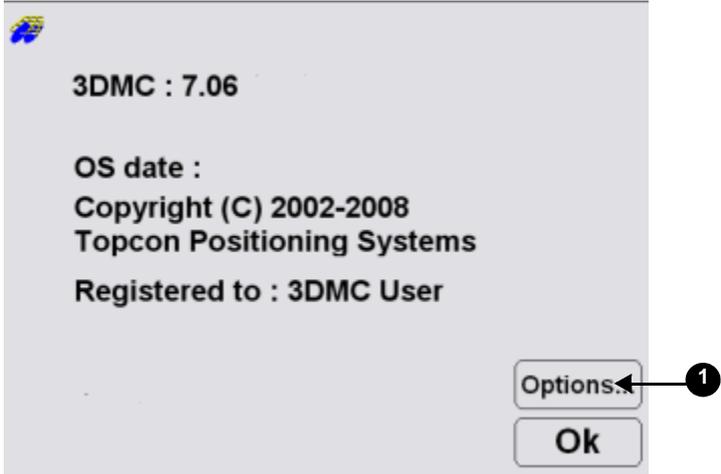
 3DMC : 7.06

OS date :
Copyright (C) 2002-2008
Topcon Positioning Systems
Registered to : 3DMC User

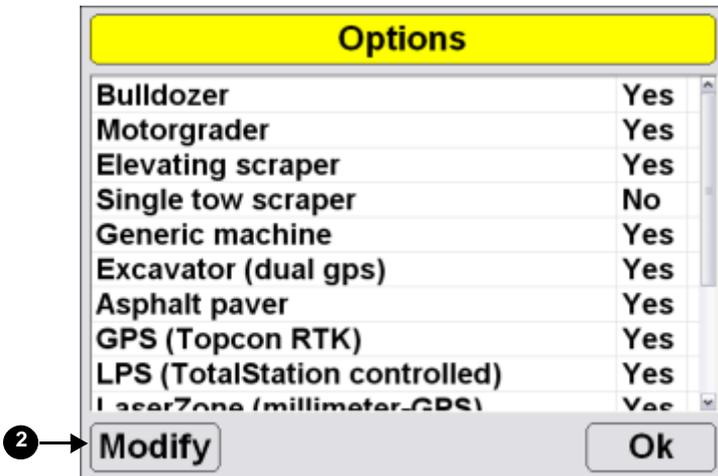
Options...
Ok

Options

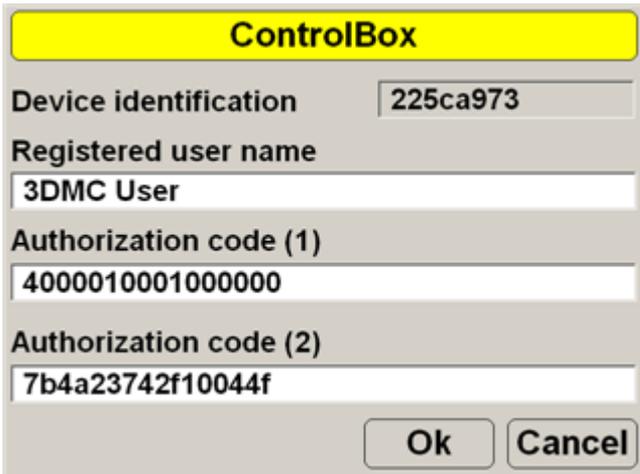
1. To view the enabled options, press **Options** on the *about 3DMC* dialog box.



2. To modify 3DMC options, press **Modify** on the *Options* dialog box.



- Record the *Device identification* number to give to your Topcon representative. Contact your Topcon representative to obtain new authorization codes for the necessary applications.



The image shows a dialog box titled "ControlBox" with a yellow header. It contains four input fields and two buttons. The first field is "Device identification" with the value "225ca973". The second field is "Registered user name" with the value "3DMC User". The third field is "Authorization code (1)" with the value "4000010001000000". The fourth field is "Authorization code (2)" with the value "7b4a23742f10044f". At the bottom right are "Ok" and "Cancel" buttons.

ControlBox	
Device identification	225ca973
Registered user name	3DMC User
Authorization code (1)	4000010001000000
Authorization code (2)	7b4a23742f10044f
Ok Cancel	

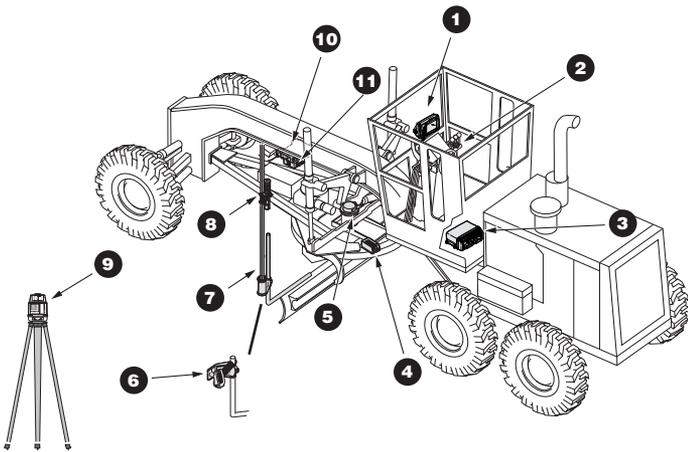
- When you have received the new authorization codes, enter the codes in the *ControlBox* dialog box.
- Press **Ok** to apply the new codes and options. Press **Ok** on each screen to return to the main screen.
- Turn off the display, wait a couple seconds, and then turn on the display to activate the new passwords.

2D

2D control applications consist of either a sonic tracker tracking a feature or stringline, or a laser receiver tracking a rotating laser. When 3DMC is in 2D mode, unnecessary functions are disabled for quick access to 2D-specific functions.

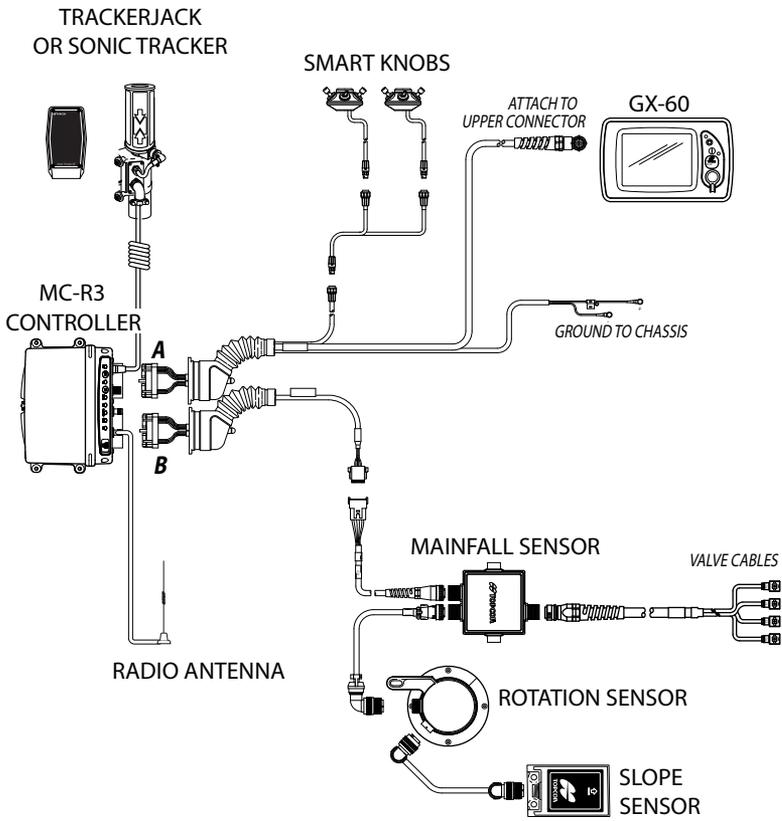
2D Components

Motor Grader

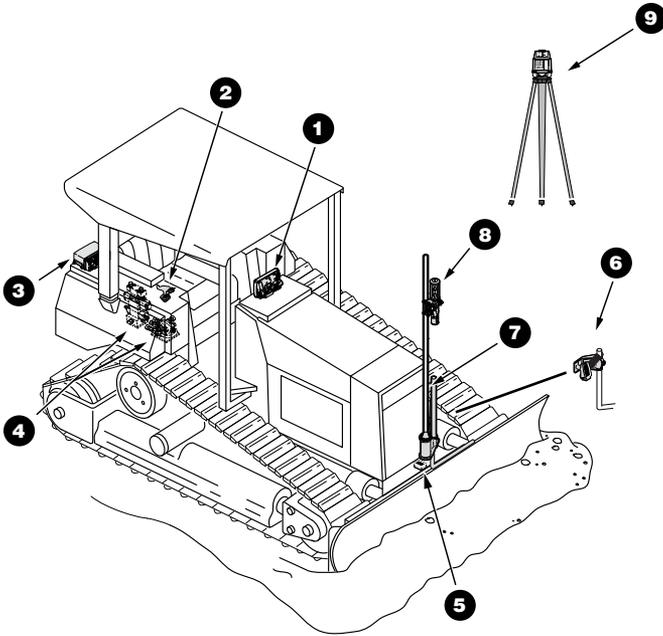


1. GX-60 Display
2. Remote Smart Knobs™
3. MC-R3 Controller
4. Blade Slope Sensor

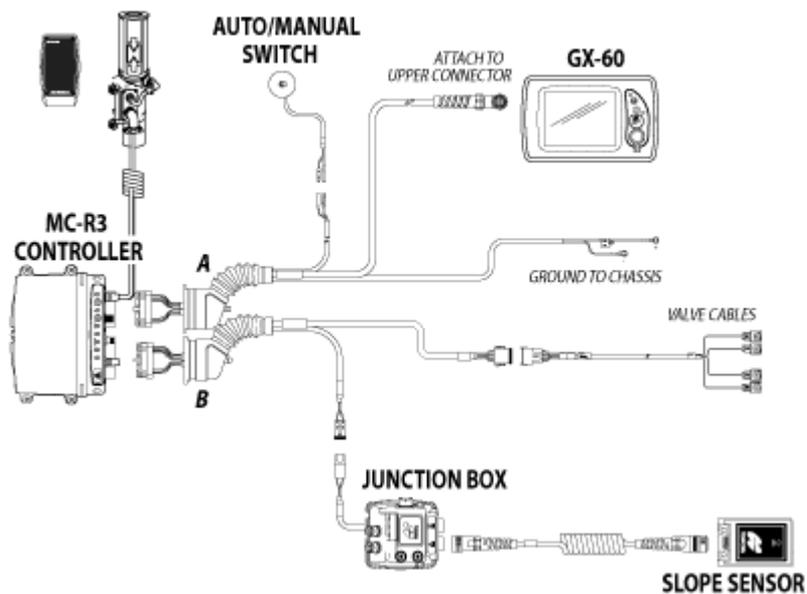
5. Rotation Sensor
6. Sonic Tracker
7. Vibration Pole
8. TrackerJack
9. Rotating Laser
10. Hydraulic Manifold Assembly
11. Mainfall Sensor



Dozer

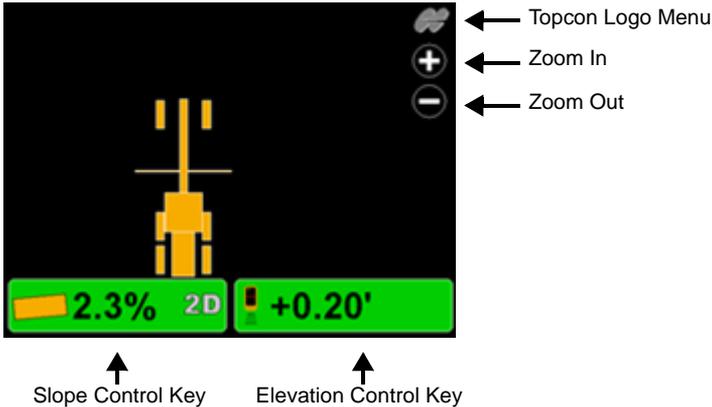


1. GX-60 Display
2. Simple Auto/Manual Knob
3. MC-R3 Controller
4. Hydraulic Valves
5. Blade Slope Sensor
6. Sonic Tracker
7. Vibration Pole
8. TrackerJack
9. Rotating Laser



3DMC 2D Introduction

3DMC Main Screen

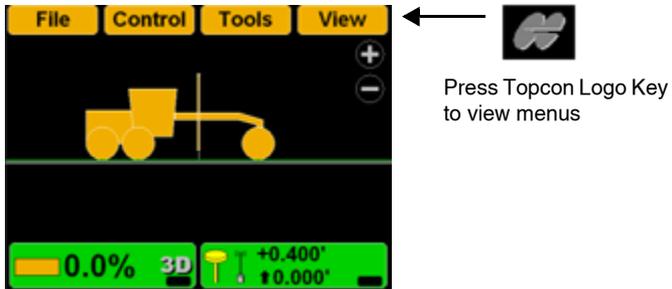


Topcon Logo Key

The Topcon Logo key at the top right corner of the Main Screen displays a pop-up bar of four menus: File, Control, Tools, and View.

To access the Topcon Logo menus, tap the **Topcon Logo** in the far right corner.

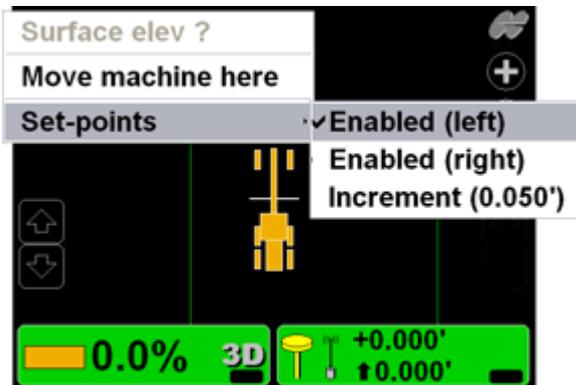
Unless used, the menus disappear after 10 seconds.



