

HOW TO GUIDE: Setting the Line Spacing and Implement Offset

This document describes a reduced-risk method of correctly setting the implement width and implement offset to minimise overlap and underlap.

Description

- The mojoRTK system needs to have the implement width and the implement offset correctly entered for optimal reduction of overlap and underlap when working a field.
- The line spacing is the desired distance between passes.
Note: this distance may be more or less than the measured implement width. This is discussed later.
- The implement offset is the distance between the centre-line of the tractor and the centre-line of the implement when under working conditions. For example if a particular implement pulls **0.5 metres to the right** when working then the implement offset should be entered as **0.5m Right**. The symptom of not having an implement offset entered into the system with a non-centred implement is you will get overlap on one side and underlap on the other.

Benefits

When set up correctly, the line spacing and implement offset can produce results with consistent pass to pass accuracy while reducing overlap and underlap.

Limitations

With respect to the implement offset, there are other aspects of the system that can behave or have the same effect as entering an implement offset. Understanding these issues before trying to set implement offset is important.

- The first of these potential issues is having an incorrect Red Antenna Offset (the Red Antenna Offset is the distance between the centre line of tractor and the red mojoRTK antenna).
- If the red antenna offset entered into the mojoRTK console is not correct then the effect on the ground is very much like entering an implement offset.



- To fix this problem you simply need to re-measure the red antenna offset and make sure that what you measured is the value entered into the system. On the console go to the Vehicle Wizard in the menu **Settings- >Vehicle- >Vehicle Wizard**.
- The second possible issue is having the antenna height incorrectly set. The antenna height is simply measured from the ground up to the red antenna and if the value in the system is incorrect you can re-enter it into the console by going into the Vehicle Wizard as above for the Red Antenna Offset
- The third possible issue is if the terrain compensation tuning needs updating. If the vehicle roll is not being measured properly by the console the effect on the ground is very much like entering an implement offset. To fix this problem you simply need to go into the menu to **Settings- >Vehicle- >Update Terrain Comp** to update terrain compensation. Take great care to place the vehicle in the same place (but facing opposite directions) for the two step process.

Note: it is best to do the **Update Terrain Comp** as opposed to the **Terrain Tuning** in the Vehicle Wizard unless otherwise instructed. The tuning in the Vehicle Wizard clears all tuning data while the update improves the current tuning data that has been gathered by the console over time.

- The fourth possible issue is if the mojoRTK console is not fitted securely into the cab of the vehicle. If the console is loose in anyway and you believe that it may move while the vehicle is moving then you are most certainly going to have issues that will have a similar effect to entering an implement offset. To resolve this issue you need to make sure that the console is securely fitted into position and you may need to update the terrain compensation as described above.

To test any of the above problems you should set the implement offset to zero and test that the system guides up and down the exact same wheel tracks when going opposite directions on the same line.

NOTE: IT IS IMPORTANT THAT THIS TEST IS SUCCESSFUL BEFORE CONTINUING OTHERWISE YOU WILL BE CHASING YOUR TAIL.

Required Items

As mentioned above in the limitations section:

- The red antenna offset and the antenna height should be entered into the system correctly. Re-measure and re-enter if necessary.
- The current terrain compensation tuning needs to be valid. To be sure you can update the terrain compensation through the menu.
- The console needs to be mounted securely in position such that it can't move in the slot.
- The vehicle tuning needs to be already set up and working well. The procedures for setting the Line Spacing and Implement Offset below rely on the system being able to guide accurately along a line.

