

# PICO *Nexus* Controller

## Operating Manual



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## Introduction

This manual provides specifications, installation, setup, programming, and troubleshooting information for the PICO® *Nexus*™ controller. The compact, DIN-rail mounted *Nexus* controller provides precise dispensing control for Nordson EFD PICO *Pulse*® XP valves in a non-contact or contact application.

The *Nexus* controller features an easy-to-use web interface for quick setup and operation over a wireless network. The *Nexus* controller also includes the following protocols for direct communication with a programmable logic controller (PLC) over the Ethernet using TCP/IP (Transmission Control Protocol/Internet Protocol):

- NX protocol
- EtherNet/IP™
- PROFINET®
- RS-232

**NOTE:** Refer to the **PICO *Pulse* Series Valves Operating Manual** for detailed information on *Pulse* XP valves.

As with all EFD products, the PICO *Nexus* controller has been produced to exacting specifications and thoroughly tested prior to shipment.

To obtain maximum performance from this equipment, read this manual carefully.



# Nordson EFD Product Safety Statement

## WARNING

The safety message that follows has a WARNING level hazard.  
Failure to comply could result in death or serious injury.



### **ELECTRIC SHOCK**

Risk of electric shock. Disconnect power before removing covers and / or disconnect, lock out, and tag switches before servicing electrical equipment. If you receive even a slight electrical shock, shut down all equipment immediately. Do not restart the equipment until the problem has been identified and corrected.

## CAUTION

The safety messages that follow have a CAUTION level hazard.  
Failure to comply may result in minor or moderate injury.



### **READ MANUAL**

Read manual for proper use of this equipment. Follow all safety instructions. Task- and equipment-specific warnings, cautions, and instructions are included in equipment documentation where appropriate. Make sure these instructions and all other equipment documents are accessible to persons operating or servicing equipment.



### **MAXIMUM AIR PRESSURE**

Unless otherwise noted in the product manual, the maximum air input pressure is 7.0 bar (100 psi). Excessive air input pressure may damage the equipment. Air input pressure is intended to be applied through an external air pressure regulator rated for 0 to 7.0 bar (0 to 100 psi).



### **RELEASE PRESSURE**

Release hydraulic and pneumatic pressure before opening, adjusting, or servicing pressurized systems or components.



### **BURNS**

Hot surfaces! Avoid contact with the hot metal surfaces of heated components. 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.

## Nordson EFD Product Safety Statement (continued)

### Halogenated Hydrocarbon Solvent Hazards

Do not use halogenated hydrocarbon solvents in a pressurized system that contains aluminum components. Under pressure, these solvents can react with aluminum and explode, causing injury, death, or property damage. Halogenated hydrocarbon solvents contain one or more of the following elements.

Element	Symbol	Prefix
Fluorine	F	“Fluoro-”
Chlorine	Cl	“Chloro-”
Bromine	Br	“Bromo-”
Iodine	I	“Iodo-”

Check the Safety Data Sheet (SDS) or contact your material supplier for more information. If you must use halogenated hydrocarbon solvents, contact your EFD representative for compatible EFD components.

### High Pressure Fluids

High pressure fluids, unless they are safely contained, are extremely hazardous. Always release fluid pressure before adjusting or servicing high pressure equipment. A jet of high pressure fluid can cut like a knife and cause serious bodily injury, amputation, or death. Fluids penetrating the skin can also cause toxic poisoning.

#### **WARNING**

Any injury caused by high pressure liquid can be serious. If you are injured or even suspect an injury:

- Go to an emergency room immediately.
- Tell the doctor that you suspect an injection injury.
- Show the doctor the following note.
- Tell the doctor what kind of material you were dispensing.

#### **Medical Alert — Airless Spray Wounds: Note to Physician**

Injection in the skin is a serious traumatic injury. It is important to treat the injury surgically as soon as possible. Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected directly into the bloodstream.

### Qualified Personnel

Equipment owners are responsible for making sure that EFD equipment is installed, operated, and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

# Nordson EFD Product Safety Statement (continued)

## Intended Use

Use of EFD equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property. Some examples of unintended use of equipment include:

- Using incompatible materials.
- Making unauthorized modifications.
- Removing or bypassing safety guards or interlocks.
- Using incompatible or damaged parts.
- Using unapproved auxiliary equipment.
- Operating equipment in excess of maximum ratings.
- Operating equipment in an explosive atmosphere.

## Regulations and Approvals

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for Nordson EFD equipment will be voided if instructions for installation, operation, and service are not followed. If the equipment is used in a manner not specified by Nordson EFD, the protection provided by the equipment may be impaired.

## Personal Safety

To prevent injury, follow these instructions:

- Do not operate or service equipment unless you are qualified.
- Do not operate equipment unless safety guards, doors, and covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.
- Keep clear of moving equipment. Before adjusting or servicing moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.
- Make sure spray areas and other work areas are adequately ventilated.
- When using a syringe barrel, always keep the dispensing end of the tip pointing towards the work and away from the body or face. Store syringe barrels with the tip pointing down when they are not in use.
- Obtain and read the Safety Data Sheet (SDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials and use recommended personal protection devices.
- Be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits, and moving parts that cannot be enclosed or otherwise guarded for practical reasons.
- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located.
- Wear hearing protection to protect against hearing loss that can be caused by exposure to vacuum exhaust port noise over long periods of time.

# Nordson EFD Product Safety Statement (continued)

## Fire Safety

To prevent a fire or explosion, follow these instructions:

- Shut down all equipment immediately if you notice static sparking or arcing. Do not restart the equipment until the cause has been identified and corrected.
- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored.
- Do not heat materials to temperatures above those recommended by the manufacturer. Make sure heat monitoring and limiting devices are working properly.
- Provide adequate ventilation to prevent dangerous concentrations of volatile particles or vapors. Refer to local codes or the SDS for guidance.
- Do not disconnect live electrical circuits when working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.
- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located.

## Preventive Maintenance

As part of maintaining continuous trouble-free use of this product, Nordson EFD recommends the following simple preventive maintenance checks:

- Periodically inspect tube-to-fitting connections for proper fit. Secure as necessary.
- Check tubing for cracks and contamination. Replace tubing as necessary.
- Check all wiring connections for looseness. Tighten as necessary.
- Clean: If a front panel requires cleaning, use a clean, soft, damp rag with a mild detergent cleaner. **DO NOT USE** strong solvents (MEK, acetone, THF, etc.) as they will damage the front panel material.
- Maintain: Use only a clean, dry air supply to the unit. The equipment does not require any other regular maintenance.
- Test: Verify the operation of features and the performance of equipment using the appropriate sections of this manual. Return faulty or defective units to Nordson EFD for replacement.
- Use only replacement parts that are designed for use with the original equipment. Contact your Nordson EFD representative for information and advice.

# Nordson EFD Product Safety Statement (continued)

## Important Disposable Component Safety Information

All Nordson EFD disposable components, including syringe barrels, cartridges, pistons, tip caps, end caps, and dispense tips, are precision engineered for one-time use. Attempting to clean and re-use components will compromise dispensing accuracy and may increase the risk of personal injury.

Always wear appropriate protective equipment and clothing suitable for your dispensing application and adhere to the following guidelines:

- Do not heat syringe barrels or cartridges to a temperature greater than 38° C (100° F).
- Dispose of components according to local regulations after one-time use.
- Do not clean components with strong solvents (MEK, acetone, THF, etc.).
- Clean cartridge retainer systems and barrel loaders with mild detergents only.
- To prevent fluid waste, use Nordson EFD SmoothFlow™ pistons.

## Action in the Event of a Malfunction

If a system or any equipment in a system malfunctions, shut off the system immediately and perform the following steps:

1. Disconnect and lock out system electrical power. If using hydraulic and pneumatic shutoff valves, close and relieve pressure.
2. For Nordson EFD air-powered dispensers, remove the syringe barrel from the adapter assembly. For Nordson EFD electro-mechanical dispensers, slowly unscrew the barrel retainer and remove the barrel from the actuator.
3. Identify the reason for the malfunction and correct it before restarting the system.

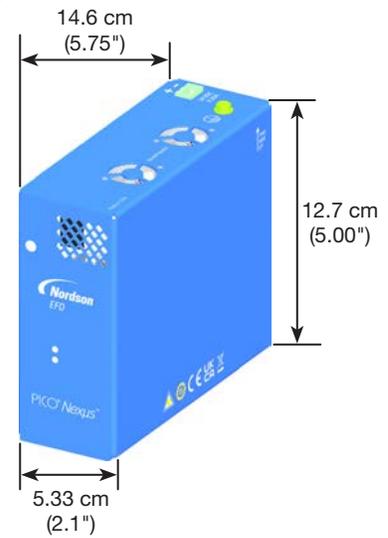
## Disposal

Dispose of equipment and materials used in operation and servicing according to local codes.

## Specifications

**NOTE:** Specifications and technical details are subject to change without prior notification.

Item	Specification
Cabinet size	5.33w × 12.7H × 14.6D cm (2.1w × 5.00H × 5.75D")
Weight	985 g (2.2 lb)
Time range	100 µs to 9.9999 s (depending on the Open Time of the selected wave profile)*
Electrical power input	24 VDC (±2%), 6.25 A maximum
Feedback circuits	Electronic switch, 24 VDC, 100 mA maximum
Cycle initiate	24 VDC signal
Valve cable minimum bend radius	44.45 mm (1.75")
Ambient operating conditions	Temperature*: 5–45° C (41–113° F) Humidity: 85% RH at 30° C, 40% at 45° C non-condensing Height above sea level: 2,000 meters max (6,562 feet)
Communication	NX protocol, EtherNet/IP, PROFINET, RS-232
Product classification	Installation Category II Pollution Degree 2
Approvals	CE, UKCA, ETL, RoHS, China RoHS, WEEE
*Each PICO system is tested to meet specifications prior to leaving the manufacturing facility. There are no procedures to calibrate the system externally. The dispense timing is accurate and tested before leaving the manufacturing facility. The indication accuracy of the temperature system is ±1° C.	



## Specifications (continued)

### ETL Certification

- Conforms to UL 61010-1
- Certified to CSA C22.2# 61010-1-12

### RECOGNIZED COMPONENT



**Intertek**  
**5029783**

### RoHS标准相关声明 (China RoHS Hazardous Material Declaration)

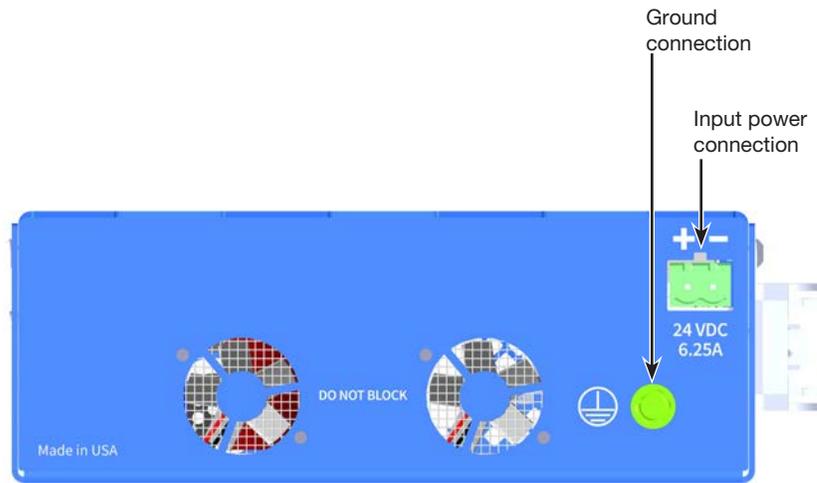
产品名称 Part Name	有害物质及元素 Toxic or Hazardous Substances and Elements					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr6)	多溴联苯 Polybrominated Biphenyls (PBB)	多溴联苯醚 Polybrominated Diphenyl Ethers (PBDE)
外部接口 External Electrical Connectors	<b>X</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<p><b>0:</b> 表示该产品所含有的危险成分或有害物质含量依照EIP-A, EIP-B, EIP-C 的标准低于SJ/T11363-2006 限定要求。Indicates that this toxic or hazardous substance contained in all the homogeneous materials for this part, according to EIP-A, EIP-B, EIP-C is below the limit requirement in SJ/T11363-2006.</p> <p><b>X:</b> 表示该产品所含有的危险成分或有害物质含量依照EIP-A, EIP-B, EIP-C 的标准高于SJ/T11363-2006 限定要求。Indicates that this toxic or hazardous substance contained in all the homogeneous materials for this part, according to EIP-A, EIP-B, EIP-C is above the limit requirement in SJ/T11363-2006.</p>						

### WEEE Directive

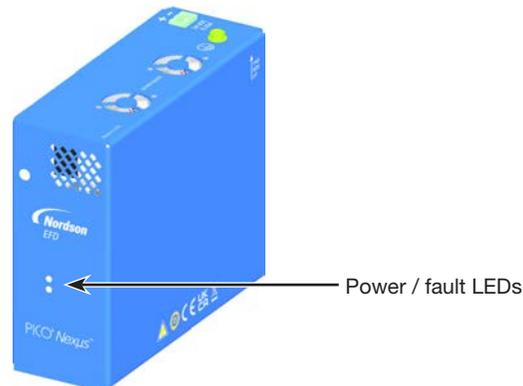
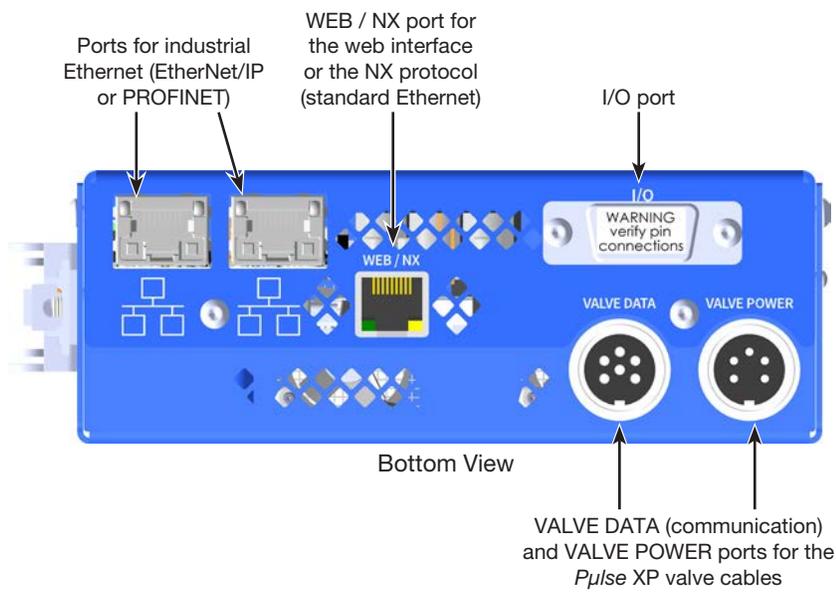


This equipment is regulated by the European Union under WEEE Directive (2012/19/EU). Refer to [www.nordsonefd.com/WEEE](http://www.nordsonefd.com/WEEE) for information about how to properly dispose of this equipment.

# Operating Features



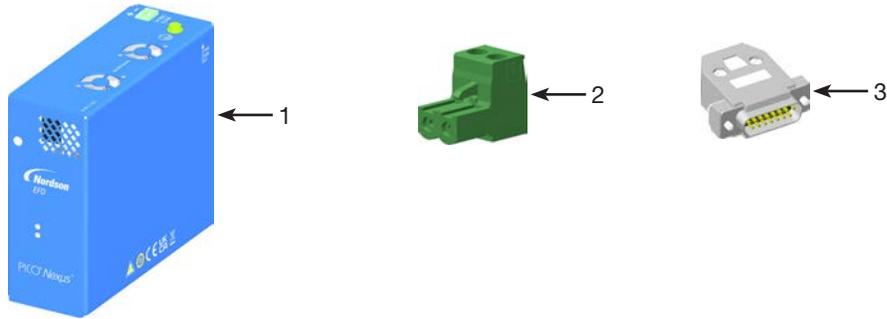
Top View



# Installation

Use this section in tandem with the quick start guide and any other system component operating manuals to install all components of the system.

## Unpack the System Components



- 1 PICO *Nexus* controller
- 2 Input power terminal block
- 3 E-stop jumper (required only if an emergency stop signal is not connected)

(Not shown)

PICO *Pulse* XP valve(s) (ordered separately)

PICO *Pulse* XP valve cable(s) (ordered separately)

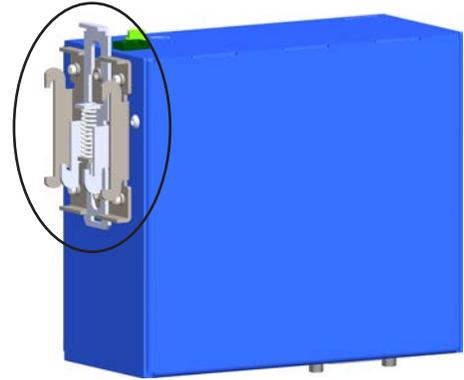
Quick start guide

## Installation (continued)

### Install the Nexus Controller

**NOTE:** Refer to “Installation Examples” on page 24 for typical configurations.

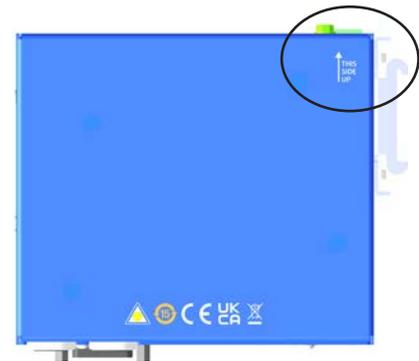
- Integrate the Nexus controller(s) into your existing machinery, observing the following guidelines:
  - Ensure that the controller is mounted in the correct orientation.
  - Ensure that each controller is mounted close enough to connecting devices to route wiring to it without straining or kinking the wiring.
  - Ensure that air can flow freely around the vent holes.
  - Ensure that all ports are easily accessible.
  - Ensure that the power / fault LEDs on the front of each controller are visible to operators.



*DIN mounting bracket on the back of the PICO Nexus controller*



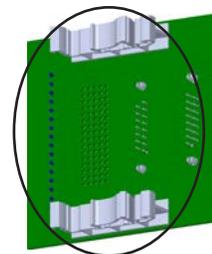
*Do not block the vent holes*



*Correct orientation*

- (Optional)** For each controller, integrate the optional DB-15 breakout board into the existing machinery, ensuring that each board is mounted close enough to its associated controller to easily route wiring to it without straining or kinking the wiring.

**NOTE:** Refer to “DB-15 Breakout Board” on page 46 for the optional breakout board part number.



*DIN mounting brackets on the optional DB-15 breakout board*

## Installation (continued)

### Install the *Pulse* XP Valves

**NOTE:** At this point, the *Nexµs* controller is neither installed nor powered on.

Assemble and mount the *Pulse* XP valve as follows:

1. Open the hinged seat of the piezo actuator by pushing the latch pin back towards the valve.
  2. Insert the fluid body assembly and close the hinged seat, ensuring it is fully engaged.
- 
3. Referring to the guidelines below, install the *Pulse* XP valve on the dispensing equipment:
  4. Nordson EFD strongly recommends using a valve mounting bracket. There are multiple mounting holes to allow for adjustment. Some valve mounting examples are shown below.
    - For repeatable mounting-location precision, use alignment dowels to mount the valve by the frame side.
    - When mounting the valve, do not install bracketing that could apply pressure to either side panel. Doing so can damage the piezo actuator, compromising valve performance.
    - When mounting a *Pulse* XP valve, ensure that the fluid supply feed loads are properly supported to prevent movement of the fluid body assembly. For *Pulse* XP valves, proper mounting is critical to ensure correct operation. Forces applied to the valve where the fluid supply attaches can cause strain movements of the fluid body assembly, which can result in calibration errors if the strain movements are too large (error code 20).

**NOTE:** Valve mounting kits are available. Refer to the valve operating manual.
  5. To divert static charges from the valve, connect it to the machine system ground. Vacant fastening threads may be used for this.



## Installation (continued)

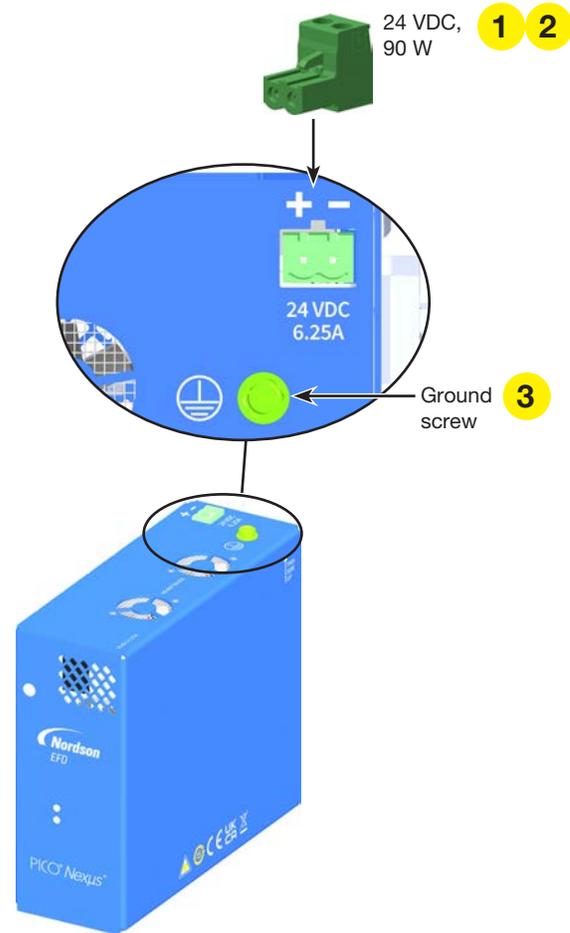
### Connect Power to the Controller

You will need the following items:

- Input power terminal block (supplied)
- Wire cutters / strippers
- Customer-supplied power (18 gauge recommended) and ground wiring
- Customer-supplied power supply as needed (Nordson EFD recommends the MEAN WELL 150 W, single-output, DIN-rail-mount power supply, part number EDR-150-24)

1. Install the input power terminal block in the 24 VDC input power port.
2. Connect 24 VDC power (6.25 A maximum) to each controller in the system, observing the marked polarity.
3. In accordance with all state and local electrical codes, follow the guidelines below to ensure that the controller is connected to earth ground through a single grounding point:
  - **If the DIN rail is rated as a grounding conductor in compliance with EN 50022**, the DIN rail acts as the grounding point. No other ground connection is required.
  - **If the DIN rail is floating, non-conductive, or if the controller is not mounted on the DIN rail**, connect an equipment grounding conductor to the green ground screw on the controller.
  - **If there are multiple controllers on an electrically floating DIN rail rated to handle ground fault currents in compliance with EN 50022**, connect an equipment grounding conductor to the green ground screw on **one** of the controllers. The remaining controllers will use the DIN rail as a daisy-chain to connect to earth ground.

**If the DIN rail is non-conductive or non-compliant**, connect an equipment grounding conductor to the green ground screw on **each** controller in the system.

