

7197PCP-DIN-NX Controller

Operating Manual



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Introduction

This manual provides specifications, installation, setup, programming, and service information for 7197PCP-DIN-NX controllers. The 7197PCP-DIN-NX controller provides precise dispensing control for Nordson EFD 797PCP Series progressive cavity pumps. Refer to the applicable 797PCP operating manual for detailed information on the pump.

The 7197PCP-DIN-NX controller features an easy-to-use web interface for quick setup and operation of 797PCPs in either a one-component or two-component (2K) application. Dispense programs are created based on the way you want to control material output, including the following:

- By dispense time, in milliseconds
- By material volume, in milliliters
- By material weight, in grams

The controller also includes a Teach feature, which allows you to “teach” the controller the desired dispense time and volume settings.

The network-capable 7197PCP-DIN-NX controller also includes the NX protocol for direct communication with a programmable logic controller (PLC) or other manufacturing plant controllers over Transmission Control Protocol / Internet Protocol (TCP/IP) via Ethernet. For complete information about the NX protocol, refer to “Appendix D, NX Protocol” on page 61.

As with all EFD products, the 7197PCP-DIN-NX 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.

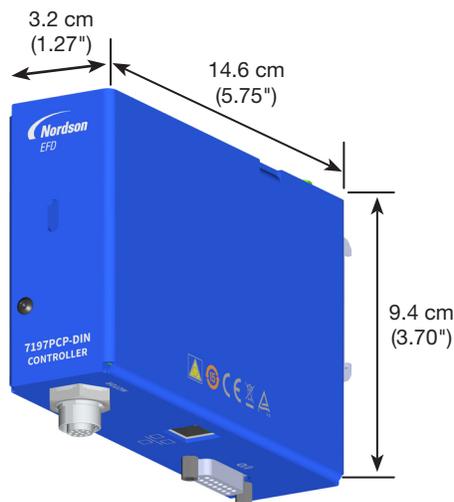
Disposal

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	3.2w × 9.4H × 14.6D cm (1.27w × 3.70H × 5.75D")
Weight	0.7 kg (1.5 lb)
Rotor speed	10–150 RPM
Time range	0.001–600,000 ms (1 s to 10 min)
Electrical power input	24 VDC (±2%), 3.75 A maximum
Feedback circuits	Electronic switch, 24 VDC, 100 mA maximum
Cycle initiate	24 VDC signal
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)
Product classification	Installation Category II Pollution Degree 2
Approvals	CE, UKCA, TÜV, RoHS, China RoHS, WEEE



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

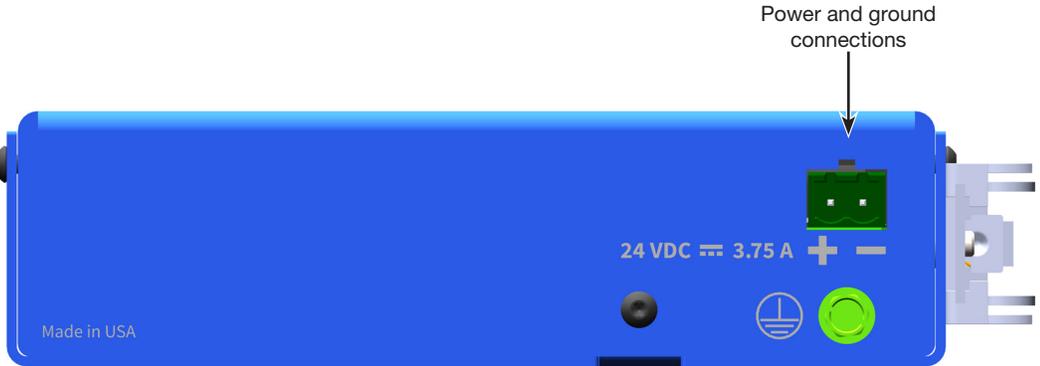
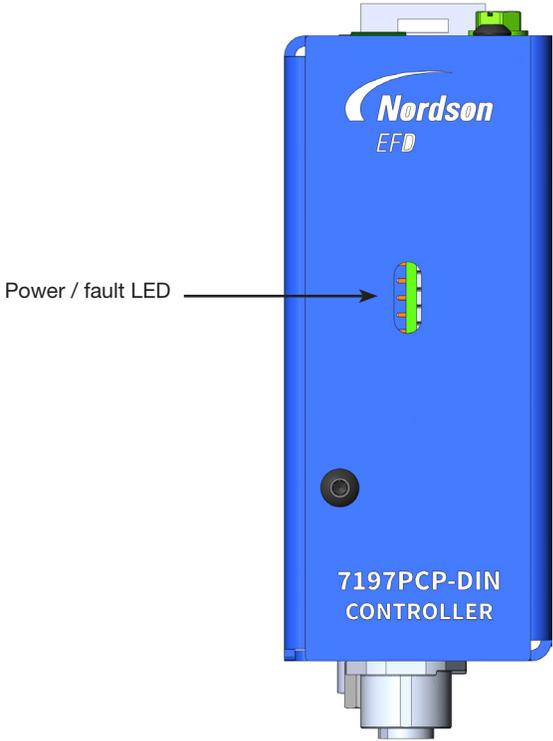
产品名称 Part Name	有害物质及元素 Toxic or Hazardous Substances and Elements					
	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr6)	多溴联苯 Polybrominated Biphenyls (PBB)	多溴联苯醚 Polybrominated Diphenyl Ethers (PBDE)
外部接口 External Electrical Connectors	X	0	0	0	0	0
<p>0: 表示该产品所含有的危险成分或有害物质含量依照EIP-A, 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>X: 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

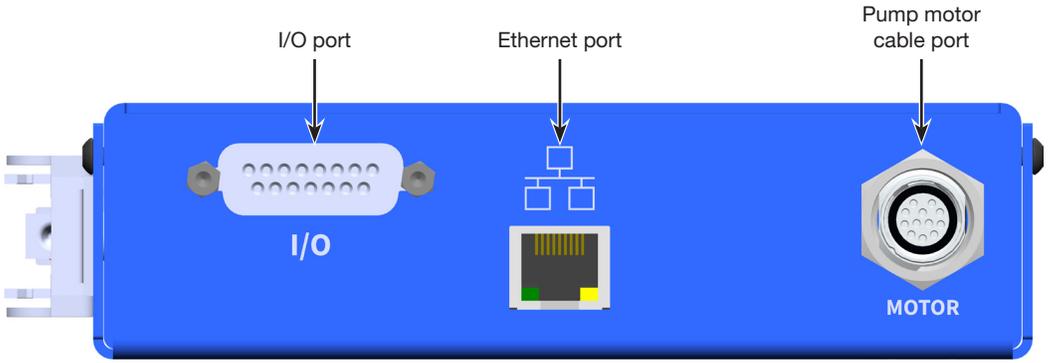


This equipment is regulated by the European Union under WEEE Directive (2012/19/EU). Refer to www.nordsonefd.com/WEEE for information about how to properly dispose of this equipment.

Operating Features



Controller top

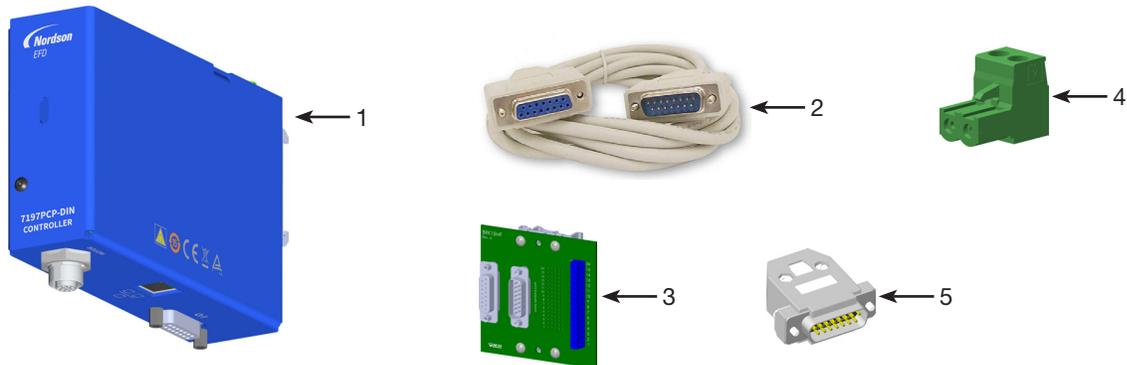


Controller bottom

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 7197PCP-DIN-NX controller
- 2 DB-15 cable, 1.6 m (5.2 ft) (for the cycle initiate, emergency stop, and purge initiate connections)
- 3 DB-15 breakout board (for the cycle initiate, emergency stop, and purge initiate connections)
- 4 Input power terminal block
- 5 E-stop jumper (required only if an emergency stop signal is not connected)

(Not shown)

797PCP or 797PCP-2K (ordered separately)

797PCP pump motor cable(s) (ordered separately)

Quick start guide

Installation (continued)

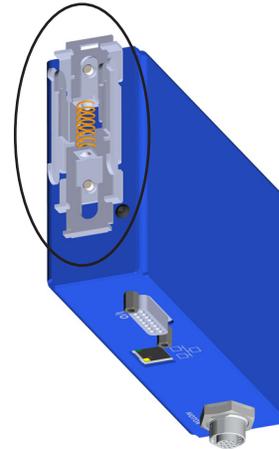
Install the 7197PCP-DIN-NX Controller

NOTE: Refer to “Installation Examples” on page 19 for system layout images of typical installations.

You will need the following items:

- 7197PCP-DIN-NX controller
- DB-15 breakout board

1. Integrate the 7197PCP-DIN-NX controller(s) into your existing machinery, observing the following guidelines:
 - Ensure that each controller is mounted close enough to connecting devices to route wiring to it without straining or kinking the wiring.
 - Ensure that the Ethernet connection on the bottom of each controller is easily accessible. This connection will be used to program the controller via the 7197PCP-DIN-NX web application.
 - Ensure that the power / fault LEDs on the front of each controller are visible to operators.

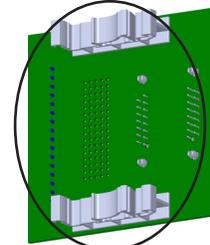


DIN mounting bracket on the back of the 7197PCP-DIN-NX controller

2. Integrate each DB-15 breakout board into your 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.

NOTES:

- All digital I/Os are 24 VDC.
- The analog input is 0–10 VDC.



DIN mounting brackets on the DB-15 breakout board

Install the Other System Components

1. Install the 797PCP(s). For pump installation instructions, refer to the applicable 797PCP manual.
2. Install any system components (other than the controller and pumps) that will comprise the complete dispensing system.

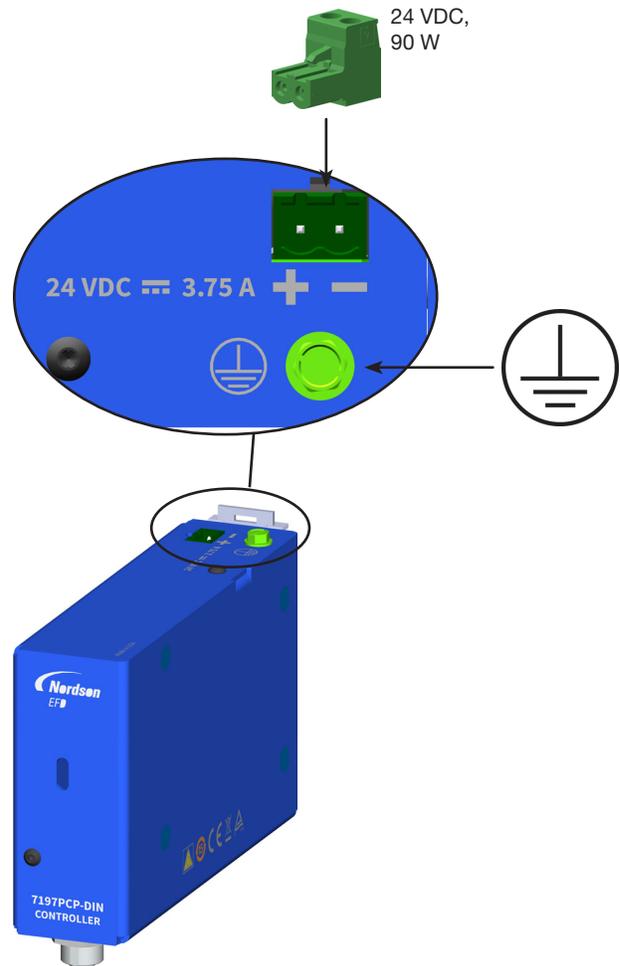
NOTE: For example, if you are using a fluid reservoir, position and install all the fluid reservoir components. For all ancillary components, refer to the quick start guide and / or operating manual provided with those components for installation and setup instructions.

Installation (continued)

Connect Power

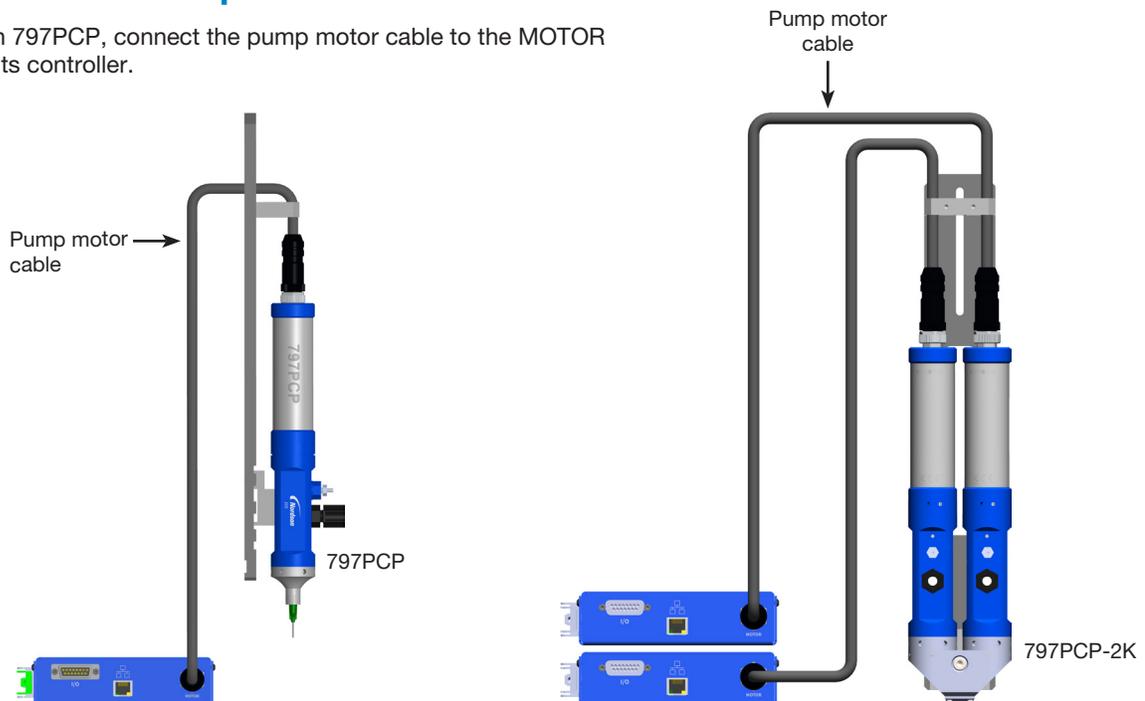
You will need the following items:

- Input power terminal block (shipped with the controller)
 - Wire cutters / strippers
 - Customer-supplied power (18 gauge recommended) and ground wiring
1. Install the input power terminal block in the 24V 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, connect an equipment grounding conductor to the green ground screw.



Connect the Pump Motor Cable

For each 797PCP, connect the pump motor cable to the MOTOR port on its controller.



Installation (continued)

Make the Cycle Initiate and Emergency Stop Connections

A dispensing cycle can be initiated by a 24 VDC signal from a device such as a mechanical start button, a PLC, or a foot pedal. For the dispense cycle to start, the emergency stop (ESTOP) circuit must be closed (as shown under “I/O Port Pin Assignments and Wiring Diagrams” on page 44). Both of these signals are connected to the applicable pins on the I/O port through the supplied DB-15 breakout board.

You will need the following items:

- Wire
 - Wire cutters / strippers
 - DB-15 cable
1. Connect the DB-15 cable to the I/O port on the controller and to the associated breakout board. For a 2K system, do this for both controllers.
 2. For each controller in the system, connect a cycle initiate signal to pins 5 and 6 (Ex_Trig + and Ex_Trig -) on the DB-15 breakout board as described in the table below.

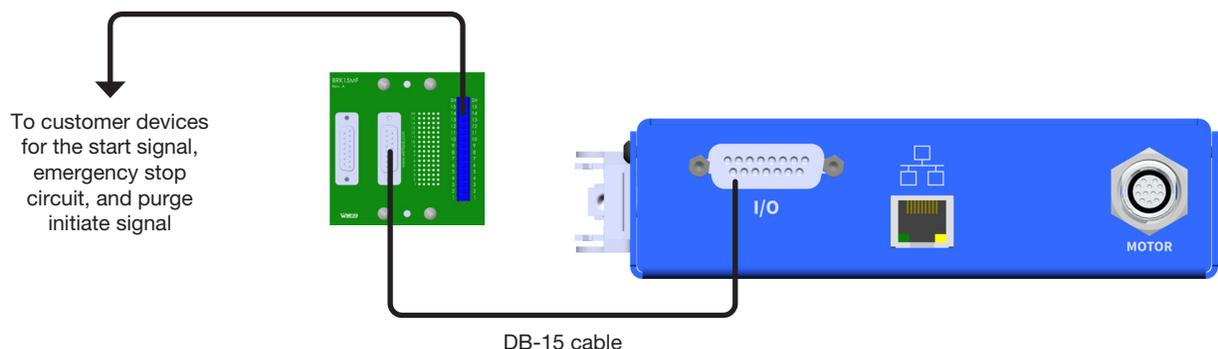
NOTE: Refer to “I/O Port Pin Assignments and Wiring Diagrams” on page 44 for details.