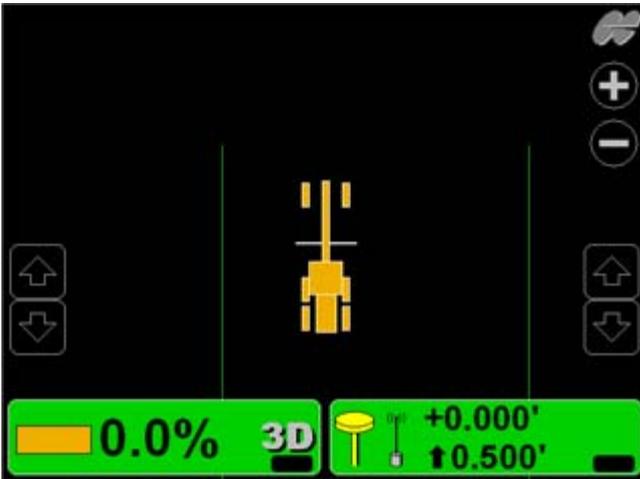
Set-Points Pop-Up Menu

The Set-points pop-up menu allows quick adjustment of the elevation set-points from the main screen.

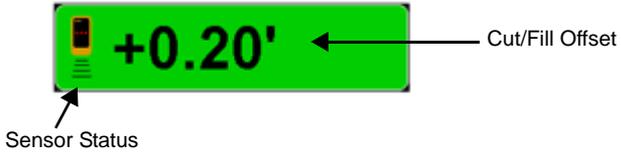
1. To access the Set-points pop-up menu, press and hold anywhere on the main screen.
2. Press **Set-points** ▶ **Enabled (left)** or **Enabled (Right)** to display the set-point adjustment arrows.
3. Press **Set-points** ▶ **Increment** to adjust the set-points increment.



4. Press the arrows to adjust the elevation set-points.



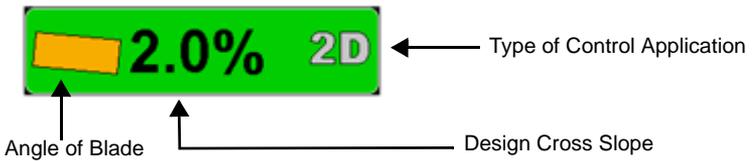
Elevation Control Key



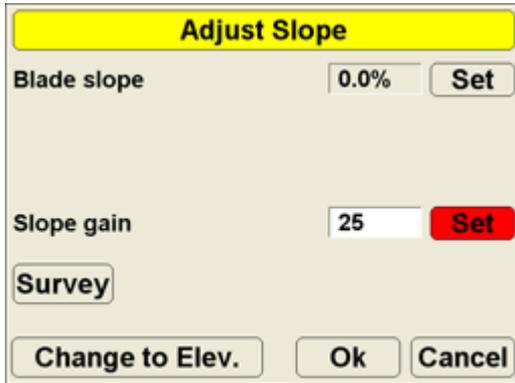
Adjust Elevation Screen

The image shows a software screen titled 'Adjust elevation' in a yellow header. Below the header are several input fields and buttons. The fields are: 'Elevation (left edge)' with an empty text box, 'Elevation (right edge)' with an empty text box, 'Elevation valve gain' with a text box containing '75' and a 'Set' button, and 'Elevation set point' with a text box containing '0.55'' and a red 'Set' button. At the bottom, there are buttons for 'Survey', 'Zero', 'Change to Slope', 'Ok', and 'Cancel'.

Slope Control Key



Adjust Slope Screen



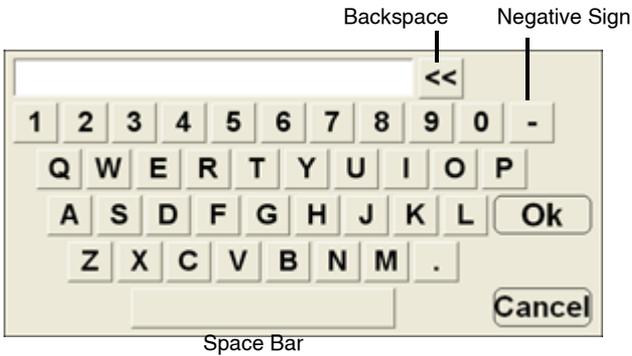
The image shows a dialog box titled "Adjust Slope" with a yellow header. It contains two input fields: "Blade slope" with a value of "0.0%" and a "Set" button; and "Slope gain" with a value of "25" and a red "Set" button. Below these is a "Survey" button. At the bottom are three buttons: "Change to Elev.", "Ok", and "Cancel".

Adjust Slope	
Blade slope	0.0% <input type="button" value="Set"/>
Slope gain	25 <input type="button" value="Set"/>
<input type="button" value="Survey"/>	
<input type="button" value="Change to Elev."/> <input type="button" value="Ok"/> <input type="button" value="Cancel"/>	

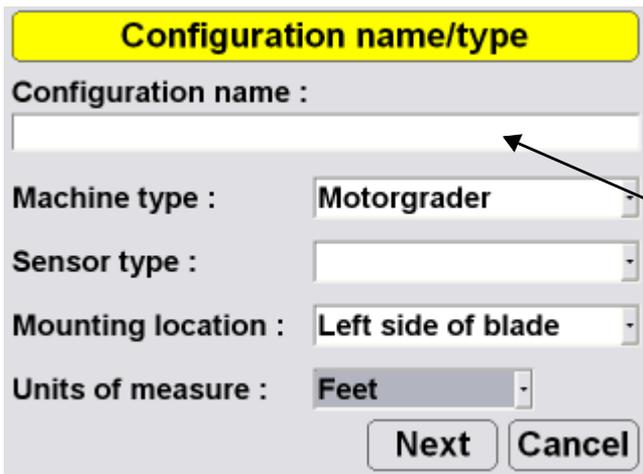
Keyboard Functions

When entering text or numbers, one of the following two pop-up keyboards displays:

Alphanumeric Keyboard



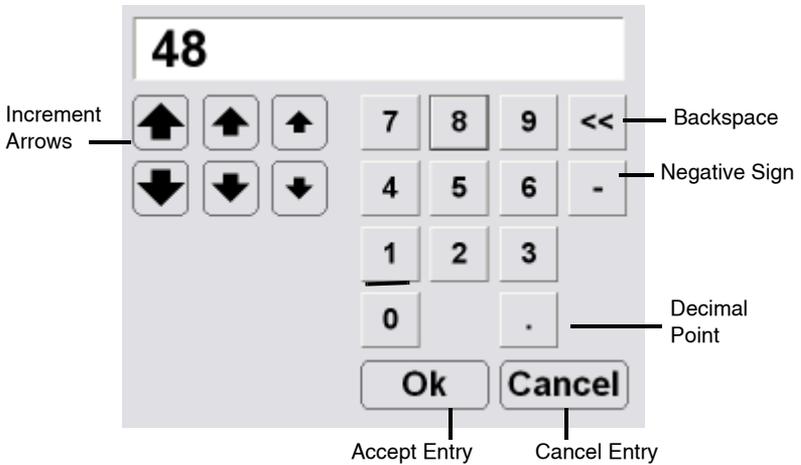
1. To access the keyboard from any field requiring an alphanumeric input, press the field.



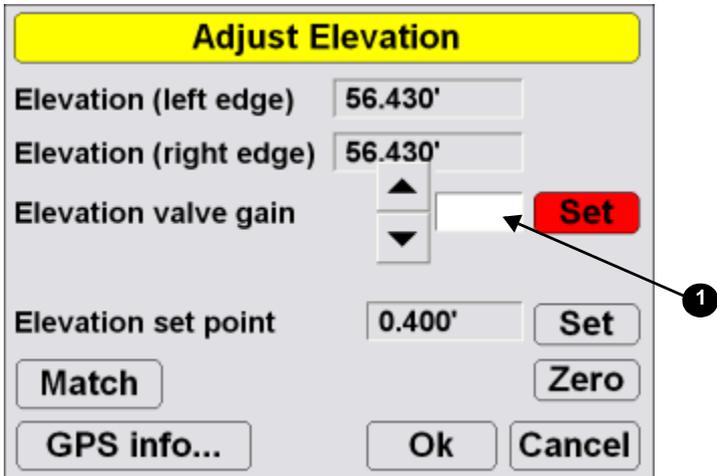
2. Press the letters or numbers on the keyboard to type.



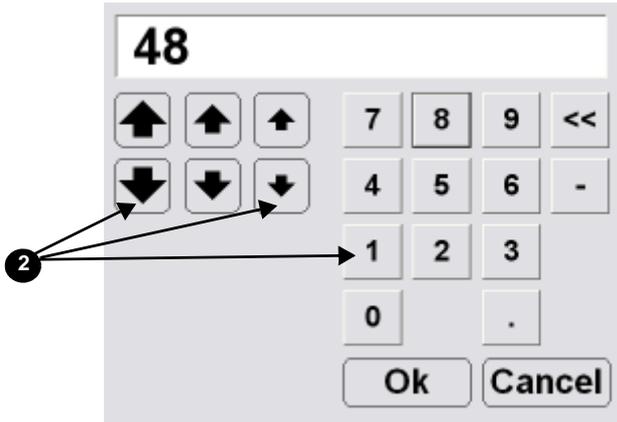
Numeric Keyboard



1. To access the keyboard from any field requiring an numeric input, press the field.



2. Press the numbers on the keyboard to type in a value, or use the arrow keys to increase the value incrementally.



2D Setup and Usage

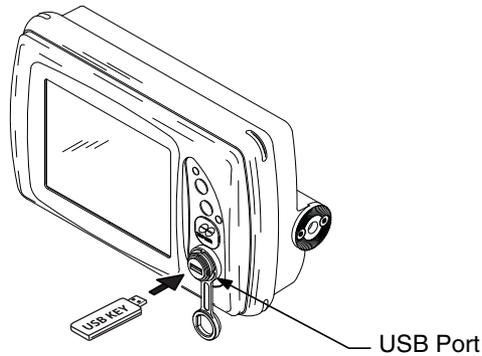
NOTICE

Notice: When using 3DMC for 2D control applications, only the equipment file is relevant to 2D Control applications. Other files, settings, and selections have no affect in this mode.

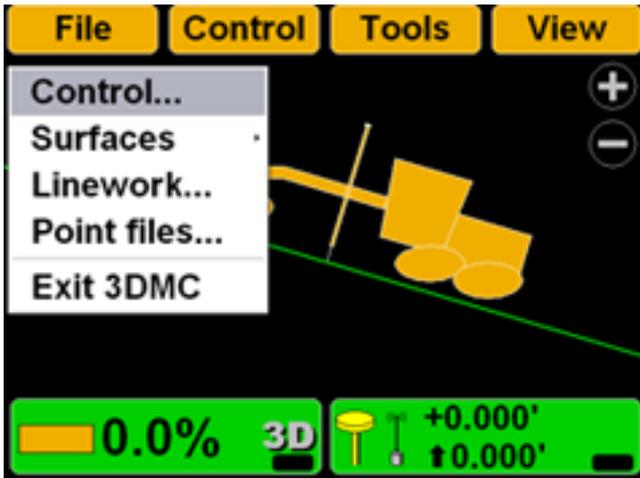
Copying 3DMC Files

To copy files from a USB key:

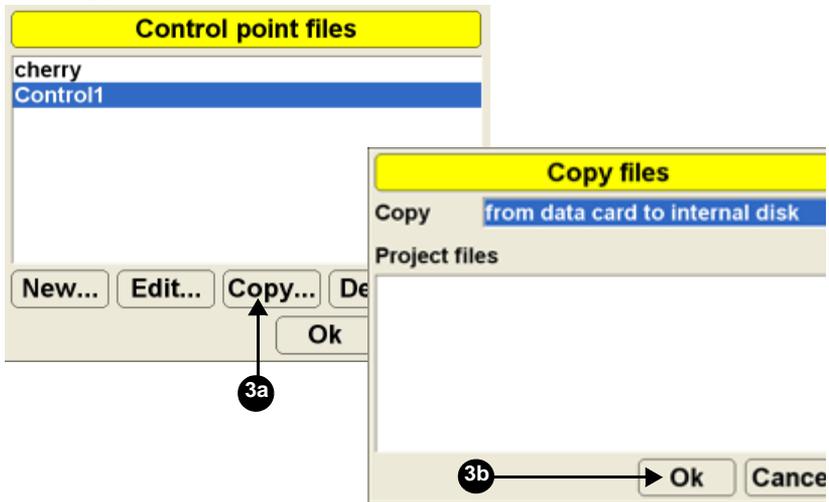
1. Press the green power button to turn on the display and insert the USB key into the GX-60 USB port.



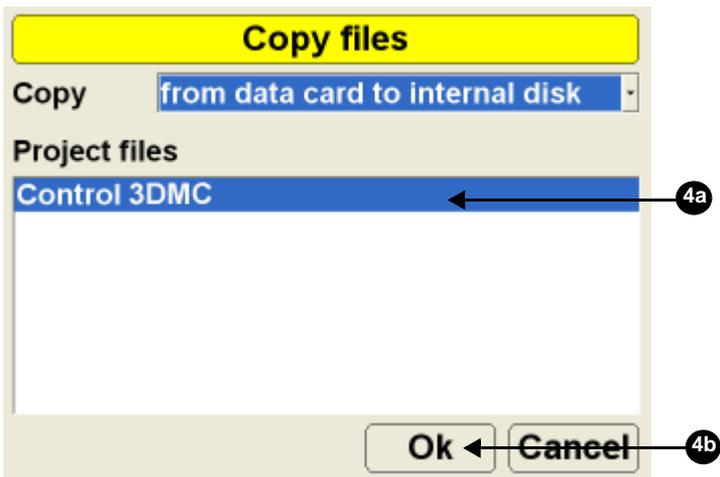
2. Press **Topcon Logo** ▶ **File** ▶ **Control**.