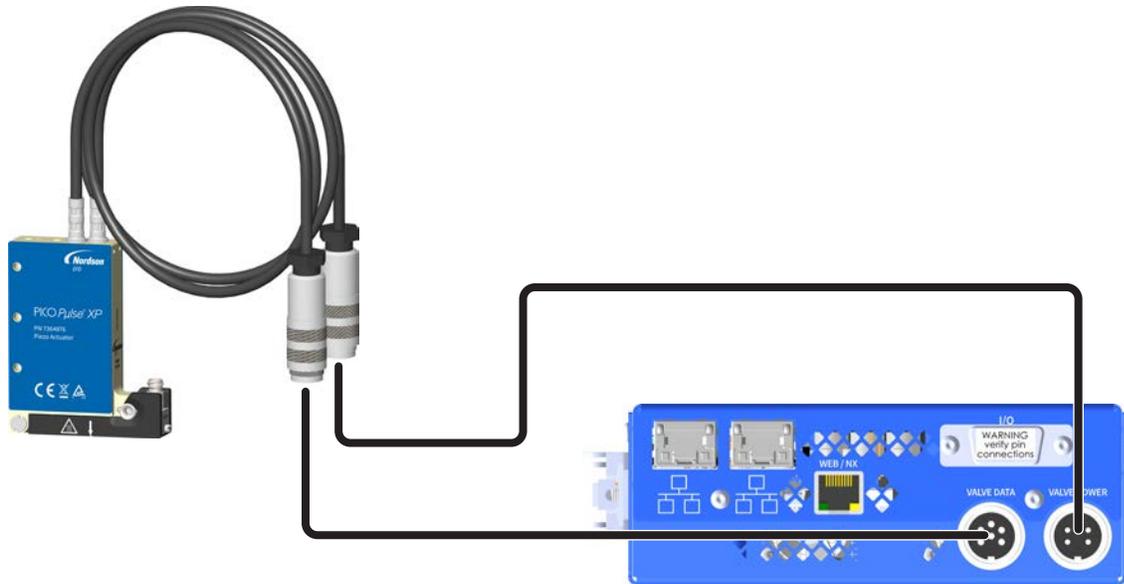


## Installation (continued)

### Connect the Valve Cables

**NOTE:** At this point, the *Nexµs* controller is NOT powered on.

Connect the *Pulse XP* valve cables to the VALVE DATA and VALVE POWER ports on the controller. Refer to “Extension Cables” on page 46 for available extension cables.



## Installation (continued)

### Connect Inputs / Outputs

Inputs / outputs (I/Os) can be connected directly to the I/O port on the controller, or alternatively to the I/O terminals on the optional DB-15 breakout board using the DB-15 cable.

**NOTE:** Nordson EFD strongly recommends using the optional breakout board and DB-15 cable for I/O connections.

You will need the following items:

- Wire
- Wire cutters / strippers
- Optional DB-15 breakout board and cable or other customer-supplied wiring for connections to the I/O port

#### NOTES:

- Refer to “I/O Port Pin Assignments” on page 58 for the I/O port pin details.
- Refer to “DB-15 Breakout Board” on page 46 for the optional breakout board part number.

### Cycle Initiate and Emergency Stop Inputs

A dispensing cycle can be initiated by a 24 VDC signal from a device such as a mechanical start button or a PLC. For the dispense cycle to start, the emergency stop (ESTOP) circuit must be closed.

1. If you are using the optional breakout board, connect the DB-15 cable to the I/O port on each controller in the system and to the associated breakout board.
2. For each controller in the system, connect a **cycle initiate input** to I/O port pins 5 and 6, Ex\_Trig (+) and Ex\_Trig (-).

Refer to “Cycle Initiate (Ex\_Trig) Signal” on page 59 for sourcing and sinking wiring diagrams.

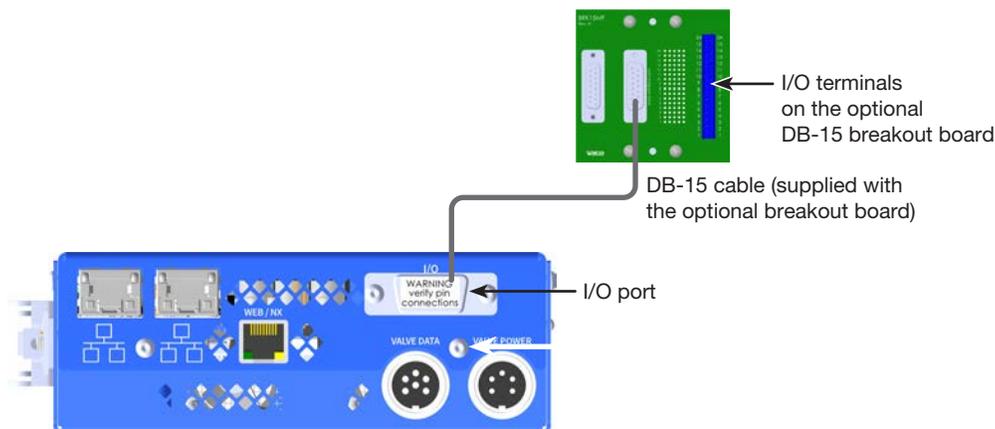
**IMPORTANT:** The cycle initiate signal must be clean and bounce-free.

3. For each controller in the system, connect an **emergency stop input** to I/O port pins 1 and 2 (Estop\_H and Estop\_L) through a normally closed relay that opens upon an emergency stop condition.

Refer to “Emergency Stop (ESTOP) Signal” on page 59 for a wiring diagram.

#### NOTES:

- If an emergency stop circuit is not needed, install the supplied E-stop jumper on pins 1 and 2. A valve will dispense only if these pins are connected.
- When an emergency stop circuit is restored to normal, the controller will begin operation again.



## Installation (continued)

### Controller Status Monitoring Output

The *Pulse* XP valve is normally open and power must be applied to close it. In the case of damage to the piezo actuator or the *Nexµs* controller, the valve may transition from a CLOSED to an OPEN condition, which can cause fluid release. Nordson EFD recommends continually monitoring the status signal of the *Nexµs* controller and immediately and automatically de-pressurizing the system if the signal indicates an error.

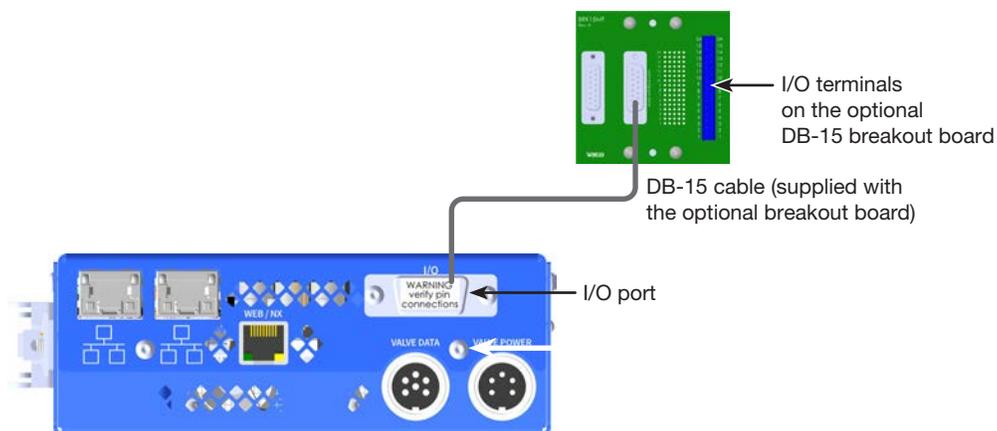
1. If you are using the optional breakout board, ensure that the DB-15 cable is connected to the I/O port on each controller in the system and to the associated breakout board.
2. For each controller in the system, connect a **status monitoring output**. Refer to “Status Monitoring or Valve Temperature Warning Signal” on page 61 for connection details.

### Other Inputs / Outputs (Optional)

Connect inputs / outputs (I/O) as needed for your operation. Refer to “I/O Port Pin Assignments” on page 58 for detailed I/O information and wiring diagrams. I/Os can be connected directly to the I/O port on the controller, or alternatively to the I/O terminals on the optional DB-15 breakout board using the DB-15 cable.

#### NOTES:

- All digital I/Os are 24 VDC.
- The analog input is 0–10 VDC.
- Nordson EFD recommends connecting a **valve temperature warning output** to provide operators with appropriate identification and protection against contact with the valve when the valve temperature exceeds +45° C (113° F). Refer to “Status Monitoring or Valve Temperature Warning Signal” on page 61 for connection details.
- For each controller in the system, Nordson EFD recommends connecting a **purge initiate input**. A purge signal allows operators to purge the valve by pressing a button or other purge-initiate device. Refer to “Purge Initiate Signal” on page 60 for connection details.



## Installation (continued)

### Establish Communication with the Controller

The Nexµs controller must be connected to the Ethernet and to a PC to use the web interface or the NX protocol. To use one of the industrial Ethernet protocols, the Nexµs controller must be also be connected to a PLC. Direct communication via RS-232 is also available.

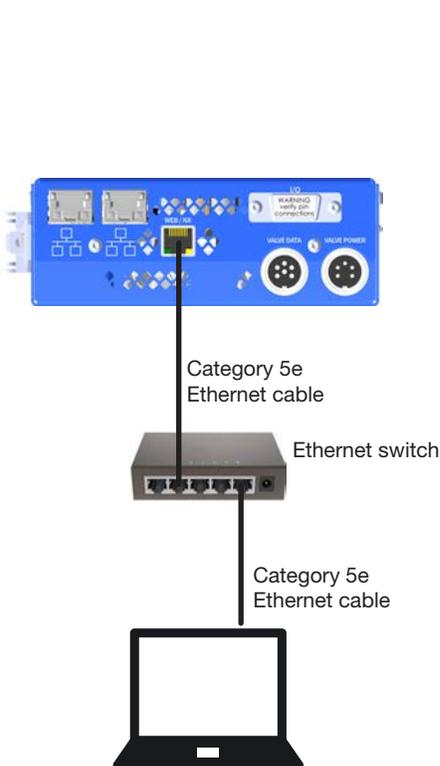
This manual provides procedures for operating the controller via the web interface. If you are using one of the communication protocols, refer to the applicable appendix for connection details and instructions:

- NX protocol: “Appendix B, NX Protocol” on page 66
- EtherNet/IP or PROFINET: “Appendix C, Industrial Ethernet Protocols” on page 79
- RS-232: “Appendix D, RS-232 Protocol” on page 82

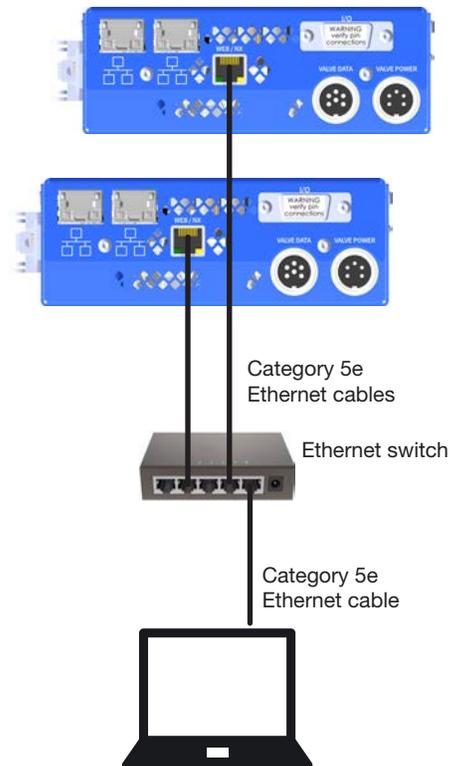
**NOTE:** Both the web interface and the communication protocols operate over TCP/IPv4 on port 80 and port 9000 respectively. To communicate with a Nexµs controller, the connected device must be capable of establishing a TCP/IPv4 connection on the appropriate port.

You will need the following items:

- Category 5e Ethernet cables (or similar), or an Ethernet crossover cable
  - Ethernet switch (if you have an Ethernet crossover cable, this switch is unnecessary)
1. As applicable for your installation, make the Ethernet connection to the Nexµs controller and to a personal computer.
  2. Enable the 24 VDC power supply to the Nexµs controller.



*Typical network connections for using the web interface with one controller*



*Typical network connections for using the web interface with two controllers*

## Installation (continued)

### Establish Communication with the Controller (continued)

- Open a web browser and go to the URL for the configured IP address. The default URL is:

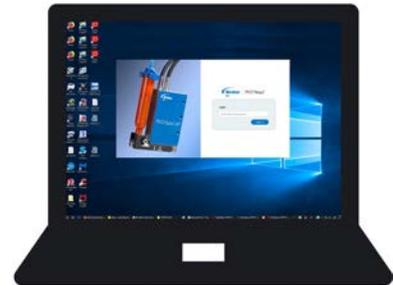
<http://192.168.10.60/>

- On the Login screen, enter the password for user-level access or administrator-level access:

- User Password: nexususer
- Administrator (Admin) Password: nexusadmin

**NOTE:** For details about administrator-level / user-level access and changing a password, refer to “User Password” on page 42.

- As needed, configure the network settings for your application:
  - Ensure that your PC is on the same network plane as the Nexµs controller. A Nexµs controller’s preprogrammed IP address is **192.168.10.60**. If there are multiple Nexµs controllers on the same network, they each need a unique IP address. To configure network settings, refer to “Standard Ethernet” on page 40.
  - To change the IP address of a computer, refer to “Appendix A, Changing the IP Address of a Computer” on page 64.



*Web interface open on a PC*

### Install the Other System Components

Install any system components (other than the controller and valves) that will comprise the complete dispensing system.

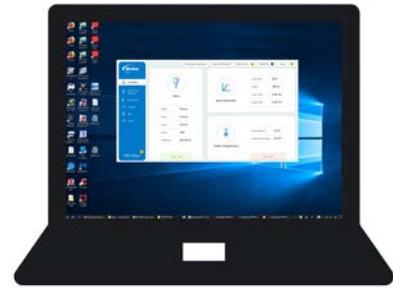
**NOTE:** For example, if you are using a fluid reservoir, position and install all the fluid reservoir components. For all ancillary components, refer to the quick start guide and / or operating manual provided with those components for installation and setup instructions.

# Installation (continued)

## Initial Startup and Testing

1. Ensure that the system is properly installed and that you are logged in to the web interface for the controller. You should see the Dashboard screen on your connected PC.
2. Add the fluid supply, but do not pressurize the fluid supply at this point.

**NOTE:** For low viscosity fluids used in a syringe barrel application, fill the barrel after installing it on the fluid-inlet fitting. High viscosity materials can be loaded into the barrel before installing it on the inlet fitting.



Web interface Dashboard screen open on a PC

### CAUTION

**Do not dry cycle the *Pulse XP* valve!** The ceramic nozzle seat and ball can be damaged if the valve is operated without fluid, causing leakage and a poor seal. Precise dispensing can no longer be guaranteed if this occurs.

3. Wait for the system to reach the heater temperature setpoint.

**NOTE:** The Dashboard screen shows both the Heater Setpoint and the actual heater temperature. Detailed information about the web interface is provided under “User Interface” on page 27.

Valve Name: Pulse XP    Valve: HD XP    Valve Power: ●    Dispensing: ●    Cycle: ●

Parameter	Value
Mode	OFF
Pulse	0.80 ms
Cycle	15.00 ms
Count	200
Frequency	66.67 Hz

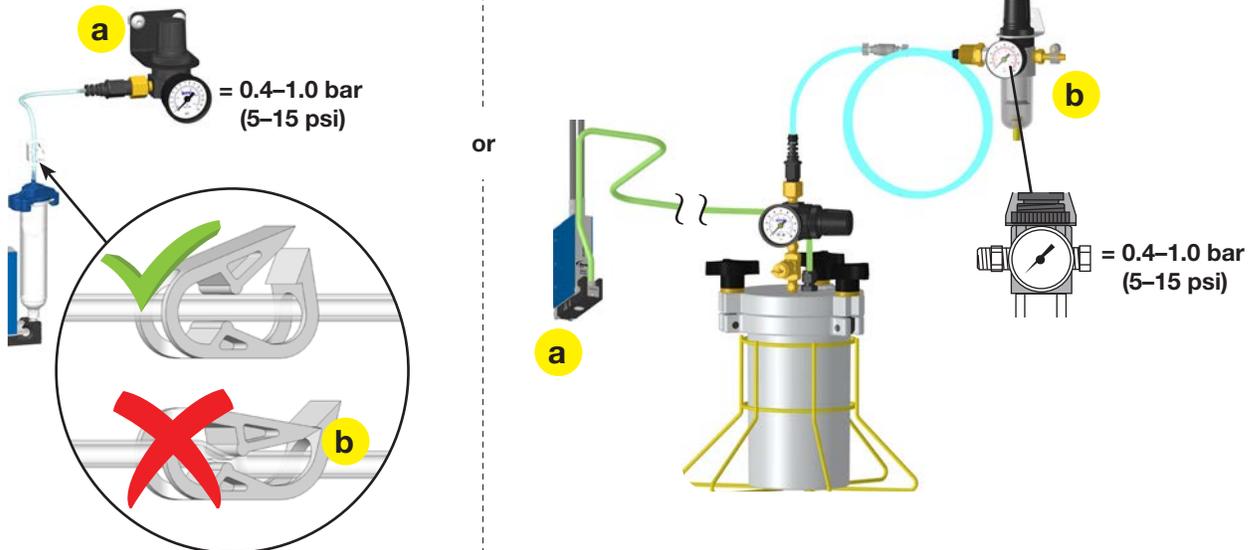
Parameter	Value
Close Volts	85 V
Stroke	82 $\mu$ m
Open Time	0.50 ms
Close Time	1.00 ms

Parameter	Value
Heater Setpoint	41.2 °C
Heater Act. Temp.	35.4 °C

Status: ON    Status: OK

## Installation (continued)

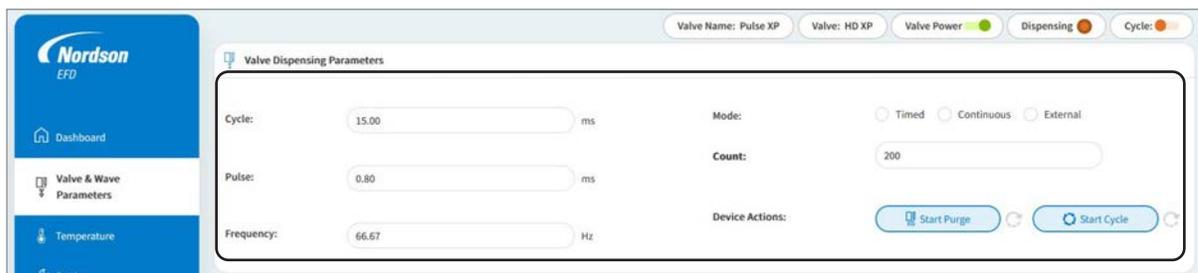
4. Introduce fluid to the system.
5. Set the reservoir pressure lower for thin fluids and higher for thick fluids [approximately 0.4–1.0 bar (5–15 psi), depending on the fluid]:
  - For tanks, use the in-line air shut-off valve to pressurize or de-pressurize the fluid supply.
  - For syringe barrels, connect or disconnect the adapter assembly from the reservoir pressure regulator and gauge.



6. Click VALVE & WAVE PARAMETERS and toggle VALVE POWER on.
7. Click START PURGE and allow fluid to purge from the system until the fluid flow is steady.
8. Click STOP PURGE to stop.
9. Enter the following recommended settings to test an actual deposit:
  - CYCLE = 5 (ms)
  - PULSE = 0.5 (ms)
  - MODE = Timed
  - COUNT = 10
10. Click START CYCLE.

The system dispenses 10 deposits and displays the Frequency indication.

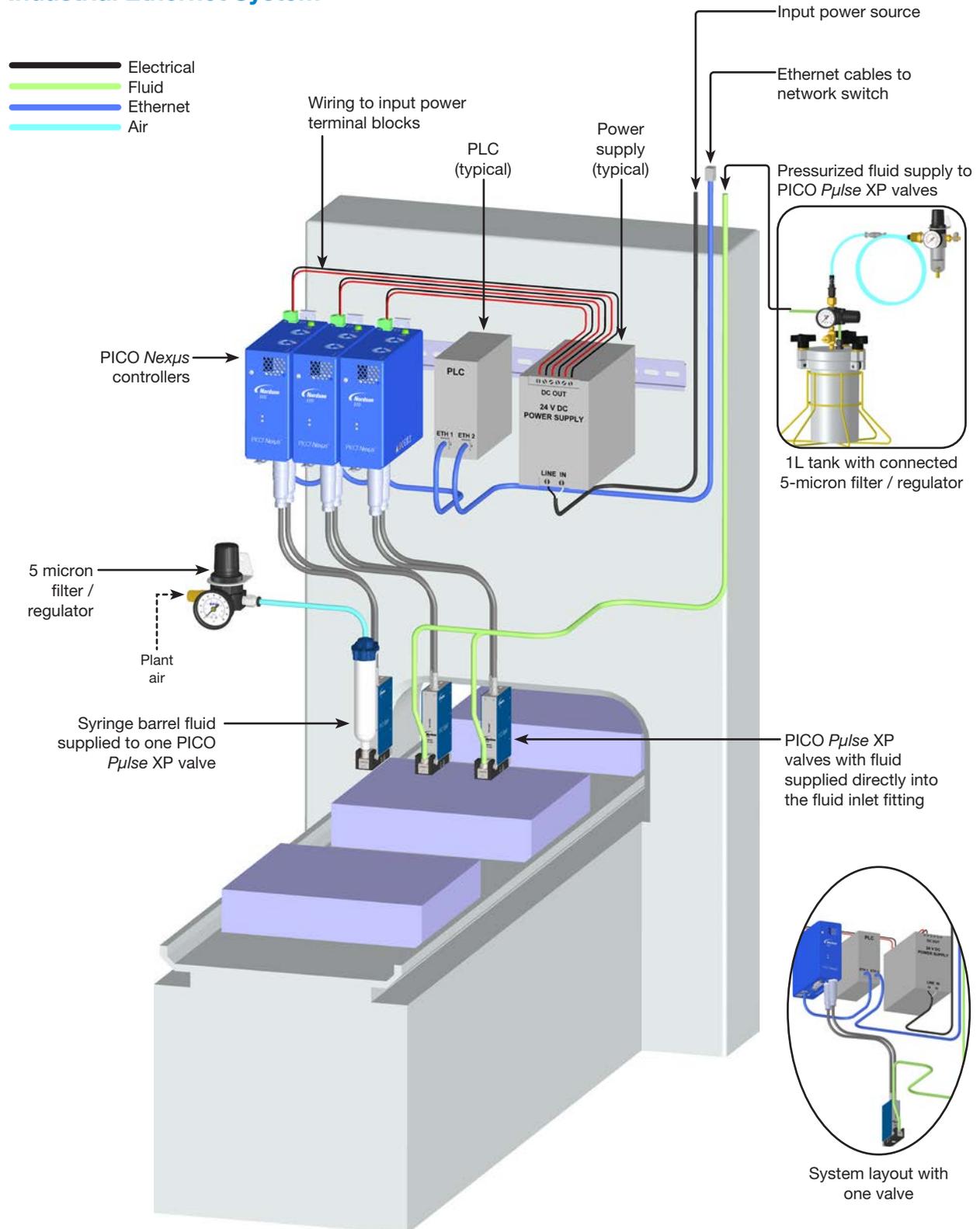
Make parameter adjustments until the desired deposit result is achieved. Use caution not to exceed maximum frequency ranges. For detailed information about the web interface and additional system setup, refer to “User Interface” on page 27 and to “System Setup” on page 32.



## Installation Examples

For valve installation instructions, refer to the *Pµlse* valve operating manual.

