

# **Profibus-DP, DeviceNet, and ControlNet Fieldbus Interface Cards**

Customer Product Manual

Part 1052255\_08

Issued 7/17



This document contains important safety information  
Be sure to read and follow all safety information in this  
document and any other related documentation.



NORDSON CORPORATION • DULUTH, GEORGIA • USA  
[www.nordson.com](http://www.nordson.com)

Nordson Corporation welcomes requests for information, comments, and inquiries about its products. General information about Nordson can be found on the Internet using the following address: <http://www.nordson.com>.

Address all correspondence to:

Nordson Corporation  
Attn: Customer Service  
11475 Lakefield Drive  
Duluth, GA 30097

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# Profibus-DP, DeviceNet, and ControlNet Fieldbus Interface Cards

## *Safety*

Read this section before using the equipment. This section contains recommendations and practices applicable to the safe installation, operation, and maintenance (hereafter referred to as “use”) of the product described in this document (hereafter referred to as “equipment”). Additional safety information, in the form of task-specific safety alert messages, appears as appropriate throughout this document.



**WARNING!** Failure to follow the safety messages, recommendations, and hazard avoidance procedures provided in this document can result in personal injury, including death, or damage to equipment or property.

## Safety Alert Symbols

The following safety alert symbol and signal words are used throughout this document to alert the reader to personal safety hazards or to identify conditions that may result in damage to equipment or property. Comply with all safety information that follows the signal word.



**WARNING!** Indicates a potentially hazardous situation that, if not avoided, can result in serious personal injury, including death.



**CAUTION!** Indicates a potentially hazardous situation that, if not avoided, can result in minor or moderate personal injury.

**CAUTION!** (Used without the safety alert symbol) Indicates a potentially hazardous situation that, if not avoided, can result in damage to equipment or property.

## Responsibilities of the Equipment Owner

Equipment owners are responsible for managing safety information, ensuring that all instructions and regulatory requirements for use of the equipment are met, and for qualifying all potential users.

### ***Safety Information***

- Research and evaluate safety information from all applicable sources, including the owner-specific safety policy, best industry practices, governing regulations, material manufacturer's product information, and this document.
- Make safety information available to equipment users in accordance with governing regulations. Contact the authority having jurisdiction for information.
- Maintain safety information, including the safety labels affixed to the equipment, in readable condition.

### ***Instructions, Requirements, and Standards***

- Ensure that the equipment is used in accordance with the information provided in this document, governing codes and regulations, and best industry practices.
- If applicable, receive approval from your facility's engineering or safety department, or other similar function within your organization, before installing or operating the equipment for the first time.
- Provide appropriate emergency and first aid equipment.
- Conduct safety inspections to ensure required practices are being followed.
- Re-evaluate safety practices and procedures whenever changes are made to the process or equipment.

### ***User Qualifications***

Equipment owners are responsible for ensuring that users:

- receive safety training appropriate to their job function as directed by governing regulations and best industry practices
- are familiar with the equipment owner's safety and accident prevention policies and procedures
- receive equipment and task-specific training from another qualified individual

**NOTE:** Nordson can provide equipment-specific installation, operation, and maintenance training. Contact your Nordson representative for information

- possess industry- and trade-specific skills and a level of experience appropriate to their job function
- are physically capable of performing their job function and are not under the influence of any substance that degrades their mental capacity or physical capabilities

### **Applicable Industry Safety Practices**

The following safety practices apply to the use of the equipment in the manner described in this document. The information provided here is not meant to include all possible safety practices, but represents the best safety practices for equipment of similar hazard potential used in similar industries.

### ***Intended Use of the Equipment***

- Use the equipment only for the purposes described and within the limits specified in this document.
- Do not modify the equipment.
- Do not use incompatible materials or unapproved auxiliary devices. Contact your Nordson representative if you have any questions on material compatibility or the use of non-standard auxiliary devices.



### ***Instructions and Safety Messages***

- Read and follow the instructions provided in this document and other referenced documents.
- Familiarize yourself with the location and meaning of the safety warning labels and tags affixed to the equipment. Refer to *Safety Labels and Tags* at the end of this section.
- If you are unsure of how to use the equipment, contact your Nordson representative for assistance.

### ***Installation Practices***

- Install the equipment in accordance with the instructions provided in this document and in the documentation provided with auxiliary devices.
- Ensure that the equipment is rated for the environment in which it will be used. This equipment has not been certified for compliance with the ATEX directive nor as nonincendive and should not be installed in potentially explosive environments.
- Ensure that the processing characteristics of the material will not create a hazardous environment. Refer to the Safety Data Sheet (SDS) for the material.
- If the required installation configuration does not match the installation instructions, contact your Nordson representative for assistance.
- Position the equipment for safe operation. Observe the requirements for clearance between the equipment and other objects.
- Install lockable power disconnects to isolate the equipment and all independently powered auxiliary devices from their power sources.
- Properly ground all equipment. Contact your local building code enforcement agency for specific requirements.
- Ensure that fuses of the correct type and rating are installed in fused equipment.
- Contact the authority having jurisdiction to determine the requirement for installation permits or inspections.

### ***Operating Practices***

- Familiarize yourself with the location and operation of all safety devices and indicators.
- Confirm that the equipment, including all safety devices (guards, interlocks, etc.), is in good working order and that the required environmental conditions exist.
- Use the personal protective equipment (PPE) specified for each task. Refer to *Equipment Safety Information* or the material manufacturer's instructions and SDS for PPE requirements.
- Do not use equipment that is malfunctioning or shows signs of a potential malfunction.

### ***Maintenance and Repair Practices***

- Allow only personnel with appropriate training and experience to operate or service the equipment.
- Perform scheduled maintenance activities at the intervals described in this document.
- Relieve system hydraulic and pneumatic pressure before servicing the equipment.
- De-energize the equipment and all auxiliary devices before servicing the equipment.
- Use only new Nordson-authorized refurbished or replacement parts.
- Read and comply with the manufacturer's instructions and the SDS supplied with equipment cleaning compounds.

**NOTE:** SDSs for cleaning compounds that are sold by Nordson are available at [www.nordson.com](http://www.nordson.com) or by calling your Nordson representative.

- Confirm the correct operation of all safety devices before placing the equipment back into operation.
- Dispose of waste cleaning compounds and residual process materials according to governing regulations. Refer to the applicable SDS or contact the authority having jurisdiction for information.
- Keep equipment safety warning labels clean. Replace worn or damaged labels.

## **Equipment Safety Information**

This equipment safety information is applicable to the following types of Nordson equipment:

- hot melt and cold adhesive application equipment and all related accessories
- pattern controllers, timers, detection and verification systems, and all other optional process control devices

## ***Equipment Shutdown***

To safely complete many of the procedures described in this document, the equipment must first be shut down. The level of shut down required varies by the type of equipment in use and the procedure being completed.

If required, shut down instructions are specified at the start of the procedure. The levels of shut down are:

### **Relieving System Hydraulic Pressure**

Completely relieve system hydraulic pressure before breaking any hydraulic connection or seal. Refer to the melter-specific product manual for instructions on relieving system hydraulic pressure.

### **De-energizing the System**

Isolate the system (melter, hoses, applicators, and optional devices) from all power sources before accessing any unprotected high-voltage wiring or connection point.

- 1.. Turn off the equipment and all auxiliary devices connected to the equipment (system).
- 2.. To prevent the equipment from being accidentally energized, lock and tag the disconnect switch(es) or circuit breaker(s) that provide input electrical power to the equipment and optional devices.

**NOTE:** Government regulations and industry standards dictate specific requirements for the isolation of hazardous energy sources. Refer to the appropriate regulation or standard.

### **Disabling the Applicators**

**NOTE:** Adhesive dispensing applicators are referred to as “guns” in some previous publications.

All electrical or mechanical devices that provide an activation signal to the applicators, applicator solenoid valve(s), or the melter pump must be disabled before work can be performed on or around an applicator that is connected to a pressurized system.

- 1.. Turn off or disconnect the applicator triggering device (pattern controller, timer, PLC, etc.).
- 2.. Disconnect the input signal wiring to the applicator solenoid valve(s).
- 3.. Reduce the air pressure to the applicator solenoid valve(s) to zero; then relieve the residual air pressure between the regulator and the applicator.

## General Safety Warnings and Cautions

Table 1 contains the general safety warnings and cautions that apply to Nordson hot melt and cold adhesive equipment. Review the table and carefully read all of the warnings or cautions that apply to the type of equipment described in this manual.




