iTRAX® PRx II Module

Customer Product Manual
Part 1107806-02
Issued 01/13

Obsolete

For parts and technical support, call the Finishing Customer Support Center at (800) 433-9319.

This document is subject to change without notice.
Check http://emanuals.nordson.com for the latest version.

CE

Nordson

NORDSON CORPORATION • AMHERST, OHIO • USA

Table of Contents

Contact Us

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

Address all correspondence to:

Nordson Corporation
Attn: Customer Service
555 Jackson Street
Amherst, OH 44001

Change Record

Revision	Date	Change
01	11/11	New Manual
02	1/13	Updated parts list for Pressure Controller Assembly (1602371) and Cable Assembly (1602472). Updated Pressure Controller Installation (page 17).

iTRAX® PRx II Module

Safety

Read and follow these safety instructions. Task- and equipment-specific warnings, cautions, and instructions are included in equipment documentation where appropriate.

Make sure all equipment documentation, including these instructions, is accessible to persons operating or servicing equipment.

Qualified Personnel

Equipment owners are responsible for making sure that Nordson 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.

Intended Use

Use of Nordson 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

Regulations and Approvals

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for Nordson equipment will be voided if instructions for installation, operation, and service are not followed.

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, or 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.
- Relieve (bleed off) hydraulic and pneumatic pressure before adjusting or servicing pressurized systems or components. Disconnect, lock out, and tag switches before servicing electrical equipment.
- While operating manual spray guns, make sure you are grounded. Wear electrically conductive gloves or a grounding strap connected to the gun handle or other true earth ground. Do not wear or carry metallic objects such as jewelry or tools.
- If you receive even a slight electrical shock, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.
- Obtain and read Material Safety Data Sheets (MSDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials, and use recommended personal protection devices.
- Make sure the spray area is adequately ventilated.
- To prevent injury, 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.

High-Pressure Fluids

High-pressure fluids, unless they are safely contained, are extremely hazardous. Always relieve 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.

If you suffer a fluid injection injury, seek medical care immediately. If possible, provide a copy of the MSDS for the injected fluid to the health care provider.

The National Spray Equipment Manufacturers Association has created a wallet card that you should carry when you are operating high-pressure spray equipment. These cards are supplied with your equipment. The following is the text of this card:

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 him this card
- Tell him what kind of material you were spraying

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.

Consultation with a plastic surgeon or a reconstructive hand surgeon may be advisable.

The seriousness of the wound depends on where the injury is on the body, whether the substance hit something on its way in and deflected causing more damage, and many other variables including skin microflora residing in the paint or gun which are blasted into the wound. If the injected paint contains acrylic latex and titanium dioxide that damage the tissue's resistance to infection, bacterial growth will flourish. The treatment that doctors recommend for an injection injury to the hand includes immediate decompression of the closed vascular compartments of the hand to release the underlying tissue distended by the injected paint, judicious wound debridement, and immediate antibiotic treatment.

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Ground all conductive equipment. Use only grounded air and fluid hoses. Check equipment and workpiece grounding devices regularly. Resistance to ground must not exceed one megohm.
- 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.

Fire Safety (contd)

- Provide adequate ventilation to prevent dangerous concentrations of volatile particles or vapors. Refer to local codes or your material MSDS 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. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.
- Shut off electrostatic power and ground the charging system before adjusting, cleaning, or repairing electrostatic equipment.
- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.
- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

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 your material MSDS or contact your material supplier for more information. If you must use halogenated hydrocarbon solvents, contact your Nordson representative for information about compatible Nordson components.

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:

- Disconnect and lock out system electrical power. Close hydraulic and pneumatic shutoff valves and relieve pressures.
- 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.

Description

The Nordson PRx II module provides the following monitoring and control capabilities:

- electronically controls base pressure
- monitors coating material temperature
- monitors belt speed, chuck speed, or chuck bearing speed
- with an optional Anybus module, the PRx II can send the can spin speed setpoint to the customer's control system

In addition, the PRx II module can also provide Extended Can-In-Pocket functions, which include:

- vacuum detect
- gun mount position
- can-in-pocket detect
- speed monitor signal

The iTRAX Operator Interface (OI) provides the configuration and monitoring interface for the PRx II module. The OI consists of OPC Server and OPC Local Client software, plus a USB-to-CAN network adapter, USB cable, and CAN termination resistor.

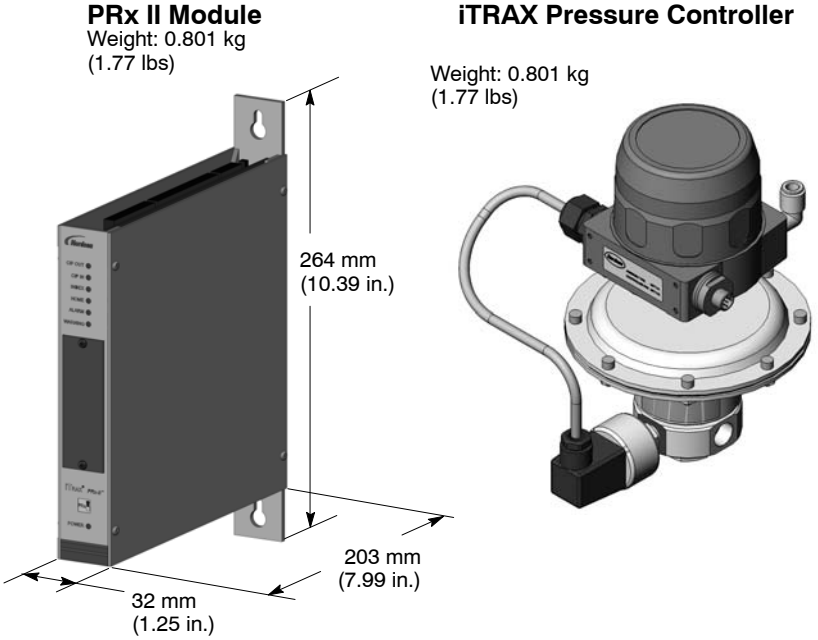

Figure 1 PRx II Module and iTRAX Pressure Controller

The Nordson OPC Server and Client run on an IBM-compatible personal or industrial computer with the Windows XP or Windows 2000 operating system. The OPC Client provides a graphical user interface for setting up and monitoring system parameters. It is referred to as the Operator Interface (iTRAX OI). Communications between the OI and the iTRAX modules is through a CAN (Controller Area Network) network and the USB-to-CAN network adapter.

Description *(contd)*

Up to 63 iTRAX modules can be connected to a single CAN network. These modules may be a mix of Spray Monitors, Spray Controllers and PRx II modules depending on the application. Because screen refresh times can become noticeably longer with greater numbers of Spray Monitors, it is recommended that no more than 40 Spray Monitors be connected to the network. This limitation does not apply to Spray Controllers or PRx II modules (if not used for pressure control).

NOTE: For systems with more than 63 modules, a CAN-to-CAN gateway is recommended to expand the CAN network node capability. Contact your Nordson Container representative for more information.

Once a PRx II module is configured, it remains fully functional even if the PC running the OPC Server and OPC Local Client is shut down.

This manual covers installation, configuration, and parts for the PRx II module, the pressure controller, and the Anybus® module options. Refer to the online Help system in the iTRAX Operator Interface for system configuration, calibration, setup, and operation.

PRx II Features

Pressure Controller

This option uses a pressure controller and iTRAX Spray Monitor to monitor and control the fluid base pressure for each spray gun.

This option works as follows:

1. The base pressure setpoint value is assigned by the operator and sent from the iTRAX OI to the PRx II module. The PRx II module communicates this setpoint value to the electronic pressure controller.
2. The Spray Monitor reads the actual base pressure at the spray gun and sends it to the iTRAX OI and PRx II module over the CAN network.
3. The iTRAX OI displays the actual pressure. The PRx II module also reads the actual base pressure from the SM module over the CAN network.
4. The PRx II module compares the actual base pressure to the setpoint, and sends the iTRAX pressure controller commands over an RS-485 link to adjust the pressure up or down as needed.
5. The pressure controller adjusts the output pressure to produce the desired base pressure at the spray gun. The pressure controller's internal control loop has a 25 millisecond update time. The PRx II module serves as a supervisory controller with an 8 second update time.

This process is continuous, allowing the pressure controller to maintain the desired base pressure at the spray gun automatically.

Pressure Controller Specifications

Maximum inlet pressure	207 bar (3000 psi)
Maximum outlet pressure	62 bar (900 psi)
Operating temperature	-54–74 °C (-65–165 °F)
Inlet/Outlet ports	$^3/_8$-in. NPT
Outlet gauge ports	$^1/_4$-in. NPT

Temperature Monitoring

To use the temperature monitoring feature, the standard spray gun pressure transducer must be replaced by a pressure transducer with RTD. The RTD uses a 4–20 mA signal to monitor temperature ranges of 0–100 °C (32–212 °F).

This feature does not adjust the fluid temperature, it only monitors it through the iTRAX OI. The OI allows the operator to set high and low temperature alarm and warning values and alerts the operator if they are exceeded.

The pressure transducer with RTD is sold separately. Refer to the *Parts* section for more information.

Speed Monitoring

This advanced feature does not adjust the can spin belt speed, but monitors and displays the RPM through the iTRAX OI. The OI allows the operator to set high and low speed alarm and warning values and alerts the operator if they are exceeded.

3 types of speed monitoring:

a. Belt speed monitoring–

- To use the spin belt speed monitoring feature, a proximity sensor must be installed to sense the RPM (0–3000 RPM) of one of the belt pulleys. The targets on the belt pulley are detected by the proximity sensor to compute the RPM. This feature continuously monitors the pulley speed provided the *Run/Stop* signal is asserted.

b. Can chuck speed monitoring–

- A proximity sensor is installed to sense targets on the chuck when it enters the spray pocket. A trigger signal is also required to validate the speed signals being detected (since the proximity switch senses targets in a dynamic environment). An index and home sensor are also required to correlate the speed of each chuck and transfer the data to the correct field in the *Speed Detail Screen*.

c. Bearing speed monitoring–

- A proximity switch is used to sense targets on the chuck at a location where the drive belt is disengaged from the chuck. Here, as the chuck speed is coasting down, the module is looking for an acceptable speed for a properly working chuck bearing. This option is used when primary concern is on the condition of bearings. A trigger, index, and home signal are required for this feature.

Extended Can-in-Pocket

To use the Extended Can-in-Pocket feature, any or all of the following customer-supplied components must be installed:

- Can-in-Pocket sensor
- Vacuum chuck sensor
- Belt spin detect sensor or signal
- Gun position proximity switch

The PRx II module combines the signals from the above sensors and sends a single CIP signal to the iTRAX Spray Monitor. If one of the sensor signals is not correct, the Spray Monitor will not receive the CIP signal, and will generate a Can-In-Pocket (CIP) fault. The iTRAX system identifies the sensor causing the CIP fault. This feature can only be used if a CIP sensor is located in the spray pocket.

