

HOW TO GUIDE:

Wayline Storage, pivot guidance, contour guidance

This document describes the setup and usage of the Wayline Storage feature, pivot guidance and contour guidance. Each of these can be enabled by entering a separate unlock code.

Description

- The mojoRTK system provides guidance for a tractor:
 - along, and parallel to, a single straight line (the wayline)
 - around a circle about a central pivot and then at increasing diameters to that pivot
 - along a defined path and then along the repeated path at offsets to that path
- The wayline storage feature allows the user to save and recall up to 100 stored waylines (20 may be contour waylines).
- The stored waylines can be transferred between mojoRTK consoles using a USB stick.

Benefits

Using Wayline Storage removes the need for the user to continually redo the setting of their wayline when working with multiple waylines.

The ability to support straight line, pivot and curved guidance provides operators with the primary navigation methods required for day to day operation.

Limitations

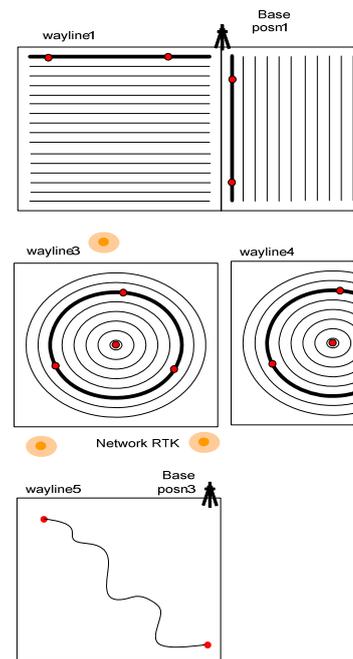
For repeatability the base station must be placed in exactly the same position as when the wayline was set. To avoid incorrect recall of waylines only the waylines set with the base in the current position will be available for recall. If the base has been moved at all and not replaced in exactly the same spot then use of the mojo feature may be required. For more information refer to the How To Guide - "Base Position Modes".

The base position is stored on the mojoRTK console with each wayline and this is used to filter which waylines are available for recall. If the current base position is not the same as the associated base position for a desired wayline then the wayline will not be available. The base position for the desired wayline can be backed up from the console and loaded into the base station.

If Network RTK is being used then the user must ensure that the data stream (mount point) is the same each time. Different data streams may give different results.

The mojo is able to store up to 100 waylines. Each wayline is associated to a Base position, or, is free to use.

The mojo stores all of the base positions and waylines but will only show the waylines for the current Base position.



Base Station	Wayline
position 1	Wayline 1
	Wayline 2
position 2	Wayline 3
Network RTK	Wayline 4
position 3	Wayline 5

Required Items

- Unlock codes are required for each of the following features:
 - Wayline storage
 - Pivot guidance
 - Contour guidance
 - Network RTK (see - HOWTO Guide Network RTK)

The unlock code can only be generated by Leica Geosystems if the console serial number has been provided.

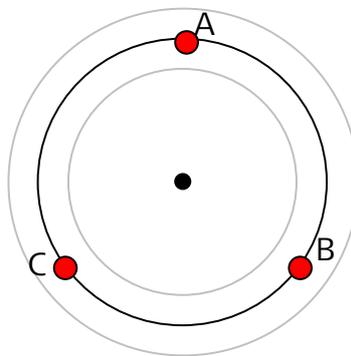
- Value added resellers can obtain unlock codes directly from Leica.

Pivot guidance

Description

Basic pivot guidance is guidance around concentric circles. The circles are defined by three waypoints (A, B, and C) along the circumference. Each point must be at least 30 metres from the last which means a minimum radius of about 15 metres.

To achieve the best results, the three points should be equally spaced around the circle (e.g. 0, 120 and 240 degrees).



The circle is projected around the centre point, assuming relatively flat terrain. Variations in the ground will reduce the accuracy in the guidance lines. Slopes can have a large effect so it is recommended that the system not be used on slopes exceeding 2 degrees. A slope will have the effect that the circle will appear oval with the highest and lowest points being the most affected. To best combat this, it is advised that the waypoints be set mid way between the most inner and outer working line. The table below represents the maximum error that can be expected on the defined slopes.

