Sure Coat® Modular Gun Control System

Part C:
UCS ProfiBus Interface Card

Customer Product Manual
Part 334662B

Issued 4/02

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 UCS ProfiBus interface card uses the ProfiBus communication protocol for open serial communication between a PLC and the modular gun control system.

The interface card is installed in slot 9 of the main control cabinet's card cage.

The interface card works with either a PLC or the Sure Coat application controller to allow the gun purge module to interface with the modular gun control system. The interface card allows the PLC to automate the operation of the modular gun control system and perform the following functions:

- Purge guns

- Trigger guns individually

- Set guns to F1/F2 settings on an individual basis

- Adjust set points to guns on an individual basis

- Change Select Charge modes

- View faults on the application controller

- View status information on the interface card

I/O Signals

The UCS ProfiBus interface card uses a standard five-pin ProfiBus interface to communicate with the application controller/PLC and purge modules.

Inputs

See Figure C 1-1 and refer to Table C 1-1. There are nine terminals on the network interface bus connector (8). The terminals allow the interface card to communicate with a standard ProfiBus master system.

Table C 1-1 Input Terminal Functions

Terminal	Function	Terminal	Function
1	Chassis Ground	6	Isolated + 5 V
2	Reserved	7	Reserved
3	Data +	8	Data -
4	Tx Enable	9	Reserved
5	Isolated Ground		

Outputs

See Figure C 1-1 and refer to Table C 1-2.

There are two outputs on the purge terminal blocks (5). The outputs allow the interface card to communicate with the optional gun purge module.

Table C 1-2 Output Terminal Functions

Terminal	Function	Terminal	Function
1	Not used	7	Not used
2	Not used	8	Not used
3	Not used	9	Not used
4	Not used	10	Not used
5	Gun purge solenoid (positive)	11	Not used
6	Gun purge solenoid (negative)	12	Not used

Theory of Operation

Purging

The purge outputs are wired to the purge panel solenoid numbered 1. The application controller/PLC commands the interface card to send a signal 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 interface card allows the application controller/PLC to switch the guns between two flow rate air settings. The application controller/PLC switches F1/F2 air pressure settings on either an individual gun or all guns at the same time.
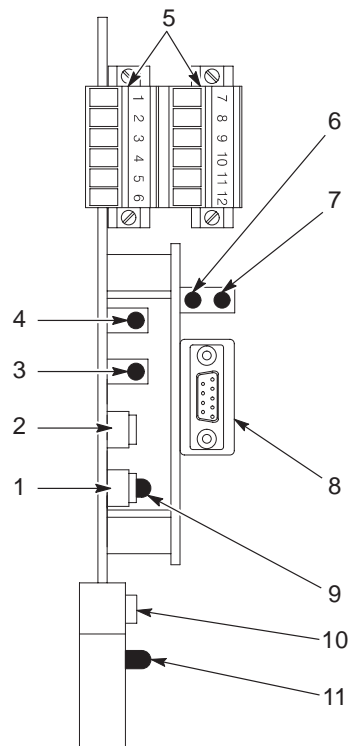
NOTE: The flow rate air settings must be adjusted on each individual gun's pneumatic module.

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Switches

See Figure C 1-1 and refer to Table C 1-3 for a description of the switches.

Table C 1-3 Switches

Item	Switch	Function
1	Service	Informs the system that new software is installed
2	Reset	Resets the interface card's microprocessor
10	SW3	8-position dip switch assembly to program card address

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Figure C 1-1   UCS ProfiBus Interface Card Components

1. Service switch
2. Reset switch
3. Status LED
4. Fault LED
5. Output (purge) terminal blocks
6. Network status LED
7. UCS status LED
8. Input (network interface) connector
9. Service LED
10. SW3 (dip switch assembly)
11. Power LED

LEDs

See Figure C 1-1 and refer to Table C 1-4. The six LEDs on the interface card indicate system status.