3. Press **Copy** and select the location of the file to copy from.



4. Select the file to copy and press **Ok**.

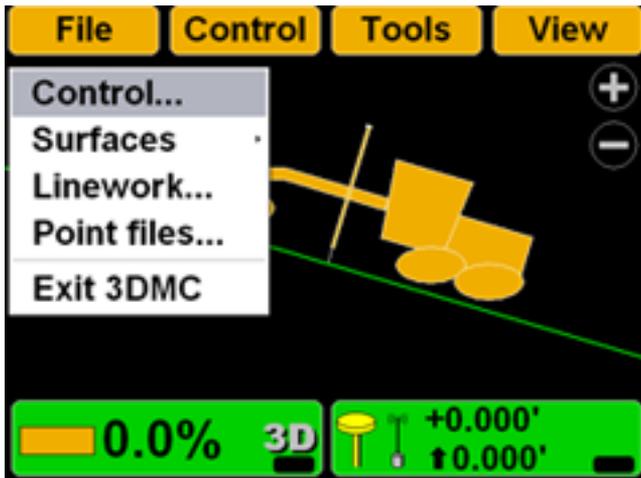


5. Select the files and press **Ok** to apply the data to the current job.

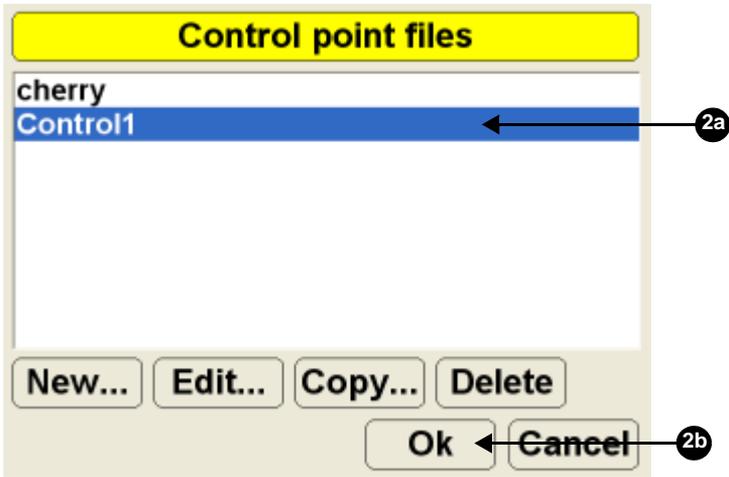
Control Point Files

Selecting a Control Point File

1. Press **Topcon Logo** ▶ **File** ▶ **Control**.

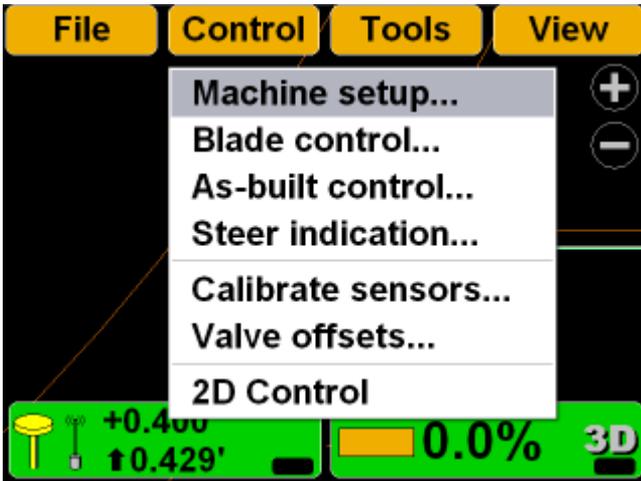


2. Select the control point file for the jobsite and press **Ok**.

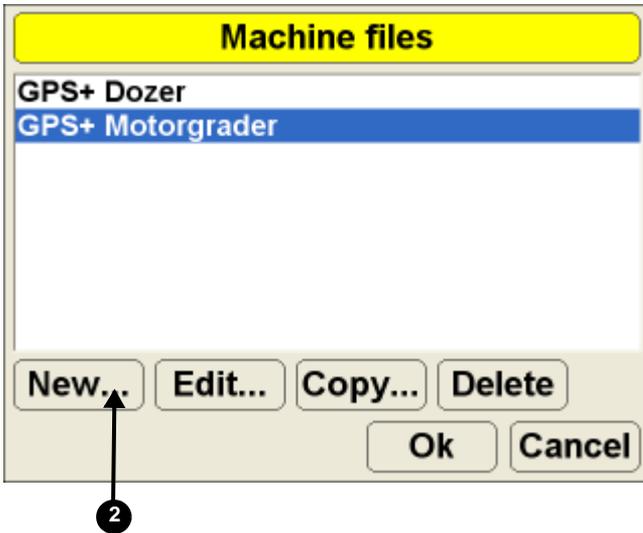


Creating a Machine Configuration File

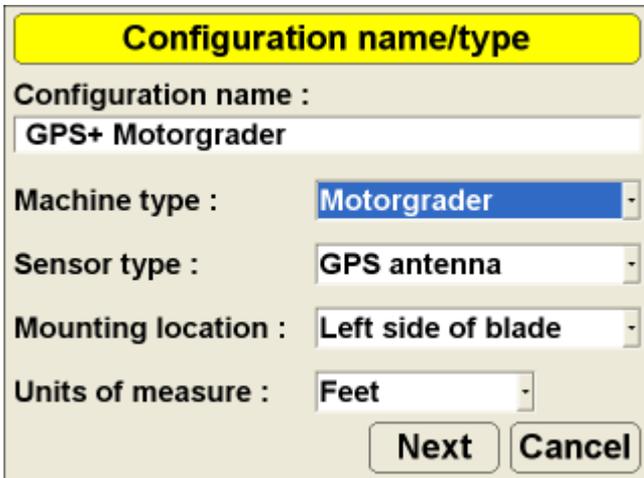
1. When the main screen displays, press **Topcon Logo ▶ Control ▶ Machine setup**.



2. Press **New**.



3. Enter the machine information.

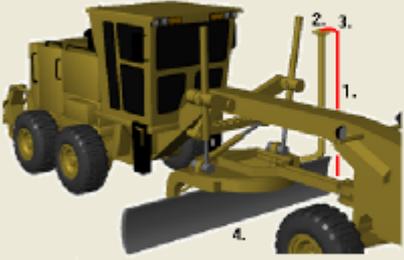


4. Press **Next**.

5. Select and enter antenna information.

Motorgrader (GPS)

Antenna :



Above (1)

Inside (2)

Behind (3)

Width (4)

6. Press **Next**.

7. Select the GPS precisions for measuring static points. Press **Next**.

GPS Precisions

Max. GPS errors (roving) :

Max. Horizontal RMS : 0.20'

Max. Vertical RMS : 0.30'

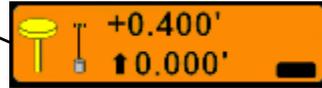
Max. GPS errors (point measurement) :

Max. Horizontal RMS : 0.10'

Max. Vertical RMS : 0.20'

Back Next Cancel

Low Precisions...



Position Check

Point of interest : Left cutting edge

North

East

Elev

Cut to design surface

Alignment stationing

Measure...

Number of sats used 8

H.Precision 0.033'

V.Precision 0.066'

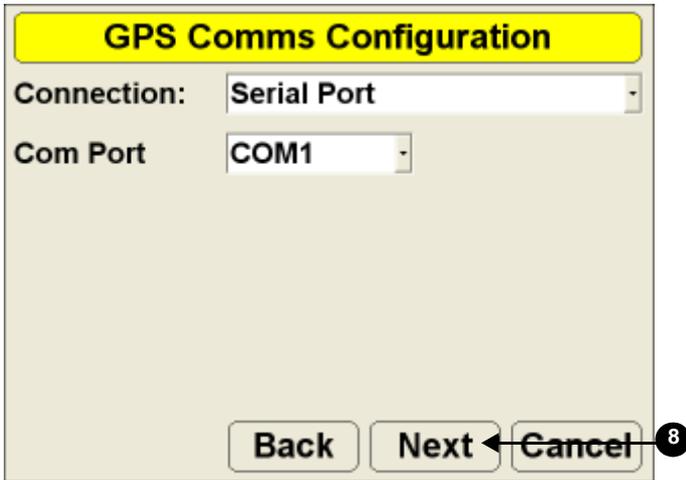
Duration (secs) 0

Measurements 1

Initialized !

Cancel

8. Enter the information for GPS Comms Configuration and press **Next**.

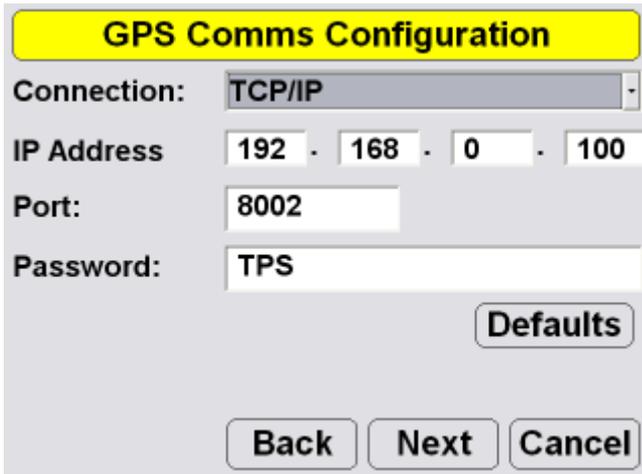


GPS Comms Configuration

Connection: Serial Port

Com Port: COM1

Back Next Cancel 8



GPS Comms Configuration

Connection: TCP/IP

IP Address: 192 . 168 . 0 . 100

Port: 8002

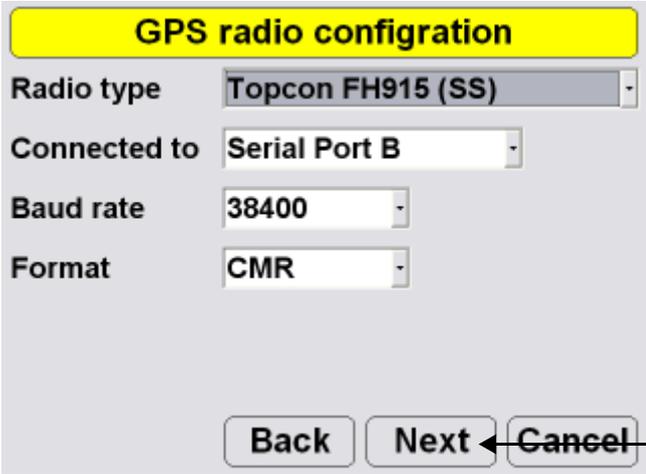
Password: TPS

Defaults

Back Next Cancel

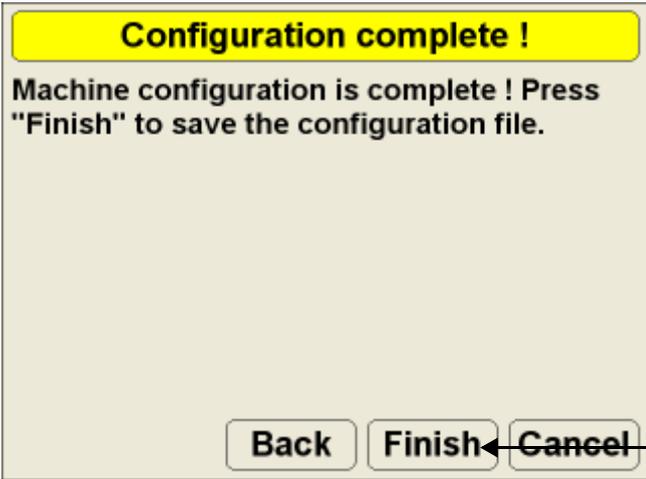
9. Select and enter radio information and press **Next**. Refer to the serial number/radio label on the MC-R3 controller to determine the correct radio type.

The radio type selection must match the radio contained in the MC-R3.



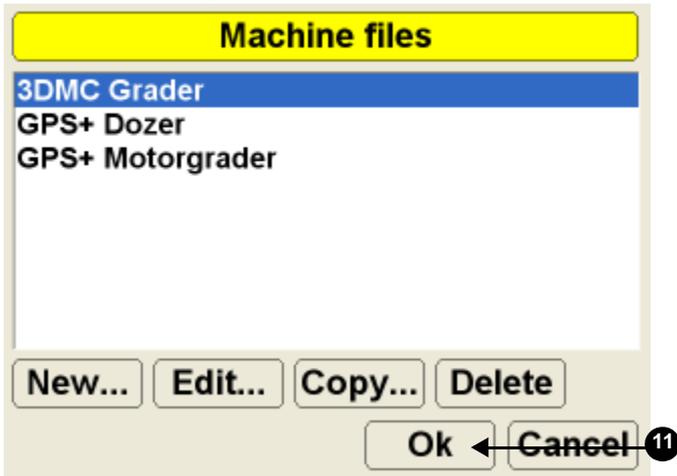
The image shows a screen titled "GPS radio configuration" with a yellow header. It contains four dropdown menus: "Radio type" set to "Topcon FH915 (SS)", "Connected to" set to "Serial Port B", "Baud rate" set to "38400", and "Format" set to "CMR". At the bottom are three buttons: "Back", "Next", and "Cancel". A circled number "9" points to the "Cancel" button.