Equipment types are designated in Table 1 as follows:

**HM** = Hot melt (melters, hoses, applicators, etc.)

**PC** = Process control






**CA** = Cold adhesive (dispensing pumps, pressurized container, and applicators)


Table 1 General Safety Warnings and Cautions

Equipment Type	Warning or Caution
HM	 <p><b>WARNING!</b> Hazardous vapors! Before processing any polyurethane reactive (PUR) hot melt or solvent-based material through a compatible Nordson melter, read and comply with the material's SDS. Ensure that the material's processing temperature and flashpoints will not be exceeded and that all requirements for safe handling, ventilation, first aid, and personal protective equipment are met. Failure to comply with SDS requirements can cause personal injury, including death.</p>
HM	 <p><b>WARNING!</b> Reactive material! Never clean any aluminum component or flush Nordson equipment with halogenated hydrocarbon fluids. Nordson melters and applicators contain aluminum components that may react violently with halogenated hydrocarbons. The use of halogenated hydrocarbon compounds in Nordson equipment can cause personal injury, including death.</p>
HM, CA	 <p><b>WARNING!</b> System pressurized! Relieve system hydraulic pressure before breaking any hydraulic connection or seal. Failure to relieve the system hydraulic pressure can result in the uncontrolled release of hot melt or cold adhesive, causing personal injury.</p>
Continued...	

**General Safety Warnings and Cautions** (contd)

Table 1 General Safety Warnings and Cautions (contd)

Equipment Type	Warning or Caution
HM	 <p><b>WARNING!</b> Molten material! Wear eye or face protection, clothing that protects exposed skin, and heat-protective gloves when servicing equipment that contains molten hot melt. Even when solidified, hot melt can still cause burns. Failure to wear appropriate personal protective equipment can result in personal injury.</p>
HM, PC	 <p><b>WARNING!</b> Equipment starts automatically! Remote triggering devices are used to control automatic hot melt applicators. Before working on or near an operating applicator, disable the applicator's triggering device and remove the air supply to the applicator's solenoid valve(s). Failure to disable the applicator's triggering device and remove the supply of air to the solenoid valve(s) can result in personal injury.</p>
HM, CA, PC	 <p><b>WARNING!</b> Risk of electrocution! Even when switched off and electrically isolated at the disconnect switch or circuit breaker, the equipment may still be connected to energized auxiliary devices. De-energize and electrically isolate all auxiliary devices before servicing the equipment. Failure to properly isolate electrical power to auxiliary equipment before servicing the equipment can result in personal injury, including death.</p>
HM, CA, PC	 <p><b>WARNING!</b> Risk of fire or explosion! Nordson adhesive equipment is not rated for use in explosive environments and has not been certified for the ATEX directive or as nonincendive. In addition, this equipment should not be used with solvent-based adhesives that can create an explosive atmosphere when processed. Refer to the SDS for the adhesive to determine its processing characteristics and limitations. The use of incompatible solvent-based adhesives or the improper processing of solvent-based adhesives can result in personal injury, including death.</p>
HM, CA, PC	 <p><b>WARNING!</b> Allow only personnel with appropriate training and experience to operate or service the equipment. The use of untrained or inexperienced personnel to operate or service the equipment can result in injury, including death, to themselves and others and can damage to the equipment.</p>

Equipment Type	Warning or Caution
HM	 <p><b>CAUTION!</b> Hot surfaces! Avoid contact with the hot metal surfaces of applicators, hoses, and certain components of the melter. If contact can not be avoided, wear heat-protective gloves and clothing when working around heated equipment. Failure to avoid contact with hot metal surfaces can result in personal injury.</p>
HM	<p><b>CAUTION!</b> Some Nordson melters are specifically designed to process polyurethane reactive (PUR) hot melt. Attempting to process PUR in equipment not specifically designed for this purpose can damage the equipment and cause premature reaction of the hot melt. If you are unsure of the equipment's ability to process PUR, contact your Nordson representative for assistance.</p>
HM, CA	<p><b>CAUTION!</b> Before using any cleaning or flushing compound on or in the equipment, read and comply with the manufacturer's instructions and the SDS supplied with the compound. Some cleaning compounds can react unpredictably with hot melt or cold adhesive, resulting in damage to the equipment.</p>
HM	<p><b>CAUTION!</b> Nordson hot melt equipment is factory tested with Nordson Type R fluid that contains polyester adipate plasticizer. Certain hot melt materials can react with Type R fluid and form a solid gum that can clog the equipment. Before using the equipment, confirm that the hot melt is compatible with Type R fluid.</p>

### ***Other Safety Precautions***

- Do not use an open flame to heat hot melt system components.
- Check high pressure hoses daily for signs of excessive wear, damage, or leaks.
- Never point a dispensing handgun at yourself or others.
- Suspend dispensing handguns by their proper suspension point.

### ***First Aid***

If molten hot melt comes in contact with your skin:

- 1.. Do NOT attempt to remove the molten hot melt from your skin.
- 2.. Immediately soak the affected area in clean, cold water until the hot melt has cooled.
- 3.. Do NOT attempt to remove the solidified hot melt from your skin.
- 4.. In case of severe burns, treat for shock.
- 5.. Seek expert medical attention immediately. Give the SDS for the hot melt to the medical personnel providing treatment.

## **Safety Labels and Tags**

Refer to the melter product manual for the location of the product safety labels and tags affixed to the equipment.

## Description

The Profibus-DP, DeviceNet, and ControlNet fieldbus cards are used in fieldbus systems to centrally collect and process data. The cards operate through the master-slave access method. When used in a fieldbus system, Nordson melters always operate as slaves.

Although most melter functionality can be set/monitored using fieldbus communications, some functionality is considered inconsistent with fieldbus usage and is therefore not accessible. Non-supported melter functions are:

- Clock
- Password protection
- PID selection (DuraBlue melters only)
- Motor-off delay (DuraBlue melters only)
- Hose 1 and 2 solenoid activation (DuraBlue melters only)

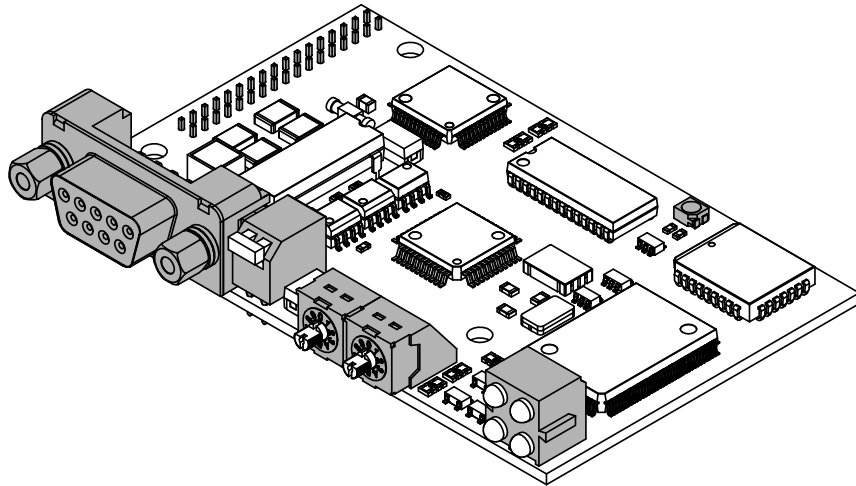


Figure 1 Typical fieldbus card (Profibus-DP card shown)



### Intended Use

This manual is intended for use by experienced PLC engineers.

The Profibus-DP, DeviceNet, and ControlNet fieldbus cards are intended to be used only as described in this manual. Any other use is considered to be unintended. Nordson is not liable for personal injury or property damage resulting from unintended use. Intended use includes the observance of Nordson safety regulations.

### Supporting Documentation

The following documentation should be used in conjunction with this manual:

- *Communication Data List*, located at the end of this manual
- Melter product manual
- Drum unloader product manual

## Hardware Interface

### ***Profibus-DP***

- Fieldbus card: Profibus-DP in compliance with standard IEC 61158 (formerly EN 50170)
- Bus topology: linear tree
- Data transmission rate: 9.6 kBit/s to 12 MBit/s
- Maximum line length: 100 m (without spur lines; without repeaters)
- Nordson melters: slaves
- Connecting technique: 9-pin D-sub socket

Table 2 Profibus-DP Fieldbus Card Terminal Positions

Pin	Connection
1	Not connected
2	Not connected
3	B-Line positive RxD/TxD according to RS485 specification
4	RTS (request to send) (See Note)
5	GND BUS isolated GND from RS485 side (See Note)
6	+5V BUS isolated +5V from RS485 side (See Note)
7	Not connected
8	A-Line negative RxD/TxD according to RS485 specification
9	Not connected
Shield	Connected to ground
<b>NOTE:</b> +5V BUS and GND BUS are used for bus termination. Some devices, like optical transceivers (RS485 to fiber optics) might require external power supply from these pins. RTS is used in some equipment to determine the direction of transmission. In normal applications, only A-Line, B-Line, and shield are used.	

