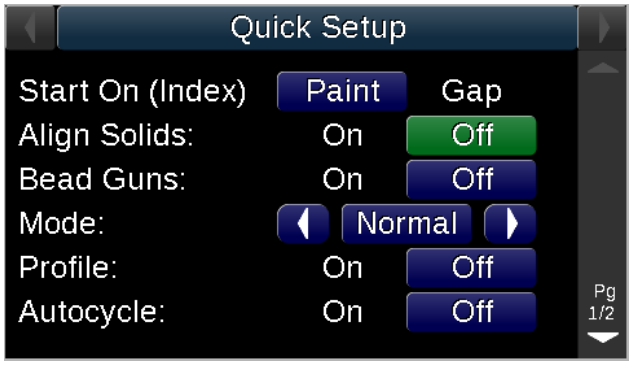
Manual Insert
Pattern Alignment Feature

Preliminary Draft

The pattern alignment feature can be used to automatically align the start and/or end of solid lines with a position relative to locations in a skip cycle.

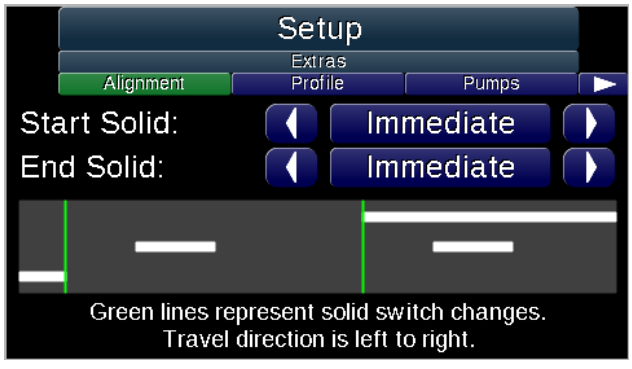
1 Enabling Pattern Alignment

To use the pattern alignment feature, locate the quick setup item called “Align Solids:” and enable it.



2 Pattern Alignment Setup

The pattern alignment setup screen is located in the Setup menu, under Extras.



2.1 Setting the Start and End Behavior

The two items on the setup screen are used to specify the start and end alignment behavior for solid lines.

Start Solid: Configures how the beginnings of solid lines should be aligned to skips.

End Solid: Configures how the ends of solid lines should be aligned to skips.

2.1.1 Solid Align Behavior Options

Start and end behavior can be set to one of four behaviors:

Immediate Solid lines start/end immediately when the corresponding gun switch is moved out of the solid position. This is also the default behavior if the “Align Solids” feature is turned off.

Start of Skip Solid lines start/end aligned to the start of the next skip that occurs.

Middle of Skip Solid lines start/end aligned to the next middle of skip that is reached.

End of Skip Solid lines start/end aligned to the next end of skip that is reached.

For best results, it is recommended to make switch changes that turn on/off solid guns during the gap between skips.

Important Note!

Gun delays/offsets and datum point are taken into account when determining where the solid guns turn on/off. Ensure that these values are set correctly before using this feature.

The start and end behaviors do not have to be set to the same behavior. This provides flexibility necessary to meet a variety of specification requirements.

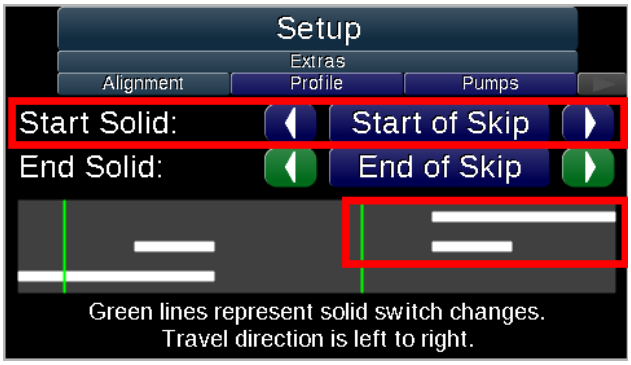
Warning!

In order for any option other than immediate to work, there must be an active skip cycle being painted. If the last gun in skip is turned off, one final cycle (see Section 4.3) will be counted so any solid end alignments can happen.