AnyBus® Option Features

NOTE: Nordson offers three options for a fieldbus network: Profibus, Ethernet I/P, and DeviceNet.

By installing an Anybus-S Profibus, Ethernet/IP, or DeviceNet interface module on the PRx II module, the PRx II module can communicate the following information to external controllers:

- Spin Belt Speed Setpoint
- Actual Belt Pulley Speed
- Actual Can Chuck Spray Speed
- Actual Can Chuck Coasting Speed
- Actual Temperature at gun
- General Status
- Warnings
- Alarms
- Current One Button Recipe Number (user assigned)

Starting with Version 4.2 of the iTRAX OI, the software allows the user to set a spin speed setpoint. The setpoint, along with the actual speed, is then sent via the Anybus module and fieldbus network to a customer-supplied host PLC/Controller for spin belt control.

Refer to *Parts* for the AnyBus-S module part numbers and ordering information, and to *Anybus Option Installation* on page 12 for installation and configuration information.

Optional Remote Display

The iTRAX Remote Display is used to display various spray parameters at the spray machine. It is packaged in a rugged steel case to withstand the factory environment. The Remote Display can be configured to display process data from up to four iTRAX Spray Monitors or one iTRAX PRx II module, but not both simultaneously.

The Remote Display receives and displays process data from the PRx II module when the serial communication interface is configured for RS-485. The operator can choose to display any or all of the following data:

- Base Pressure (PSI or KPa)
- Fluid Temperature (°C or °F)
- Spin Belt Speed (RPM) – this is the same value shown on the Prx face plate.

The Remote Display can also be configured and connected to the iTRAX CAN Network to display any or all of the following data:

- Base Pressure (psi or KPa)
- Fire Pressure (psi or KPa)
- Gun Durationj (msec)
- On Time (msec)
- Off Time (msec)

Data selected for display is displayed sequentially.

The Remote Display can be mounted in a suitable location where it is visible to the coating line operators. Refer to the Remote Display manual for more information.

Figure 2 Remote Display

PRx II Module Requirements

NOTE: For compliance with the European Union Electromagnetic Compatibility Directive, refer to *EMC Directive Requirements*.

The following customer-supplied hardware is required to install the PRx II module and options:

- Power Supply: 24 Vdc, 0.7 amp required per PRx II module/pressure controller combination (the PRx II module alone is 0.35A max).
- CAN Network Cable: Belden 9841 or equivalent. The PRx II module is guaranteed to communicate properly only if the total CAN network length is ≤ 75m (246 ft).
- Enclosure: IP54 or better metal enclosure
- Cables, as required, for index and timer output and Can-In-Pocket sensors, timer input, spray output, and warning/alarm outputs
- Pressure controller cable (if used): Belden 3084A or equivalent
- 8-mm air tubing for pressure controller air input
- Filtered compressed air at 5.5 bar (80 psi) minimum for air servos inside the pressure controller

Refer to *Parts* for part numbers and ordering information for optional equipment.

EMC Directive Compliance

For compliance to the European Union Electromagnetic Compatibility Directive (EMC Directive):

1. Mount the PRx II module in an IP54 or better metal enclosure.
2. Use a CE-labeled 24 VDC power supply.
3. For general safety fuse L1 and L2 of power supply.
4. All customer-supplied cables must be shielded and terminated.

Installation

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

Installation includes mounting, configuring, and wiring the PRx II module and optional equipment. PRx II module configuration is done through the iTRAX Operator Interface.

NOTE: For compliance with the European Union Electromagnetic Compatibility Directive, refer to *EMC Directive Requirements*.

Conditions of Warranty

The iTRAX PRx II module must be installed and wired per the specifications provided herein. Other than technical support provided under warranty for defective equipment, Nordson will not provide complimentary post-sale technical support if the installation does not comply with the requirements stated in this manual and local electrical codes.

Furthermore, if post-sale technical services are performed and the installation is found to be non-complaint with these requirements, then the customer will be invoiced and be responsible for payment of the charges associated with the service.

Anybus® Option Installation

Install the Anybus module on the PRx II module before installing the PRx II module in an enclosure.

Anybus-S Module Installation

Follow this procedure to install the AnyBus-S module on the PRx II board. See Figure 3.

1. Remove the four screws (2) and cover (1) from the PRx II module.
2. Remove the three screws (5) from the stand-offs (6) on the PRx II board (3).
3. Insert the connector on the AnyBus module (4) into the J4 header (7) on the PRx II board.
4. Secure the AnyBus module to the stand-offs with the three screws removed in step 2.
5. Find the SW4 dipswitch (8) on the PRx II board and set switch SW4–4 to the Closed position.

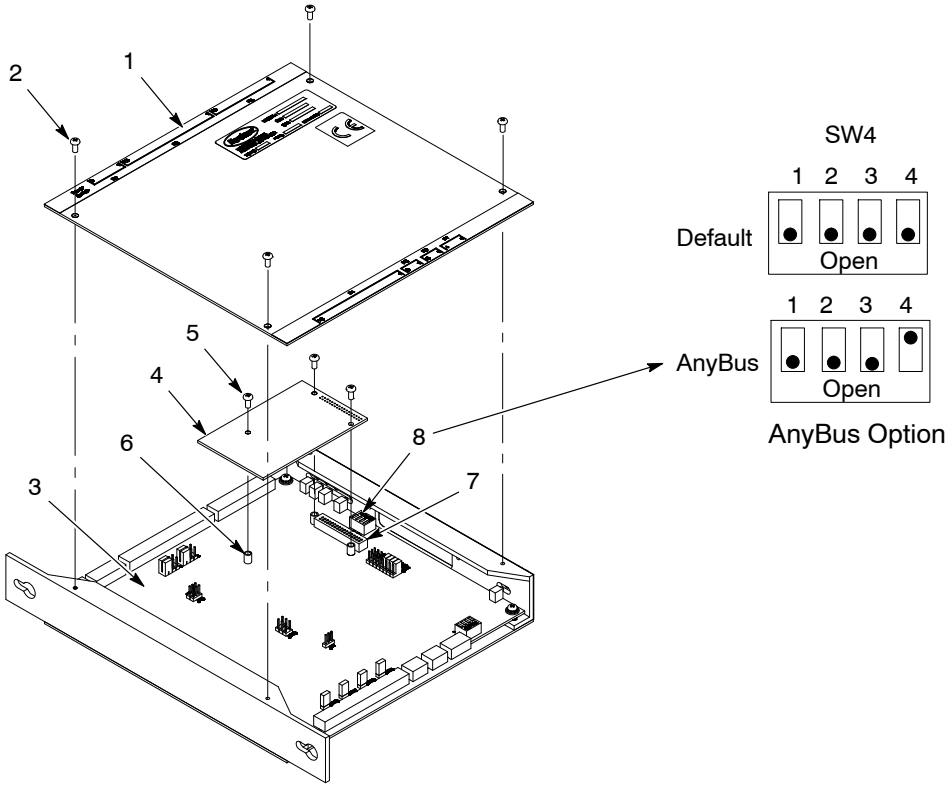

Figure 3 Anybus Module Installation and Jumper Setting

1. Cover
2. Cover screws (x 4)
3. PRx II board
4. AnyBus board
5. Stand off screws (x 3)
6. Stand offs
7. Header J4
8. SW4

Anybus-S Profibus-DP Configuration

The PRx II module is compatible with the Anybus-S Profibus-DP slave interface module. This module is available from Nordson (refer to the *Parts* section) and is field-installed.

NOTE: The iTRAX OPC Server and Local Client CD includes the required support files for the Anybus option. The files are contained in a folder titled PRx II_Support.

The file HMS1003.GSD must be loaded into the Profibus-DP master for it to recognize the Anybus module. Also, the network address of the Anybus module must be determined and set.

The PRx II module software pre-configures the installed Anybus module I/O space for 13 2-byte words of inputs. Table NO TAG lists the definition of each input word. There are no output words.

For the Profibus master, a similar I/O configuration table must be created and downloaded. This may be done using one of several Profibus system configuration/development tools such as Step 7 from Siemens or SyCon® System Configurator from Hilscher GmbH. Configure the master so that 13 2-byte input words are mapped to the master input image table.

Anybus-S Ethernet/IP Configuration

The PRx II module is compatible with the Anybus-S Ethernet/IP slave interface module. This module is available from Nordson (refer to the *Parts* section) and is field-installed.

NOTE: The iTRAX OPC Server and Local Client CD includes the required support files for the Anybus option. The files are contained in a folder titled PRx II_Support.

The file 73−9599−EDS_ABS_EIP_V_1_9.eds must be loaded into the Ethernet/IP master/scanner for it to recognize the Anybus module.

Also, the IP address of the Anybus module must be determined and set. It is recommended to set all the DIP switches on the Anybus card to OFF, and to set the IP address of the module using the Anybus IPConfig software tool, which is included on the iTRAX CD in a folder titled PRx II_Support. The CD also includes an excellent configuration procedure titled *EthernetIP_Adapter_RSLogic_2.02.pdf*.

The 4-byte IP address should have the same network address (first 3 bytes) as the rest of the Ethernet network to which the Anybus module is connected, and then have a unique sub-net address (the least significant byte).

The PRx II module pre-configures the installed Anybus module I/O space for 13 2-byte words. Table 1 lists the definition of each input word. There are no output words. The Ethernet/IP master/scanner must be configured to create a matching I/O configuration table. This may be done using one of several Ethernet/IP system configuration/development tools such as the Rockwell Automation RSLogix™ 5000 or SyCon® System Configurator from Hilscher GmbH. Configure the master/scanner so that 13 2-byte input words are mapped to the input image table.

Anybus-S DeviceNet Configuration

The Prx module is compatible with the Anybus-S DeviceNet slave interface module. This module is available from Nordson (refer to *Parts* section) and is field -installed into the iTRAX PRx module.

NOTE: The *iTRAX OPC Server and Local Client* CD includes the required support files for the Anybus option. The files are contained in a folder titled *PRx_Support*. The same and additional support files can be downloaded from www.anybus.com.

A unique MAC address for the Anybus-S module must be assigned and set with the dip switches provided on the module.

The PRx module software pre-configures the installed Anybus-S module's I/O space for 13 2-byte words of inputs. Table 1 lists the definition of each input word. There are no output words. For the DeviceNet master (i.e. DeviceNet Scanner), a similar I/O configuration table must be created and saved. This may be done using one of several Rockwell-Allen Bradley configuration/development tools such as Control Logix 5000™ or RSNetWorx™ for DeviceNet. Configure the DeviceNet Scanner so that 26 bytes (13 2-byte words) are mapped to the input image table.

The correct *.EDS file must be loaded into the DeviceNet scanner (master) for it to recognize the Anybus slave (i.e. DeviceNet Adapter) module. The following list describes the correct EDS file load:

- EDS_ABS_DEV_V_2_3.eds – use with Anybus-S having Version 2.x firmware (see label on module) when not using the Quick Connect feature.
- EDS_ABS_DEV_2_2.eds – use with Anybus-S having Version 2.x firmware when using the Quick Connect feature.
- EDS_ABS_DEV_V_1_35.eds – use with Anybus-S having Version 1.x firmware.

