

**900 Series  
Industrial  
Ethernet  
Switch**

**Installation  
Guide**

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*Industrial Ethernet Switch Installation Guide*

**900B/900N**

**908TX**

**904FX**

**904FXE**

**902FX**

**902FXE**





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### **Warning**

Do not perform any services on the unit unless qualified to do so.  
Do not substitute unauthorized parts or make unauthorized modifications to the unit.  
Do not operate the unit with the top cover removed, as this could create a shock or fire hazard.  
Do not block the air vents on the sides or the top of the unit.  
Do not operate the equipment in the presence of flammable gasses or fumes. Operating electrical equipment in such an environment constitutes a definite safety hazard.

# Safety Warnings

## ELECTRICAL SAFETY



**WARNING:** Disconnect the power cable before removing the enclosure top.

**WARNING:** Do not operate the unit with the top cover removed.

**WARNING:** Do not work on equipment or cables during periods of lightning activity.

**WARNING:** Do not perform any services on the unit unless qualified to do so.

**WARNING:** Do not block the air vents.

**WARNING:** Observe proper DC Voltage polarity when installing power input cables. Reversing voltage polarity can cause permanent damage to the unit and void the warranty.

## LASER SAFETY (904FXE and 902FXE Only)



**WARNING:** CLASS 1 Laser Product.

**WARNING:** Do not stare into the Laser Beam.

## 900 Series Hazardous Location Installation Requirements

1. **WARNING:** EXPLOSION HAZARD. DO NOT DISCONNECT UNIT WHILE CIRCUIT IS LIVE, UNLESS KNOWN TO BE NON-HAZARDOUS.
2. **AVERTISSEMENT:** RISQUE D'EXPLOSION. NEPAS DE'BRANCHER TANT QUE LE CIRCUIT EST SOUS TENSION, A'MOINS QU'IL S' A GISSE D'UN EMPLACEMENT NON DANGEREUX.
3. **WARNING:** Install only in accordance with Local & National Codes of Authorities Having Jurisdiction.
4. Power must be supplied by an isolating source, and a 3.3A max rated UL recognized fuse must be installed immediately before the unit.
5. Class I, Div 2 installations require that all devices connected to this product must be UL approved for the area in which it is installed.
6. Only UL approved wiring with temperature ratings greater than 90°C permitted for Class I, Div 2 installations operating at temperatures up to 70°C ambient.
7. Limited Operating Voltage: 12-30V for Class I, Div 2 installations.

## **900 Series Industrial Ethernet Switches**

The 900 Series Modular Industrial Ethernet Switches support high speed layer 2 switching between ports. The 900B and 900N enclosures contain a three slot backplane that supports up to three modules. The 908TX, 902FX and 904FX modules are the available modules. The N-TRON Corp. 900B is housed in a ruggedized steel enclosure, and can withstand industrial temperatures, as well as extreme shock & vibration.

The 908TX is an 8 port module that is capable of auto negotiating 10/100 Mb and half/full duplex communications. The N-TRON 908TX also supports MDIX auto sensing (for auto connect of straight through or crossover cables) and provides 8 Category 5 compliant 10/100-BaseT connections for high performance network design, and hub/repeater upgrades.

The 902FX is a two port 100Mb module, that supports multimode fiber. ST and SC connectors are available.

The 902FXE is a single mode (laser) version of the 902FX, and can support distances of up to 80km.

The 904FX and 904FXE are four port versions of the 902FX and 902FXE respectively.

All 900 Series Units operate on 10-30VDC (1A @ 24V, 2A Surge)

### **Key Features**

- Full IEEE 802.3 & 100BASE-FX Compliance
- Extended Environmental Specifications
- Support for Full/Half Duplex Operation
- LED Link/Activity Status Indication
- Auto Sensing Speed and Flow Control
- Auto MDIX (908TX only)
- Up to 4.8 Gb/s Maximum Throughput
- Industry Standard DIN-Rail Enclosure

## PACKAGE CONTENTS

Please make sure the Ethernet Switch package contains the following items:

1. 900 Series Ethernet Switch
2. Installed Modules
3. This Installation Guide

Contact your carrier if any items are damaged.