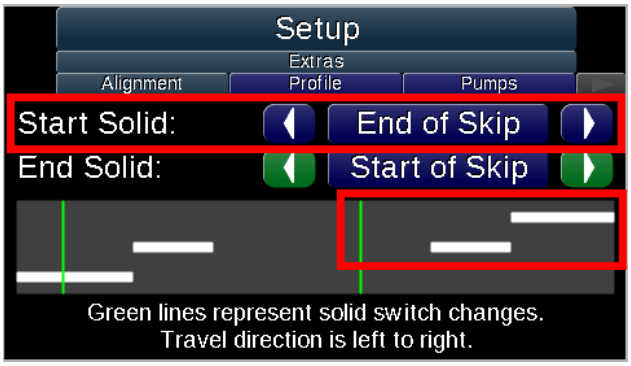
2.1.2 Solid Align Preview

When the start or end behavior is changed, the preview at the bottom of the screen will automatically update. The preview shows end behavior on the left and start behavior on the right. Green lines indicate switch position changes.

In this example, start behavior is set to start of skip. Even though the gun switch was moved to solid at the green line, it waited to turn on with the next skip.



In this example, start behavior is set to end of skip. Even though the gun switch was moved to solid at the green line, it will not turn on until the end of the next skip.

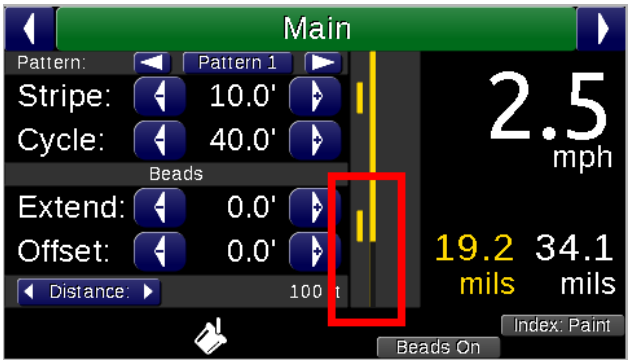


In this example, end behavior is set to immediate. The solid line ends when the switch is changed, ignoring the current cycle.

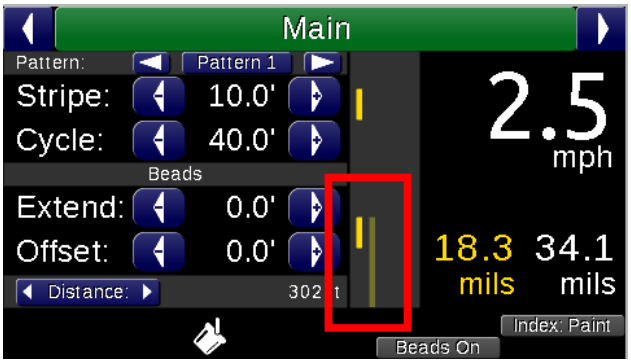
3 Pattern Preview

If the pattern alignment feature is enabled and start/end solid behaviors are set to something other than immediate, the main screen pattern preview will show pending solid on/off events using the specifed behavior.

The dark gray line indicates that that gun is in solid, but it is waiting to turn on. In this example, the solid will start aligned to the start of the skip.



The dark yellow line indicates that the gun is not in solid anymore, but it is waiting to turn off. In this example, the solid will end aligned to the end of the skip.



4 Pattern Alignment Examples

In each of the following examples, the vertical green lines represent switch changes, and the pink lines represent the start of a cycle. A dark gray solid line represents a solid gun that has its switch in solid, but is not on yet due to the assigned start behavior. A dark yellow solid line represents a solid gun that has its switch set to off, but it is still on due to the assigned end behavior.

4.1 Start Behavior

Example 1: If there is no active skip cycle, then solid guns will turn on immediately, regardless of any selected start behavior.

Example 2: **Start Behavior = Immediate** Regardless of skip cycle, the solid gun will come on immediately with the pattern switch change.

Example 3: **Start Behavior = Start of Skip** The solid gun will not turn on until the start of next skip. The pattern switch may be moved into solid anywhere in the gap, but the solid gun will not activate until the start of the next skip.

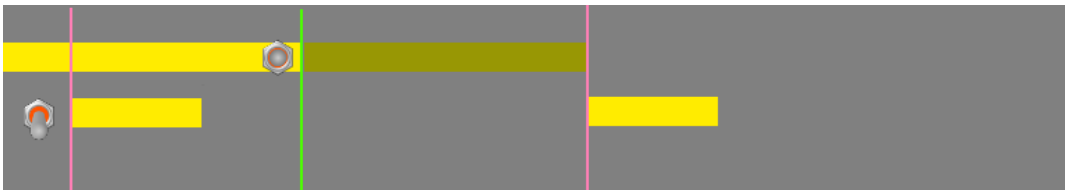
Example 4: **Start Behavior = End of Skip** The solid gun will not turn on until the end of the next skip. The pattern switch may be moved into solid anywhere in the gap, but the solid gun will not activate until the end of the next skip.