Table 1 Input Words to Master

Word No.	Definition
1	Spin Speed Setpoint (units RPM)
2	Actual Spin Speed (units RPM)
3	Future Use
4	Actual Temperature (units °F)
5	Future Use
6	Future Use
7	Future Use
8	General Status
9	Warnings
10	Alarms
11	One-Button Recipe Number
12	Reserved
13	Watchdog counter to PLC (increments every second)

PRx II Module Installation

Configuration

CAUTION: Electrostatic sensitive device: To avoid damaging the circuit board wear an ESD wriststrap and use proper grounding techniques.

1. See Figure 4. Using a screwdriver, remove the access plate on the front of the PRx II module.
2. Use a small screwdriver to set the CAN network address for the module.
   - If using the optional pressure controller, the PRx II module address must match the address of the corresponding Spray Monitor.
   - If the optional pressure controller is not used, any unique address from 1–63 may be used.

   NOTE: The Spray Monitor address can be verified with the Spray Monitor configuration window on the iTRAX operator interface.
3. **Last Module in the iTRAX CAN Network Only**: The last module on the CAN network must be terminated. If the module is a PRx II module close switch SW3 position 1 to terminate the network (see Figure 4). This switch is accessible from the bottom of the PRx II module.
4. Replace the access plate on the front of the PRx II module.
5. Repeat this procedure for all additional PRx II modules in the system.

NOTE: If necessary, remove the PRx II module cover as shown in Figure 3 to set jumpers on the PRx II board for other options.

Mounting

NOTE: For compliance with the European Union Electromagnetic Compatibility Directive, refer to the *EMC Directive Requirements* on page 10 .

Use the two #10 screws to mount the PRx II module in the controller cabinet.

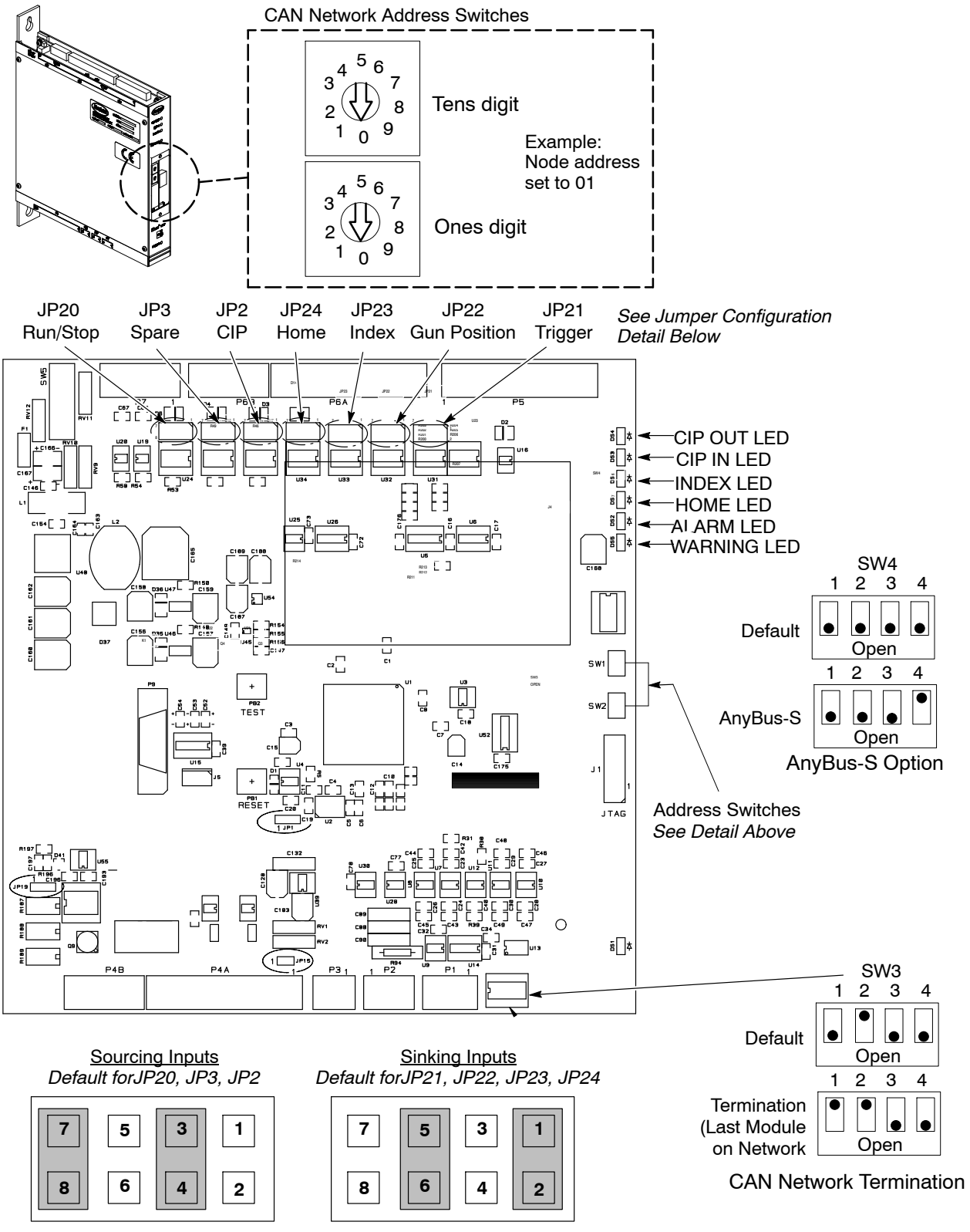

Figure 4 PRx II Circuit Board Switches and Jumper Settings

Pressure Controller Installation

See Figure 5. Use this procedure to connect the pressure controller to the PRx II module.

NOTE: When using a Belden 3084A cable, the cable length from the pressure controller to the PRx II module must be less than 100 meters (300 ft).

1. Mount the controller assembly. Refer to the *Parts* for the optional mounting bracket (5).
2. Use $^{3}/_{8}$ in. NPT fittings to connect the fluid lines to the IN and OUT fluid ports (4).

   NOTE: Carefully apply PTFE tape to fittings so that tape will not inadvertently get into the fluid stream. Preventing fragments of tape or other contaminants from becoming lodged at the ball/seat will allow for proper performance.

3. Run a customer-supplied cable (Belden 3084A or equivalent) (2) from the PRx II module to the cordset connector (1).

   NOTE: The cordset connector is available from Nordson. A 3-m length cable assembly with connector is also available. Refer to *Parts* for the part number and ordering information.

4. Wire the cordset connector as shown in Figure 5. Wire ferrules are recommended for connections to pins 1 thru 4.
5. Mate the cordset connector to the pressure controller.
6. Connect the RS-485 wiring to the PRx II module P1 terminal block as shown in Figure 5.
7. Connect a source of compressed air to the air inlet port (3). Input air should be filtered and supplied at 5.5 bar (80 psi) minimum.

   NOTE: Refer to *Parts* for a recommended air regulator/filter/gauge assembly.

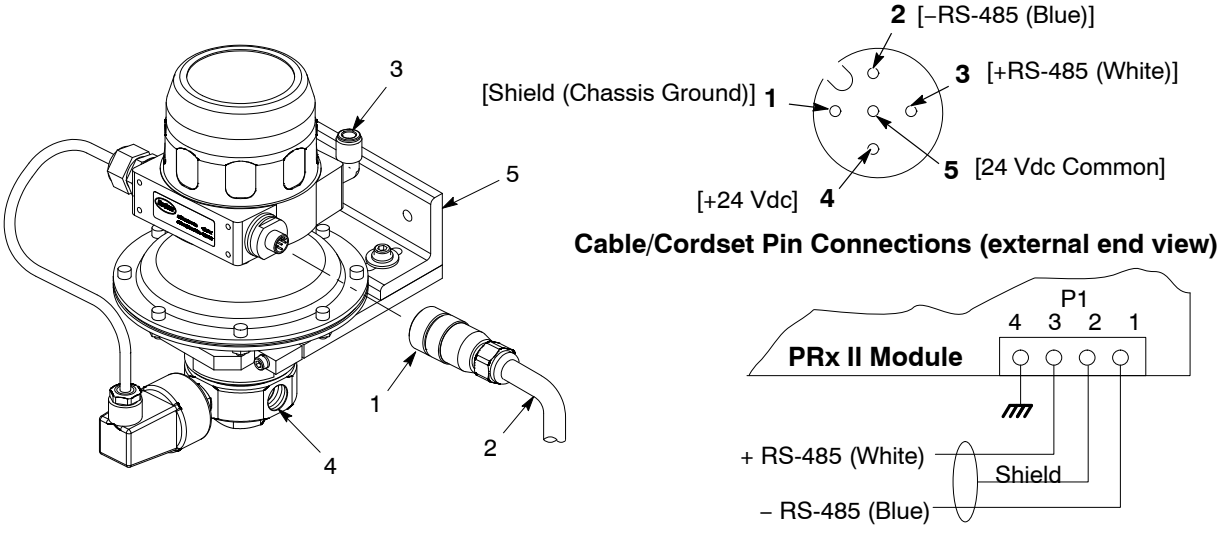

Figure 5 Pressure Controller Installation

System Wiring

NOTE: Refer to **Conditions of Warranty** on page 11 for important information. For compliance with the European Union Electromagnetic Compatibility Directive, refer to *EMC Directive Requirements* on page 10.

See Figure 6 for wiring diagram.

