Sure Coat® Modular Gun Control System

Part C:
Discrete I/O Interface Card

Customer Product Manual
Part 334660B
Issued 4/03

For parts and technical support, call the Industrial Coating Systems Customer Support Center at (800) 433-9319 or contact your local Nordson representative.

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Section C 1
Description

Introduction

The discrete I/O interface card allows the optional gun purge module and the triggering controller or an external PLC and to interface with the Sure Coat modular gun control system. The discrete I/O interface card is installed in slot 9 of the main control cabinet's card cage.

NOTE: Set points cannot be adjusted through the PLC.

The discrete I/O interface card allows the Sure Coat modular gun control system to perform the following functions:

- Purge guns
- Trigger guns individually
- Set all guns to F1/F2 at same time

NOTE: The Sure Coat triggering controller allows only gun triggering. The triggering controller cannot control purge or F1/F2 functions.

I/O Signals

The discrete I/O interface card uses 18 input signals and one output signal to control triggering and purging.

Signals	Function
Input	The discrete I/O interface card can accommodate up to 18 inputs from the triggering controller/PLC: sixteen for triggering guns, one F1/F2, and one gun purge.
Output	The discrete I/O interface card has one output that controls the purge panel's pilot air solenoids, which activates the gun purge module.

Terminal Functions

Refer to Table C 1-1 and see Figure C 1-3. Input and output wiring is connected to the terminal blocks on the front edge of the discrete I/O interface card.

Table C 1-1 Terminal Functions

Terminal	Type	Function	Terminal	Type	Function
1	N/A	Auxiliary common	15	Input	Gun purge
2	Input	F1/F2	16	N/A	Not used
3	Input	Trigger 15	17	Input	Trigger 16
4	Input	Trigger 13	18	Input	Trigger 14
5	Input	Trigger 11	19	Input	Trigger 12
6	Input	Trigger 9	20	Input	Trigger 10
7	Input	Trigger 7	21	Input	Trigger 8
8	Input	Trigger 5	22	Input	Trigger 6
9	Input	Trigger 3	23	Input	Trigger 4
10	Input	Trigger 1	24	Input	Trigger 2
11	N/A	Trigger common	25	Output	Gun purge (positive)
12	N/A	Chassis ground	26	Output	Gun purge (negative)
13	N/A	Not used	27	N/A	Not used
14	N/A	Not used	28	N/A	Not used

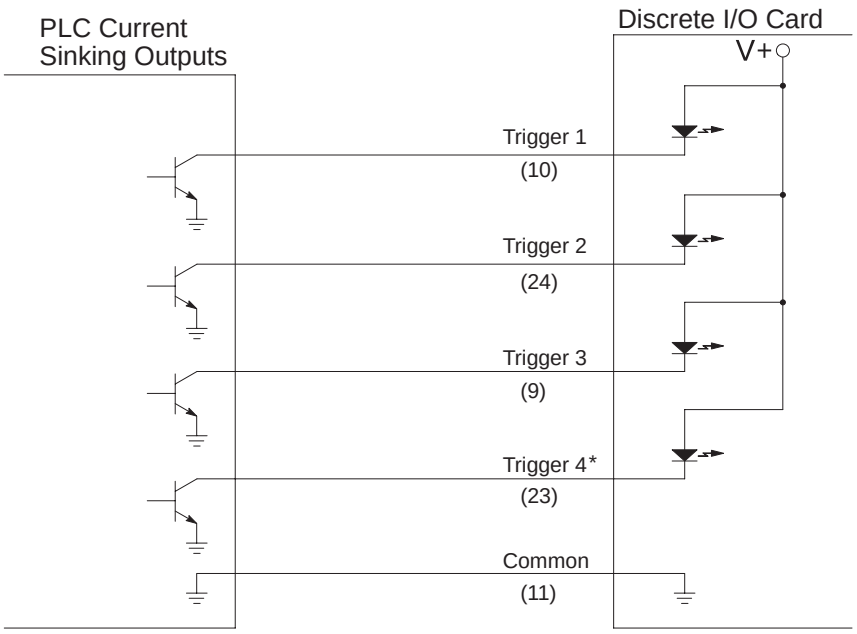
Theory of Operation

Triggering

The triggering controller/PLC activates the discrete I/O card's trigger inputs in response to information from photo eyes or switches. When the photo eyes sense a part, the triggering controller/PLC triggers the corresponding guns. When the part has passed the guns, the triggering controller/PLC turns off the guns to conserve powder.