***DeviceNet***

- Fieldbus card: DeviceNet
- Bus topology: linear tree
- Data transmission rate: 125, 250, and 500 kBit/s
- Maximum line length:
  - 500 m at 125 kBit/s
  - 250 m at 250 kBit/s
  - 100 m at 500 kBit/s
- Nordson melters: slaves
- Connecting technique: 121-ohm termination resistors located at both ends of the fieldbus system

Table 3 DeviceNet Open-Style Connector Positions

Pin	Connection
1	VDC comm. (black)
2	Signal low (blue)
3	Shield (shield)
4	Signal high (white)
5	+ VDC (red)

**ControlNet**

- Fieldbus card: ControlNet
- Bus topology: tree, star, or ring
- Data transmission rate: 5 MBit/s
- Maximum line length:
  - 1,000 m at 5 Mbit/s (1,000 m with two nodes, 250 m with 48 nodes)
  - 5,000 m at 5 Mbit/s with repeaters
- Nordson melters: slaves
- Conforms to communications adapter, profile 12
- Connecting technique: two BNC connectors. Only one connection is required, but two can be used for redundancy. An RJ45 network access port for diagnostics and configuration is also present.

**Interface Characteristics**

- Data volume: approximately 100 words for multiplexed communication
- Data:
  - Status information
  - Alarms and faults
  - Control signals
  - Actual values
  - Setpoint values
  - Limit parameters

# Profibus-DP Card Installation

## Install the Card

See Figures 2 and 3.

Install the Profibus-DP onto the melter CPU board observing the following guidelines:

- Install the Profibus-DP card inside the melter electrical cabinet. Use a two-wire connection: line A (usually green) and line B (usually red) must be the same on the entire bus.
- Route the bus cable out of the melter's electrical cabinet through an available conduit knockout (left side or base of the melter).
- To ensure smooth operation, end the fieldbus system with an active bus terminator (terminating resistor) at the beginning and end of a Profibus-DP card segment.
- Nordson recommends attaching both ends of the bus cable screen to protective grounding/functional grounding. When the potential is not the same at both ends, an equipotential bonding conductor should be laid.

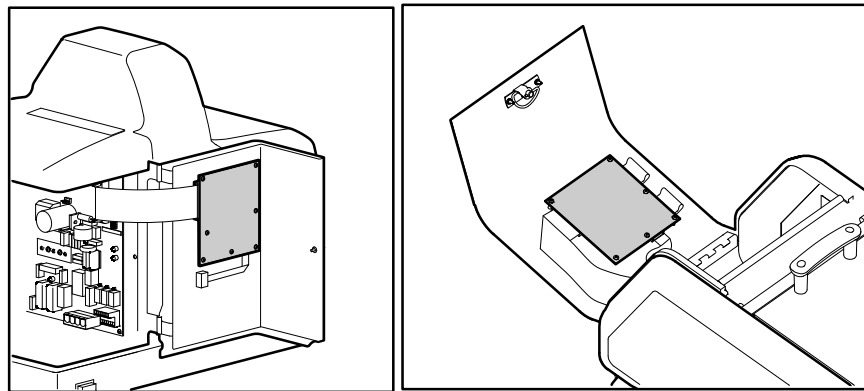


Figure 2 Location of the CPU card (Left: ProBlue; Right: DuraBlue)

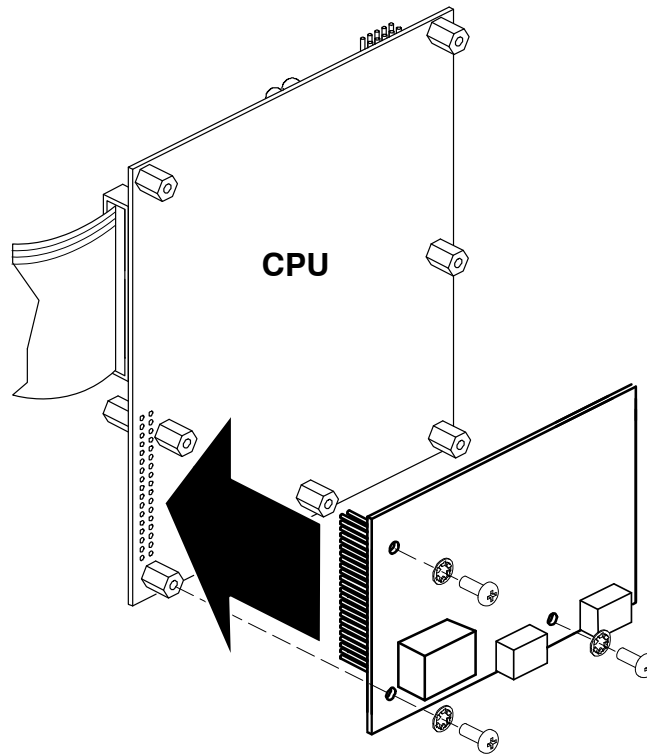


Figure 3 Attaching the Profibus-DP card to the melter CPU

## Check the Installation

Power on the melter and observe the red/green watchdog LED on the back of the Profibus-DP card. Refer to Table 4.

Table 4 Watchdog LED Indications

Indication	LED Color	Frequency
ASIC and FLASH ROM check fault	Red	2 Hz
Module not initiated	Green	2 Hz
Module initialized and running OK	Green	1 Hz
RAM check fault	Red	1 Hz
DPRAM check fault	Red	4 Hz

## Set the Transmission Speed

To minimize electromagnetic compatibility disruptions, select the lowest possible baud rate. Nordson Corporation recommends a 1.5 MBit/s baud rate.

## Set the Fieldbus Device Addresses

Use the rotary switches located on the card to set a unique fieldbus address for every Profibus-DP card on the fieldbus system. The address range is 2 to 99.

## Obtain the Profibus-DP Master

Nordson Corporation provides a device master (.GSD) for the technical description of the Profibus-DP interface described in this manual. The format is based on the standard EN 50170. The GSD file may be downloaded from [www.enordson.com/support](http://www.enordson.com/support).

## Establish Communication

Using the .GSD file, establish communication between the melter and the Profibus-DP card. For debugging purposes, the card has four LEDs on the front and one LED on the back. See Figure 4 and Table 5.

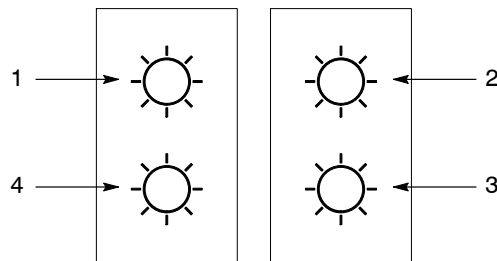


Figure 4 Status LEDs

Table 5 Status LEDs

Item No. in Figure 4	Description	Color	Indication
2	Online	Green	Indicates that the module is online on the fieldbus system: <b>Green</b> —module is online and data exchange is possible. <b>Turned off</b> —module is not online.
3	Offline	Red	Indicates that the module is offline on the fieldbus system: <b>Red</b> —module is offline and no data exchange is possible. <b>Turned off</b> —module is not offline.
4	Fieldbus system diagnostics	Red	Indicates certain faults on fieldbus system side: <b>Flashing red, 1 Hz</b> —error in configuration; IN and/or OUT length set during initialization of the module is not equal to the length set during configuration of the fieldbus system. <b>Flashing red, 2 Hz</b> —error in user parameter data; the length/contents of the user parameter data set during initialization of the module is not equal to the length/contents set during configuration of the fieldbus system. <b>Flashing red, 4 Hz</b> —error in initialization of the Profibus communication ASIC. <b>Turned off</b> —no diagnostics present.

## Additional Guidelines

For additional information and wiring recommendations, refer to *Installation Guideline for PROFIBUS-DP/FMS*, available online at [www.Profibus.com](http://www.Profibus.com).



# DeviceNet Card Installation

## Install the Card

See Figures 5 and 6.

Install the DeviceNet card onto the melter CPU. Refer to Table 6 for wire terminations.

**NOTE:** Nordson Corporation recommends that you follow the Open DeviceNet Vendors Association (ODVA) specifications for grounding of the DeviceNet cables and shields.