Table 2 PRx II Module Pinouts

Function	Pin Number	Signal Designation	Signal Specification
Electronic Pressure serial communication	P1–1	RS-485 (–)	RS-485 Specification
	P1–2	Shield	RS-485 Specification
	P1–3	RS-485 (+)	RS-485 Specification
	P1–4	Chassis Ground	RS-485 Specification
iTRAX CAN Network (recommended)	P2–1	Shield	CAN 2.0 Specification
	P2–2	CAN (–)	CAN 2.0 Specification
	P2–3	CAN (+)	CAN 2.0 Specification
iTRAX CAN Network (optional use)	P3–1	CAN (+)	CAN 2.0 Specification
	P3–2	Shield	CAN 2.0 Specification
	P3–3	CAN (–)	CAN 2.0 Specification
Temperature Monitor Signal	P4–5	Temp (–)	24 Vdc Common
	P4–6	Temp (+)	4–20 mA analog
Alarm Output Contacts *(see note A)*	P4–13	Normally Open	Dry Contacts
	P4–14	Common	Dry Contacts
	P4–15	Normally Closed	Dry Contacts
Trigger Signal (*see note A)*	P5–1	Configurable Input Signal	Compatible with SC module Trigger Output (10 mA load)
	P5–5		
Gun Position	P5–2	Configurable Input Signal	10 mA maximum load
	P5–10	Trigger Signal A Reference	24 Vdc Common
Index Signal (*see note A)*	P5–3	Configurable Input Signal	10 mA maximum load
	P5–6		
Home Signal (*see note A)*	P5–4	Configurable Input Signal	10 mA maximum load
	P5–12	Signal Reference	24 Vdc Common
Vacuum Signal	P6–1	Sinking Input Signal	from NPN Output or N.O. contact (10 mA load)
	P6–2	Vacuum Signal Reference	24 Vdc Common to Sinking
Can-in-Pocket (CIP) Signal	P6–3	CIP Signal Input	Jumper (JP2) configure to Sinking or Sourcing (See Figure NO TAG)
	P6–4	CIP Signal Reference	24 Vdc Common
	P6–5	CIP Signal Power Source	+24 Vdc @ 20 mA

Function	Pin Number	Signal Designation	Signal Specification
Speed Signal (*see note A)*	P6–9	Sourced Input Signal	from PNP Proximity Switch
	P6–10	Speed Signal Reference	24 Vdc Common
	P6–11	Speed Signal Power Source	+24 Vdc @ 20 mA
Run/Stop Signal from PLC (*see note A and B)*	P6–12	Sourced Input Signal	Requires PNP signal or dry contact across P6–12 and P6–14
	P6–13	Signal Reference	24 Vdc Common
	P6–14	Signal Power Source	+24 Vdc @ 10 mA
Can-in-Pocket (CIP) Output	P6–15	Sinking Output	Compatible with SM CIP Input
	P6–16	CIP Output Power Source	+24 Vdc @ 10 mA
Alarm Output	P6–17	Sinking Output	for external 24 Vdc Alarm Relay
	P6–18	Alarm Output Power Source	+24 Vdc @ 25 mA
Power Connections *(see note A for P7–3, –4, 5, and –6)*	P7–1	24 Vdc Common	
	P7–2	+24 Vdc Switched Output	+24 Vdc for external devices (if used)
	P7–3	24 Vdc Common Input	24 Vdc Common for PRx I/O
	P7–4	+24 Vdc Power Input	+24 Vdc for PRx I/O @ 150 mA (max)
	P7–5	24 Vdc Common Input	
	P7–6	+24 Vdc Power Input	+24 Vdc @ 200 mA (max)

Note A: Wiring requirement for Spin Speed.
Note B: The Run/Stop signal is provided by the customer's spray machine control system. The signal must be asserted when the spray machine is automatically spraying. The Run/Stop signal may be logically tied to the can-feed control, or to the spinner speed control system. The Run/Stop signal serves to validate the time during which monitoring speed is active (and to differentiate from times when the spray machine is shut-off). The iTRAX system also prevents new recipes from being loaded when the Run/Stop signal is asserted (i.e. when in the Run state).

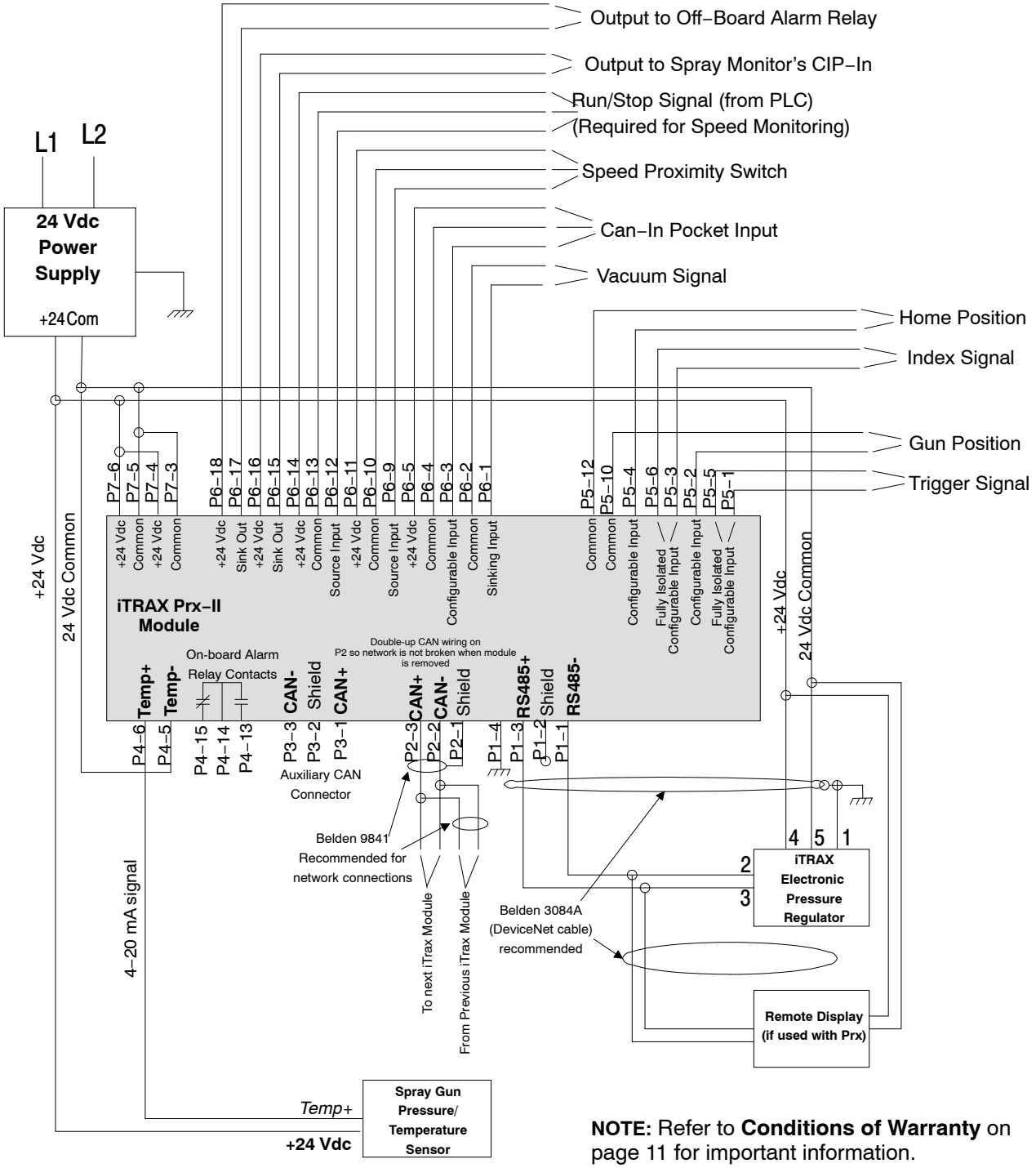

Figure 6 PRx II System Wiring

Speed Sensors and Targets for Spin Speed

CAUTION: All equipment should be turned off before installing proximity sensors and targets.

One PRx-II module, one speed proximity sensor, and two targets (on spinner/chuck) are required for monitoring speed at a single spray pocket. An Index and home sensor are also required for the starwheel, so that the captured speed readings can be properly displayed on the iTRAX *Speed Detail Screen*. Consult your Nordson container representative to determine the equipment needed for your application.

The speed proximity sensor should be mounted to detect targets on the chuck spinners at a location where the can is spinning at the desired speed for spraying.

Two targets should be located on the chuck spinners 180° apart from each other. The targets can be machined onto or mounted to the chuck spinners. Although best practice would be to use two targets, the iTRAX system can also be configured for up to four targets.

Ferrous steel targets are recommended. Aluminum targets require the proximity sensor's sensing range to be derated, which results in compromised performance.

The home proximity sensor should be mounted to detect a single target on the starwheel. The home sensor must detect the home target while the starwheel is stopped at the home position.

The home position is defined by the user and can be assigned as any position on the starwheel. Once the number 1 position is determined, other positions must follow consecutively in a clockwise direction.

Requirements for Spin Speed

- The proximity sensors must have an operating frequency of 2Khz minimum and sourcing output (PNP) capable of operating at 24 Vdc.
- The mechanical mounting of the proximity sensor may be radial or axial depending on the application.
- For reliable RPM sensing, the target exposure time to the proximity sensor must be at least 1 millisecond when the chuck spinner is rotating at a speed of 3000 RPM.
- Each chuck spinner needs to be assigned a number, starting with the number one.
- An index signal must be generated by the spray machine to the Prx-II module.

Operation

iTRAX System operation is automatic once the PRx II modules are configured to the desired level of process monitoring through the Operator Interface. The OI displays system operation, provides warnings and alarms, and allows the operator to record responses to warnings and alarms.

If the PC is powered down, the PRx II module remains fully operational and continues to control pressure (if used) and monitors process parameters.

Power Switch

The PRx II module has a power switch on the top rear of the unit. This switch is turned on by default and should be left on. Use this switch to turn off power before disconnecting any of the wire terminal plugs.

WARNING: Turn off external power to the power supply before disconnecting power wires from any terminal plug. Failure to do so could result in an electrical shock.

LED Indicators

The PRx II module has seven LEDs on the front panel:

LED	Color	Function
CIP OUT	Green	Can-in-pocket output signal. Signal is green when all selected can-in-pocket requirements are met. (can-in-pocket sensor, vacuum sensor, belt speed signal, gun in position proximity switch)
CIP IN	Green	Can-In-Pocket sensor signal is being received. **NOTE:** Can-In-Pocket is an optional function that is set up through the OI. Contact your Nordson representative for more information.
INDEX	Yellow	The Index input is being asserted for diagnostic use.
HOME	Yellow	The Home input is being asserted for diagnostic use.
ALARM	Red	Alarm condition exists. Refer to the iTRAX OI online help system for troubleshooting procedures.
WARNING	Yellow	Warning condition exists. Refer to the iTRAX OI online help system for troubleshooting procedures.
POWER	Green	Power to PRx II module is on. LED will flash when Anybus option is activated.

Spin Speed

The PRx II module uses a number of targets and sensors to transfer data to the iTRAX system OI. The *Speed Detail* screen (see Figure 7) displays a table where each numbered chuck spinner is listed along with the last recorded reading of it's spin speed.

The chuck spinner numbers are assigned by the user in the section *Configuring iTRAX for Indexing Chuck Spinners* on page 25.