Hilly ground should be avoided as the inaccuracies introduced by the ground will create undesirable results.

It is recommended that pivot guidance be used in RTK mode.

Base position and repeatability

In order for the circle guidance to be repeatable, it is critical that the base station is placed in the same position each time.

We recommend that if a fixed base is being used that it be mounted on a stake planted firmly into the ground on which will not move.

If you are using Network RTK then as long as you use the same Network data stream each time then the centre point of your circle will be correct.

If the base must be moved, then the circle must be re-driven.

mojo, and field offset

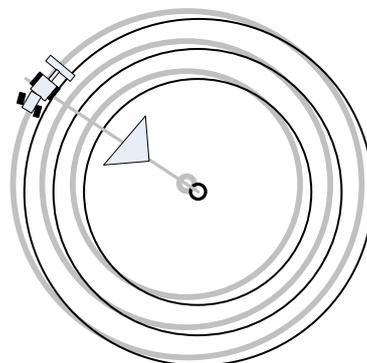
In pivot guidance the operation of field offset, or a mojo offset, or a nudge, adjusts the diameter of the working line and does not move the centre position.

Nudge

In pivot guidance the operation of nudge is to move the centre of the circle toward or away from the vehicle in a direct a direct line from the centre pivot to the vehicle.

Over time the centre position effectively wanders about the real centre position in two dimensions. Moving the centre point toward and away from the vehicle in this way deals with that two dimensional shift.

tractor is off line to the right by 12 inches



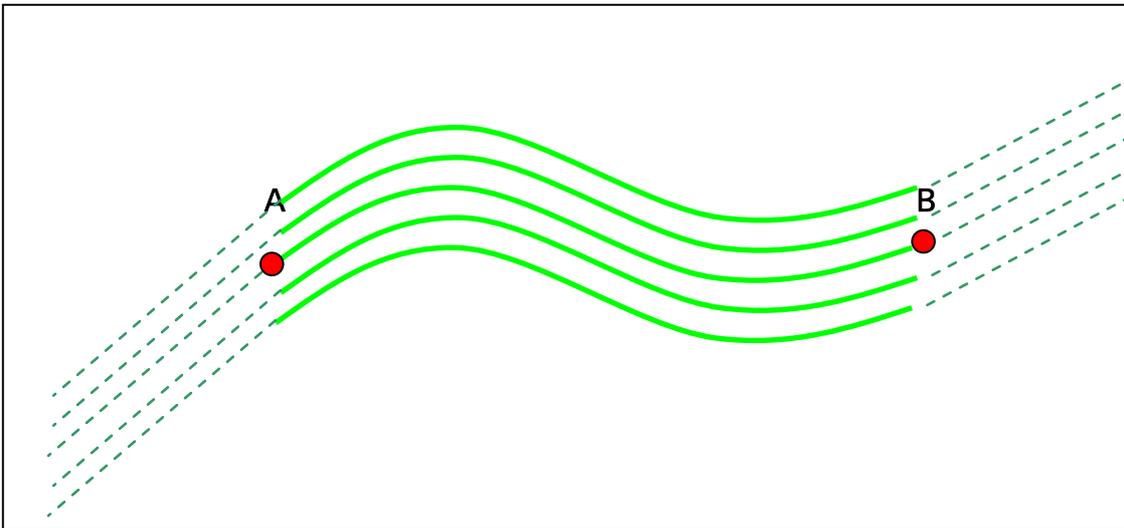
perform nudges to the left note that the
the original circle circumference is maintained

Contour guidance

Description

Contour guidance is guidance along a defined path (AB Curve) and identical curves equally spaced from the defined path. The contour guidance is not adaptive and therefore every pass will be the contour shape as the defined path, just offset from the last by the implement width.

The contour curve is defined by two waypoints and the path driven between them. The contour curve is extended in a straight line indefinitely before the A point and after the B point to allow for irregular shaped fields.



