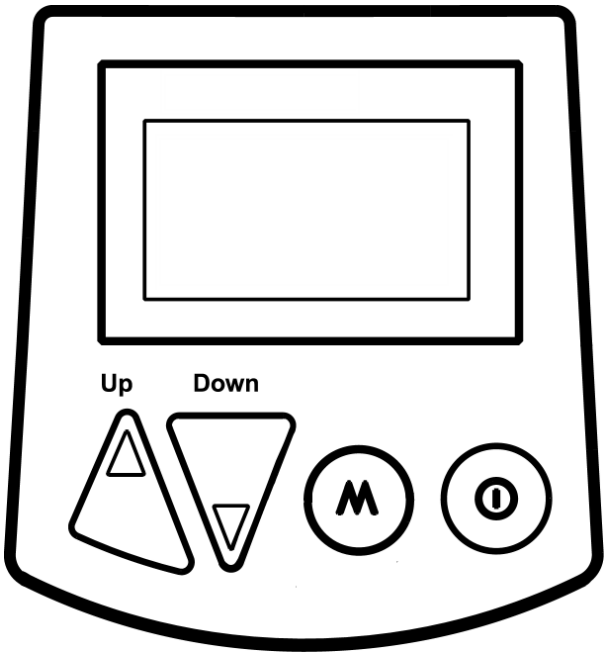
USER MANUAL



Autoline 410
Standalone Roadmarking Controller

Rev 2.1

Table of Contents

Safety Information

Please read the following safety information. Equipment misuse can cause equipment malfunction resulting in serious injury.

- Read and understand all manuals, wiring diagrams, and any other supporting documentation provided in full before installing or operating the equipment.
- A suitably qualified technician must carry out installation.
- This equipment is for professional use only. All operators must be suitably qualified and trained to use the equipment.
- Use the equipment only for its intended purpose. Contact the manufacturer or distributor if you are unsure of any aspects of installation or operation.
- Do not alter or modify this equipment. Installation and wiring must be strictly in accordance with the instructions provided within the manuals, wiring diagrams, and any other supporting documentation provided.
- The Autoline controller must be mounted in a safe position where it is easily visible and will not interfere with the operator's view of the road.
- Check equipment routinely. Repair or replace worn or damaged parts immediately.
- Comply with all applicable local, state, and national fire, electrical, and safety regulations.
- To avoid serious injury or equipment damage the Autoline controller must be disconnected whenever servicing any part of the roadmarking machine.
- Operators of equipment must at all times follow occupational health and safety protocols issued by their organization.

Introduction

The Autoline 410 roadmarking controller provides an electronic means of controlling pattern generation of roadmarking operations.

This product range is suitable for paint, thermoplastic, and cold-applied plastic applications.

Features:

- Quick pattern selection
- Can paint 1 or 2 lines simultaneously – useful for barriers
- 2 outputs with offsets to help improve beads coverage over paint (single line applications only)
- 2 trigger inputs – useful for quickly changing between two patterns
- Adjustable line length compensation
- Latch mode provides semi-automatic operation – useful for re-marking applications
- Look ahead triggering
- ReSync Cycle feature retards/advances pattern cycle during re-marking applications
- Full graphic display with continuous speed readout in metres or feet
- Speed alarm function
- Suitable for profile/vibraline applications
- Adjustable spot marking mode
- Layout wizard
- Automatic calibration wizard
- Bulit-in user pattern for field programming
- PC utility available to edit patterns

Specifications

Power Supply:	9-30VDC
Operating Temperature:	-5 to 60 deg C (23 to 140 deg F)
No. Sensor Inputs:	1 Input (speed)
Sensor Input Polarity:	Negative switched (NPN) or Positive switched (PNP)
No. Trigger Inputs:	2 Inputs
Trigger Input Polarity:	Negative switched (NPN) or Positive switched (PNP)
No. Outputs:	2 Outputs
Output Polarity:	Positive switched (PNP)
Output Current (max):	3.5A
Display Type:	Transflective LCD
Dimensions (W x H x D):	104mm x 112mm x 24mm (4.1in x 4.4in x 0.9in)
Enclosure:	ABS
Sealing:	IP65, NEMA4 Compliant (not including cable entry)

Notes:

Refer to the wiring diagrams for further electrical information.

Installation

Mounting:

