Nordson Corporation

OPERATOR'S CARD

P/N 1017461C

Sure Coat® Triggering Controller

Operator Interface

WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

The operator interface consists of an LCD and eight keys. Use the interface to program and operate the triggering controller.

Edit/Configure Keys			Operation Keys		
Key	**Function**	**Press to:**	**Key**	**Function**	**Press to:**
MODE	**Mode**	toggle modes: run, language, setpoint adjustment, and configure.		**Auto**	put controller in automatic mode. Spray guns triggered according to controller settings and signals received from sensors and encoder.
+ SELECT −	**Select + and -**	navigate through mode menus, or to increase or decrease values when in edit mode.		**Manual**	put controller in manual mode. Spray guns triggered continuously.
OK	**OK (Enter)**	to enter edit mode, again to set value and exit edit mode.		**Off**	turn off spray guns. Controller continues to monitor parts moving through booth.
	Undo	cancel value change and exit the edit mode.			

Accessing and Changing Controller Settings

Accessing Configuration and Setpoint Menus

1. Press the **MODE** key until the desired mode appears.
2. Press the **OK** key to enter the mode.
3. Press the **SELECT+** or **SELECT-** keys to toggle through the mode menus.

Changing Menu Settings

1. Press the **OK** key to enter edit mode. **EDIT** appears next to the menu label. The value you are editing will flash while you are in the edit mode.
2. Press the **SELECT+** or **SELECT-** keys to change the value displayed below the menu label.
3. If you change a value but then decide to revert to the old value, press the **UNDO** key. This key only works while you are in edit mode.
4. Press the **OK** key to accept the value and exit edit mode.

Changing Interface Language

NOTE: The default interface language is English.

1. Press the **MODE** key until **SELECT LANGUAGE** appears.
2. Press the **OK** key to enter edit mode. The currently selected language appears.
3. Press the **SELECT+** or **SELECT-** keys until the desired language appears.
4. Press the **OK** key to set the change and exit the edit mode.

Configuring the Triggering Controller

The triggering controller must be configured and calibrated before trigger setup.

Configuration Steps

Menu Item	Default	Parameters and Functions
English/Metric	English	Choose English or Metric units.
Encoder Scale	1:1	Choose 1:1 or 1:2 encoder scale. Determines unit of movement per encoder pulse. If set to 1:2, encoder signal is split so that one unit of movement is equal to two encoder pulses, allowing finer resolution and more precise triggering.
Clocking Method	Encoder	Choose Encoder or Timer. Timer is an internal clock. If you choose Timer, the conveyor interlock is automatically enabled and cannot be disabled. The conveyor interlock circuit must be connected when the timer is used.
User Conveyor Speed	0.0 ft/min or m/min	Enter speed of conveyor, in feet or meters per minute. Used for Timer operation only, do not set if encoder is used.
Encoder Alarm	Time 5.0	The Encoder Alarm can function in either of two ways, depending on how the External Interlock menu item is set: **External Interlock Enabled:** The encoder alarm is a delay (in seconds) between the time the encoder stops pulsing and when an alarm message appears on the display. Do not set this value to zero; doing so will cause the trigger controller to malfunction. To disable the alarm set this value to a large number. **External Interlock Disabled:** The encoder alarm function is an encoder pulsing stopped monitor. Refer to *Encoder Pulsing Stopped Monitor* for setup instructions.
Sensor Alarm	Time 90.0	Enter number of seconds after last sensor signal is received before alarm message appears. Indicates sensor fault or photoeye-to-reflector misalignment.

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Menu Item	Default	Parameters and Functions
Sensor 1-4 Filters	0.0 dly/ext	Enter positive number to extend sensor signal, negative number to delay signal. Extend signal to eliminate signal chatter when coating wire goods, delay signal to skip hangers.
Outputs	4	Choose 4, 6, or 8 trigger outputs. Use 4 or 8 for Sure Coat Modular Gun Control System, 6 for Sure Coat Mini Stack System, and 4, 6, or 8 for Versa-Spray systems.
Trigger 1-8 <-> Sensor 1-4	-	See Figure 1. Connect trigger outputs to sensors. Any combination can be set. In the example shown, each output triggers two spray guns. Outputs 1 and 2 spray one side of part, and outputs 3 and 4 spray other side. Part 1 triggers all four outputs, but part 2 only triggers outputs 1 and 3. **NOTE:** On the run menu, outputs 1-4 are shown as A-D in normal type, and outputs 5-8 are shown as A-D in reverse type.
Conveyor Run Delay	0.0	Enter number of seconds it takes for parts ahead of sensors to start moving after conveyor is started.
Conveyor Stop Delay	0.0	Enter number of seconds it takes for parts in booth to stop moving after conveyor is stopped.
External Interlock	Disable	Choose Disable or Enable. Can be disabled if encoder is used. If clocking method is set to Timer, then external interlock is automatically enabled and cannot be disabled.
Pickoff Setpoints	Show	Choose Show or Hide. When hidden, only Lead and Lag Setpoints are displayed in Setpoint Adjustment menus.