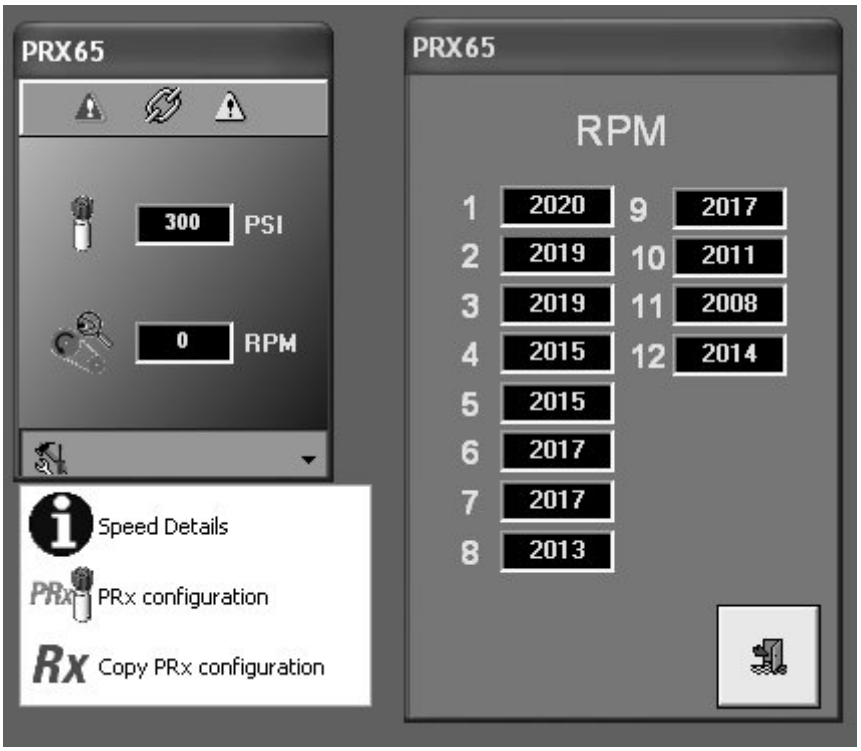

Figure 7 Speed Detail Screen

Configuring for Indexing Chuck Spinners

NOTE: The numbering and settings in the following figures may not be the same as in the user's application.

See Figure 8.

1. Verify that the starwheel is in the home position. The home sensor should be aligned with the home target.
2. Assign each of the chuck spinners a number beginning with the number 1, and number consecutively in a clockwise direction. Although chuck number 1 may be located anywhere on the starwheel. It is recommended to label the chuck located at the spray pocket with the speed sensor as *Chuck Number 1*.
3. See Figure 9. Through the iTRAX OI, go to the PRx configuration *Service Screen* to customize the settings for *Chuck–Home Offset.*
4. Verify that the number of chuck spinners is correct.
5. In the *Chuck–Home Offset* box, enter the assigned number of the chuck spinner that is located at the Gun 1 spray position. If the above recommendation is followed, this is set to *1*.

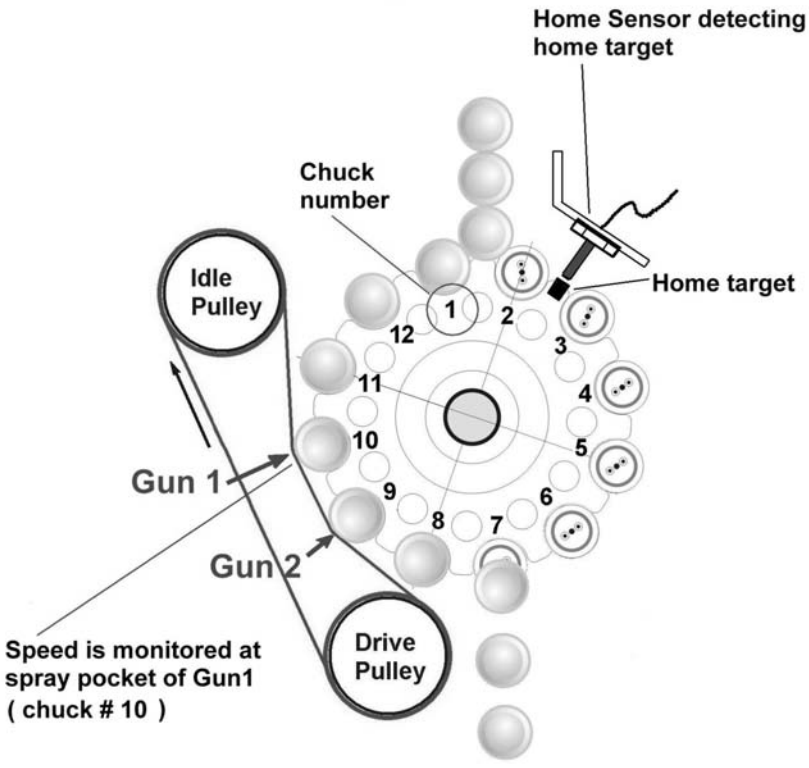

Figure 8 Starwheel in Home Position (with chuck number 10 in speed-monitor position)

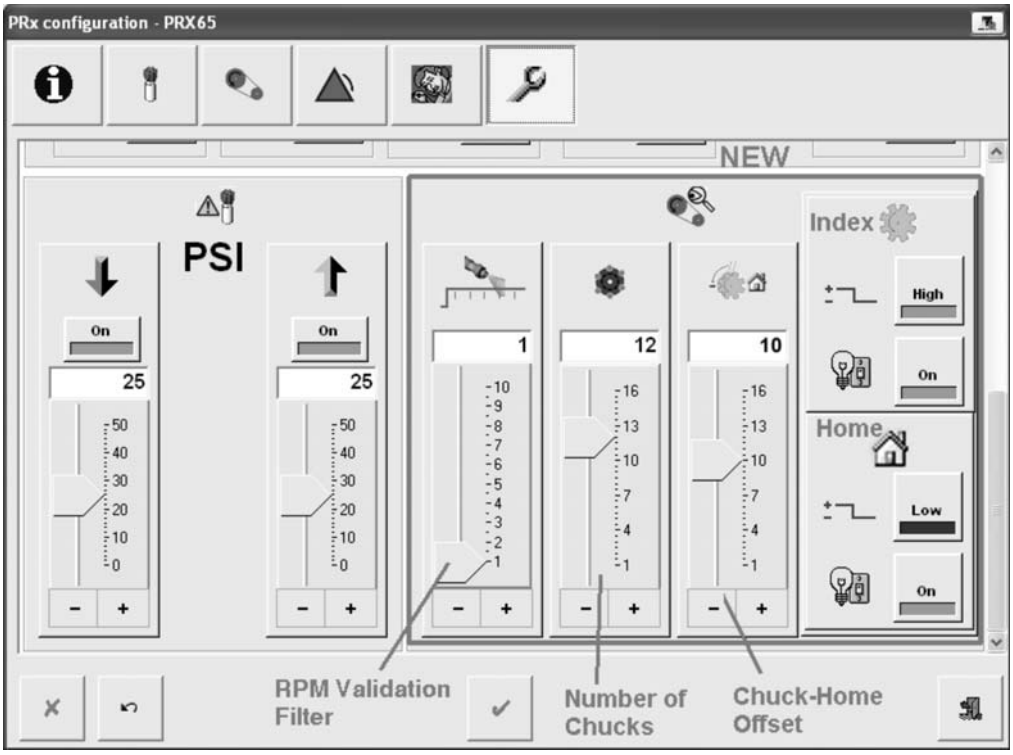

Figure 9 PRx II Configuration Service Screen (for the case in Figure 8)

Configuring Spin Speed for PRx II Alarms

To be sure that the alarms correspond with the correct readings at a chuck spinner, the *RPM Validation Filter* (shown in Figure 9) allows the PRx II module to differentiate between readings that are taken before the chuck spinner has had enough time to reach the desired spin speed. The *RPM Validation Filter* defines which RPM measurement is the first to be accepted and applied to the alarm criteria during the spray duration. The *RPM Validation Filter* number and all the readings following that number for the duration of the spray cycle are applied against the alarm criteria.

The readings displayed through the *Speed Detail* screen are also affected by the setting for the *RPM Validation Filter.*

Figure 10 shows the speed related events of a typical cycle using the *RPM Validation Filter.* In this example, the desired speed is 2000 RPM, with speed readings happening every 15 msec where the third reading is chosen as the first acceptable reading.

To find the correct *RPM Validation Filter* number for your application, begin at the number 1 and monitor readings as the spray equipment is in operation. Adjust the number as needed. The time that it takes for a first reading and the time between the readings can vary depending on where the targets are located when entering the spray pocket and the speed of the chuck spinners.

If no RPM measurement is made or accepted during a spray cycle the iTRAX system will generate a speed alarm with a fault value of 1. In this case, either the *RPM Validation Filter* is set too high (speed cannot be measured) or repair of the spray equipment is required.

NOTE: The user must decide whether the speed performance is acceptable to the spray process. The iTRAX Spin Speed feature is a speed monitoring system, and not a speed control system. Process parameters such as spray delay, duration, can RPM, or line speed may need to be changed to produce an acceptable spray operation on the coated product.

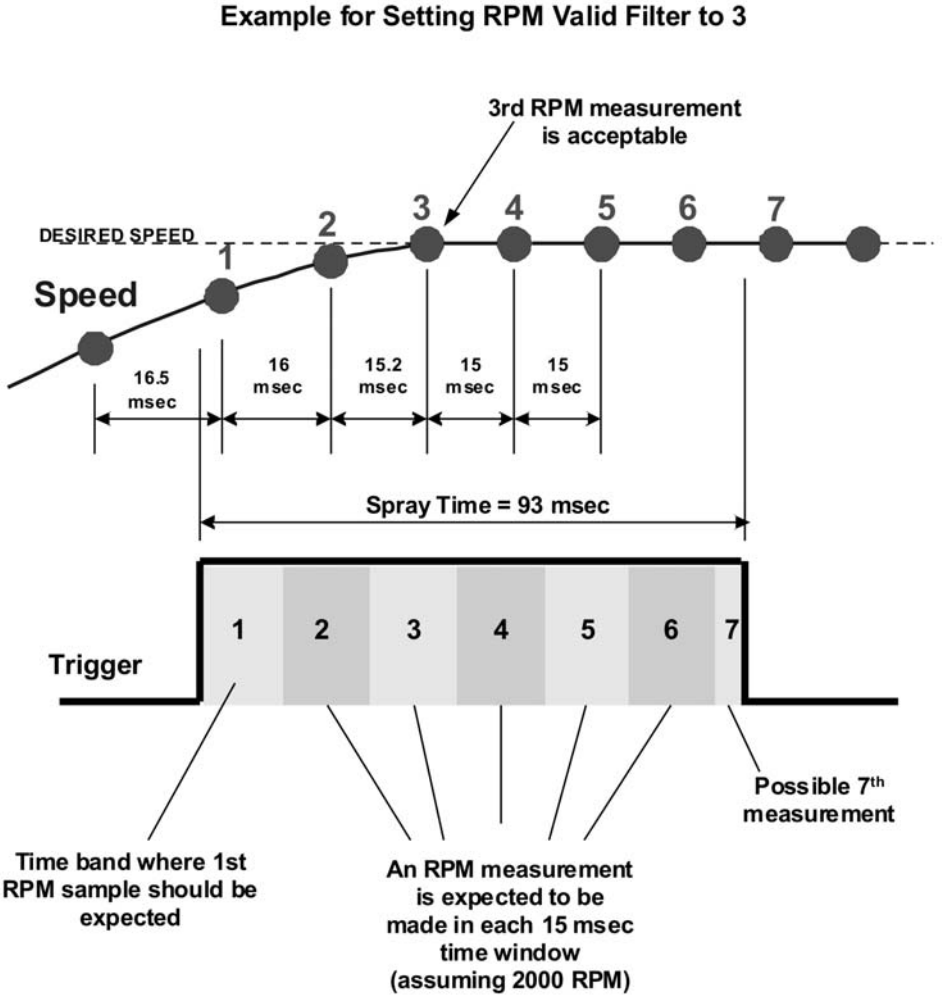

Figure 10 Related Speed Events for Spray Time with the RPM Validation Filter

Sources of RPM Error

The optimal number of targets for detecting spin speed is two. Changing the number of targets affects the accuracy range. Table 3 shows the range needed to keep the accuracy to +/– 1 RPM as the number of targets change.