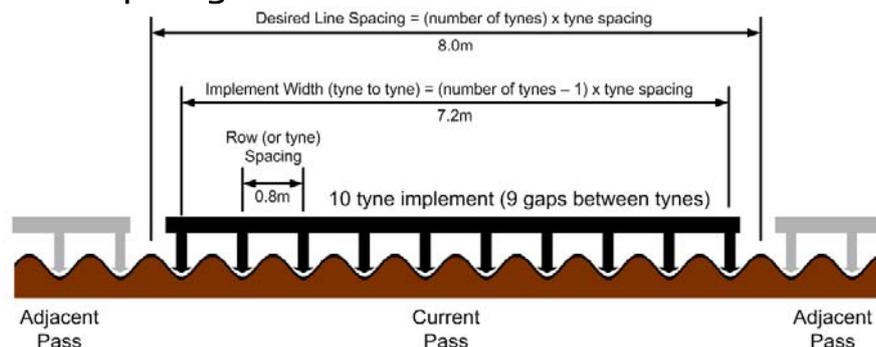
Setting the Line Spacing

The first step to setting the line spacing is to determine how far apart you actually want centre-lines from each pass to be. This sounds simple however it is likely that the value you want is not just width of the implement. In the instructions below the **desired line spacing** is the value that you need to enter into the mojoRTK console.

Steps for Determining the Desired Line Spacing

1. **Measure the Distance Between Working Lines.** See each scenario below and choose which one applies to the job you are about to do.
 - a. **Scenario 1** - See Figure 1. In this case the furrow spacing (or tyne spacing) is 0.8m and implement has 10 tynes giving an implement width (tyne to tyne) of 7.2m.
Notice that although the implement width is 7.2m the desired line spacing is wider than the actual implement by a half row on each side. This makes the desired line spacing 8.0m
To determine the line spacing to enter into the mojoRTK console, calculate the number of tynes on your implement multiplied by the tyne spacing which in this example is 8.0m.

Figure 1 – Line Spacing Scenario 1

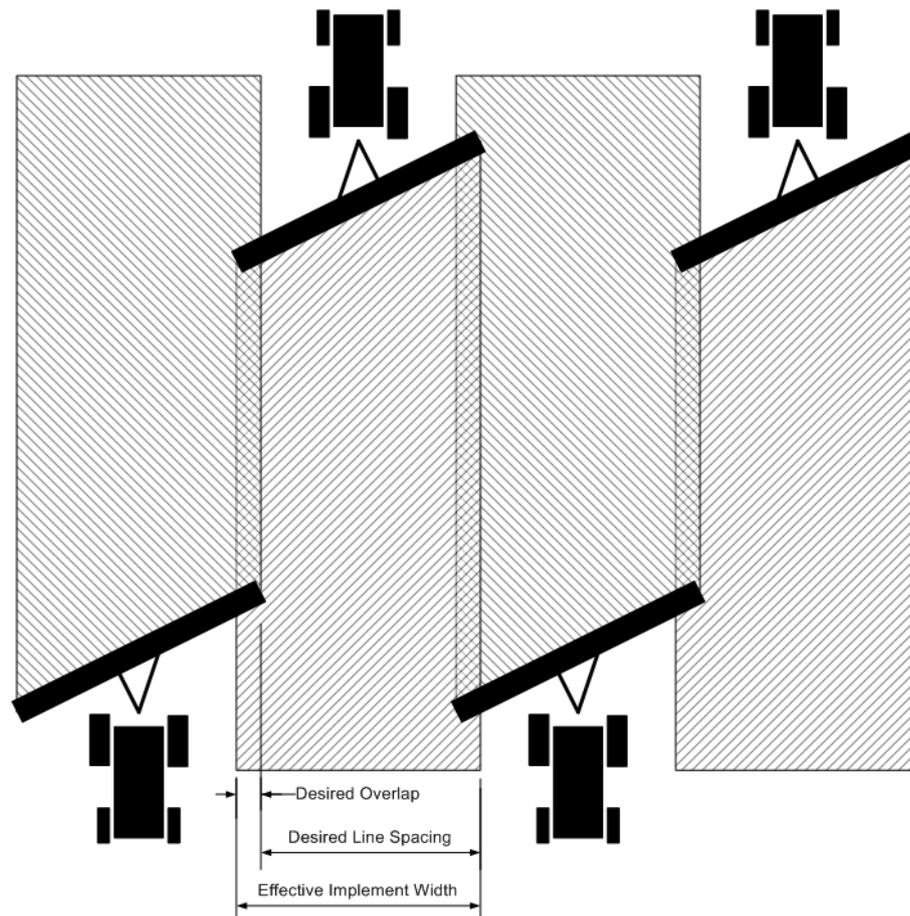


- b. **Scenario 2** – See Figure 2. In this case a bit of overlap is desired to make sure that no part of the field is left unworked.

