V1.0.04 Geofence Function User Manual



introduction



Geofence function places 3D obstacles on the design surface and alerts the user if a construction machine approaches or comes into contact with them. This function can be used to avoid contact hazards such as buildings and piping.

(A collection of use cases will be provided in a separate document.)

<u>Important</u>

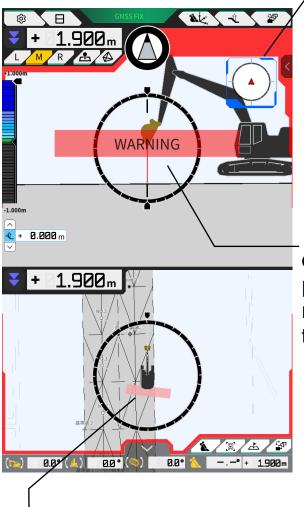
The geofence contact detection/alert notification function may not function properly depending on the environment and conditions in which it is used. Do not overconfidently use the function and make sure you understand the function and conditions of use.

%Geofence is not available for 2 Piece Boom and Swing Boom at this moment

How to see the screen



This section explains how to view the geofences displayed on the guidance screen and related alert displays.



■ Rader

 The display indicates the presence of a geofence in the detection area.

•The color changes to yellow when a geofence exists within the collision detection angle.

■ Alert



 When a construction machine contacts a geofence, the following pattern of screen display or audio notification is given, depending on the alert type.

- Notice ··· Sound only
- •Attention ··· Yellow flashing + Sound
- •Caution ··· Yellow flashing + Text + Sound
- •Warning ··· Red flashing + Text +

Sound

•Danger ··· Red flashing + Text + Sound

■ Geofence

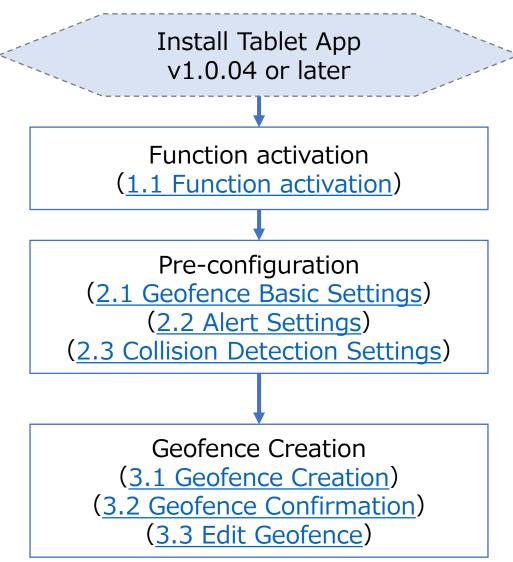
•Geofences are available in three types. (Wall, Circle and Line)

 When a construction machine makes contact with a geofence, the geofence in question is highlighted.

Workflow



You can use the geofence function in the following flow





01 Chapter

Function activation

1.1 Function activation

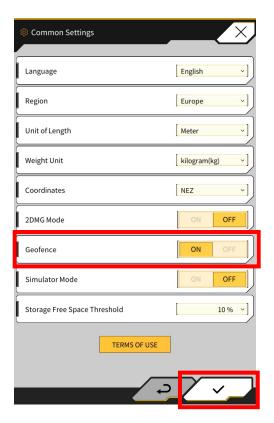


[Attention] The geofence function is available with the tablet app v1.0.04 or later; it cannot be used in conjunction with the 2DMG mode or the simulator mode.

Geofence can be activated in the common settings.

- 1. Launching the tablet app
- 2. Tap 🌣
- 3. Turn ON "Geofence"
- 4. Tap ✓ (save settings)

Smart Construction Pilot
Machine Guidance
Payload Meter
© Version 1.0.04-7





02 Chapter

Pre-configuration

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2.1 Geofence Basic Settings ***** EARTHBRAIN



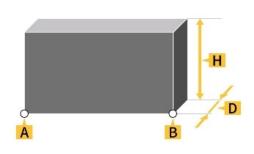
Each of the three types (Wall, Circle, and Line) can be set and will be reflected in the default parameters for geofence creation (Each parameter can be changed at the time of creation).