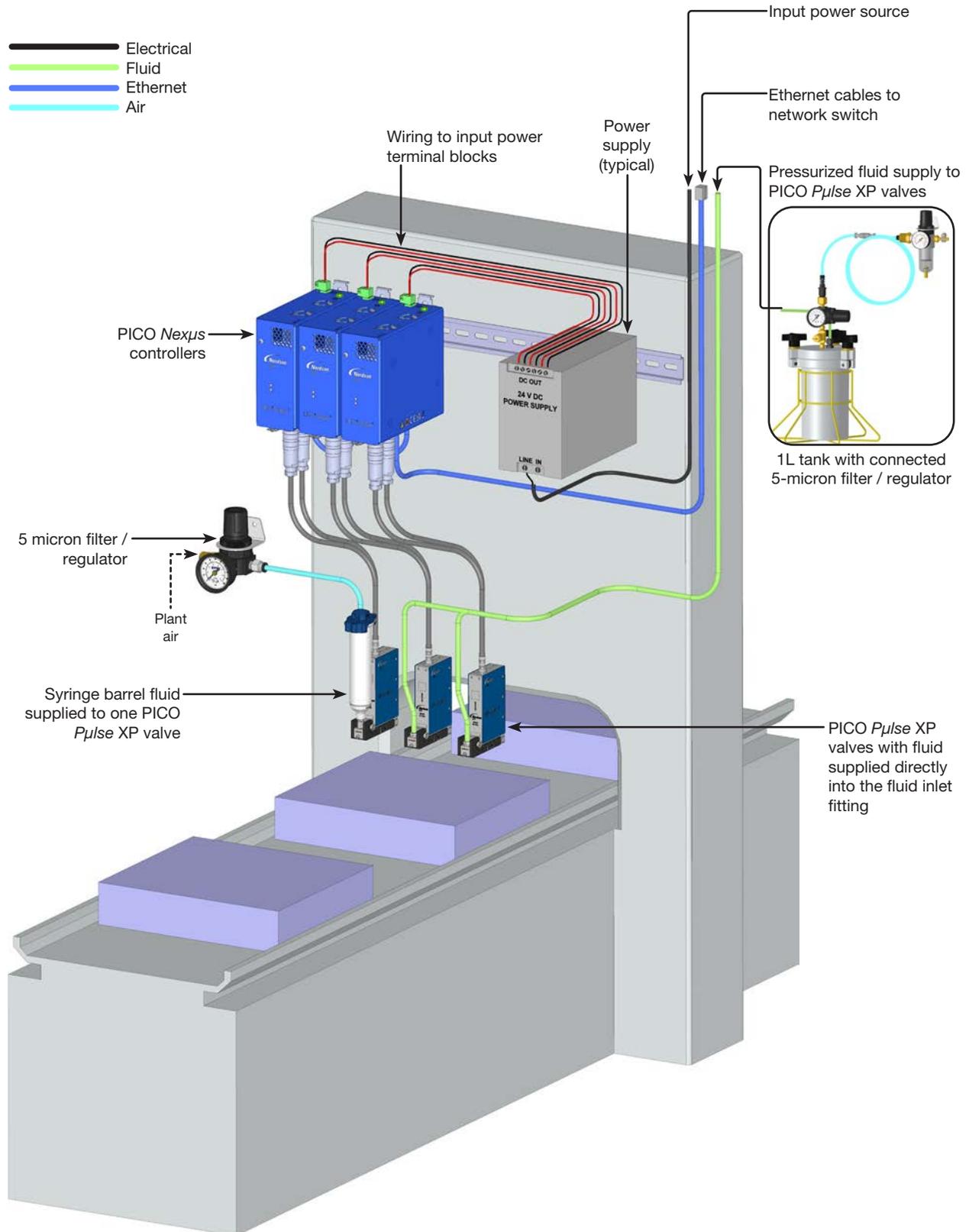
### Industrial Ethernet System



## Installation Examples (continued)

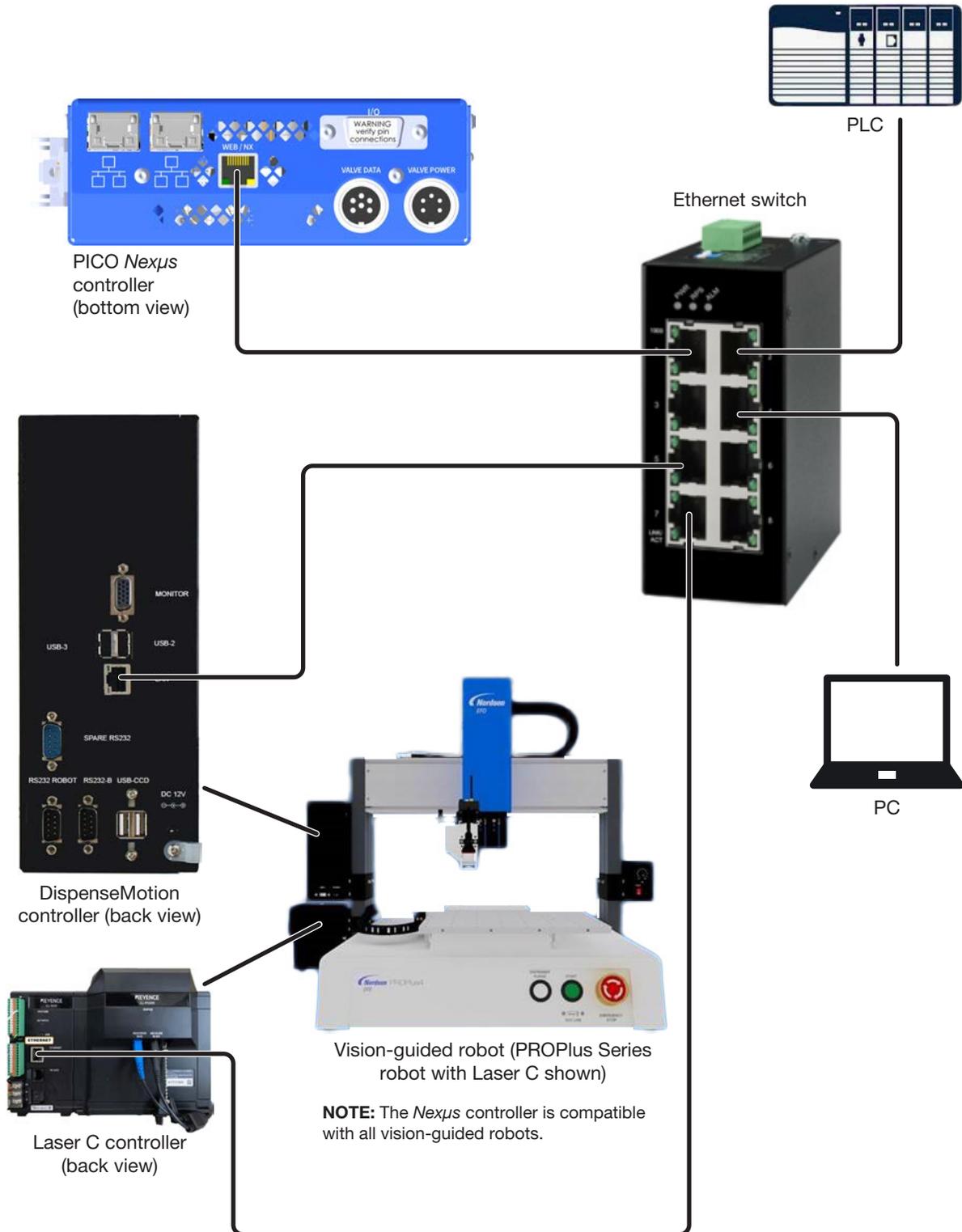
For valve installation instructions, refer to the *Pulse* valve operating manual.

### Standard Ethernet System



## Installation Examples (continued)

### Typical Network Connections for an Automated Dispensing System



## User Interface

The *Nexus* controller is programmed using the web interface or one of the available communication protocols.

**NOTE:** This manual provides procedures for operating the controller via the web interface. If you are using one of the communication protocols, refer to the applicable appendix:

- NX protocol: “Appendix B, NX Protocol” on page 66
- EtherNet/IP or PROFINET: “Appendix C, Industrial Ethernet Protocols” on page 79
- RS-232: “Appendix D, RS-232 Protocol” on page 82

## Login

On the Login screen, enter the password for user-level access or administrator-level access:

- User Password: nexususer
- Admin Password: nexusadmin

**NOTE:** For details about administrator-level / user-level access and changing a password, refer to “User Password” on page 42.



# User Interface (continued)

## Dashboard Screen

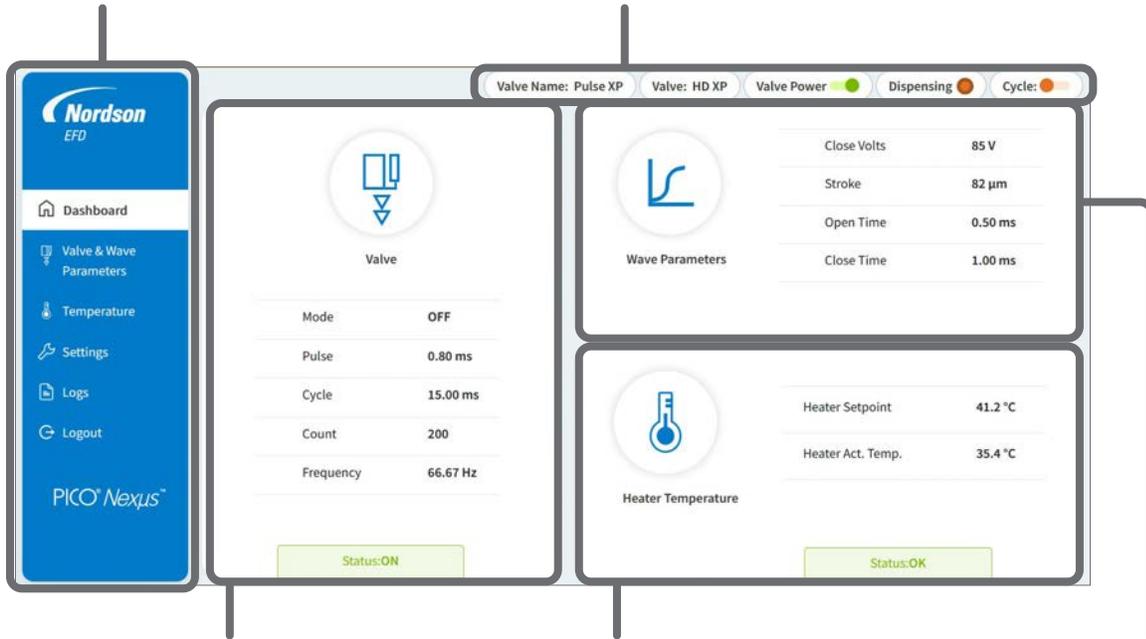
The Dashboard screen provides a summary of the system settings and actual values for the Valve & Wave Parameters and Temperature screens. The Main Menu is always present — use this menu to navigate through all the screens and to log out. The Status Bar is also always present.

### Main Menu

Refer to “Main Menu” on page 29 for details.

### Status Bar

Refer to “Status Bar” on page 29 for details.



### Valve data

Refer to “Adjusting the Valve Dispensing Parameters” on page 32 for details.

### Heater Temperature data

Refer to “Setting Up and Controlling the Valve Heater” on page 37 for details.

### Wave Parameter data

Refer to “Adjusting the Wave Parameters” on page 35 for details.

# User Interface (continued)

## Main Menu



Item	Description
<b>Dashboard</b>	Opens the Dashboard screen. Refer to “Dashboard Screen” on page 28 for details.
<b>Valve &amp; Wave Parameters</b>	Opens the Valve & Wave Parameters screen. Refer to “Adjusting the Valve Dispensing Parameters” on page 32 and to “Adjusting the Wave Parameters” on page 35 for details.
<b>Temperature</b>	Opens the Temperature screen. Refer to “Setting Up and Controlling the Valve Heater” on page 37 for details.
<b>Settings</b>	Opens the Settings screen. Refer to “Viewing or Changing System Settings” on page 39 for details.
<b>Logs</b>	Opens the Logs screen. Refer to “Logs” on page 47 for a description for details.
<b>Logout</b>	Click to log out of the web interface.

## Status Bar

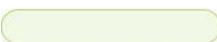


Item	Type	Description
<b>Valve Name</b>	Indication	Name of the connected valve. <b>NOTE:</b> Refer to “Standard Ethernet” on page 40 to change the valve name.
<b>Valve</b>	Indication (not editable)	Model of the connected valve, automatically determined by the controller.
<b>Valve Power</b>	Toggle	Switches valve power ON or OFF: <ul style="list-style-type: none"> <li>Green = Valve power ON = Valve CLOSED</li> <li>Orange = Valve power OFF = Valve OPEN</li> </ul> For each valve power cycle, you will be prompted to shut OFF the fluid pressure to the valve. Refer to “Switching Valve Power On or Off” on page 44 for details.
<b>Dispensing</b>	Indication	Indicates when the system is dispensing: <ul style="list-style-type: none"> <li>Blue = Valve is dispensing</li> <li>Orange = Valve is not dispensing</li> </ul>
<b>Cycle</b>	Toggle	Starts or stops a dispense cycle: <ul style="list-style-type: none"> <li>Green = Valve is dispensing</li> <li>Orange = Valve is not dispensing</li> </ul> <b>NOTE:</b> You can also use the Start Cycle / Stop Cycle button on the Valve and Wave Parameters screen to control dispensing.

# User Interface (continued)

## Buttons and Screen Colors

System selections are made by clicking on a button or toggle. Buttons and indications change color based on their status, as shown in the following table.

Button	Button Color	Description
	Pale orange	Indication (such as Heating)
	Pale blue	Not selected
	Pale green	OK or ON
	Blue	Selected
	Orange	OFF
	Green	ON
	Orange	Not dispensing
	Blue	Dispensing

## Icons

All system icons are shown in the legend below.

About 	Ethernet Configuration 	Logout 	Settings 	User Password 
Admin Password 	Import/Export 	Logs 	Start Cycle 	Valve 
Alert 	Language 	NX Protocol 	Start Purge 	Wave Parameters 
Dashboard 	Lockout 	Reset 	Temperature 	Wave Profile 

## User Interface (continued)

### Entering Values

To enter values, click inside the value field and enter the desired value. The system checks the value and either saves it or indicates if the value is outside the acceptable range.



Cycle: 30 ms 

*Entering a value and value being saved*



Cycle: 30.00 ms 

*Value saved*



Cycle: 150000 ms 

\*Cycle must be from 0.67 to 9999.00

*Value not allowed (hover the cursor over the caution symbol to see the allowable parameter range)*

## System Setup

**NOTE:** This manual provides procedures for operating the controller via the web interface. If you are using one of the communication protocols, refer to the applicable appendix:

- NX protocol: “Appendix B, NX Protocol” on page 66
- EtherNet/IP or PROFINET: “Appendix C, Industrial Ethernet Protocols” on page 79
- RS-232: “Appendix D, RS-232 Protocol” on page 82

## Adjusting the Valve Dispensing Parameters

Use the **Valve Dispensing Parameters** screen area for the following tasks:

- Changing the valve operating mode (Timed, Continuous, External)
- Adjusting the valve dispensing parameters (Cycle, Pulse, Frequency, and Count)
- Purging the valve (Start / Stop Purge)
- Cycling the valve (Start / Stop Cycle)

**NOTE:** The saved parameter settings are shown on the Dashboard screen.

1. On the Main Menu, click VALVE & WAVE PARAMETERS.
2. Enter settings for your application in the Valve Dispensing Parameters area of the screen, using START / STOP PURGE and START / STOP CYCLE to purge the system or test your settings.

Refer to “Valve Dispensing Parameters Screen” on page 33 for details about each element of this screen.

**Valve Dispensing Parameters** area of the Valve & Wave Parameters screen

## System Setup (continued)

### Valve Dispensing Parameters Screen

Valve Dispensing Parameters area of the Valve & Wave Parameters screen

Item	Description
<b>Cycle</b>	Sets the amount of time between deposits (in milliseconds). Range: 2 (ms) to 9.9999 (s) typical (minimum setting depends on open and close profile times)
<b>Pulse</b>	Sets how long the valve opens (in milliseconds). This setting is also referred to as the valve open time. Range: Depends on the open profile time and the type of valve being used; as low as 100 $\mu$ s possible
<b>Frequency</b>	Sets how fast the valve operates. A lower frequency causes slower operation; a higher frequency causes faster operation. Range: 1–1000 (Hz)

*Continued on next page*

## System Setup (continued)

### Valve Dispensing Parameters Screen (continued)



Valve Dispensing Parameters area of the Valve & Wave Parameters screen

Item	Description
<b>Mode</b>	<p>Sets the system operating mode.</p> <ul style="list-style-type: none"> <li>• <b>Timed:</b> In the Timed mode, the valve follows the Cycle, Pulse, and Count settings for each valve initiate signal.</li> <li>• <b>Continuous:</b> In the Continuous mode, the valve follows the Cycle and Pulse settings for as long as the valve initiate signal is active, ignoring the Count setting.</li> <li>• <b>External:</b> In the External mode, the controller operates as a slave to an input signal (such as input from a PLC) and thus no longer generates the timing signals required to drive the valve.</li> </ul> <p style="text-align: center;"><b>⚠ CAUTION</b></p> <p>Because the controller does not generate timing signals in the External mode, take care to not exceed the maximum operating parameters of the connected valve. In addition, the time setting of any external signal used to drive the valve must be greater than the Open Time setting for the wave parameter. Exceeding timing and valve operational parameters can result in overall loss of performance.</p>
<b>Count</b>	<p>Sets the number of deposits the valve dispenses per valve initiate cycle.</p> <p>Default: 1 Range: 00001–65535</p>
<b>Device Actions: Start Purge / Stop Purge</b>	<p>Purges the system.</p> <p><b>NOTE:</b> The Start Purge button...</p> <ul style="list-style-type: none"> <li>• Is enabled only when Valve Power is ON.</li> <li>• Functions only if the valve is not dispensing.</li> <li>• Is disabled if an error condition exists.</li> <li>• Must be clicked again to stop a purge.</li> </ul>
<b>Device Actions: Start Cycle / Stop Cycle</b>	<p>Sets whether a valve initiate signal is processed and also closes (applies voltage to) the valve. Valve initiate signals are processed only when Valve Power is ON. By default, Valve Power is ON when the controller is switched on.</p> <p><b>NOTE:</b> The valve is normally open and power must be applied to close it. Always turn the valve ON before applying fluid and air pressure; otherwise, the valve will leak.</p>

# System Setup (continued)

## Adjusting the Wave Parameters

The **Wave Parameters** are used to control the wave profile of the valve. A wave profile, or waveform, is the rise and fall of the valve actuation signal. Use the Wave Parameters to fine-tune the resulting material deposit by adjusting the currently selected wave profile.

### NOTES:

- The default wave profile is Ramp. To change to a different wave profile, refer to “Wave Profile” on page 41.
- The saved Wave Parameter settings are shown on the Dashboard screen.

1. On the Main Menu, click VALVE & WAVE PARAMETERS.
2. To fine-tune the wave profile, adjust the settings in the Wave Parameters area of the screen.  
Refer to “Wave Parameters Screen” on page 36 for details about each element of this screen.

**Wave Parameters** area of the Valve & Wave Parameters screen

# System Setup (continued)

## Adjusting the Wave Parameters (continued)

Wave Parameters area of the Valve & Wave Parameters screen

### Wave Parameters Screen

Item	Description
<b>Close Volts</b>	Sets the voltage to close the valve. The higher the voltage, the greater the sealing force applied. Minimum: 20 V Maximum: 130 V
<b>Stroke</b>	Sets the tappet displacement in microns. Minimum: 15 µm Maximum: 165 µm <b>NOTE:</b> The controller adjusts automatically to maintain the tappet displacement.
 <b>CAUTION</b>	
For fluids with a viscosity lower than 1000 cP, do not use aggressively low Open Time / Close Time settings (i.e., settings lower than 250 µs / 0.25 ms); doing so can damage the valve. Nordsion EFD recommends starting with higher Open Time / Close Time settings (250 µs / 0.25 ms or greater), then decreasing in small increments based on the dispensing results.	
<b>Open Time</b>	Sets how fast the valve opens. Minimum: 100 µs (0.10 ms) Maximum: 500 µs (0.50 ms)
<b>Close Time</b>	Sets how fast the valve closes. Minimum: 100 µs (0.10 ms) Maximum: 2000 µs (2.0 ms)
<b>Graph</b>	Provides a visual representation of the selected wave profile. Click FULL SCREEN for a larger view of the graph. The default wave profile is Ramp. To change to a different wave profile, refer to “Wave Profile” on page 41.

# System Setup (continued)

## Setting Up and Controlling the Valve Heater

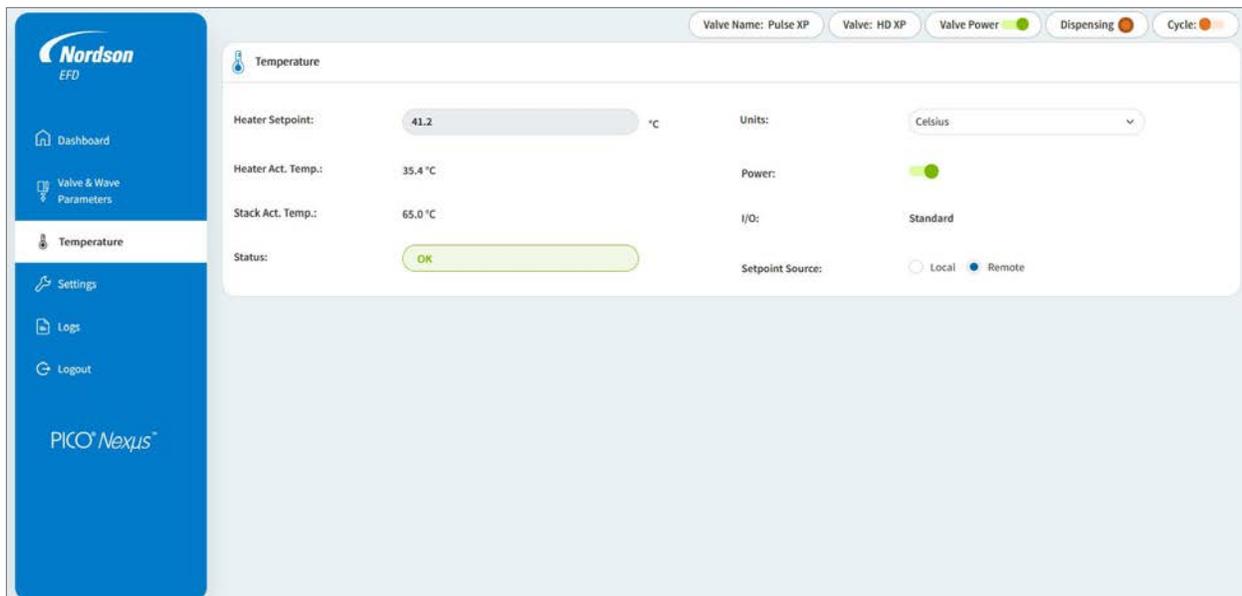
Use the Temperature screen area for the following tasks:

- Changing the heater temperature setpoint
- Viewing the actual temperatures of the heater and the piezo stack
- Viewing the heater ON / OFF status
- Changing the temperature units to Celsius or Fahrenheit
- Switching the heater power ON or OFF
- Setting the type of input / output (I/O) control for the heater
- Setting the heater setpoint control to Local or Remote

### NOTES:

- The heater ON / OFF status and actual heater and piezo stack temperatures are shown on the Dashboard screen.
- By default, the system uses the Heater Set Point defined on the temperature screen. To use a heater temperature setpoint from a remote source, change the Setpoint from Local to Remote.

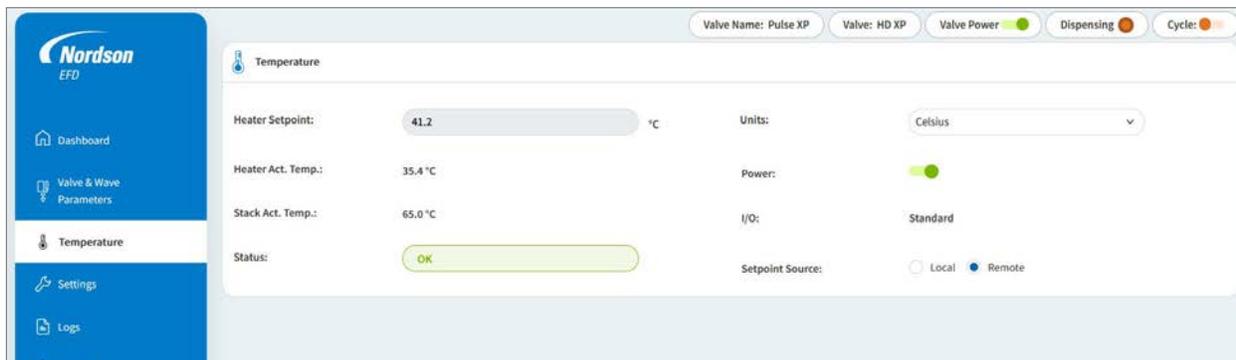
1. On the Main Menu, click TEMPERATURE.
2. Enter settings for your application, or use the heater POWER toggle to switch heater power ON or OFF.  
Refer to “Temperature Screen” on page 38 for details about each element of this screen.