10. Press **Finish** to save the machine configuration file.



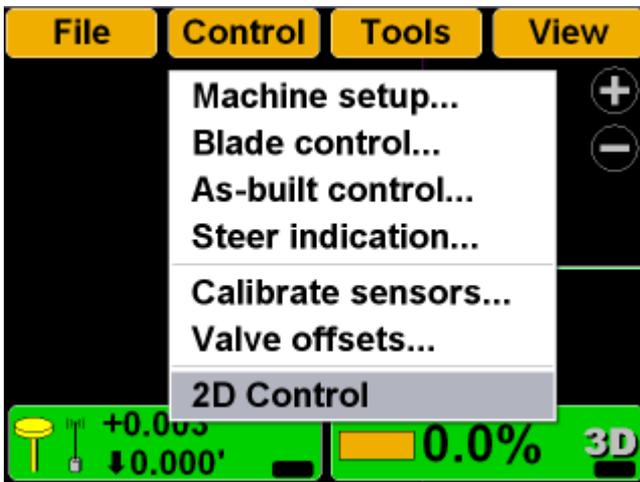
The image shows a screen titled "Configuration complete !" with a yellow header. The text below reads: "Machine configuration is complete ! Press 'Finish' to save the configuration file." At the bottom are three buttons: "Back", "Finish", and "Cancel". A circled number "10" points to the "Finish" button.

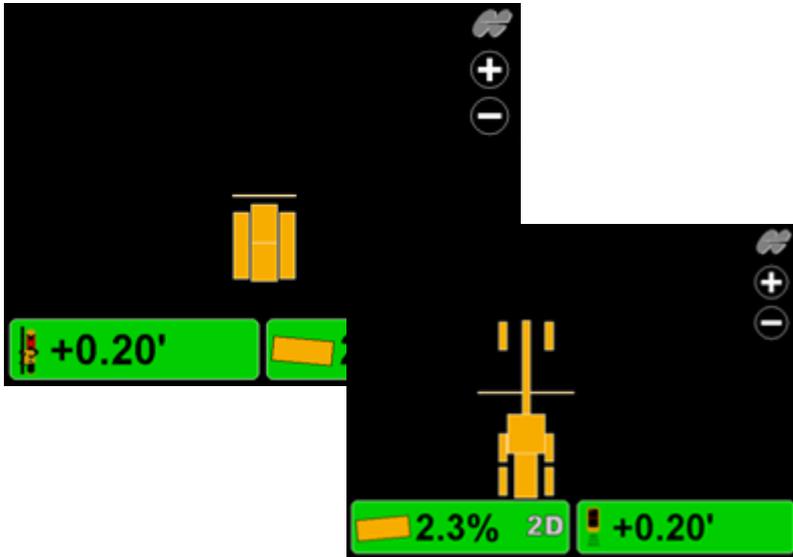
11. Select a machine configuration file on the *Machine files* dialog box and press **Ok** to set this as the machine for the job.



Activating 2D Control

To activate 2D control, press **Topcon Logo** ▶ **Control** ▶ **2D control**.





Locking On-Grade

The Survey button is used to quickly lock on-grade, performing the same function as the Remote Smart Knobs feature.

To lock the elevation on-grade: 1.

1. Press the **Elevation Control** key.
2. Press **Survey** to quickly lock on-grade.
3. Press **Ok** to return to the Main Screen.

To lock the slope on-grade:

1. Press the **Slope Control** key
2. Press **Survey** to quickly lock on-grade.

3. Press **Ok** to return to the Main Screen.



2

Adjust elevation

Elevation (left edge)

Elevation (right edge)

Elevation valve gain **Set**

Elevation set point **Set**

Survey **Zero**

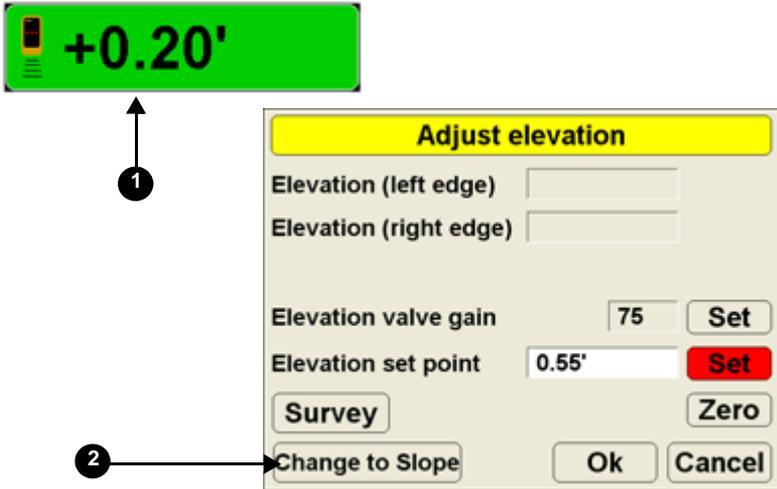
Change to Slope **Ok** **Cancel**

Changing Control Methods

To change the elevation side of the machine to slope:

1. Press the **Elevation Control** key

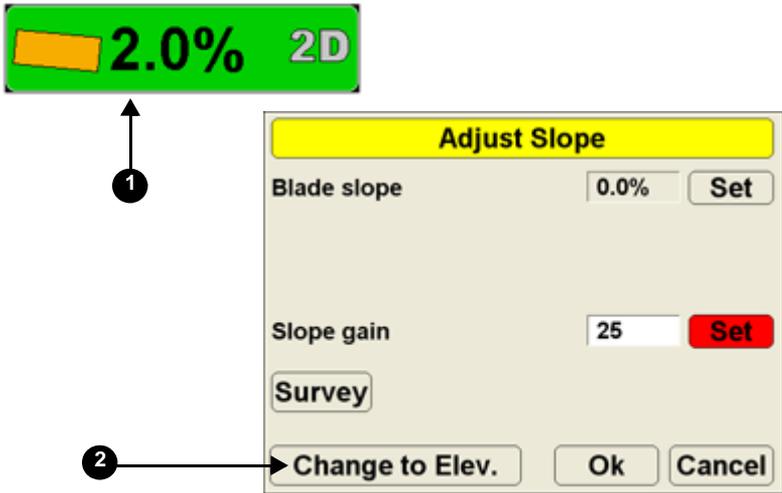
2. Press **Change to Slope** to use the slope method for control.



To change the slope side of the machine to elevation: 1.

1. Press the **Slope Control** key.

2. Press **Change to Elev.** to use the elevation method for control.

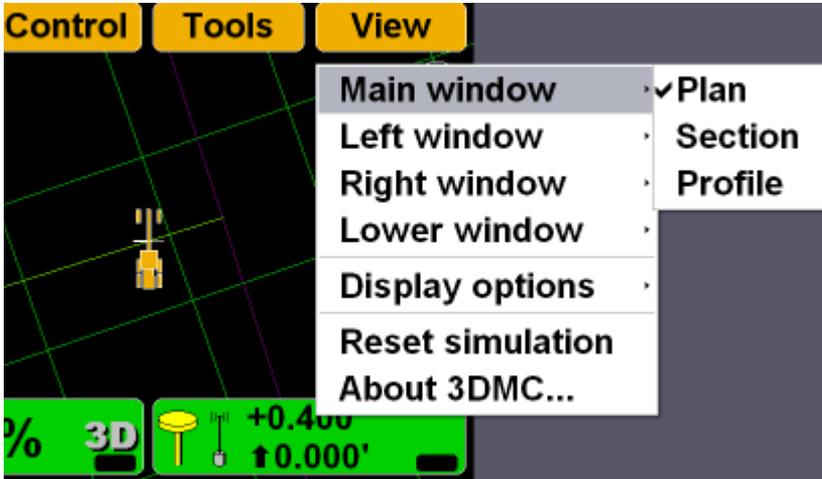


Changing the Display View

Main Window Views

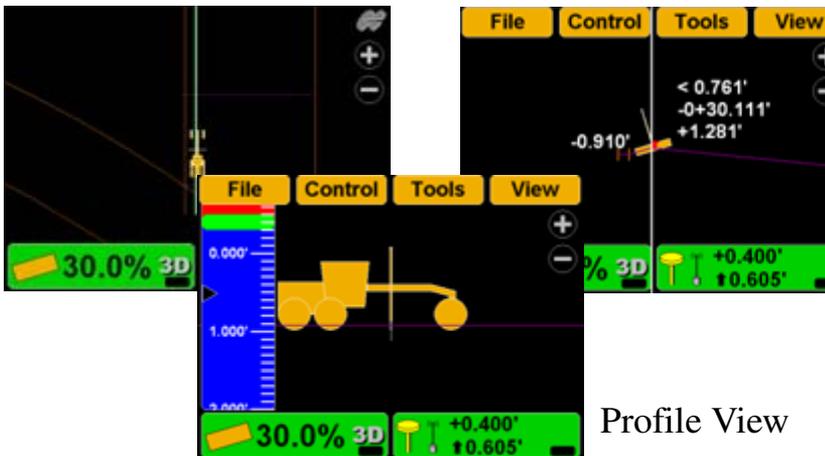
To access the main window view, press **Topcon Logo ▶ View ▶ Main window**, then press the

necessary view; a check mark indicates the active view.



Plan View

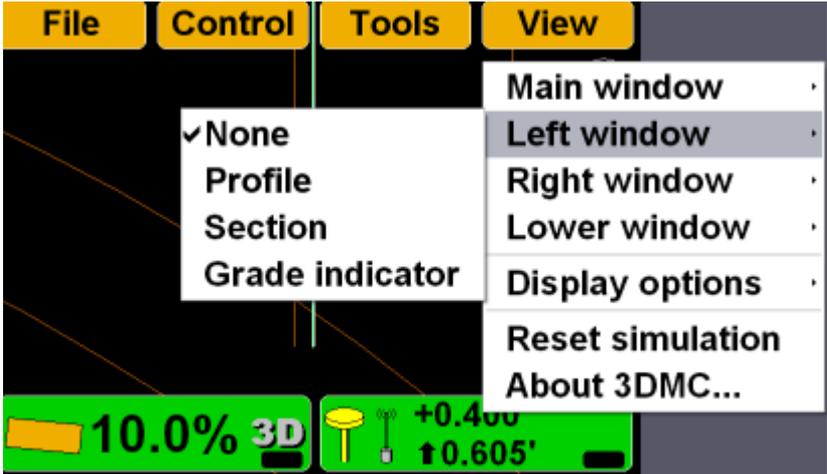
Section View



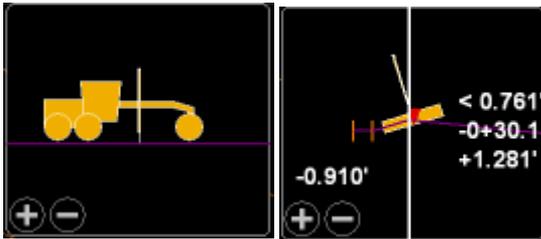
Profile View

Left Window Views

To access the lower window view, press **Topcon Logo** ▶ **View** ▶ **Left window**, then select a view.



Section View

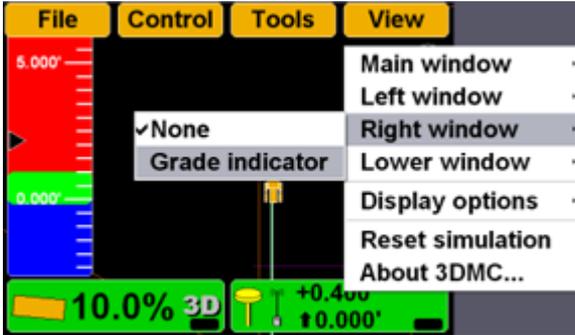


Grade Indicator



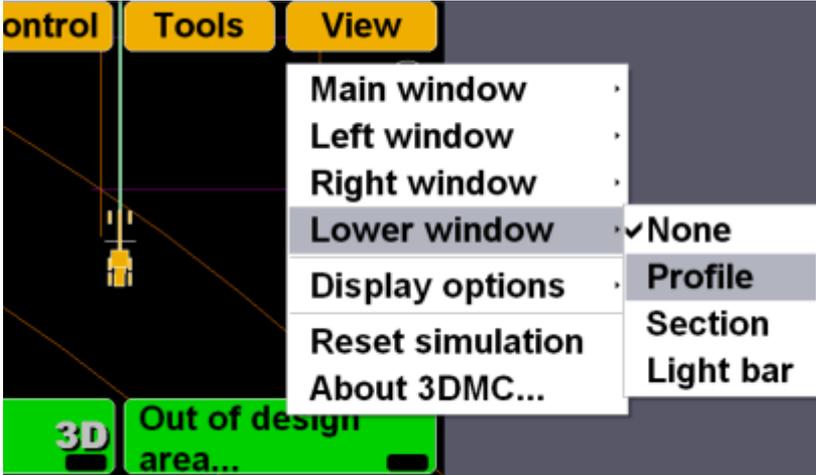
Right Window View

To access the right window view, have the Plan view visible and press **Topcon Logo ▶ View ▶ Right window**, then select **Grade indicator**.

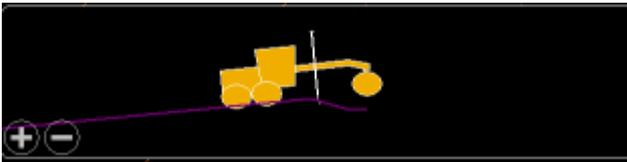


Lower Window Views

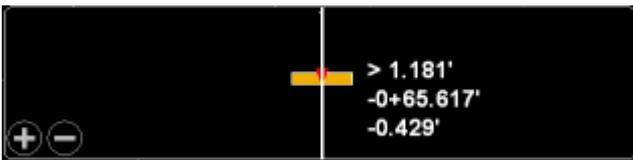
To access the lower window view, press **Topcon Logo** ▶ **View** ▶ **Lower window**, then select a view.