The guns may be triggered individually or in groups through the triggering controller/PLC. Sixteen triggering controller/PLC outputs may be wired to the sixteen trigger inputs on the interface card. The triggering controller/PLC outputs may be either current sinking outputs or relay contacts.

Trigger Signal	Description
Current Sinking	See Figure C 1-1. One of the sixteen inputs activates when a triggering controller/PLC output sinks current from the trigger input through the triggering controller/PLC output to the common ground, causing the corresponding gun to trigger.
Relay Contacts	See Figure C 1-2. One of the inputs activates when a triggering controller/PLC relay contact closes, which shorts the corresponding input together to the trigger common pin. When a trigger input is shorted to the trigger common pin, the gun associated with the corresponding input is triggered.



*NOTE: Maximum of 16 trigger inputs.

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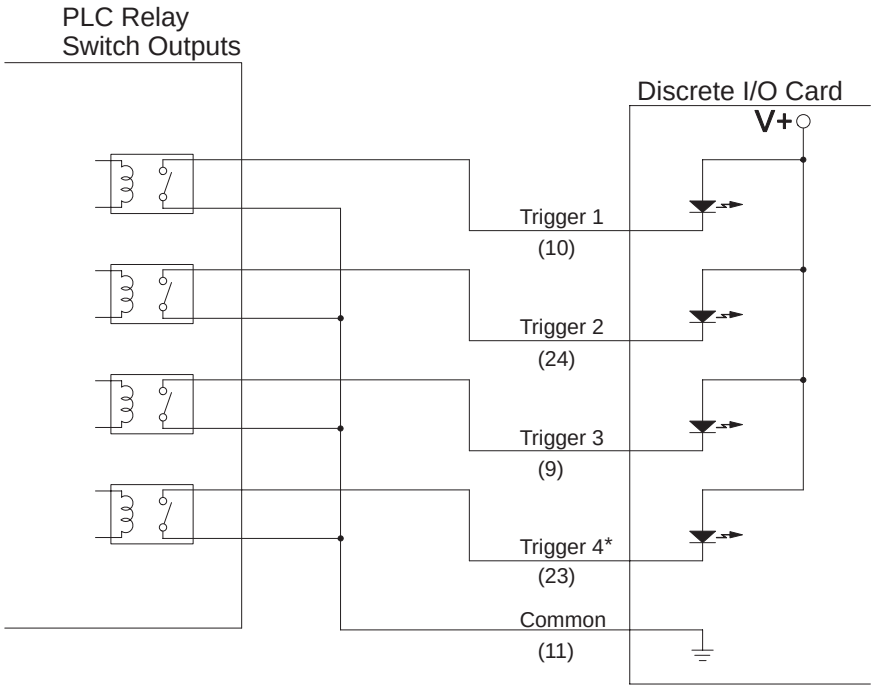
Figure C 1-1 PLC Current Sinking Operation Schematic



*NOTE: Maximum of 16 trigger inputs.

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Figure C 1-2 PLC Relay Contact Operation Schematic

Purging

The purge output is wired to the purge panel solenoid numbered 1. The central control unit sends a command signal through the interface card to the purge panel solenoid. The solenoid opens, sending a pneumatic signal to activate the gun purge module.

The gun purge output is activated by pressing the GUN PURGE key on the central control unit. The gun purge function remains active for as long as the operator presses the GUN PURGE key.

F1/F2

NOTE: The F1/F2 function is only available for systems that have three-gauge, F1/F2 pneumatic modules. The Sure Coat triggering controller cannot control F1/F2 functions.

The discrete I/O interface card allows the PLC to switch all guns in the system between two flow rate air settings.

The F1/F2 input activates when the PLC relay contacts close, which shorts the F1/F2 input together to the auxiliary input common pin. When the F1/F2 and auxiliary common pins are shorted together, all pneumatic modules switch to the F2 air pressure setting. The F2 air pressure setting remains active until the PLC separates the F1/F2 and auxiliary common pins. When the F1/F2 and auxiliary common pins are open, F1 is the active air pressure setting.