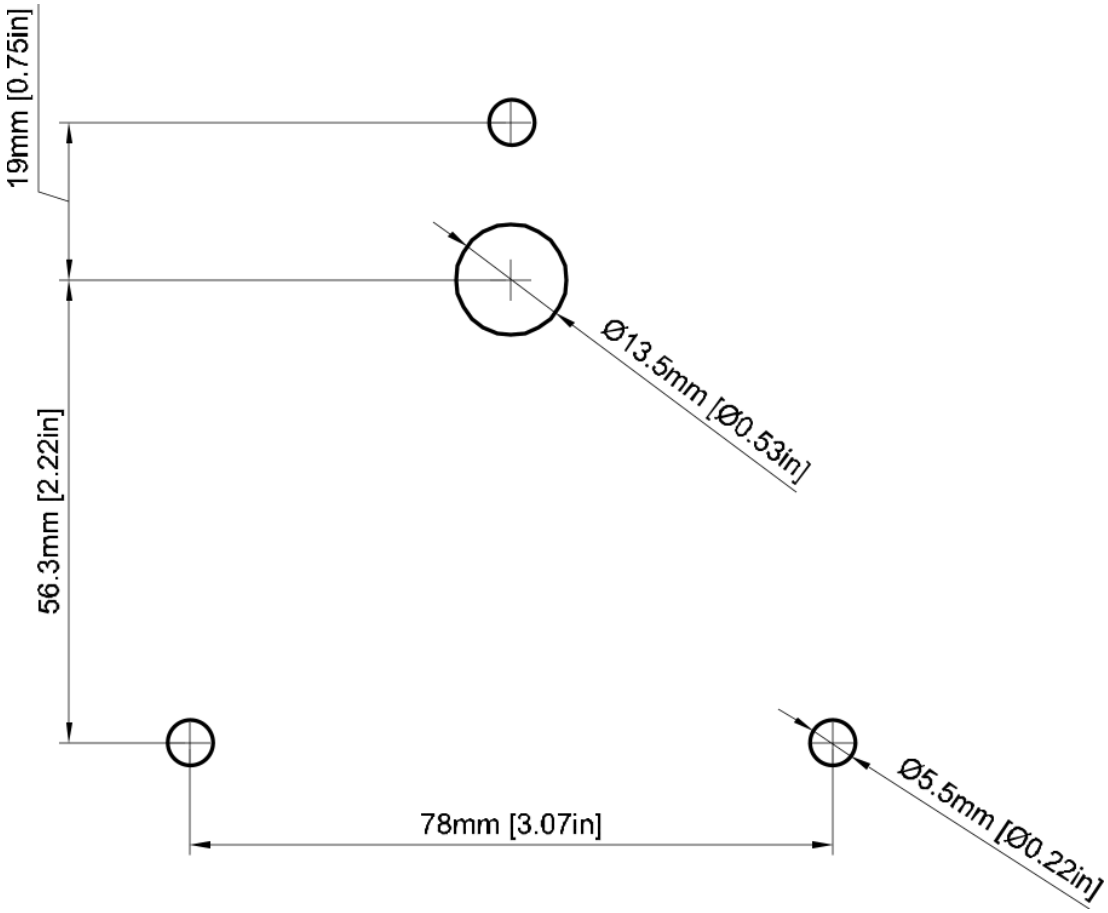
The Autoline controller should be mounted in a location where the operator can view the screen and touch the keys with ease.

The Autoline controller should be mounted on a flat surface. The mounting fasteners should be finger tightened. See below for mounting drill guide.

Available as an option is the Autoline Mounting Kit, this includes a mounting plate and a RAM-Mount (P/N: RAM-B-102U-A). Alternative mounting options are available.

The enclosure is rated to IP65 sealing (NEMA4 compliant), except for the rear cable wire entry. This allows the unit to be subjected to low pressure water jets without any harmful ingress of water. The rear cable entry allows the enclosure to breathe and dispel moisture.

Mounting Drill Guide:



Wiring Installation:

Refer to wiring diagram for installation wiring.

Speed Sensor Installation:

See specific manual chapters for installation details relating to the speed sensor. Other information may be located in the wiring diagram and supporting documentation.

Trigger Installation:

See specific manual chapters for installation details relating to the triggers. Other information may be located in the wiring diagram and supporting documentation.

Static Strap:

It is recommended that a static strap be fitted to the vehicle to prevent ESD (electrostatic discharge) damaging electronic devices.

Welding Warning:

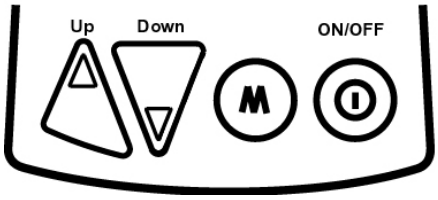
All electronic devices must be completely disconnected before any welding is carried out on the vehicle. Welding can cause severe damage to sensitive electronic devices.

Excessive Transient Voltage Warning:

All electronic devices must be completely disconnected in the event of servicing to the equipment that has the potential to develop excessive transient voltages that can cause severe damage to sensitive electronic devices. Examples of such events are welding, jump-starting batteries, servicing alternators etc.

Main Operation

Menu Access & Navigation:



ON / OFF:

- Turn the Autoline controller ON by pressing and releasing the key.
- Shut down (OFF) the Autoline controller by pressing and holding the key for 3 seconds.

Setup Menu Access:

- Shut down (OFF) the Autoline controller by pressing and holding the key for 3 seconds.
- While holding the key down, press and release the key to enter the Setup Menu.

Operating Menu Access:

- Ensure machine is stationary and Autoline controller is idle.
- Press the key to enter Main Menu.

Menu Navigation:

- Navigate to the required setting using the keys.
- Use the key to select a menu item.
- Use the keys to make the adjustments.
- Press the key to confirm.
- Press the key to go back.

Setup Menu:

This menu is where most system settings are configured.