Application	How to Connect the Cycle Initiate to the I/O Port
One-component	<ul style="list-style-type: none"> • Connect an input signal to pins 5 and 6, Ex_Trig (+) and Ex_Trig (-).
Two-component (2K)	<ul style="list-style-type: none"> • Connecting both pin 5s [Ex_Trig (+)] and both pin 6s [Ex_Trig (-)] together, connect an input signal to both controllers. • Use one 24V source, but connect both ground pins (pin 9) together. <p>NOTES:</p> <ul style="list-style-type: none"> - Never connect the system ground (pin 9) and the analog ground (pin 13) together. - Do not connect either the system ground (pin 9) or the analog ground (pin 13) to a chassis or to an equipment ground connection.

3. For each controller in the system, connect an emergency stop input to pins 1 and 2 (Estop_H and Estop_L) on the DB-15 breakout board through a normally closed relay that opens upon an emergency stop condition.

NOTES:

- Refer to “I/O Port Pin Assignments and Wiring Diagrams” on page 44 for details.
- 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.
- When an emergency stop circuit is restored to normal, the controller will begin operation again.



Installation (continued)

Connect a Purge Initiate

For each controller in the system, connect a purge initiate signal to pins 10 and 11 (Purge + and Purge -) on the DB-15 breakout board. The purge signal allows operators to purge the pump(s) by pressing a button or other purge-initiate device.

NOTE: Refer to “I/O Port Pin Assignments and Wiring Diagrams” on page 44 for details.

Make the Ethernet Connection

Each controller in the system must be connected to the Ethernet in order to access the 7197PCP-DIN-NX web interface. To use the NX protocol to communicate with a 7197PCP-DIN-NX controller, the controller must also be connected to the PLC. Refer to “Ethernet and PLC Connection” on page 61 for details.

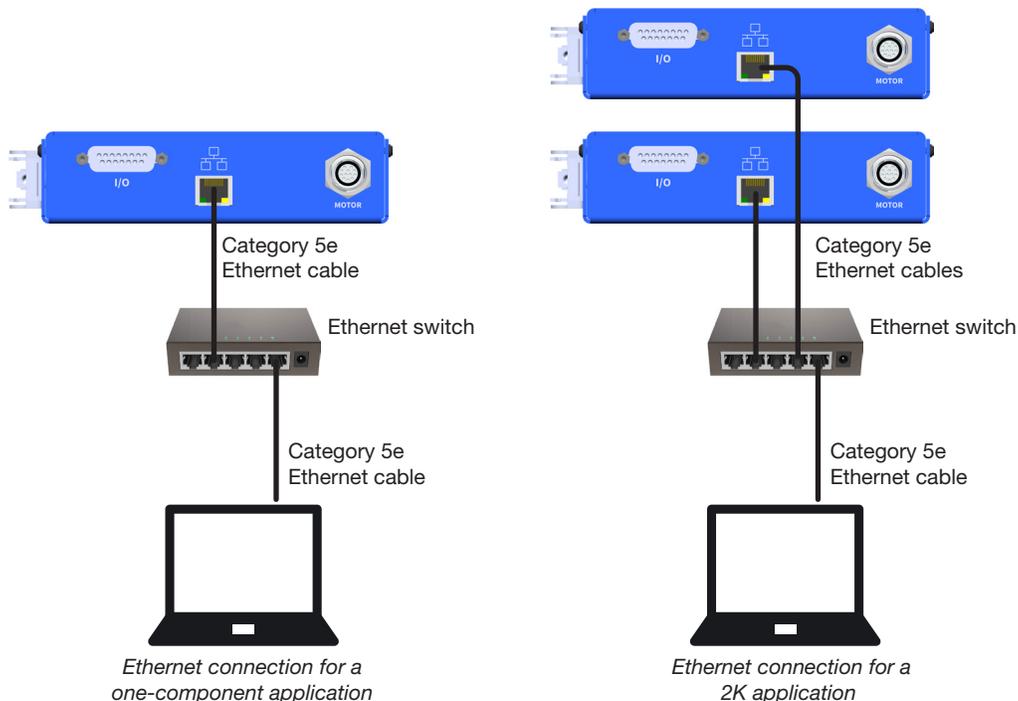
NOTE: Both the web interface and the NX protocol operate over TCP/IPv4 on port 80 and port 9000 respectively. To communicate with a 7197PCP-DIN-NX controller, the connected device must be capable of establishing a TCP/IPv4 connection on the appropriate port.

You will need the following items:

- Two (2) Category 5e Ethernet cables (or similar), or one 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 7197PCP-DIN-NX controller(s) and to a personal computer.
 2. Enable the 24 VDC power supply to the 7197PCP-DIN-NX controller(s).
 3. Ensure that your computer is on the same network plane as the 7197PCP-DIN-NX controller(s).

NOTE: A 7197PCP-DIN-NX controller’s preprogrammed IP address is **192.168.10.51**. If there are multiple 7197PCP-DIN-NX controllers on the same network, they each need a unique IP address:

- To change the IP address of a 7197PCP-DIN-NX controller, refer to “Defining the Controller Network Settings” on page 37.
- To change the IP address of a computer, refer to “Appendix A, Changing the IP Address of a Computer” on page 51.



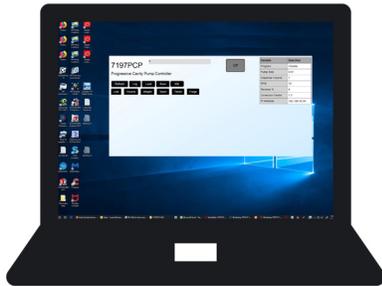
Installation (continued)

Communicating with the Controller

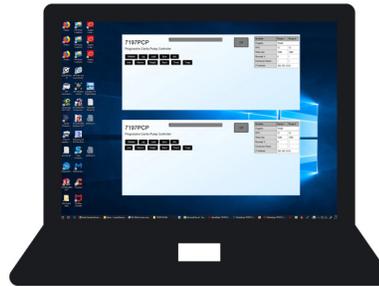
The 7197PCP-DIN-NX controller can be operated via the 7197PCP-DIN-NX web interface or via a PLC (or other manufacturing plant controller) using the NX protocol.

NOTES:

- This manual provides procedures for operating the controller via the web interface. If you are using the NX protocol to operate the controller, refer to “Appendix D, NX Protocol” on page 61.
 - Each controller in the system must be properly connected to the Ethernet as shown under “Make the Ethernet Connection” on page 16.
1. Ensure that the 24 VDC power supply to the 7197PCP-DIN-NX controller(s) is enabled.
 2. Open a web browser (Chrome or Firefox are preferred) and go to the following URL for a one-component system: <http://192.168.10.51:8088/lface.php>. For a multi-component system, open the unique URL(s) assigned to each pump. The Main screen appears when you open the application.



Single-component application



2K application

Installation (continued)

Purge the Pump(s)

Before creating any programs or placing the system into operation for the first time, purge each pump without a tip or mixer installed.

CAUTION

Risk of equipment damage. **Do not operate a 797PCP without material.** Excessive friction of dry components can damage the pump.

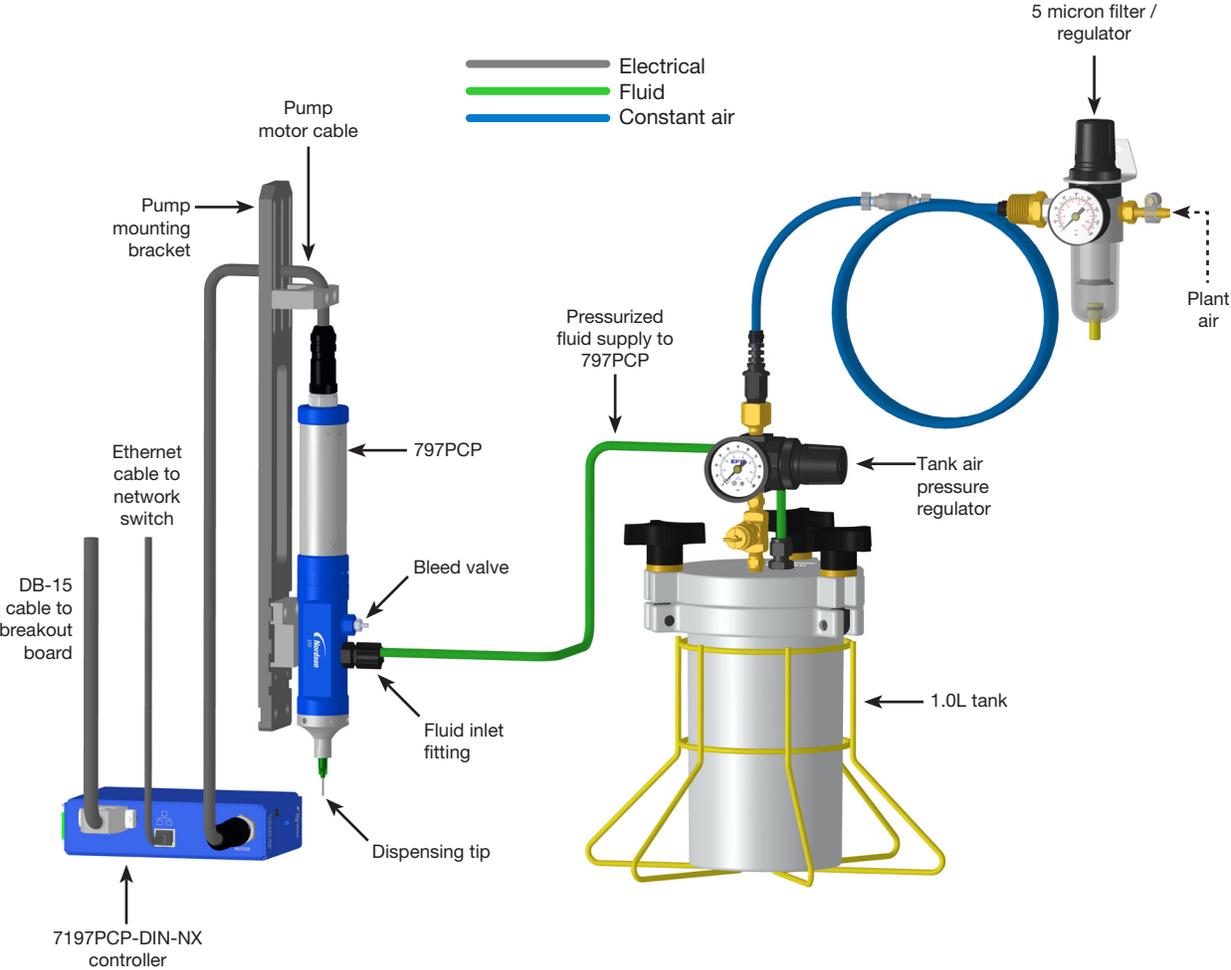
Refer to the pump purging procedures in the installation section of the pump manual to purge each 797PCP in the system. Return here to continue.

The system is now ready for routine operation. Continue to “Programming” on page 21 to create dispense programs for pump operation.

Installation Examples

7197PCP-DIN-NX Controller and 797PCP in a One-Component System

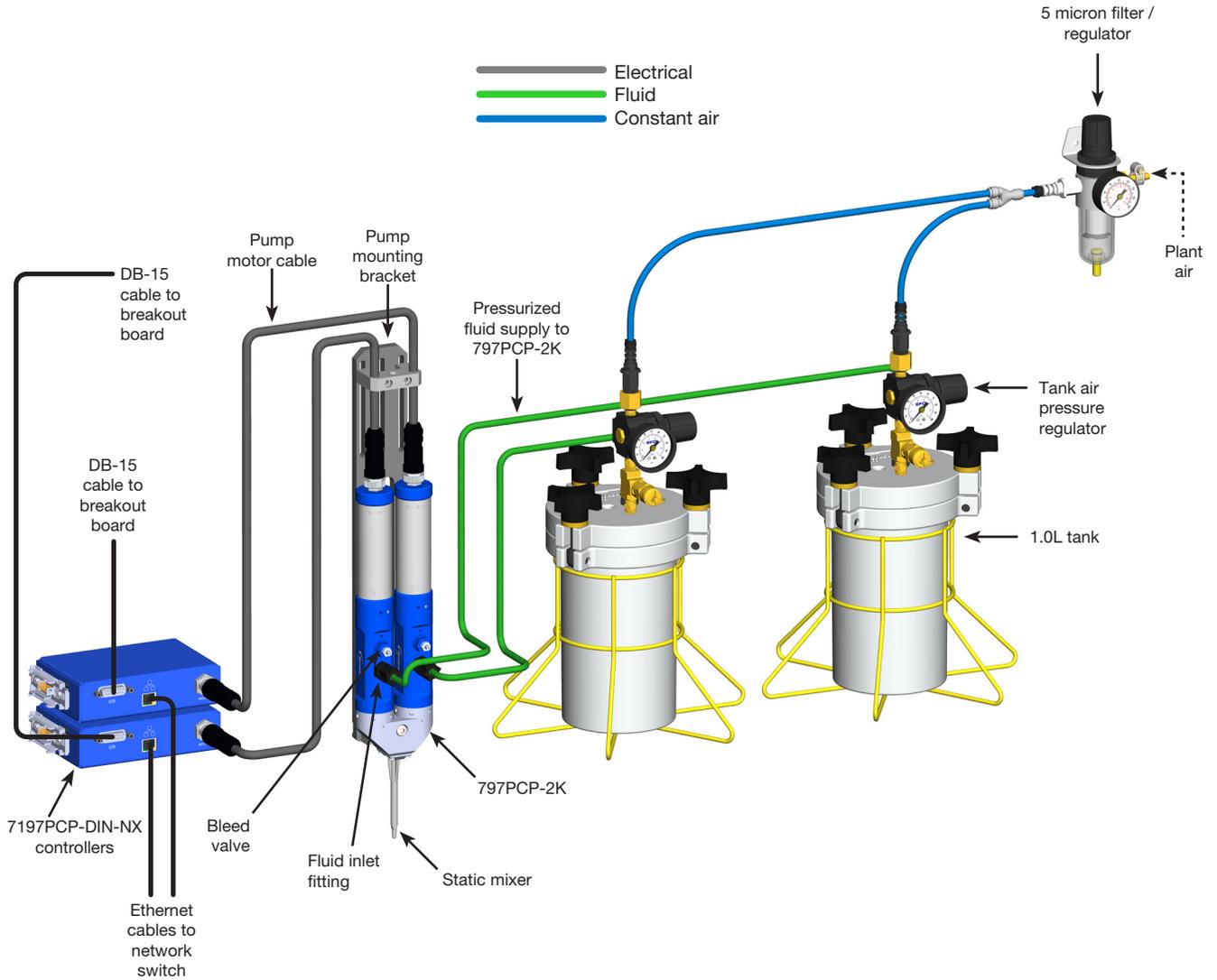
For pump installation instructions, refer to the 797PCP operating manual.



Installation Examples (continued)

7197PCP-DIN-NX Controller and 797PCP-2K in a 2K System

For pump installation instructions, refer to the 797PCP-2K operating manual.



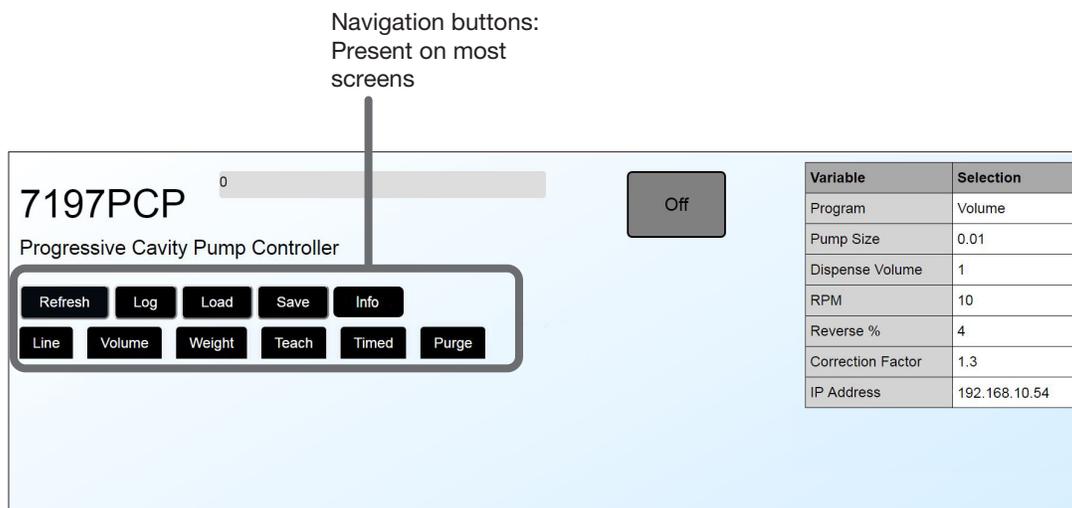
Programming

The 7197PCP-DIN-NX controller can be programmed using the 7197PCP-DIN-NX web interface or via PLC using the NX protocol.

NOTE: This manual provides procedures for operating the controller via the web interface. If you are using the NX protocol to operate the controller, refer to “Appendix D, NX Protocol” on page 61.

Navigation

From the Main screen, you can access all other screens. The navigation buttons are present on most screens, allowing you to easily switch to other screens.



Main screen

Button	Description	Relevant Section in this Manual
Refresh	Refreshes the current screen	n/a
Log	Opens the Log screen	“Viewing the Log” on page 42
Load	Opens the Load screen	“Opening a Saved Program (Load Screen)” on page 34
Save	Opens the Save screen	“Saving a Program to the Program Library (Save Screen)” on page 33
Line	Displays the Line program variables	“Line Programs” on page 28
Volume	Displays the Volume program variables	“Volume Programs” on page 29
Weight	Displays the Weight program variables	“Weight Programs” on page 30
Teach	Displays the Teach program variables	“Teach Programs” on page 31
Timed	Displays the Timed program variables	“Timed Programs” on page 32
Purge	Displays the Purge screen to allow adjustment of the purge speed	“Adjusting the Purge Speed Setting” on page 25

Programming (continued)

Variable Table

The variable table at the top right of the screen changes based on the open program. For the Line, Volume, Weight, Teach, and Timed program screens, the variable table shows the currently entered values of all variables. For example, when you select the Line Program screen, the table changes to show the current values of the Line Program settings.