- 1. Launch Machine Guidance Screen
- 2.
 ^OMenu
- 3. Geofence Settings
- 4. Geofence Basic Settings

Geofence Basic Settings X	Geofence Basic Setting	zs 🔨 🔨
Geofence Type	Geofence Type	Wall
Wall Circle Line	Thickness	2.000 m
	Height	20.000 m
	Dimension	3D V
	Alert Type	Caution V
	Detection Interval	0.5 s
	Transparency	ON OFF
	Color	
× →		2 ~

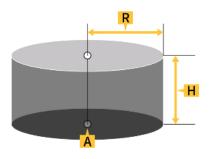
Geofence Basic Settings **KEARTHBRAIN** 2.1

Wall

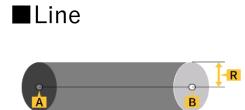


- Used for buildings, fences, etc.
- 3D object created by two points A
- and B, depth D, and height H.
- Alert type is "Construction equipment contact (3D)" only.

ICircle



- Used for reference points, danger areas, etc.
- 3D or 2D object created by point A, radius R, and height H.
- Alert type: "Construction equipment in contact (3D)" or "Construction equipment entering/exiting geofence (2D).



- Used for waterways, power lines, etc.
- 3D object created by two points A and B and a radius of R.
- Alert type is "Construction
- equipment contact (3D)" only.

2.1.1 Wall Type Settings



The following items can be configured.

- Thickness
- Height
- Alert Type (5 types)
- Detection Interval
- Transparency ON/OFF
- · Color

Geofence Basic Settings		X	Pulldown
Geofence Type		Wall	Caution
		wait	: Notice
Thickness		2.000 m	Attention
Height		20.000 m	
			✓ Caution
Dimension	3D		Warning
Alert Type	Caution		Danger
Detection Interval		0.5 s	
Transparency		DN OFF	Touch color pad
Color			
	2		#FF9900

2.1.2 Circle Type Settings



The following items can be configured.

 Radius Height 2D/3D Alert Type (2D: 10 types) 	 Detection Interval Transparency ON/OFF Color 3D: 5 types)
Geofence Basic Settings	× Pulldown
Geofence Type	Circle Caution ~
Radius 5.	Notice
	Attention
Height 1.	Caution
Dimension 2D	Warning
Alert Type Caution(in area)	Danger
Detection Interval	0.5 s
Transparency ON	Touch color pad
Color	
	#FF9900

2.1.3 Line Type Settings



The following items can be configured.

- Radius
- Alert Type (5 types)
- Detection Interval
- Transparency ON/OFF
- · Color

Geofence Basic Settings		X	Pulldown	
Geofence Type		Line	Caution	~
{			I Notice	
Radius		0.500 m	Attention	
Dimension	3D	<u> </u>	✓ Caution	
Alert Type	Caution	/	• Caution	
			Warning	
Detection Interval		0.5 s	Danger	
Transparency	ON	OFF		
Color			Touch color pad	
٢			$\left[\begin{array}{c} \bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet \\ \hline \end{array} \right]$	5
		Ì		
	- 2		#FF9900	

2.2 Alert Settings



For each of the five types of alerts set for geofences, you can set the type of alert, volume, and whether or not it repeats.

- 1. Launch Machine Guidance Screen
- 2. ØMenu
- 3. Geofence Settings
- 4. Alert Settings

	 Alert Set Notice Attention 	tings	Volume (5 levels)
Types of alerts (12 types from F-1 to H-4)	Caution	F-1 Screen Display:Yellow Flashing Message:CAUTION F-1 V F-1 F-2 F-3 F-4	Repeat ON: yellow OFF: white
	Danger	G-1 G-2 G-3 Screen Display:Red Flashing Message:DANGER	Preview Button
			13