Temperature screen

## System Setup (continued)

### Setting Up and Controlling the Valve Heater (continued)



Temperature screen

#### Temperature Screen

Item	Description
<b>Heater Setpoint</b>	Sets the desired temperature for the valve heater. Minimum: 0 °C (0 °F) Maximum: 100 °C (212 °F)
<b>Current Heater</b>	Shows the actual temperature of the valve heater.
<b>Current Stack</b>	Shows the actual temperature of the piezo actuator stack.
<b>Status</b>	Indicates whether the valve heater is switched ON or OFF.
<b>Units</b>	Sets how temperature units are displayed (Celsius or Fahrenheit).
<b>Power</b>	Toggles the valve heater power ON or OFF: <ul style="list-style-type: none"> <li>• Green = Heater ON</li> <li>• Orange = Heater OFF</li> </ul>
<b>I/O</b>	Shows the status of the heater connectivity: <ul style="list-style-type: none"> <li>• <b>Standard (default):</b> Indicates normal heater operation.</li> <li>• <b>Overwritten:</b> Indicates that an input has disabled the heater.</li> </ul>
<b>Setpoint Source</b>	Sets which heater temperature setpoint the system uses: <ul style="list-style-type: none"> <li>• <b>Local:</b> The system uses the Heater Setpoint setting of the web interface.</li> <li>• <b>Remote:</b> The system uses the heater temperature setpoint from the remote input supplied through the I/O connector. Refer to “I/O Port Pin Assignments” on page 58 to connect inputs / outputs.</li> </ul>

# System Setup (continued)

## Viewing or Changing System Settings

Use the Settings screen for the following tasks:

- Configuring the industrial Ethernet protocol settings (PROFINET or EtherNet/IP)
- Configuring the standard Ethernet settings (NX protocol)
- Changing the Valve Name
- Managing lockouts
- Selecting the Wave Profile
- Changing the administrator password
- Changing the user password
- Restoring the system to the factory default settings
- Setting the language
- Viewing the controller and valve information
- Updating the system firmware

1. On the Main Menu, click SETTINGS.
2. In the Settings sub-menu, click the setting you want to view or change. The respective sub-screen opens on the right side.
3. Enter settings for your application.

Refer to “Settings Menu Sub-Screens” on page 40 for details and task-oriented information for each sub-screen.

The screenshot displays the PICO Nexus Settings interface. On the left is a blue sidebar with the Nordsion EFD logo and navigation options: Dashboard, Valve & Wave Parameters, Temperature, Settings (highlighted), Logs, and Logout. The main content area is divided into two panels. The left panel, titled 'Industrial Ethernet', contains a sub-menu with options: Standard Ethernet, Import/Export, Lockout, Wave Profile, Admin Password, User Password, Reset, Language, and About. The right panel, also titled 'Industrial Ethernet', shows configuration fields: Mac Address (60-5B-30-07-7F-47), IP Address (192.168.45.50), Subnet Mask (255.255.255.0), Default Gateway (192.168.45.1), and Protocol (radio buttons for PROFINET and selected EtherNet/IP). A 'Save' button is located at the bottom right of the right panel. At the top right of the main area, there are status indicators for Valve Name: Pulse XP, Valve: HD XP, Valve Power (green dot), Dispensing (orange dot), and Cycle (orange dot).

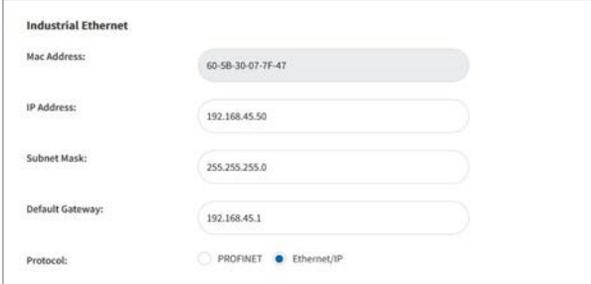
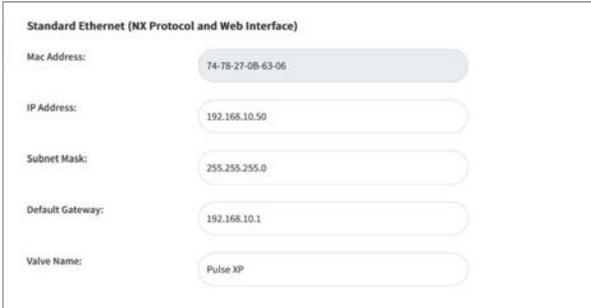
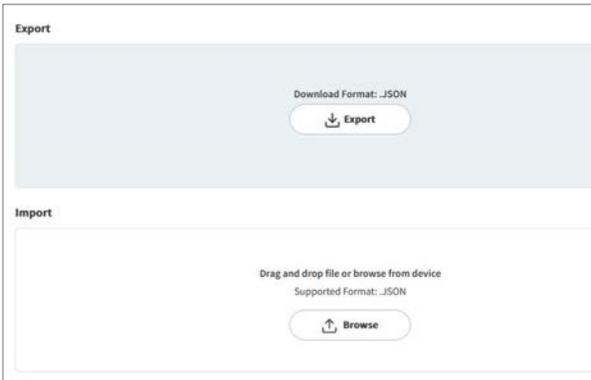
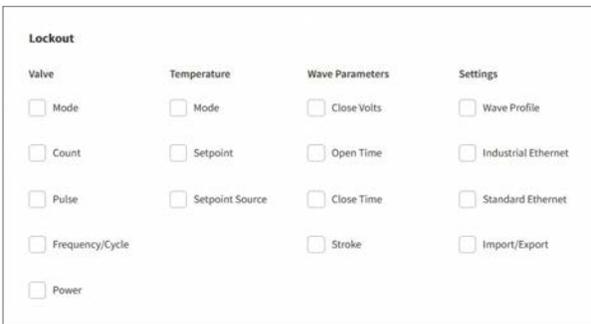
Settings sub-menu (remains visible as long as Settings is selected)

This sub-screen changes depending on the selected sub-menu item

Settings screen and sub-menu (Industrial Ethernet sub-screen shown)

# System Setup (continued)

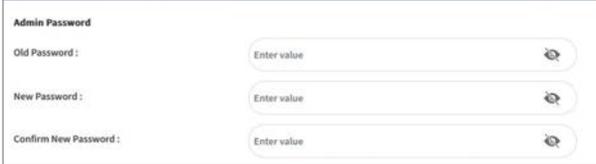
## Settings Menu Sub-Screens

Item	Description and Use	Screen Capture
<p><b>Industrial Ethernet</b></p>	<p>Select the desired <b>Protocol</b> radio button.</p> <p>Use the following fields to configure the network settings for the selected protocol:</p> <ul style="list-style-type: none"> <li>• Mac Address</li> <li>• IP Address</li> <li>• Subnet Mask</li> <li>• Default Gateway</li> </ul>	
<p><b>Standard Ethernet</b></p>	<p>Use the following fields to configure the network settings for the web interface or NX protocol:</p> <ul style="list-style-type: none"> <li>• Mac Address</li> <li>• IP Address</li> <li>• Subnet Mask</li> <li>• Default Gateway</li> </ul> <p><b>Valve Name:</b> Use to change the valve name shown in the status bar. This field supports Unicode® characters.</p>	
<p><b>Import/Export</b></p>	<p>Use to export or import parameter settings in *.json format:</p> <ul style="list-style-type: none"> <li>• When an import is successful, the new settings are displayed.</li> <li>• If a setting is not allowed, an error message shows the out-of-range values.</li> </ul> <p><b>NOTE:</b> You can view or edit *.json files in a text editor.</p>	
<p><b>Lockout</b></p>	<p>Select or deselect the functions you want to lock out. The selected functions cannot be changed or used, but the settings can still be viewed.</p>	

*Continued on next page*

# System Setup (continued)

## Settings Menu Sub-Screens (continued)

Item	Description and Use	Screen Capture
<b>Wave Profile</b>	<ol style="list-style-type: none"> <li>Click the tab for the wave profile you want to select: <ul style="list-style-type: none"> <li><b>Ramp:</b> This is the default selection. Use this wave profile when dispensing thicker or shear-thinning fluids.</li> <li><b>1, 2, 3, or 4:</b> Up to four custom wave profiles configured by Nordson EFD can be added. Contact your Nordson EFD technical support representative for assistance.</li> </ul> <p><b>NOTE:</b> A graph of each wave profile is provided. Click FULL SCREEN for a larger view. Click EXIT FULL SCREEN to return to the normal view.</p> </li> <li>Click SELECT to save the wave profile selection. To fine-tune the wave profile, refer to “Adjusting the Wave Parameters” on page 35.</li> </ol>	 <p>The top screenshot shows the 'Wave Profile' screen with the 'Ramp' tab selected. It includes a 'Wave Description' section stating: 'Ramp: This is the default selection. Use this wave profile when dispensing thicker or shear-thinning fluids. See the waveform graph for a visual representation of the wave profile.' The graph shows a square wave with a ramp up and down. The bottom screenshot shows the same screen with a custom profile '1' selected. The 'Wave Description' section states: 'Custom: This wave profile can be customized by Nordson EFD. Contact your local sales / technical support representative to determine if a custom wave profile can be created for your application. See the waveform graph for a visual representation of the wave profile.' The graph is identical to the one above.</p>
<b>Admin Password</b>	<p>Use to change the administrator password.</p> <p>Administrator access allows full control of all system functions.</p>	 <p>The screenshot shows the 'Admin Password' screen with three input fields: 'Old Password', 'New Password', and 'Confirm New Password'. Each field has a placeholder 'Enter value' and a toggle icon to the right.</p>

*Continued on next page*

# System Setup (continued)

## Settings Menu Sub-Screens (continued)

Item	Description and Use	Screen Capture
<b>User Password</b>	<p>Use to change the user password.</p> <p>User access disables the following:</p> <ul style="list-style-type: none"> <li>• Lockout</li> <li>• Admin Password</li> <li>• User Password</li> <li>• Reset</li> </ul> <p><b>NOTE:</b> To lock out user access to any other functions, make the selections on the Lockout sub-screen.</p>	 <p>The screenshot shows the 'User Password' screen with two input fields: 'New Password' and 'Confirm New Password'. Each field has a placeholder 'Enter value' and a clear button (X) on the right.</p>
<b>Reset</b>	<p>Click RESET to perform a complete factory reset to the original default settings.</p>	 <p>The screenshot shows the 'Reset' screen with a warning message: 'A factory reset restores the controller to its original system state, erasing all user-edited settings.'</p>
<b>Language</b>	<p>Use to change the language. The following languages are available:</p> <ul style="list-style-type: none"> <li>• English</li> <li>• Spanish</li> <li>• French</li> <li>• Russian</li> <li>• Hungarian</li> <li>• Portuguese</li> <li>• Polish</li> <li>• Chinese</li> <li>• Korean</li> <li>• Japanese</li> <li>• Italian</li> <li>• German</li> <li>• Czechoslovakian</li> </ul>	 <p>The screenshot shows the 'Select Language' screen with radio buttons for various languages: English (selected), Portuguese, Italiano, Español, Polski, Deutsch, Français, 中文, čeština, and Русский. There is also a button for 한국어.</p>
<b>About</b>	<p>Use to view the following system information:</p> <ul style="list-style-type: none"> <li>• Firmware Version</li> <li>• Date (publication date of Firmware Version)</li> <li>• URL for Nordson EFD</li> <li>• Valve Firmware Number</li> <li>• Valve Serial Number</li> <li>• Valve Model Number</li> <li>• Shot Count (total number of shots in the Timed mode)</li> </ul> <p>To update the firmware, follow the on-screen instructions.</p>	 <p>The screenshot shows the 'About' screen with system information: Firmware Version: tst-bld, Date: Nov 5 2021, URL: www.nordsonefd.com, Valve Firmware Version: 3.17, Valve Serial Number: 654321, Valve Model Number: 7361217, Shot Count: 12345789012. There is also a 'Firmware Update' section with a download icon and a '1. Download Software Update' instruction pointing to www.nordsonefd.com. Below that is a '2. Upload Files Here' section with an upload icon, a 'Browse...' button, and the text 'No file selected. Supported Format : .NEU'.</p>

## Operation

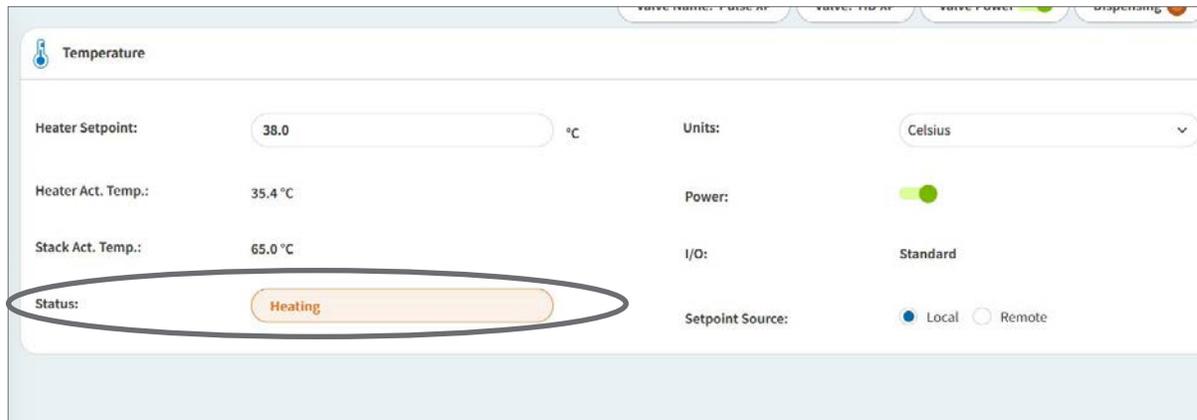
After the dispensing system is fully installed and set up, the system is ready for routine operation. Follow these recommended procedures for daily / routine startup and shutdown to obtain the best performance from your system.

**NOTE:** This manual provides procedures for operating the *Nexµs* controller via the web interface. If you are using one of the available communication protocols instead, refer to the applicable appendix in this manual for operating details.

## Routine Startup

1. Switch on the power source for all *Nexµs* controllers in the system.
2. If a process requires a heated valve, click TEMPERATURE, then click the POWER toggle to switch the heater power ON.

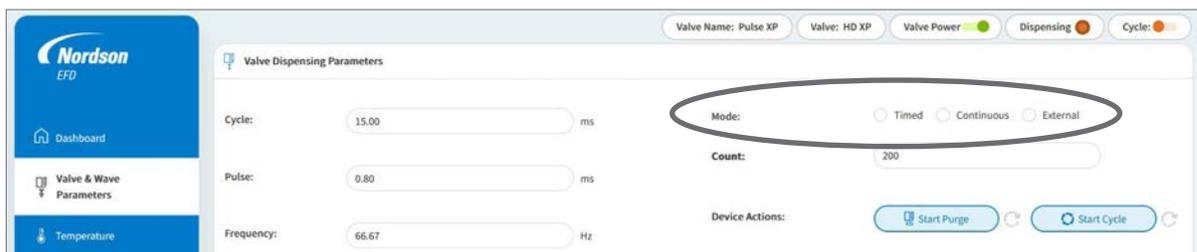
**NOTE:** Upon reboot, the controller remembers the last selected heater power status.



### **⚠ CAUTION**

**Do not dry cycle the *Pulse XP* valve!** The ceramic nozzle seat and ball can be damaged if the valve is operated without fluid, causing leakage and a poor seal. Precise dispensing can no longer be guaranteed if this occurs.

3. On the Valve & Wave Parameters screen, select the desired operating MODE (Timed, Continuous, or External).



4. Start your process.

When the system is operating normally:

- The green LED on the front of the controller illuminates when the pump cycles.
- The Dispensing indicator on the Status Bar illuminates blue when the valve is dispensing.



## Operation (continued)

### Purging the System

On the Valve and Wave Parameters screen, use the START PURGE / STOP PURGE button as needed to clear debris or to purge after changing the fluid body assembly. Refer to the *Pulse* valve operating manual for more detailed information on purging and system cleaning.

### Switching Valve Power On or Off

Use the Valve Power toggle on the Status Bar to set whether a valve initiate signal is processed, thus starting a dispense cycle. A dispense cycle can be initiated only when Valve Power is ON.

**NOTE:** By default, Valve Power is ON when the controller is switched ON (or anytime the controller is rebooted).

- On the Status Bar, click VALVE POWER toggle to switch the valve power ON or OFF:
  - Valve Power OFF (orange): Valve open; valve initiate signals NOT processed.
  - Valve Power ON (green): Valve closed; valve initiate signals processed.



*Valve Power toggled OFF*



*Valve Power toggled ON*

- Before switching valve power OFF, shut off the fluid supply pressure (as prompted by the system), then click CONFIRM.



### Switching Heater Power On or Off

Refer to “Setting Up and Controlling the Valve Heater” on page 37.

# Operation (continued)

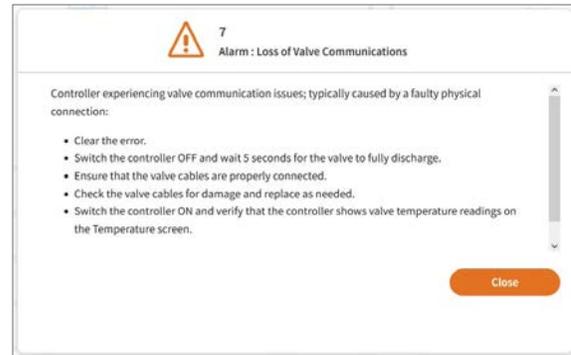
## Clearing Alarms

When an alarm occurs, an alarm window opens on the web interface. The alarm window provides an error code, error name, cause, and corrective action. Some alarms cause the system to stop dispensing.

**NOTE:** All error codes, error names, system responses, possible causes, and corrective actions are included in this manual. Refer to “Error Code Troubleshooting” on page 54.

### When an alarm occurs:

1. Clear the alarm. Alarms can be cleared in two ways:
  - By clicking CLOSE in the alarm window.
  - By sending an error reset command using any of the communication protocols. Refer to the applicable appendix in this manual for details.
2. If needed, correct the problem that caused the alarm. Refer to “Troubleshooting” on page 47 for complete troubleshooting information.



## Routine Shutdown

1. Stop the process.
2. De-pressurize the system.
3. Switch valve power OFF.

### WARNING

Risk of burns. Wear heat-protective gloves when working with a heated valve.

4. If the valve is heated, switch the heater power OFF.
5. Refer to the valve manual to perform any of the following procedures as appropriate for the fluid:
  - Removing the fluid body assembly.
  - Purging the valve with the process fluid.
  - Purging the valve with cleaning fluid.
  - Cleaning the valve fluid paths.

## PICO Nexµs Controller Part Number



Part #	Description	Supported Valves
7366000	PICO Nexµs controller	<ul style="list-style-type: none"> <li>• 7366525, PICO Pulse XP</li> <li>• 7366526, PICO Pulse XP Contact</li> </ul>

## Accessories

### DB-15 Breakout Board

The DB-15 breakout board facilitates I/O connections.

Item	Part #	Description
A green printed circuit board with a DB-15 connector and a blue ribbon cable. Next to it is a white DB-15 to DB-15 cable.	7364775	<ul style="list-style-type: none"> <li>• Breakout board</li> <li>• DB-15 cable, 1.6 m (5.2 ft)</li> </ul>

### Extension Cables

Item	Part #	Description
A coiled black cable with a white connector at one end and a grey connector at the other.	7366521	2 m (6.6 ft) valve extension cable set*
	7366522	6 m (19.7 ft) valve extension cable set*
	7366523	9 m (29.5 ft) valve extension cable set*
	7366524	12 m (39.4 ft) valve extension cable set*
*Includes one power cable and one communication cable		

# Troubleshooting

Use the troubleshooting table in this section, along with the system logs, to troubleshoot the dispensing system. Contact your Nordson EFD representative for assistance as needed.

## Logs

Logs provide a report of notable system events. Events are listed in ascending order, starting with the most recent event. The system stores up to 100,000 events for each log before it starts to overwrite the oldest events. When 100,000 events are reached in a current log, the system creates a downloadable file.

Use the Logs screen for the following tasks:

- Viewing the system logs — refer to “Viewing Logs” on page 50 for details.
- Downloading logs — refer to “Downloading Logs” on page 50 for details.

**NOTE:** The only way to clear any log is to perform a system reset.

Logs sub-menu (remains visible as long as Logs is selected)

This sub-screen changes depending on the selected sub-menu item

Uptime	Error Code	Error Name
04/09/2032, 02:38 AM	16	Valve Hall Null Invalid
04/09/2032, 02:38 AM	10	Missing Valve Response
04/09/2032, 02:38 AM	19	None
04/09/2032, 02:38 AM	20	FA Calibration Error
04/09/2032, 02:38 AM	20	FA Calibration Error
04/09/2032, 02:38 AM	5	Pulse Time Adjusted, Profile Timing Error
04/09/2032, 02:38 AM	17	None
04/09/2032, 02:38 AM	10	Missing Valve Response
04/09/2032, 02:38 AM	9	PZD Communication Fault

Logs screen and sub-menu (Errors sub-screen shown)

# Troubleshooting (continued)

## Logs Screen

Uptime	Error Code	Error Name
04/09/2032, 02:38 AM	16	Valve Hall Null Invalid
04/09/2032, 02:38 AM	10	Missing Valve Response
04/09/2032, 02:38 AM	19	None
04/09/2032, 02:38 AM	20	FA Calibration Error
04/09/2032, 02:38 AM	20	FA Calibration Error
04/09/2032, 02:38 AM	5	Pulse Time Adjusted, Profile Timing Error
04/09/2032, 02:38 AM	17	None
04/09/2032, 02:38 AM	10	Missing Valve Response
04/09/2032, 02:38 AM	9	PZD Communication Fault

Logs screen sub-menu (Errors sub-screen shown)

Item	Description
<b>Errors</b>	Provides details about all system alarms, including date and time, Error Code (refer to “Error Code Troubleshooting” on page 54 for details), and Error Name (type of fault). This log is shown in the screen capture above.
<b>Parameters</b>	Provides details about all parameter changes, including date, time, and parameter values. See “Parameter log” on page 49 for a screen capture of this log.
<b>Dispensing</b>	Provides dispensing details, including date and time, number of shots, heater temperature, and stack temperature. See “Dispensing log” on page 49 for a screen capture of this log.
<b>Download Logs</b>	Use to download any log. Refer to “Downloading Logs” on page 50 for details.

# Troubleshooting (continued)

## Logs Screen (continued)

Valve Name: Pulse XP    Valve: HD XP    Valve Power: ●    Dispensing: ●    Cycle: ●

Parameter	Uptime	Interface	Param Change
Dispensing	04/09/2032, 02:37 AM		Error Occured
Download Logs	04/09/2032, 02:37 AM	RS-232,NX,EtherNet/IP	DisplacementStroke, PulseTimeHigh, CycleTimeHigh
	04/09/2032, 02:37 AM	I/O,RS-232,NX	DisplacementStroke, PulseTimeLow, OperatingMode, CycleTimeLow
	04/09/2032, 02:37 AM	I/O,NX,Web,EtherNet/IP	DisplacementStroke, OpenTime, OperatingMode, CycleTimeLow, Cyc
	04/09/2032, 02:37 AM		Error Occured
	04/09/2032, 02:37 AM	EtherNet/IP	DisplacementStroke, OpenTime, OperatingMode, CycleTimeLow
	04/09/2032, 02:37 AM	Web	DispenseCount, DisplacementStroke, OpenTime, OperatingMode, Cyc
	04/09/2032, 02:37 AM		Error Occured
	04/09/2032, 02:37 AM	RS-232	OperatingMode, CycleTimeLow, CycleTimeHigh

Navigation: < Prev 1 2 3 Next >

Parameter log

**NOTE:** This log includes multiple columns; use the scroll bar to view all the columns.

Valve Name: Pulse XP    Valve: HD XP    Valve Power: ●    Dispensing: ●    Cycle: ●

Parameter	Uptime	Lifetime Count	Shots	Heater Act. Temp. (°C)	Stack Act. Temp. (°C)
Dispensing	5/3/2032, 2:38 AM	114238194295119	0	0	0
Download Logs	5/3/2032, 2:38 AM		Parameter Changed		
	5/3/2032, 2:38 AM	114238194295119	0	0	0
	5/3/2032, 2:38 AM		Parameter Changed		
	5/3/2032, 2:38 AM	114238194383062	87943	0	0
	5/3/2032, 2:38 AM		Parameter Changed		
	5/3/2032, 2:38 AM	114238293598392	99215330	0	0
	5/3/2032, 2:38 AM		Parameter Changed		
	5/3/2032, 2:38 AM	114238293598392	0	0	0

Navigation: < Prev 1 2 3 Next >

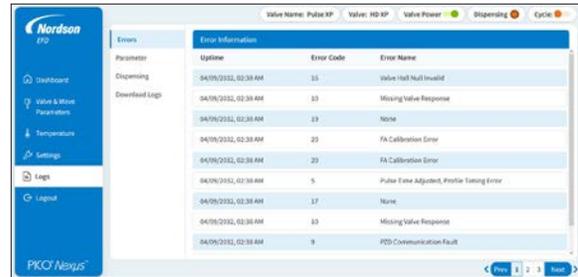
Dispensing log

# Troubleshooting (continued)

## Viewing Logs

1. On the Main Menu, click LOGS.
2. In the Logs sub-menu, click the log you want to view. The respective log sub-screen opens on the right side.