Variable	Selection
Program	Volume
Pump Size	0.01
Dispense Volume	1
RPM	10
Reverse %	4
Correction Factor	1.3
IP Address	192.168.10.54

Main screen for a one-component system

Variable table: The content of this table changes based on the selected program / variables.

On a 2K system, the settings for both pumps are shown side by side.

Variable	Pump 1	Pump 2
Program	Timed	
RPM	10	10
Time (ms)	1000	1000
Reverse %	0	1
Correction Factor	1	1
IP Address	192.168.10.54	

Main screen for a two-component (2K) system

Programming (continued)

Status Indications

The status indications shown below are present on most screens.

Operating Mode	Indicator Description
Volume program running	Shows what percentage of the dispense cycle remains
Weight program running	
Timed program running	
Teach program OFF	
Teach program ON	Shows how long the dispense cycle has been triggered
Line program running	Shows the speed in RPM

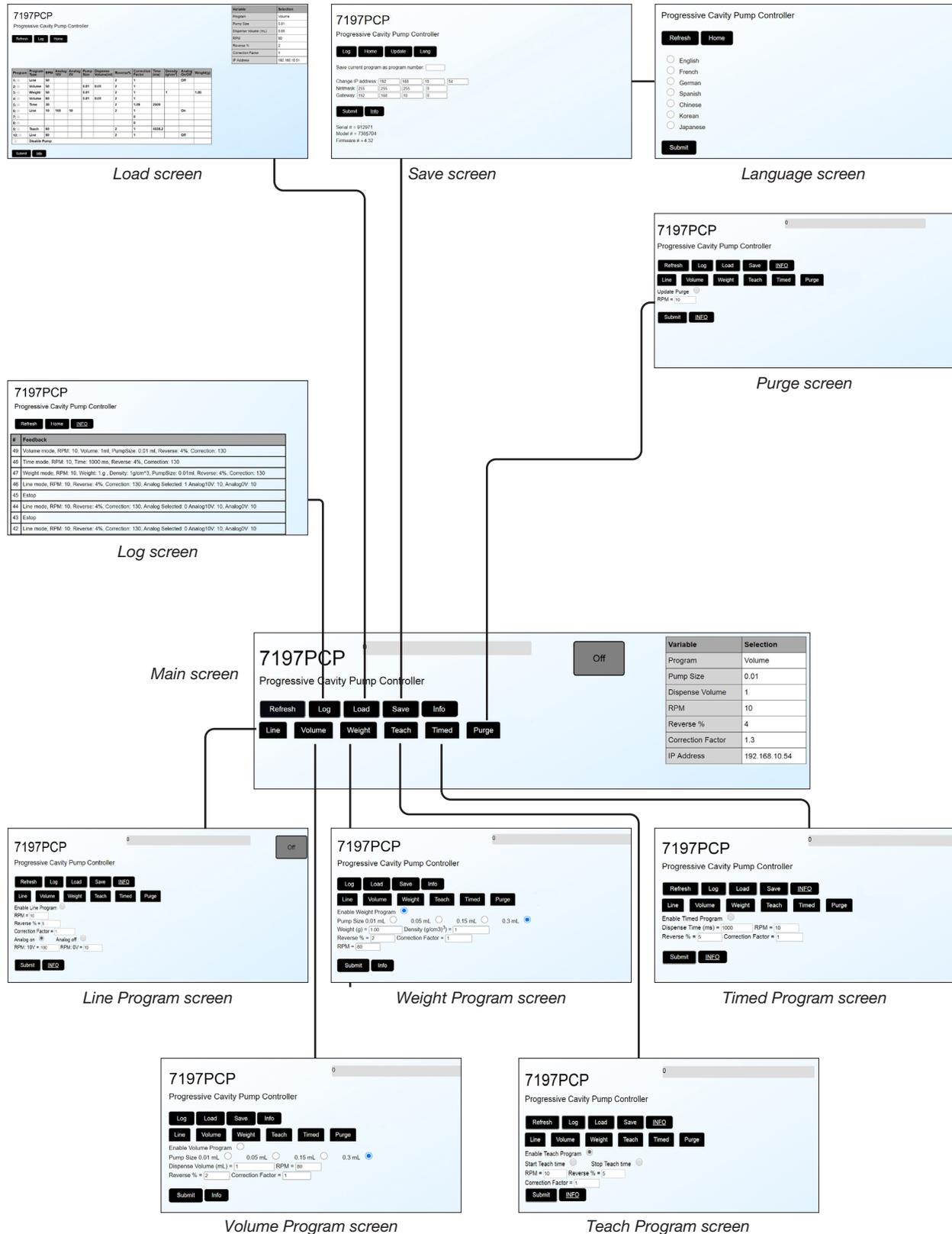
Variable	Selection
Program	Volume
Pump Size	0.01
Dispense Volume	1
RPM	10
Reverse %	4
Correction Factor	1.3
IP Address	192.168.10.54

Main screen

Status		Color	Description
Off		Dark gray	The pump is not running.
Running		Green	The system is running normally.
ESTOP		Red	An emergency stop has occurred.
Error		Yellow	An error has occurred. Refer to "Troubleshooting" on page 42.

Programming (continued)

Flowchart of Controller Screens



Programming (continued)

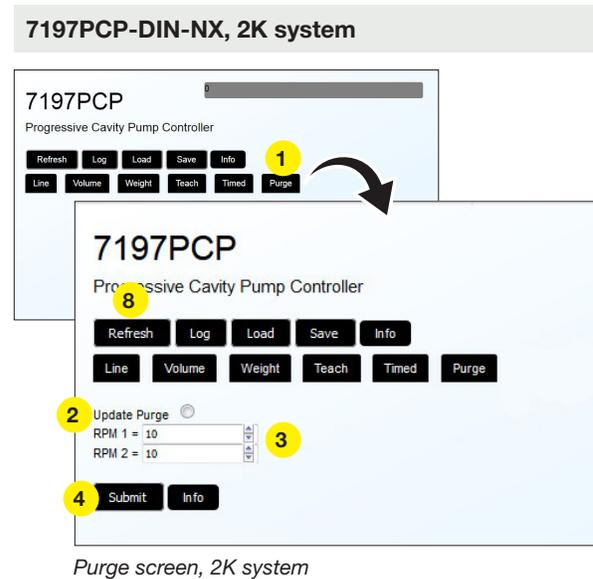
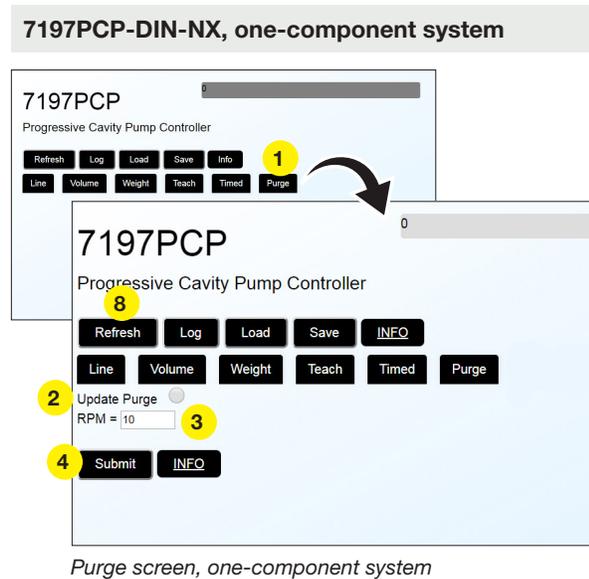
Adjusting the Purge Speed Setting

Before placing the system into operation, or anytime that purging is required, refer to the pump manual for the purging procedure. Use this procedure only to change the purge RPM, ensuring that the maximum allowable motor speed is not exceeded. Refer to “Maximum Motor Speed Based on Viscosity” on page 49.

1. Select PURGE.
2. Select the UPDATE PURGE radio button.
3. Enter the desired RPM setting, ensuring that the maximum allowable motor speed is not exceeded. Refer to “Maximum Motor Speed Based on Viscosity” on page 49.

NOTE: Values must be within the specified range limits, or they will not save.

4. Select SUBMIT. The Purge RPM speed updates, and the saved purge RPM is displayed in the Variable table next to RPM.



Variable	Range	Description
RPM	10–150 (RPM)	Sets the purge motor speed in RPM; for guidance on setting the RPM, refer to “Maximum Motor Speed Based on Viscosity” on page 49.
INFO	n/a	Select to view information about the current screen, including the range limits for settings.

Programming (continued)

Creating Programs

The controller allows you to create five types of program: Line, Volume, Weight, Teach, and Timed. A general programming procedure is provided on the next page. Specific programming procedures, including detailed information on all settings, are provided in the sections shown under “Detailed Information.”

Program Type	Description	Typical Application	Detailed Information
Line	Use a Line program to dispense material continuously, for as long as the dispense cycle is activated.	Continuous lines, all viscosities	Refer to “Line Programs” on page 28.
Volume	Use a Volume program to dispense a specified amount of material in milliliters.	Filling a known volume	Refer to “Volume Programs” on page 29.
Weight	Use a Weight program to dispense a specified amount of material in grams.	Dispensing based on weight	Refer to “Weight Programs” on page 30.
Teach	Use Teach program to “Teach” the system the desired dispense time and volume.	Filling an unknown volume	Refer to “Teach Programs” on page 31.
Timed	Use a Timed program to dispense for a specified amount of time, in milliseconds per cycle.	Dispensing for a known period of time	Refer to “Timed Programs” on page 32.

Program type buttons

Variable table: The content of this table changes based on the selected program / variables

Variable	Selection
Program	Volume
Pump Size	0.01
Dispense Volume	1
RPM	10
Reverse %	4
Correction Factor	1.3
IP Address	192.168.10.54

Main screen

Programming (continued)

Creating Programs (continued)

Follow this general procedure to enter settings for a program. A task-specific procedure is also provided for each program type later in this section.

NOTE: This manual provides procedures for operating the controller via the web interface. If you are using the NX protocol to operate the controller, refer to “Appendix D, NX Protocol” on page 61.

1. Select any program type button to display the variables for that selection.

NOTE: The navigation buttons are present on most screens, allowing you to easily switch to other screens.
2. To view information about the currently displayed screen, select INFO.
3. To enable a program, select the ENABLE [program type] PROGRAM radio button.

NOTE: If you don't enable the program, the system will not save any entered settings.
4. Make the desired radio button selections and / or enter settings inside the value fields. Refer to the applicable sections of this manual as noted in the table above for detailed information about each program type, including setting ranges.
5. When all variables are at the desired setting, select SUBMIT. The system saves the settings.
6. To save the values you entered as a program in the Program Library, refer to “Saving a Program to the Program Library (Save Screen)” on page 33.

7197PCP-DIN-NX, one-component system

7197PCP
Progressive Cavity Pump Controller

Refresh Log Load Save INFO

1 Line Volume Weight Teach Timed Purge

Enable Line Program 3

4 RPM = 50

Reverse % = 5

Correction Factor = 1

Analog on Analog off

RPM: 10V = 10 RPM: 0V = 10

5 Submit INFO 2

7197PCP-DIN-NX, 2K system

7197PCP
Progressive Cavity Pump Controller

Refresh Log Load Save Info

1 Line Volume Weight Teach Timed Purge

Enable Line Program 3

RPM 1 = 10 RPM 2 = 10

4 Reverse % 1 = 3 Reverse % 2 = 3

Correction Factor 1 = 0.01 Correction Factor 2 = 0.01

Analog On Analog Off

RPM 1: 10V = 10 RPM 1: 0V = 10

RPM 2: 10V = 10 RPM 2: 0V = 10

5 Submit Info 2

Example of general programming steps (Line program screen shown)

Programming (continued)

Line Programs

Use a Line program to dispense a continuous line of material. When a Line program is run, the pump dispenses for as long as the dispense cycle is initiated. You can enable Analog On to fine-tune the motor speed while running a Line program. Refer to “Make the Cycle Initiate and Emergency Stop Connections” on page 15 to connect the cycle initiate signal.

1. On the Main screen, select LINE.
2. Select the ENABLE LINE PROGRAM radio button.
NOTE: If you don't enable the program, the system will not save any entered settings.
3. Enter the desired settings, referring to the table below for detailed information on each variable.
4. Select SUBMIT to save the settings. The variable table shows the saved settings.
5. To save the values you entered as a program in the Program Library, refer to “Saving a Program to the Program Library (Save Screen)” on page 33.

Line program screen (one-component system shown)

Variable	Range	Description
RPM	10–150 (RPM)	Sets the motor speed in RPM; for guidance on setting the RPM, refer to “Maximum Motor Speed Based on Viscosity” on page 49.
Reverse %	0–200 (%) (adjustable in increments of 1%)	Based on the percentage of rotation, sets the suck-back to reverse the motor at the end of a dispense cycle to prevent drooling.
Correction Factor	0.1–2.00 (adjustable in increments of 0.01)	Because rotors and stators may not be perfectly matched, the Correction Factor linearly scales the output to ensure that the expected amount is deposited every time.
Analog On / Analog Off	n/a	Select Analog On to use the “RPM: 10V” and “RPM: 0V” fields to change the motor speed on-the-fly. When Analog Off is selected, the “RPM: 10V” and “RPM: 0V” fields are disabled.
RPM: 10V	10–150	Scales the output RPM linearly from 0–10V based on the input analog voltage (pins 12 and 13 of the I/O port; refer to “I/O Port Pin Assignments and Wiring Diagrams” on page 44 as needed).
RPM: 0V	10–150	
INFO	n/a	Select to view information about the current screen, including the range limits for settings.

Programming (continued)

Volume Programs

Use a Volume program to dispense primarily based on volume. When a Volume program is used, the pump dispenses until the specified amount (in milliliters) has been deposited. Refer to “Make the Cycle Initiate and Emergency Stop Connections” on page 15 to connect the cycle initiate signal.

NOTE: For an example of how to create a Volume program, including how to use Correction Factor and Reverse %, refer to “Appendix B, Example Volume Program (797PCP)” on page 53 or “Appendix C, Example Volume Program (797PCP-2K)” on page 56, as applicable.

1. On the Main screen, select VOLUME.
2. Select the ENABLE VOLUME PROGRAM radio button.
NOTE: If you don't enable the program, the system will not save any entered settings.
3. Enter the desired settings, referring to the table below for detailed information on each variable.
4. Select SUBMIT to save the settings. The variable table shows the saved settings.
5. To save the values you entered as a program in the Program Library, refer to “Saving a Program to the Program Library (Save Screen)” on page 33.

Variable	Selection
Program	Volume
Pump Size	0.3
Dispense Volume (mL)	1
RPM	80
Reverse %	2
Correction Factor	1
IP Address	192.168.10.51

Volume Program screen (one-component system shown)

Variable	Range	Description
Pump Size	0.01 mL, 0.05 mL, 0.15 mL, or 0.30 mL	Select the size of the pump for which you are creating the program.
Dispense Volume (mL)	0.001–15000.00 (mL) (adjustable in increments of 0.001)	Sets the amount of material (in mL) that will be dispensed for each cycle of the pump.
RPM	10–150 (RPM)	Sets the motor speed in RPM; for guidance on setting the RPM, refer to “Maximum Motor Speed Based on Viscosity” on page 49.
Reverse %	0–200 (%) (adjustable in increments of 1%)	Based on the percentage of rotation, sets the suck-back to reverse the motor at the end of a dispense cycle to prevent drooling.
Correction Factor	0.1–2.00 (adjustable in increments of 0.01)	Because rotors and stators may not be perfectly matched, the Correction Factor linearly scales the output to ensure that the expected amount is deposited every time.
INFO	n/a	Select to view information about the current screen, including the range limits for settings.

Programming (continued)

Weight Programs

Use a Weight program to dispense primarily based on weight. When a Weight program is used, the pump dispenses until the specified material weight (in grams) has been deposited. Refer to “Make the Cycle Initiate and Emergency Stop Connections” on page 15 to connect the cycle initiate signal.

1. On the Main screen, select WEIGHT.
2. Select the ENABLE WEIGHT PROGRAM radio button.
NOTE: If you don't enable the program, the system will not save any entered settings.
3. Enter the desired settings, referring to the table below for detailed information on each variable.
4. Select SUBMIT to save the settings. The variable table shows the saved settings.
5. To save the values you entered as a program in the Program Library, refer to “Saving a Program to the Program Library (Save Screen)” on page 33.

Variable	Selection
Program	Weight
Weight (g)	1.00
Density	1
Reverse %	2
Correction Factor	1
RPM	80
Pump Size	0.3
IP Address	192.168.10.51

Weight Program screen (one-component system shown)

Variable	Range	Description
Pump Size	0.01 mL, 0.05 mL, 0.15 mL, or 0.30 mL	Select the size of the pump for which you are creating the program.
Weight	0–600 (g) (adjustable in increments of 0.001 g)	Sets the amount of material (in g) that will be dispensed for each cycle of the pump.
Density	0–11000 (g/cm ³) (adjustable in increments of 0.01 g/cm ³)	Sets the density of the material (in g/cm ³) to be dispensed.
Reverse %	0–200 (%) (adjustable in increments of 1%)	Based on the percentage of rotation, sets the suck-back to reverse the motor at the end of a dispense cycle to prevent drooling.
Correction Factor	0.1–2.00 (adjustable in increments of 0.01)	Because rotors and stators may not be perfectly matched, the Correction Factor linearly scales the output to ensure that the expected amount is deposited every time.
RPM	10–150 (RPM)	Sets the motor speed in RPM; for guidance on setting the RPM, refer to “Maximum Motor Speed Based on Viscosity” on page 49.
INFO	n/a	Select to view information about the current screen, including the range limits for settings.

Programming (continued)

Teach Programs

The Teach program allows you to “Teach” the system how long to run at the specified speed. When a Teach program is selected and the dispense cycle is activated, the pump dispenses for the amount of time determined by the Teach program.

1. On the Main screen, select TEACH.
2. Select the ENABLE TEACH PROGRAM radio button.
NOTE: If you don't enable the program, the system will not save any entered settings.
3. Enter the desired settings, referring to the table below for detailed information on each variable.
NOTE: Values must be within the specified range limits, or they will not save.
4. Select the START TEACH TIME radio button, then select SUBMIT.
5. Start the dispense cycle by activating the external trigger.
NOTE: As long as the dispense cycle is activated, the controller tracks the dispense time. If the dispense cycle is stopped and restarted, the controller erases the previous time and starts tracking again.
6. When the desired amount of material has been dispensed, select the STOP TEACH TIME radio button, then select SUBMIT.
The system saves the settings.
7. Select REFRESH to see the new Teach Time (ms) in the variable table.
8. To save the values you entered as a program in the Program Library, refer to “Saving a Program to the Program Library (Save Screen)” on page 33.