General:

Units:	Sets the measurement units as either Metres or Feet.
Speed Units:	Sets the speed.
Backlight:	Sets the backlight level of the display.
Auto power on:	Enables / Disables the automatic power on function.
Key beep:	Enables / Disables beeping when keys are pressed.
Factory defaults:	Reverts all setting back to factory defaults.

Speed Units:

Metric Options:	Km/h – Kilometres per hour Metres/h – Meteres per hour
Imperial Options:	Miles/h – Miles per hour Feet/h – Feet per hour

Calibration:

Manual:	Performs the manual speed calibration process.
Automatic:	Performs the automatic speed calibration process.
Input type:	Sets the input type as NPN or PNP.

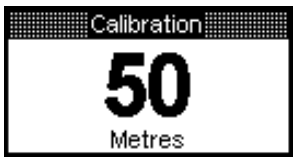
Manual Speed Calibration Process:

This setting allows the speed calibration value to be manually adjusted.

- Use the keys to make the adjustments.
- Use the key to save the adjustment and exit.

Automatic Speed Calibration Process:

- Accurately measure and mark out a calibration distance. Minimum of 30m (100ft) is recommended.
- Enter the correct calibration distance into the Autoline controller. Adjust distance setting if required.



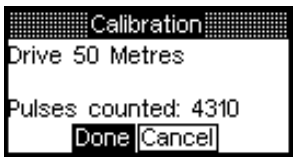
Use the keys to make the adjustments.

Use the key to continue.

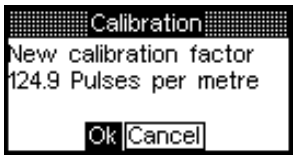
Continued on next page…

Automatic Speed Calibration Process – Continued…

- Position vehicle at the start of the calibration distance marked on the road.
- Either activate a trigger or press the (M) key to Start calibration.
- Drive the calibration distance. The pulse count will increase as the vehicle travels.



- Either deactivate the trigger or press the (M) key to Stop calibration when the vehicle reaches the end of the calibration distance.
- Use the (M) key to save the new calibration value and exit.

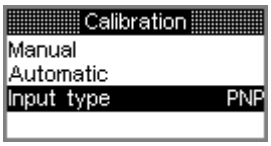


It is recommended to verify the entered calibration by checking the operation.

- *Example:* The system should measure a 100m distance if the vehicle travels 100m.

Input Type:

The Speed and Trigger inputs can be configured to be compatible with either NPN or PNP open-collector signals. NPN input type is recommended, and the default setting.



Painting Setup:

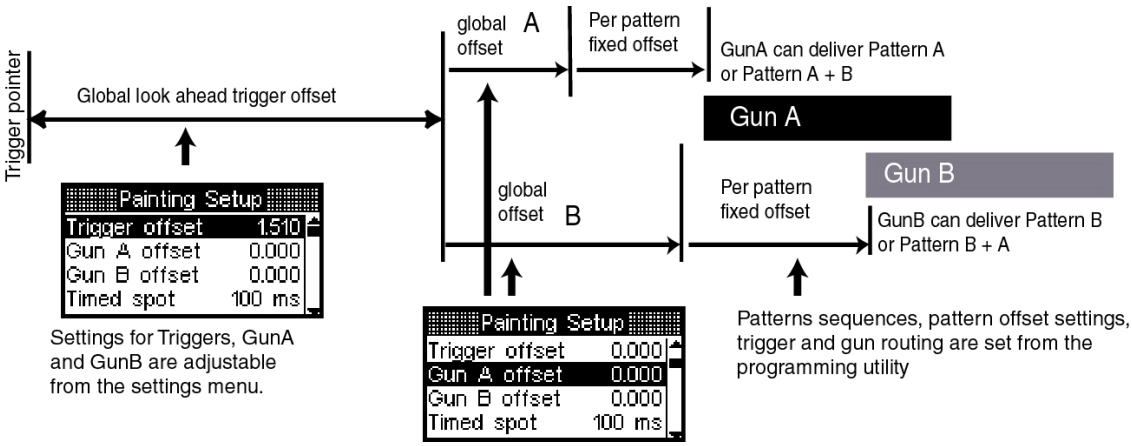
Trigger offset:	Sets the offset between when the trigger is activated and when the output is activated.
Output Offsets:	Sets offsets between outputs to help match material placement on road. Useful for matching placement of paint and beads.
Timed Spot Length:	Sets duration of time-based spots.
Distance Spot Length:	Sets length for distance-based spots.
Trigger latch enable:	Enable / Disables the Trigger Latch Mode.
Display accuracy:	Sets number of decimal places of speed display.
Target speed:	Sets the target speed for the Speed Alarm function.
Speed margin:	Sets the speed margin for the Speed Alarm function.
Minimum speed:	Sets minimum speed that system will allow marking.
Line Adjust Units:	Can be set as either distance-based or time-based.
ReSync resolution:	Sets the increment length for the ReSync Cycle function.
Distance count:	Configures distance measurement as Pattern or Applied.

Trigger Offset:

The Trigger Offset function allows for a distance-based offset between when the trigger is activated and when the output is activated. This is useful for look-ahead triggering, where the operator may be triggering from a pointer extended in front of the vehicle and several metres in front of where the guns are positioned.