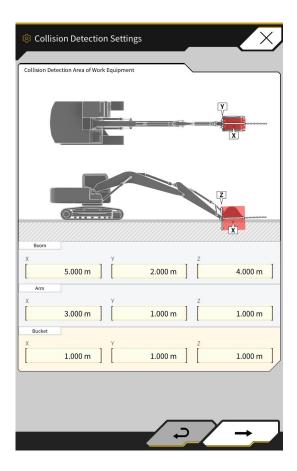
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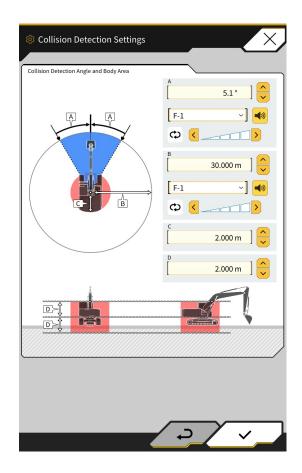
2.3 Collision Detection Settings



The collision detection settings are used to detect proximity and contact with geofences. The following two settings can be changed in the collision detection settings. Depending on the conditions of use and other factors, you can set a larger value for detection with more leeway.

- 1. Collision Detection Area of Work Equipment
- 2. Collision Detection Angle and Body Area

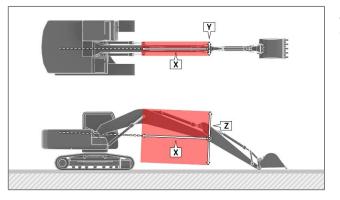


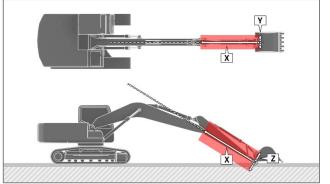


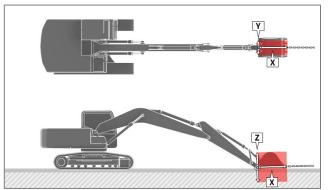
2.3.1 Collision Detection Area of Work Equipment



Set the area that will be alerted when the work equipment contacts the geofence. Measure and enter XYZ values for the boom, arm, and bucket, respectively.







- Enter the values for the shape of the boom. In particular, the Z value must be entered in consideration of the geometry.
- 2. Enter the values for the shape of the arm.

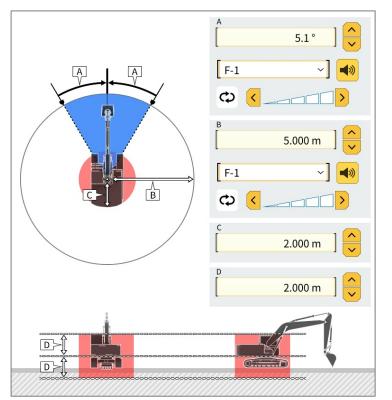
3. Enter the values for the shape of the bucket.

2.3.2 Collision Detection Angle and Body Area



Sets the area to detect when a construction machine is approaching a geofence, the area to notify when there is a risk of contact with a geofence when turning, and the area to be alerted when the vehicle body contacts a geofence.

- A. You can set the angle of contact with the geofence when turning. If there is a geofence within the detection area, the radar will change to yellow in the guidance screen.
- B. You can set the radius within which geofences are detected. If there is a geofence within the radius, the radar will be displayed on the guidance screen.



C. The contact radius of the vehicle can be set.

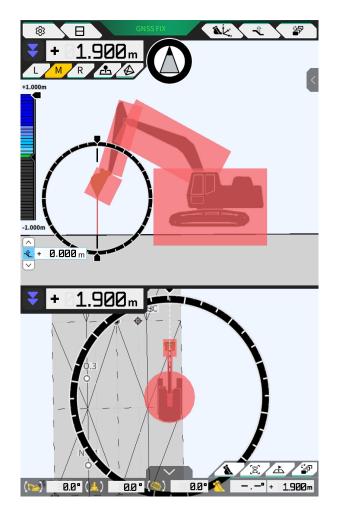
D. The contact height of the vehicle can be set.

2.3.3 Check Detection Area



To check the detection area set in 2.3.1 and 2.3.2 on the guidance screen, turn on the "Detection Area Display Mode" according to the following procedure.

- 1. Tap Menu (۞) on the Guidance screen
- 2. Tap Guidance Settings
- 3. Tap Application Settings
- 4. Turn on "Detection Area Display Mode" for Geofence
- 5. Tap the \checkmark in the lower right corner to save settings



%The size, shape, etc. of the displayed car body differs from the actual car body. Be sure to make settings based on actual measurements.

Also, once the detection area has been confirmed, "Detection Area Display Mode" should basically be set to OFF.