Variable	Selection
Program	Teach
RPM	10
Teach Mode	ON
Reverse %	5
Teach Time ms	6589.9
Correction Factor	1
IP Address	192.168.10.52

Teach Program screen (one-component system shown)

Variable	Range	Description
RPM	10–150 (RPM)	Sets the motor speed in RPM; for guidance on setting the RPM, refer to “Maximum Motor Speed Based on Viscosity” on page 49.
Reverse %	0–200 (%) (adjustable in increments of 1%)	Based on the percentage of rotation, sets the suck-back to reverse the motor at the end of a dispense cycle to prevent drooling.
Correction Factor	0.1–2.00 (adjustable in increments of 0.01)	Because rotors and stators may not be perfectly matched, the Correction Factor linearly scales the output to ensure that the expected amount is deposited every time.
INFO	n/a	Select to view information about the current screen, including the range limits for settings.

Programming (continued)

Timed Programs

Use a Timed program to dispense primarily based on time. When a Timed program is run, the pump dispenses for the specified time (in milliseconds) for each dispense cycle. Refer to “Make the Cycle Initiate and Emergency Stop Connections” on page 15 to connect the cycle initiate signal.

1. On the Main screen, select TIMED.
2. Select the ENABLE TIMED PROGRAM radio button.
NOTE: If you don't enable the program, the system will not save any entered settings.
3. Enter the desired settings, referring to the table below for detailed information on each variable.
4. Select SUBMIT to save the settings. The variable table shows the saved settings.
5. To save the values you entered as a program in the Program Library, refer to “Saving a Program to the Program Library (Save Screen)” on page 33.
6. Select REFRESH to return to the Main screen.

Variable	Selection
Program	Timed
RPM	10
Time to dispense	1000
Reverse %	5
Correction Factor	1
IP Address	192.168.10.52

Timed Program screen (one-component system shown)

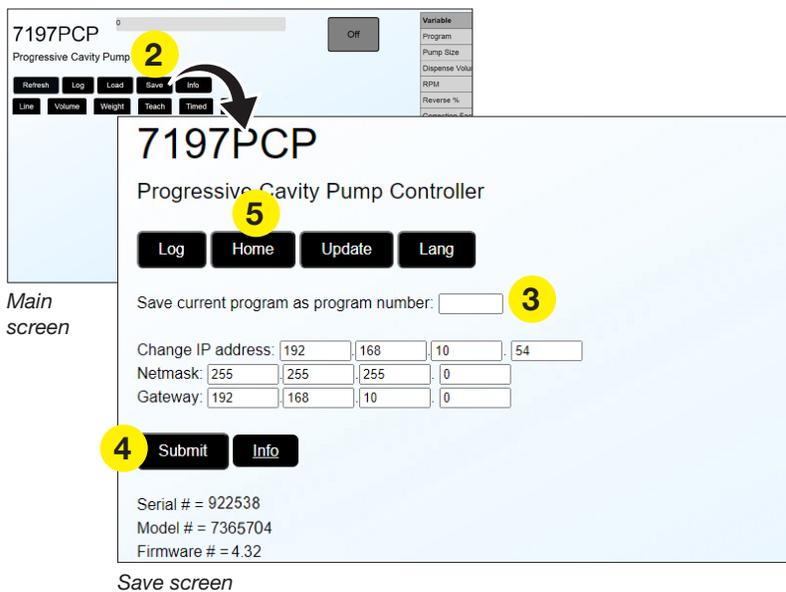
Variable	Range	Description
Dispense Time (ms)	0.001–600,000 (ms) (adjustable in increments of 0.001 ms)	Sets the amount of time (in ms) to open the pump for each dispense cycle. NOTE: In other words, the Dispense Time is adjustable between 1 ms (0.001 s) and 10 minutes (600,000 ms).
RPM	10–150 (RPM)	Sets the motor speed in RPM; for guidance on setting the RPM, refer to “Maximum Motor Speed Based on Viscosity” on page 49.
Reverse %	0–200 (%) (adjustable in increments of 1%)	Based on the percentage of rotation, sets the suck-back to reverse the motor at the end of a dispense cycle to prevent drooling.
Correction Factor	0.1–2.00 (adjustable in increments of 0.01)	Because rotors and stators may not be perfectly matched, the Correction Factor linearly scales the output to ensure that the expected amount is deposited every time.
INFO	n/a	Select to view information about the current screen, including the range limits for settings.

Programming (continued)

Saving a Program to the Program Library (Save Screen)

Follow this procedure to save a program to the Program Library.

1. Ensure that the program you want to save is displayed, and that the variable settings are correct.
2. On the Main screen, select SAVE. The Save screen opens.
3. Enter a program number next to “Save current program as program number.”
Up to 10 programs can be saved. The program shown in the variable table is saved to the selected program number.
4. Select SUBMIT. The system saves the program in the Program Library.
5. Select HOME to return to the Main screen.



Field	Description
Save current program as program number:	Used to save a program to the Program Library.
Change IP address, Netmask, and Gateway	Used to change the network settings of the controller. Refer to “Defining the Controller Network Settings” on page 37.

Programming (continued)

Opening a Saved Program (Load Screen)

If you have saved a program to the Program Library, follow this procedure to load the program at any time.

NOTE: This screen also includes a radio button to disable the pump. Refer to “Disabling a Pump” on page 39 for details.

1. On the Main screen, select LOAD. The Load screen opens.
2. (2K systems only) Select the pump button to toggle between the Pump 1 and Pump 2 screens.
3. Select the radio button of the program number you want to load.
4. Select SUBMIT. The selected program loads into the variable table.
5. Select HOME to return to the Main screen.

7197PCP-DIN-NX, one-component system

7197PCP
Progressive Cavity Pump Controller

Refresh Log Home

Program	Program Type	Program Size	RPM	Analog I/V	Analog V/V	Pump Size	Dispense Volume(ml)	Reverse%	Correction Factor	Time (ms)	Density (g/cm ³)	Analog On/Off	Weight(g)
1: <input type="radio"/>	Line	50					0.01	0.01	2	1		Off	
2: <input type="radio"/>	Volume	50					0.01	0.01	2	1			
3: <input type="radio"/>	Weight	50					0.01	0.01	2	1	1		1.00
4: <input type="radio"/>	Volume	60					0.01	0.01	2	1			
5: <input type="radio"/>	Time	30					2	1.00		2500		On	
6: <input type="radio"/>	Line	10	100	10			2	1					
7: <input type="radio"/>								0					
8: <input type="radio"/>								0					
9: <input type="radio"/>	Teach	60					2	1		4038.2			
10: <input type="radio"/>	Line	80					2	1				Off	
<input type="radio"/>	Disable Pump												

Submit Info

Load screen, one-component system

7197PCP-DIN-NX, 2K system

7197PCP
Progressive Cavity Pump Controller

Refresh Log Home Pump 1

Program	Program Type	Program Size	RPM	Analog I/V	Analog V/V	Pump Size	Dispense Volume(ml)	Reverse%	Correction Factor	Time (ms)	Density (g/cm ³)	Analog On/Off	Weight(g)
1: <input type="radio"/>	Volume	55					0.01	0.01	4	0.98			
2: <input type="radio"/>	Volume	10					0.01	0.01	4	0.98			
3: <input type="radio"/>	Weight	57					0.01	0.01	3	1.01	12.5		0.5
4: <input type="radio"/>	Line	10							3	0.01		Off	
5: <input type="radio"/>	Time	52							5	1	1000		
6: <input type="radio"/>	Time	50							6	0.002	10000		
7: <input type="radio"/>	Line	10							3	0.01		Off	
8: <input type="radio"/>	Time	50							6	0.002	10000		
9: <input type="radio"/>	Line	10							3	0.01		Off	
10: <input type="radio"/>	Time	10							1	0.01	1000		
<input type="radio"/>	Disable Pump 1												

Submit Info

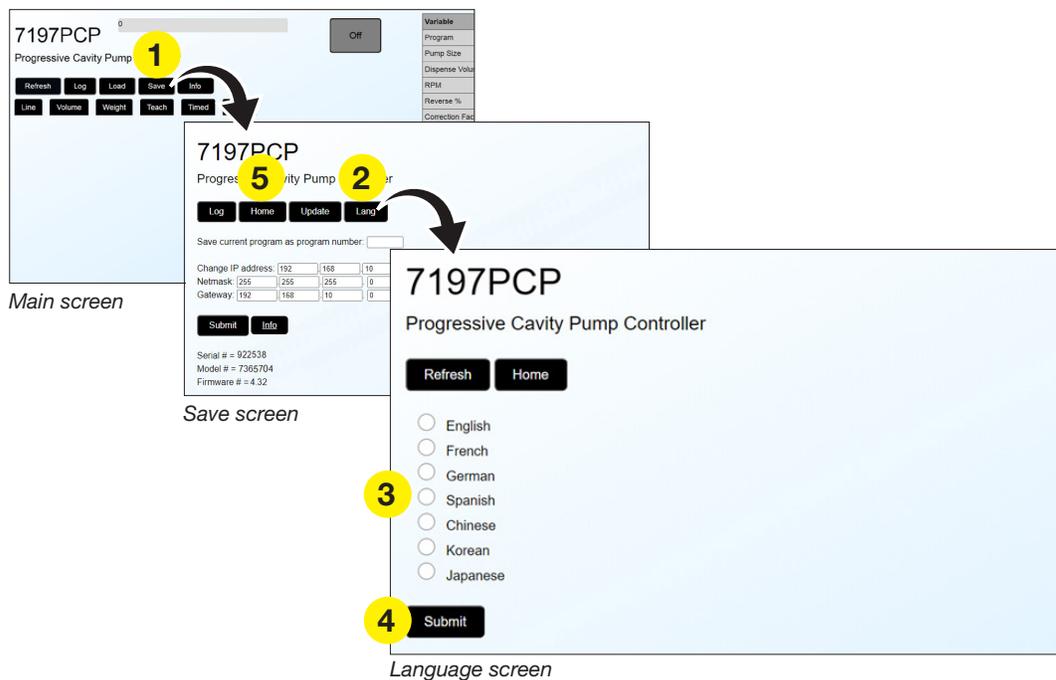
Load screen, 2K system

Programming (continued)

Setting the Language

Follow this procedure to select the desired language.

1. On the Main screen, select SAVE. The Save screen opens.
2. Select LANG.
3. Select the radio button for the desired language.
4. Select SUBMIT.
5. Select HOME to return to the Main screen.



Programming (continued)

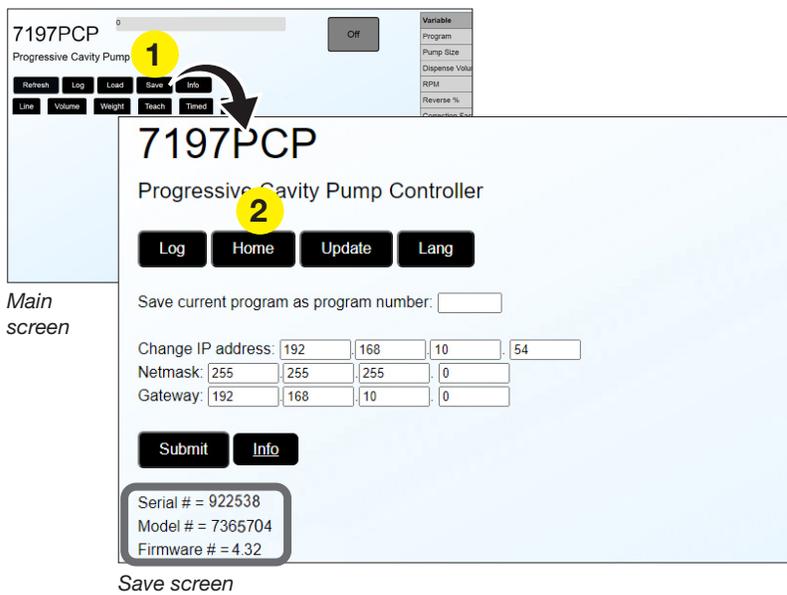
Viewing the System Information

Follow this procedure to view the following information about the controller:

- Serial number
- Model number
- Firmware version

NOTE: The Update button on this screen is used to update the controller firmware. Refer to “Firmware Update” on page 40 for details.

1. On the Main screen, select SAVE. The Save screen opens.
The system information is displayed on the Save screen.
2. Select HOME to return to the Main screen.



Programming (continued)

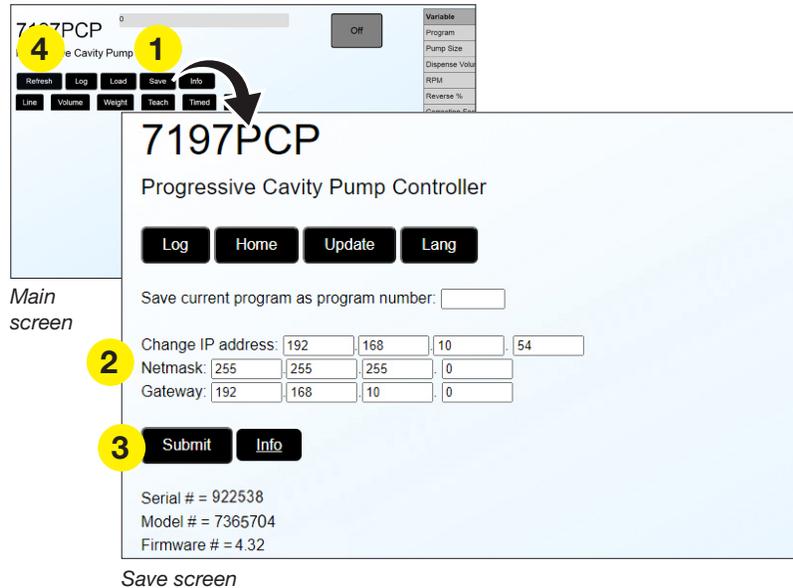
Defining the Controller Network Settings

Use the Save screen to define the IP address, netmask, and gateway settings for your system.

NOTES:

- A 7197PCP-DIN-NX controller must have a unique IP address. If a controller is connected to a network that includes another device with the same IP address, follow this procedure to change the IP address of a controller.
- Each computer in a 7197PCP system must also have a unique IP address. Refer to “Appendix A, Changing the IP Address of a Computer” on page 51 to change the IP address of a computer.

1. On the Main screen, select SAVE. The Save screen opens.
2. Enter the desired network settings.
3. Select SUBMIT.
4. Select REFRESH to confirm that the changes are saved.
5. Cycle the controller power to make the changes live.



Field	Description
Save current program as program number:	Used to save a program to the Program Library. Refer to “Saving a Program to the Program Library (Save Screen)” on page 33.
Change IP address	Used to change the IP address of the controller
Netmask	Used to set the netmask address for the system
Gateway	Used to set the gateway address for the system

Operation

After the dispensing system is fully installed and the desired dispensing programs are created, 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.

Routine Startup

1. Switch on the power source for all 7197PCP-DIN-NX controllers in the system.

CAUTION

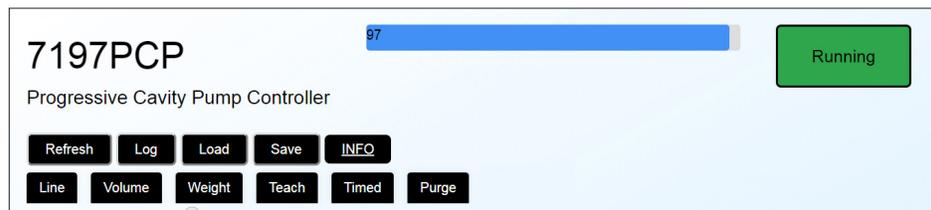
Risk of equipment damage. **Do not operate a 797PCP without material.** Excessive friction of dry components can damage the pump.

2. Create or load the program to run. To load a saved program, refer to “Opening a Saved Program (Load Screen)” on page 34.
3. Start your process.

When the system is operating normally:

- The green LED on the front of the controller illuminates when the pump cycles.
- The green status indicator on the 7197PCP-DIN-NX application indicates “Running.”

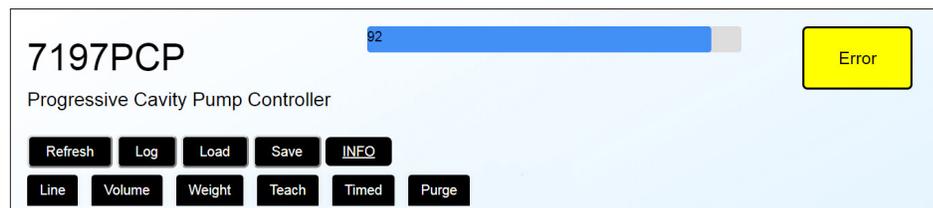
NOTE: Refer to “Status Indications” on page 23 for an explanation of all status indications provided on the Main screen.



Normal operation indication on the 7197PCP-DIN-NX web application

Errors and Emergency Stops (ESTOP)

If the system indicates an error or emergency stop, check the Log screen and correct the problem that caused the error or stop. Refer to “Viewing the Log” on page 42 and to “Troubleshooting” on page 42.



Error indication on the 7197PCP-DIN-NX web application

Operation (continued)

Disabling a Pump

Follow this procedure to disable a pump, whether for service or to test the output of only one pump in a 2K system.

1. On the Main screen, select LOAD. The Load screen opens.
2. (2K systems only) Select the pump button to toggle between the Pump 1 and Pump 2 screens.
3. Select the DISABLE PUMP radio button. The pump associated with the IP address of the open 7197PCP-DIN-NX application is now disabled.

To re-enable the pump, select a program to run by creating one on the Main screen or by selecting a program from the Load screen.