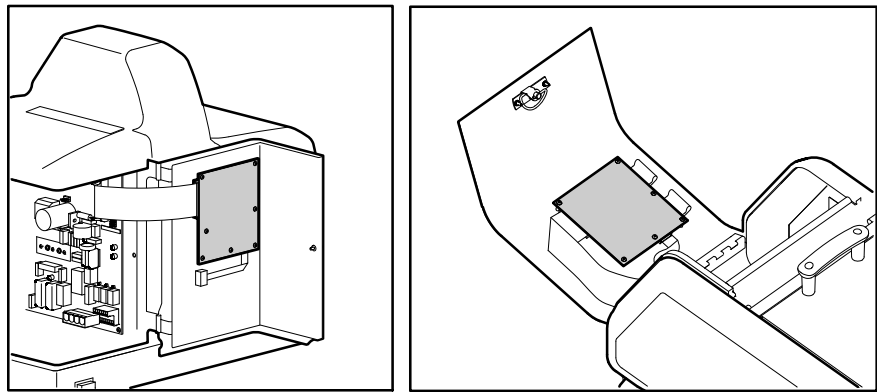


Figure 5 Location of the CPU card (Left: ProBlue; Right: DuraBlue)

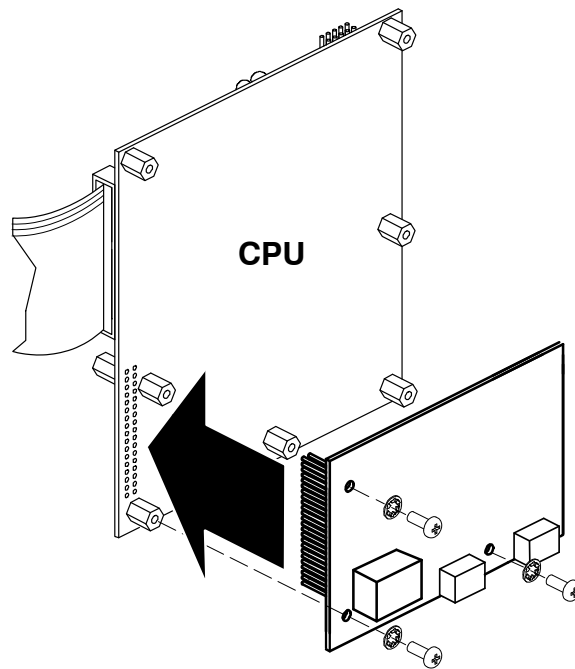


Figure 6 Attaching the DeviceNet card to the melter CPU

Table 6 DeviceNet Connector Positions

Pin	Connection
1	VDC comm. (black)
2	Signal low (blue)
3	Shield (shield)
4	Signal high (white)
5	+ VDC (red)

To ensure smooth operation, install a 121-ohm,  $\frac{1}{4}$  W terminating resistor at the beginning and end of the DeviceNet fieldbus system.

## Check the Installation

Power on the melter and observe the red/green watchdog LED on the back of the DeviceNet card. Refer to Table 7.

Table 7 Watchdog LED Indications

Indication	LED Color	Frequency
ASIC and FLASH ROM check fault	Red	2 Hz
Module not initiated	Green	2 Hz
Module initialized and running OK	Green	1 Hz
RAM check fault	Red	1 Hz
DPRAM check fault	Red	4 Hz

## Set the Transmission Speed

The DeviceNet card has three different baud rates: 125, 250, and 500 kBit/s. To minimize electromagnetic compatibility disruptions, Nordson Corporation recommends selecting the lowest possible baud rate (125 kBit/s). Refer to Table 8 and Figure 7 to select the baud rate using the DIP switch. This should be done before any other configurations are made.

Table 8 Baud Rate Settings

Baud Rate	Switch 1,2
125 kbits/s	0,0
250 kBits/s	0,1
500 kBits/s	1,0

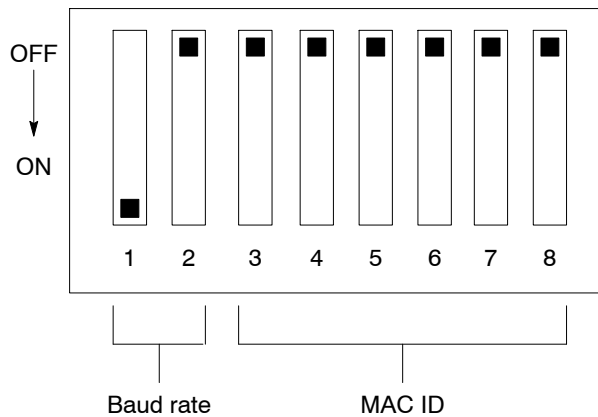


Figure 7 DeviceNet card DIP switch settings

## Set the Fieldbus Device Address

Set the node address (MAC ID) by setting DIP switches 3-8, shown in Figure 7. DIP switch 3 is the most significant bit and DIP switch 8 is the least significant bit.

- The address range is 0 to 63.
- Addresses 0 and 63 must be reserved for system functions.

## Obtain the Electronic Data Sheet

Nordson Corporation provides an Electronic Data Sheet (EDS) for the technical description of the DeviceNet interface described here. The EDS file may be downloaded from [www.enordson.com/support](http://www.enordson.com/support).

## Establish Communication

Using the .EDS file, establish communication between the melter and the DeviceNet card. For debugging purposes, the card has four LEDs on the front and one LED on the back. See Figure 8 and Table 9.

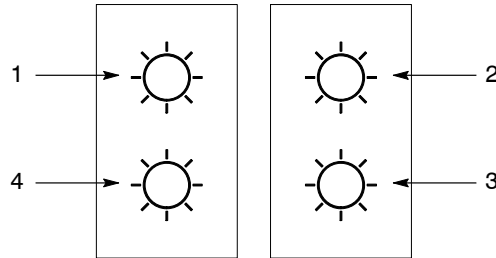


Figure 8 Status LEDs

- |                   |                          |
|-------------------|--------------------------|
| 1. Reserved       | 3. Module network status |
| 2. Network status | 4. Reserved              |

Table 9 Status LEDs

LED	Status of LED	Indication
Module network status	Steady off	No power
Module network status	Steady red	Unrecoverable fault
Module network status	Steady green	Device operational
Module network status	Flashing red	Minor fault
Network status	Steady off	No power/offline
Network status	Steady green	Link okay/online/connected
Network status	Steady red	Critical link failure
Network status	Flashing green	Online/not connected
Network status	Flashing red	Connection timeout

## Additional Guidelines

For additional information and wiring recommendations, refer to the Open DeviceNet Vendors Association (ODVA) website, [www.odva.org](http://www.odva.org).

# ControlNet Card Installation

## Install the Card

See Figures 9 and 10.

Install the ControlNet card onto the melter CPU.

**NOTE:** Nordson Corporation recommends that you follow the Open DeviceNet Vendors Association (ODVA) specifications for grounding of the cables and shields.

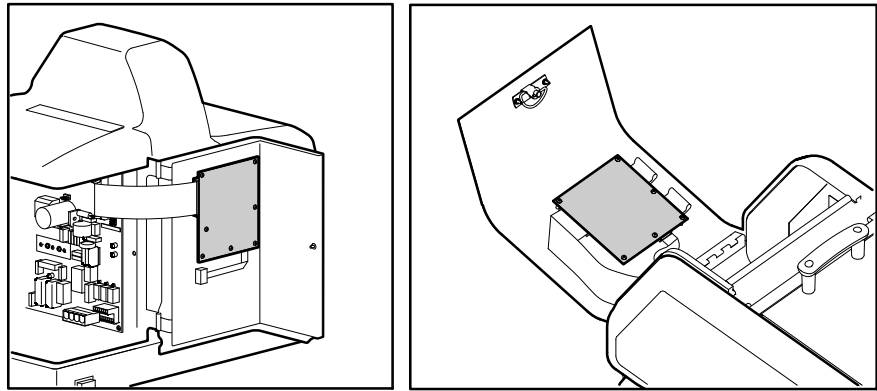


Figure 9 Location of the CPU card (Left: ProBlue; Right: DuraBlue)

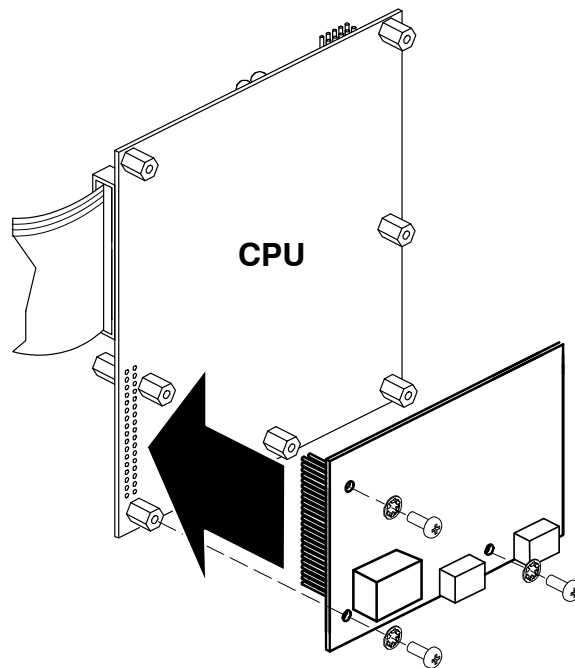


Figure 10 Attaching the ControlNet card to the melter CPU

## Check the Installation

Power on the melter and observe the red/green watchdog LED on the back of the ControlNet card. Refer to Table 10.

Table 10 Watchdog LED Indications

Indication	LED Color	Frequency
ASIC and FLASH ROM check fault	Red	2 Hz
Module not initiated	Green	2 Hz
Module initialized and running OK	Green	1 Hz
RAM check fault	Red	1 Hz
DPRAM check fault	Red	4 Hz

## Set the Fieldbus Device Address

Use the rotary switches located on the card to set a unique fieldbus address for every ControlNet card on the fieldbus system.