03 Chapter

Geofence Creation

3.1 Geofence Creation



Create a geofence and place it on the design data.

- 1. Machine Guidance Menu > Project File
- 2. Tap 🔼 on Project File

3. Tap 🗕 🔁

- 4. Tap + on Geofence List screen
- 5. Go to the Create New Geofence screen

© Project File	Project Settings	Geofence List
Project File In Use	Project Name 東京IoTセンタ2	an a
Project Name 東京IoTセンタ2 Design surface TIN_1st イ	Coordinate System	
Projectiles	Design surface	
● 東京IoTセンタ2	View Layers	103 103 103 103 103 103
	✓ TIN_2nd	
		wall159
	✓ TIN_4th	
	Linework	
		+
2 ~		

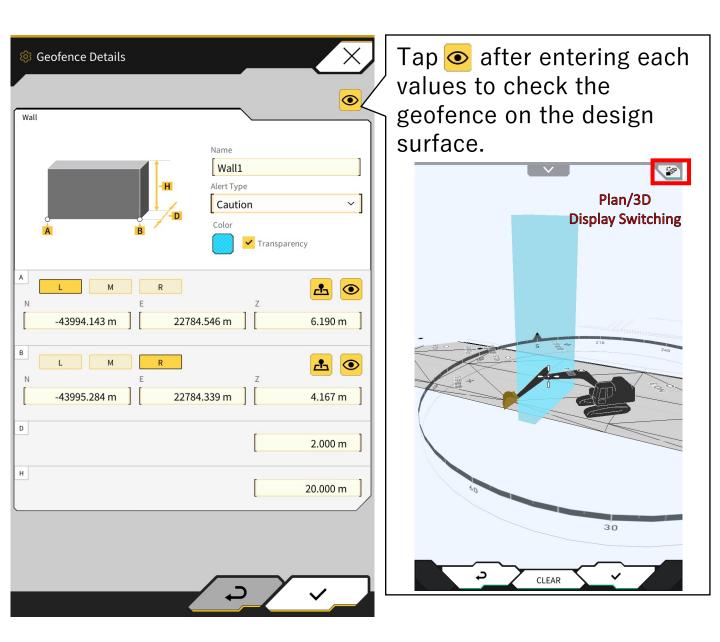
3.1.1 Wall Type Creation



- 1. Create New Geofence Screen Select Wall and press \checkmark
- 2. Enter Name
- 3. Set each parameter and press \checkmark to save

Geofence Details Wall Name	Select and tap to enter the cutting edge coordinates.
Wall1 Alert Type Caution Color Color Transparency	Tap after entering the coordinates of A and B to adjust the points on the design surface.
L M R Z N E Z -43994.143 m 22784.546 m 6.190 m	Plan/3D Display Switching
B L M R L M	**
D 2.000 m	
20.000 m	A/B position (changes as you drag)
	Offset height