Table C 1-4 LED Identification

Item	Color	Function	Status	Meaning
3	Green	Status	Flashing green	Communicating properly with a gun card
4	Red	Fault	Red continuously	No communication with the application controller or PLC
6	Green/Red	Network Status	Off	Network interface offline/No network power
			Flashing red	I/O connection in timed out or other recoverable fault
			Flashing green	Device is online, but has no connection
			Red continuously	Unrecoverable fault
			Green continuously	Online with established connections
			Flashing green/red	Device is in communication faulted state and responding to an identify communication faulted request
7	Green/Red	UCS Status	Off	No power or hard/soft reset asserted
			Flashing red	Recoverable configuration fault (invalid firmware, OEM data, or personality data
			Red continuously	Hardware or fatal runtime error
			Flashing green	No errors; client interface is not open
			Green continuously	No errors; client interface is active
			Green and red continuously	Configuration mode
9	Yellow	Service	Yellow continuously	Bad node hardware
			Flashing once every two seconds	Power up/reset
			Flashing repeatedly	Watchdog timer resets occurring
			Flashing once every second	Node is unconfigured
			Flashes once, then off continuously	Normal at startup
11	Green	Power	Green continuously	Power is applied to the card

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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 UCS ProfiBus interface card into an existing system. Disregard this section if the UCS ProfiBus interface card was installed at the factory.

Installation

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

1. Open the main control cabinet door.

2. If a card is installed in slot 9, remove the card and disconnect the card's solenoid wires. Refer to *Purge Panel* for more information.

3. Pull the top of the card's locking tab downward so that it is 90° from its original, locked position.

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

   NOTE: The terminal blocks and nine-pin bus connector must be facing the front of the main control cabinet.

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

6. Push the card's locking tab upward to lock the card into the card cage.

Wiring

Interface Cable Wiring

NOTE: ProfiBus interface cables and connectors are prewired at the factory.

In order to connect interface cables to the UCS ProfiBus interface card in the main control cabinet, you must remove the connectors from the cable and install them onto the cable after routing the cable.

Types of Cable Connectors

See Figure C 2-1 and refer to Table C 2-1. Two types of interface cable connectors are available. Either connector can accommodate an input interface cable and an output interface cable for other devices.
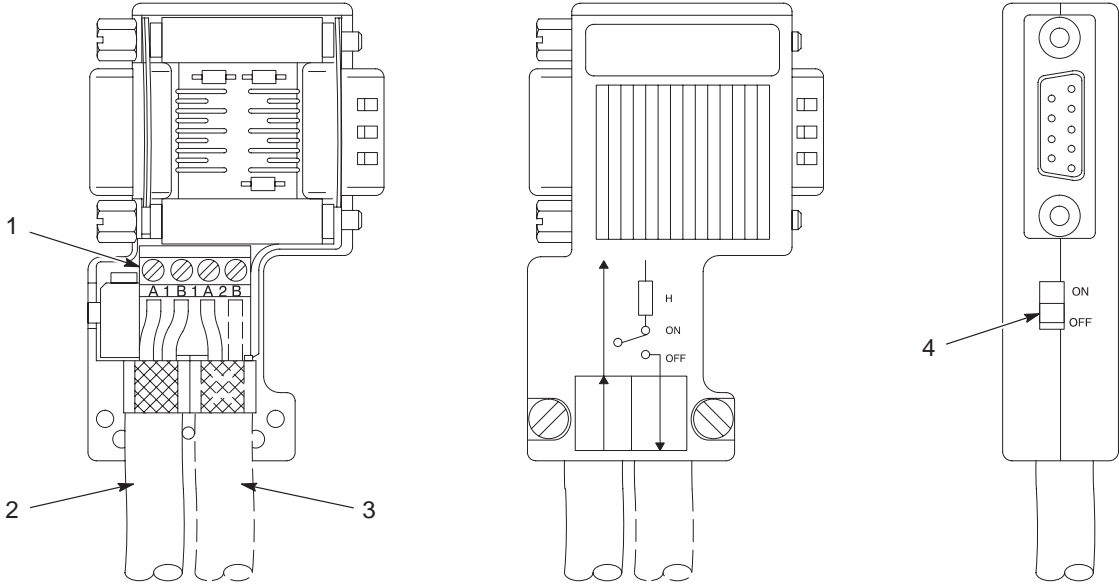
Table C 2-1 Connector Types