- The address range is 1 to 99.

## Obtain the Electronic Data Sheet

Nordson Corporation provides an Electronic Data Sheet (.EDS) for the technical description of the ControlNet interface described here. The .EDS file may be downloaded from [www.enordson.com/support](http://www.enordson.com/support).

## Establish Communication

Using the .EDS file, establish communication between the melter and the ControlNet card. For debugging purposes, the card has four LEDs on the front and one LED on the back. See Figure 11 and Table 11.

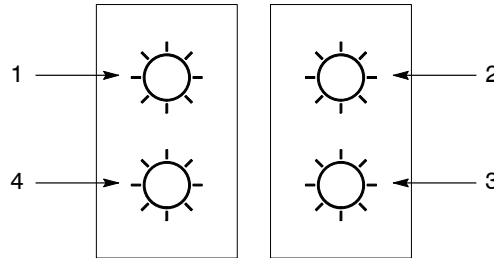


Figure 11 Status LEDs

- |                  |                 |
|------------------|-----------------|
| 1. Module status | 3. Channel B    |
| 2. Channel A     | 4. Module owned |

Table 11 Status LEDs

LED	Status of LED	Indication
Module status	Steady red	Major fault
Module status	Flashing green	Connecting or connection idle
Module status	Steady green	Connection in run state
Module status	Flashing red	Minor fault
Channel A <i>and</i> Channel B	Steady off	Module not initialized
Channel A <i>and</i> Channel B	Steady green	Link okay/online/connected
Channel A <i>and</i> Channel B	Steady red	Major fault
Channel A <i>and</i> Channel B	Alternating red and green	Self-test
Channel A <i>and</i> Channel B	Flashing red	Node configuration error
Channel A <i>or</i> Channel B	Off	Channel disabled
Channel A <i>or</i> Channel B	Green	Normal channel operation
Channel A <i>or</i> Channel B	Flashing green	Temporary error (node will self correct) or not configured
Channel A <i>or</i> Channel B	Flashing red and green	Network configuration error
Module owned	Off	No connection opened
Module owned	Green	Connection opened

## Additional Guidelines

For additional information and wiring recommendations, refer to the Open DeviceNet Vendors Association (ODVA) website, [www.odva.org](http://www.odva.org).



## ***Other Functionality***

### **Melter Control Panel Lock-out**

When password protection (melter parameters 10 and 11) is enabled with a fieldbus card installed, all operator panel controls are disabled.

## ***Melter Operational Modes***

Melters with a fieldbus card have two operational modes: local and remote. The default is the remote mode. The mode may be selected through the melter operator panel.

**NOTE:** For the remainder of this manual, the term “fieldbus” is used to refer to the Profibus-DP, DeviceNet, or ControlNet fieldbus system.

### **Local Mode**

The local mode of operation is used mainly to view data for maintenance and repair purposes. In this mode, the melter operates like a melter that does not include a fieldbus card:

- Control access is only via the melter operator panel
- Parameter input is only via the melter operator panel
- Through the master, all parameters can be displayed but not changed. The master can always read actual values.

To place the melter in the local mode, change Parameter 14 (External Comm Lockout) to 1.

### **Remote Mode**

When the melter is in the remote mode of operation, it can be operated from both the master and the melter operator panel:

- Setpoints and system parameters can be entered through the master or the melter operator panel.
- If control of the melter exclusively through the master is desired, you can enable password protection (melter operating parameters 10 and 11), which locks-out operation of the melter using the operator panel. Refer to the melter product manual for information on enabling password protection.

**NOTE:** When a fieldbus card is installed in the melter, enabling password protection will disable all melter operator panel input, including the Heaters, Pump, and Standby keys.

To place the melter in the remote mode, change Parameter 14 (External Comm Lockout) to 0. This is the default setting.

## Data Interface

When data is transmitted from the Nordson melter to the master and vice versa, the data is accessed through indexes. The available data are shown in the *Communication Data List* at the end of this section.

The use of indexes has two advantages. First, the communication data list is not constrained by the fieldbus card's maximum data width. Second, the indexing method allows a smaller transmit packet, which prevents the fieldbus system from being loaded with unnecessary data.

## Transmit and Receive Packets

Communication is accomplished through two packet formats: transmit and receive (from the viewpoint of the master). These packets are always 16 bytes in length. Each packet format contains specific data blocks, as shown in Tables 12 and 15 later in this section.

The master sends a transmit packet to the Nordson melter. Figure 12 shows how the command for reading actual temperature values is communicated.

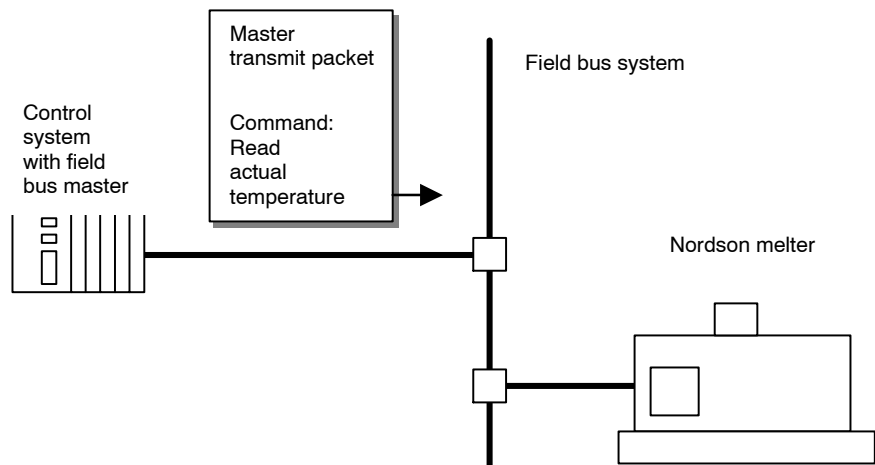


Figure 12 Example of master-to-melter communication

The Nordson melter sends a receive packet that includes status information on the processing of the transmit packet command. Requested data values are also returned in the receive packet, as shown in Figure 13.

The master cannot formulate and transmit a new command until the receive packet arrives.

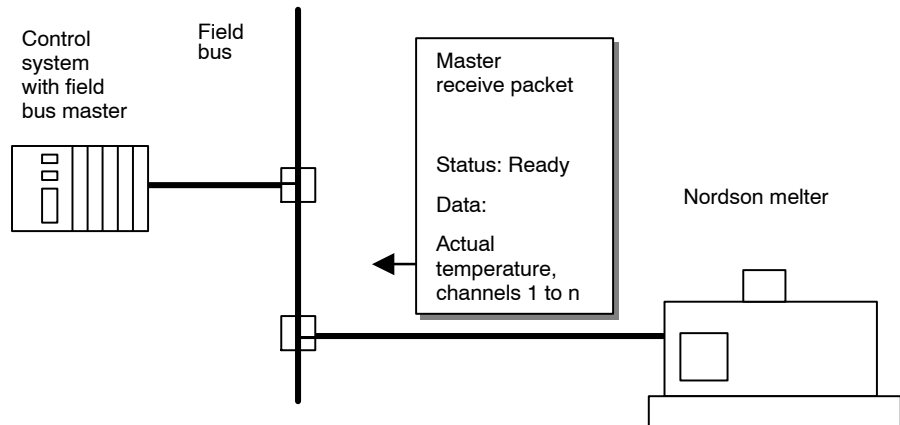


Figure 13 Example of melter-to-master communication

## Packet Processing

The master formulates a command and communicates it through the transmit packet. The Nordson melter processes the command and formulates the receive packet.

The master processes the data in the receive packet or repeats the command until a reply is received from the Nordson melter. Only one command is processed at a time. The Nordson melter keeps the reply available until the master formulates a new command.

When a command can not be executed, the Nordson melter replies by generating a fault signal in the status block. The master determines through this identification whether the previously transmitted command was correctly processed by the Nordson melter.

The master must check that data in the the *acknowledge data: data index* and *channel number* data blocks from the Nordson melter are the same as the data in the transmit packet.

## Transmit Packet Data Blocks

Table 12 lists the transmit packet data blocks.

Table 12 Transmit Packet Data Blocks

Byte Address N	Byte (B), Word (W)	Designation
N	B	Melter control
N + 1	B	Command
N + 2	B	Data index
N + 3	B	Channel number
N + 4	W	Write data value of channel number
N + 6	W	Motor 1 speed in %
N + 8	W	Motor 2 speed in %
N + 10	W	Motor 3 speed in %
N + 12	W	Motor 4 speed in %
N + 14	W	Not used
<b>NOTE:</b> The master may need to swap bytes in some or all of the packet data if the data formats of the master and the Nordson melter do not correspond.		

### ***Melter Control***

The melter control data in the transmit packet is executed by the Nordson melter with each packet, regardless of the command type.