You can work out the effective implement width by carefully measuring across a patch that has been worked with the implement. This is difficult for sprayers or other implements that don't leave a visible mark on the ground and with these you will have to know or measure the width **noting that the effective implement width is not necessarily the distance along the implement as in the Figure 2.**

Once you know the effective width of the implement you can subtract the amount of overlap you want from the implement width and enter that value into the mojoRTK console as the Line Spacing. **NOTE:** you only subtract the overlap from one side – not both sides.

Figure 2 – Line Spacing Scenario 2

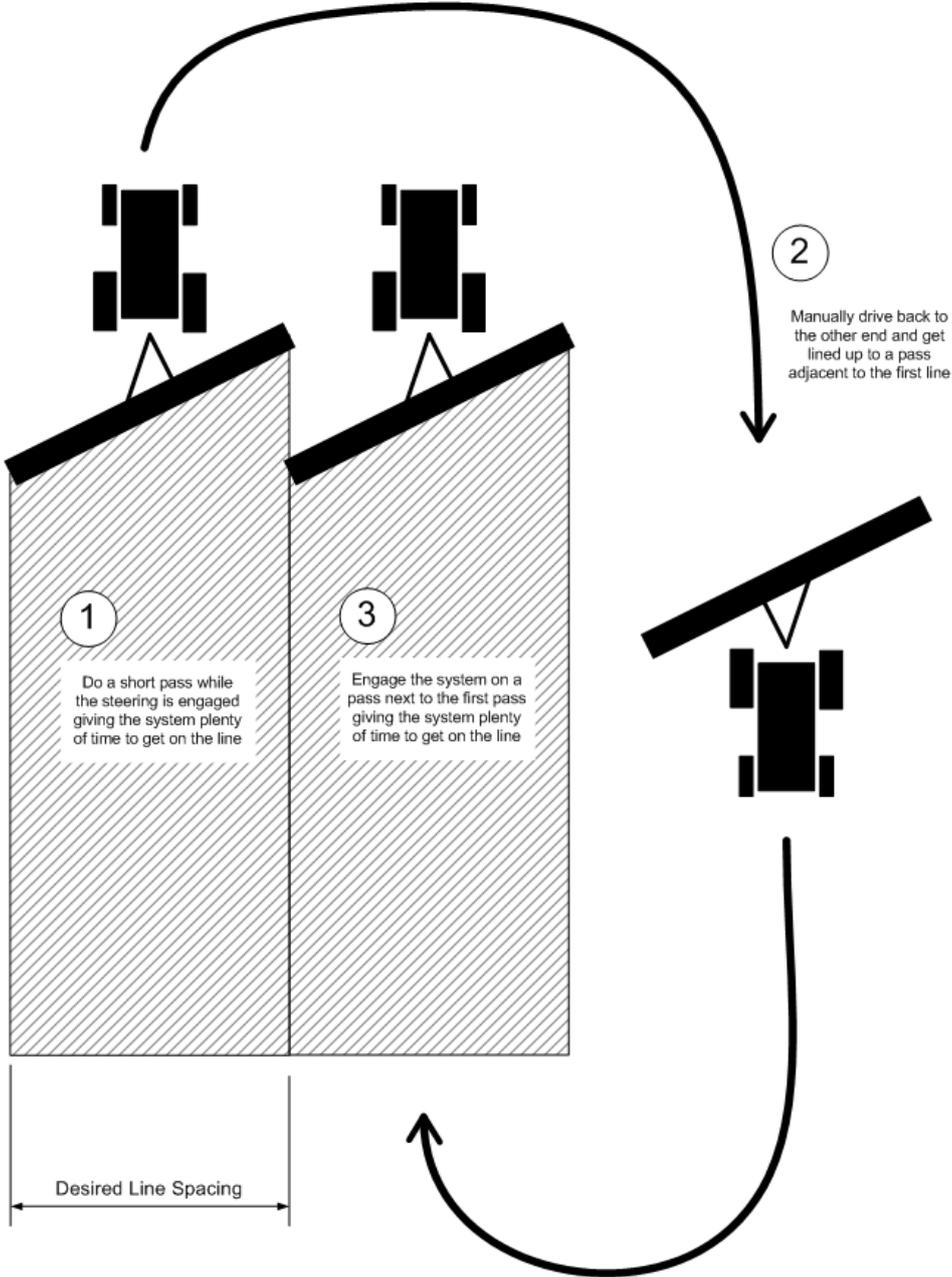




2. **Do a Test Run.** It is important that the line spacing is set correctly from the beginning, especially if you plan on using an implement offset for an implement that is not centred with the vehicle. To test the line spacing with no influence from implement offsets or the issues described in the limitations section above do the following (also refer to Figure 3):
 1. **Do a short pass while the steering is engaged** and the implement in the ground. Do not stop until the system has been driving right on the line for a while.
 2. **Manually drive back to the end where you started** with the implement out of the ground.
 3. **Drive onto a pass right next to the first pass and engage** the steering with the implement in the ground. The important part is that you are driving in the same direction as the first pass.
 4. If you have the line spacing set correctly you should have the desired overlap or underlap. If not, you need to adjust the Line Spacing and redo the test.



Figure 3 – Testing the Line Spacing (overlap or under lap not shown)



Setting the Implement Offset

Steps for Determining the Implement Offset

There is more than one way to set the implement offset and the procedure below is a reduced-risk method which, when followed correctly, should produce the desired results.

This procedure refers to the diagram below in Figure 4 which has an example of an implement which is offset to the left. Figure 4 does not show any overlap or underlap as described in the line spacing section above.

Note: Get the line spacing set correctly first. You will have no end of trouble trying to get the implement offset correct if you have the Line Spacing set incorrectly.