7197PCP-DIN-NX, one-component system

Program	Program Type	RPM	Analog IV	Analog OV	Pump Size	Dispense Volume(ml)	Reverse	Correction Factor	Time (ms)	Density (g/cm ³)	Analog On/Off	Weight(g)	
1: ☉	Line	50					2	1				Off	
2: ☉	Volume	50		0.01	0.01	0.01	2	1					
3: ☉	Weight	50		0.01		0.01	2	1		1		1.00	
4: ☉	Volume	60		0.01	0.01	0.01	2	1	1.09	2500			
5: ☉	Time	30					2	1					
6: ☉	Line	10	100	10			2	1				On	
7: ☉								0					
8: ☉								0					
9: ☉	Teach	60					2	1	4038.2				
10: ☉	Line	80					2	1				Off	
☉	Disable Pump												

Load screen, one-component system

7197PCP-DIN-NX, 2K system

Program	Program Type	RPM	Analog IV	Analog OV	Pump Size	Dispense Volume(ml)	Reverse	Correction Factor	Time (ms)	Density (g/cm ³)	Analog On/Off	Weight(g)	
1: ☉	Volume	55			0.01	0.01	4	0.99					
2: ☉	Volume	10			0.01	0.01	4	0.99					
3: ☉	Weight	57			0.01		3	1.01		12.5		0.5	
4: ☉	Line	10					3	0.01				Off	
5: ☉	Time	52					5	1	1000				
6: ☉	Time	50					6	0.0102	10000				
7: ☉	Line	10					3	0.01				Off	
8: ☉	Time	50					6	0.0102	10000				
9: ☉	Line	10					3	0.01				Off	
10: ☉	Time	10					1	0.01	1000				
☉	Disable Pump 1												

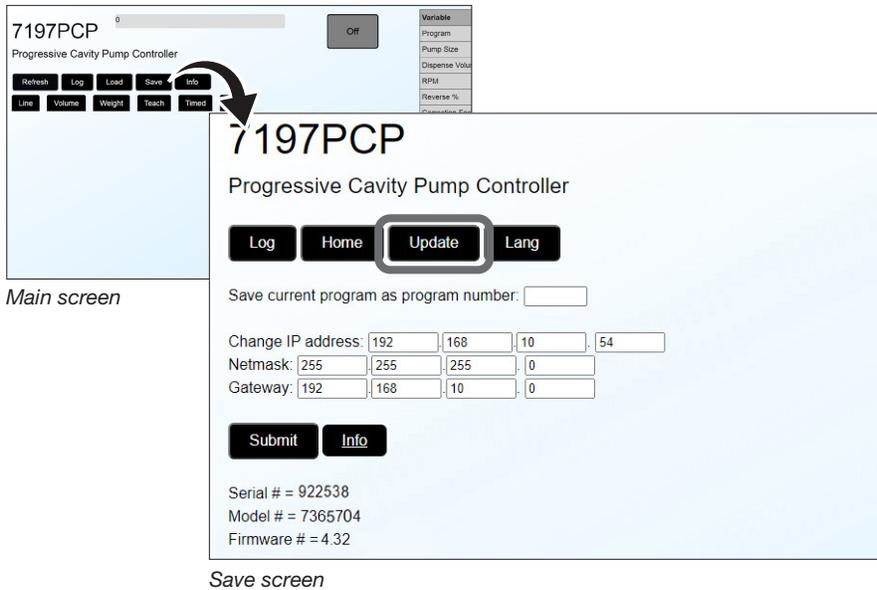
Load screen, 2K system

Longterm Shutdown

For long periods of downtime or for storage, refer to the applicable pump manual to remove the pump stator(s). Removing the stator prevents rotor deformation.

Firmware Update

Firmware updates are made via the Update button on the Save screen. For firmware update files and instructions, go to the 7197PCP-DIN-NX web page: www.nordsonefd.com/7197PCP-DIN-NX



Part Numbers

7197PCP-DIN-NX Controller



Part #	Description	Compatible Pumps
7365704	7197PCP-DIN-NX controller with NX protocol (includes the DB-15 breakout board and DB-15 cable)	797PCP, 797PCP-2K
7364775	Breakout board and DB-15 cable only	n/a

797PCPs and Pump Motor Cable

797PCPs and the pump motor cable are ordered separately. Refer to the 797PCP / 797PCP-2K manuals for part numbers.

Troubleshooting

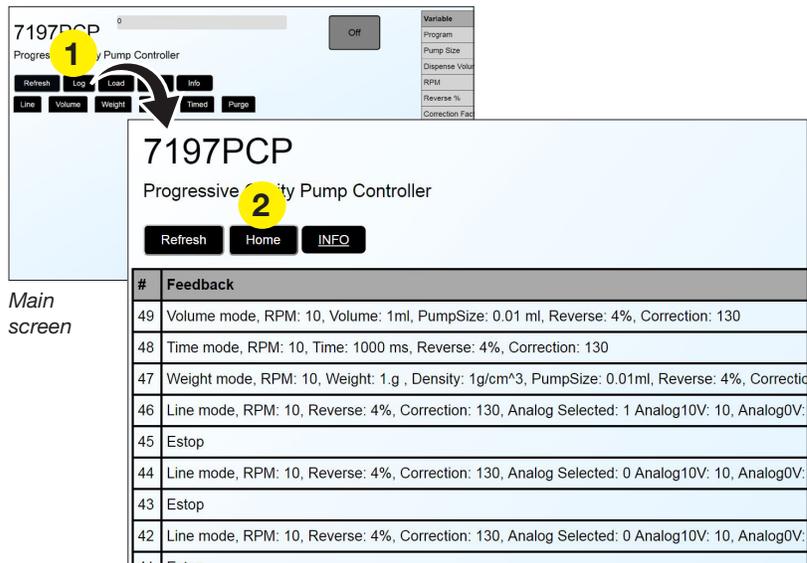
Use the troubleshooting table in this section, along with the system error log, to troubleshoot the dispensing system. Contact your Nordson EFD representative for assistance as needed.

Viewing the Log

The log is a list of notable system events. Events are listed in ascending order, starting with the most recent event. The system stores up to 50 events before it starts to overwrite the oldest ones.

NOTE: Log entries are in English only.

- On the Main screen, select LOG. The Log screen opens.
The event number is shown in the left column. The event is described in the right column.
- Select HOME to return to the Main screen.



Log screen

Event Log Feedback Troubleshooting

Feedback	Possible Cause	Corrective Action
No motor feedback	Pump motor cable not connected, loose, or damaged	Disconnect and lock out power to the controller Ensure that the pump motor cable is properly connected. Replace the cable if it is damaged.
No counter feedback	Faulty printed circuit board	Cycle the controller power. If the problem persists, contact your Nordson EFD representative for assistance.
	Encoder feedback error	

General Troubleshooting

Problem	Possible Cause	Corrective Action
Controller not powering on	Power supply not connected	Connect a customer-supplied power cable to the power input port. Refer to “Connect Power” on page 14.
Pump not dispensing	ESTOP signal not connected	If the red LED on the controller is illuminated, the ESTOP circuit is open. Ensure that the ESTOP circuit is properly connected. Refer to “Wiring Diagrams for Connecting the Emergency Stop (ESTOP) Circuit” on page 47. If an emergency stop circuit is not needed, connect pins 1 and 2 (Estop_H and Estop_L) together. The pump will dispense only if these pins are connected.
	Initiate signal (Ex_Trig) not connected	Check the initiate signal connections. Refer to “I/O Port Pin Assignments and Wiring Diagrams” on page 44.
	Pump motor cable not connected, loose, or damaged	Disconnect and lock out power to the controller. Ensure that the pump motor cable is properly connected. Replace the cable if it is damaged.
Entered value will not save	Value not within range limits	The values entered for program variables must be within the specified range limits. Refer to the information table for each program type for range limits.
	Program not enabled (7197PCP-DIN-NX web application only)	Ensure that the program is enabled by selecting the enable / disable radio button; program variables can be changed only after a program is enabled.

Technical Data

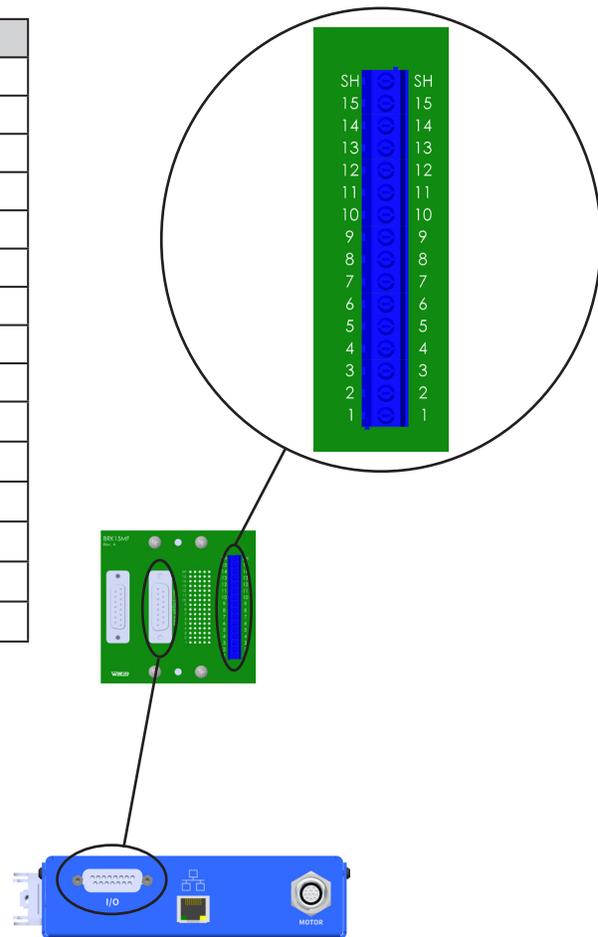
I/O Port Pin Assignments and Wiring Diagrams

- 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.

I/O Port Pin Assignments

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	NC (not connected)
4	Input	NC (not connected)
5	Input	Ex_Trig (+)
6	Input	Ex_Trig (-)
7	Output	Error (output)
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

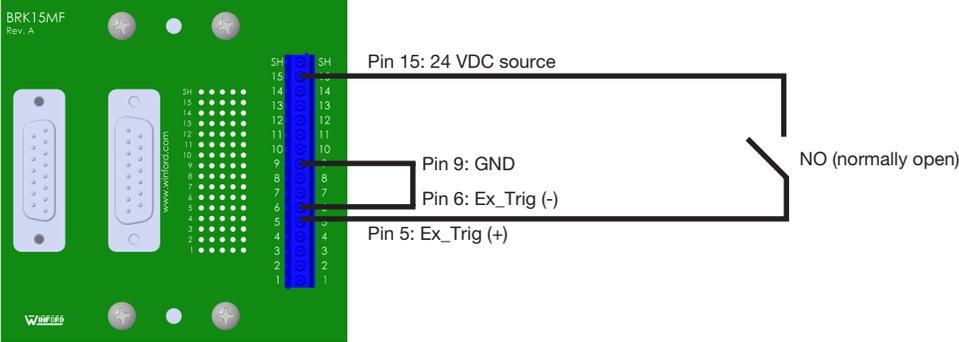


Technical Data (continued)

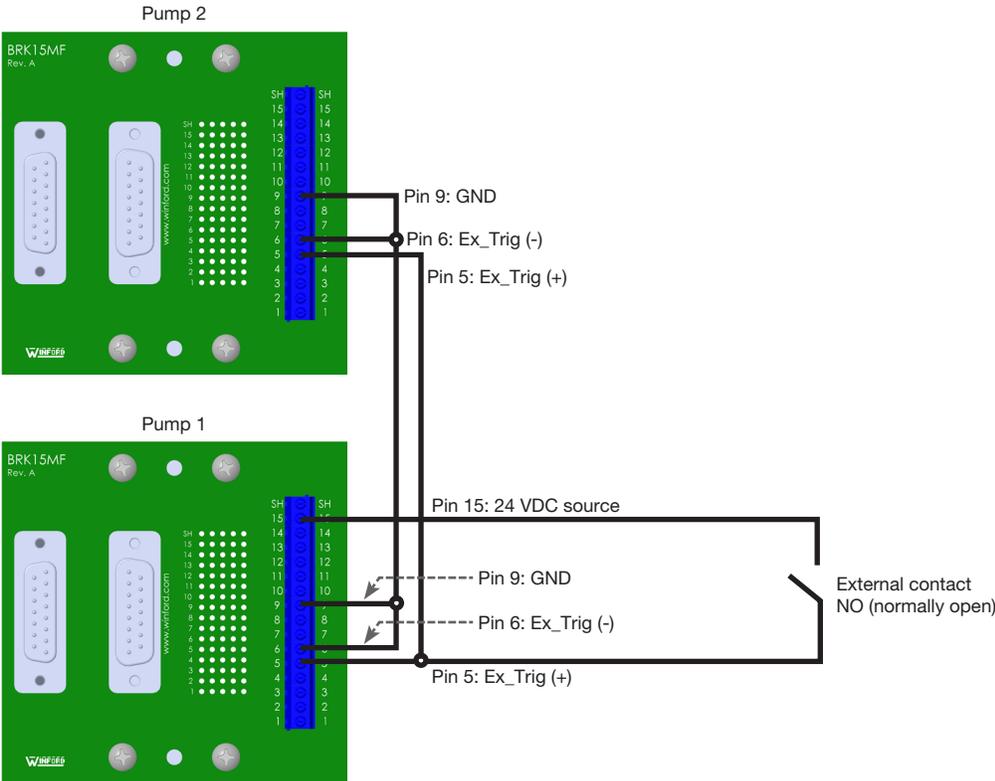
I/O Port Pin Assignments and Wiring Diagrams (continued)

Sourcing Wiring Diagrams for Connecting the Cycle Initiate (Ex_Trig)

Sourcing, One-Component Systems



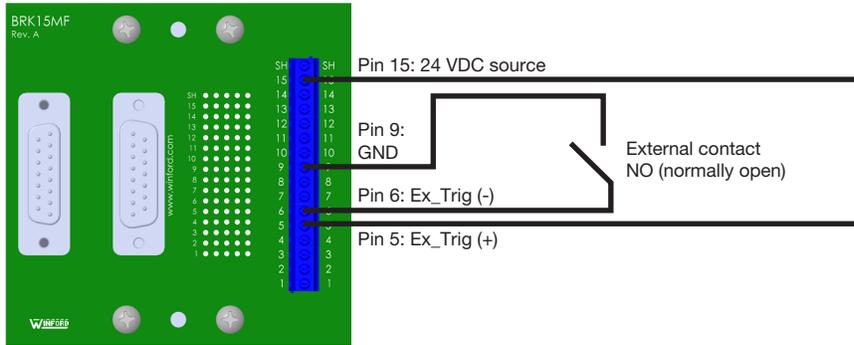
Sourcing, 2K Systems



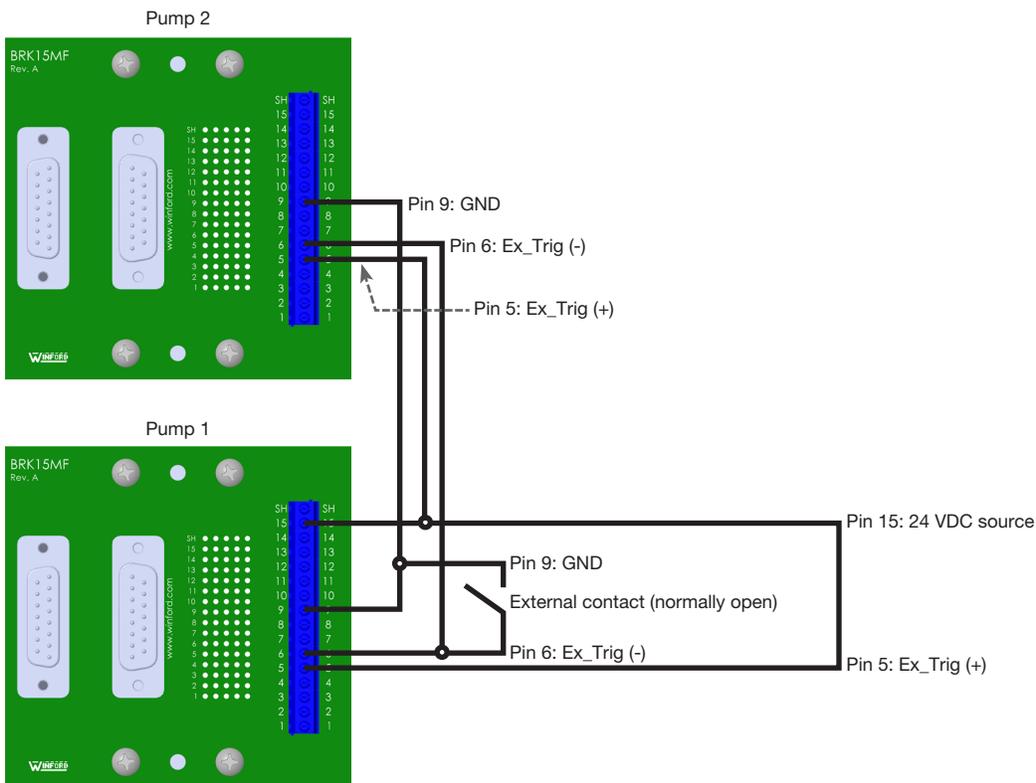
Technical Data (continued)

Sinking Wiring Diagrams for Connecting the Cycle Initiate (Ex_Trig)

Sinking, One-Component Systems



Sinking, 2K Systems



Technical Data (continued)

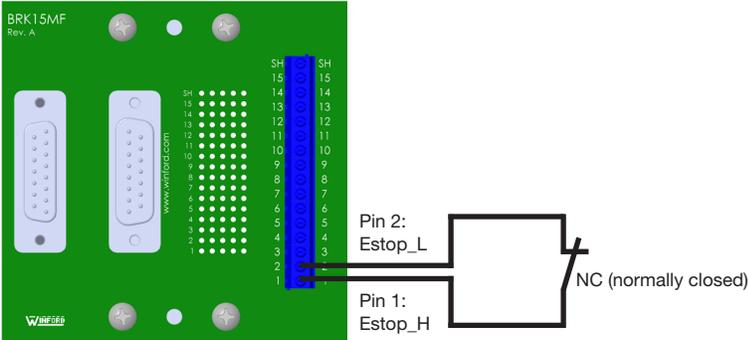
I/O Port Pin Assignments and Wiring Diagrams (continued)

Wiring Diagrams for Connecting the Emergency Stop (ESTOP) Circuit

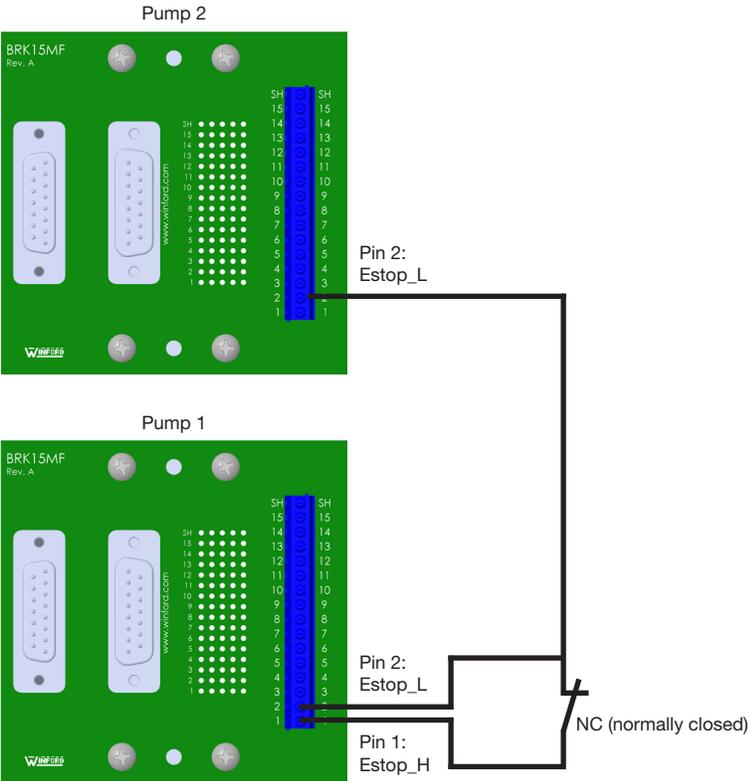
NOTE: If an emergency stop circuit is not needed, install the supplied E-stop jumper on pins 1 and 2. The pump will dispense only if these pins are connected.