**NOTE:** Use the vertical scroll bars to move through the log entries. The Parameters log includes multiple columns; use the horizontal scroll bar to view all the columns.

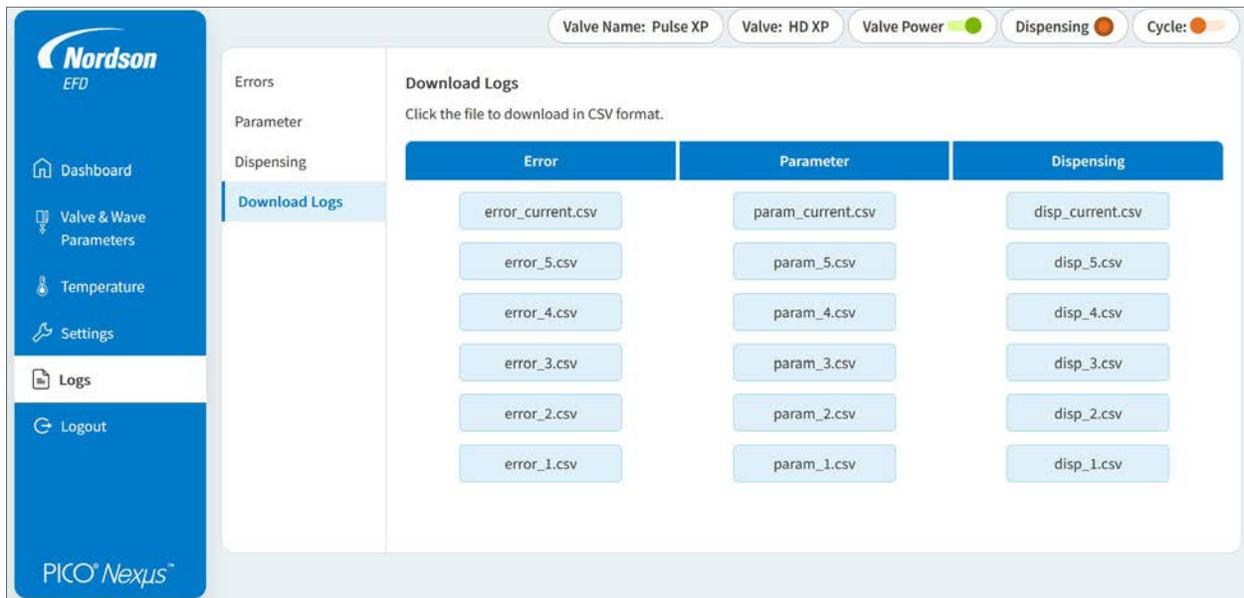


## Downloading Logs

1. On the Main Menu, click LOGS.
2. In the Logs sub-menu, click DOWNLOAD LOGS. The Download Logs screen opens on the right side of the screen.
3. Click the log you want to download.

**NOTES:**

- All log files are exported as \*.csv files. This file format can be viewed in most text editing and spreadsheet applications.
- Only the last five download logs are available. Newer logs overwrite older logs.



Download Logs screen

## Troubleshooting (continued)

### General Troubleshooting

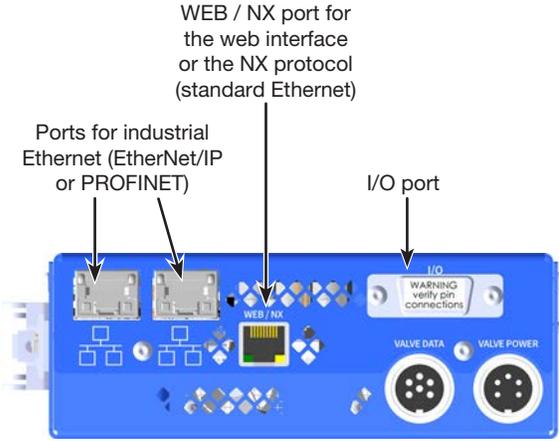
**NOTE:** To troubleshoot error codes, refer to “Error Code Troubleshooting” on page 54.

Problem	Possible Cause	Corrective Action
Fluid leaks	Valve not powered ON	Verify that the valve POWER is ON.
	Insufficient closing voltage	Increase the closing voltage of the valve.
	Improper wave profile selected	If RAMP is not selected for the open and close WAVE PROFILE settings, verify that the selected profile is correctly programmed.
	Worn or damaged valve	Refer to the troubleshooting section of the valve operating manual.
	Damaged driver	Contact Nordson EFD.
Valve will not power ON	Loose or damaged cable / connection	Verify that both valve input cables are connected. Check the integrity of all cables and connections.
	Error condition present	Correct and clear any pending alarms.
	Improper wave profile selected	If RAMP is not selected for the open and close WAVE PROFILE settings, verify that the selected profile is correctly programmed.  Switch off the controller and wait 5 seconds for the valve to fully discharge. Disconnect and reconnect all cables to the controller, then switch on the controller. If a system restart does not correct the problem, contact Nordson EFD.
Controller not responding to an initiate signal	Error condition present	When an error condition is present, the controller will not initiate. Correct and clear any pending alarms.
	Problem with initiate signal integrity	Verify that the signal being user on the USET (Initiate) circuit is a clean, bounce-free signal (5–24VDC).
	Problem with wiring integrity	Ensure that the wiring is correctly stripped and that the conductors are making contact on the 15 pin connector
	Valve not powered ON	Verify that the valve POWER is ON.

*Continued on next page*

# Troubleshooting (continued)

## General Troubleshooting (continued)

Problem	Possible Cause	Corrective Action
<p>Communication issues between valve and controller</p>	<p>Multiple ground loops connected to controller</p>	<p>Ensure that there is only one earth ground connection to the controller. Connecting the controller to earth ground through multiple paths can introduce a ground loop interference that may disrupt the function of the controller and / or (electrically) nearby equipment.</p> <p>Under normal operating conditions, ground loops are unlikely to affect system performance, but installations that use longer cables (such as the 12-meter extension cable) are more prone to their effects.</p> <p>Connections that create an earth ground connection to the controller include the following:</p> <ul style="list-style-type: none"> <li>• Industrial Ethernet or standard Ethernet (WEB / NX) shield: A ground loop can be created when a shielded Ethernet cable connected to one of the industrial Ethernet ports or the WEB / NX port on the controller is connected to another device that is connected to earth ground. To prevent this, use an unshielded cable for short distance applications, or include an unshielded patch cable in the cable run.</li> <li>• I/O shield: A ground loop can be created when a shielded cable connected to the I/O port on the controller is connected to a device that is connected to earth ground. To prevent this, use a shielded cable that connects the drain wire to the ground connector at one end only, leaving the other end floating.</li> </ul> <div style="text-align: center;">  </div>

*Continued on next page*

## Troubleshooting (continued)

### General Troubleshooting (continued)

Problem	Possible Cause	Corrective Action
Setting change made from the web interface or an industrial Ethernet protocol does not take effect	<p>Multiple interfaces connected to a controller (for example, commands can be sent to the <i>Nexus</i> controller from either the <i>Nexus</i> web interface or the DispenseMotion™ software in an automated dispensing system).</p> <p><b>NOTE:</b> When multiple interfaces are connected to the controller, the controller will not implement a setting change from a source other than the NX protocol if the setting value is the same as the previous setting value sent from that source.</p>	Change the setting to a new value, then change the setting back to the desired value.

# Troubleshooting (continued)

## Error Code Troubleshooting

### NOTES:

- For troubleshooting not related to error codes, refer to “General Troubleshooting” on page 51.
- Nordson EFD strongly recommends monitoring all “Notification only” errors and addressing those errors that frequently recur.

Error Code	Error Name	Related to...	System Response	Possible Cause: Corrective Action(s)
1	Valve Heater Fault	<ul style="list-style-type: none"> <li>• Valve</li> </ul>	<ul style="list-style-type: none"> <li>• Valve heater is disabled</li> <li>• Dispensing continues but dispense results may be affected</li> </ul>	Heater failed or shorted RTD in the valve: <ul style="list-style-type: none"> <li>• Switch off the controller and wait 5 seconds for the valve to fully discharge, then switch on the controller. If the error persists, a possible valve heater failure exists. Return the valve to Nordson EFD or to the vendor for service.</li> </ul>
2	Stack Over Temperature	<ul style="list-style-type: none"> <li>• Valve settings</li> <li>• Environment</li> </ul>	<ul style="list-style-type: none"> <li>• Dispensing stops</li> </ul>	System operating beyond its acceptable range, typically caused by high frequency operation: <ul style="list-style-type: none"> <li>• Frequency of operation too high for duty cycle: Lower the operating frequency (increase CYCLE time).</li> <li>• Duty cycle too high for frequency of operation: Lower the duty cycle rate (decrease PULSE time).</li> </ul> Environmental conditions slowing heat dissipation: <ul style="list-style-type: none"> <li>• Improve valve heat dissipation.</li> </ul> Internal valve problem: <ul style="list-style-type: none"> <li>• Return the valve to Nordson EFD or to the vendor for service.</li> </ul>
3	Not used			
4	Piezo Driver Fault	<ul style="list-style-type: none"> <li>• Controller</li> </ul>	<ul style="list-style-type: none"> <li>• Valve shuts OFF</li> </ul>	Error occurred with the piezo driver circuitry: <ul style="list-style-type: none"> <li>• Check the controller filter for cleanliness. A clogged filter can cause an overheating issue.</li> <li>• Switch off the controller and wait 5 seconds for the valve to fully discharge, then switch on the controller.</li> <li>• Test the system with a different valve to see if the alarm repeats. If the alarm persists, return the controller to Nordson EFD or to the vendor for service.</li> </ul>

*Continued on next page*

# Troubleshooting (continued)

## Error Code Troubleshooting (continued)

Error Code	Error Name	Related to...	System Response	Possible Cause: Corrective Action(s)
5	Pulse Time Adjusted Profile Timing Error	<ul style="list-style-type: none"> <li>External triggering issue</li> </ul>	<ul style="list-style-type: none"> <li>Notification only</li> <li>Dispensing continues but dispense results may be affected</li> </ul>	<p>Programmed wave length time (RAMP) longer than PULSE time interval length, or consecutive dispense signals arriving at controller before task execution completed on first signal:</p> <ul style="list-style-type: none"> <li>Check for a clean, bounce-free electrical signal.</li> </ul>
6	Not used			
7	Loss of Valve Communications	<ul style="list-style-type: none"> <li>Valve cables</li> </ul>	<ul style="list-style-type: none"> <li>Heater status is lost</li> <li>Valve heater is disabled</li> <li>Dispensing continues but dispense results may be affected</li> </ul>	<p>Controller experiencing valve communication issues; typically caused by a faulty physical connection:</p> <ol style="list-style-type: none"> <li>On the controller alarm screen, press CLOSE to clear the error.           <p><b>NOTE:</b> This action clears the screen, but may not clear the error. Continue with the next steps to ensure the error is cleared.</p> </li> <li>Switch the controller OFF and wait 5 seconds for the valve to fully discharge.</li> <li>Ensure that the valve cables are properly connected.</li> <li>Check the valve cables for damage and replace as needed.</li> <li>Switch the controller ON and verify that the controller shows valve temperature readings on the Temperature screen.</li> </ol>  <p><b>NOTE:</b> Valve communication can also be verified by ensuring that the valve serial number is shown on the About screen. Refer to "About" on page 42.</p>
8	No Valve Detected	<ul style="list-style-type: none"> <li>Valve cables</li> </ul>	<ul style="list-style-type: none"> <li>Valve shuts OFF</li> </ul>	<p>System cannot detect a valid valve connected to the controller:</p> <ul style="list-style-type: none"> <li>Ensure that all wiring connections are correct.</li> <li>Ensure that the valve cables are properly connected.</li> </ul>

*Continued on next page*

## Troubleshooting (continued)

### Error Code Troubleshooting (continued)

Error Code	Error Name	Related to...	System Response	Possible Cause: Corrective Action(s)
9	Not used			
10	Missing Valve Response	<ul style="list-style-type: none"> <li>Valve cables</li> </ul>	<ul style="list-style-type: none"> <li>Notification only</li> <li>Dispensing continues</li> </ul>	<p>The controller is missing a reply communication from the valve:</p> <ul style="list-style-type: none"> <li>Check the valve cables for interference (EMI).</li> <li>Ensure that the valve cables are properly connected.</li> </ul>
11	Not used			
12	Extra Valve Response	<ul style="list-style-type: none"> <li>Valve</li> </ul>	<ul style="list-style-type: none"> <li>Notification only</li> <li>Dispensing continues</li> </ul>	<p>Controller has received more communication signals from the valve than expected:</p> <ul style="list-style-type: none"> <li>Check the valve cables for interference (EMI).</li> </ul>
13	Stroke Limitation Error	<ul style="list-style-type: none"> <li>Settings</li> <li>Fluid body assembly condition</li> <li>Valve actuator condition</li> </ul>	<ul style="list-style-type: none"> <li>Notification only</li> <li>Dispensing continues but dispense results may be affected</li> </ul>	<p>Stroke setting too high for other paired settings:</p> <ul style="list-style-type: none"> <li>If using a PULSE time that is close to the OPEN time, try a slightly longer PULSE time. This will allow the valve time to fully open before it tries to close.</li> <li>Ensure that the fluid body assembly is clean and free of deposits or residues.</li> <li>Ensure that the valve actuator assembly is clean and free of deposits or residues.</li> <li>Ensure that the tappet O-ring of the fluid body assembly is properly lubricated.</li> <li>Test the operation with a different fluid body assembly to see if the error repeats. If the error persists, return the valve to Nordson EFD or to the vendor for service.</li> </ul>
14	Valve Response Mismatch	<ul style="list-style-type: none"> <li>Valve</li> </ul>	<ul style="list-style-type: none"> <li>Notification only</li> <li>Dispensing continues</li> </ul>	<p>Controller has received more communication signals from the valve than expected:</p> <ul style="list-style-type: none"> <li>Check the valve cables for interference (EMI).</li> </ul>
15	Controller Over Temperature	<ul style="list-style-type: none"> <li>Controller</li> </ul>	<ul style="list-style-type: none"> <li>Valve shuts OFF</li> </ul>	<p>Controller temperature has exceeded the shutoff temperature.</p> <ul style="list-style-type: none"> <li>Ensure that the controller(s) are adequately ventilated and that the controller vents are not blocked.</li> <li>Wait for the system to cool down and then restart operation.</li> </ul>
16	Valve Hall Null Invalid	<ul style="list-style-type: none"> <li>Valve</li> </ul>	<ul style="list-style-type: none"> <li>Dispensing not possible</li> </ul>	<p>Return the valve to Nordson EFD or to the vendor for service.</p>
17	Controller Almost Over Temperature	<ul style="list-style-type: none"> <li>Controller</li> </ul>	<ul style="list-style-type: none"> <li>Notification only</li> </ul>	<p>Controller temperature is close to the shutoff temperature.</p>

*Continued on next page*

## Troubleshooting (continued)

### Error Code Troubleshooting (continued)

Error Code	Error Name	Related to...	System Response	Possible Cause: Corrective Action(s)
18	Valve Hall Scale Invalid	<ul style="list-style-type: none"> <li>Valve</li> </ul>	<ul style="list-style-type: none"> <li>Dispensing not possible</li> </ul>	Return the valve to Nordson EFD or to the vendor for service.
19	Not used			
20	FA Calibration Error	<ul style="list-style-type: none"> <li>Fluid body assembly condition</li> <li>Settings</li> <li>Mechanical operation</li> </ul>	<ul style="list-style-type: none"> <li>Dispensing not possible</li> </ul>	<p>Issue with fluid body assembly condition:</p> <ul style="list-style-type: none"> <li>Ensure that the fluid body assembly is clean and free of deposits or residues.</li> <li>Ensure that the tappet O-ring of the fluid body assembly is properly lubricated.</li> <li>Test the operation with a different fluid body assembly to see if the error repeats. If the error persists, return the valve to Nordson EFD or to the vendor for service.</li> </ul> <p>CLOSE VOLTS setting too low:</p> <ul style="list-style-type: none"> <li>Adjust the CLOSE VOLTS setting.</li> </ul> <p>Fluid body assembly not installed:</p> <ul style="list-style-type: none"> <li>Install the fluid body assembly.</li> </ul> <p>Fluid assembly latch not closed fully:</p> <ul style="list-style-type: none"> <li>Ensure that the heater body that houses the fluid body assembly is fully closed.</li> </ul>
21	Not used			
22	Extra Valve Comm Data	<ul style="list-style-type: none"> <li>Valve</li> </ul>	<ul style="list-style-type: none"> <li>Notification only</li> <li>Dispensing continues</li> </ul>	Return the valve to Nordson EFD or to the vendor for service.
23	Not used			
24	Stack Almost Over Temperature	<ul style="list-style-type: none"> <li>Valve</li> </ul>	<ul style="list-style-type: none"> <li>Notification only</li> </ul>	Stack temperature is close to the shutoff temperature.

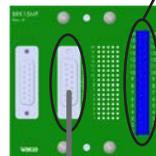
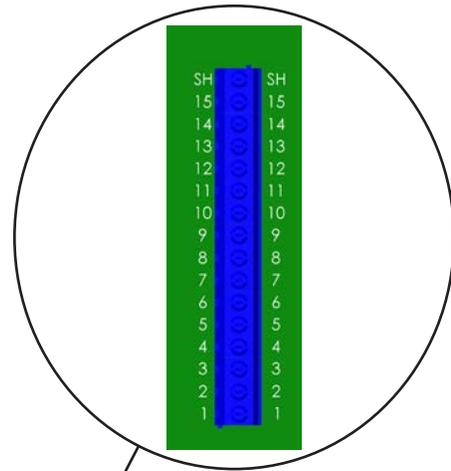
# Technical Data

## I/O Port Pin Assignments

- All outputs are rated at 70 mA.
- Inputs / outputs can be wired as either sinking or sourcing.
- Inputs / outputs can use either the courtesy 24 VDC power source at pin 15 or an external 24 VDC source.
- All inputs can be wired as shown in this section. Outputs are configured only for 24 VDC sourcing, but the source can be either pin 15 or an external source. To use the courtesy 24 VDC power source for the output signals, connect to pins 14 and 15. To use an external power source, connect to pin 14.

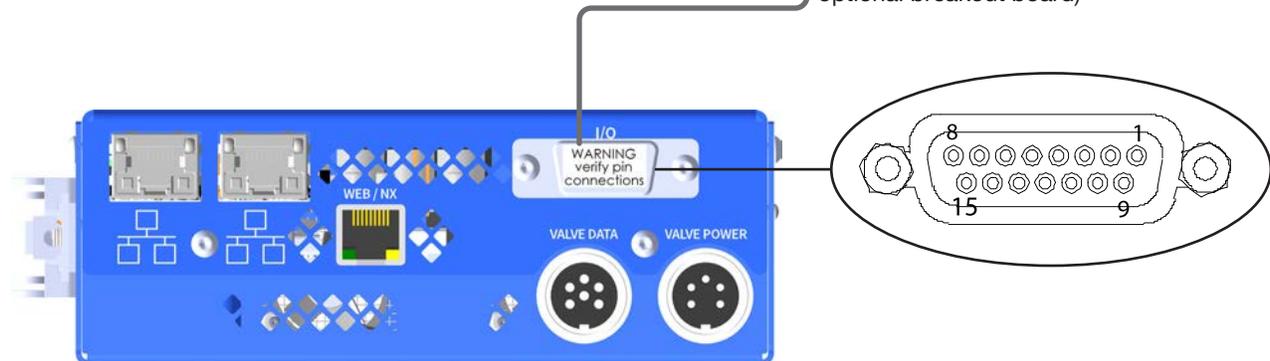
**NOTE:** Do not connect the system ground (pin 9) and the analog ground (pin 13) together.

I/O Pin	Direction	Assignment
1	Source	Estop_H
2	Input	Estop_L
3	Input	RS-232 RX
4	Output	RS-232 TX
5	Input	Ex_Trig (+)
6	Input	Ex_Trig (-)
7	Output	Error (out)
8	Output	Running (out)
9	n/a	GND
10	Input	Purge (+)
11	Input	Purge (-)
12	Input	Analog in (0–10V)
13	n/a	Analog GND
14	Input	External 24V input
15	Output	24 VDC (100 mA) out



Optional DB-15 breakout board

DB-15 cable (supplied with the optional breakout board)



# Technical Data (continued)

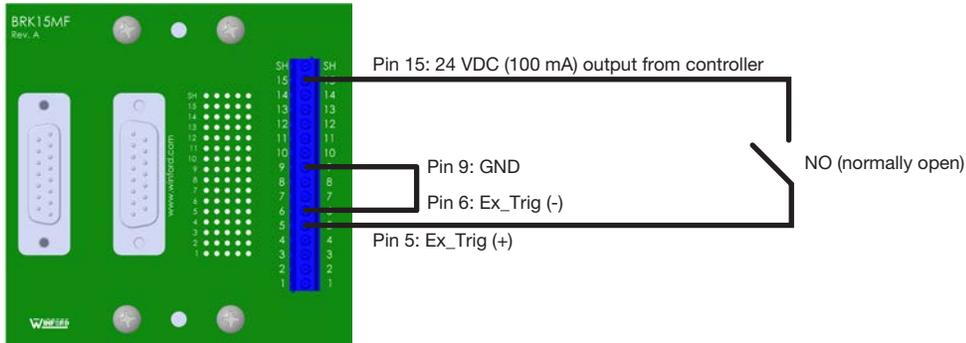
## Wiring Diagrams

**NOTE:** Connections are shown on the optional breakout board for clarity. For the optional breakout board part number, refer to “DB-15 Breakout Board” on page 47.