**NOTE:** Unused or reserved bits must be set to 0 (zero).

Table 13 Melter Control Data

Bit	Value	Action	Note
0	1	Heaters ON	Heaters ON and temperature standby requires a transition from 0 to 1 for activation.
	0	Heaters OFF	
1	1	All pumps ON	
	0	All pumps OFF	
2	1	Pump 1 ON	
	0	Pump 1 OFF	
3	1	Pump 2 ON (if available)	
	0	Pump 2 OFF (if available)	
4	1	Pump 3 ON (if available)	
	0	Pump 3 OFF (if available)	
5	1	Pump 4 ON (if available)	
	0	Pump 4 OFF (if available)	
6	1	Temperature standby ON	Heaters ON and temperature standby requires a transition from 0 to 1 for activation.
	0	Temperature standby OFF	
7	1	Auto Motor ON	Automatically turns motors ON when unit has reached Ready
	0	Auto Motor OFF	

## Command

The master must send a command to the Nordson melter. Each command is defined by a command identification.

Table 14 Command Identifications

Command	Function
1 <sub>dec</sub>	No command for the Nordson melter
3 <sub>dec</sub>	Master wants to <b>read</b> data from the Nordson melter
6 <sub>dec</sub>	Master wants to <b>write</b> data to the Nordson melter

Any other command identification is not valid and will generate a communication fault in the status data block.

If the command is 0 (zero), a “host communication failure” will be generated at the melter. This functionality operates for communication monitoring and master life guarding.

## Data Index

The indexes in the *data index* block correspond to those in the *Communication Data List* at the end of this section.

The range of data indexes is 0 to 255. A data index set to 0 (zero) is interpreted as “no *data index*.”

## Channel Number

The master must select a channel number that is valid. Refer to *Channel Number List* later in this section for the channel number descriptions (such as for a temperature channel).

Beginning with the selected channel number as a start channel, the command for reading data is processed for the six successive channels.

## Write Data Value

In the *write data value* data block, the master writes the data values used to enter settings in the Nordson melter.

**Example:** Master sets the Ready Delay parameter to a value of 25 minutes.

Transmit Packet Data	Channel Number	Value
Write data value of channel number	0	25 <sub>dec</sub> (25min)

## Receive Packet Data Blocks

Table 15 lists the receive packet data blocks.

Table 15 Receive Packet Data Blocks

Byte Address N	Byte (B), Word (W)	Designation
N	W	Status
N + 2	B	Acknowledge: Data index
N + 3	B	Acknowledge: Channel number
N + 4	W	Read data value of channel number
N + 6	W	Read data value of channel number + 1
N + 8	W	Read data value of channel number + 2
N + 10	W	Read data value of channel number + 3
N + 12	W	Read data value of channel number + 4
N + 14	W	Read data value of channel number + 5
<b>NOTE:</b> The master may need to swap bytes in some or all of the packet data if the data formats of the master and the Nordson melter do not correspond.		

### Status

The status data in each receive packet communicates general information from the Nordson melter.

Table 16 Status Data

Bit	Value	Action
0	1	Ready for operation
	0	Not ready for operation
1	1	Pump Startup Protection On
	0	Pump Startup Protection Off
2	1	Alert
	0	No alert
3	1	Fault
	0	No fault
4	1	Shutdown
	0	No shutdown
5	1	Heat-up phase active
	0	Heat-up phase not active
<i>Continued...</i>		

**Status** (contd)

Table 16 Status Data (contd)

Bit	Value	Action
6	1	Temperature standby on
	0	Temperature standby off
7	1	Pump 1 is running
	0	Pump 1 is not running
8	1	Pump 2 is running (if available)
	0	Pump 2 is not running if available)
9	1	Pump 3 is running (if available)
	0	Pump 3 is not running (if available)
10	1	Pump 4 is running (if available)
	0	Pump 4 is not running (if available)
11	1	Not used
	0	Not used
12	—	Reserved
13	—	Reserved
14	1	Communication fault: <ul style="list-style-type: none"> <li>• Wrong <i>command</i> received</li> <li>• Wrong <i>data index</i> received</li> <li>• Wrong <i>channel number</i> received</li> </ul>
	0	No communication faults in block header
15	1	Communication fault in data value: <ul style="list-style-type: none"> <li>• Data values can not be changed. <b>Example:</b> Write command on actual values.</li> <li>• Data access not permitted. <b>Example:</b> Write command in the <i>Local mode</i> or <i>commands</i> for channels that are not installed.</li> <li>• At least one data value is invalid. The data block received may not be evaluated by the master. <b>Example:</b> A value is outside of the permitted value range.</li> </ul>
	0	No communication faults in data values



**NOTE:** Nordson melters are equipped with automatic Pump Startup Protection. The Pump Startup Protection prevents all stopped pumps (such as those stopped as a result of an RTD fault) from starting up automatically after finishing the heat-up phase or after a fault has occurred.

To acknowledge the Pump Startup Protection, change the All Pumps ON/OFF parameter from OFF to ON. (For a rising transition-based reset, refer to *Melter Control*. If bit1 = 0, then set to 1; if bit1 = 1, then set to 0 and subsequently to 1 again.)

### Read Data Value

In the *read data value* data block, the master reads the data received from the Nordson melter. The read data values of six successive channels are transmitted with each packet (where applicable).

**Example:** Master reads actual temperature values; channel number is set to 9.

Table 17 Read Data Values

Receive Packet Data	Temperature Channel	Value
Read data value of channel number	9	150 <sub>dec</sub> (150 °C)
Read data value of channel number + 1	10	151 <sub>dec</sub> (151 °C)
Read data value of channel number + 2	11	160 <sub>dec</sub> (160 °C)
Read data value of channel number + 3	12	165 <sub>dec</sub> (165 °C)
Read data value of channel number + 4	13	172 <sub>dec</sub> (172 °C)
Read data value of channel number + 5	14	180 <sub>dec</sub> (180 °C)

**NOTE:** If the master sets the *command* or *data index* to 0 (zero) in the transmit packet, the *read data values* are set to 0 (zero) from the melter.

**Example:** Master sets *data index* to 0 (zero).

#### Transmit Packet

Melter control	Command	Data Index	Channel Number	Write Data Value of Channel Number	1	2	3	4
		0		...				

**Read Data Value** (contd)

Receive Packet

Status	Acknowledge: Data index	Acknowledge: Channel Number	Read Data Value of Channel Number					
				+ 1	+ 2	+ 3	+ 4	+ 5
0001 <sub>hex</sub>	0	...	0	0	0	0	0	0

**NOTE:** If the transmit packet is faulty, the *read data values* are set to 0 (zero) from the Nordson melter.

**Example:** Master sets *data index* to a fault value (999). The *status* of the Nordson melter is *ready for operation* and *communication fault: wrong data index*.

Transmit Packet

Melter control	Command	Data Index	Channel Number	Write Data Value of Channel Number	1	2	3	4
		999		...				

Receive Packet

Status	Acknowledge: Data index	Acknowledge: Channel Number	Read Data Value of Channel Number					
				+ 1	+ 2	+ 3	+ 4	+ 5
4001 <sub>hex</sub>	999	...	0	0	0	0	0	0

**NOTE:** Invalid *read data* values are set to 0 (zero) by the Nordson melter.

**Data Security**

Data transfer occurs upon receipt of the transmit packet by the melter. The master can confirm correct data transfer by sending a read command in a transmit packet. The master cannot send a new command to the Nordson melter until a reply has been received.

## ***Master Procedures***

These procedures apply to programming executed from the master.

### **Master: Determine Transmit Packet**

- 1.. Set *melter control*.
- 2.. Set *command*, *data index*, and *channel number*.
- 3.. In case of a write command, determine the *write data value*.
- 4.. Send the transmit packet to the Nordson melter.

### **Melter: Process a New Packet**

- 1.. Evaluate and execute *melter control*, *command*, *data index*, and *channel number*.
- 2.. In case of a read command in the transmit packet: set *read data value*.
- 3.. Set received *data index* and *channel number* as acknowledge data.
- 4.. Set *status*.
- 5.. Provide the receive packet to the master.

### **Master: Evaluate the Receive Packet**

- 1.. Evaluate *status*.
- 2.. Check acknowledge data: *data index* and *channel number*.
- 3.. In case of a read command in the previous transmit packet: evaluate and process *read data value* in the master application.