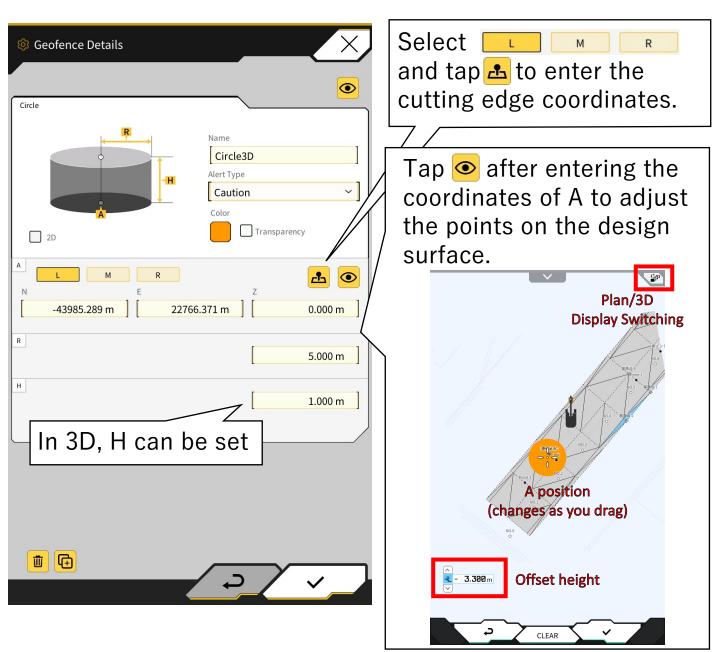




3.1.2 Circle Type Creation



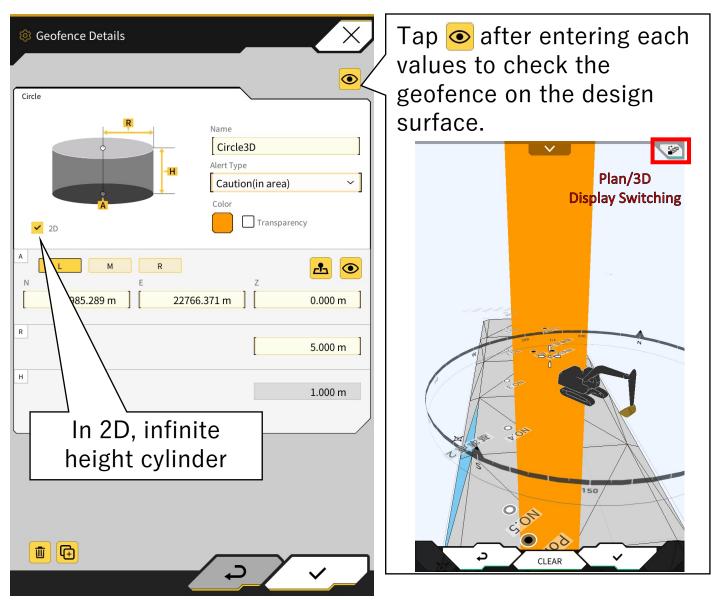
- 1. Create New Geofence Screen Select Circle and press \checkmark
- 2. Enter Name
- 3. Set each parameter and press \checkmark to save



3.1.2 Circle Type Creation



If 2D is ticked, the height H cannot be entered and the alert type can be selected "construction equipment in contact(in area)" or "construction equipment out of area from within geofence(out of area)".



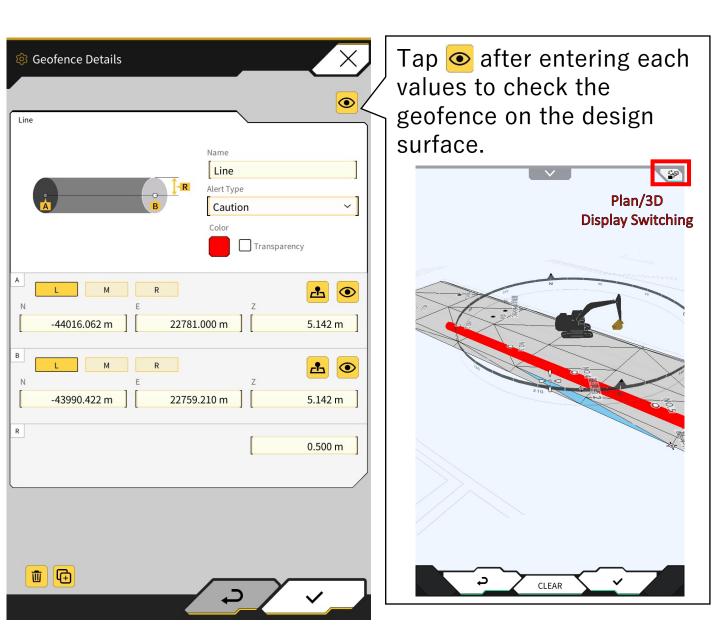
3.1.3 Line Type Creation



- 1. Create New Geofence Screen Select Line and press \checkmark
- 2. Enter Name
- 3. Set each parameter and press \checkmark to save

Geofence Details	Select and tap to enter the cutting edge coordinates.
A L M R Color -44016.062 m 22781.000 m 5.142 m B L M R Z -43990.422 m 22759.210 m 5.142 m	Tap after entering the coordinates of A and B to adjust the points on the design surface. Plan/3D Display Switching
	A/B position (changes as you drag) • • • • • • • • • • • • • • • • • • •