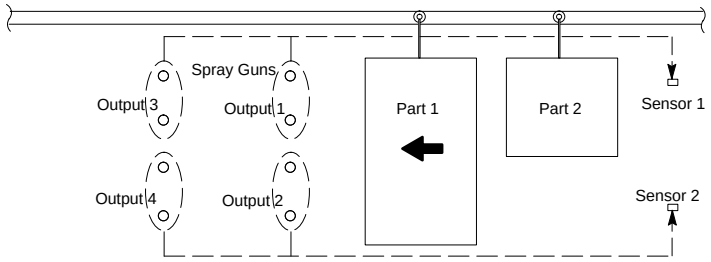

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Figure 1 Tying Outputs to Sensors

Encoder Pulsing Stopped Monitor

If your system does not have an external conveyor interlock, the triggering controller must monitor encoder pulses to indicate when the conveyor has stopped.

NOTE: This function only works if during the *Configuration* procedure you set the external interlock to Disabled.

To configure the monitor, set the encoder alarm value to a value that is slightly greater than the elapsed time between encoder pulses:

NOTE: If the conveyor speed changes as part of the daily operation, perform this procedure at the conveyor's slowest operating speed.

1. Set the Conveyor Run and Conveyor Stop delays to 0.0.
2. Start the conveyor. The encoder should be pulsing.
3. Press the Manual key to turn on the spray guns.
4. Decrease the Encoder Alarm delay value until the spray guns start to turn on and off repeatedly.

   NOTE: If the Encoder Alarm delay value is less than the time elapsed between encoder pulses, the spray guns will turn on and off repeatedly.
5. Increase the Encoder Alarm delay value (0.1 second at a time) until the spray guns spray continuously.
6. Add 0.2-0.4 to the Encoder Alarm delay value to make sure that the spray guns will not turn off if the conveyor speed varies slightly.

NOTE: The spray guns will turn off if the time between encoder pulses exceeds the Encoder Alarm delay value. The next time that an encoder pulse is received, the spray guns will turn on again.

Calibrating the Triggering Controller

1. Choose a test part. It can be a production part or a piece of cardboard. It will not be coated.
2. Measure the part length as it is hung on the conveyor. The measurement must be in real world units, so if you are scaling to inches measure in inches.
3. Enter **Configure controller** mode.
4. Make sure **Encoder scale** is set correctly.
5. Go to the **RESET Enc Counts** menu.
6. Press the **OK** key to enter edit mode.
7. Press the **Select+** or **Select-** key to reset the counts to zero.
8. Press the **OK** key to exit edit mode.
9. Hang the test part on the conveyor, ahead of the photoeyes.
10. Start the conveyor.

As the part moves through the photoeyes the controller measures it in counts. When the part passes by the photoeyes the scaling adjustment is set in the controller. This scale is displayed on the **RESET Enc Counts** menu.

11. Go to the **Encoder CAL** menu.
12. Press the **OK** key to enter edit mode.
13. Use the **Select+** and **Select-** keys to enter the length of the part you measured in step 2. The more accurate the measurement is, the more accurate the triggering will be.
14. Press the **OK** key to exit edit mode. The triggering controller is now scaled to real world units of inches or centimeters.

Setting Trigger Points

Triggering setup consists of determining and setting three values for each output: pickoff, lead, and lag. All values are entered in real-world units of inches or centimeters.

Finding Starting Pickoff Points

See Figure 2. The pickoff point is the distance from the sensors to the spray guns, measured in real-world units (inches or centimeters). Use this procedure to obtain a starting value for each bank of guns (outputs), then adjust it as necessary to obtain the desired accuracy.

NOTE: Once you have the pickoff points adjusted properly, you do not need to change them unless you move the sensors or spray guns. Pickoff points can be hidden once they are set, as described in *Configuration*.