Example 5: **Start Behavior = Middle of Skip** The solid gun will not turn on until the middle of the next skip. The pattern switch may be moved into solid anywhere in the gap, but the solid gun will not activate until the middle of the next skip.

4.2 End Behavior

Example 6: If there is no active skip cycle, then solid guns will turn off immediately, regardless of any selected end behavior.

Example 7: **End Behavior = Immediate** Regardless of active skip cycle, the solid gun will turn off immediately with the pattern switch position change.



Example 8: **End Behavior = Start of Skip** The solid gun will not turn off until the start of next skip. The pattern switch may be moved into off anywhere in the gap, but the solid gun will not deactivate until the start of the next skip.

Example 9: **End Behavior = End of Skip** The solid gun will not turn off until the end of the next skip. The pattern switch may be moved into off anywhere in the gap, but the solid gun will not deactivate until the end of the next skip.

Example 10: **End Behavior = Middle of Skip** The solid gun will not turn off until the middle of the next skip. The pattern switch may be moved into off anywhere in the gap, but the solid gun will not deactivate until the middle of the next skip.

4.3 Alignment Behavior at the End of a Skip Cycle

When the pattern alignment feature is enabled, taking the last skip gun out of skip does not immediately end the cycle. The user has a 250 ms window to put at least one gun into skip to preserve the current cycle. This allows immediate changes, such as from solid-skip to skip-solid, with one solid ending and other starting around the skip as desired, without restarting the skip cycle.

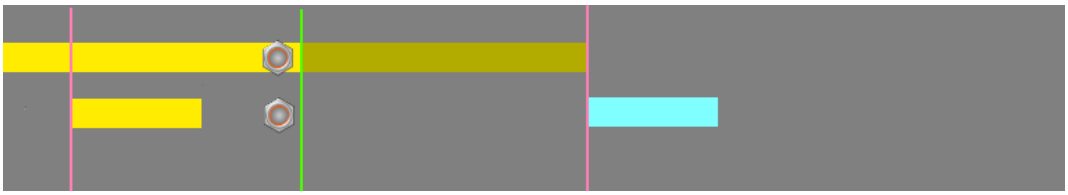
Important Note!

This feature is compatible with patterns that use the Centerline Dropout feature, such as solid-skip-solid to solid-skip-off or off-skip-solid to solid-skip-solid.

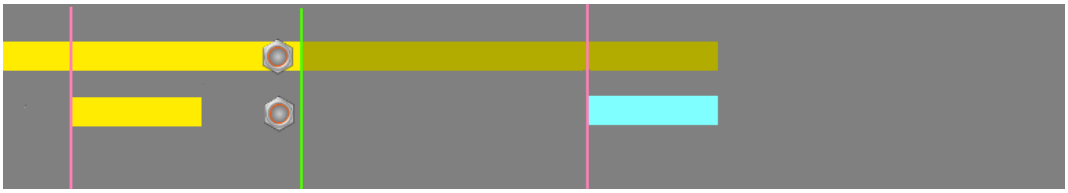
Any solid guns that are either on or waiting to turn off due to the assigned alignment behavior will continue painting. Once the 250 ms window has elapsed without another skip gun present, the system will allow one final cycle to complete. This allows the user to turn off any solid guns that are still on and have them all end aligned together. In the images below, this final cycle is denoted with a blue skip. This final skip will not be painted on the road and is only used for determing solid alignment.

If the final skip completes and there are still solid guns on, then any end solid events that take place will use the rule specified in Example 6. Any start solid events that occur after the final skip completes will use the rule specified in Example 1.

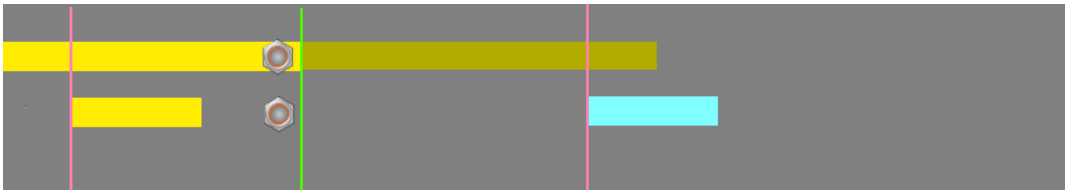
Example 11: **End Behavior = Immediate** The solid gun will turn off immediately with the pattern switch position change.



Example 12: **End Behavior = Start of Skip** The solid gun will not turn off until the start of the upcoming final skip.



Example 13: **End Behavior = End of Skip** The solid gun will not turn off until the end of the upcoming final skip.



Example 14: **End Behavior = Middle of Skip** The solid gun will not turn off until the middle of the upcoming final skip.