Contour guidance is guidance along a sequence of plotted points to a maximum of 3000 points. Points are automatically plotted every 1.4 metres but can be as close as 1 metre if the steering angle is severe. The available distance is typically 2 miles or 3 kilometres.

The minimum distance for a contour wayline is 100 feet.

A contour wayline is invalid if the new point being plotted is closer to the start than the previous wayline point.

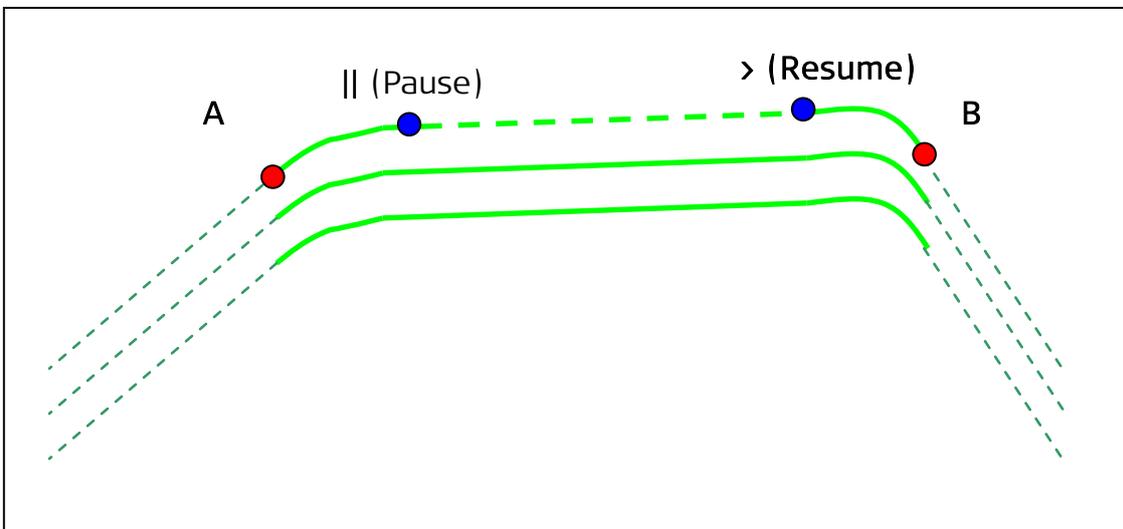
Contour waylines require a large amount of storage and therefore a limit of 20 has been placed on the number of contour waylines that can be stored.

When you attempt to save the 21st contour wayline you will have to overwrite an existing contour wayline.

While you are restricted to saving 20 contour waylines you will still be able to save a further 80, AB, A heading or pivot waylines

You can overcome the limitation of the number of waylines that you can save by using the backup and restore wayline options and more than one USB stick.

During the recording of a contour curve there is the availability to pause (||) and resume (>) the curve recording to allow for entry of very straight sections within the contour curve.



Contour curve guidance is only suitable for situations where there is a gentle curve in the desired path. Tight curves will cause implement overlap as the curves are absolutely identical and not adaptive at all.

It is recommended that contour guidance be used in RTK mode.

The operation of field offset, nudge, or a mojo offset, during contour guidance adjusts the line perpendicular to the AB points.

mojoRTK Configuration

Installing unlock codes

1. The unlock codes for Wayline, pivot guidance and contour guidance are all installed as described in HOW TO GUIDE: Installing Unlock Codes

Wayline Storage - mojoRTK

Setting the wayline points

1. Switch on the mojoRTK console and wait for a good position fix to be achieved (red light will turn on)
2. Drive to your intended wayline start position.
3. If you are not on the navigation screen then press the Esc button until it comes up.
4. Press Softkey 1 twice to enter the Wayline wizard

Straight line

1. Press OK to store point A
2. Drive forward until prompted to store point B
3. Press OK to store point B
4. See Store wayline - below

Heading

1. Select 1 to navigate to the wayline type menu select 1 again to select heading
2. Use the right dial, esc and OK buttons to select the heading that you wish to use for a wayline
3. See 'store wayline' below