### Cycle Initiate (Ex\_Trig) Signal

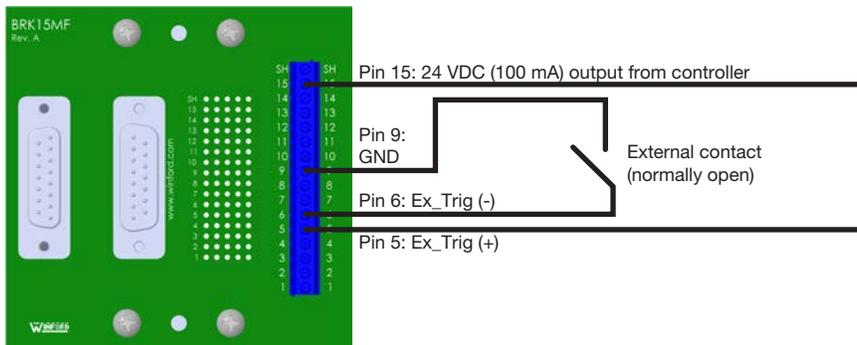
#### Sourcing

**NOTE:** Sourcing is synonymous with PNP (Positive, Negative, Positive).



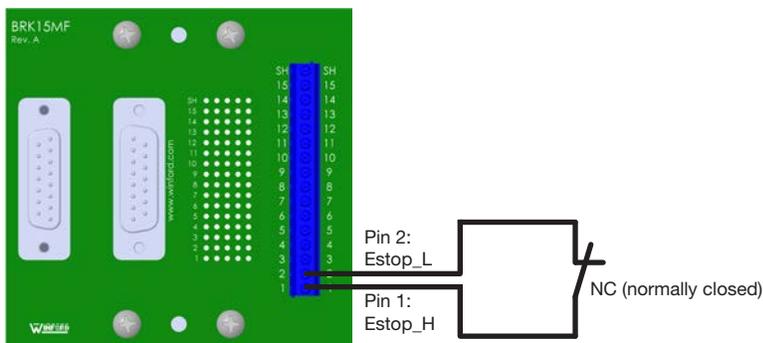
#### Sinking

**NOTE:** Sinking is synonymous with NPN (Negative, Positive, Negative).



### Emergency Stop (ESTOP) Signal

**NOTE:** If an emergency stop circuit is not needed, install the supplied E-stop jumper on pins 1 and 2. The pump will dispense only if these pins are connected.



E-stop jumper

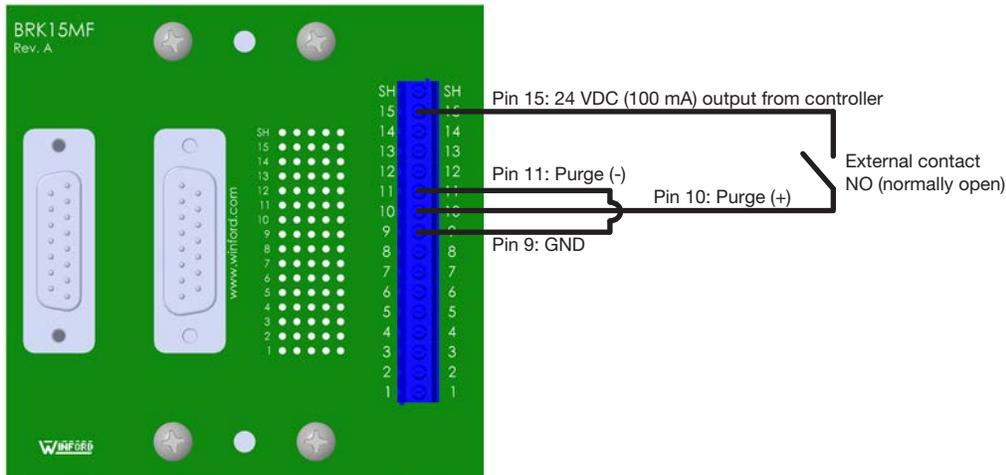
# Technical Data (continued)

## Wiring Diagrams (continued)

### Purge Initiate Signal

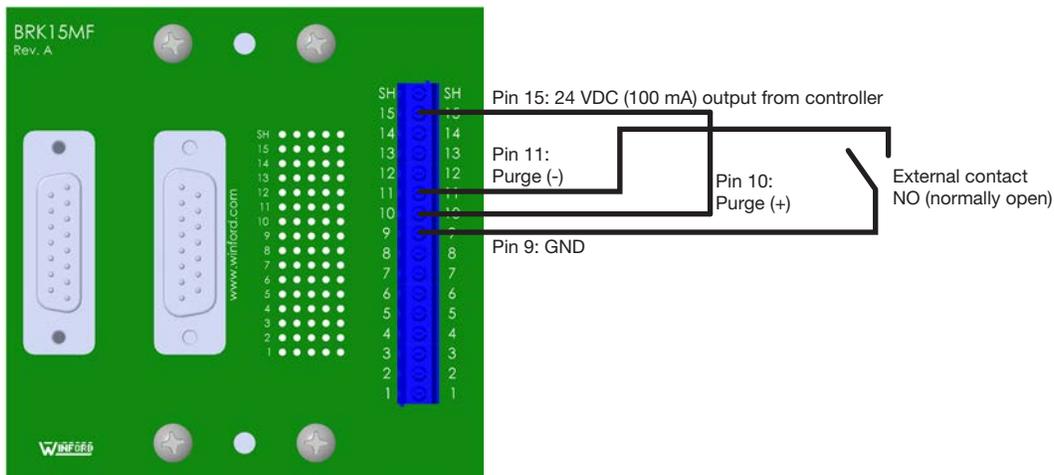
#### Sourcing

**NOTE:** Sourcing is synonymous with PNP (Positive, Negative, Positive).



#### Sinking

**NOTE:** Sinking is synonymous with NPN (Negative, Positive, Negative).

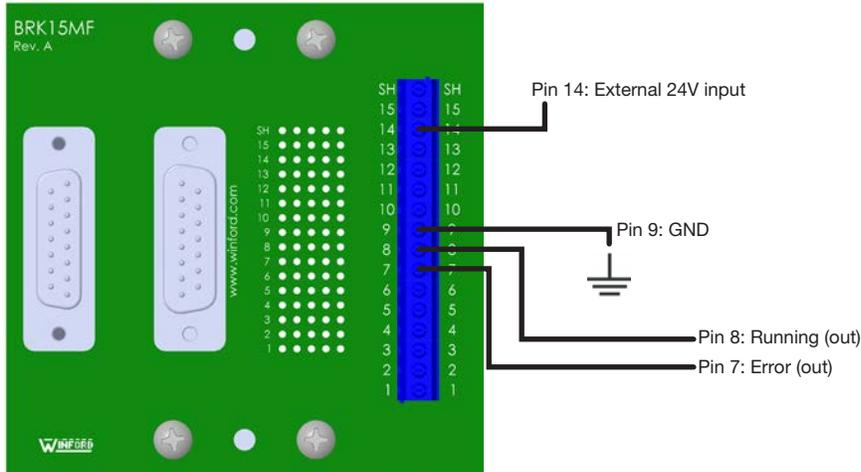


# Technical Data (continued)

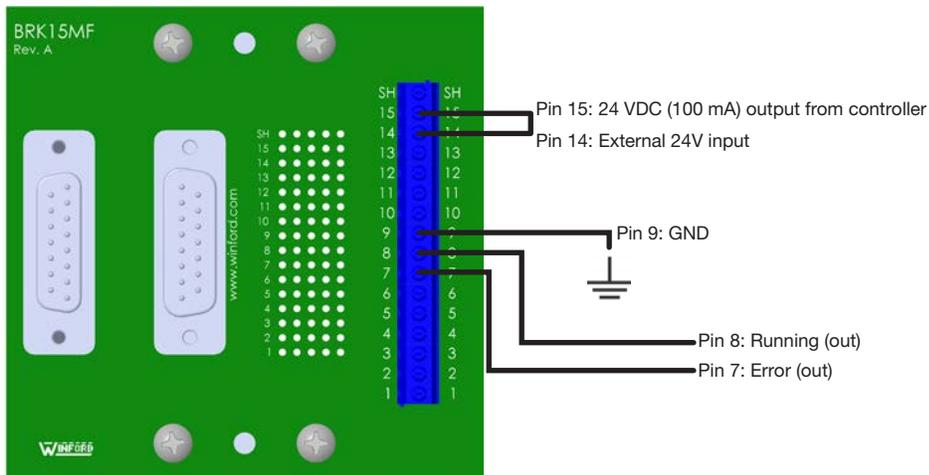
## Wiring Diagrams (continued)

### Status Monitoring or Valve Temperature Warning Signal

#### External 24V Power Source



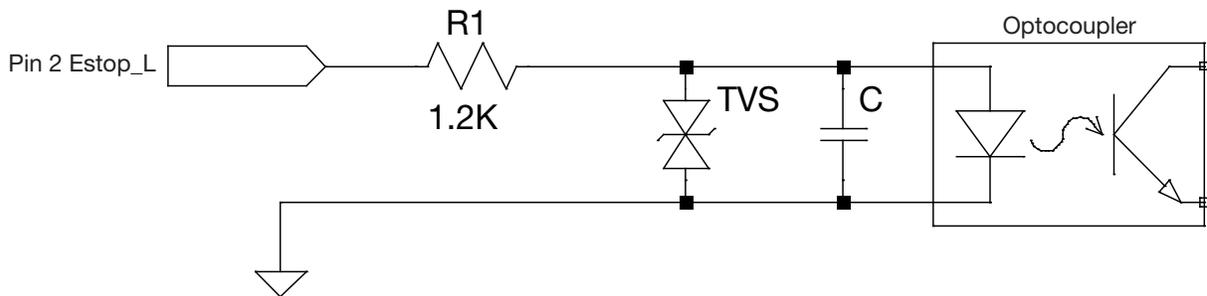
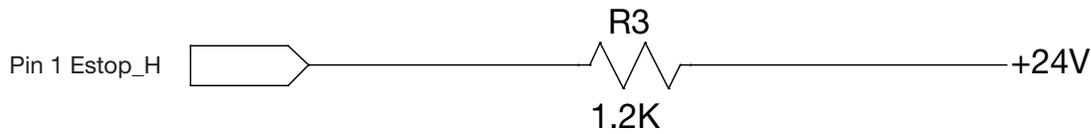
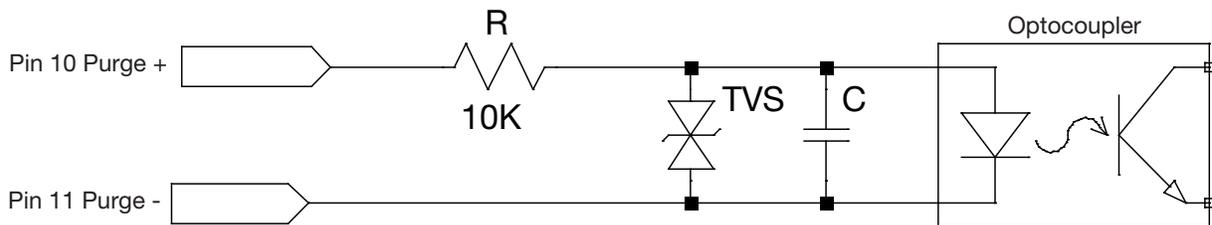
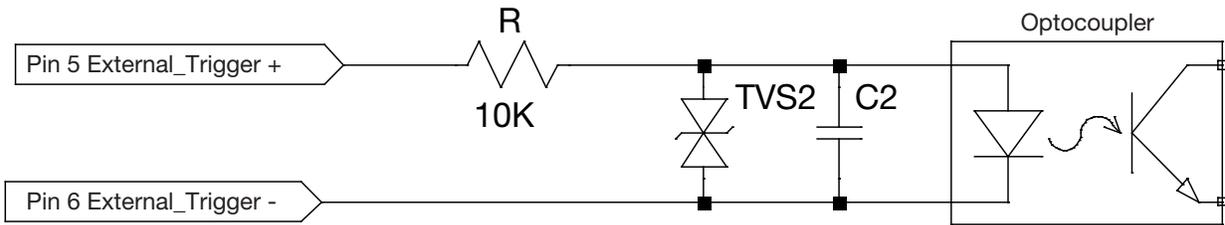
#### Internal 24V Power



# Technical Data (continued)

## Schematics

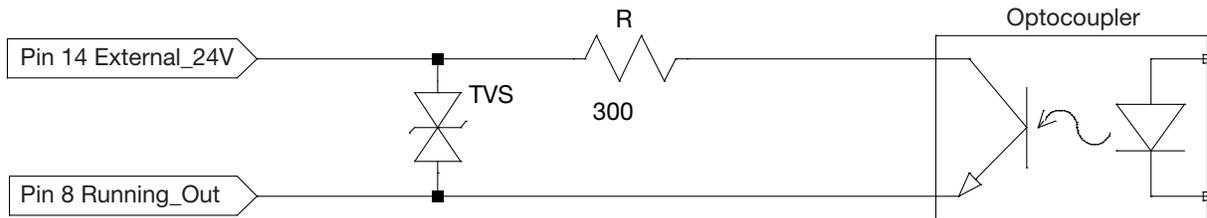
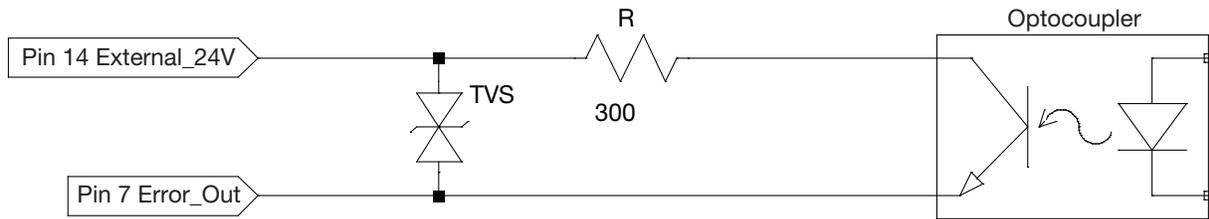
### Controller Inputs



# Technical Data (continued)

## Schematics (continued)

### Controller Outputs



# Appendix A, Changing the IP Address of a Computer

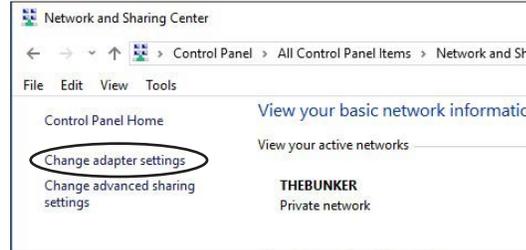
Each computer in a Nexµs system must have a unique IP address. Follow this procedure to change the IP address of a computer.

**NOTE:** To change the IP address of the Nexµs controller, refer to “Standard Ethernet” on page 40.

1. On your computer, navigate to the “Network and Sharing Center.”
2. Click “Change Adapter Settings.”

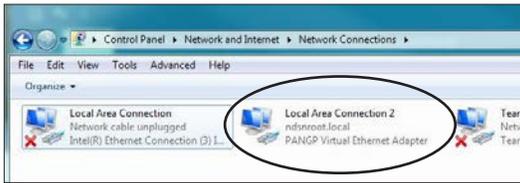


Windows® 7

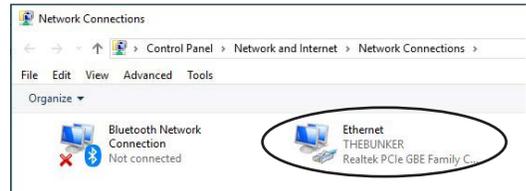


Windows 10

3. Select the network connection to set up. You can determine the correct connection by unplugging and replugging the Ethernet cable from your PC: When the cable is unplugged, the connection has a red X to show it is disconnected; when you reconnect the cable, the connection is restored.

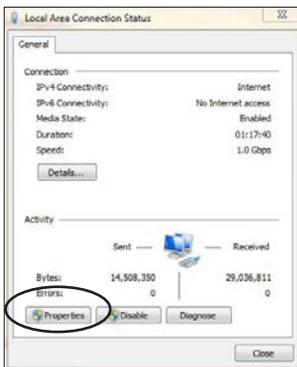


Windows 7 (typical)

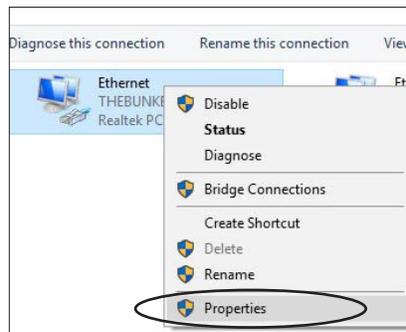


Windows 10 (typical)

4. Double-click (Windows 7) or right-click (Windows 10) to select “Properties.”

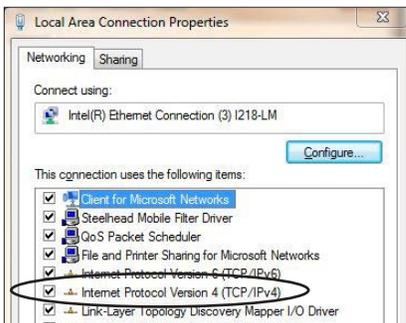


Windows 7

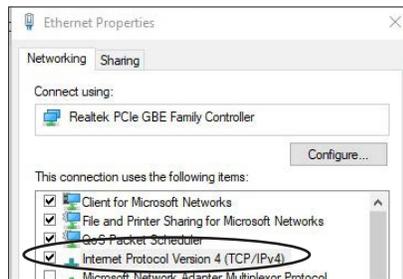


Windows 10

5. Double-click “Internet Protocol Version 4 (TCP/IPv4).”



Windows 7

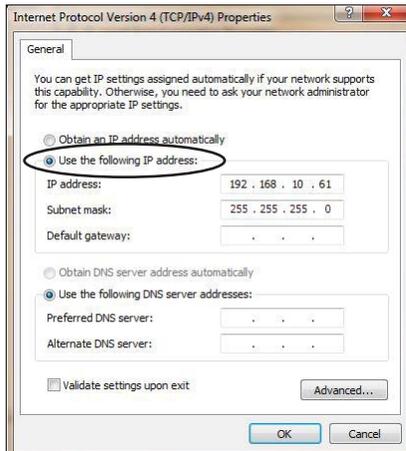


Windows 10

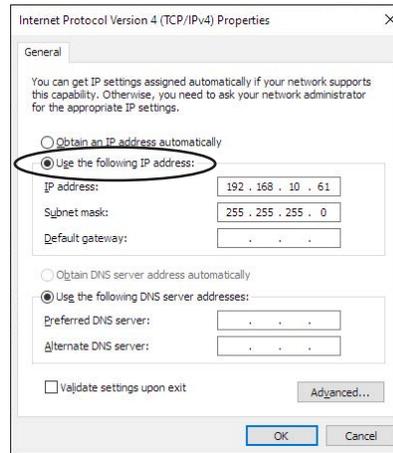
## Appendix A, Changing the IP Address of a Computer (continued)

- Click “Use the following IP address” and then enter the desired IP address.

**NOTE:** In this example, the entered IP address is 192.168.10.61. Because the IP address of the controller is 192.168.10.60, no IP conflicts can occur because the IP addresses are different. If you want to set up multiple controllers on one network, each controller and computer must have a unique IP address. The digit range for each field is 1–255.



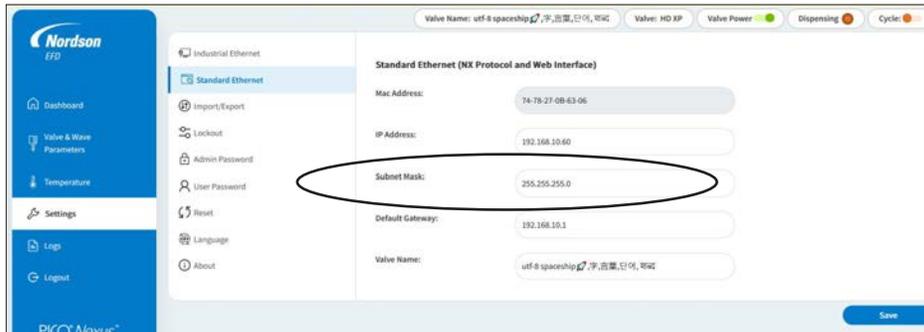
Windows 7



Windows 10

- Click OK > OK to save the new IP address.
- Verify that the “Subnet mask” setting of the computer (255.255.255.0 in the examples above) matches the Subnet mask setting for the Nexys controller.

**NOTE:** To view or change the Subnet mask of the Nexys controller, go to the Nexys web interface and click SETTINGS > STANDARD ETHERNET. Refer to “Standard Ethernet” on page 40 for details.



Subnet mask setting of the Nexys controller shown on the Standard Ethernet submenu of the Nexys web interface Settings screen

## Appendix B, NX Protocol

This appendix provides the technical information required to use the NX protocol to interface with a Nexµs controller. The NX protocol operates over TCP/IPv4 on port 9000. To communicate with a Nexµs controller, the connected device must be capable of establishing a TCP/IPv4 connection on the appropriate port. The IP address, netmask, and gateway settings are user-defined on the Save screen.

### NOTES:

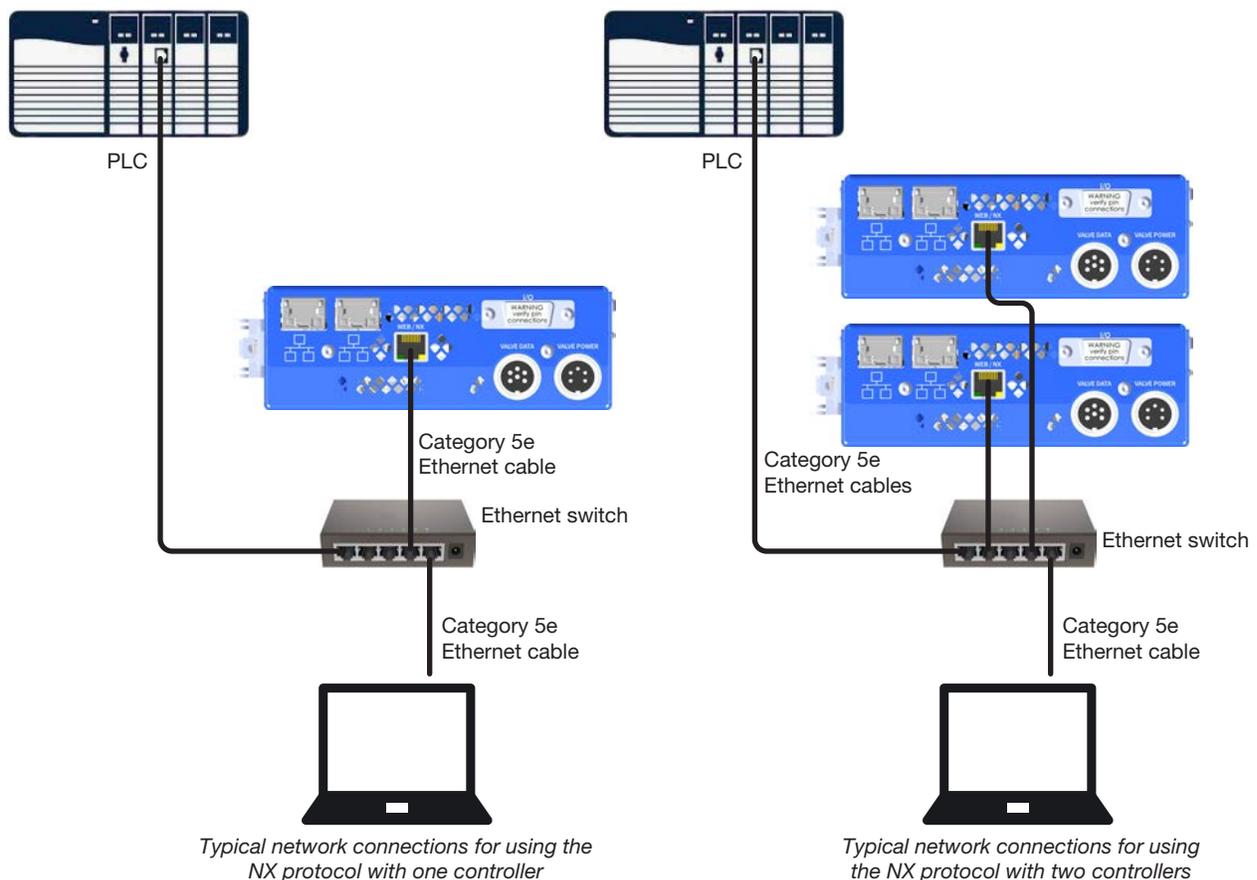
- Throughout this appendix, the user is referred to as the Client.
- The Nordson NX Client Application is a software application that shows how the registers can be written to fully control a Nexµs controller using the NX protocol, thus allowing a greater understanding of the communication process. You can use the Nordson NX Client Application to facilitate the development of your own PLC application. Refer to “Nordson NX Client Application for NX Protocol Implementation” on page 67 for details.

## Ethernet and PLC Connection

As applicable for your installation, make the Ethernet connections between the Nexµs controller, a personal computer, and the PLC.