1. Enter **Configure controller** mode.
2. Go to the **RESET Enc Measure** menu.
3. Press the **OK** key to enter edit mode.
4. Press the **Select+** key to reset the values.
5. Hang a test part on the conveyor, ahead of the photoeyes. Have another person stand behind the first bank of spray guns to tell you when the part reaches them, while you watch the **Measure** value.
6. Start the conveyor and note the **Measure** value when the leading edge of the part reaches the spray guns.
7. To determine the pickoff point for any other vertical banks of spray guns, either repeat this procedure, or measure from the first bank to the second and add the distance measured to the pickoff point for the first bank.

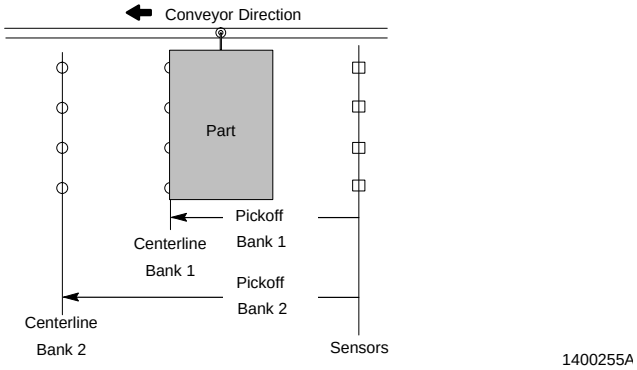

Figure 2 Finding Starting Pickoff Points

Calculating Lead and Lag Values

Value	Description	Positive or Negative Values
Lead	Lead is the distance from the spray guns to the leading edge of the part. The lead value can be positive or negative.	**Positive Lead:** Setting the lead to a positive value turns on the spray guns before the leading edge of the part reaches them. **Negative Lead:** Setting the lead to a negative value turns on the spray guns after the leading edge of the part reaches them.
Lag	Lag is the distance from the spray guns to the trailing edge of the part. Lag values can be positive or negative.	**Positive Lag:** Setting the lag to a positive value turns off the spray guns after the trailing edge of the part passes them. **Negative Lag:** Setting the lag to a negative value turns off the spray guns before the trailing edge of the part passes them.

Spray Patterns

Spray Pattern	Description
Restricted	Both the lead and lag values are negative. The spray guns turn on after the leading edge of the part passes them and turn off before the trailing edge passes them. This pattern prevents or limits powder wrap around the edge of the part.
Extended	Both the lead and lag values are positive. The spray guns turn on before the leading edge of the part passes them and turn off after the trailing edge passes them. This pattern allows powder to wrap around the edges of the part.

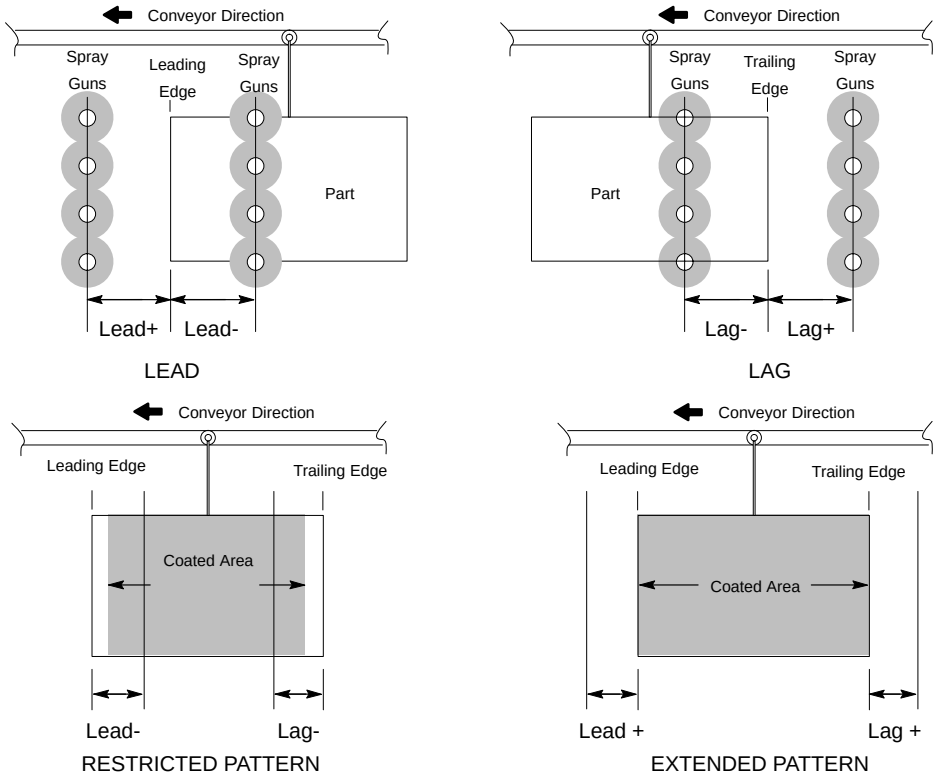

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Figure 3 Calculating Lead and Lag Values, Typical Spray Patterns

