

# 716M12-HV Industrial Ethernet Switch

N-Tron Networking Series



## ▶▶▶ Fully Managed Industrial Ethernet Switch

The N-TRON® 716M12-HV Industrial Ethernet Switch offers outstanding performance and ease of use. With 16 10/100BaseTX M12 D-coded ports and high voltage capabilities, this fully managed switch is ideally suited for connecting Ethernet enabled devices in railway, industrial and security applications. It is designed to meet or exceed the operating parameters of the connected equipment. These include extended temperature ratings, extended shock and vibrations specs, redundant power inputs and high MTBF (greater than 2 million hours). The switch features a rugged IP67-rated enclosure for resistance to dust and wash immersion.

### PRODUCT FEATURES

- IP67-rated hardened metal enclosure
- Bulkhead mountable (optional DIN-rail mounting)
- Dustproof
- Protection against low/high pressure water jets
- Temporary immersion in water
- Sixteen 10/100BaseTX M12 D-Coded ports
- -40° C to 80°C operating temperature
- ESD and surge protection diodes on all ports
- Auto Sensing 10/100BaseTX, Duplex, and MDIX
- Store-and-Forward Technology
- Redundant power inputs (40-160 VDC)

### FULLY MANAGED FEATURES

- Full SNMP v1, v2, v3 and web browser management
- Detailed ring map and fault location charting
- N-Ring™ Technology with ~30ms healing
- N-Link™ redundant N-Ring coupling
- 802.1d, 802.1w, 802.1D RSTP
- N-View™ OPC Monitoring
- Plug-and-Play IGMP support
- 802.1Q tag VLAN and Port VLAN
- 802.1p QoS, Port QoS, DSCP
- EtherNet/IP™ CIP Messaging
- LLDP (Link Layer Discovery Protocol)
- Trunking
- Port mirroring
- DHCP Server, Option 82 relay, Option 61, IP Fallback
- Port Security—MAC address based
- Optional N-Tron auto configuration device for saving and restoring configuration. (P/N 700-NTCD-M12)



## 716M12-HV

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### REMOTE MONITORING

N-Tron provides multiple tools to monitor 716M12-HV switch activities. A convenient web-based interface is available to view and configure switch options, as well as to monitor network traffic, alarms and trend information. For tightly controlled environments, N-View OPC server software easily combines with HMI control and monitoring applications to form a complete surveillance solution for N-View-enabled switches. For local monitoring, each switch features configurable LEDs to indicate power failure and N-Ring status.

### N-RING TECHNOLOGY

Advanced N-Ring technology provides expanded capacity, detailed fault diagnostics and fast ~30ms healing times in rings composed of N-Tron fully managed switches. The integrity of the N-Ring is continually monitored for error conditions. If a fault is detected, the ring converts to a daisy chain topology and restores communications within ~30ms. For convenience, users can easily access a detailed ring map and fault location chart through the ring manager's browser or the OPC server. Each N-Ring accommodates up to 250 fully-managed N-Tron switches. N-Link easily connects multiple rings, creating additional pathways to critical applications and increasing overall network resiliency.

### INDUSTRIAL SPECIFICATIONS

Standard industrial product features include high MTBF, extended shock and vibration specifications, redundant power inputs and a wide operating temperature range.

### EASE OF USE

N-Tron's auto sensing capabilities allow all 10/100BaseTX ports to automatically negotiate maximum speed and performance. If preferred, ports can be hardcoded using the user interface. A high-speed processor enables simultaneous wire speed capability on all 100BaseTX ports.

## SPECIFICATIONS

### Switch Properties

Number of MAC Addresses: 8,000  
Aging Time: Programmable  
Latency Typical: 2.9  $\mu$ s  
Switching Method: Store & Forward

### Case Dimensions

Height: 6.7" (16.9 cm)  
Width: 6.7" (16.9 cm)  
Depth: 2.2" (5.6 cm)  
Weight: 4.6 lbs (2.3 kg)  
Din-Rail: 35 mm (with optional clips)

### Electrical

Redundant Input Voltage: 40-160 VDC  
Input Current (max): 73mA max @ 124 VDC  
BTU/hr: 30.9 @ 124 VDC  
N-Tron Power Supply: NTPS-24-1.3 (1.3A @ 24 VDC)

### Environmental

Operating Temperature: -40°C to 80°C  
Operating Humidity: 5% to 100% (Non Condensing)  
Operating Altitude: 0 to 10,000 ft.

### Shock and Vibration (bulkhead mounted)

Shock: 50g @ 10ms  
Vibration/Seismic: 30g, 10-200 Hz, triaxial

### Reliability

MTBF: >2 million hours

### Network Media

10BaseT:  $\geq$ Cat3 cable  
100BaseTX:  $\geq$ Cat5 cable

### Connectors

10/100BaseTX: Sixteen (16) M12 D-coded 4-pin female ports  
RS-232 Com: One (1) M12 A-coded 5-pin female port  
NTCD-M12: One (1) M12 A-coded 5-pin female port  
Power: One (1) M12 A-coded 4-pin male port

### Recommended Wiring Clearance

Front: 4" (10.2 cm)

### Regulatory Certifications

#### Product Safety

EN60950-1

#### Emissions

FCC Title 47, Part 15, Radio Frequency Devices, Subpart B;  
ANSI C63.4-2003; Industry Canada ICES-003; EN 61000-6-4 (radiated and conducted)

#### Immunity

EN 61000-6-2; IEC 61000-4-2 (ESD); IEC 61000-4-3 (RFAM);  
IEC 61000-4-4 (EFT); IEC 61000-4-5 (SURGE); IEC 61000-4-6 (RFCM);  
IEC 61000-4-8 (PFMF); IEC 61000-4-11 (VDI)

#### Other

EMC Directive 2004/108/EC; CE; EN 50155 Railway Applications;  
GOST-R

Designed to comply with:

IEEE 1613 for Electric Utility Substations



### EtherNet/IP™



# ▶▶▶ 716M12-HV Specifications

PART NUMBER	DESCRIPTION
716M12-HV.....	IP67-rated 16-port 10/100BaseTX fully managed Industrial Ethernet Switch with M12 D-coded female 4-pin connectors, bulkhead mountable, 40-160 VDC
700-NTCD-M12.....	Configuration device for saving and restoring configuration on parameters
NTPS-24-1.3.....	DIN-Rail Power Supply 24V @ 1.3 amp recommended for 716M12
M12DRC-ISO.....	DIN-Rail kit, two isolated plastic clips

## Cat5E STP Cables with M12 connectors

- CAT5E-M12-M12-X ..... Straight M12 to straight M12, shielded
- CAT5E-M12-RJ45-X ..... Straight M12 to RJ-45, shielded
- CAT5E-M12-X ..... Straight M12 to bare end, shielded
- CAT5E-RM12-M12-X ..... 90° M12 to straight M12, shielded
- CAT5E-RM12-RM12-X ..... 90° M12 to 90° M12, shielded
- CAT5E-RM12-RJ45-X ..... 90° M12 to RJ-45, shielded
- CAT5E-RM12-X ..... 90° M12 to bare end, shielded
- PWR-M12-A-X ..... Power Cable, M12 A-Coded straight female to bare end, shielded
- PWR-RM12-A-X ..... Power Cable, M12 A-Coded 90° female to bare end, shielded
- SERIAL-DB9-M12 ..... Serial cable, DB-9 to M12, 5 ft, shielded
- SERIAL-DB9-RM12 ..... Serial cable, DB-9 to 90° M12, 5 ft, shielded