The Trigger Offset value will be the distance between the operator's visual triggering point and the position of the guns.

The Trigger Offset enable allows the offset function to be enabled / disabled without having to clear the offset value.



Output Offsets:

The Output Offset function allows for a distance-based offset between when the pattern is activated and when the actual output is activated. This is useful for the matched placement of paint and beads.

Each output has an individual offset setting.

Example:

Paint gun on Output 1, Bead gun on Output 2.
Physical distance between guns is 500mm.
Output 1 Offset value = 0mm, Output 2 Offset value = 500mm.

Distance Spot Length / Timed Spot Length Setting:

Both these settings set the length of the spot pattern output.

- Distance-based spot patterns use the program script element “LS”.
- Distance-based unit is millimetres (mm) or feet.

- Time-based spot patterns use the program script element “S”.
- Time-based unit is milliseconds (ms).

It is recommended to edit this setting to adjust the spot length, rather than using the Line Adjust setting. This will maintain the correct Line Adjust setting for the line outputs.

Refer to the Autoline Pattern Editor Guide for further pattern program details.

Trigger Latch Mode:

Latch Mode latches ON the line outputs until the completion of the line pattern (if enabled in the pattern program). This semi-automatic functionality is useful for remark work and multiple line (barrier) applications.

During remark work the start of the line output can be triggered by momentarily activating the input trigger. The programmed line length will be outputted and stopped automatically at completion.

Multiple line (barrier) applications can be configured so multiple line outputs turn off together when deactivated. This provides the uniform line finish that is required in some applications.

The Latch Mode function is ignored by patterns containing only solid lines. This is because these patterns do not have a known end to the line.

Speed Display Accuracy:

Sets the number of decimal places of the speed display. The options are:

- [0]: No decimal place (e.g. 8km/hr)
- [1]: One decimal place (e.g. 8.4km/hr). Reverts to no decimal place over 20km/hr.
- [2]: Two decimal places (e.g. 8.42km/hr). Reverts to one decimal place over 10km/hr.

Display accuracy can be adjusted with the keys.

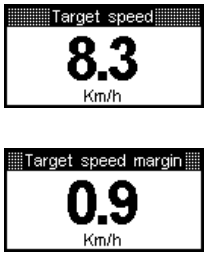
Speed Alarm Function:

This function is designed to assist with application rates and QA.

This function provides visual and audible alarms as the actual speed falls and exceeds the margin set for the target speed value.

This can be set to “off” or to a target speed value with the keys.

The allowed speed margin can be adjusted with the keys.



Example speed alarm results:

Minimum Speed:

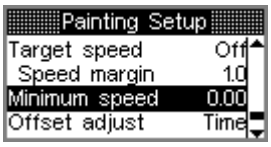
This setting determines the minimum speed required to allow marking of pattern outputs. If the speed falls below this threshold the 'Release Trigger" notification will be displayed.

Default setting is 0.5km/hr (0.5 Miles/hr).

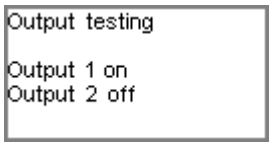
Minimum Speed setting can be adjusted with the keys.

The gun outputs can still be tested at zero speed if the minimum speed setting is greater than zero. This is useful to check gun operation, clear nozzle etc.

Stationary start can be allowed by setting the minimum speed threshold to zero. However the outputs will not be activated until the first speed pulse is detected.

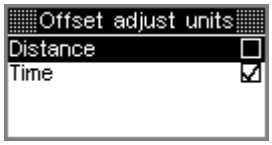


When minimum speed threshold is set to zero, the output testing page will have to be accessed from the operating menu.



Line Adjust Units:

Line Adjust can be set as either a distance-based (mm) or time-based (ms) value. Time-based adjustment gives an adjustment independent of the vehicle speed and is the recommended setting. Distance-based adjustment is a legacy option that provides a constant adjustment based on speed pulses.



ReSync resolution:

The increment length for the Cycle ReSync function is entered into this setting. Each key press during Cycle ReSync use will be incremented by this length.

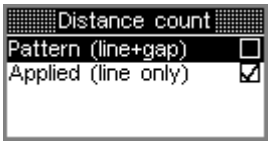
Example:

If ReSync resolution set to 30mm, and Cycle Resync function has the UP key pressed 3 times, the total Cycle Resync distance will be +90mm.

Distance count:

The distance count for pattern cycles can be selected to count in two modes:

Pattern (line + gap)
Applied (line only)



About:

Displays software version details and serial number.

Operating Menu:

This menu can only be accessed when the machine is stationary and the Autoline is idle.

Line Adjust:

Line Adjust setting compensates for mechanical delays within the system by increasing / decreasing the line length output slightly. The mechanical delays are be introduced by the air system, solenoids, and guns etc.

Line Adjust can be set as either a distance-based (mm) or time-based (ms) value. Time-based adjustment gives an adjustment independent of the vehicle speed and is the recommended setting. Distance-based adjustment is a legacy option that provides a constant adjustment based on speed pulses.