One-Component Systems



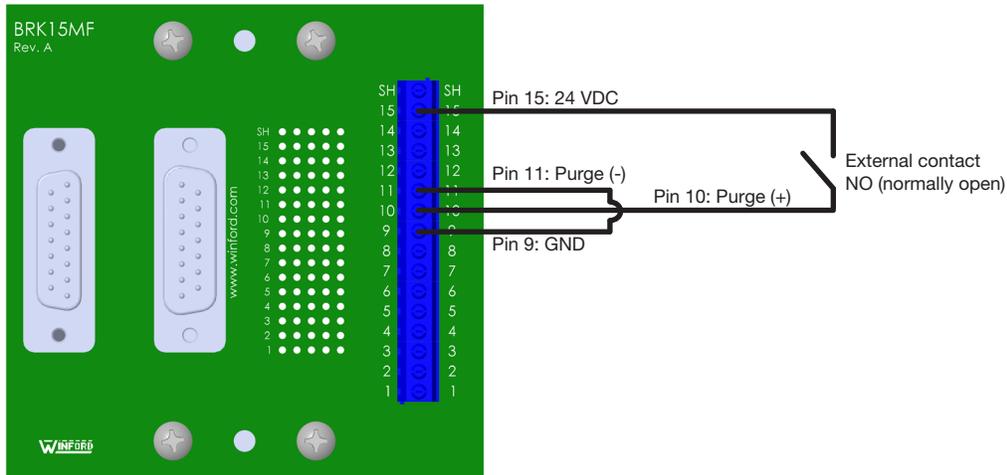
2K Systems



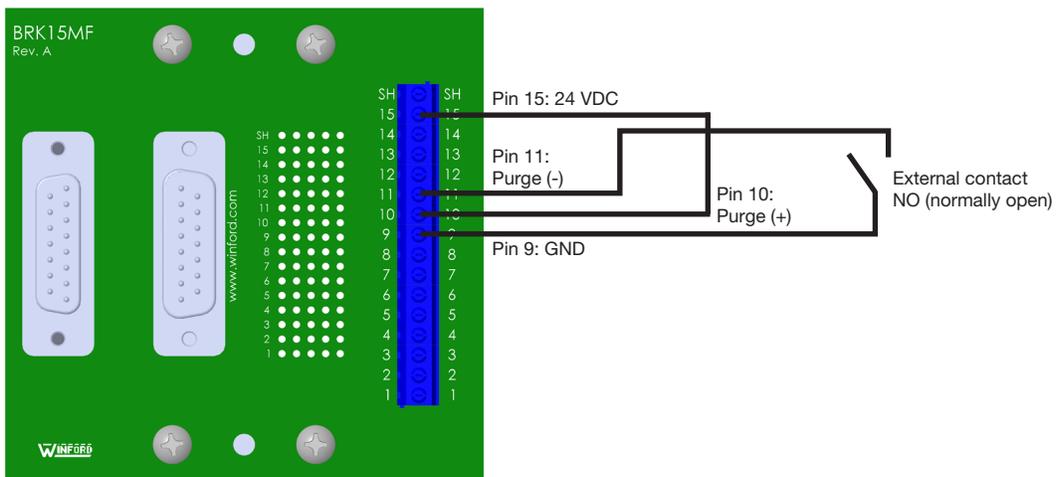
Technical Data (continued)

Wiring Diagrams for Connecting the PURGE Initiate Circuit

Sourcing, One-Component Systems



Sinking, One-Component Systems



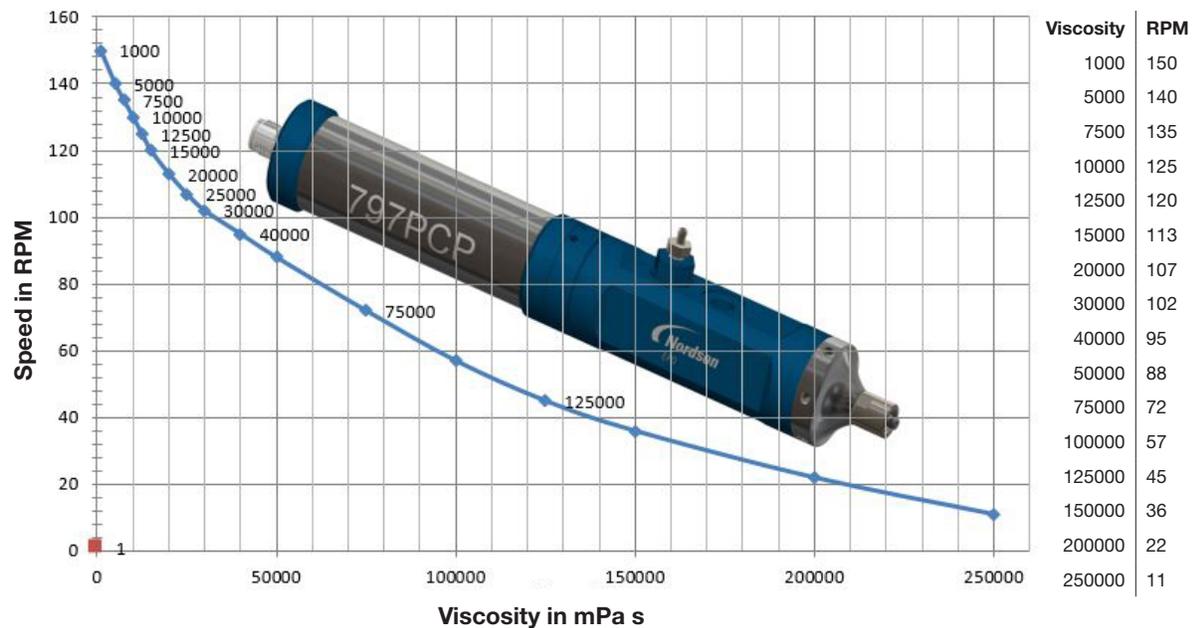
Technical Data (continued)

Maximum Motor Speed Based on Viscosity

Based on the viscosity of the dispensing material, ensure that the motor speed does not exceed the maximum RPM based on the table and graph below.

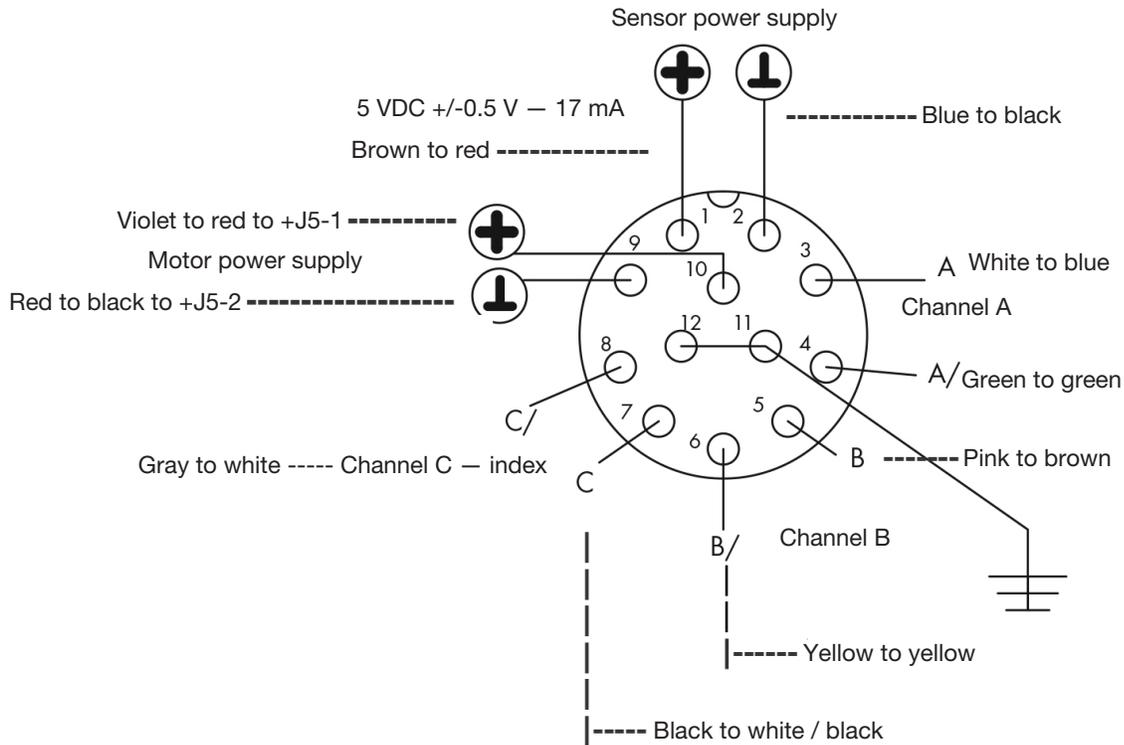
Example: If the dispensing material has a viscosity of 8,000 mPa s, the RPM setting should be no higher than 135 RPM (90% of the allowable maximum setting of 150 RPM).

Viscosity	Percentage of Maximum RPM
1–800 mPa s	100%
800–10,000 mPa s	90%
10,000–25,000 mPa s	70%
25,000–50,000 mPa s	50%
50,000–150,000 mPa s	25%



Technical Data (continued)

Motor Port Pin Assignments

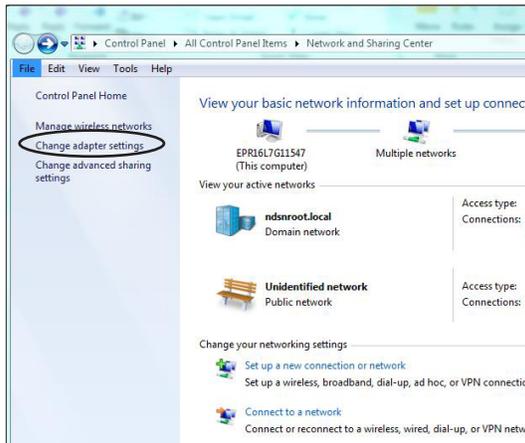


Appendix A, Changing the IP Address of a Computer

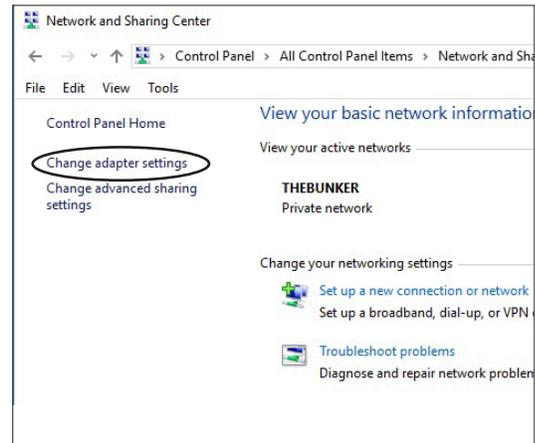
Each computer in a 797PCP system must have a unique IP address. Follow this procedure to change the IP address of a computer.

NOTE: To change the IP address of the 7197PCP-DIN-NX controller, refer to “Defining the Controller Network Settings” on page 37.

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

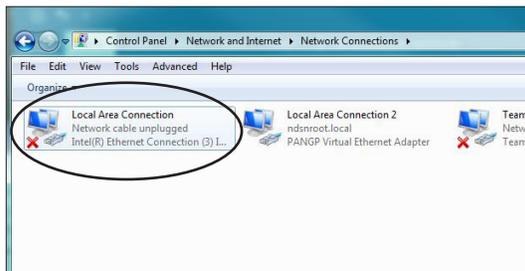


Windows® 7

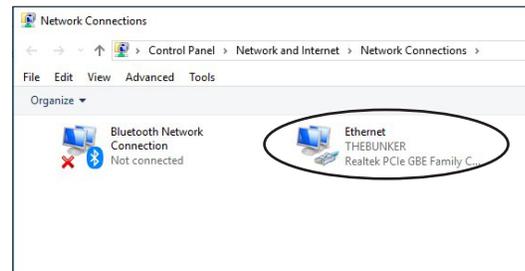


Windows 10

3. Select “Local Area Connection” (Windows 7) or “Ethernet” (Windows 10).

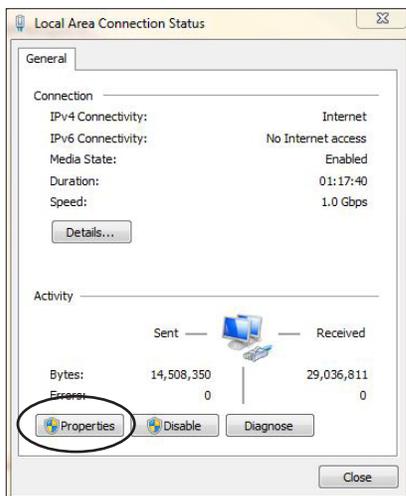


Windows 7

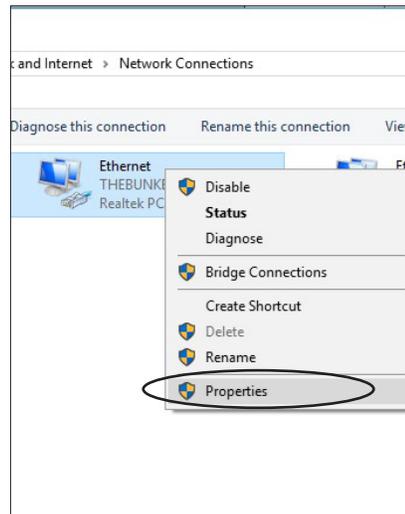


Windows 10

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



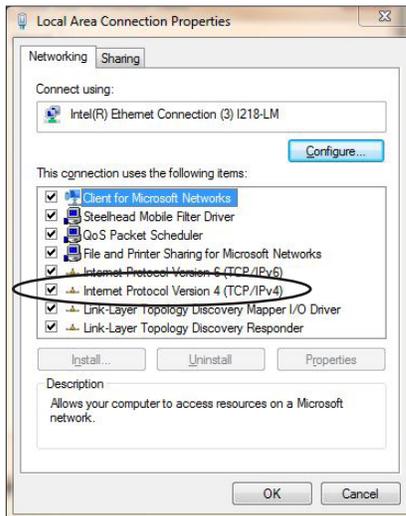
Windows 7



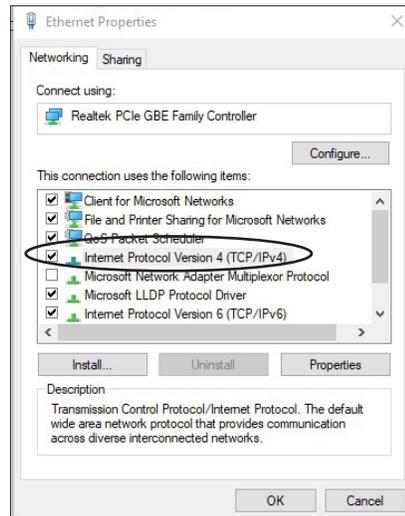
Windows 10

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

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



Windows 7

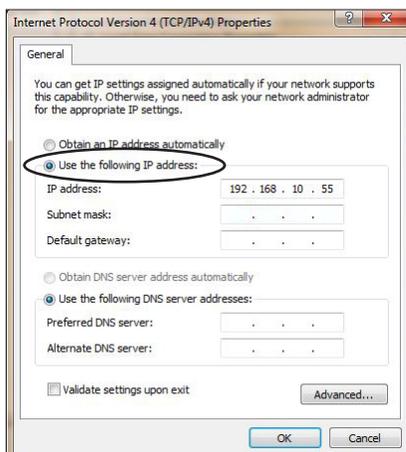


Windows 10

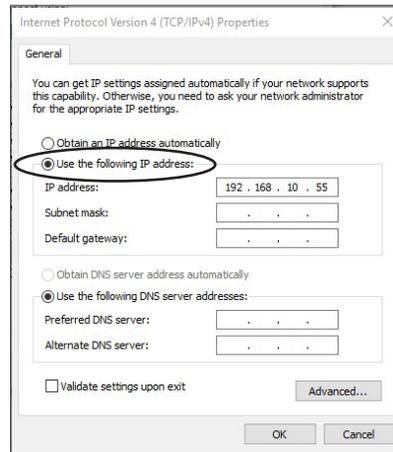
6. Click “Use the following IP address” and then enter the desired IP address.