Connector Type	Connection to Other ProfiBus Interface Cables
Male Bus	Hard wire into connector
90° Male/Female Bus	• Hard wire into connector • Plug additional connector into the nine-pin female bus connector

Cable-to-Connector Wiring

1. See Figure C 2-1. Remove the screws in the connector's outer shell and separate the shell halves.

2. Loosen the appropriate screws on the terminal block (1) to disconnect the cable wires.

3. Route the exposed end of the input interface cable (2) through the appropriate knockout in the main control cabinet.

4. If you are wiring an output interface cable (3) to the connector, route the output interface cable now.

NOTE: The interface cable wires and connector terminals are color coded. Connect each wire to the terminal of the corresponding color. Make sure that input (2) and output (3) cables are connected in the positions illustrated.
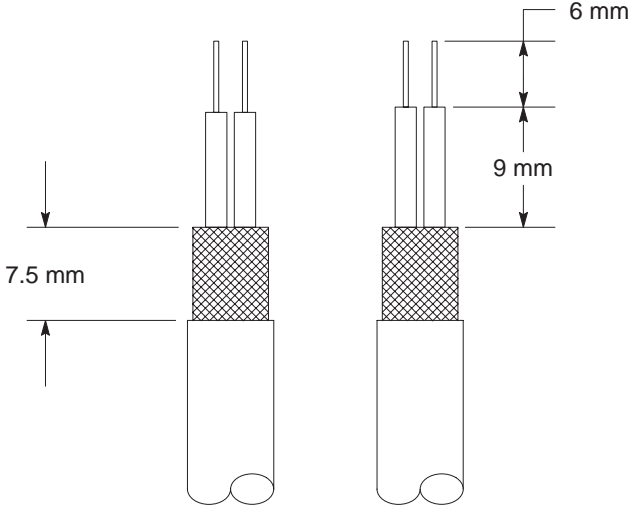
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Figure C 2-1   Interface Cable Connectors

1. Terminal block
2. Input interface cable

3. Output interface cable

4. On/Off network termination switch

Note: Typical 90° male/female interface cable connector shown. Your connector may differ from the one illustrated.

5. See Figure C 2-2. Make sure that the interface cable wires are stripped to the appropriate length.

6. Connect the interface cable(s) to the connector's terminal block, tighten the screws, and assemble the connector.

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Figure C 2-2   ProfiBus Interface Cable Stripping Specifications

Application Controller/PLC

NOTE: The UCS ProfiBus interface card must use Nordson ProfiBus interface cables and connectors. Refer to *Parts* for ordering information.
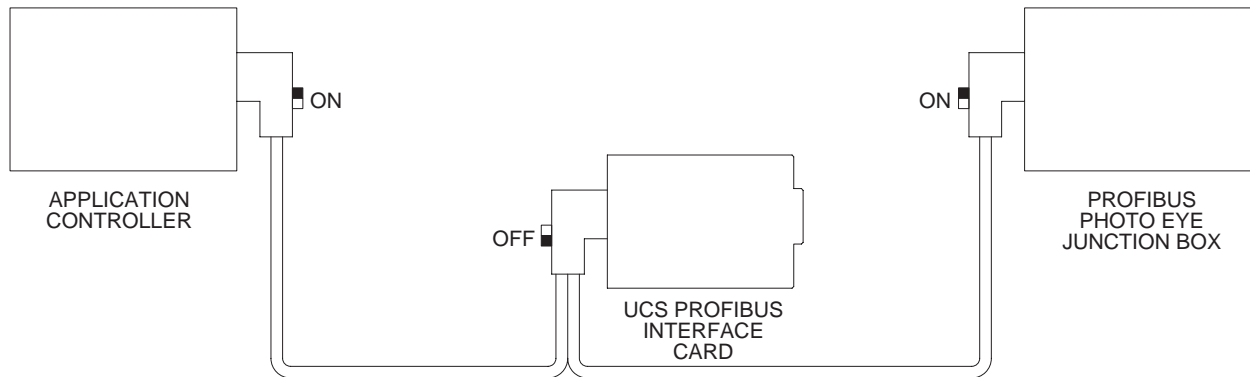
NOTE: Refer to *Interface Cable Wiring* for information about routing ProfiBus interface cables.