1. **Determine which side your implement is offset to.** If the centre of implement is to the right hand side of the vehicle's centre line then you will need a right implement offset value. Alternatively, if the centre of your implement is to the left hand side of the vehicle's centre line then you will need a left implement offset. If your implement is perfectly centred you can leave the implement offset setting at zero.
2. **Do a pass with the implement offset set to zero (0.00m).** On the mojoRTK console set the implement offset to zero (to find the setting in the menu go to **Settings- >Guidance**). Do one pass with the steering engaged in the field or a test area you have chosen making sure you have given the system plenty of time to guide along the line. **Note:** you will need to have already set or recalled a wayline to do this.
3. **Turn at the end of the test run.** If you think you need a right implement offset make a left turn at the end of the run or if you think you need a left implement offset make a right turn at the end of the run (Figure 3 shows a left implement offset and a right hand turn).



4. **Engage onto the return pass.** Once you have made your left or right hand turn engage the steering on the adjacent pass and give the system enough time to acquire the line. You should be leaving a gap between the first pass and the current pass.
5. **Measure the gap.** Measure the gap that has been left between the two passes. Enter half that distance as the implement offset into the mojoRTK console making a point to set the left/right correctly.
Note: if you are intentionally adding overlap to your setup in Figure 2 you need to make sure that your line spacing has overlap factored in (described above) and that you add the desired overlap to the gap measurement.
6. **Remove the remaining offset.** If you are testing in the field you plan on working in you will need to fix the left over gap. There will still be a gap equal to your implement offset setting if you now engage and attempt to finish the second pass (shown in Figure 3 at 5b). This is because the first pass was done with a zero implement offset in the system.

To fix this problem, manually drive the vehicle to remove the gap and use the console's mojo feature from the main navigation screen by pressing key 2 twice and following the on-screen instructions. You should now be able to engage, finish the current pass and finish working the field.

Note: if you have your Line Spacing and Implement Offset correctly configured you can set a new wayline and simply start working if you wish. You don't need to do step 6. Step 6 is only required if you plan on continuing to work the field off the first pass in Step 2.

Figure 4 – Setting the Implement Offset