NOTE: The flow rate air settings must be adjusted on each individual gun's pneumatic module.

LEDs

The four LEDs on the discrete I/O interface card indicate system status.

Refer to Table C 1-2 and see Figure C 1-3.

Table C 1-2 LED Identification

Item	Color	Function	Meaning
1	Red	Fault	Lit when there is no communication with the central control unit
2	Green	Status	Flashes when communicating properly with the central control unit
3	Green	Power	Lit when power is applied to the card
4	Yellow	Service	Lit continuously: Bad node hardware Flashes once every 2 seconds: Power up/reset Flashes repeatedly: Watchdog timer resets occurring Flashes once every second: Node is unconfigured Flashes once, then off continuously: Normal at startup

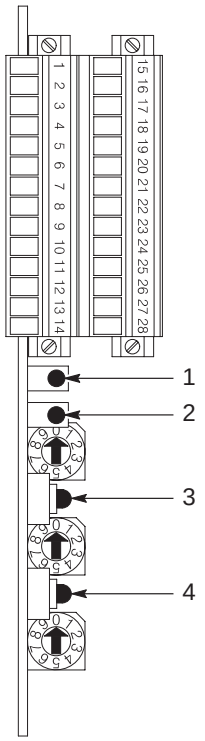

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Figure C 1-3 Discrete I/O Interface Card Components

Switches

There are three switches on the discrete I/O interface card. The Reset and Service switches are push-button switches; the Trigger Mode switch is a two-position switch.

Refer to Table C 1-3 for a description of the switches.

NOTE: See Figure C 1-3. The switches are located behind the dials. The Reset switch is closest to the top of the card. The Trigger Mode switch is toward the middle of the card.

Table C 1-3 Switches

Switch	Function
Reset	Resets the interface card
Service	Informs the system that new software is installed
Trigger Mode	Sets the input mode to either gun or group; allows either individual or group gun triggering

Specifications

Maximum Voltage:	26.4 Vdc
Maximum Current:	7.5 mA
Trigger/Auxiliary Input Type:	Current sinking, open collector/drain or relay/switch contact closure input
Input States:	Off: input high (open)
	On: input low (shorted to trigger input common)
Maximum On State Current:	5 mA
Maximum On State Voltage:	2.5 Vdc
Maximum Off State Current:	2 mA
Minimum Off State Voltage:	17.5 Vdc

Section C 2
Installation

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

WARNING: Risk of electric shock. Shut off and lock out system electrical power before performing the following procedures.

Introduction

This section explains the procedures necessary to install the discrete I/O interface card into a Sure Coat modular gun control system and connect it to a customer-supplied PLC. Disregard the *Installation* procedure if the discrete I/O interface card was installed at the factory.

NOTE: If your system has a triggering controller, refer to the *Sure Coat Triggering Controller for Sure Coat Modular Gun Control Systems* manual for more detailed installation information.

Installation

1. Open the main control cabinet door.

WARNING: This unit contains electrostatic sensitive devices (ESD). To prevent damage to ESD parts, wear a grounding wrist strap.

2. Orient the card in the position shown in Figure C 2-1.

   NOTE: The terminal blocks and dials must be facing the front of the main control cabinet.

3. Carefully slide the interface card into slot 9 of the main control cabinet's card cage.

Wiring

1. Make sure that the PLC and purge panel wiring is routed through the rubber grommet to the lower right of the card cage.
2. See Figure C 2-1. Connect the PLC and purge panel wires to the terminal blocks on the interface card in the sequence listed in Table C 2-1.

NOTE: Terminals 13, 14, 16, 27, and 28 are not used.