See Figures C 2-3 and C 2-4.

1. Connect a ProfiBus interface cable between the application controller/PLC and UCS ProfiBus interface card. Route this cable into the applicable strain relief in the top rear of the main control cabinet.

2. Connect a ProfiBus interface cable between the UCS ProfiBus interface card and the other devices in the network.

3. See Figure C 2-1. Terminate the ProfiBus network at both ends by putting the corresponding connectors' termination switches (4) in the ON position.
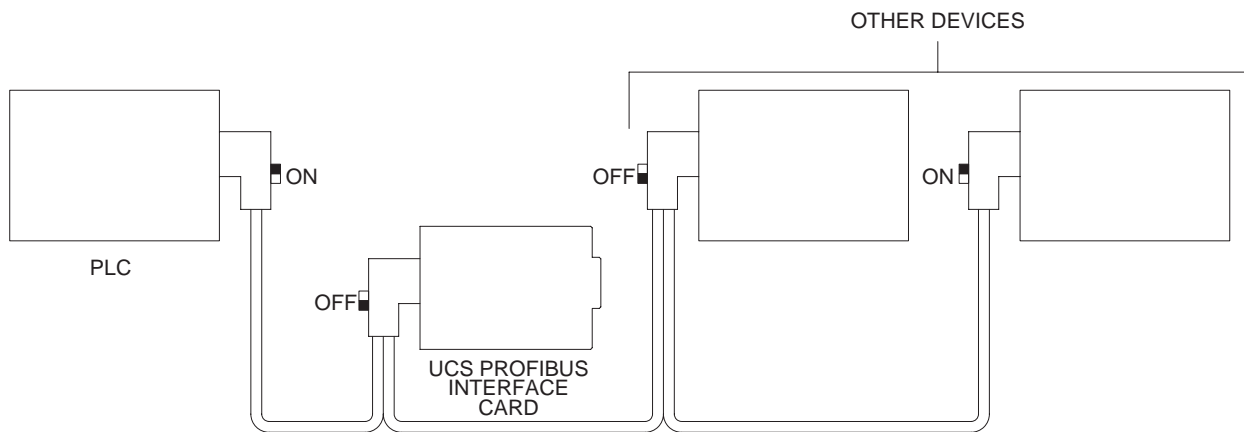
Table C 2-2 Network Termination Guidelines

Operator Interface Type	Terminate Interface Cable at the	See Figure
Sure Coat application controller	• application controller • photo eye junction box	C 2-3
PLC	• ProfiBus master (in the PLC) • last device in the network	C 2-4
NOTE: Terminate the ProfiBus interface cable at both ends of the network by putting the corresponding connectors' termination switches in the ON position.		

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Figure C 2-3   Sure Coat Application Controller Network Termination