NOTE: Having only one target may introduce mechanical balancing or vibration issues.

Table 3 PRx II Module Pinouts

Number of Targets	Range (RPM)
1	500 – 3800
2	250 – 2800
3	200 – 2400
4	150 – 1900

Repair

Rebuilding the iTRAX Pressure Regulator

See Figures 11.

Replacing the Diaphragm

1. Remove the pressure control assembly, the transducer kit (3), and other input/output port fittings from the fluid regulator kit (2).
2. Remove the back cap assembly (16) from the regulator body (15). The back cap assembly (16) contains the spring loaded ball valve (19 and 18). Use parts in fluid regulator rebuild kit (2) to rebuild the back cap assembly (16).
3. Use a marker to indicate the relative alignment of the bonnet ring (8), inside bonnet (8), and regulator body (15).
4. Grab the flats on the bonnet ring (8) with a wrench or vice, and loosen the regulator body (15).
5. Remove the regulator body (15) to expose the diaphragm assembly (12). Replace if necessary.
6. Re-assemble (in reverse sequence).
7. Perform a leak test on the loader nipple. (See page 33 for *the Loader Nipple Leak Test* procedure.)

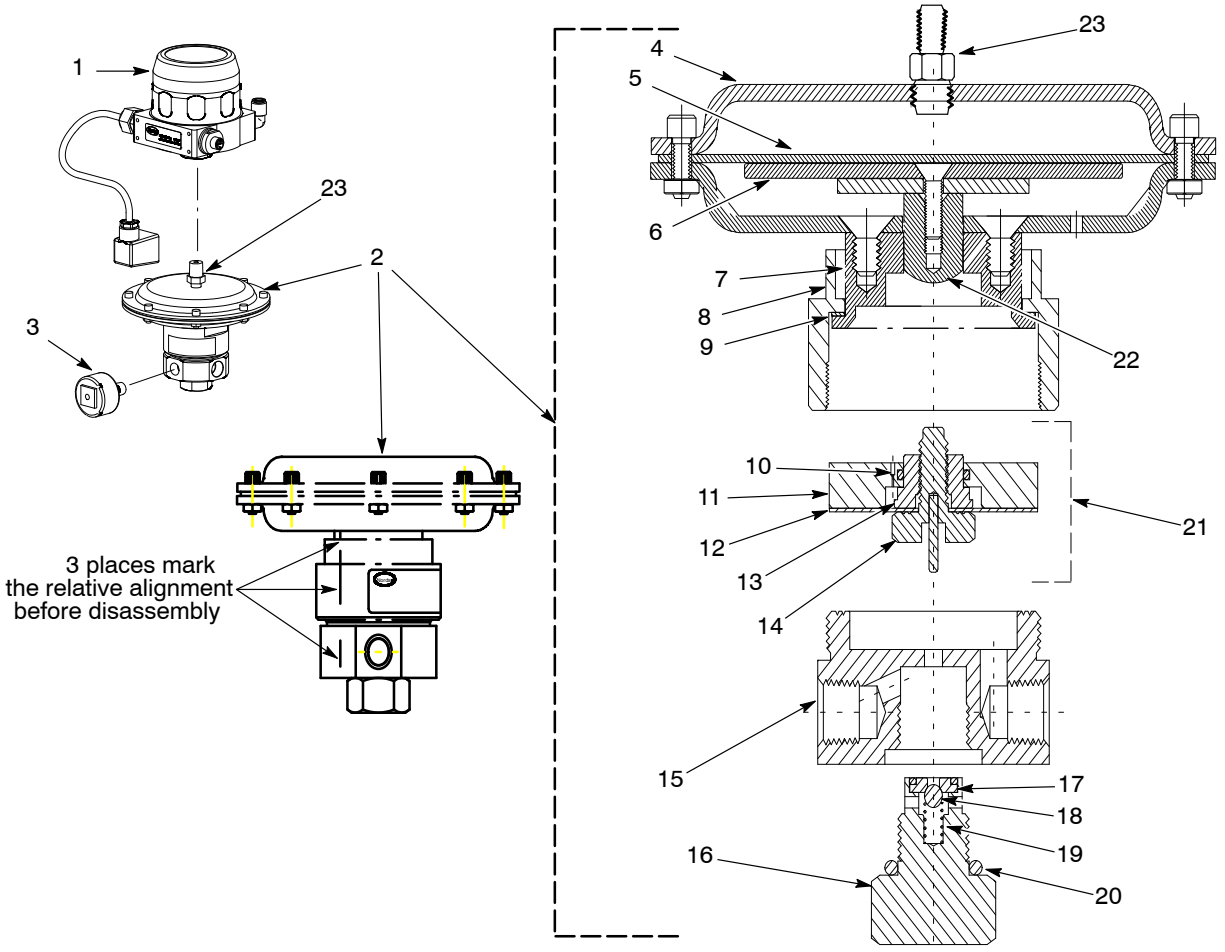

Figure 11 Pressure Regulator

1. Pressure Controller
2. Fluid Regulator Kit
3. Transducer Kit
4. Diaphragm Upper Shell
5. Rubber Diaphragm
6. Diaphragm Piston Assembly
7. Adapter Cap
8. Bonnet Ring
9. Brass Washer
10. O-Ring PTFE
11. Spacer
12. Diaphragm
13. Locknut Button
14. Diaphragm Assembly Button
15. Regulator Body
16. Back Cap Assembly
17. Seat
18. Ball
19. Spring
20. O-Ring PTFE
21. Diaphragm Replacement Kit
22. Hi-Temperature Lubricant
23. Loader Nipple

Note: The Maintenance Kit includes items 10, 12, and 20.
The Fluid Regulator Kit includes items 10, 12, 17, 18, 19, and 20.
The Diaphragm Replacement Kit includes items 10, 11, 12, 13, 14, and 22.
Apply a thin uniform coating of lubricant (item 22) onto pneumatic plunger before inserting the diaphragm replacement kit into the regulator's bonnet ring (item 8).

Replacing the Servo Valves

CAUTION: All electrical power, air pressure, and fluid pressure must be removed from the regulator before beginning the procedure for replacing the servo valves.

1. Remove the top cover of the pressure controller by unscrewing it from the threads and the O-ring seal.

CAUTION: Exercise proper ESD grounding practices when handling the circuit boards.

2. Remove the two circuit boards from the pressure controller.
3. See Figure 12. Use a hex socket key (Allen key) to remove the screws mounting the valves and remove both servo valves.

NOTE: Before installing the new servo valves, verify that the mounting surface is clean, which provides an O-ring seal.

4. Mount the new valves with the screws, paying attention to the orientation of the contact pins, seen in Figure 12. The contact pins must be in the proper place to properly reconnect to the circuit board.
5. Reassemble the circuit boards and screw the top cover back on the pressure controller with the O-ring seal.

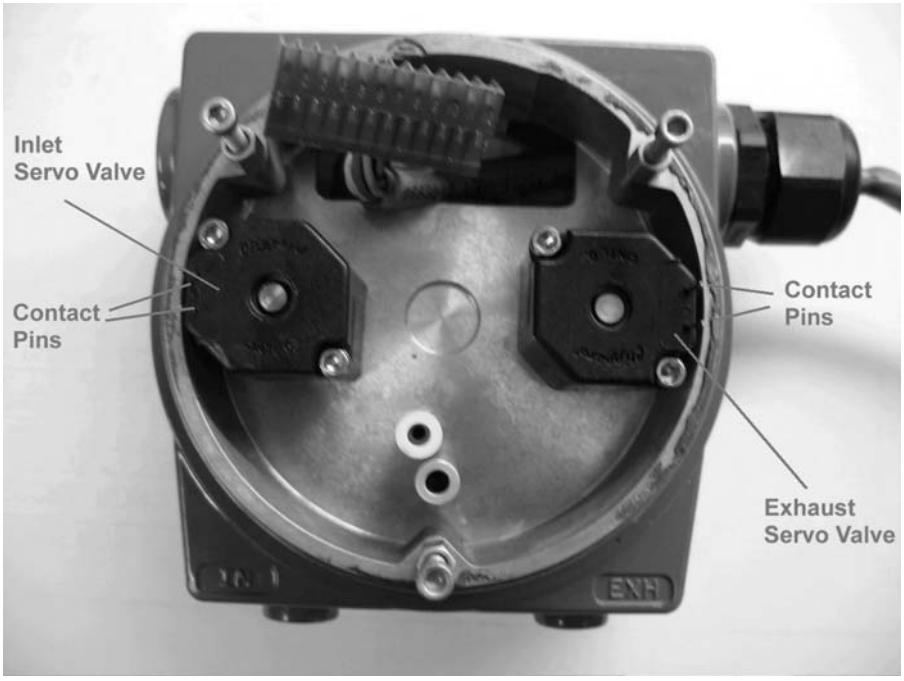

Figure 12 Servo Valves in Pressure Controller

Troubleshooting

Loader Nipple Leak Test

See Figure 13.

The loader nipple (23) should be checked for air leaks after the pressure regulator has been installed or handled for maintenance purposes. The loader nipple connects the controlled air pressure generated by the pressure controller (via the inlet and exhaust servo valves) to the rubber diaphragm (5). The loader nipple is the pneumatic mechanism which physically moves the diaphragm assembly button (14) of the fluid regulator.

Use the following procedure to perform a leak test around the loader nipple.

1. While the pressure regulator is in operation, apply a few drops of liquid leak detector (soapy water) to the threaded sections of the loader nipple (23). If any bubbles appear in these areas continue on to *Step 2*.
2. Shut off any supply pressure (air and fluid) to the regulator. Shut down power to the pressure controller.
3. Remove the pressure controller (1) and the loader nipple (23) from the fluid regulator (2).
4. Apply a thin uniform coat of thread sealant to both the pipe and straight threads of the nipple. Then, apply PTFE tape over the coated threads, followed by another thin coat of pipe sealant.

   NOTE: This method minimizes the chance of the PTFE tape shredding and contaminating the pneumatic section.

5. Tighten the nipple (pipe thread side) into the pressure controller (1) first, then thread the pressure controller (with the loader nipple) into the fluid regulator (2) until it is hand-tight. Do not over tighten.
6. Remount the pressure regulator, taking care not to put any stress on the nipple.