NOTE: In this example, the entered IP address is 192.168.10.55. Because the IP address of the controller is 192.168.10.51, 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.

7. Click OK > OK to save the new IP address.



Windows 7



Windows 10

Appendix B, Example Volume Program (797PCP)

This appendix provides an example setup of a Volume program, including how to determine the amount of fluid dispensed and then how to use the Correction Factor and Reverse % variables to fine-tune the deposit size.

Determine the Maximum Motor Speed

To achieve the most repeatable deposit amount for an unknown fluid density, first consult the table below to determine the maximum operating RPM is based on the fluid viscosity:

NOTE: Refer to “Maximum Motor Speed Based on Viscosity” on page 49 for a graph.

Viscosity	Percentage of Maximum RPM
1–800 mPa s	100%
800–10,000 mPa s	90%
10,000–25,000 mPa s	70%
25,000–50,000 mPa s	50%
50,000–150,000 mPa s	25%

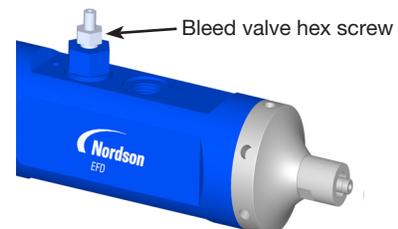
The maximum allowable RPM setting is 150 RPM.

Based on a viscosity of 9,000 mPa s, the maximum motor speed should be $0.9 * 150 = 135$ RPM.

Ensure the System is Free of Trapped Air

Trapped air in the system can cause drooling of the fluid. Follow these steps to remove trapped air.

1. If a tip is installed, remove the tip.
2. Ensure that pressurized fluid is flowing into the fluid cavity of the pump.
3. Open the bleed valve hex screw and keep it open until fluid exists the bleed valve.
4. Install the tip and then turn the pump upside down.
5. Do one of the following:
 - Select the Line program and set the RPM to 50
 - Open the Purge screen and set the RPM to 50. (The Purge initiate input trigger must be connected.)
6. Run the pump until a steady stream of bubble-free fluid is exiting the tip.



Appendix B, Example Volume Program (797PCP) (continued)

Determine the Deposit Weight After One Rotation

For an unknown density, follow these steps to determine the weight of the pump output after one (1) rotation. For example, if using a 0.01 mL/rev rotor / stator, one revolution of the motor should dispense approximately 0.01 mL of fluid.

1. Open the Volume screen and enter the following variables:

- Dispense Volume (mL) = 0.01
- RPM = 50
- Reverse % = 0
- Correction Factor = 1

NOTE: Volume and Weight programs are the most accurate and repeatable programs for this determination because they actively use the encoder to judge how many rotations the motor has made.

Volume Program screen

2. Make five (5) deposits and then determine the average amount of fluid dispensed for those five deposits. This provides the average amount of fluid dispensed in **mg/rev**.
3. Using this one-revolution average, calculate the closest revolutions to the amount you want to dispense. For example, if the average amount of fluid dispensed was 25 mg/rev, but you want to dispense 48 mg/rev, then the closest number of full revolutions required would be 2.
4. In the Volume program, change the Dispense Volume to 0.02 (because this represents 0.02 mL of fluid and should be the closest to the 48 mg/rev of dispense weight needed).

Appendix B, Example Volume Program (797PCP) (continued)

Use Correction Factor and Reverse % to Fine Tune the Deposit Size

1. Make five more deposits using the new setting, then again determine the average amount of fluid dispensed. If, at these settings, the average dispensed is 51 mg/rev (as compared to the desired 48 mg/rev), you can use the Correction Factor to reduce the target weight to 48 mg/rev.
2. To determine the Correction Factor, use the following equation:

$$\text{Correction Factor} = \frac{\text{Target weight}}{\text{Measured weight}}$$

So, for this example the resulting Correction Factor is: $\text{Correction Factor} = \frac{48 \text{ mg}}{51 \text{ mg}} = 0.94$

3. Enter the new 0.94 Correction Factor in the Volume program.
4. Make a few more deposits. If needed, increase Reverse % to eliminate drooling.

NOTE: Contact your Nordson EFD representative for assistance as needed to determine the best values for your application.

Appendix C, Example Volume Program (797PCP-2K)

This appendix provides an example setup of a Volume program for a two-component (2K) application. This example assumes that the proper procedures have been completed to remove all trapped air from the system and that the static mixer is not installed. To achieve a correct 2K mix, each component (fluid) must be dispensed and weighed individually and a correction factor calculated.

The application used for this example has the following characteristics:

- A mix ratio of 10:3 (A:B by weight)
- Two (2) pumps with 0.01 mL/rev rotors / stators (this is the Pump Size variable)
- Part A (epoxy) has a specific gravity of 1.2 and a viscosity of 8,000 mPa s
- Part B (catalyst) has a specific gravity of 1.01 and a viscosity of 20 mPa s

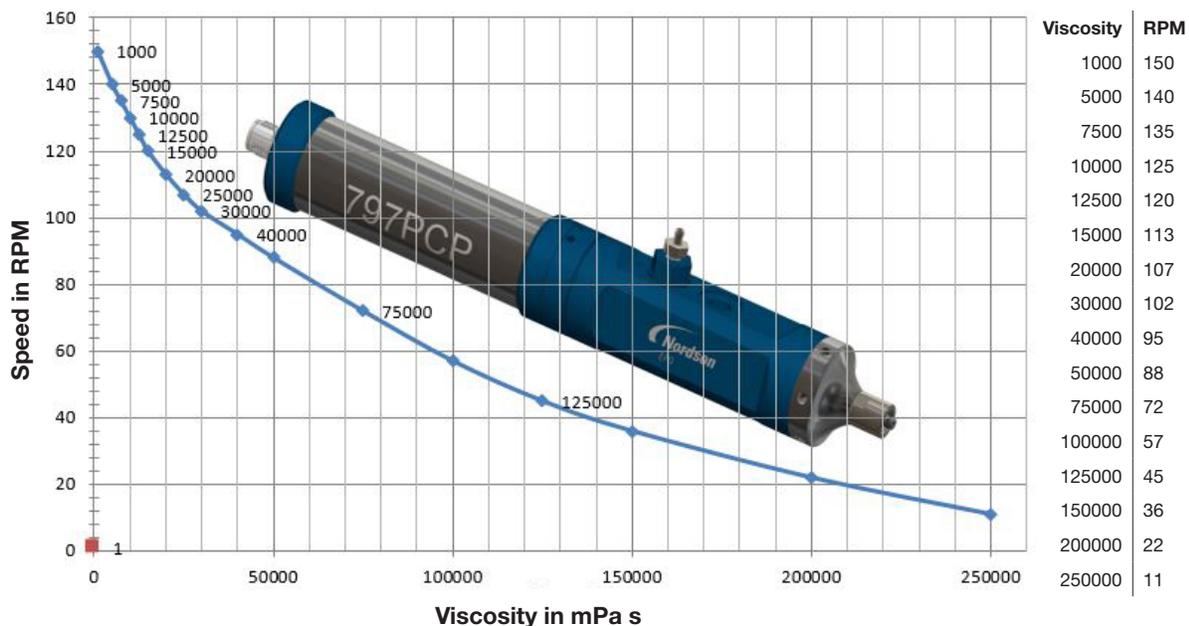
NOTE: For Line programs, Nordson EFD recommends following the example in this appendix to determine the Correction Factor. Then, for the RPM 1 and RPM 2 values, you can enter the fluid ratio. In this case, the RPM for Pump 1 (Part A) would be 130, and the RPM for Pump 2 (Part B) would be 39.

Determine the Maximum Motor Speed

Consult the table below to determine the maximum operating RPM for each component. Based on a viscosity of 8,000 mPa s, the maximum RPM allowed for Part A is 130. Part B has no restrictions, so its maximum RPM is 150.

Viscosity	Percentage of Maximum RPM*
1–800 mPa s	100%
800–10,000 mPa s	90%
10,000–25,000 mPa s	70%
25,000–50,000 mPa s	50%
50,000–150,000 mPa s	25%

*The RPM setting range is 10–150.



Appendix C, Example Volume Program (797PCP-2K) (continued)

Determine a Target Weight for Each Component

For Part A, which has a specific gravity of 1.2, use a target dispense volume (mL) of 1 rotation (0.01 mL) to determine a target weight of 12 mg, as shown by the following equation:

$$\text{Weight (g)} = \text{Specific gravity} \times \text{Volume dispensed} = 1.2 \frac{\text{g}}{\text{mL}} \times 0.01 \text{ mL} = 12 \text{ mg}$$

For Part B, which has a specific gravity of 1.01, use a target dispense volume (mL) of 1 rotation (0.01 mL) to determine a target weight of 10.1 mg, as shown by the following equation:

$$\text{Weight (g)} = \text{Specific gravity} \times \text{Volume dispensed} = 1.01 \frac{\text{g}}{\text{mL}} \times 0.01 \text{ mL} = 10.1 \text{ mg}$$

Determine Values for RPM 1 (Part A) and RPM 2 (Part B)

The maximum RPM for Part A is 130. If you enter 130 for RPM 1 (Part A), then, based on a mix ratio of 10:3, the correct RPM for Part B is 39, as shown by the following equation:

$$\text{Part B RPM} = \frac{\text{Part B ratio}}{\text{Part A ratio}} \times \text{Part A RPM} = \frac{3}{10} \times 130 = 39 \text{ RPM}$$

NOTE: The RPM values can be set to any ratio that is equivalent to 130:39 as long as the maximum RPM is not exceeded (in this example, a maximum of 130). For example, RPM 1 (Part A) could be set to 100 and RPM 2 (Part B) could be set to 35. Round RPM values to nearest whole integer.

Appendix C, Example Volume Program (797PCP-2K) (continued)

Pump 1: Use the Deposit Weight After One Rotation to Determine the Correction Factor

- Open the Volume screen for Pump 1 and enter the following values:
 - RPM = 130
 - Reverse % = 0
 - Dispense Volume (mL) = 0.01
 - Pump Size = 0.01 mL
 - Correction Factor = 1
- Disable Pump 2 (Main > Load > Disable Pump).
- Make five deposits of Part A, ensuring that a representative amount of fluid has dispensed each time.
- Weigh the amount of all five deposits.
- Divide the weight amount by 5.
- Use the following formula to determine a Correction Factor:

$$\text{Correction Factor} = \frac{\text{Target weight}}{\text{Measured weight}}$$

Example: If the target weight was 12 mg and the average weight of the five deposits was 12.2 mg, then:

$$\text{Correction Factor} = \frac{12 \text{ mg}}{12.2 \text{ mg}} = 0.98$$

- On the Volume screen, enter 0.98 for Correction Factor.

7197PCP 0

Progressive Cavity Pump Controller

Refresh Log Load Save INFO

Line Volume Weight Teach Timed Purge

Enable Volume Program

Pump Size 0.01 mL 0.05 mL 0.15 mL 0.3 mL

Dispense Volume (mL) = 0.01 RPM = 130

Reverse % = 0 Correction Factor = 0.98

Submit INFO

Volume Program screen for Pump 1 (Part A)

Appendix C, Example Volume Program (797PCP-2K) (continued)

Pump 2: Use the Deposit Weight After One Rotation to Determine the Correction Factor

- Open the Volume screen for Pump 2 and enter the following values:
 - RPM = 39
 - Reverse % = 0
 - Dispense Volume (mL) = 0.01
 - Pump Size = 0.01 mL
 - Correction Factor = 1
- Disable Pump 1 (Main > Load > Disable Pump).
- Make five (5) deposits of Part B, ensuring that a representative amount of fluid has dispensed each time.
- Weigh the amount of all five deposits.
- Divide the weight amount by 5.
- Use the following formula to determine a Correction Factor:

$$\text{Correction Factor} = \frac{\text{Target weight}}{\text{Measured weight}}$$

Example: If the target weight was 10.1 mg and the average weight of the 5 deposits was 9.8 mg, then:

$$\text{Correction Factor} = \frac{10.1 \text{ mg}}{9.8 \text{ mg}} = 1.02$$

- On the Volume screen, enter 1.02 for Correction Factor.

7197PCP 0

Progressive Cavity Pump Controller

Refresh Log Load Save INFO

Line Volume Weight Teach Timed Purge

Enable Volume Program

Pump Size 0.01 mL 0.05 mL 0.15 mL 0.3 mL

Dispense Volume (mL) = 0.01 RPM = 39

Reverse % = 0 Correction Factor = 1.02

Submit INFO

Volume Program screen for Pump 2 (Part B)

Appendix C, Example Volume Program (797PCP-2K) (continued)

Install the Mixer and Test the Process

Now that the Correction Factors have been determined, install the static mixer. Nordson EFD recommends filling the mixer with the pumps inverted (upside down) to fully remove any trapped air in the static mixer. Ensure that the mixer is filled with the intended ratio. The target volume per dispense in this application based on the weight will be 0.1 mL for part A and 0.03 mL for part B, which also observes the required ratio 10:3.

This application has a minimum process time of:

$$t \text{ (min)} = \frac{\text{Dispense Volume}}{\text{RPM} \times \text{rotor / stator size}} = \frac{0.1 \text{ mL}}{120 \text{ rev/min} \times 0.01 \text{ mL/rev}} = 0.08 \text{ min (or 5 s)}$$

If a faster process time is needed, you can increase the size of the pump for part A. The next pump size up is 0.05 mL/rev. With this pump size, achieving the same volume will require only 2 revolutions of the rotor / stator. This would change the pump RPM ratio to 2:3, but the volume ratio will stay the same. With this new ratio, you can increase the RPM for Part B to a maximum of 150, and you can increase the RPM for Part A to 100. The new minimum process time will be:

$$t \text{ (min)} = \frac{\text{Dispense Volume}}{\text{RPM} \times \text{rotor / stator size}} = \frac{0.1 \text{ mL}}{100 \text{ rev/min} \times 0.05 \text{ mL/rev}} = 0.02 \text{ min (or 1.2 s)}$$

Appendix D, NX Protocol

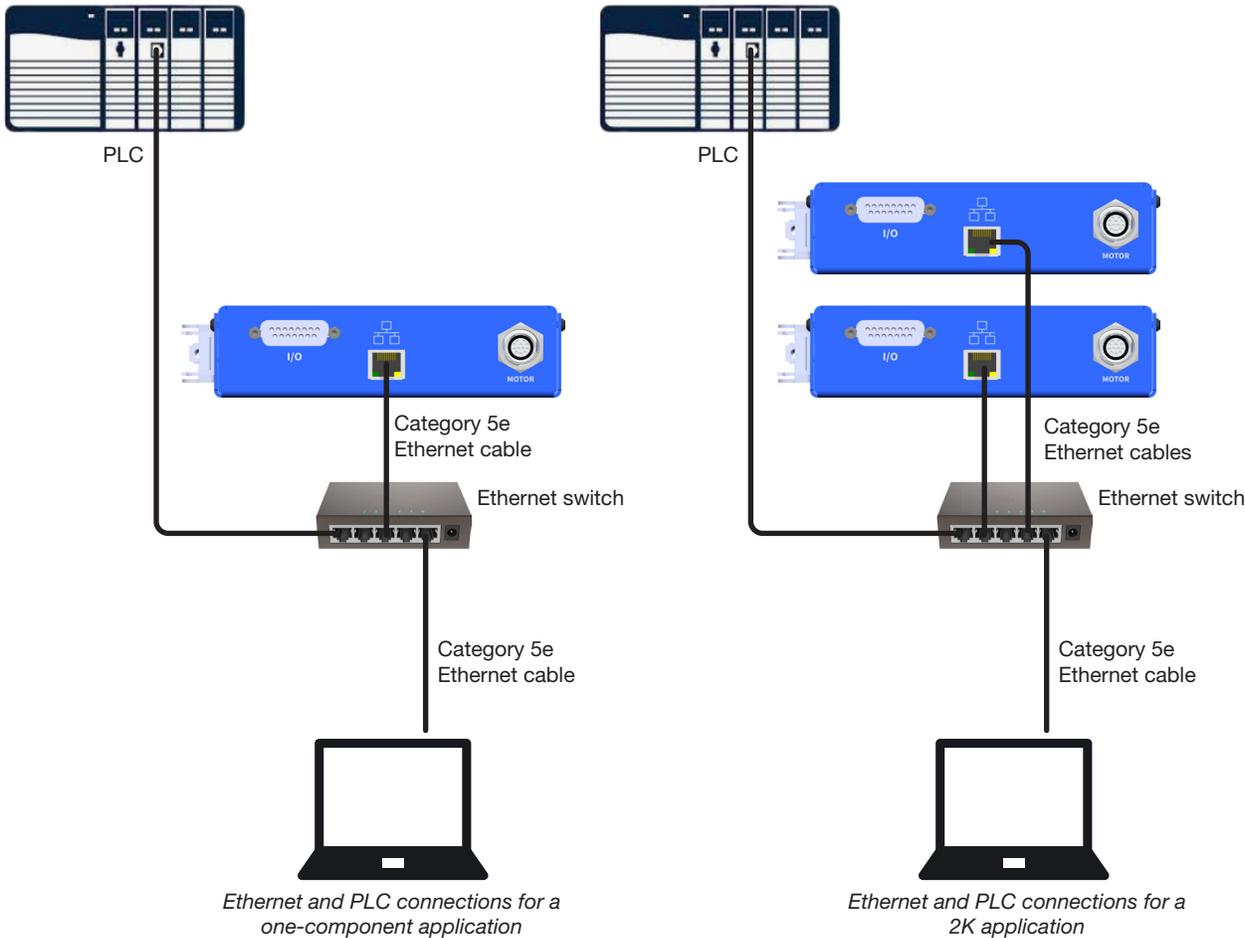
This appendix provides the technical information required to use the NX protocol to interface with a 7197PCP-DIN-NX controller. The NX protocol operates over TCP/IPv4 on port 9000. To communicate with a 7197PCP-DIN-NX controller, the connected device must be capable of establishing a TCP/IPv4 connection 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 7197PCP-DIN-NX 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 62 for details.

Ethernet and PLC Connection

To use the NX protocol to communicate with a 7197PCP-DIN-NX controller, the controller must be connected to the Ethernet and to the PLC. Refer to “Make the Ethernet Connection” on page 16 for Ethernet connection details.