Setting Trigger Points *(contd)*

Error Factor Effect on Spray Patterns

The triggering controller has an error factor of one real-world unit. For example, if the controller scale is inches, the error factor is one inch. This factor can affect coverage if lead and lag values are not calculated properly.

The lead and lag values you set apply to all parts entering the booth. When setting lead and lag values make sure to take into account the error factor.

For example, if both lead and lag are set to -2 inches and parts five inches long or less are placed on the conveyor, they will not be coated. The lead and lag values subtract four inches from the length of part and the error factor subtracts the remaining inch, leaving a zero length to coat.

Entering Trigger Points

Use the following steps to enter pickoff, lead, and lag values for each trigger output.

1. Press the **MODE** key until **Setpoint Adjustment** appears.
2. Press the **OK** key to enter **Setpoint Adjustment** mode. The **Pickoff Output 1** menu appears. If it does not press one of the **Select** keys until it does.
3. Press the **OK** key to enter edit mode. Enter the **Measure** value from the *Finding Starting Pickoff Points* procedure. Press the **OK** key to accept the value and exit edit mode.
4. Press the **SELECT+** key to go to the **Lead Output 1** menu.
5. Press the **OK** key to enter edit mode. Use the **SELECT** keys to enter the desired lead value. Press the **OK** key to accept the value you entered and exit edit mode.
6. Press the **SELECT+** key to go to the **Lag Output 1** menu.
7. Press the **OK** key to enter edit mode. Use the **SELECT** keys to enter the desired lag value. Press the **OK** key to accept the value you entered and exit edit mode.
8. Press the **SELECT+** key to go to the **Pickoff Output 2** menu.
9. Repeat steps 3 through 8 to enter pickoff, lead, and lag values for the rest of the outputs.

Normal Operation

Operation Keys

Key	Function	Description
	**Auto**	Press the **Auto** key to put the triggering controller in Auto mode. The spray guns are triggered automatically according to the current trigger settings and the sensor and encoder inputs.
	**Manual**	Press the **Manual** key to put the triggering controller in Manual mode. The spray guns turn on and spray continuously as long as the conveyor runs.
	**Off**	Press the **Off** key to shut off the spray guns. The triggering controller continues to receive encoder and sensor signals and track parts.

Run Mode Display

See Figure 4.

While the system is operating, indicators on the display show sensor, output, and conveyor status.

Item	Indicator	Description
1	Sensor Status	Sensors 1-4 status is shown by the squares below the sensor number: ■ (Filled) = Part detected □ (Hollow) = No part detected
2	Output Status	On the run menu, outputs 1-4 are shown as A-D in normal type, and outputs 5-8 are shown as A-D in reverse type. Below each output letter is the output status indicator: I=On 0=Off
3	Conveyor Status	When the bar is rotating, the conveyor is moving. When the bar stops, either the signal from the encoder has stopped or the conveyor interlock circuit has signaled a conveyor stop.
4	Warning	Appears when one of the following conditions exist: • Conveyor interlock open • Encoder not pulsing • Photoeye blocked too long Press the Nordson oval to find out which condition exists.

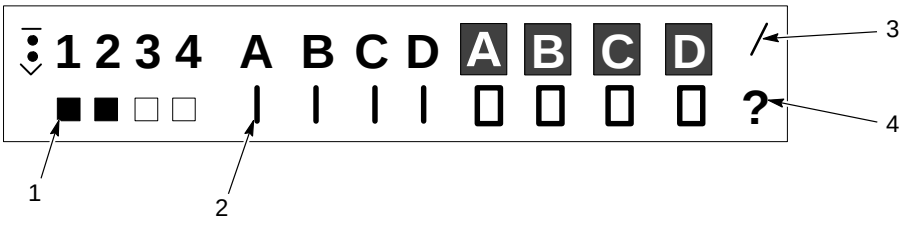

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Figure 4 Run Mode Display

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