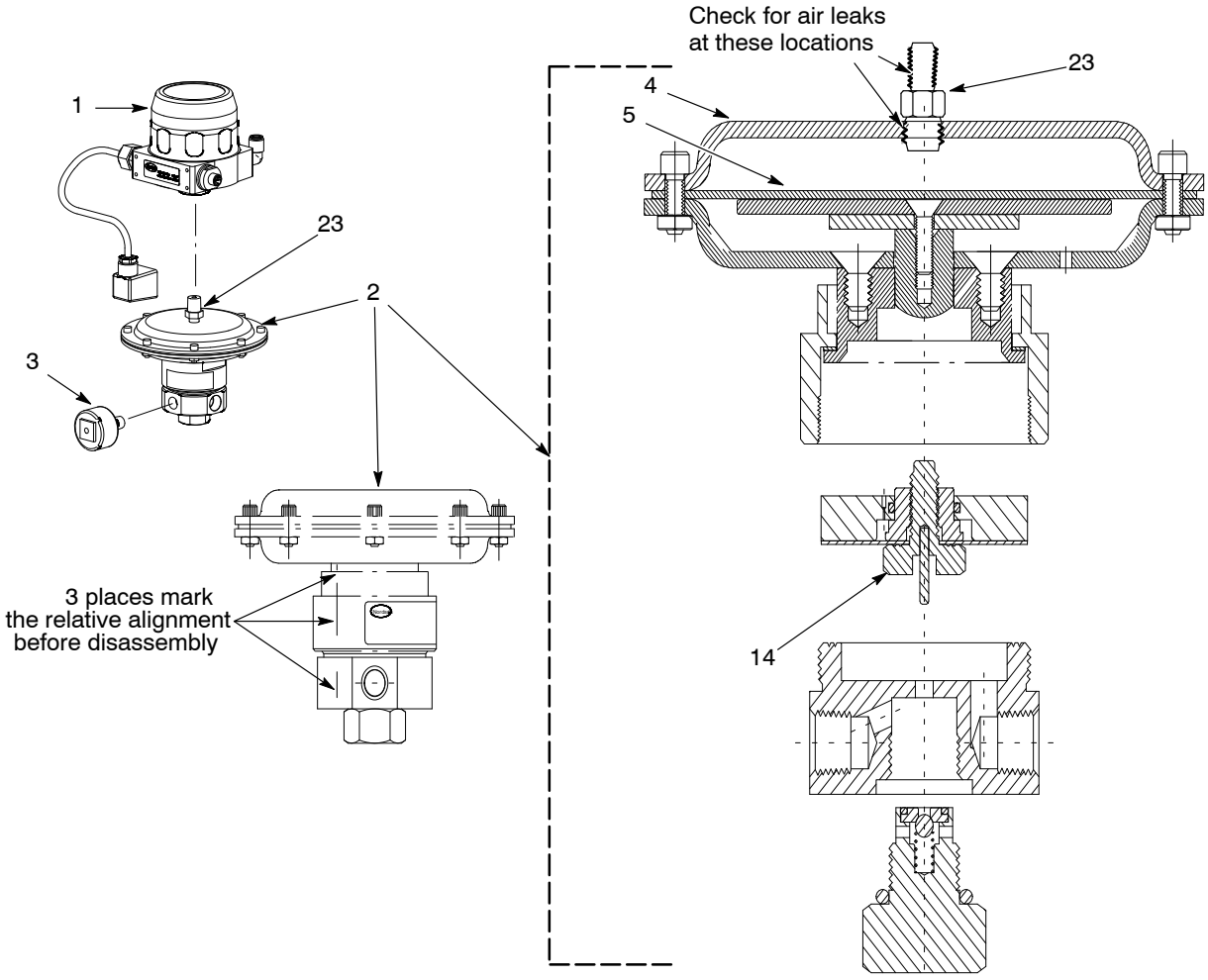

Figure 13 Pressure Regulator

1. Pressure Controller
2. Fluid Regulator
5. Rubber Diaphragm
14. Diaphragm Assembly Button
23. Loader Nipple

Servo Valve Leak Test

The two pneumatic servo valves of the pressure controller should be periodically checked for air leaks, especially after two years of accumulated usage, and/or if increasingly erratic pressure control is observed.

The servo valve leak test requires the ER3000 Software Utility, which is available from your Nordson container specialist.

Test Preparations

Complete the following tasks before beginning the leak test.

1. Complete the *Loader Nipple Leak Test* to make sure there is no loader nipple leak.
2. Check that the pressure controller is connected to +24 Vdc power, and connected through the RS485 to a laptop running Windows 2000, XP, Vista, or Windows 7. This step assumes that the RS485 interface is configured and functional.
3. Check that the air pressure applied to the inlet of the pressure regulator is between a minimum of 95 PSI and a maximum of 100 PSI.

Configure Windows ER3000 Application

1. Start the Windows ER3000 application.
2. See Figure 14. At the main menu, drop down the *Windows* menu, and select *Tuning.*

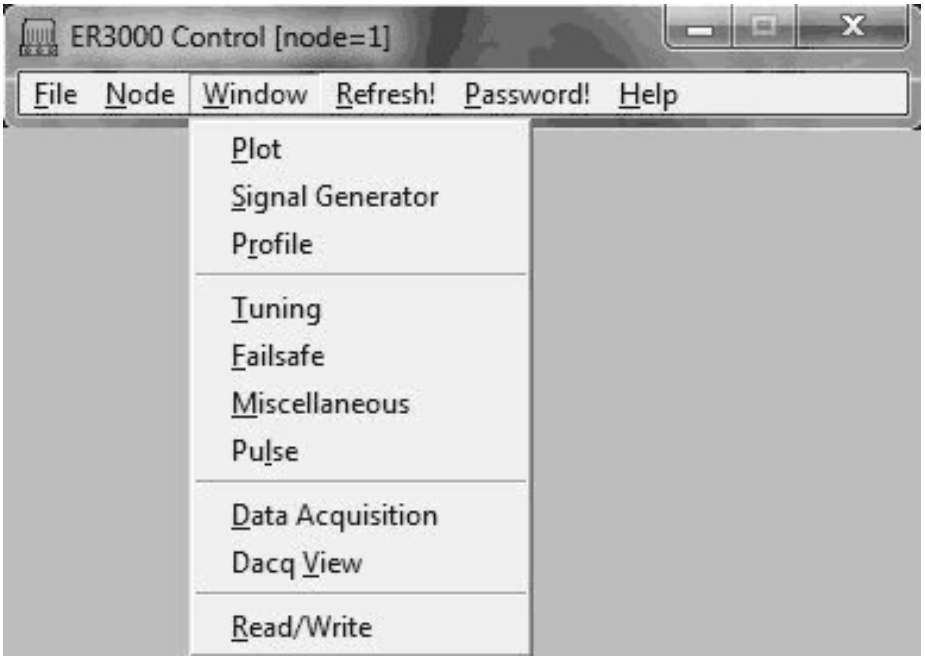

Figure 14 Window Drop Down Menu

3. See Figure 15. In the *Tuning* window, adjust the setting as follows:
   Control Mode: Manual
   Sensor Range Minimum: 0
   Sensor Range Maximum: 100
4. Close the *Tuning* window. From the *Windows* menu select *Signal Generator*.
5. In the *Signal Generator* window, adjust the settings as follows:
   Signal Type: Toggle
   Setpoint 1 (PSI): 0
   Setpoint 2 (PSI): 50
6. Leave the *Signal Generator* window open. From the *Windows* menu, select *Miscellaneous.*

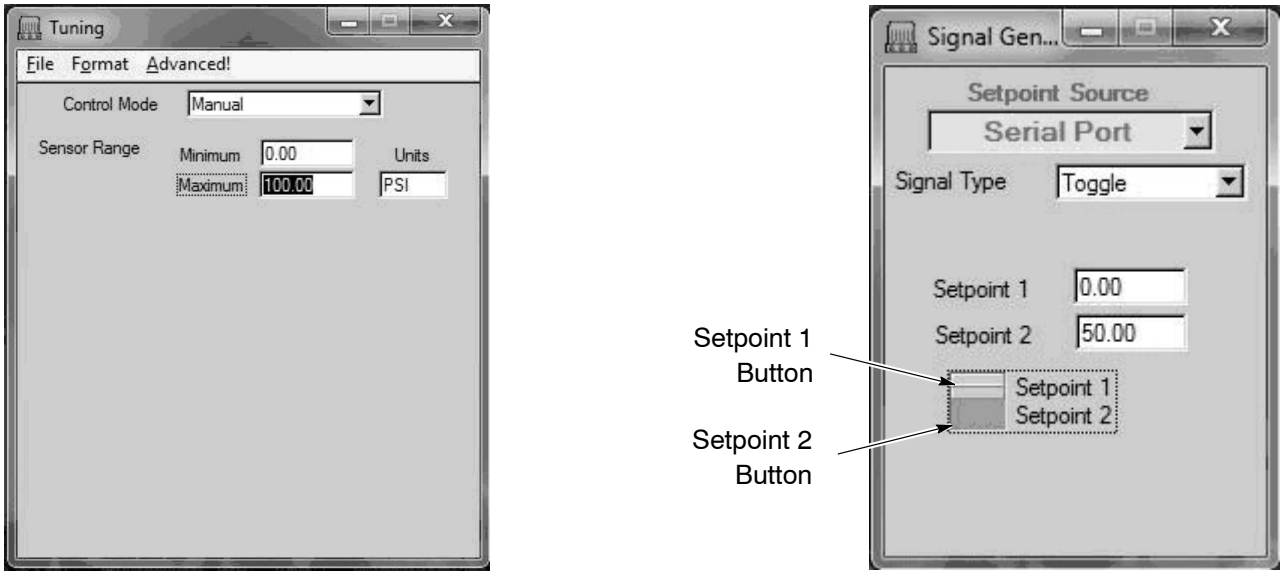

Figure 15 Tuning and Signal Generator Windows

7. See Figure 16. In the *Miscellaneous* window, adjust the settings as follows:
   Span: 100
   Zero: 0

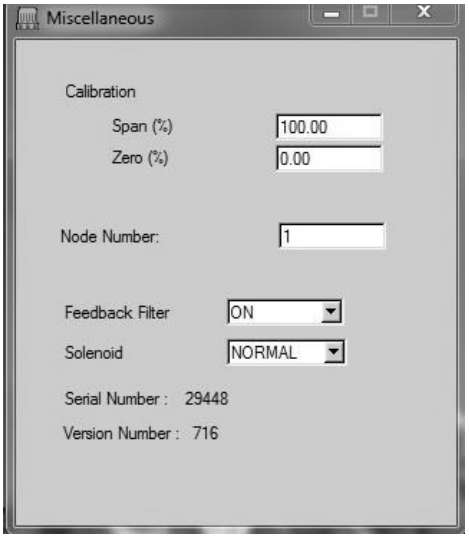

Figure 16 Miscellaneous Window

8. Close the *Miscellaneous* window. From the *Windows* menu, select *Plot*. Then, select *Axis* from the menu bar.
9. In the *Axis window*, configure the axis settings as follows:
   Axis Time (seconds): 10
   Vertical Axis Minimum: –5
   Vertical Axis Maximum: 105
10. Close the *Axis* , but leave the *Plot* window open.