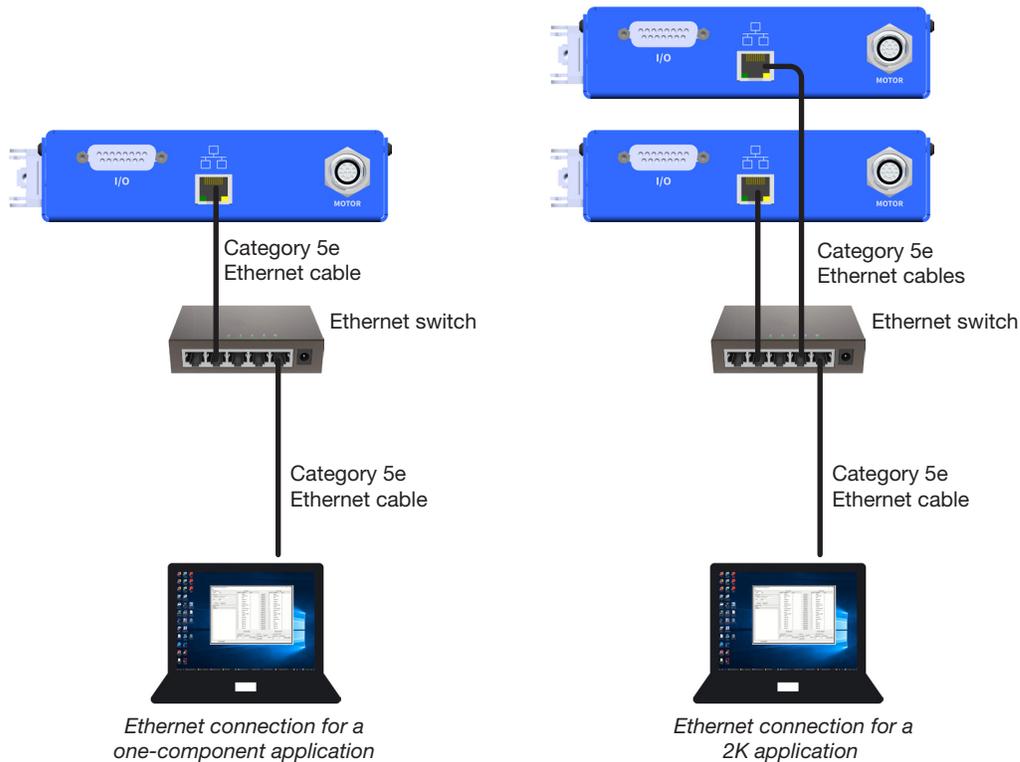
Appendix D, NX Protocol (continued)

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 7197PCP-DIN-NX 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 65.

To Install and Open the Nordson NX Client Application

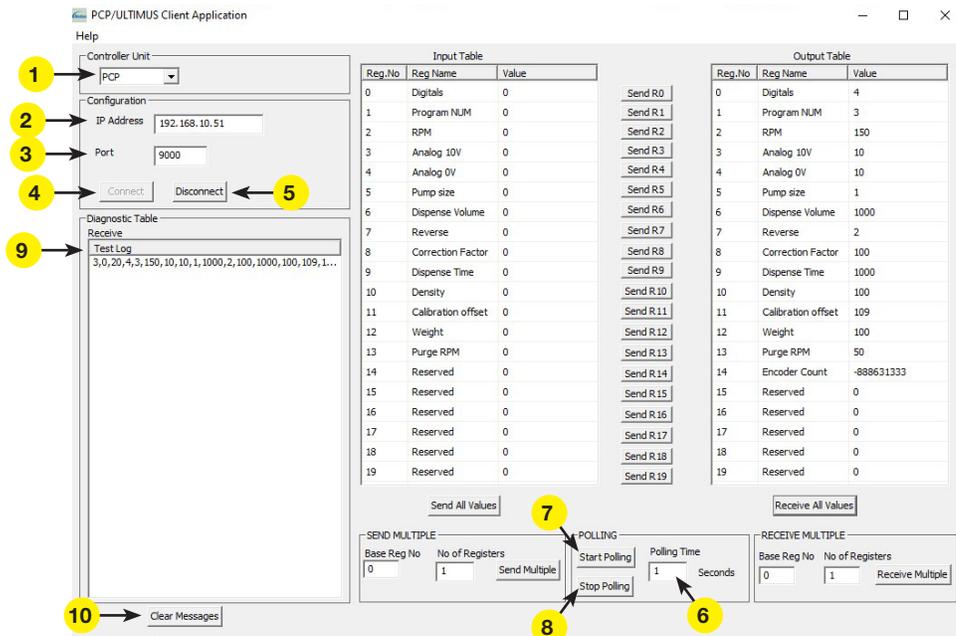
1. Download the Nordson NX Client Application from the 7197PCP-DIN-NX web page.
2. Extract the Nordson NX Client Application on the PC connected to the 7197PCP-DIN-NX controller(s).
3. Open the executable file located inside the extracted folder. Continue to “To Use the Nordson NX Client Application” on page 63.



Appendix D, NX Protocol (continued)

Nordson NX Client Application for NX Protocol Implementation (continued)

To Use the Nordson NX Client Application

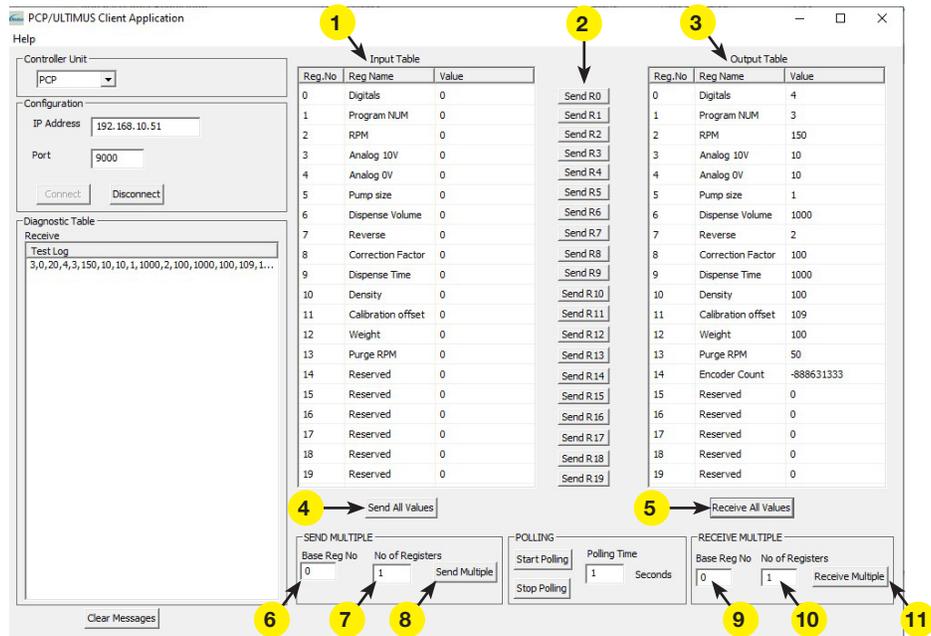


Item	Field	Description
1	Controller Unit	Select PCP.
2	IP Address	Enter the IP ADDRESS for the 7197PCP-DIN-NX controller to communicate with.
3	Port	Ensure that PORT is 9000.
4	Connect	Click to activate the connection to the controller.
5	Disconnect	Click to deactivate the connection to the controller.
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	Test Log	When polling is active, the Test Log shows the current values stored in the registers (the raw data received from the controller).
10	Clear Messages	Click to clear the Test Log.

Appendix D, 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 D, NX Protocol (continued)

Register Set for the NX Protocol

This section includes the complete register set for operating the 7197PCP-DIN-NX 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.

[Write Data] From Client to Controller

Register #	Data Name	Limits	Description	Additional Information
0	Digitals	No limits	Command bits from Client	Refer to “[Write Data] Digitals from Register 0 (From Client to Controller)” on page 66 for the bit number designation.
1	Program Type	1, 2, 3, 4, 7, 20	Sets the program type	<ul style="list-style-type: none"> • 1 = Line • 2 = Volume • 3 = Weight • 4 = Teach • 7 = Time • 20 = Disable
2	RPM	1–150	Sets the motor speed	Used for all programs
3	RPM: 10V	1–150	Sets the RPM when the analog input is 10V	Used only for Line programs in analog mode (Analog On selected)
4	RPM: 0V	1–150	Sets the RPM when the analog input is 0V	
5	Pump Size	1, 5, 15, 30	Sets the pump size	<ul style="list-style-type: none"> • 1 = 0.01 mL/rev • 5 = 0.05 mL/rev • 15 = 0.15 mL/rev • 30 = 0.30 mL/rev Used for Weight and Volume programs
6	Dispense Volume (mL)	1–15000000	Sets the amount of fluid for the dispenser to output	<ul style="list-style-type: none"> • 0.001 mL to 15000 mL times 1000 Used only for Volume programs
7	Reverse %	0–200	Sets the amount of post-dispense reverse	Used for all programs
8	Correction Factor	10–200	Sets the output multiplier	<ul style="list-style-type: none"> • 0.10 to 2.00 times 100 Used for all programs
9	Dispense Time (ms)	1–600000	Sets the dispense time for timed dispensing	<ul style="list-style-type: none"> • Time in milliseconds (ms) Used only for Timed programs
10	Density (g/cm ³)	1–1100000	Sets the input fluid density in g/cm ³	<ul style="list-style-type: none"> • 0.001 to 11000 g/cm³ times 1000 Used only for Weight programs
11	Not used			
12	Weight (g)	10–600000	Sets the target output weight	<ul style="list-style-type: none"> • 0.010 to 600.000 g times 1000 Used only for Weight programs
13	Purge RPM	1–150	Sets the purge RPM	Used only for purging
14–31	Not used			

Appendix D, NX Protocol (continued)

Register Set for the NX Protocol (continued)

[Write Data] Digitals from Register 0 (From Client to Controller)

Bit Number	Bit Function	Description
0	Not used	
1	Save Program	Saves the parameters in registers 1–13 into runtime memory
2	Trigger	Triggers the controller to run a program; when the program finishes, a clear command (16, 0, 1, 0) must be sent before another trigger command is sent (16, 0, 1, 4); otherwise the controller will not trigger.
3	E-Stop	Triggers an emergency stop; see “Restarting After an E-Stop” below for details about restarting a program after an E-stop.
4	Purge Trigger	Triggers a purge to run
5	Analog Select	Places the unit in analog RPM adjust mode
6	Load / Save Program 1	Loads / saves a saved program into the runtime file
7	Load / Save Program 2	Loads / saves a saved program into the runtime file
8	Load / Save Program 3	Loads / saves a saved program into the runtime file
9	Load / Save Program 4	Loads / saves a saved program into the runtime file
10	Load / Save Program 5	Loads / saves a saved program into the runtime file
11	Load / Save Program 6	Loads / saves a saved program into the runtime file
12	Load / Save Program 7	Loads / saves a saved program into the runtime file
13	Load / Save Program 8	Loads / saves a saved program into the runtime file
14	Load / Save Program 9	Loads / saves a saved program into the runtime file
15	Load / Save Program 10	Loads / saves a saved program into the runtime file
16–31	Not used	

NOTES:

- The data in the runtime registers of the controller are not saved into memory and are volatile. To save a program into memory (so that the same values will be loaded when the controller boots up), turn ON bit 1 of Register 0.
- The Purge trigger works similarly to a Line program and runs as long as the bit is high.
- The Analog Select bit is valid only when the controller is in the Line mode. This allows the controller RPM output to vary based on the 0–10V signal.
- An E-stop stops the controller as soon as bit 3 is sent high. When the bit is low again, there is a five-second delay before programs can be run again. See “Restarting After an E-Stop” below for details about restarting a program after an E-stop.

Restarting After an E-Stop

- When the controller is running a **Line** program and enters an emergency stop (E-stop) via an NX protocol command (16, 0, 1, 8), the controller immediately restarts when it receives a trigger command (16, 0, 1, 4); the controller **does not require** a clear command (16, 0, 1, 0) before the trigger command.
However, to restart the controller after an E-stop when it is running a **Volume, Weight, Teach, or Timed** program, the controller **does require** a clear command before the trigger command.
- If the NX protocol is used to trigger a Line program and the DB-15 I/O cable is disconnected from the controller, the controller enters an E-stop condition (as it should); however, because an NX protocol command did not cause the E-stop, the controller immediately restarts a Line program, without requiring a clear command, when the cable is reconnected.

Appendix D, NX Protocol (continued)

Register Set for the NX Protocol (continued)

[Write Data] Digitals from Register 0 (From Client to Controller) (continued)

Write Command Example: 16, 0, 1, 2

To save the program from the runtime memory (volatile) to one of the memory slots, turn ON bit 1 and one of bits 6–15. For example, to save a program in slot 1, turn ON bit 1 (2) and bit 6 (64), for a total value of 66 in register 0.

Write Command Example: 16, 0, 1, 64

To load a program from saved memory into the runtime file, send the value of the program you want to load. For example, to load program 10 into the runtime memory, send 32768 in register 0 to the controller.

Write Command Example: 16, 0, 1, 32768

The trigger works differently depending on the runtime program. As long as bit 2 is high in Line mode and in Teach ON mode, the pump will run. In Volume, Weight, Teach OFF, and Time, the programs will start when bit 2 goes from low to high. Bit 2 must be low before the program will run again.

Write Command Example: 16, 0, 1, 36

For the Analog On mode, a Line program must be used and the Trigger and Analog Select bits must be ON. With both of these ON, the controller will use the 10V and 0V RPM settings based on the analog input voltage level.

Write Command Example: 16, 1, 2, 1, 50

- In position 2, “1” means that the register being written to first will be Register 1 instead of Register 0.
- In position 3, “2” means that the command will write to two registers; in this case, Register 1 and Register 2.
- In position 4, “1” means that the Line program type is selected.
- In position 5, “50” sets the RPM value to 50.

Write Command Example: 16, 5, 3, 1, 1000, 10

- In position 2, “5” means that the command starts at register 5 for its write values.
- In position 3, “3” means that three registers will be written to; in this case, Registers 5, 6, and 7.
- In position 4, “1” means that the selected pump size is 0.01 mL/rev.
- In position 5, “1000” means that the dispense volume is 1 mL.
- In position 6, “10” sets Reverse % to 10%.

Appendix D, NX Protocol (continued)

Register Set for the NX Protocol (continued)

Write Request

Index	Description	Data
0	Command	16
1	Start Register ID	[0–20]
2	Number of Registers	[0–20]
3	Register Data 1	XXXXX
4	Register Data 2	XXXXX
...

Write Request Acknowledgment

Index	Description	Data
0	Command	16
1	Start Register ID	[0–20]
2	Number of Registers	[0–20]
3	Register Data 1	XXXXX
4	Register Data 2	XXXXX
...

Write Request Example: Client request to write 5 registers, starting with register index 0

Client: 16, 0, 5, 100, 200, 300, 400, 500

Controller Response: 16, 0, 5, 100, 200, 300, 400, 500

Write Request Error Response

Index	Description	Data
0	Command	144 (0 x 90)
1	Error Code	-1 (Data Format Error) -2 (Data Limit Error)

Write Request Error Example: Client request to write 5 registers starting with register index 0, but not sending all 5 data values

Data sent from Client: 16, 0, 5, 100, 200, 300

Data received from Controller: 144, -1

Write Request Error Example: Client request to write 5 registers starting with register index 0, but sending an illegal value

Data sent from Client: 16, 0, 5, 100, 200, 300, -1, 500

Data received from Controller: 144, -2

Appendix D, NX Protocol (continued)

Register Set for the NX Protocol (continued)

[Output Data] From Controller to Client

Register #	Data Name	Limits	Description
0	Digitals	No limits	Status bits: Refer to “[Output Data Digitals from Register 0] (from Controller to Client)” below for the bit number designation.
1	Program Type	1, 2, 3, 4, 6, 7, 20	Current program type
2	RPM	1–150	Current setting for motor speed
3	RPM: 10V	1–150	Current setting for RPM when the analog input is 10V
4	RPM: 0V	1–150	Current setting for RPM when the analog input is 0V
5	Pump Size	1, 5, 15, 30	Current setting for pump size
6	Dispense Volume (mL)	1–15000000	Current setting for amount of fluid that the dispenser is outputting
7	Reverse %	0–200	Current setting of post-dispense reverse
8	Correction Factor	1–20	Current setting for Correction Factor (output multiplier)
9	Dispense Time (ms)	1–600000	Current setting for timed dispensing
10	Density (g/cm ³)	1–1100000	Current setting for fluid density
11	Not used		
12	Weight (g)	1–60000	Current setting for target output weight
13	Purge RPM	1–150	Current setting for purge RPM
14	Encoder Count	0–2 ³²	Count from the incremental encoder
15–31	Not used		

[Output Data Digitals from Register 0] (from Controller to Client)

Bit Number	Bit Function	Description
0	Not used	
1	Unit running	Unit is running
2	E-Stop	E-stop is active
3	Error	Pump cable has been cut or is broken
4	Analog Selected	Unit is in line mode with analog
5	Purge Running	Purge program is running
6–31	Not used	

Appendix D, NX Protocol (continued)

Register Set for the NX Protocol (continued)

Read Request

Index	Description	Data
0	Command	3
1	Start Register ID	[0–20]
2	Number of Registers	[0–20]

Read Request Response

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

Read Request Example: Client request to read three registers, starting at Register 2

Data Sent from Client: 3, 2, 3

Data Received from Controller: 3,2,3,100,10,10

In this example, a read command is sent to request the data stored in three registers, starting at Register 2. Position 2 is the starting register index and Position 3 is how many registers to read from. Accordingly, the response from the controller includes the command that was sent; in this case, 3, 2, 3 and the three additional data parameters.

Read Request Example: Client request to read five registers, starting at Register 0

Data sent from Client: 3, 0, 5

Data received from Controller: 3, 0, 5, 0, 1, 100, 110, 10

Read Request Error Response

Index	Description	Data
0	Command	131 (0 x 83)
1	Error Code	-1 (Data Format Error) -2 (Data Limit Error)

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.



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