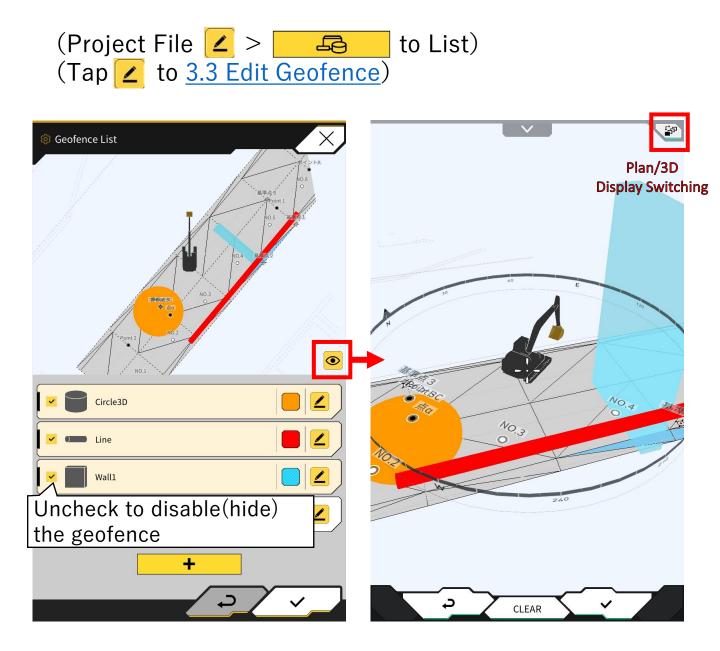




Geofence Confirmation 3.2



The Geofence List screen allows you to check the type, name, color, location, and enable/disable settings for the list of geofences you have created.



3.3 Edit Geofence

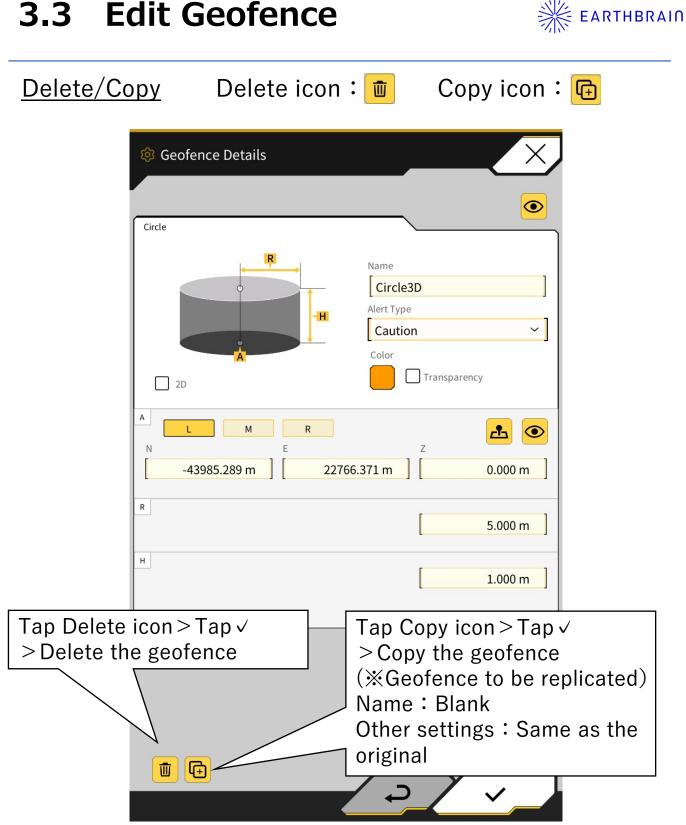


Geofence Details screen allows you to edit, delete, or copy for a geofence that has already been created.



- 1. Project File ∠ > Tap _____ to Geofence List
- Tap on the target geofence and go to Geofence Details screen
- 3. Set each parameter and tap \checkmark

🕸 Geofence List	Geofence Details
Image: State Sta	Circle Circle3D Alert Type Caution Color 2D Color Transparency A L M R E Z -43985,289 m 22766.371 m 0.000 m
Circle3D	R 5.000 m
	н 1.000 m
💌 🔳 Wall1	
wall137	
+	
2 ~	



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