Running the Servo Valves Leak Test

NOTE: Before running the servo valve leak test, the procedures under *Test Preparations* must be completed.

NOTE: See Figure 17. The dotted red line in the graph is the setpoint value, and the yellow line is the actual feedback value. A solid red vertical line sweeps across the *Plot* window acting as a time cursor.

1. With the *Signal Generator* and *Plot* windows in view, click on the *Setpoint 1* button in the *Signal Generator* window (see Figure 15), and wait until the feedback reaches 0 (PSI).
2. Click on the *Setpoint 2* button. Then, in the *Plot* window (see Figure 17, observe the feedback plot, represented by the yellow line, for 25 seconds, and verify that it remains at 0.
3. If there is any at all in the feedback plot then it means the inlet servo valve is leaking.
4. Next, in the *Signal Generator* window, change the *Setpoint 1* value to 90 (PSI).
5. Click on the *Setpoint 1* button in the *Signal Generator* window. The feedback value will now rise and stabilize after about ten seconds at the 90 PSI level. Verify that the pressure (the red line) in the *Plot* window has stabilized before proceeding.
6. Click on the *Setpoint 2* button in the *Signal Generator* window. Observe the feedback plot for 25 seconds and verify that it remains at 90. If there is any decrease in the feedback plot it means the exhaust servo valve is leaking.
7. If either of the servo valves have tested positive for leaks, both should be replaced. Use the procedure for *Replacing Servo Valves* on page 31 to replace the servo valves.

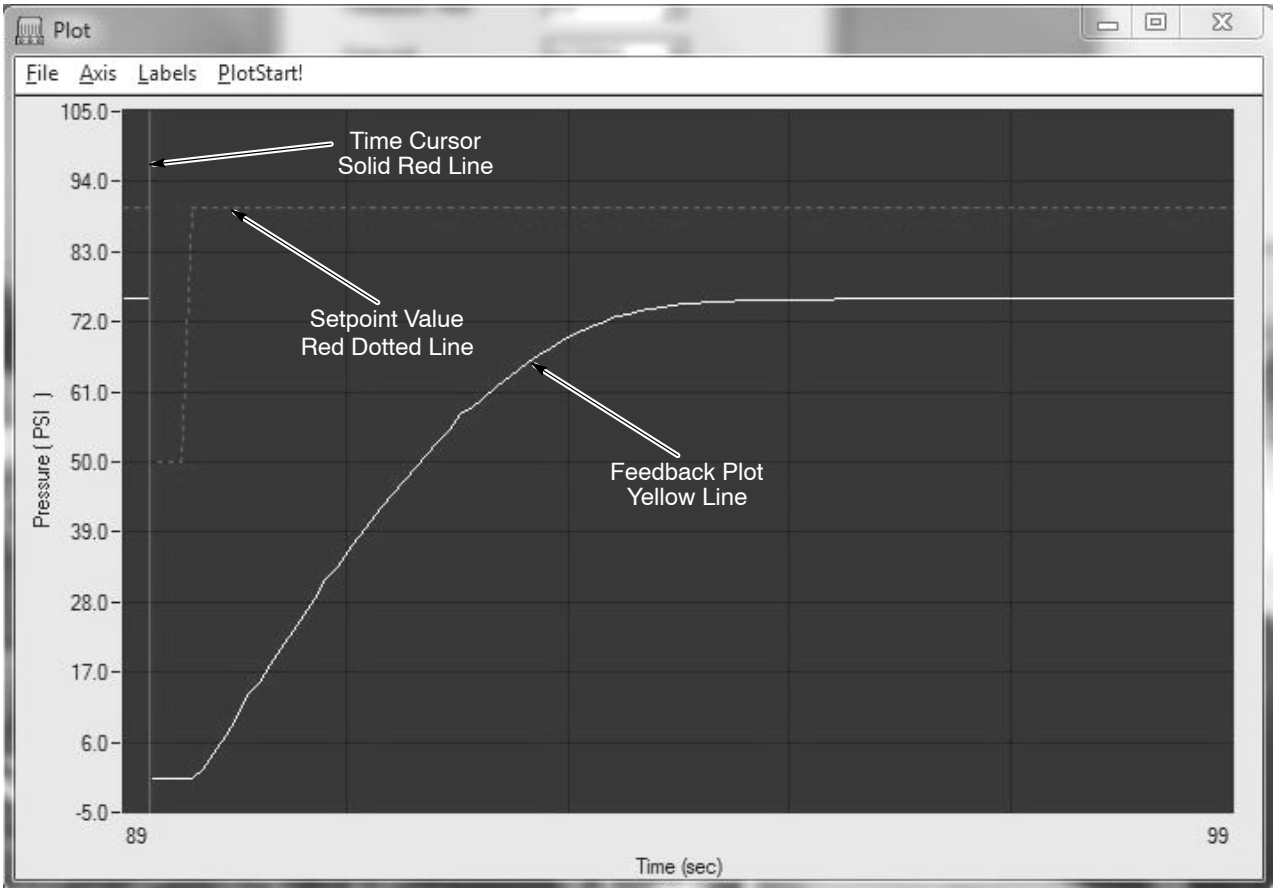

Figure 17 Plot Window

Parts

To order parts, call the Nordson Finishing Customer Support Center at (800) 433-9319 or contact your local Nordson representative.

Using the Illustrated Parts List

Numbers in the Item column correspond to numbers that identify parts in illustrations following each parts list. The code NS (not shown) indicates that a listed part is not illustrated. A dash (—) is used when the part number applies to all parts in the illustration.

The number in the Part column is the Nordson Corporation part number. A series of dashes in this column (- - - - - -) means the part cannot be ordered separately.

The Description column gives the part name, as well as its dimensions and other characteristics when appropriate. Indentions show the relationships between assemblies, subassemblies, and parts.

- If you order the assembly, items 1 and 2 will be included.
- If you order item 1, item 2 will be included.
- If you order item 2, you will receive item 2 only.

The number in the Quantity column is the quantity required per unit, assembly, or subassembly. The code AR (As Required) is used if the part number is a bulk item ordered in quantities or if the quantity per assembly depends on the product version or model.

Letters in the Note column refer to notes at the end of each parts list. Notes contain important information about usage and ordering. Special attention should be given to notes.

Item	Part	Description	Quantity	Note
—	0000000	Assembly	1	
1	000000	• Subassembly	2	A
2	000000	• • Part	1	

PRx II Module Parts

Part	Description	Quantity	Note
1107573	CONTROL, module, iTRAX PRx II	1	C
1602475	CABLE ASSEMBLY, pressure regulator, 3-m	1	H
1077062	• CONNECTOR, cordset	1	F
1079965	PRESSURE TRANSDUCER, 160, RTD, W/INTNL AMPL, 0–1000	1	D
1080102	MODULE, gateway CAN-to-CAN network	1	A, D
1084971	KIT, card,interface, Profibus	1	D, G
1084972	KIT, card, interface, Ethernet	1	D, G
1600544	KIT, card, interface, DeviceNet	1	D, G
1079966	DISPLAY, Remote LED	1	
1602371	PRESSURE CONTROLLER ASSY, iTRAX	1	C
1078125	KIT, clamp plate assembly, mounting bracket, hardware	1	
1080570	FILTER, regulator, gauge, assembly	1	
900619	TUBING, polyurethane, 8 mm OD, blue	AR	B
1065268	MODULE, Spray Monitor, iTRAX	1	C
1083541	CONTROLLER, Spray Controller, iTRAX	—	D
1092056	SENSOR, proximity, M8, sensor range, 2mm	1	E
1098326	SENSOR, proximity, M12, sensor range, 4mm	1	E
1092055	CABLE, 3-pin Picofast, 6M, 24 AWG, female	1	E

NOTE A: For networks running more than 63 nodes, a CAN-to-CAN gateway is recommended to expand the CAN network node capacity. Contact your Nordson Container representative for more information.

B: Order in increments of one foot.

C: Required for Pressure Control.

D: Optional Part available through Nordson.

E: Required for speed monitor feature. Contact Nordson representative.

F: For pressure controller.

G: For PRx II module.

H: Includes cable and connector.

AR: As Required

Pressure Controller Assembly

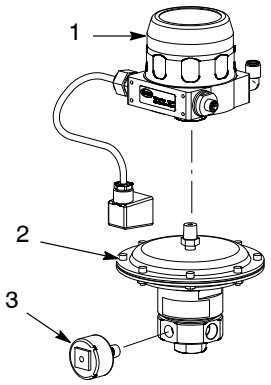

Figure 18 Pressure Controller Assembly

Item	Part	Description	Quantity	Note
–	1602371	PRESSURE controller assembly, iTRAX	1	
1	1077142	• PRESSURE controller, without fluid regulator	1	
2	1077143	• KIT, fluid regulator, iTRAX	1	A, B, C
3	1077144	• KIT, transducer	1	
NS	1600439	VALVE, solenoid, control, 12Vdc, PCB mounted	2	

NOTE A: Maintenance kit 1079150 includes O-rings, diaphragm, and instructions. See Figure 11 on page 30.

B: Fluid regulator kit 1079151 includes O-rings, diaphragm, ball, seat, spring, and instructions. See Figure 11 on page 30.

C: Order kit 1091710 for the complete, pre-tested diaphragm replacement kit. See item 21 in Figure 11 on page 30.

DECLARATION of CONFORMITY

PRODUCT: iTRAX Spray Control, iTRAX PRx, and NC-1 control units for the Container Product Line

Models: iTRAX Series modules and NC-1 module

Description:
iTRAX Spray Control – used as a timer / driver module for Container Applicators.
iTRAX PRx – electrically controls pressure, monitor coating material temperature, monitors speed
NC-1 – used as a driver module for Container Applicators.
These three units all have the same hardware but different software.

Applicable Directives:

2006/42/EC – Machinery Directive
2006/95/EC – Low Voltage Directive
2004/108/EEC – Electromagnetic Compatibility Directive

Standards Used for Compliance:

EN60204 (2006)	EN55011 (2010)
ANSI/ISO 12100–1 (2012)	EN6100–6–2 (2005)

Principles:

This product has been manufactured according to good engineering practice.
The product specified conforms to the directive and standards described above.

Certificates:

DNV – ISO9001:2008 (Houston, Texas, USA)

Date: 07 February 2013

Justin Hall
Engineering Manager
Industrial Coating Systems

NORDSON AUTHORIZED REPRESENTATIVE IN THE EU:
Person authorized to compile the relevant technical documentation.

Contact: Operations Manager
Industrial Coating Systems
Nordson Deutschland GmbH
Heinrich–Hertz–StraBe 42–44
D–40699 Erkrath