Pivot

1. Select 1 to navigate to the wayline type menu select 2 to select Pivot. This selection sets Point A of the circle you are about to drive.
2. Drive to a point approx 1/3 the way around the circle and select point B
3. Drive to a point approx 2/3 the way around the circle and select point C
4. See Store wayline - below

Contour

1. Select 1 to navigate to the wayline type menu select 3 to select Contour. This selection sets Point A of the contour you are about to drive.
2. Drive the path you wish to record bearing in mind:
 - the minimum length is 100 feet (30 meters)
 - the maximum length is approx 2 miles (3 km)
 - the direction of travel can not be toward the start point – this will invalidate the wayline

3. contour waylines are not adaptive – gentle curves are best
4. ends of contour waylines are infinitely long straight lines
5. Press pause to halt recording for very long straight sections
6. Press play to recommence recording
7. Press OK to store point B
8. See Store wayline - below

Store the current wayline

1. Navigate to the wayline wizard by escaping to the Navigation screen and pressing SoftKey 1 twice.
2. Press Softkey 3 to bring up 'store wayline'.

Store wayline

1. You will be asked whether you want to store the wayline for later recall, select Yes or No
2. Once you have chosen to save the wayline you will have the option to select which slot (1 through 100) to save the wayline to.
3. Use the main dial to select a slot. Free slots are clearly indicated.
4. Once you have selected a slot press the OK button to save it. You can select a free slot or a used slot. If you select a used slot the current details for that slot will be overwritten. If you select No then you will not be able to recall your wayline unless you subsequently save the current wayline position.

Recalling a wayline

1. Switch on the mojoRTK console and wait for a good position fix to be achieved (red light will turn on).
2. If you are not on the navigation screen then press the Esc button until it comes up.
3. Press Softkey 1 twice to enter the Wayline wizard.
4. Press Softkey 2 once to enter the Recall Wayline screen. Note: A wayline cannot be recalled if auto-steer is currently engaged. You must disengage first.
5. If there are waylines stored for your current base position you will have the option to select which wayline to use.
6. Use the main dial to scroll through the waylines. The current wayline is indicated with '*'. The type of wayline and distance to the A point will be displayed. Press OK once you have selected the wayline to recall.
7. If your current wayline has not been saved you will be given the option to save it.
8. After recalling the wayline a mojo operation will be required if the base is not in exactly the same place for the associated base position.



Backing up stored waylines

1. Switch on the mojoRTK console and insert a USB stick (the USB stick should be cleared of all files and folders prior to its use).
2. Navigate to the main menu. To do this press Esc until you return to the navigation screen. Then press the OK button.
3. Use the main dial to scroll down to Settings then press the OK button.
4. Use the main dial to select guidance then press the OK button.
5. Use the main dial to scroll down to Backup Waylines and press the OK button.
6. A message will then be displayed indicating if the backup was successful.
7. Once the waylines have been backed up shutdown the console.
8. DO NOT remove the USB stick until the console has fully shutdown (screen has turned off).

Loading backed up waylines

1. Switch on the mojoRTK console and insert the USB stick containing the backed up waylines.
2. Navigate to the main menu by pressing Esc until you return to the navigation screen. Then press the OK button.
3. Use the main dial to scroll down to Settings then press the OK button.
4. Use the main dial to select guidance then press the OK button.
5. Use the main dial to scroll down to Load Waylines and press the OK button.
6. You will be prompted to confirm that you wish to load the waylines. Loading a new set of waylines will **ERASE ALL CURRENT WAYLINES**.
7. If you wish to cancel then press the Esc button. If you wish to proceed with loading the waylines then select the Yes button by using the main dial then press the OK button.
8. A message will then be displayed indicating if the load was successful. Press the OK button to close the message.
9. The loaded waylines may now be used.

Notes:

- Consider labelling your USB sticks when you Backup Waylines. You might want to use a unique heading from the saved waylines to identify the USB stick.
- The base station location is stored with Waylines when they are created. The base positions can be imported onto the base station using a USB stick and the Base Station option Import Waylines.
- The wayline file is saved to the USB stick as WaylineDb.xml.

Wayline Screen Map - mojoRTK