## INSTALLATION

Read the following warning before beginning the installation:

### WARNING



The 902FXE and 904FXE unit contain a class 1 laser. Do not stare into the laser beam (fiber optic connector) when installing or operating the product.



Never install or work on electrical equipment or cabling during periods of lightning activity.

Disconnect the power cable before removing the enclosure top.

Do not operate the unit with the top cover removed

### UNPACKING

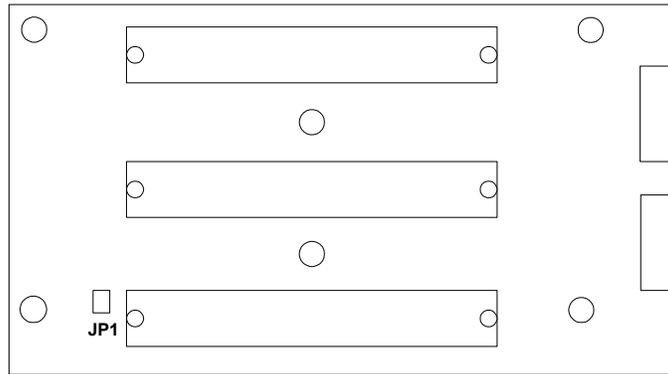
Remove all the equipment from the packaging, and store the packaging in a safe place.

File any damage claims with the carrier.

## 902FX/FXE & 904FX /FXE HALF DUPLEX SETUP (Rev. B modules Only)

Rev. B 900 series fiber modules are factory configured for full duplex operation. The setting is controlled by jumper JP1 on the backplane. Note: Most 100Mbit fiber systems will be compatible with this Full Duplex setting. If Half Duplex operation is desired, then follow these steps using proper wrist strap grounding techniques:

1. Remove the power & power plugs from the unit.
2. Loosen all thumbscrews & remove all modules.
3. Remove the six screws holding the backplane.
4. Remove the backplane.
5. Move the jumper JP1 from position 1-2 to 3-4
6. Re-install the backplane & modules & power plugs.



Rev. C & D boards are hard wired for Port 1 HDPLX, Port 2-4 FDPLX  
Rev. E boards are hard wired for ports 1-4 FDPLX

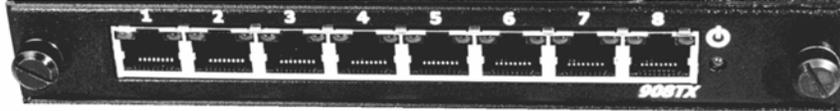
### DIN-Rail Mounting

Install the unit in a standard Din-Rail. Recess the unit to allow at least 3" of horizontal clearance for fiber optic cable bend radius and for TX models. The Din-Rail mount is reversible to allow pressure up or pressure down for Din-Rail insertion/removal, and it is removable for panel mounting.

### 19" Rack Mounting

19" Rack mount kits are available. Please consult the factory for price & availability.

## 908TX Module



**From Left to Right:**

**RJ45 Ports**            Ports 1-8 Auto sensing 10/100 BaseT Ports  
**Upper Left LED**       Port Link Status  
**Upper Right LED**      Port Activity Status  
**⏻**                            Green LED lights when Power is connected

**Note:** At power cycle, all LED's flash on for approximately two seconds, and then return to proper state.

**LED's:** The table below describes the operating modes:

LED	Color	Description
⏻	GREEN	Power is Applied
	OFF	Power is OFF
LNK	GREEN	Link between ports established
	OFF	No Link between ports
ACT	GREEN	Data is active between ports
	OFF	Data is inactive between ports

### 908 Module Jumpers Settings

**JP1**    install jumper in location 1-2 when 1 or 2 modules installed  
          install jumper in location 3-4 when 3 modules installed

**JP2**    install jumper in location 1-2 when 1 module installed  
          install jumper in location 3-4 when 2 or 3 modules installed

**902/904 FX & FXE Module**



**From Left to Right:**

- TX** Fiber Optic Transmit Port
- RX** Fiber Optic Receive Port
- LNK** Link LED (top LED) for Fiber Optic Port
- ACT** Activity LED (bottom LED) for Fiber Optic Port
- ⏻** Green LED lights when Power is connected

**Note:** At power cycle, only the LED's on the first port flash on to indicate the reset condition, and then return to their proper state. All other reports remain off during reset. This is normal behavior.