Profile View



Section View

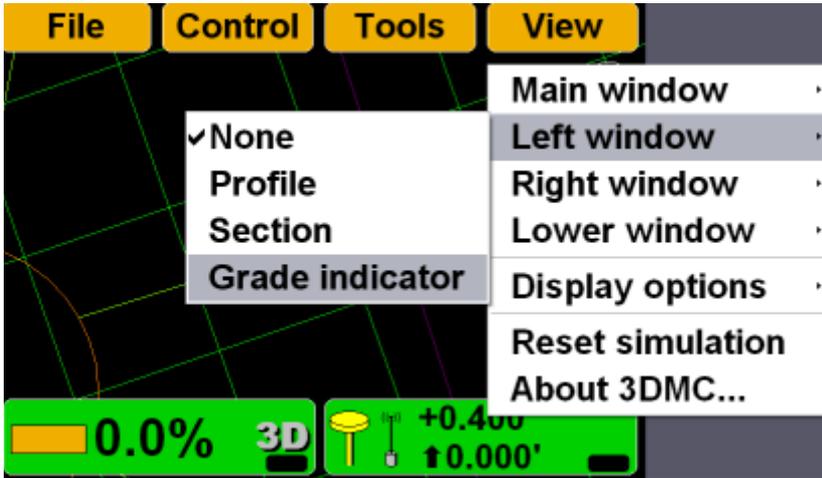


Lightbar

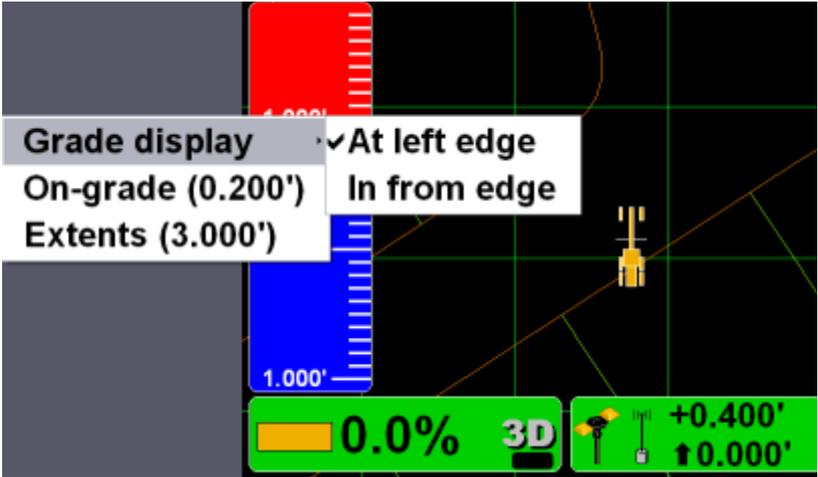


Changing the Grade Indicator Scale and Extents

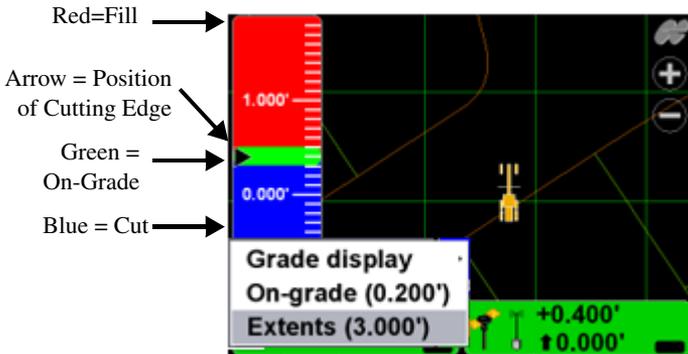
To view the grade indicator, press **Topcon Logo** ▶ **View** ▶ **Left window** ▶ **Grade indicator**.



To change the grade display, press and hold the grade indicator for one second, press **Grade display, then the necessary option.**



To change the on-grade or extents, press and hold the grade indicator for one second, then press the necessary menu option.



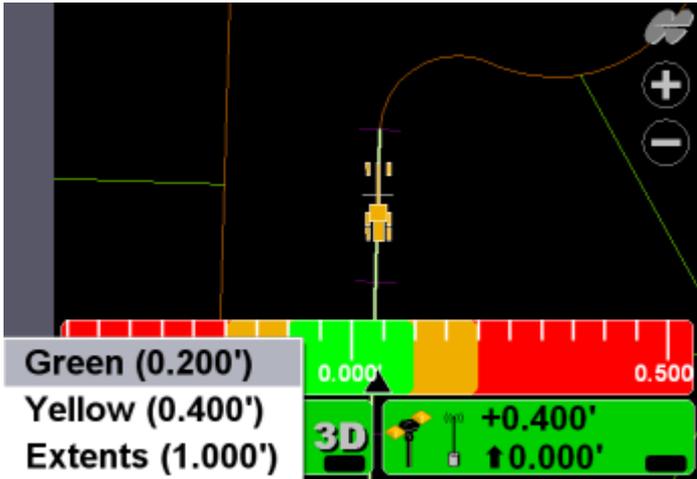
Changing the Light Bar Scale and Extents

To view the light bar scale, press **Topcon Logo** ▶ **View** ▶ **Lower window** ▶ **Light bar**.



To change the light bar scale and extents:

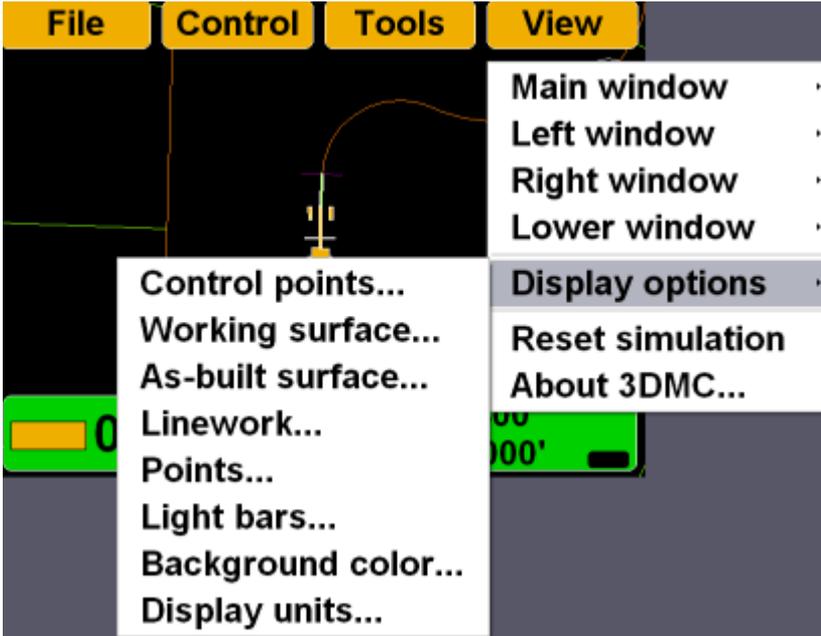
Press and hold the light bar scale for one second, then press **Green**, **Yellow**, or **Extents** to change the scale.



Changing Display Options

To view available options, press

TopconLogo ▶ View ▶ Display options.

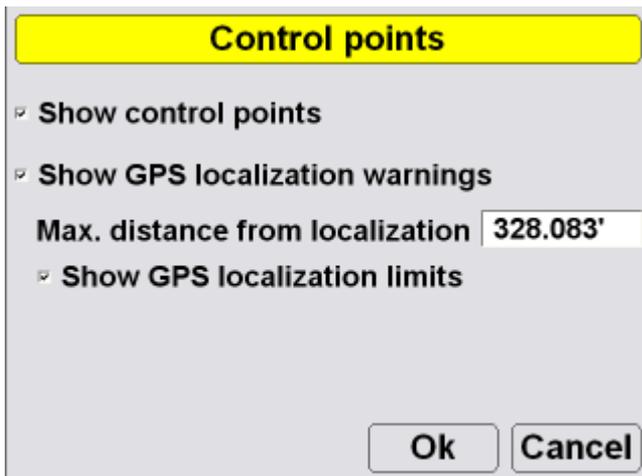


Control Points Display Options

- To view information about the control points, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Control Points**.

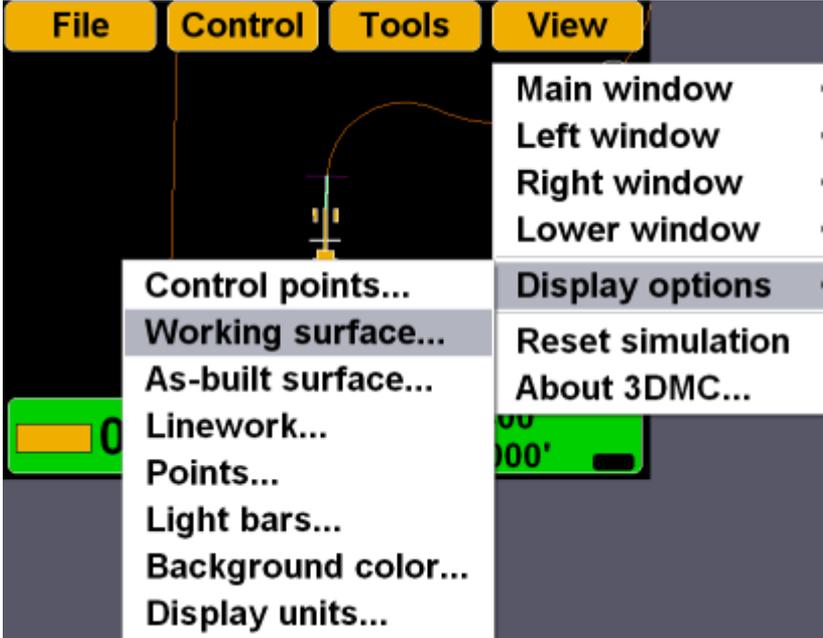


- Enable (check mark) or enter the necessary options, then press **Ok**.

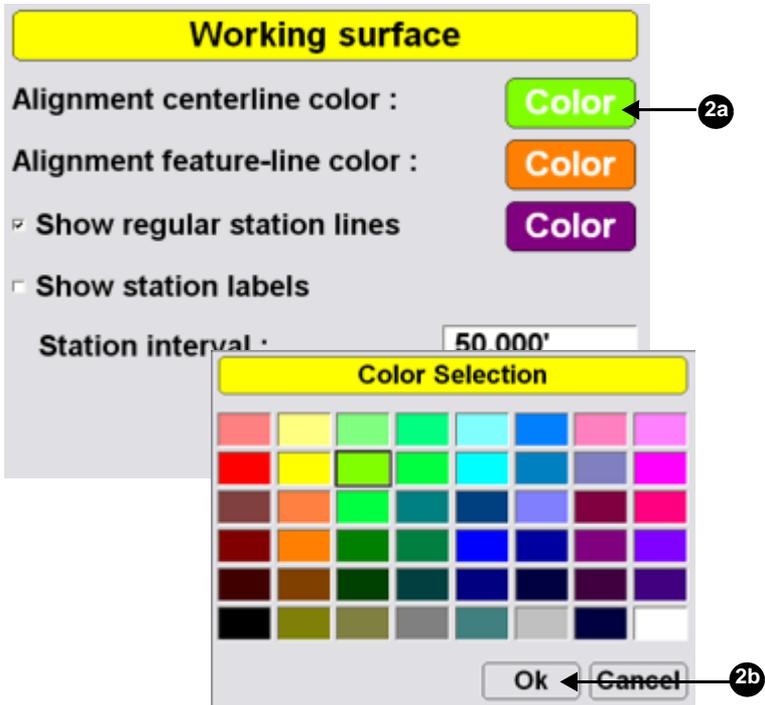


Working Surface Display Options

1. When using a TIN surface model file, press **Topcon Logo ▶ View ▶ Display options ▶ Working Surface**.



2. Press **Color** to change the color of the alignment and station lines. Select a color and press **Ok**.



3. Enable (check mark) or enter the necessary options, then press **Ok**.

Working surface

Alignment centerline color : **Color**

Alignment feature-line color : **Color**

Show regular station lines **Color**

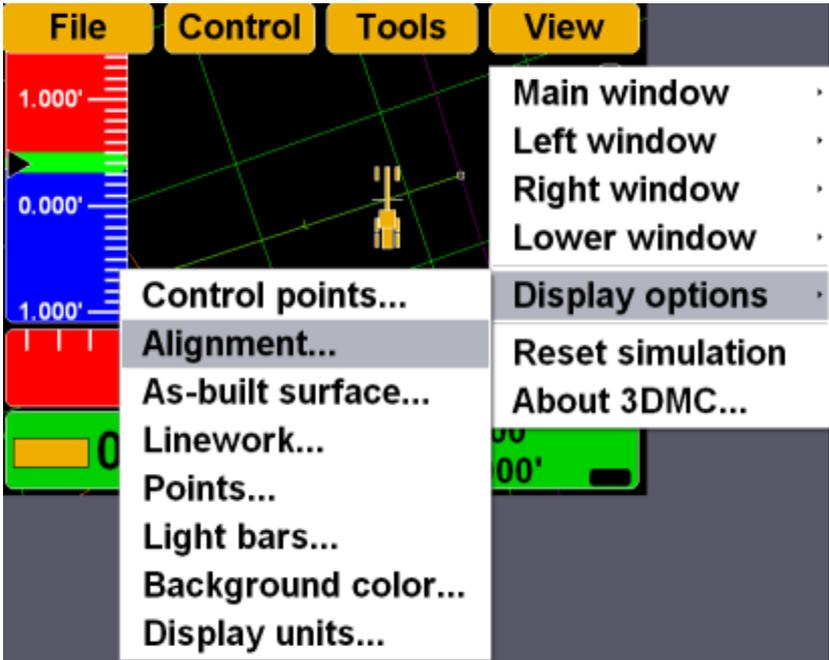
Show station labels

Station interval : 50.000'

Ok **Cancel**

Alignment Display Options

1. When using either a road surface model or an alignment file, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Alignment**.