You will need the following items:

- NX protocol-capable PLC
- Category 5e Ethernet cables (or similar), or an Ethernet crossover cable
- Ethernet switch (if you have an Ethernet crossover cable, this switch is unnecessary)



## Appendix B, NX Protocol (continued)

### Nordson NX Client Application for NX Protocol Implementation

The Nordson NX Client Application shows how the controller settings (registers) can be written to fully control a *Nexµs* controller using the NX protocol, thus allowing a greater understanding of the communication process. You can use the Nordson NX Client Application to facilitate the implementation and development of your own PLC application. For the complete register set, refer to “Register Set for the NX Protocol” on page 70.

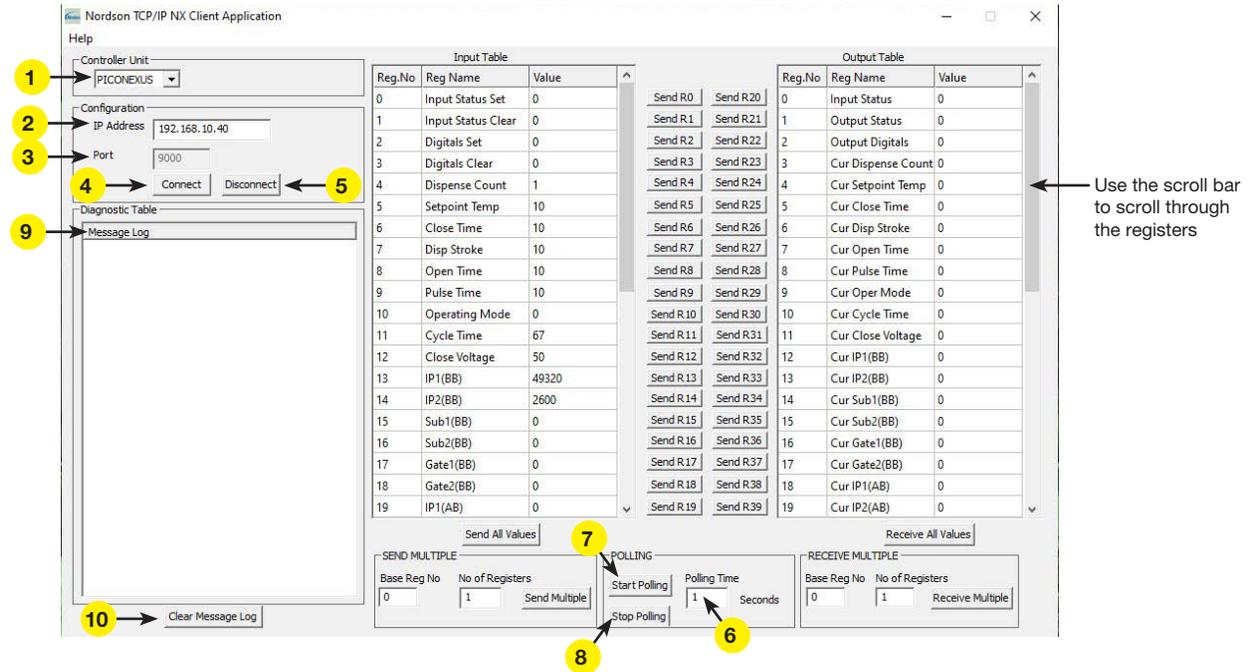
#### To Install and Open the Nordson NX Client Application

1. Download the Nordson NX Client Application from the *Nexµs* web page.
2. Extract the Nordson NX Client Application on the PC connected to the *Nexµs* controller(s).
3. Open the executable file located inside the extracted folder.
4. To connect the Nordson NX Client Application to the controller and to use the application to change settings, refer to the tables under “To Use the Nordson NX Client Application” on page 68.

# Appendix B, NX Protocol (continued)

## Nordson NX Client Application for NX Protocol Implementation (continued)

### To Use the Nordson NX Client Application

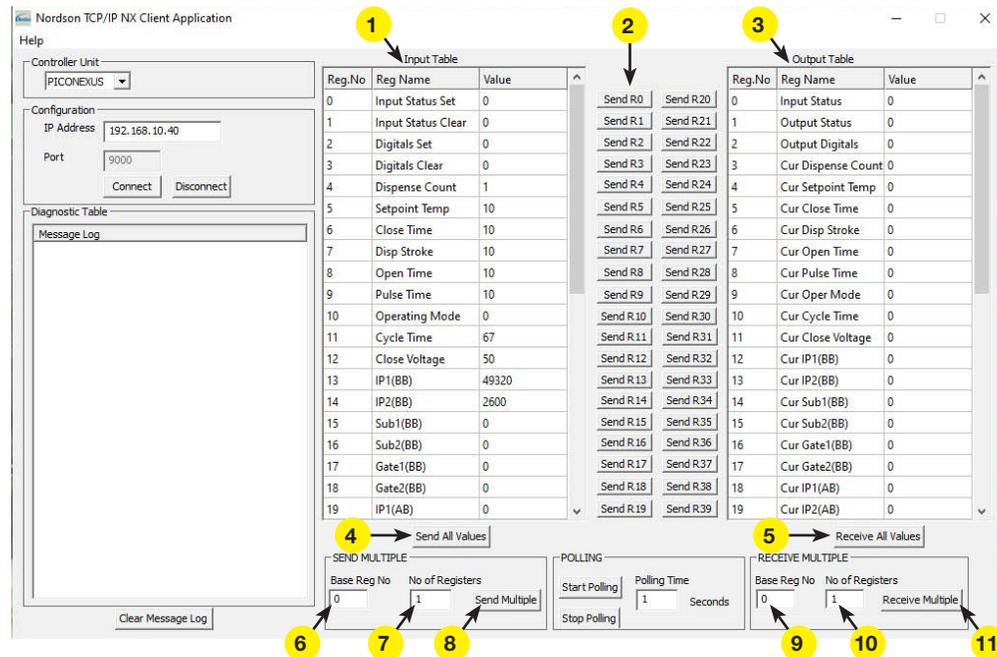


Item	Field	Description
1	Controller Unit	Select PICONEXUS.
2	IP Address	Enter the IP ADDRESS for the Nexµs controller to communicate with.
3	Port	Ensure that PORT is 9000.
4	Connect	Click to activate the connection to the controller.
5	Disconnect	Click to deactivate the connection to the controller.
6	Polling Time (Seconds)	Enter the desired polling time. This is how long at a time the application reads the data from the controller. The range of possible values is 0.1 to 5.0 seconds (s).
7	Start Polling	Click to start reading data from the controller.
8	Stop Polling	Click to stop reading data from the controller.
9	Message Log	When polling is active, the Message Log shows the current values stored in the registers (the raw data received from the controller).
10	Clear Messages	Click to clear the Message Log.

## Appendix B, NX Protocol (continued)

### Nordson NX Client Application for NX Protocol Implementation (continued)

#### To Use the Nordson NX Client Application (continued)



Item	Field	Description
1	Input Table	Write data register set. Under Value, enter the write command values to send to the controller.
2	Send Rx	Click to write the selected register value to the controller.
3	Output Table	Read data from the controller; shows the currently active register settings.
4	Send All Values	Click to send all values entered in the Input Table to the controller.
5	Receive All Values	Click to read all values from the controller. The Output Table updates to show the currently active register settings.
6	Send Multiple: Base Reg No	To send a string of registers to the controller, enter a starting register number (Reg No under Input Table).
7	Send Multiple: No of Registers	To send a string of registers to the controller, enter the number of registers to send (starting from the specified Base Reg No).
8	Send Multiple: Send Multiple	Click to send the specified register set string.
9	Receive Multiple: Base Reg No	To read a string of registers from the controller, enter a starting register value (Reg No under Output Table).
10	Receive Multiple: No of Registers	To read a string of registers from the controller, enter the number of registers to read (starting from the specified Base Reg No).
11	Receive Multiple: Send Multiple	Click to read the specified register set string.

## Appendix B, NX Protocol (continued)

### Register Set for the NX Protocol

This section includes the complete register set for programming the Nexµs controller via the NX protocol. To facilitate implementation and use of the register set, Nordson EFD recommends using the Nordson NX Client Application as described in the previous section.

#### Output Table

The Output Table displays all currently active parameters. Some parameters are scaled by 10 to make them whole numbers, as noted under Comments.

Output Table					
Register #	Parameter (Reg Name)	Data Type	Minimum	Maximum	Comments
REG 0	Input Status	16 bits	—	—	Current input status
REG 1	Output Status	16 bits	—	—	Current output status. Refer to “REG 1 (Output Status) Details Table” on page 74.
REG 2	Digitals	16 bits	—	—	Current digitals. Refer to “REG 2 (Output Digitals) / REG 2 (Input Digitals Set) / REG 3 (Input Digitals Clear) Details Table” on page 75.
REG 3	Cur Dispense Count	Range	1	65535	Number of shots per valve initiate in Timed mode
REG 4	Cur Setpoint Temperature	Range	10	1000	Units in degrees Celsius (scaled by 10)
REG 5	Cur Close Time	Range	10	500	Units are in 10 µs
REG 6	Cur Displacement Stroke	Range	10	200	Units are in microns or in percentage (depending on valve used)
REG 7	Cur Open Time	Range	10	500	Units are in 10 µs
REG 8	Cur Pulse Time	Range	10	999999	Units are in 10 µs
REG 9	Cur Operating Mode	Range	0	2	0 = Timed 1 = Continuous 2 = External
REG 10	Cur Cycle Time	Range	67*	999999	Units are in 10 µs
REG 11	Cur Close Voltage	Range	50	130*	Units are in volts (V)
REG 12	IP1 (BBB)	Range	0	65535	Example: 192.168.10.61 192 (MSB) and 168 (LSB) <b>(hex = 0xC0A8 and Dec = 49320)</b>
REG 13	IP2 (BBB)	Range	0	65535	10 (MSB) and 61 (LSB) <b>(hex = 0x0A3D and Dec = 2621)</b>
REG 14	Sub1 (BBB)	Range	0	65535	Example: 255.255.255.0 255 (MSB) and 255 (LSB) <b>(hex = 0xFFFF and Dec = 65535)</b>
REG 15	Sub2 (BBB)	Range	0	65535	255 (MSB) and 0 (LSB) <b>(hex = 0xFF00 and Dec = 65280)</b>

*Continued on next page*

## Appendix B, NX Protocol (continued)

### Register Set for the NX Protocol (continued)

#### Output Table (continued)

Output Table					
Register #	Parameter (Reg Name)	Data Type	Minimum	Maximum	Comments
REG 16	Gate1 (BBB)	Range	0	65535	Example: 192.168.10.0 192 (MSB) and 168 (LSB) <b>(hex = 0xC0A8 and Dec = 49320)</b>
REG 17	Gate2 (BBB)	Range	0	65535	10 (MSB) and 0 (LSB) <b>(hex = 0x0A00 and Dec = 2560)</b>
REG 18	IP1 (AnyBus)	Range	0	65535	Example: 192.168.10.61 192 (MSB) and 168 (LSB) <b>(hex = 0xC0A8 and Dec = 49320)</b>
REG 19	IP2 (AnyBus)	Range	0	65535	10 (MSB) and 61 (LSB) <b>(hex = 0x0A3D and Dec = 2621)</b>
REG 20	Sub1 (AnyBus)	Range	0	65535	Example: 255.255.255.0 255 (MSB) and 255 (LSB) <b>(hex = 0xFFFF and Dec = 65535)</b>
REG 21	Sub2 (AnyBus)	Range	0	65535	255 (MSB) and 0 (LSB) <b>(hex = 0xFF00 and Dec = 65280)</b>
REG 22	Gate1 (AnyBus)	Range	0	65535	Example: 192.168.10.0 192 (MSB) and 168 (LSB) <b>(hex = 0xC0A8 and Dec = 49320)</b>
REG 23	Gate2 (AnyBus)	Range	0	65535	10 (MSB) and 0 (LSB) <b>(hex = 0x0A00 and Dec = 2560)</b>
REG 24	Heater Temperature	Range	0	1000	(Scaled by 10) Degrees Celsius
REG 25	Stack Temperature	Range	0	1000	(Scaled by 10) Degrees Celsius
REG 26	Valve Shot Count Low	Range	0	65535	Provides the total shot count, combining the low, medium, and high values (48 bits).
REG 27	Valve Shot Count Med	Range	0	65535	
REG 28	Valve Shot Count High	Range	0	65535	
REG 29	Error Code	Range	0	65535	Error code as generated by the field-programmable gate array (FPGA)
REG 30	Valve Serial Number	No Data Type	—	—	
REG 31	Valve Firmware Version	No Data Type	—	—	

## Appendix B, NX Protocol (continued)

### Register Set for the NX Protocol (continued)

#### Input Table

The Input Table is used to edit program parameters and some system settings. Some parameters are scaled by 10 to make them whole numbers, as noted under Comments.

Input Table					
Register #	Parameter (Reg Name)	Data Type	Minimum	Maximum	Comments
REG 0	Input Status Set (see NOTE below)	None	—	—	Input status set. Refer to “REG 0 (Input Status Set) Details Table” on page 76.
REG 1	Input Status Clear (see NOTE below)	None	—	—	Input status clear. Refer to “REG 0 (Input Status Set) Details Table” on page 76.
REG 2	Digitals Set (see NOTE below)	None	—	—	Digitals set. Refer to “REG 2 (Output Digitals) / REG 2 (Input Digitals Set) / REG 3 (Input Digitals Clear) Details Table” on page 75.
REG 3	Digitals Clear (see NOTE below)	None	—	—	Digitals clear. Refer to “REG 2 (Output Digitals) / REG 2 (Input Digitals Set) / REG 3 (Input Digitals Clear) Details Table” on page 75.
REG 4	Dispense Count	Range	1	65535	Number of shots per valve initiate in Timed mode
REG 5	Setpoint Temperature	Range	10	1000	Units in degrees Celsius (scaled by 10)
REG 6	Close Time	Range	10*	500	Units are in 10 $\mu$ s
REG 7	Displacement Stroke	Range	10	200	Units are in micros or in percentage (depending on valve used)
REG 8	Open Time	Range	10*	500	Units are in 10 $\mu$ s
REG 9	Pulse Time	Range	10	999499	Units are in 10 $\mu$ s
REG 10	Operating Mode	Range	0	2	0 = Timed 1 = Continuous 2 = External
REG 11	Cycle Time	Range	67*	999999	Units are in 10 $\mu$ s
REG 12	Close Voltage	Range	50	130*	Units are in volts (V)
<p><b>NOTE:</b> The Input Status and Digitals registers have many useful bits that can be changed without affecting other bits. This is achieved by splitting these registers into Set registers and Clear registers. The split registers allow setting (changing to 1) or clearing (changing to 0) any set of bits without affecting the other bits.</p> <p><b>EXAMPLE:</b> You can use a single command to: Turn on the heater (bit 4), reset errors (bit 9), stop dispensing (bit 2), and set the heater setpoint to internal (bit 5). In this example, the Digitals Set register is <math>24 + 29 = 16 + 512 = 528</math> and the Digitals Clear register is <math>22 + 25 = 4 + 32 = 36</math>. So, sending “16, 2, 2, 528, 36;” to the controller would set and clear only the specified bits.</p>					
<i>Continued on next page</i>					

## Appendix B, NX Protocol (continued)

### Register Set for the NX Protocol (continued)

#### Input Table (continued)

Input Table					
Register #	Parameter (Reg Name)	Data Type	Minimum	Maximum	Comments
REG 13	IP1 (BBB)	Range	0	65535	Example: 192.168.10.61 192 (MSB) and 168 (LSB) <b>(hex = 0xC0A8 and Dec = 49320)</b>
REG 14	IP2 (BBB)	Range	0	65535	10 (MSB) and 61 (LSB) <b>(hex = 0x0A3D and Dec = 2621)</b>
REG 15	Sub1 (BBB)	Range	0	65535	Example: 255.255.255.0 255 (MSB) and 255 (LSB) <b>(hex = 0xFFFF and Dec = 65535)</b>
REG 16	Sub2 (BBB)	Range	0	65535	255 (MSB) and 0 (LSB) <b>(hex = 0xFF00 and Dec = 65280)</b>
REG 17	Gate1 (BBB)	Range	0	65535	Example: 192.168.10.1 192 (MSB) and 168 (LSB) <b>(hex = 0xC0A8 and Dec = 49320)</b>
REG 18	Gate2 (BBB)	Range	0	65535	10 (MSB) and 1 (LSB) <b>(hex = 0x0A01 and Dec = 2561)</b>
REG 19	IP1 (AnyBus)	Range	0	65535	Example: 192.168.10.61 192 (MSB) and 168 (LSB) <b>(hex = 0xC0A8 and Dec = 49320)</b>
REG 20	IP2 (AnyBus)	Range	0	65535	10 (MSB) and 61 (LSB) <b>(hex = 0x0A3D and Dec = 2621)</b>
REG 21	Sub1 (AnyBus)	Range	0	65535	Example: 255.255.255.0 255 (MSB) and 255 (LSB) <b>(hex = 0xFFFF and Dec = 65535)</b>
REG 22	Sub2 (AnyBus)	Range	0	65535	255 (MSB) and 0 (LSB) <b>(hex = 0xFF00 and Dec = 65280)</b>
REG 23	Gate1 (AnyBus)	Range	0	65535	Example: 192.168.10.0 192 (MSB) and 168 (LSB) <b>(hex = 0xC0A8 and Dec = 49320)</b>
REG 24	Gate2 (AnyBus)	Range	0	65535	10 (MSB) and 0 (LSB) <b>(hex = 0x0A00 and Dec = 2560)</b>
REG 25	Reserved	None	—	—	—
REG 26	Reserved	None	—	—	—
REG 27	Reserved	None	—	—	—
REG 28	Reserved	None	—	—	—
REG 29	Reserved	None	—	—	—
REG 30	Reserved	None	—	—	—
REG 31	Reserved	None	—	—	—

## Appendix B, NX Protocol (continued)

### Register Set for the NX Protocol (continued)

#### REG 1 (Output Status) Details Table

REG 1 (Output Status) Details		
Reg 1 Bit Number	Function	Execution
BIT_0	RESERVED	
BIT_1	Ethernet port configuration complete	0 = No change 1 = New Ethernet port settings initiated
BIT_2	RESERVED	
BIT_3	RESERVED	
BIT_4	New industrial network settings	0 = Network settings not updated 1 = New network settings updated successfully
BIT_5	Industrial network up	0 = Network down 1 = Network up
BIT_6	RESERVED	0 = No reset request 1 = Reset request from B40
BIT_7	RESERVED	0 = Device reset 1 = Factory reset
BIT_8	RESERVED	0 = Do not reset 1 = Execute reset
BIT_9	Reset request response status	0 = No response 1 = Response status
BIT_10	Reset request response accept / reject	0 = Reset request rejected 1 = Reset request accepted
BIT_11	Current network type	0 = EtherNet/IP 1 = PROFINET
BIT_12	Network change response status	0 = No response 1 = Response status
BIT_13	Network change response accept / reject	0 = Network change request rejected 1 = Network change request accepted
BIT_14	Network change complete response status	0 = No response 1 = Response status
BIT_15	Network change complete response success / failed	0 = Network change failed 1 = Network change succeeded

## Appendix B, NX Protocol (continued)

### Register Set for the NX Protocol (continued)

#### REG 2 (Output Digitals) / REG 2 (Input Digitals Set) / REG 3 (Input Digitals Clear) Details Table

REG 2 (Output Digitals) / REG 2 (Input Digitals Set) / REG 3 (Input Digitals Clear) Details		
Reg 1 Bit Number	Function	Execution
BIT_0	Power	0 = Power OFF 1 = Power ON
BIT_1	RESERVED	
BIT_2	Trigger	0 = Trigger OFF 1 = Trigger ON
BIT_3	Purge	0 = Purge OFF 1 = Purge ON
BIT_4	Heater	0 = Heater OFF 1 = Heater ON
BIT_5	External Heater	0= Internal setpoint 1= External analog setpoint
BIT_6	Heater I/O Override	0 = Normal 1 = Override active (heater disabled)
BIT_7	RESERVED	
BIT_8	RESERVED	
BIT_9	Error Reset	Rising edge resets error
BIT_10	E-STOP	Rising edge sets E-STOP (dispense disabled) Falling edge clears E-STOP if hardware E-STOP is not active Reading 0 indicates no E-STOP active Reading 1 indicates E-STOP active
BIT_11	RESERVED	
BIT_12	Compatibility Mode	0 if normal, 1 when ignoring XP
BIT_13	Custom Wave 0	Refer to “Custom Wave Details Table” on page 76.
BIT_14	Custom Wave 1	Refer to “Custom Wave Details Table” on page 76.
BIT_15	Custom Wave 2	Refer to “Custom Wave Details Table” on page 76.

## Appendix B, NX Protocol (continued)

### Register Set for the NX Protocol (continued)

#### REG 0 (Input Status Set) Details Table

REG 0 (Input Status Set) Details		
Reg 1 Bit Number	Function	Execution
BIT_0	EFD USE ONLY	Nordson EFD use only
BIT_1	EFD USE ONLY	Nordson EFD use only
BIT_2	EFD USE ONLY	Nordson EFD use only
BIT_3	Reset Request	0 = No reset request 1 = Reset requested
BIT_4	Reset Request Type	0 = Device reset 1 = Factory reset
BIT_5	EFD USE ONLY	Nordson EFD use only
BIT_6	EFD USE ONLY	Nordson EFD use only
BIT_7	EFD USE ONLY	Nordson EFD use only
BIT_8	Network Change Request	0 = No change 1 = Network change request
BIT_9	Network Type Selection	0 = EtherNet/IP 1 = PROFINET
BIT_10	RESERVED	0
BIT_11	RESERVED	0
BIT_12	RESERVED	0
BIT_13	RESERVED	0
BIT_14	RESERVED	0
BIT_15	RESERVED	0

#### Custom Wave Details Table

Digitals: Custom Wave Details			
CW_2	CW_1	CW_0	Comments
0	0	0	Profile 0
0	0	1	Profile 1
0	1	0	Profile 2
0	1	1	Profile 3
1	0	0	Profile 4
1	0	1	Profile 5 (Smooth)
1	1	0	Profile 6 (Ramp)
1	1	1	Profile 7

## Appendix B, NX Protocol (continued)

### Message Format for the NX Protocol

This section provides the read, write, and error messages that are implemented in the server (the *Nexus* controller). The server and the Client (the PLC / PC) communicate over standard TCP/IP. The Nordson NX Client Application uses the message format shown in this section. Any PLC or program can use this format to communicate with the dispenser.

Read messages (requesting output registers) are differentiated from write messages (sending input registers) by their message format. The message format is loosely based on the Modbus/TCP framework, but does not strictly adhere to it. The basic commands (function codes) are supported by Modbus protocol. The Modbus frame considers the data in byte format, but for readability messages are formatted as text.

When the Client sends a request, the server (the dispenser) parses the received request and validates it. If invalid data is received, the server responds with an error code. The Modbus/TCP framework is used to formulate the data. When a message is invalid, the server responds to the Client with the command OR'ed with 0x80 and an error code. The Client application must check this bit when it receives a response from the server to determine whether the data send was successfully processed or not.

**NOTE:** The actual data from the Client must be in CSV (Comma Separated Values) format.

### Read Request (Sent from Client to Dispenser)

Description	Data
Command	3
Start Register Number	[0 – 19]
Number of Registers	[1 – 20]

### Read Request Response (Sent from Dispenser to Client)

Description	Data
Command	3
Start Register Number	[0 – 19]
Number of Registers	[1 – 20]
Register Data 1	XXXXX
Register Data 2	XXXXX
....	....

### Read Request Error Response (Sent from Dispenser to Client)

Description	Data
Command	131 (0x83)
Error Code	-1 Data Format Error -2 Data Limit Error

## Appendix B, NX Protocol (continued)

### Message Format for the NX Protocol (continued)

#### Write Request (Sent from Client to Dispenser)

Description	Data
Command	16
Start Register Number	[0 – 19]
Number of Registers	[1 – 20]
Register Data 1	XXXXX
Register Data 2	XXXXX
....	....