**LED's:** The table below describes the operating modes:

LED	Color	Description
⏻	GREEN	Power is Applied
	OFF	Power is OFF
LNK	GREEN	Link between ports established
	OFF	No Link between ports
ACT	GREEN	Data is active between ports
	OFF	Data is inactive between ports

**902/904 Module Jumpers Settings**

- JP1** install jumper in location 1-2 when 1 or 2 modules are installed  
install jumper in location 3-4 when 3 modules are installed
- JP2** install jumper in location 1-2 when 1 module are installed  
install jumper in location 3-4 when 2 or 3 modules are installed

## MODULE LOCATION

Modules must be installed in slot order. In a single module system, the module must be installed in the top slot. In a two module system, modules must be installed in the top two slots. Empty (unused) slots must be covered with blank 900B front panels to meet emission standards.

## APPLYING POWER

1. Unscrew the flange & Remove the DC Voltage Input Plug(s) from the side headers.
2. Install the DC Power Cables into the Plug(s) (observing polarity).
3. Plug the Voltage Input Plug(s) back into the side header. All 10/100 BaseT LED's will flash ON Momentarily. For fiber optic ports, only port 1 will flash momentarily.
4. Verify the Power LED stays ON (GREEN).

**Note:** Only 1 plug must be connected to power for minimal operation. For redundant power operation, V<sub>1</sub> and V<sub>2</sub> plugs must be connected to separate DC Voltage sources. Use wire sizes 16-28 guage.

Recommended 24V DC Power Supplies, similar to

120/240VAC:

Puls Engineering ML70.100  
24VDC at 3 A 0-70C

## CONNECTING THE UNIT

For 902 & 904 FX & FXE units, remove the dust cap from the fiber optic connectors and connect the fiber optic cables. The TX port on the 902 and/or 904 units should be connected to the RX port of the far end station. The RX port on the 902 and/or 904 units should be connected to the TX port of the far end station.

For 10/100 Base-TX ports, plug a Category 5 twisted pair cable into the RJ45 connector. Connect the other end to the far end station. Verify that the LNK LED's are ON once the connection has been completed. For Switch to Switch or Switch to Repeater connections, since the 908TX supports the advanced MDIX function, there is no need to use crossover cables. The 908TX will sense & adapt accordingly.

## **TROUBLESHOOTING**

1. Make sure the  (Power LED) is ON.
2. Make sure the  (Error LED) remains OFF 3 seconds after initial power up.
3. Verify that Link LED's are ON for connected ports.
4. Verify straight through cabling used between stations.
5. Verify cabling (pin-outs & integrity).
6. Verify that cabling is Category 5 (or higher) for 100Mbit Operation.
7. Verify TX is connected to far end RX and vice versa (902 and 904 FX/FXE only).

## **SUPPORT**

Contact N-TRON Corp. at:  
TEL: 251-342-2164  
FAX: 251-342-6353  
[www.n-tron.com](http://www.n-tron.com)

## **FCC STATEMENT**

This product complies with Part 15 of the FCC-A Rules.

Operation is subject to the following conditions:

- (1) This device may not cause harmful Interference
- (2) This device must accept any interference received, including interference that may cause undesired operation.

## Key Specifications

### Physical

*Height:* 3.2" (8.13 cm)  
*Width:* 7.1" (18.03 cm)  
*Depth:* 4.1" (10.41 cm)  
*Weight:* ~3.0 lbs (2.3 kg)  
(note: can be mounted horizontally or vertically)

### Electrical

*Input Voltage:* 10-30 VDC (Redundant Inputs)  
*Input/Inrush Current:* 200/400mA@24V per backplane  
*Input/Inrush Current:* 250/500 mA@24V per 908TX module  
*Input/Inrush Current:* 400/800mA@24V per 902/904FX module

### Environmental

*Operating Temperature:* 0°C to 70°C (32°F to 158°F)  
*Storage Temperature:* -20°C to 85°C (-4°F to 185°F)  
*Operating Humidity:* 10% to 90%  
(Non Condensing)  
*Operating Altitude:* 0 to 10,000 ft.