2. Change the alignment settings, and press OK.

Alignment

Alignment centerline color : **Color**

Alignment feature-line color : **Color**

Show regular station lines **Color**

Show station labels

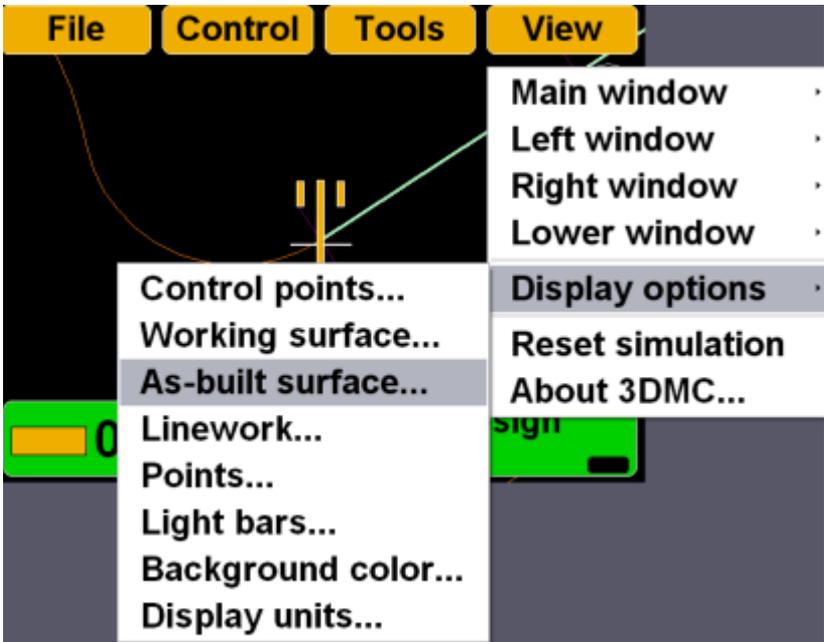
Station interval : 50.000'

Ok Cancel

As-built Surface Display Options

As-built surface files display a colored map of the graded surface.

1. Press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **As-built**.



2. Select and/or enter the necessary options and press **Ok**.

As-built Surface

• Multi-color cut/fill @ interval:

• Tri-color cut/fill : Cut Grade Fill

On-grade tolerance (+/-) :

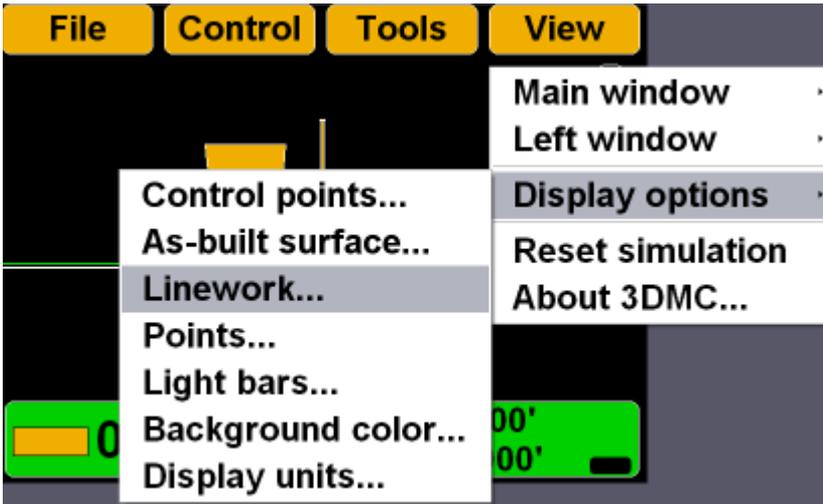
• Number of passes : 1 2 3 4+

• Pass variation : <0.050' <0.100' <0.150' >0.150'

Step :

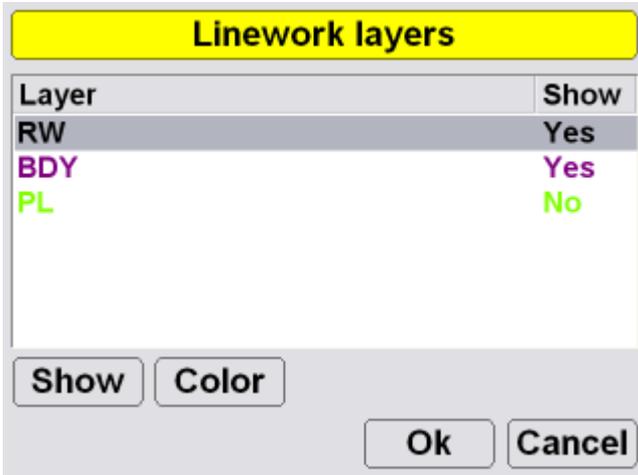
Linework Display Options

1. When using a Linework file, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Linework**.



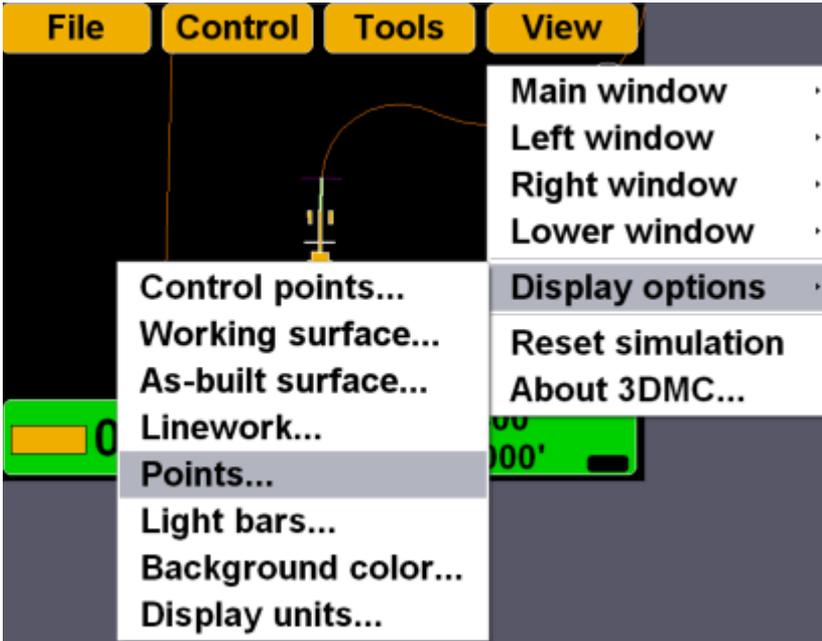
2. To display layers on the Main Screen, select the layer and press **Show**, “Yes” displays in the *Show* column. Press **Show** again to not display the layer on the Main Screen; “No” displays in the *Show* column.

3. Press **Ok** to return to the Main Screen.

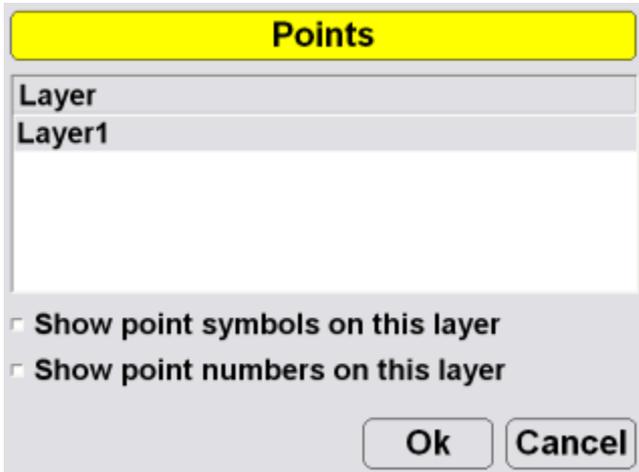


Point Display Options

1. When using a Point file, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Points**.

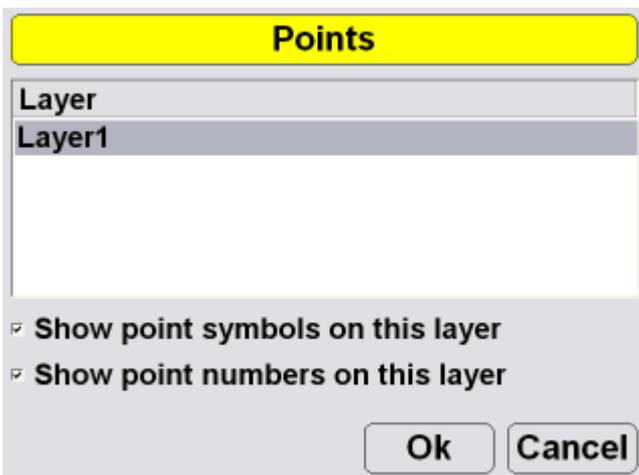


2. To display a points layer on the main screen, select the layer and press **Ok**.



The screenshot shows a dialog box titled "Points" with a yellow header. Below the header is a list box labeled "Layer" containing "Layer1". At the bottom of the dialog, there are two unchecked checkboxes: "Show point symbols on this layer" and "Show point numbers on this layer". "Ok" and "Cancel" buttons are located at the bottom right.

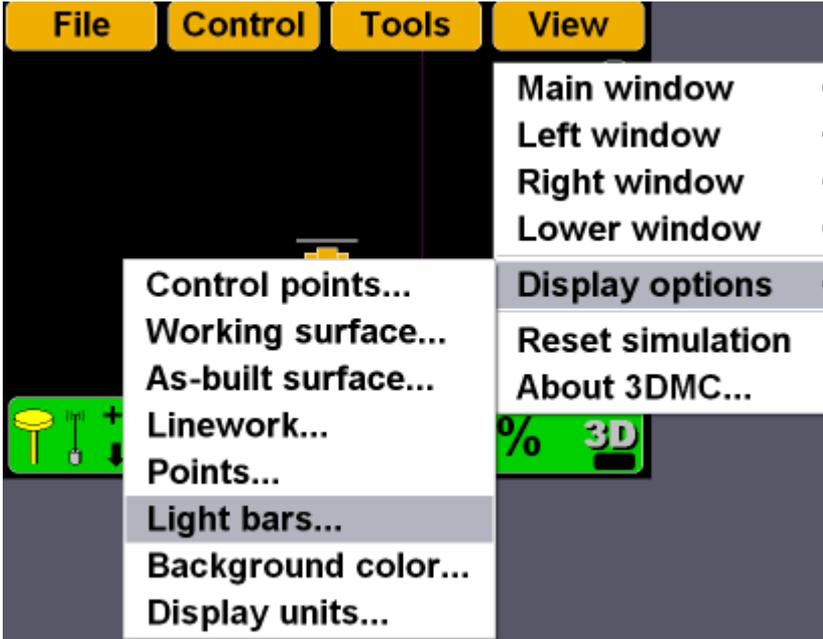
3. To display points symbols and/or point numbers during a topographic survey, select the corresponding check box and press **Ok**.



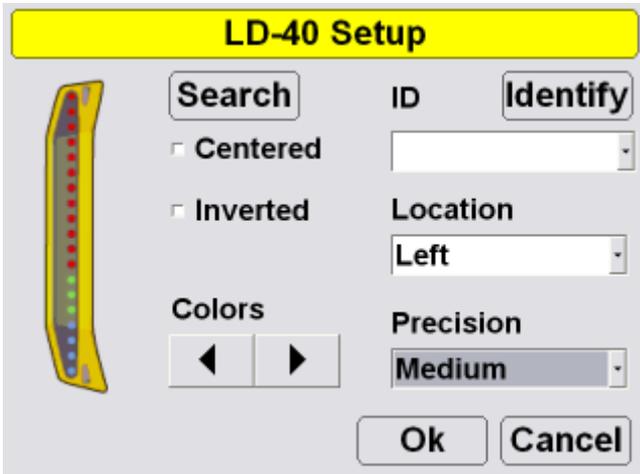
The screenshot shows the same "Points" dialog box as above, but with both checkboxes checked: "Show point symbols on this layer" and "Show point numbers on this layer". The "Ok" and "Cancel" buttons remain at the bottom right.

Lightbar Display Options

1. To set the lightbar display options, press **Topcon Logo ▶ View ▶ Display options ▶ Light bars**.

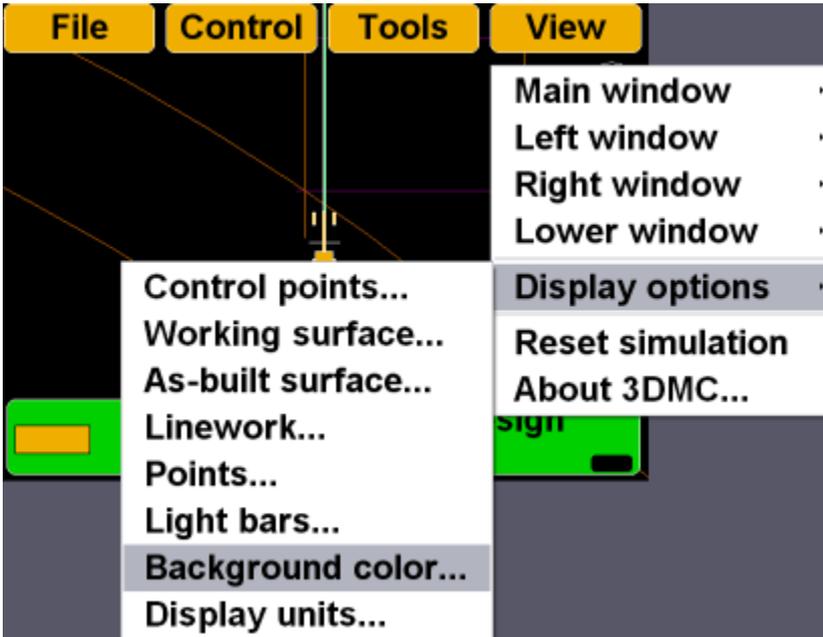


- Set the LD-40 options, and press **Ok**.