There are two methods to adjust the Line Adjust setting:

Adjust from menu:

- Use the keys to make the adjustments.
- Use the M key to save the adjustment and exit.

Adjust during operation:

At ant time while a pattern is selected:

- While holding the M key down, press the keys to make the adjustments.

Clear Counters:

Clear this pattern:

This clears to zero the distance counter for the current pattern selected.

Clear all patterns:

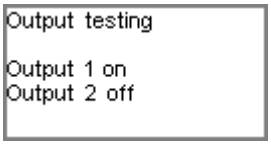
This clears to zero the distance counters for all patterns.

Layout Wizard:

Selecting the Layout Wizard changes operation mode from Normal Marking mode to the Layout Wizard mode. See page 17 for further details.

Output Testing:

This function allows the outputs to be tested in a stationary manner without a vehicle speed signal. This is useful for testing both trigger and output operation, and for unblocking the guns etc.



To test the outputs activate the corresponding trigger. The output will remain ON until the trigger is deactivated.

Trigger A activates Output 1
Trigger B activates Output 2

If the Minimum Speed Threshold in the Painting Setup sub-menu is NOT set to zero, then the output testing function can also be accessed from the normal marking mode operation without having to enter the menu. This can be by achieved by simply activating the triggers when the vehicle is stationary (speed is zero).

Edit User Pattern:

The User Pattern allows the operator to enter customs patterns in the field. This function can be accessed through the operating menu.

For further details see the Pattern Editing section on page 19.

Normal Marking Mode Operation:

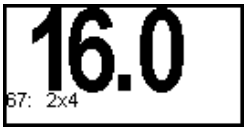
Pattern Cycle Select:

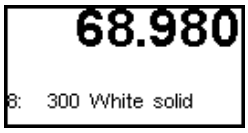
Patterns cycles can be browsed and selected while the Autoline controller is idle.

- Use the keys to select pattern cycles.

Display Modes:

If the vehicle is stationary (speed is zero) the screen will always display the distance counters for the pattern cycles.





If the vehicle is moving the screen can toggle between the speed value and the distance counters being displayed.

- Press the key to toggle between speed display and distance counter display.

Marking Operation:

Basic marking operation as follows:

1. Select a pattern cycle.
2. Drive vehicle at required application speed.
3. Activate trigger to start line outputs. Deactivate trigger to stop line outputs.

When a pattern is active, the ID number will be highlighted.

Press the key to cancel marking immediately.

Resync Cycle:

The Cycle ReSync function is used during re-painting to advance/retard the pattern cycle so the placement of outputted lines matches over the existing lines on the road.

This function can only be used when the trigger is activated.

Use the keys to set the Cycle ReSync distance.

Multiple key presses will increase the distance in accordance with the ReSync Resolution setting.

The Cycle ReSync will only be effective for the next line. After the next line has started the Cycle ReSync distance will be reset to zero.

Trigger Latch Mode:

Latch Mode latches ON the line outputs until the completion of the line pattern (if enabled in the pattern program). This semi-automatic functionality is useful for remark work and multiple line (barrier) applications.

During remark work the start of the line output can be triggered by momentarily activating the input trigger. The programmed line length will be outputted and stopped automatically at completion.

Multiple line (barrier) applications can be configured so multiple line outputs turn off together when deactivated. This provides the uniform line finish that is required in some applications.

The Latch Mode function is ignored by patterns containing only solid lines. This is because these patterns do not have a known end to the line.

Line Adjust:

Line Adjust setting compensates for mechanical delays within the system by increasing / decreasing the line length output slightly. The mechanical delays are be introduced by the air system, solenoids, and guns etc.

Adjust during operation:

At ant time while a pattern is selected:

- While holding the M key down, press the keys to make the adjustments.

Notifications:

Release trigger:

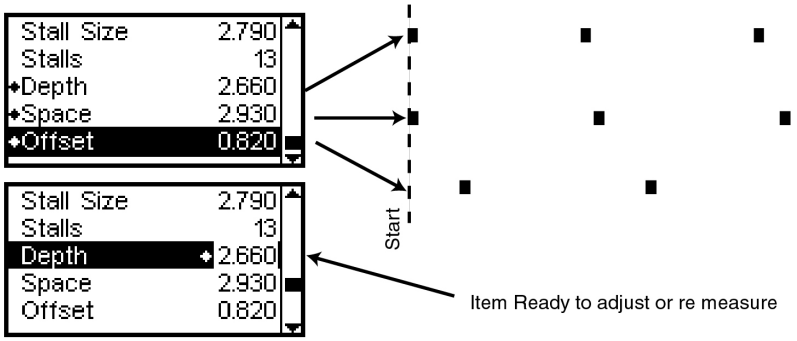
A trigger input is currently activated when the system does not allow trigger activity. The most common cause of this is when the painting activity has been disabled due the vehicle speed falling below the minimum speed threshold.