### Shock and Vibration (Bulkhead Mounting)

*Shock:* 200g @ 10ms  
*Vibration:* 1g, 10-500Hz, 3 axis  
*Seismic:* 20g, 5-200Hz, 15s

### Reliability

*MTBF:* >1M Hours (measured)

### Network Media

*10BaseT:* Category 3,4,5 Cable  
*100BaseT:* Category 5 or higher Cable  
*100BaseFX:* 62.5/125µm Fiber @ 1300nm  
or 50/125µm Fiber @ 1300nm

### Fiber Transceiver Characteristics

(multimode/singlemode - 15km)

*Transmit Power:* -17/-3dBm (typical)  
*Receiver Sensitivity:* -33/-35dBm (typical)

**Recommended Wiring Clearance:**

Front: 2" (5.08 cm)  
 Side: 1" (2.54 cm)

**Key Specifications (Cont.)****Emissions and Safety Approvals:**

FCC Part 15 Class A, CE

Note: Shielded cables must be used to meet emission standards.

**Ordering Information**

<b><u>PN</u></b>	<b><u>Description</u></b>
900B	Industrial Ethernet switch chassis with 3 slots for optional expansion modules
900-RM	19" Rackmount Kit
908TX	Eight ports 10/100BaseTX (RJ45)
902FX-XX	Two ports 100BaseFX multimode fiber
902FXE-XX-YY	Two ports 100BaseFX singlemode fiber
904FX-XX	Four ports 100BaseFX multimode fiber
904FXE-XX-YY	Four ports 100BaseFX singlemode fiber
Where "XX" is:	ST for ST style fiber connector SC for SC style fiber connector
Where "YY" is:	15 for 15km max. fiber segment length 40 for 40km max. fiber segment length 80 for 80km max. fiber segment length

**Warranty**

One Year Parts & Labor

**Contact/Support Information**

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 820 S. University Blvd.  
 Suite 4E  
 Mobile, AL 36609  
 TEL (251) 342-2164  
 FAX (251) 342-6353  
 Website: [www.n-tron.com](http://www.n-tron.com)

## **N-TRON Limited Warranty**

N-TRON, Corp. warrants to the end user that this hardware product will be free from defects in workmanship and materials, under normal use and service, for the applicable warranty period from the date of purchase from N-TRON or its authorized reseller. If a product does not operate as warranted during the applicable warranty period, N-TRON shall, at its option and expense, repair the defective product or part, deliver to customer an equivalent product or part to replace the defective item, or refund to customer the purchase price paid for the defective product. All products that are replaced will become the property of N-TRON. Replacement products may be new or reconditioned. Any replaced or repaired product or part has a ninety (90) day warranty or the remainder of the initial warranty period, whichever is longer. N-TRON shall not be responsible for any custom software or firmware, configuration information, or memory data of customer contained in, stored on, or integrated with any products returned to N-TRON pursuant to any warranty.

**OBTAINING WARRANTY SERVICE:** Customer must contact N-TRON within the applicable warranty period to obtain warranty service authorization. Dated proof of purchase from N-TRON or its authorized reseller may be required. Products returned to N-TRON must be pre-authorized by N-TRON with a Return Material Authorization (RMA) number marked on the outside of the package, and sent prepaid and packaged appropriately for safe shipment. Responsibility for loss or damage does not transfer to N-TRON until the returned item is received by N-TRON. The repaired or replaced item will be shipped to the customer, at N-TRON's expense, not later than thirty (30) days after N-TRON receives the product. N-TRON shall not be responsible for any software, firmware, information, or memory data of customer contained in, stored on, or integrated with any products returned to N-TRON for repair, whether under warranty or not.

**ADVANCE REPLACEMENT OPTION:** Upon registration, this product qualifies for advance replacement. A replacement product will be shipped within three (3) days after verification by N-TRON that the product is considered defective. The shipment of advance replacement products is subject to local legal requirements and may not be available in all locations. When an advance replacement is provided and customer fails to return the original product to N-TRON within fifteen (15) days after shipment of the replacement, N-TRON will charge customer for the replacement product, at list price.

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