Changing the Background Color

1. To change the background color of the Main Screen, press **Topcon Logo** ▶ **View** ▶ **Display options** ▶ **Background color**.

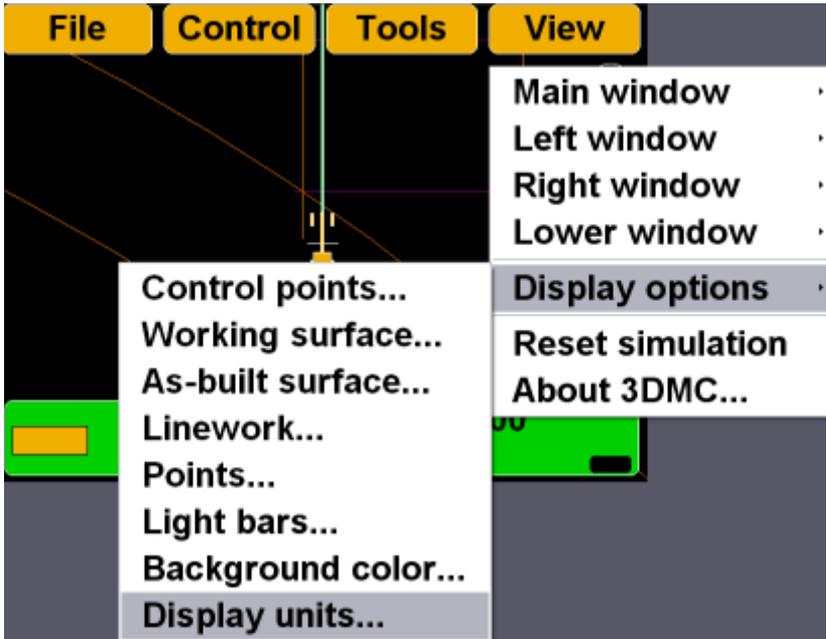


2. Select a color and press **Ok**.



Display Units Options

1. To set the type of units used in the job, press **Topcon Logo ▶ View ▶ Display options ▶ Display units**.



2. Select the display unit options and press **Ok**.

Display Units	
Distances	US Survey feet 3 d.p.
Angles	DD°MM'SS"
Grades	Percent (%)
Stations	1+00.000
Volumes	Cubic yards
Coordinates	North-East-Elev
<input type="button" value="Ok"/> <input type="button" value="Cancel"/>	

Viewing and Updating 3DMC

To view information about 3DMC, press **Topcon Logo ▶ View ▶ About 3DMC**.



3DMC : 7.06

OS date :

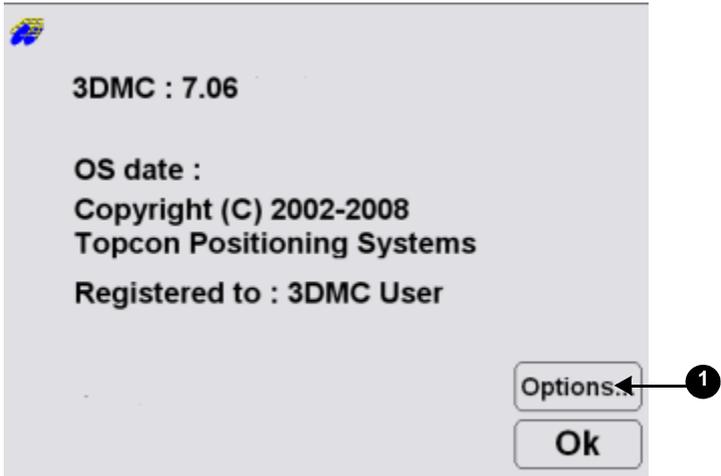
Copyright (C) 2002-2008

Topcon Positioning Systems

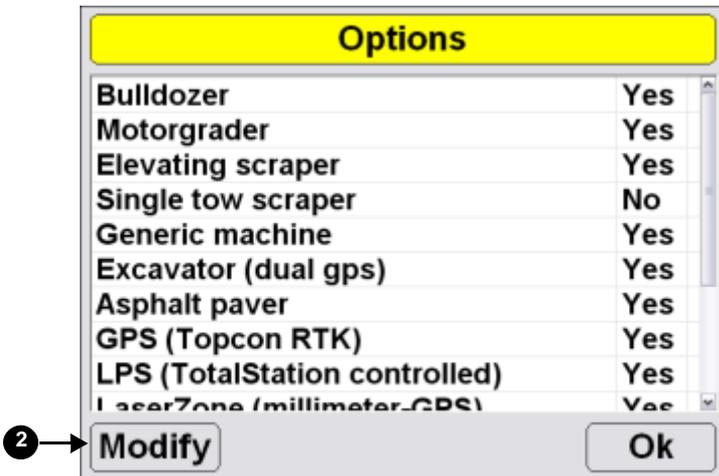
Registered to : 3DMC User

Options

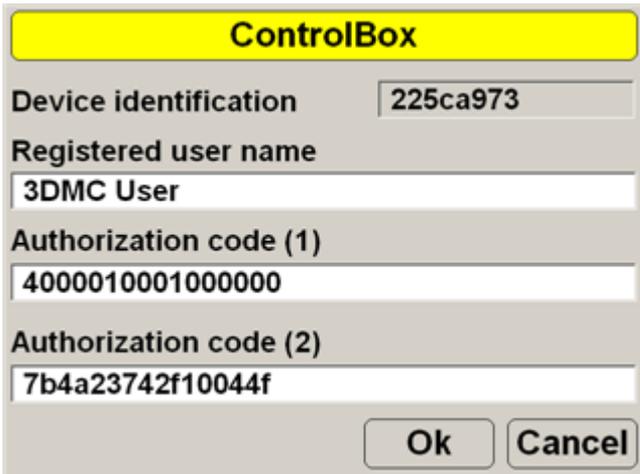
1. To view the enabled options, press **Options** on the *about 3DMC* dialog box.



2. To modify 3DMC options, press **Modify** on the *Options* dialog box.



- Record the *Device identification* number to give to your Topcon representative. Contact your Topcon representative to obtain new authorization codes for the necessary applications.



The image shows a dialog box titled "ControlBox" with a yellow header. It contains four text input fields and two buttons. The first field is labeled "Device identification" and contains the text "225ca973". The second field is labeled "Registered user name" and contains "3DMC User". The third field is labeled "Authorization code (1)" and contains "4000010001000000". The fourth field is labeled "Authorization code (2)" and contains "7b4a23742f10044f". At the bottom right, there are two buttons labeled "Ok" and "Cancel".

- When you have received the new authorization codes, enter the codes in the *ControlBox* dialog box.
- Press **Ok** to apply the new codes and options. Press **Ok** on each screen to return to the main screen.
- Turn off the display, wait a couple seconds, and then turn on the display to activate the new passwords.

Troubleshooting

Before contacting TPS Customer support about any problems, try the following and see the following sections:

- Check that the various components for your Topcon 3D Machine Control system (radio, MC-R3 Controller, GX-60 Display, Base Station receiver) have power and are powered up.
- Check that all cables are securely and properly connected to the various components of system.
- Disconnect cables and inspect them for damage or contamination. Clean all connections with an electrical contact cleaner.

Base Station

This section lists possible Base Station problems you may encounter (also refer to the Base Station's documentation) for 3D Machine Control. If you still have problems after trying the solutions listed here, contact TPS customer support.

Problem	
Receiver does not power on.	
Causes	Solutions

<p>The PWR button was pressed too quickly.</p>	<p>Make sure you hold the PWR button down for at least one second. A quick press will not activate the receiver.</p>
<p>The power cable is incorrectly connected or damaged.</p>	<p>Check that the power cable is correctly connected to the battery—RED to positive and BLACK to negative—and that the battery is charged.</p> <p>Check that the RED dots on the power cable connector and the socket on the receiver are aligned, and the cable is pushed in as far as it can go.</p> <p>If the power cable is damaged, contact your dealer to replace it.</p>

Problem

Radio modem does not power on.

Causes	Solutions
<p>The power cable is incorrectly connected or damaged.</p>	<p>Check that the power cable is correctly connected to the battery—RED to positive and BLACK to negative—and that the battery is charged.</p> <p>If the power cable is damaged, contact your dealer to purchase a new cable.</p>

The radio receives power through the receiver.	Some radios do not require a separate power supply, but are supplied power through the port on the receiver. For these radios, check that the receiver is also switched on.
Problem	
Pocket-3D does not connect to receiver.	
Causes	Solutions
The receiver may be off.	Check that the receiver is switched on.
The cable may be incorrectly connected.	Check that the cable is connected to the COM port on the computer and Port A on the receiver. If still no connection, try to reset the computer and repeat.
Problem	
Pocket-3D is waiting for satellites.	
Causes	Solutions
The cable is incorrectly connected or damaged.	Check that the antenna cable is not cross-threaded and is screwed in all the way. If the cable is damaged, contact your dealer to purchase a new cable.

<p>The antenna has poor PDOP.</p>	<p>Check that the antenna has a clear view of the sky.</p>
<p>The receiver is collecting an almanac.</p>	<p>If this is the first time connecting to the receiver, or if an internal reset has recently been performed, this message may persist for several minutes while the receiver obtains a new almanac.</p>
<p>Problem</p>	
<p>Radio modem light is not flashing</p>	
<p>Causes</p>	<p>Solutions</p>
<p>The cable is incorrectly connected or damaged.</p>	<p>Check that the cable from the receiver is properly connected to the radio.</p> <p>If the cable is damaged, contact your dealer to purchase a new cable.</p>
<p>The radio does not have a TX LED.</p>	<p>Some radios may not have a TX (Transmit) LED so the radio may in fact be functioning.</p>

The radio has a TX LED, but it is not yet flashing.

All radio types specifically listed for the Base Station kit have a TX light and should flash every second. It may take several seconds after connection for this flashing to commence.

GX-60 Display

This section lists possible display problems you may encounter. If you still have problems after trying the solutions listed here, contact TPS customer support.

Problem	
Display does not power on.	
Causes	Solutions
The cable is the wrong cable, incorrectly connected, or damaged.	<p>Check that the power cable supplies 12 to 24 VDC and is negative conductive.</p> <ul style="list-style-type: none"> • A socket (positive) = 12 to 24 VDC • E socket = Ground <p>Check that the power cable is connected to the correct port and the ends are securely fastened.</p> <p>If the cable is damaged, contact your dealer to purchase a new cable.</p>
Problem	
Screen display turns off by itself.	
Causes	Solutions

<p>The fan may be damaged, causing the display to overheat.</p>	<p>Check that the fan is rotating.</p> <p>If the fan is not rotating, it may be damaged and needs to be replaced with a new one. Contact your dealer.</p> <p>Contact your dealer for information on replacing the fan.</p>
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Problem

Screen display goes dim by itself

Causes	Solutions
<p>The fan may not be rotating.</p>	<p>Check that the fan is rotating.</p> <p>If the fan is not rotating, it may be damaged and needs to be replaced with a new one. Contact your dealer for information on replacing the fan.</p>
<p>The display has the self-adjusting ability of screen brightness.</p>	<p>Brightness may be dimmed when the display gets over-heated with high temperature around the cab, as well as when the ambient light becomes dim.</p> <p>The backlight also reduces when the ambient light becomes dim.</p>

Problem

Screen has transferred to operating system.

Causes	Solutions
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<p>“Exit 3DMC” function may have been pressed unexpectedly or incorrectly.</p>	<p>If the screen displays the desktop, the “My Computer” folder should be visible.</p> <ol style="list-style-type: none"> 1. Double-tap “My Computer” folder. 2. Look for the folder named “Disk C”, and double-tap on it. 3. Look for the “Control Box” icon and double-tap. The application program opens and returns to the Main Screen.
--	--

Problem

“Control file has no GPS localization” message.

Causes

Solutions

No GPS localization has been performed for the project.

Plan to implement the GPS localization.

An LPS application is the current job

Create or select the correct LPS Machine Configuration file so the Control Points file will require no GPS localization.

Problem

“Loading....” or “Building....” message.

Causes

Solutions

<p>The program in the display is in the middle of loading files or making graphics.</p>	<p>If the pointer on the Main Screen moves, when you press in different places, the display is computing.</p> <p>When the system is busy, the pointer becomes an hourglass.</p> <p>Wait for a few more minutes to let it complete the process.</p> <p>Remember, computing will take longer when a larger file is selected.</p>
<p>If the pointer does not move, the display may have a computing problem.</p>	<p>Switching off the display can fix the computing problem.</p>
<p>Problem</p>	
<p>Elevation/Slope Control pad displays: “GPS receiver not connected!”</p>	
<p>Causes</p>	<p>Solutions</p>

<p>Either the GPS+ signal or radio signal is invalid. The graphic may indicate what causes the problem.</p>	<p>For GPS+ signal, check cable connections along the GPS antenna cable from the GPS Antenna port on the MC-R3 Controller to the Rover Antenna. Check cable connections at the MC-R3 Controller and at the display.</p>
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Problem

Elevation Control key displays:

“Waiting for radio link”

Causes

Radio transmission, radio antenna, lights status on the receiver, and/or power may have a problem.

Solutions

Check that the Base Station is working correctly.
Also check that the Rover Radio Antenna on the machine and its cable connections are properly connected.
Make sure that the radio channel is identical between the Base Station and the Machine Rover, and that the radio is correctly configured on the display.

Problem

Elevation Control key displays:

“Waiting for Initialization”

Causes

Solutions

The GPS+ receiver has not been successful tracking enough valid satellites.

Check that the Rover Antenna has a clear view of the sky.