Layout Wizard Mode Operation:

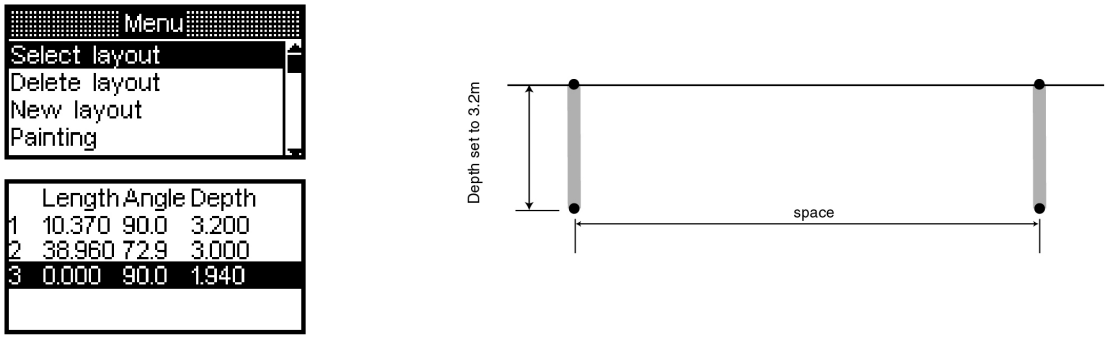
The layout wizard creates and stores up to five layouts which may be reused or edited at any time. The two main types of layout these are designed for straight and angle parking bays. General purpose spotting of any size can be done using the Depth spot.

The three spot pattern lines showing a indicator dot are available to operate at the distance showing.The offset pattern has a calculated gap for angle parking use, see layout3 below.

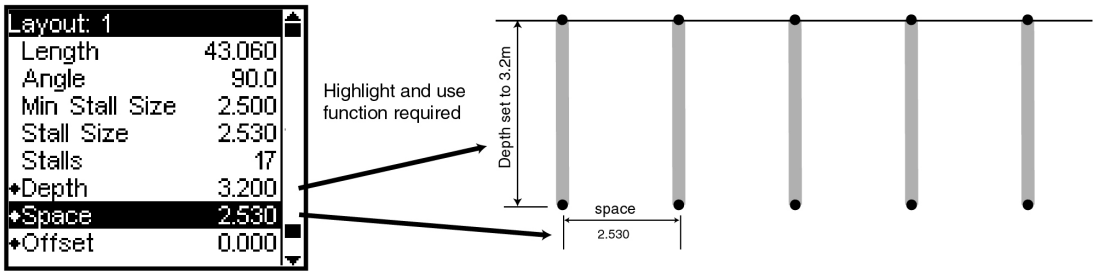
length, depth and offset and can be edited by pressing ⊙ and using the arrow keys or can be re-measured by pressing the trigger and running the vehicle along the ground then releasing the trigger.



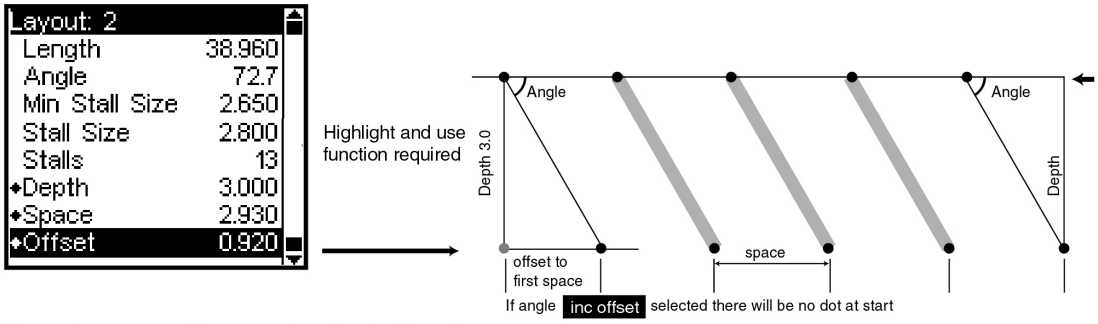
Examples



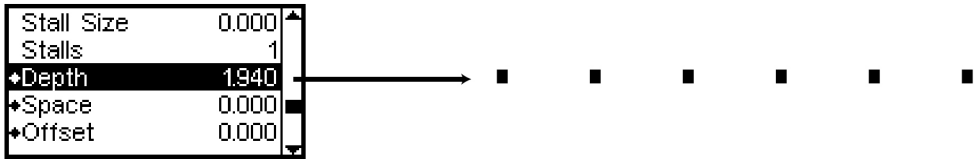
Straight parking example, angle set to 90



Angle parking example angle set to 72.7



General purpose spotting example using depth spots



Setup Checklist:

This checklist helps outline the required steps for a standard setup.

Installation:

- Ensure system components are installed and wired correctly.
- Refer to wiring diagrams.

Sensor Calibration:

- Ensure the speed calibration procedure has been carried out.
- Ensure the calibration values have been verified.

Outputs:

- Ensure all outputs activate the intended guns.

Marked Pattern Module Length:

- Mark at least four modules of a line+gap pattern (e.g. 3m line, 9m gap) in a straight line, at a constant and typical marking speed.
- Measure from the start of the second line to the start of the third line, and the start of the third line to the start of the fourth line. The first line is not used for checking in case there is a sticking gun etc.
- The distances measured should be equal to the line+gap sum of the pattern. This further validates that the speed calibration is correct and the system is measuring distance correctly.