#### Write Request Acknowledgment (Sent from Dispenser to Client)

Description	Data
Command	16
Start Register Number	[0 – 19]
Number of Registers	[1 – 20]
Register Data 1	XXXXX
Register Data 2	XXXXX
....	....

#### Write Request Error Response (Sent from Dispenser to Client)

Description	Data
Command	144 (0x90)
Error Code	-1 (Data Format Error) -2 (Data Limit Error)

## Appendix C, Industrial Ethernet Protocols

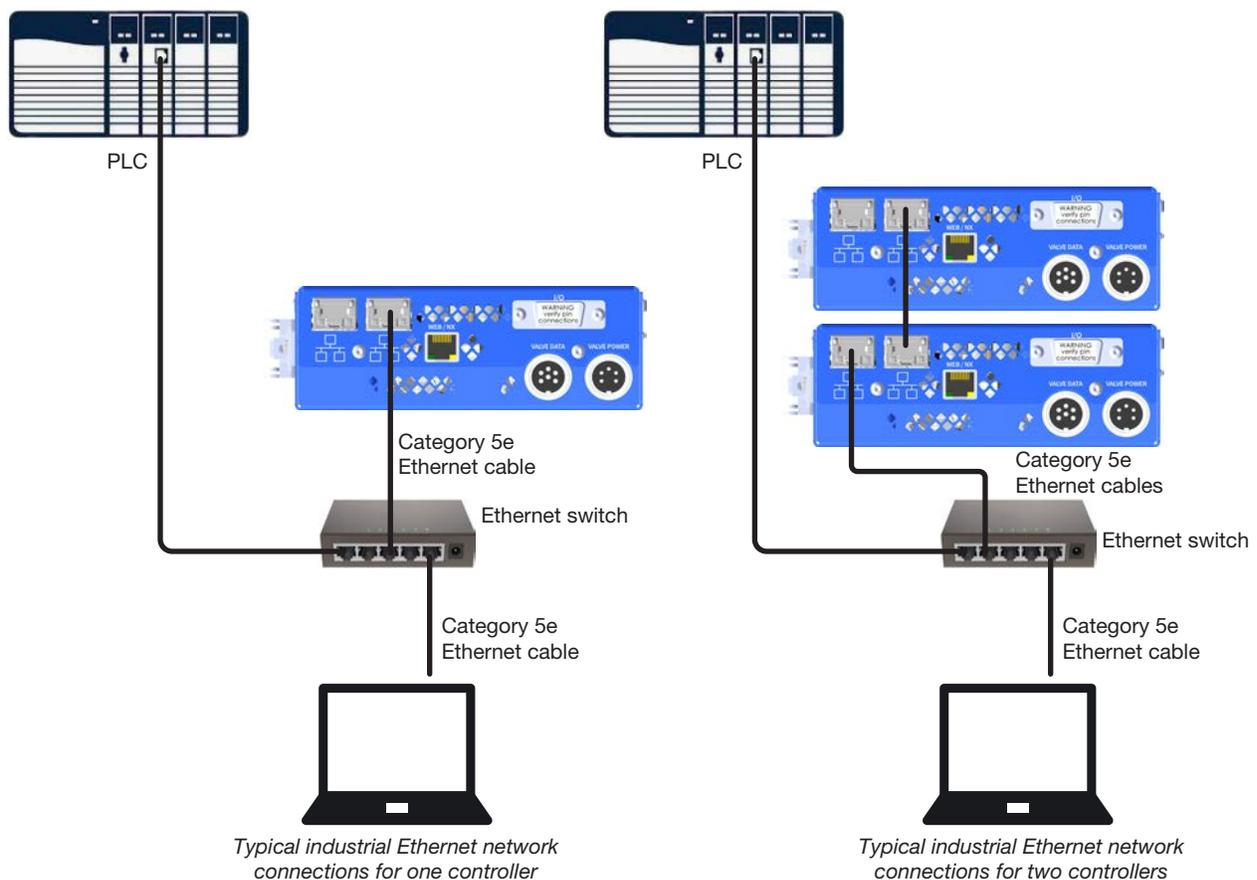
This appendix provides technical information for using the EtherNet/IP or PROFINET protocol to interface with a *Nexus* controller. To communicate with a *Nexus* controller, the connected device must be capable of establishing an IPv4 connection on the appropriate port. The IP address, subnet mask, and gateway settings are user-defined via the web interface (refer to “Industrial Ethernet” on page 40).

### Ethernet and PLC Connection

As applicable for your installation, make the Ethernet connections between the *Nexus* controller, a personal computer, and the PLC.

You will need the following items:

- PLC with EtherNet/IP or PROFINET compatibility
- PLC configuration file (EDS or GSDML) downloaded from the Nordson EFD *Nexus* controller web page
- Category 5e Ethernet cables (or similar), or an Ethernet crossover cable
- Ethernet switch (if you have an Ethernet crossover cable, this switch is unnecessary)



## Appendix C, Industrial Ethernet Protocols (continued)

### Communication and Programming

1. Download the PLC configuration file for the protocol you want to use.

Protocol	PLC Configuration File Name	Download Link
EtherNet/IP	01A0002BFFFF6300.EDS	<a href="http://nordsonefd.com/Nexus-PLC-PROFINET">nordsonefd.com/Nexus-PLC-PROFINET</a>
PROFINET	GSDML-V2.42-Nordson-picodin-20230816.xml	<a href="http://nordsonefd.com/Nexus-PLC-EtherNetIP">nordsonefd.com/Nexus-PLC-EtherNetIP</a>

2. Load the PLC configuration file into your development application and establish communication between the *Nexus* controller and the PLC network port.

**NOTES:**

- Follow the instructions from the PLC vendor on how to load a PLC configuration file and how to establish the connection between third-party hardware and the PLC.
  - Ensure that there are no duplicate IP addresses and subnet masks. To configure the *Nexus* controller network settings (IP address, subnet mask, etc.), refer to “Industrial Ethernet” on page 40.
3. Test the communication by writing a quick sample code or by manually altering an output register and verifying that the corresponding input changes accordingly (refer to the “Protocol Key” on page 81).
  4. When communication is established and working, use the “Protocol Key” on page 81 to accomplish the PLC programming for your application.

## Appendix C, Industrial Ethernet Protocols (continued)

### Protocol Key

Parameter	Register Name	Limits	PROFINET Registers (8-bit)	EtherNet/IP Registers (8-bit)	NX Protocol Registers (16-bit or 32-bit)
Total Shot Count (SC)	Valve SC Low	n/a (read only)	in0, in1	in1, in0	out26
	Valve SC Med		in2, in3	in3, in2	out27
	Valve SC High		in4, in5	in5, in4	out28
Error Code	Alarm Code		in6, in7	in7, in6	out29
Heater Act. Temp	Act. Heater Temp		in8, in9	in9, in8	out24
Stack Act. Temp	Stack Temp		in10, in11	in11, in10	out25
Digitals	Cur Digitals		in12, in13	in13, in12	out2
Mode	Cur Operating Mode		in14, in15	in15, in14	out9
Count (number of shots per valve initiate in the Timed mode)	Cur Dispense Count		in16, in17	in17, in16	out3
Heater Setpoint	Cur Setpoint Htr Temp		in18, in19	in19, in18	out4
Open Time	Cur Open Time		in20, in21	in21, in20	out7
Close Time	Cur Close Time		in22, in23	in23, in22	out5
Pulse (time)	Cur Pulse Time Low		in24, in25	in25, in24	out8
	Cur Pulse Time High		in26, in27	in27, in26	
Cycle (time)	Cur Cycle Time Low		in28, in29	in29, in28	out10
	Cur Cycle Time High		in30, in31	in31, in30	
Close Volts	Cur Close Voltage		in32, in33	in33, in32	out11
Stroke	Cur Displacement Strk		in34, in35	in35, in34	out6
Digitals	Digitals		out0, out1	out1, out0	in2
Count (number of shots per valve initiate in the Timed mode)	Dispense Count		1 -> 65535	out2, out3	out3, out2
Heater Setpoint	Set Point Htr Temp		out4, out5	out5, out4	in5
Close Time	Close Time	10 -> 500	out6, out7	out7, out6	in6
Stroke	Displacement Strk	15 -> 165	out8, out9	out9, out8	in7
Open Time	Open Time	15 -> 500	out10, out11	out11, out10	in8
Pulse (time)	Pulse Time Low	15 -> 999499	out12, out13	out13, out12	in9
	Pulse Time High		out14, out15	out15, out14	
Mode	Operating Mode	0, 1, 2, 3, 4	out16, out17	out17, out16	in10
Cycle (time)	Cycle Time Low	67 -> 999999	out18, out19	out19, out18	in11
	Cycle Time High		out20, out21	out21, out20	
Close Volts	Close Voltage	10 -> 130	out22, out23	out23, out22	in12

## Appendix D, RS-232 Protocol

You can operate the controller by connecting to the RS-232 terminals on the I/O port.

### Communication Specifications

The controller acts as a terminal to the remote host PC. The controller communicates using the following settings:

- Synchronous mode: half duplex
- Baud rate: 115200
- Start bit: 1
- Data length: 8 bit (ASCII)
- Parity bit: None
- Stop bit: 1

### Communication Sequence

The host machine initiates all communication sequences. The controller evaluates the last four characters in the command packet as the command.

Typical Command Packet: xxxCCCC  
 (where xxx is the setting and CCCC is the command)  
 The length of the setting varies depending on the command.

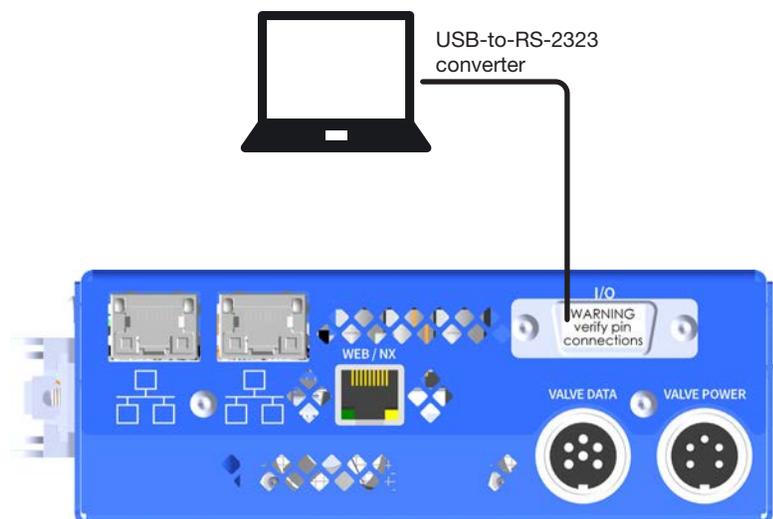
### Serial Commands

Commands are evaluated after a return (Enter key or 0x0D hex). After a return is received, the controller evaluates the command, transmits any data related to the command, and closes the packet with <3.

The following tables provide the commands for the controller. Each entry includes a brief description of the command, shows the command format, and provides a description of the data that is attached and retrieved by the command.

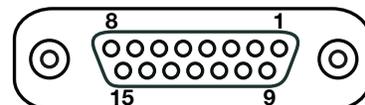
#### NOTES:

- The <3 acknowledge command is removed from the examples since all commands are successfully evaluated.
- The return constant (Enter key: ↵) is depicted as [Enter] in all examples.



For RS-232 communication, make the connections shown below to the I/O port.

Pin	Direction	Description
3	Input	RS-232 RX
4	Output	RS-232 TX
9	n/a	GND



DB15 I/O port pin positions

## Appendix D, RS-232 Protocol (continued)

### Valve (Driver)

**NOTE:** Commands are returned only in English.

Command	Description	Command Format	Sample, with Output After [Enter]
drv1	Sets the valve mode (MODE)	x = 1-5 Where x equals: drv1 Sets MODE to Timed drv1 Sets MODE to External / Purge drv1 Sets MODE to Continuous drv1 Reads the current mode	drv1 [Enter] Driver 1: TIME  drv1 [Enter] Driver 1: PURG  drv1 [Enter] Driver 1: CONT  drv1 [Enter] Driver 1: CONT
dcn1	Sets the valve dispense count (COUNT)	xxxxxdcn1 Where x equals: >00001-65535 counts (DCNT)	00001dcn1 [Enter] Dispense Count (DCNT) = 00001
ont1	Sets the valve ON time (PULSE)	xxxx.xxont1 Where xxxx.xx = ON time in ms <b>NOTE:</b> Time is entered as an ON / OFF time where ON = PULSE and CYCLE = ON + OFF. ON and OFF times should be adjusted together to preserve the CYCLE time setting.	0001.45ont1 [Enter] Time Set To = 0001.45 ms
oft1	Sets the valve OFF time (CYCLE) (Where OFF time + ON Time = CYCLE)	xxxx.xxoft1 Where xxxx.xx = OFF time in ms <b>NOTE:</b> Time is entered as an ON / OFF time where ON = PULSE and CYCLE = ON + OFF. ON and OFF times should be adjusted together to preserve the CYCLE time setting.	0005.00oft1 [Enter] Time Set To = 0005.00 ms
rdr1	Returns the valve status	rdr1	rdr1 [Enter] Power: OFF MODE : TIME PULSE: 0002.00ms CYCLE: 0004.00ms COUNT: 00001 Profile Rise.: 6 Profile Fall.: 6 Stroke.....: 0070 Up Ramp Time.: 000.500ms Dwn Ramp Time: 000.250ms Close Voltage: 090 Numb Shots...: 0000398174 Power Mode: ON at boot up

*Continued on next page*

## Appendix D, RS-232 Protocol (continued)

### Valve (Driver) (continued)

Command	Description	Command Format	Sample, with Output After [Enter]
cycl	Cycles the valve (mimics the CYCLE icon on the touchscreen)	0cycl Cycle OFF 1cycl Cycle ON <b>NOTE:</b> Each Cycle ON command must be followed by a Cycle OFF command.	1cycl [Enter] Cycle: ON  0cycl [Enter] Cycle: OFF
dpwr	Sets the valve power control	0dpwr Valve power OFF 1dpwr Valve power ON	0dpwr [Enter] Valve Driver Power: OFF  1dpwr [Enter] Valve Driver Power: ON
plok*	Sets the duration of the PULSE OK Time I/O pin output	AAAplok Where AAA = PULSE OK Time in ms	050plok [Enter] Pulse OK Time Adj:050
drvo*	Sets the driver configuration at power up to ON	drvo	drvo [Enter] Power Mode: ON at boot up
drvf*	Sets the driver configuration at power up to OFF (default)	drvf	drvf [Enter] Power Mode: Default
sdr1	Sets OPEN, CLOSE, and COUNT in one command	xxxx.xx,yyyy.yy,zzzzzsdr1 Where xxxx.xx is the OPEN time (in ms) Where yyyy.yy is the CLOSE time (in ms) Where zzzzz is COUNT	0002.23,0005.77,00535sdr1 [Enter] 0002.23,0005.77,00535
*Not implemented for the Nexus controller.			

## Appendix D, RS-232 Protocol (continued)

### Temperature

**NOTE:** Commands are returned only in English.

Command	Description	Command Format	Sample, with Output After [Enter]
chtr	Sets the heater mode	xchtr Where x equals: 0chtr Disables the corresponding channel 1chtr Enables the corresponding channel 2chtr Reads back the status (enabled / disabled) of the corresponding channel 3chtr Sets the heater mode to remote	0chtr [Enter] Heater: OFF  1chtr [Enter] Heater: ON  2chtr [Enter] Heater: ON  3chtr [Enter] Heater: REM
stmp	Sets the heater temperature setpoint	DDD.Dstmp Where DDD.D = temperature setting in degrees C <b>NOTE:</b> Temperature must be entered in °C.	045.9stmp [Enter] Set Temperature = 045.9C
rhtr	Returns the heater status	rhtr	rhtr [Enter] MODE = OFF SET = 055.3C ACT = 031.5C STACK = 031.1C
trng*	Sets the adjustable temperature range limit for I/O 1 pin 5 (Status of Temperature)	DD.Dtrng Where DD.D = temperature range limit for pin 5 (0.5–12.0° C) <b>NOTES:</b> • Default is 06.0C (6° C). • Temperature must be entered in °C.	06.0trng [Enter] Temp Range = 06.0C
rrng*	Reads the adjustable temperature range limit for I/O 1 pin 5 (Status of Temperature)	rrng	rrng [Enter] Temp Range = 06.0C

\*Not implemented for the Nexus controller.

## Appendix D, RS-232 Protocol (continued)

### Profile

**NOTE:** Commands are returned only in English.

Command	Description	Command Format	Sample, with Output After [Enter]
rzpr*	Sets the close (rise) profile of the valve	Xrzpr Where X = selections 1–6	6rzpr [Enter] Profile: 6
flpr*	Sets the open (fall) profile of the valve	Xflpr Where X = selections 1–6	6flpr [Enter] Profile: 6
strk	Sets the stroke of the valve	AAAstrk Where AAA = stroke adjustment in volts <b>NOTE:</b> Only valid in Ramp mode.	075strk [Enter] Stroke Adjusted: 075
volp	Sets the close voltage of the valve	AAAvolp Where AAA = close voltage <b>NOTE:</b> Only valid in Ramp mode.	095volp [Enter] Voltage Adjust: 095
clst	Sets the close (rise) time of the valve	AAAAclst Where AAAA = close time in $\mu$ s <b>NOTE:</b> Only valid in Ramp mode.	0300clst [Enter] Profile Time Adj: 0300
opnt	Sets the open (fall) time of the valve	AAAAopen Where AAAA = open time in $\mu$ s <b>NOTE:</b> Only valid in Ramp mode.	0220opnt [Enter] Profile Time Adj: 0220
<i>*Not implemented for the NexuS controller.</i>			

## Appendix D, RS-232 Protocol (continued)

### Configuration

**NOTE:** Commands are returned only in English.

Command	Description	Command Format	Sample, with Output After [Enter]
cfg1*	Configures I/O 1 pin 6 for Error Reset (default), Valve Power On/Off Control, or Valve Purge Control <b>NOTE:</b> If pin 6 is set to Valve Power On / Off Control, the drv command must be used. Refer to drv under “Valve (Driver)” on page 83.	0cfg1 Sets pin 6 to Error Reset (default) 1cfg1 Sets pin 6 to Valve Power On/Off Control 2cfg1 Sets pin 6 to Valve Purge Control	0cfg1 [Enter] Input Configuration... Pin 6 = Error Reset Pin 12 = Temperature Off  1cfg1 [Enter] Input Configuration... Pin 6 = Valve Power On/Off Control Pin 12 = Temperature Off  2cfg1 [Enter] Input Configuration... Pin 6 = Valve Purge Control Pin 12 = Temperature Off
cfg2*	Configures I/O 1 pin 12 for Temperature Off (default), Valve Power On/Off Control, or Valve Purge Control <b>NOTE:</b> If pin 12 is set to Valve Power On / Off Control, the drv command must be used. Refer to drv under “Valve (Driver)” on page 83.	0cfg2 Sets pin 12 to Temperature Off (default) 1cfg2 Sets pin 12 to Valve Power On/Off Control 2cfg2 Sets pin 12 to Valve Purge Control	0cfg2 [Enter] Input Configuration... Pin 6 = Error Reset Pin 12 = Temperature Off  1cfg2 [Enter] Input Configuration... Pin 6 = Error Reset Pin 12 = Valve Power On/Off Control  2cfg2 [Enter] Input Configuration... Pin 6 = Error Reset Pin 12 = Valve Purge Control
rcfg*	Reads the current configuration settings for I/O 1 pins 6 and 12	rcfg	rcfg [Enter] Input Configuration... Pin 6 = Error Reset Pin 12 = Valve Purge Control
dioi*	Sets the following pins to an internally provided (non-isolated) signal: <ul style="list-style-type: none"> <li>I/O 1 pin 4 (GND) and pin 15 (Ext 24 Volts)</li> <li>I/O 2 pins 17, 19, and 21 (DSUB_GND) and pin 25 (+25).</li> </ul> <b>NOTE:</b> Use this setting to configure an Ext 24 Volt pin as a courtesy power supply.	dioi	dioi [Enter] Voltage = Internal

\*Not implemented for the Nexµs controller.

Continued on next page

## Appendix D, RS-232 Protocol (continued)

### Configuration (continued)

Command	Description	Command Format	Sample, with Output After [Enter]
dioe*	<p>Sets the following pins to an externally provided (non-isolated) signal:</p> <ul style="list-style-type: none"> <li>I/O 1 pin 4 (GND) and pin 15 (Ext 24 Volts)</li> <li>I/O 2 pins 17, 19, and 21 (DSUB_GND) and pin 25 (+25).</li> </ul> <p><b>NOTE:</b> Use this setting to configure an Ext 24 Volts pin as an externally provided source for the optically isolated inputs / outputs.</p>	dioe	dioe [Enter] Voltage = External
rly*	<p>Reads the current settings (as set using the dioi and dioe commands) for the following pins:</p> <ul style="list-style-type: none"> <li>I/O 1 pin 4 (GND) and pin 15 (Ext 24 Volts)</li> <li>I/O 2 pins 17, 19, and 21 (DSUB_GND) and pin 25 (+25).</li> </ul>	rly*	rly* [Enter] Voltage = Internal
<i>*Not implemented for the NexuS controller.</i>			
baud	Sets the bits per second (bps) of this interface.	xbaud Where x equals: 0baud Set baud rate to 115200 bps 1baud Set baud rate to 57600 bps 2baud Set baud rate to 38400 bps 3baud Set baud rate to 19200 bps 4baud Set baud rate to 9600 bps (default)	0baud [Enter] Communications will be interrupted. Changing Baud Rate to: 9600  <b>NOTE:</b> The usual <3 will be transmitted at the new baud rate, so it may not be correctly received.
gcip (get current IP address)	Reads the standard Ethernet IP address.	gcip	gcip [Enter]

## Appendix D, RS-232 Protocol (continued)

### Other

**NOTE:** Commands are returned only in English.

Command	Description	Command Format	Sample, with Output After [Enter]
info	Displays the controller and valve information	info	info [Enter] PICO Touch: 01.05 PCB Serial Number: 12345678 Serial Number: 123456 Model Number: 7361217 Hardware Version: 04 Valve Serial Number: 123456 Valve FW Rev: 01.01 Valve PCB Rev: 02 Valve Type: HD-Actuator
ralr	Retrieves the last 40 (0-39) alarm conditions that occurred; includes time and alarm name	ralr	ralr [Enter] Current Error #: 30 Code # 00 Time: 00005 Code: Piezo Driver Fault Code # 01 Time: 00005 Code: Piezo Driver Fault : : Code # 39 Time: 00005 Code: Piezo Driver Fault Code # 39 Time: 00005 Code: Piezo Driver Fault
stat	Returns the system status (active alarms) as a bitmap or SYS OK when there are no alarms	stat	stat [Enter] Alarm:0x90  stat [Enter] SYS OK
arst	Resets a currently active alarm	arst	arst [Enter]

## NORDSON EFD ONE YEAR LIMITED WARRANTY

This Nordson EFD product is warranted for one year from the date of purchase to be free from defects in material and workmanship (but not against damage caused by misuse, abrasion, corrosion, negligence, accident, faulty installation, or by dispensing material incompatible with equipment) when the equipment is installed and operated in accordance with factory recommendations and instructions.

Nordson EFD will repair or replace free of charge any defective part upon authorized return of the part prepaid to our factory during the warranty period. The only exceptions are those parts which normally wear and must be replaced routinely, such as, but not limited to, valve diaphragms, seals, valve heads, needles, and nozzles.

In no event shall any liability or obligation of Nordson EFD arising from this warranty exceed the purchase price of the equipment.

Before operation, the user shall determine the suitability of this product for its intended use, and the user assumes all risk and liability whatsoever in connection therewith. Nordson EFD makes no warranty of merchantability or fitness for a particular purpose. In no event shall Nordson EFD be liable for incidental or consequential damages.

This warranty is valid only when oil-free, clean, dry, filtered air is used, where applicable.



*EFD*

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