Table C 2-1 Wiring

Terminal	Function	Terminal	Function
1	Auxiliary common	15	Gun purge
2	F1/F2	16	Not used
3	Trigger 15	17	Trigger 16
4	Trigger 13	18	Trigger 14
5	Trigger 11	19	Trigger 12
6	Trigger 9	20	Trigger 10
7	Trigger 7	21	Trigger 8
8	Trigger 5	22	Trigger 6
9	Trigger 3	23	Trigger 4
10	Trigger 1	24	Trigger 2
11	Trigger common	25	Gun purge—Solenoid 1 (positive)
12	Chassis ground	26	Gun purge—Solenoid 1 (negative)
13	Not used	27	Not used
14	Not used	28	Not used

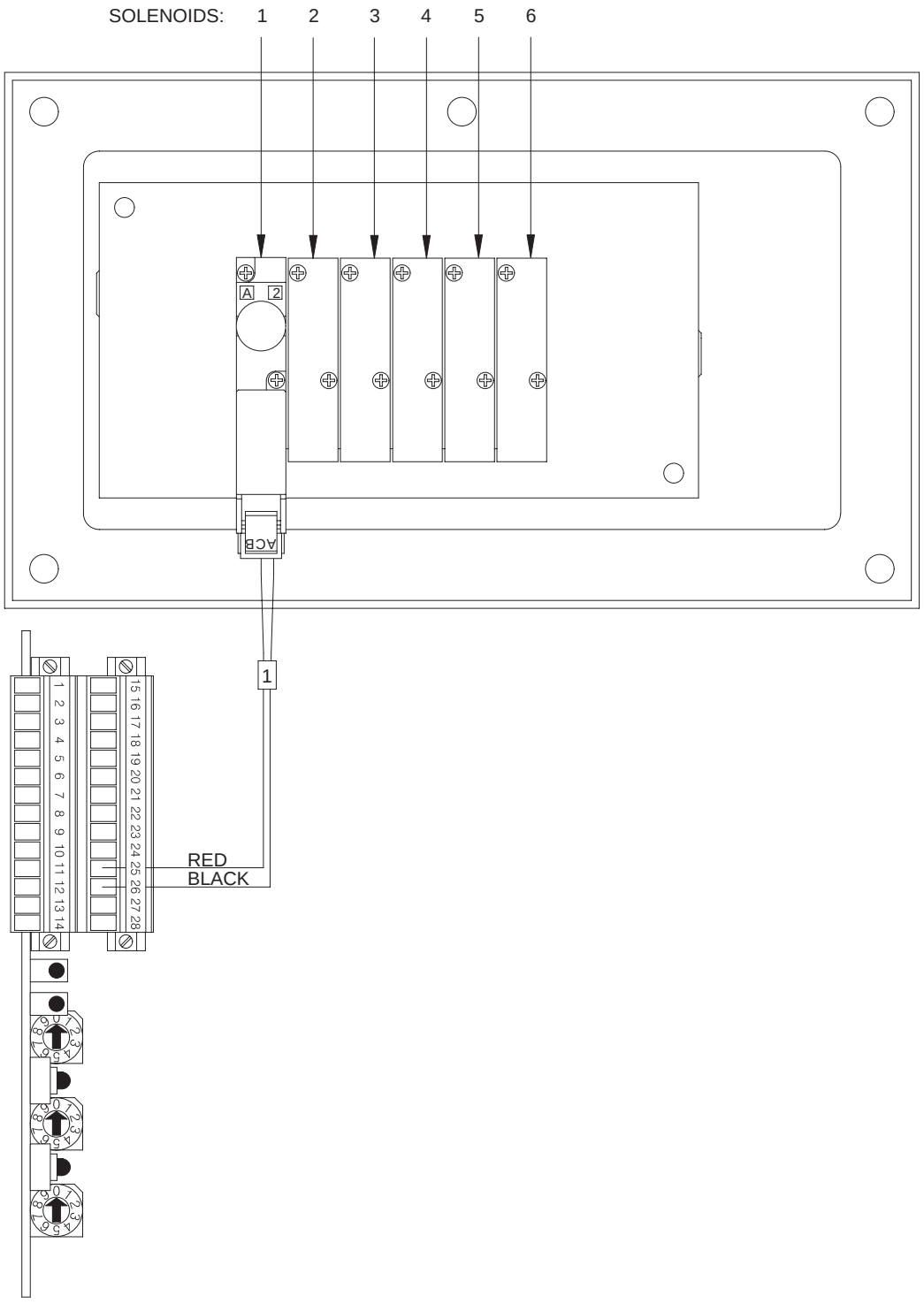

Figure C 2-1 Discrete I/O Interface Card Gun Purge Wiring Diagram