Set Line Adjust:

- Measure the length of the second, third, and fourth lines marked.
- Compare these lengths with the required pattern length.
- Use the Line Adjust setting to increase / decrease the line length. This will compensate for the mechanical delays within the system.
- Mark another set of four modules and measure new line lengths.
- Repeat process until line length matches required pattern length.

Note:

Check the air system, solenoids and guns if consistent line lengths cannot be achieved. Ensure the air hoses going from the air solenoids to the guns are kept to a minimum length. Ensure installed air hoses installed have a suitable aperture. Ensure that the air pressure is stable. Check operation of guns.

Set Spot Length (if applicable):

- Mark out at least two spots at typical marking speed.
- Check spot length of second spot. The first line is not used for checking in case there is a blockage in the gun etc.
- Adjust spot length setting as required.

Set Trigger and Output Offsets (if applicable):

- Set required offset values.
- Mark some line output.
- Check line application to ensure offset value set is correct.
- Adjust and re-check where necessary.

Pattern Editing

It is possible to edit, add, or remove patterns by using either the PC based Pattern Editor program or the built-in pattern editing function.

PC Based Pattern Editor Program:

Introduction:

The PC based Pattern Editor program can generate and save pattern files. These files can then be loaded onto the Autoline controller via the Autoline-USB cable connected to a PC. The Pattern Editor can also be used as a means of updating the software in the Autoline unit.

Operation:

The VX10 Pattern Editor has the following capabilities:

- Generate new or modify existing pattern files.
- Create line patterns using the pattern programming elements (e.g. L3G9C).
- Configure trigger inputs.
- Configure outputs.
- Enable trigger latching.
- Update Autoline software.

Refer to the Autoline Pattern Editor Guide for further information.

Built-In User Pattern Function:

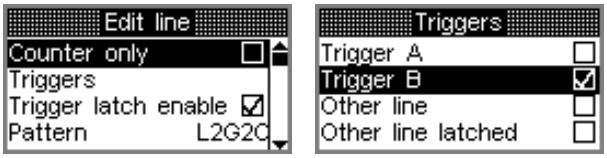
The User Pattern allows the operator to enter customs patterns in the field. This function can be accessed through the operating menu.

Line Configuration:

Two individual pattern generators exist, Line 1 and Line 2. Each line can be edited separately.

Combine measurements checkbox:

The pattern generators can have separate counters for distance measurement, or have the measurement combined into a single counter.



Counter only checkbox:

Selecting counter only will produce a pattern with incremental counting functionality (1,2,3,4…), there are no outputs enabled. This is useful for counting events such as RRPMs, pedestrian crossings etc.

Triggers Configuration:

Select the trigger input/s required to activate the pattern generator. Line 2 has the additional options of cascading off Line 1, where the pattern generator can be activated from the other line being active. This is useful for thermoplastic applications using profile / vibraline.

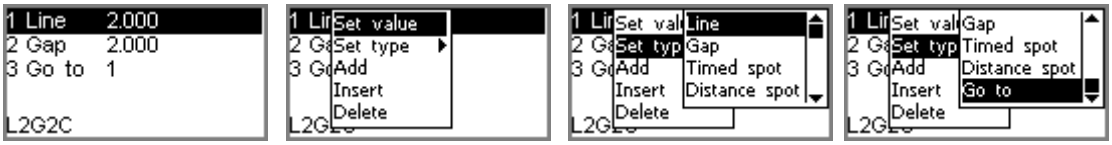
'Other Line Output':
This is useful in thermoplastic tactile applications, where one line may be a slave of the other. The slave line will only be activated if the master line has an active output.

'Other Line Latched':
This is useful in multiple line (barrier) and thermoplastic tactile applications, where one line may be a slave of the other. The slave line will be activated if the master line is active, this includes when both line or gaps are being outputted.

Trigger latch enable checkbox:

The trigger latching checkbox enables the pattern to operate in semi-automatic mode.

This mode latches ON the line outputs until the completion of the line pattern (if enabled in the pattern program). This semi-automatic functionality is useful for remark work and multiple line (barrier) applications. The 'Trigger Latching Mode' needs to also be enabled in the 'Painting Setup' menu of the Autoline controller.



Pattern Generator Program:

The pattern program can be edited by adding elements and editing their values. Elements can be added, inserted, or deleted. Select each element to modify value or type.

Following is a table outlining the basic pattern programming elements.

Element	Description	Details
L	Line	Line generation. "L" element is followed by line length (e.g. L3).
G	Gap	Gap generation. "G" element is followed by gap length (e.g. G9).
LS	Distance Spot	Distance spot generation. Length is dependent of spot length setting in the Autoline controller setup menu.
S	Timed Spot	Time spot generation. Duration is dependent of spot length setting in the Autoline controller setup menu.
C	Continue / Go To	This element is used to define a jump in the pattern generation. Normally is used on the end of the pattern program to jump back to the start.

Note:
Pattern program lengths apply to the unit setting of the Autoline controller. So a L3 will be 3m if Metric units are selected, or 3 feet if Imperial units are selected.