# Packet Examples

## Example 1

Master action: enable melter (turn heaters on)

**NOTE:** In this example, the Nordson melter is operating and there are no faults.

Transmit Packet

Melter control	Command	Data Index	Channel Number	Write Data Value of Channel Number	1	2	3	4
Bit 0 set to 1: 01 <sub>hex</sub>		999		Does not matter	Does not matter			

Receive Packet

Status	Acknowledge: Data index	Acknowledge: Channel Number	Read Data Value of Channel Number					
				+ 1	+ 2	+ 3	+ 4	+ 5
001 <sub>hex</sub>		Does not matter						

## Example 2

Master action:

- Enable melter
- Set temperature setpoint of Hose 1 to 150°C

**NOTE:** In this example, the Nordson melter is operating and there are no faults.

Transmit Packet

Melter control	Command	Data Index	Channel Number	Write Data Value of Channel Number	1	2	3	4
Bit 0 set to 1: 01 <sub>hex</sub>	6 <sub>hex</sub>	73 <sub>hex</sub>	3 <sub>hex</sub>	96 <sub>hex</sub> (150 °C)	Does not matter			

Receive Packet

Status	Acknowledge: Data index	Acknowledge: Channel Number	Read Data Value of Channel Number				
				+ 1	+ 2	+ 3	+ 4
0001 <sub>hex</sub>	73 <sub>hex</sub>	3 <sub>hex</sub>	Does not matter				

### Example 3

Master action:

- Enable melter
- All pumps ON
- Read actual value of temperature channels 3 and 4

Result: channel 3 = 175°C; channel 4 = 180°C

**NOTE:** In this example, the Nordson melter is operating and there are no faults.

Transmit Packet

Melter control	Command	Data Index	Channel Number	Write Data Value of Channel Number	1	2	3	4
Bit 0 and bit 1 set to 1: 03 <sub>hex</sub>	3 <sub>hex</sub>	78 <sub>hex</sub>	3 <sub>hex</sub>	Does not matter	Does not matter			

Receive Packet

Status	Acknowledge: Data index	Acknowledge: Channel Number	Read Data Value of Channel Number					
				+ 1	+ 2	+ 3	+ 4	+ 5
0001 <sub>hex</sub>	78 <sub>hex</sub>	3 <sub>hex</sub>	AF <sub>hex</sub> (175 °C)	B4 <sub>hex</sub> (180 °C)	Does not matter			

## Troubleshooting

If there is a problem communicating with your network card, please use these troubleshooting tips.

- First, look at the four status LEDs on the card. Do they give an indication of a problem? Most often, a problem indicated by the status LEDs is caused by a cabling problem or the PLC is not correctly configured to communicate to the card. Please see the table in the Establish Communications section of this manual for details.
- Next, verify that the address of the card is set correctly.
- Next, verify that the watchdog LED is blinking green once per second. If it is not:
  - Reboot the melter
  - Verify that the melter has the latest software for that model of melter. If the software is not the latest version, a software upgrade may be necessary. The latest version of software is available at
    - For ProBlue and Liberty  
<http://emanuals.nordson.com/adhesives/software/BlueSeriesSoftware.html>
    - For AltaTouch  
<http://emanuals.nordson.com/adhesives/software/AltaBlueTouchSoftware.html>
    - For Concert  
<http://emanuals.nordson.com/adhesives/software/TruFlowSoftware.html>
- If the melter is displaying the F4/E error code but is otherwise communicating with the PLC, please verify that the PLC code is not writing an illegal value in the 'Command' byte in the index protocol. The only legal values in the Command byte are 1 (No Command), 3 (Read) and 6 (Write). Please see the Data Interface section of this manual for details.
- If none of the above steps solve the problem, please contact Nordson Technical Service at 1-877-NORDSVC or at [HMTechnicalService@nordson.com](mailto:HMTechnicalService@nordson.com)

## ***Channel Number List***

Table 18 Channel Numbers

<b>Number</b>	<b>Channel</b>
1	Tank
2	Manifold/Pump
3	Hose 1
4	Gun 1
5	Hose 2
6	Gun 2
7	Hose 3
8	Gun 3
9	Hose 4
10	Gun 4
11	Hose 5
12	Gun 5
13	Hose 6
14	Gun 6
15	Hose 7
16	Gun 7
17	Hose 8
18	Gun 8

## Communication Data List

### General Melter Data

Data Designation	Quantity	Range Resolution	Default	Remarks	Indexed Protocol	
					Data Index	Channel Number
Melter control/status	1	0-FFFF	N/A	Read/Write	NA	NA
Software version	1	byte 1 - version byte 0- revision	N/A	Read only	3	0
Melter operation mode: - Local mode - Fieldbus mode	1	1 (Local mode) 0 (Fieldbus)	0 (Fieldbus)	Read/Write at the operator panel; Read only via fieldbus	4	0
Hour Meter: Total hours with heaters on	1	0-99999 h	N/A	Read only	5	0
Service Interval: Adjustable time frame to check a particular maintenance	1	0-8736 h (1 year)	500 h	Read/Write	6	0
Clear Fault/Warning  <b>NOTE:</b> If the fault/warning condition has not been fixed, the fault/warning will reappear.	1	0/1	0 (no reset)	Read/Write	7	0
Ready delay value	1	0 - 60 min	0 min	Read/Write	9	0
Melter status: - heatup phase - startup protection - ready for operation - warning - fault - shutdown - standby - melter not enabled - motors not enabled	1	0 ( ) 1 (heatup phase) 2 (startup protection) 3 (melter ready) 4 (warning) 5 (fault) 6 (shutdown) 7 (standby) 8 (melter not enabled) 11 (motors not enabled)	N/A	Read only	10	0



**General Melter Data** (contd)

Data Designation	Quantity	Range Resolution	Default	Remarks	Indexed Protocol	
					Data Index	Channel Number
Seconds Left in Interlock Capability to let the user see how many seconds are left in the ready interlock delay.	1	0-3600	N/A	Read only	11	0
Hours Until Next Service	1	0-8736	N/A	Read only	12	0
Melter status and alarms Bit 1: Host Communication Fault Bit 3: Service Reminder Bit 10: Fill System Fault Bit 11: Tank Low	1	0000/FFFF (0/1)	N/A	Read only	15	0
Current alarm High byte: Channel Number of the involved channel (if there is a temperature failure) 1-18 (1= Tank 2= Manifold/Pump, 3= Hose 1, 4= Gun 1, etc) OR System Failure Number (if there is a system failure): Consult your Manual Low byte: Bit 0: System alarm Bit 1: Channel alarm Bit 3: Pressure alarm Bit 4: Tank Level alarm	1	0000/FFFF		Read only	23	0
Auto Pump On Off This allows the unit to automatically turn the piston pump on when the unit reaches setpoint.	1	0/1	1	Read/Write	29	0

**Flow/Pressure Data**

Data Designation	Quantity	Range Resolution	Default	Remarks	Flow and Pressure	
					Indexed Protocol	
					Data Index	Channel Number
Pressure Actual Value	1-16	0 - 138 bar 0 - 2001.5 PSI 0 - 13800 kPa	N/A	Read only	61	1-16
Underpressure Warning Value	1-16	0 - 100%	20	Read/Write	70	1-16
Overpressure Warning Value	1-16	0 - 100%	20	Read/Write	73	1-16
Motor Mode	1-4	0 = Manual 1 = Runup 2 = Pressure 3 = Flow	0	Read/Write	31	1-4
Motor Setpoint	1-4	0 - 100%	0	Read/Write	32	1-4
Target Linespeed Pt.2/Scale Factor Linespeed	1-16/1-4	0 - 100%	100	Read/Write	33	1-16/1-4
Scale Factor Motor Speed	1-4	1-94 RPM	94	Read/Write	34	1-4
Motor Actual Speed	1-16	RPM	N/A	Read only	36	1-4
Target Linespeed Pt. 1	1-16	0 - 100%	0	Read/Write	39	1-16
Overpressure Fault Value	1-16	0 - 100%	50	Read/Write	76	1-16
Target Pressure Pt. 2	1-16	0-1000 PSI 0 - 68.9 bar 0 - 6894.7 kPa	500	Read/Write	80	1-16
Target Pressure Pt. 1	1-16	0-1000 PSI 0 - 68.9 bar 0 - 6894.7 kPa	100	Read/Write	81	1-16
Pressure Build Enable	1-16	0/1	0	Read/Write	82	1-16
Stop Speed Threshold	1-4	0 - 100%	10	Read/Write	83	1-4
Pressure Build Setpoint	1-16	0-1000 PSI 0 - 68.9 bar 0 - 6894.7 kPa	50	Read/Write	84	1-16
True Flow Linespeed Setpoint	1-8	0 - 100%	100	Read/Write	90	1-8