Check for obstructions, such as trees, buildings, and vehicles, that can block or reflect satellite signals.

The system is still in the process of determining a solid position.

If this is the very first time operation, this message may persist for several minutes while the receiver obtains a new almanac.

Problem

Elevation Control key displays:

“Out of design area”

Causes

Solutions

The machine is out of the Design Surface area.

Make sure that the correct Control Point File and Design Surface file is selected.

Move into the Design Surface area so the operator can start grading.

Problem

Elevation Control key displays :	
“No GPS localization”	
Causes	Solutions
The Control Points file currently selected has not been localized properly.	Make sure that the correct Control Point file currently is selected.
You are in a process of building a Control Point file or just starting the process.	Disregard the message until the localization is complete.
Problem	
Slope Control key displays:	
“Slope sensor not connected!”	
Causes	Solutions
Cross slope system is not connected properly.	Check cable connections display, the Mainfall Sensor, the Rotation Sensor and to the Blade Sensor.
Problem	

Elevation Control key displays: “Waiting on data from GRT”	
Causes	Solutions
Problem	
Elevation Control key displays: “ELEV sensor not connected!”	
Causes	Solutions
Wrong control mode selected.	If in 3D GPS+, deactivate 2D Control Mode: select Topcon Logo ▶ Control ▶ 2D Control.

MC-R3 Controller

LED Status Chart

The CAN, Sensor, Control, and Auto LED's in the chart below have a heartbeat to indicate proper operation of the processor.

7 EA BI-COLOR RED/GREEN STATUS**CAN**

	STATUS	RED	GREEN
	CAN Communication OK	Off	On
	No CAN Communication	On	Off
	No CAN Required	Off	Off

SENSOR

	STATUS	RED	GREEN
	Sensor Communication OK	Off	On
	No Sensor Communication	On	Off
	Firmware Loading	Alternate Flashing Red/Green (LED flashes alternately with Control LED)	

CONTROL

	STATUS	RED	GREEN
	GUI Communication OK; Current	Off	On
	GUI Communication Established; Not Current	Off	Blinking
	No GUI Communication	On	Off
	Firmware Loading	Alternate Flashing Red/Green (LED flashes alternately with Sensor LED)	

AUTO

	STATUS	RED	GREEN
	Not in Automatic	On	Off
	One Side in Automatic	Off	Blinking
	Both Sides in Automatic	Off	On

7 EA BI-COLOR RED/GREEN STATUS			
RADIO RX			
	STATUS	RED	GREEN
	Power	Off	On
	Receiving Radio Signal	1 Blink per Second for Each Reception of Data	On
MAIN and AUX (GPS ANTENNAS)			
	STATUS	RED	GREEN
	Tracking GPS	Off	1 Blink for Each Satellite Tracked
	Tracking Glonass	1 Orange Blink for Each Satellite Tracked - Red and Green Blink Together	
	Firmware Download	Alternate Flashing Red/Green	

This section lists possible MC-R3 Controller problems you may encounter. If you still have problems after trying the solutions listed here, contact TPS customer support.

Problem	
All LEDs off.	
Causes	Solutions
The power cable may be incorrectly connected.	Power is supplied through the cable connected on the power port. Check that the cable is properly connected
The Display does not have power.	The MC-R3 Controller turns on only when the Display is also powered on.
Problem	

Satellite Status indicator does not flash green.

Causes

Solutions

The cable is incorrectly connected or damaged.

Check that the antenna cable is not cross-threaded at the antenna and is connected to the intermediate cable installed on the machine.

Check the connection at the GPS Antenna port on the MC-R3 Controller.

If the cable is damaged, contact your dealer to purchase a new cable.

The antenna has poor PDOP.

Check that the Machine Antenna has a clear view of the sky.

The receiver is collecting an almanac.

If this is the first time connecting to the MC-R3 Controller, the LED may not flash for several minutes while the GPS receiver obtains a new almanac.

Problem

Radio Status indicator does not flash green.

Causes

Solutions

The Base Station and/or Base Station radio has a problem.

Check that the Base Station is running correctly and the TX light on the radio modem flashes on.

<p>Different channels are used between the Base Station and the machine.</p>	<p>Check that the Base Station and Machine use the same radio channel.</p> <ul style="list-style-type: none"> • For the Base Station, use the button on the radio modem or use the “GPS Radio Configuration” program with the Pocket-3D connected. For the machine, use the Control Box function.
<p>The antenna at the Rover or Base may be too low, incorrectly placed, or too far away.</p>	<p>If the green LED flashes when near the Base Station, but not when farther away, check that the Machine Radio Antenna mast is mounted vertically at the highest point on the machine.</p> <p>If the machine gets too far from the Base Station, elevate the radio antenna at the Base Station or move it to a closer Control Point.</p>

GPS Localization

This section lists possible GPS localization problems you may encounter. If you still have problems after

trying the solutions listed here, contact TPS customer support.

Problem	
Measurement takes too long.	
Causes	Solutions
The machine may be blocking satellite signals to the range-pole or tripod-mounted antenna.	Watch the status of the measurement screen. If the status indicates “waiting for satellites” move the machine away from the antenna.
The Control Point may be located too close to obstructions.	Move to an alternative Control Point or have the surveyor place a new Control Point away from the obstructions.
The MC-R3 Controller has not yet initialized; the system may be tracking many satellites.	The MC-R3 Controller may take several minutes to initialize.
The range-pole was unsteady.	Make sure that the pole is held steady while measurement is taking place. Any movement will make for a lengthy initialization and/or measurement.
Problem	

Localization produces large errors.	
Causes	Solutions
A typographical error occurred.	<p>If errors are 10s or 100s of feet or meters, it is likely that a typographical error has occurred.</p> <p>If coordinates are manually entered, check that longitudes are correctly prefixed with a minus sign if working in the western hemisphere (e.g., USA).</p> <p>Re-enter the coordinates.</p>
The range-pole was unsteady.	<p>If the errors are decimeter level in magnitude, it may point to either inaccurately measured local site coordinates or not holding the range-pole vertical when measuring the GPS coordinates.</p>
Inaccurate local site coordinates or erroneous GPS measurement.	<p>If error values of the first few points are reasonable but increase when a new point is measured, the point just measured must have either inaccurate local site coordinates or erroneous GPS measurement.</p>

To isolate the error, disable horizontal and/or vertical localization for each Control Point in turn and observe the set of errors.

When the errors become acceptable due to certain isolation, the point isolated is most likely to detract from the quality of the localization.

Also, as a general rule, if error values of the first few points are reasonable but increase when a new point is measured, the point just measured must have either inaccurate local site coordinates or erroneous GPS measurement.

Once a problematic Control Point is discovered, try to re-measure the point again to see any improvement. If it is still suspect and affects the acceptable tolerance, the horizontal and/or vertical localization for this point may be disabled.

Problem

There are no H.Error and V.Error values.

Causes	Solutions
<p>“Use for horizontal GPS localization” and/or “Use for vertical GPS localization” check boxes may not have been selected.</p>	<p>These check boxes need to be selected for a minimum of three points. Note that the error value will be calculated once three Control Points are measured and used for the GPS localization. This troubleshooting is useful when the Pocket-3D is being used to perform GPS localization as well as the display.</p>

Blade Response

This section lists possible Blade Response problems you may encounter. If you still have problems after trying the solutions listed here, contact TPS customer support.

Problem	
<p>Blade is moving too slowly. The blade seems to move too slowly in Control Mode. The Grade Indicator takes too long to reach grade.</p>	
Causes	Solutions

<p>The Valve Gain setting is too low.</p>	<p>Increase the Valve Gain setting, which will cause the hydraulics to respond quicker.</p> <p>Check which control is slow before adjusting the Valve Gain. Remember that the larger number setting speeds up the response.</p>
<p>Problem</p>	
<p>Blade is moving too fast. The blade seems to move too fast in Control Mode. The Grade Indicator skips through on-grade.</p>	
<p>Causes</p>	<p>Solutions</p>
<p>The Valve Gain setting is too high.</p>	<p>Decrease the Valve Gain setting, which will cause the hydraulics to respond slower.</p> <p>Check which side control is fast before adjusting the Valve Gain. Remember that the lower number setting slows down the response.</p>
<p>Problem</p>	
<p>Blade reacts, but does not reach On Grade</p>	
<p>Causes</p>	<p>Solutions</p>
<p>Valve Offsets are too small.</p>	<p>Assume that Valve Offsets are too small, and perform a Valve Offsets Calibration.</p>

Problem	
Blade reacts, but overshoots around On Grade	
Causes	Solutions
Valve offsets are too large.	Assume that Valve Offsets are too large, and perform a Valve Offsets Calibration.

Safety Information

It is your responsibility to be completely familiar with the cautions described in this manual. These messages advise against the use of specific methods or procedures which can result in personal injury, damage to the equipment, or unsafe operating conditions. Remember, most accidents are caused by failure to observe basic safety precautions.

General Precautions

1. Read and become familiar with the machine manufacturer's operating instructions, including safety information, before installing or using your Topcon equipment.
2. Use extreme caution on the job site. Working around heavy construction equipment can be dangerous.
3. DO NOT attach Topcon 3D Machine Control brackets or hose connections while the machine is running.
4. DO NOT allow any 3D Machine Control component to limit the visibility of the operator.

5. Use Ty-wraps, supplied with 3D Machine Control, to keep hoses and wires secured and away from possible wear or pinch points.
6. Use eye protection whenever welding, cutting, or grinding is being done on the machine.
7. Protect yourself at all times, and wear protective clothing, when working on or near hydraulic lines. Hydraulic lines can be under extreme pressure, even when the machine is turned off.

WARNING

Warning: Relieve all pressure in the hydraulic lines before disconnecting or removing any lines, fittings or related components. If injury does occur, seek medical assistance immediately.

CAUTION

Caution: Avoid direct exposure to your eyes when using laser control. DO NOT stare into the laser beam or view the beam directly with optical equipment.

8. Use appropriate welding precautions and practices when welding. After welding, all paint all affected areas with a rust inhibitor
9. To prevent vandalism or theft, do not leave removable Topcon components on the machine at

- night. Remove the components each evening and store appropriately in the Carrying Case.
10. Keep the Carrying Case dry at all times. If moisture does get inside of the Carrying Case, leave it open and allow it to thoroughly dry before storing any components.

Radio Usage Information

Depending on the type of radio, users may need to obtain an FCC (Federal Communications Commission) license before operating a Topcon system (GPS RTK (Real-Time Kinematic) or simultaneous calculation of Global Positioning System and Global Navigation Satellite System). Check the sites listed below to determine if a license is needed before operating a Topcon system.

- **The Federal Communications Commission is at:**

<http://www.fcc.gov/>

- **The rules are at:**

http://www.access.gpo.gov/nara/cfr/waisidx_00/47cfr90_00.html

There have been many problems in the past with RTK base radio modems interfering with voice users. The issue finally culminated with the FCC refusing to grant licenses until something was done to ensure that surveyors did not interfere with voice users. The solution was to stop using frequencies in the 469MHz

range, to add an identifier to the broadcast message, and other measures designed to minimize interference with voice users. The user and his employer are subject to fines of up to \$82,500, confiscation of surveying equipment and legal action, if the rules are ignored.

Topcon cannot obtain the license for the user. There are companies to assist with licensing. Two are listed here:

- **Professional Licensing Consultants Inc.**

P.O. Box 1714
Rockville, MD 20849-1714

- **Atlas License Company and Data Services**

1725-A North Shadeland Avenue
Indianapolis, IN 46219
<http://www.alclds.com/>

General Usage Warnings

CAUTION

Caution: If any Topcon 3D Machine Control component has been dropped, altered, transported or shipped without proper packaging, or otherwise treated without care, erroneous measurements, calculations, or display may occur. Periodically test 3D Machine Control components to ensure accurate measurements and operation.

Inform TPS immediately if any product does not function properly.

WARNING

Warning: The LCD display can be damaged if struck with sufficient force.

Base Station Precautions

CAUTION

Caution: TPS receivers are designed for machine control, survey, and survey related uses (i.e., surveying coordinates, distances, angles and depths, and recording such measurements). This product should never be used:

Without the user thoroughly understanding this manual.

After disabling safety systems or altering the product.

With unauthorized accessories.

Without proper safeguards at the survey site.

Contrary to applicable laws, rules, and regulations.

WARNING

Warning: TPS receivers should never be used in dangerous environments. Use in rain or snow for a limited period is permitted.

Internal Battery Pack Warnings

WARNING

Warning: Tampering with the internal batteries by end users or non-factory authorized technicians will void the receiver's warranty.

Do not attempt to open the battery pack or replace it.

Do not disassemble the battery pack.

Do not charge in conditions different than specified.

Do not use other than the specified battery charger.

Do not short circuit.

Do not crush or modify

WARNING

Warning: Never attempt to open the receiver's casing or replace the batteries! Lithium-Ion batteries can be dangerous if mishandled!

WARNING

Warning: Do not incinerate or heat battery pack above 212 degrees fahrenheit (100 degrees celsius). Excessive heat can cause serious damage and possible explosion.

Mercury Warning

The LCD display in the GX-60 Topcon display contains mercury. The display should not be disposed of or placed in a waste stream destined for disposal until the mercury is removed and reused, recycled, or otherwise managed to ensure that the mercury in the product does not become mixed with other solid waste or wastewater.

EU-Member Warning



WEEE DIRECTIVE

This symbol is applicable to EU-member states only.

The following information is only for EU-member states:

The use of the symbol indicates that this product may not be treated as household waste. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. For more detailed information about the take-back and recycling of this product, please contact your supplier where you purchased the product or consult.



EU BATTERY DIRECTIVE

This symbol is applicable to EU-member states only.

Battery users must not dispose of batteries as unsorted general waste, but treat properly.



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