Following is a series of pattern program examples to show the use of the pattern programming elements:

L
Generates an indefinite line output. Used for solid line generation.

G
Generates an indefinite gap output. Used for measurement patterns that require distance measurement but no output generation. Also used in counting patterns.

L30
Generates a 30m line, and then STOPS.

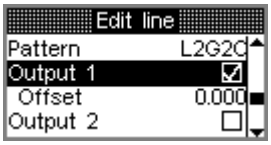
L3G9C
Generates a 3m line, a 9m gap, and then continues with a 3m line, a 9m gap, and so on…

LSG12C
Generates a distance-based spot, a 12m gap, and then continues with a spot, a 12m gap, and so on…

L3G4.5LSG4.5C
Generates a 3m line, a 4.5m gap, a distance-based spot, a 4.5m gap, and then continues with a line, a gap, a spot, a gap, and so on…

Note:
The following example shows how the "C" element can be used to jump to a program location other than the start. This is done by defining the required element number for the continue point (the first element being number 1).

G9L1G1C2
Generates a 9m gap, a 1m line, a 1m gap, and then jumps back to the 1m line, 1m gap, 1m line, 1m gap, and so on…



Output configuration:

Select the output/s that are required to be activated by the pattern generator. None, one, or both output/s can be configured for each pattern generator.

An output offset can also be configured. These offsets are additional to the offsets set in the painting setup menu.

The offset provides a permanent distance offset so the output will not activate for a defined distance after the pattern has been activated. This is for advanced use only. These offsets are additional to the output offsets configured in the painting setup menu, which provide better flexibility to the operator.

Speed Sensors

For accurate line measurement the recommended minimum speed signal resolution is:

Metric: 100ppm (pulses per metre). This provides a line accuracy of +/- 10mm.
Imperial: 30p/ft (pulses per foot). This provides a line accuracy of +/- 0.033ft.

For more accurate line requirements a sensor with greater resolution should be used.

The speed input can either be an NPN or PNP open-collector signal, depending on the 'Input Type' selection found in the 'Calibration' sub-menu. NPN input type is recommended, and the default setting.

Refer to wiring diagrams for installation wiring.

There are various sensor options available to generate accurate vehicle motion pulses. Following are examples of possible options:

5th Wheel Encoder:

- This type of sensor is fitted so it runs along a tyre of the vehicle.
- Typical pulse resolution options include 100ppm (30p/ft), 200ppm (60p/ft), 400ppm (120p/ft).

Gearbox Encoder:

- This type of sensor is installed into the speedometer cable port of the gearbox.
- Typical pulse resolution is 100ppm (30p/ft).

Digital Multiplier:

- This device connects to the vehicle's onboard electronic speed signal, and multiplies the output resolution so that it is suitable for roadmarking use.
- Multiplication factor options include x8, x16, x32.

Drive-Shaft Collar:

- This consists of a sensor such as a proximity or hall-effect sensor mounted to detect movement from a gear-toothed or magnetic disc mounted to the drive shaft.

Further technical information and installation details are available. Contact the manufacturer or distributor.

Triggers

Trigger inputs use mechanical switches to activate marking outputs. These are typically mounted in a convenient location for the operator to use.

The trigger inputs can either be an NPN or PNP open-collector signal, depending on the 'Input Type' selection found in the 'Calibration' sub-menu. NPN input type is recommended, and the default setting.

Refer to wiring diagrams for installation wiring.

Either standard trigger switch assemblies from the manufacturer can use used, or a custom trigger switch assembly can be made. Contact the manufacturer or distributor for options.

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12 Month Limited Warranty:

Novo Innovation Ltd warrants only to the purchaser of the Product from Novo Innovation Ltd (the "Customer") that the product purchased from Novo Innovation (the "Product") will be free from defects in materials and workmanship under the normal use and service of which the Product was intended for a period of 12 months from the date of purchase of the Product by the Customer. The Customer's exclusive remedy under this Limited Warranty shall be the repair or replacement, at Novo Innovation Ltd's sole option, of the Product, or any part of the Product, determined by Novo Innovation Ltd to be defective.

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Obtaining Warranty Service:

If the Product was purchased from a Distributor, please contact that Distributor to obtain a Returned Material Authorization (RMA). If the Product was purchased directly from Novo Innovation Ltd, please contact us direct at peter@novoinnovation.co.nz or +64 9 419 1219.

Customer shall prepay shipping charges for Products returned to Novo Innovation Ltd for warranty service and Novo Innovation Ltd shall pay for return of Products to Customer. However, Customer shall pay all shipping charges, duties and taxes for Products returned to Novo Innovation from outside New Zealand.

Appendix A:
Software Update & Revision History

Software Update Capability:

The Autoline controller can have the software updated through the use of the PC based Autoline Pattern Editor program. The Autoline controller is connected to the PCB via the Autoline-USB cable.

Please refer to the Autoline Pattern Editing Guide for further details on the software update capability.

Software Revision History:

Version	Release Date	Comments
1.48	13-09-2012	First release. Autoline 410 succeeds Autoline 400.

Appendix B:
Document Revision History

Revision	Release Date	Comments
2.1	13-09-2012	First release.

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