**Flow/Pressure Data** (contd)

Data Designation	Quantity	Range Resolution	Default	Remarks	Flow and Pressure	
					Indexed Protocol	
					Data Index	Channel Number
True Flow Flow Setpoint	1-8	1000-500,000 mg/min	20000	Read/Write	96	1-8
True Flow Flow Status	1-8	Bit 0: Warning Bit 1: Fault	N/A	Read only	101	1-8
True Flow Underflow Warning	1-8	0 - 100%	10	Read/Write	102	1-8
True Flow Underflow Fault	1-8	0 - 100%	25	Read/Write	103	1-8
Motor minimum speed		0-94 RPM	0	Read/Write	35	0
True Flow Overflow Warning	1-8	0 - 100%	10	Read/Write	104	1-8
True Flow Overflow Fault	1-8	0 - 100%	25	Read/Write	105	1-8
True Flow Actual Flow	1-8	0 - 500,000 mg/mm	10	Read only	106	1-8
Line speed percent	1-4	0 - 100%	N/A	Read only	107	1-4
Line speed type	1-4	0 - Line speed reference from 0-10V terminal. 3 - Each Motor Line speed will come from the 3rd,4th,5th and 6th of control words	0	Read/Write	224	0

**Flow/Pressure Alarms**

Data Designation	Quantity	Range Resolution	Default	Remarks	Flow and Pressure	
					Indexed Protocol	
					Data Index	Channel Number
Pressure Status and Alarms Bit 0: Underpressure Bit 1: Overpressure	1-16	N/A	N/A	Read only	79	1-16

## Temperature Data

Data Designation	Quantity	Range Resolution	Default	Remarks	Indexed Protocol	
					Data Index	Channel Number
Pressure actual value	1	0 - 138 Bar	0	Read only	61	0
Temperature unit: Celsius/Fahrenheit	1	0 (°C)/1 (°F)	0 (°Celsius)	Read/Write	110	0
Activate Hose/Gun pair	1-8	0/1	0	Read/Write	112	1-8
Temperature setpoint value	1-18	40-230 °C/ 100-450 °F	N/A	Read/Write	115	1-18
Temperature setpoint value, global	1	40-230°C/ (100-450 °F)	N/A	Read/Write	116	0
Temperature setpoint value, group hose	1	40-230°C/ 100-450 °F	N/A	Read/Write	117	0
Temperature setpoint value, group gun	1	40-230°C/ 100-450 °F	N/A	Read/Write	118	0
Temperature actual value	1-18	40-230°C/ 100-450 °F	N/A	Read only	120	1-18
Temperature standby value, global	1	5-190°C 10-350 °F	50 °C/100 °F	Read/Write	128	0
Time period for deactivating heaters (after automatic standby)	1	0-1440min (24h)	0min	Read/Write	133	0
Time period for automatic standby mode activation (if no guns are active)	1	0 - 1440min (24h)	0min	Read/Write	135	0
Activate Temperature Channel	1-16	0/1	0	Read/Write	111	1-16

**Temperature Data** (contd)

Data Designation	Quantity	Range Resolution	Default	Remarks	Indexed Protocol	
					Data Index	Channel Number
Undertemperature fault value, global	1	5-60 °C/ 10-110 °F	0min	Read/Write	142	0
Overtemperature fault value, global	1	5-60 °C/ 10-110 °F	15 °C/25 °F	Read/Write	152	0
Fieldbus data: Temperature status and alarms Bit 0: Heater is ON / OFF Bit 1: Undertemperature warning Bit 2: Undertemperature fault Bit 3: Overtemperature warning Bit 4: Overtemperature fault Bit 5: Overtemperature shutdown Bit 6: Shorted temperature sensor Bit 7: Broken temperature sensor	1-18	0000/FFFF (0/1)	N/A	Read only	157	1-18
Auto Exit Standby	1	0 - 180 min	0	Read/Write	160	0

**Seven-Day Clock Data**

Data Designation	Quantity	Range Resolution	Default	Remarks	Indexed Protocol	
					Data Index	Channel Number
Seven-Day Clock switched ON / OFF, for fieldbus	1	0/1	0 (OFF)	Read/Write	200	0
Status: Seven-Day Clock in operation	1	0/1	N/A	Read only	201	0
Set Clock Day	1	1-7	N/A	Read/Write	202	0
Set Clock Hour	1	0-23	N/A	Read/Write	203	0
Set Clock Minute	1	0-59	N/A	Read/Write	204	0

**PML Data**

Data Designation	Quantity	Range Resolution	Default	Remarks	Indexed Protocol	
					Data Index	Channel Number
Current Mode: 0 = Manual, 1 = Automatic	1	0/1	0	Read Only	205	0
Current State: PML_UNDEFINED = 0 PML_OFF = 1 PML_STOPPED = 2 PML_STARTING = 3 PML_READY = 4 PML_STANDBY = 5 PML_PRODUCING = 6 PML_STOPPING = 7 PML_ABORTING = 8 PML_ABORTED = 9 PML_HOLDING = 10 PML_HELD = 11	1	0-11	0	Read/Write <b>Note:</b> Setting this value to anything other than 0 will cause the melter to behave according to the PackML specification. Leave this value at 0 if PackML specification is not being used.	206	0
Current State Time	1	HHHH:MM:SS.hh	N/A	Read only	207	0
Current Mode Time	1	HHHH:MM:SS.hh	N/A	Read only	208	0
Off Time	1	HHHH:MM:SS.hh	N/A	Read only	209	0
Stopped Time	1	HHHH:MM:SS.hh	N/A	Read only	210	0
Started Time	1	HHHH:MM:SS.hh	N/A	Read only	211	0
Ready Time	1	HHHH:MM:SS.hh	N/A	Read only	212	0
Standby Time	1	HHHH:MM:SS.hh	N/A	Read only	213	0
Producing Time	1	HHHH:MM:SS.hh	N/A	Read only	214	0

**PML Data** (contd)

Data Designation	Quantity	Range Resolution	Default	Remarks	Indexed Protocol	
					Data Index	Channel Number
Stopping Time	1	HHHH:MM:SS.hh	N/A	Read only	215	0
Aborting Time	1	HHHH:MM:SS.hh	N/A	Read only	216	0
Aborted Time	1	HHHH:MM:SS.hh	N/A	Read only	217	0
Holding Time	1	HHHH:MM:SS.hh	N/A	Read only	218	0
Held Time	1	HHHH:MM:SS.hh	N/A	Read only	219	0
Manual Mode Time	1	HHHH:MM:SS.hh	N/A	Read only	220	0
Automatic Mode Time	1	HHHH:MM:SS.hh	N/A	Read only	221	0
Clear PML Registers	1	0/1	0	Read/Write	222	0

**Commands for Fill Features**

**NOTE:** The following table applies only to Liberty melters.

Data Designation	Quantity	Range Resolution	Default	Remarks	Indexed Protocol	
					Data Index	Channel Number
Tank Fill Commands	1	0 (No command) 2 (Calibrate empty) 4 (Silence alarm) 8 (Reset refill fault)	0	Write only	196	0
Fill Time Delay	1	0 - 1000 S	3	Read/Write	162	0
Fill Time Limit	1	0 - 1000 S	30	Read/Write	163	0
* Fill Enable	1	0/1	1	Read/Write	197	0
* Tote Vibrator Time	1	0-30 S	10	Read/Write	198	0
* Actuator Counts	1	0-65535	0	Read/Write	199	0

Note: \* These three are only available for melter software 3.010 and higher

### Adhesive Tracking System Data (ATS)

Data Designation	Quantity	Range Resolution	Default	Remarks	Indexed Protocol	
					Data Index	Channel Number
Target Add On	1	0-1,000,000mg		Read/Write (Double Words)	234	0
K Factor	0.001	800-1000	915	Read/Write	235	0
Detector Polarity	1	0- Light on, 1-Dark On	1	Read/Write	236	0
Specific Gravity	0.01	80-120	95	Read/Write	90	0
Products to Skip	1	0-200	10	Read/Write	237	0
Products Skip Time	1	1-60s	10	Read/Write	238	0
Products to Avg.	1	1-200	10	Read/Write	239	0
Product to Teach	1	5-50	8	Read/Write	240	0
Alarm Delay Count	1	1-15	4	Read/Write	241	0
Units	1	0-Metric, 1-English	0	Read/Write	242	0
ATS Control	1	bitmask: 0x01: reset totals if change to 1 0x02: clear alerts if change to 1 0x04: factory reset ATS if change to 1		Write only	232	0
System Mode	1	0-disabled, 1-Teach, 3-Enabled	0	Read/Write	233	0
Adhesive/Hour	1			Read only (Double Words)	225	0
Add-On/Product	1			Read only (Double Words)	226	0
Total Adhesive	1			Read only (Double Words)	227	0
Total Products	1			Read only (Double Words)	228	0



**Adhesive Tracking System Data (ATS)(contd)**

Data Designation	Quantity	Range Resolution	Default	Remarks	Indexed Protocol	
					Data Index	Channel Number
Alarm Status	1	0-None, 1- Add-on overlimit, 2-Add-on under limit, 4-Flow without trigger, 8--phase error, 16-OverFlow Error		Read only (Double Words)	229	0
Total Alarms	1			Read only (Double Words)	230	0
Defective Products	1			Read only (Double Words)	231	0
Alarm Low Limit	0-100%	5-50	20	Read/Write	103	0
Alarm Upper Limit	0-100%	5-50	30	Read/Write	105	0