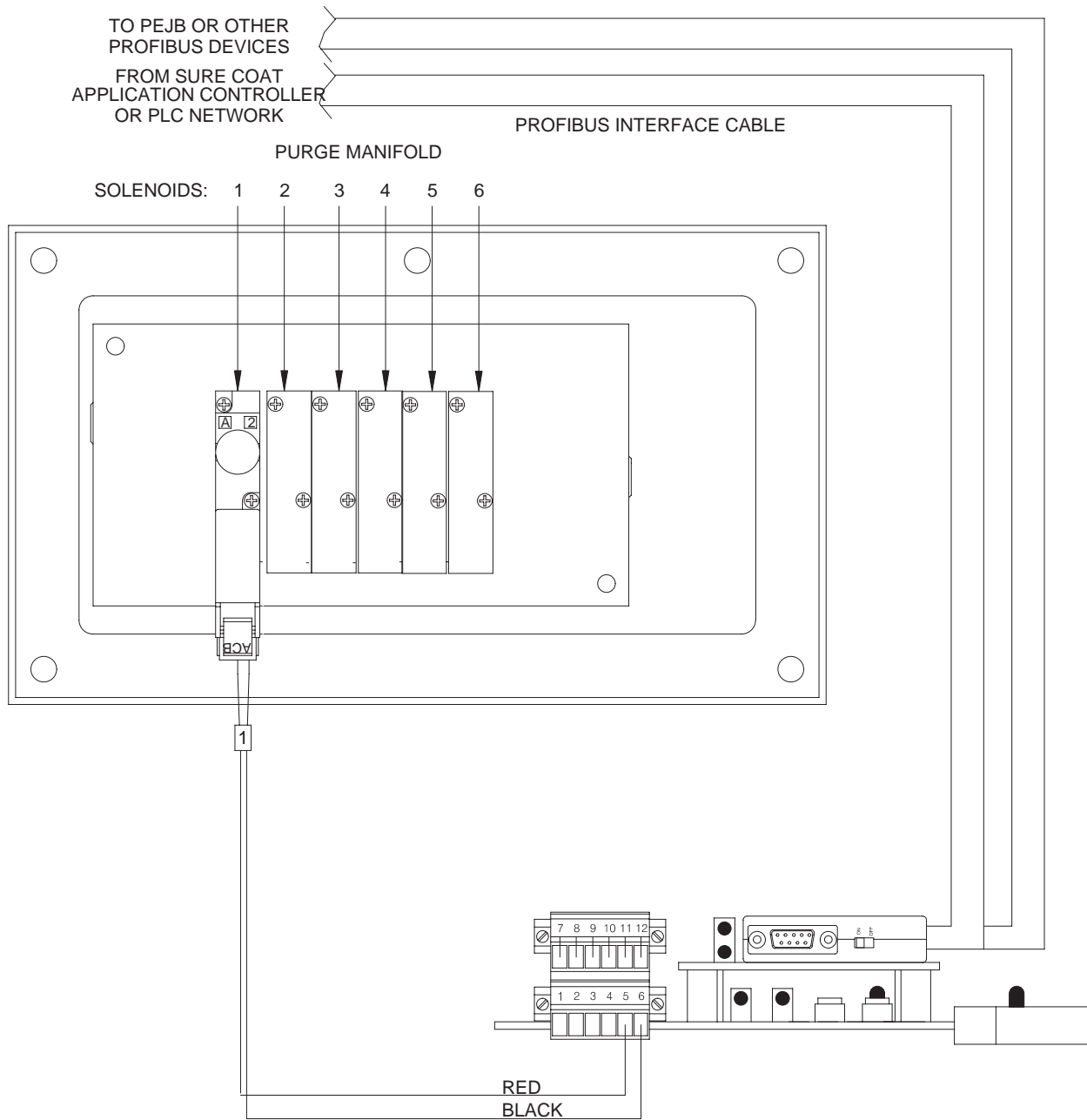
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Figure C 2-4   PLC Network Termination

Purge Panel

1. Make sure that the purge panel's wire group is routed through the rubber grommet to the lower right of the card cage.

2. See Figure C 2-5. Connect the wiring from the purge panel to the purge terminal blocks. Refer to Table C 2-3 for the wiring sequence.

Table C 2-3 Purge Panel Wiring

ProfiBus Terminal	Function	ProfiBus Terminal	Function
1	Not used	7	Not used
2	Not used	8	Not used
3	Not used	9	Not used
4	Not used	10	Not used
5	Gun purge solenoid 1 (positive)	11	Not used
6	Gun purge solenoid 1 (negative)	12	Not used

Purge Panel *(contd)*

Figure C 2-5   UCS ProfiBus Interface Card Wiring Diagram

Parts

Part	Description	Note
341628	PCA, UCS ProfiBus, packaged	
1013364	CABLE WITH CONNECTORS, ProfiBus, 5 meter	A
1013363	CONNECTOR, ProfiBus, 90 degree, with terminating switch	
- - - - - -	CABLE, jacketed, 2 conductor, shielded, 22 AWG	
NOTE A: This cable comes with a 90-degree connector on one end and a straight connector on the other end.		

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