

NS-105/NS-108 5-Port/8-Port Switch
10/100 Fast Ethernet Switch
Installation Guide

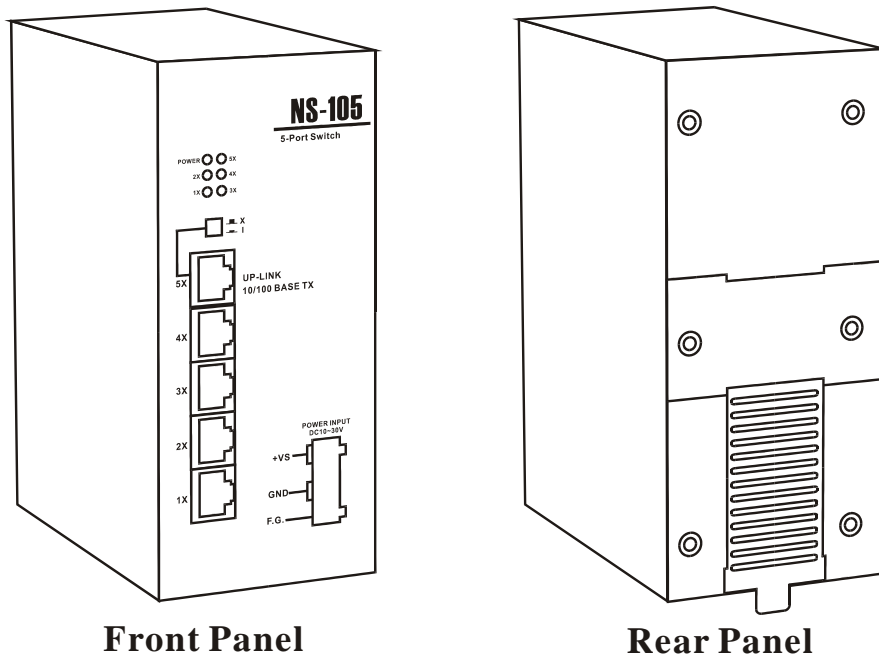
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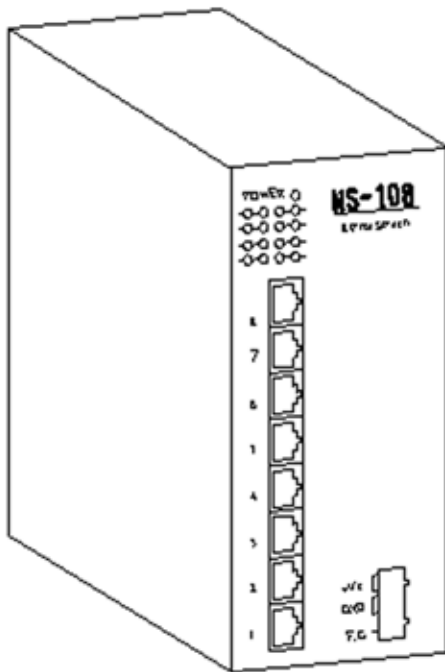
1. Introduction

NS-105/NS-108 Industrial Switches are DIN-Rail mounting and designed for industrial environments. Their rugged packaging and protected circuitry keep them working under conditions that may cause office-grade units to fail.

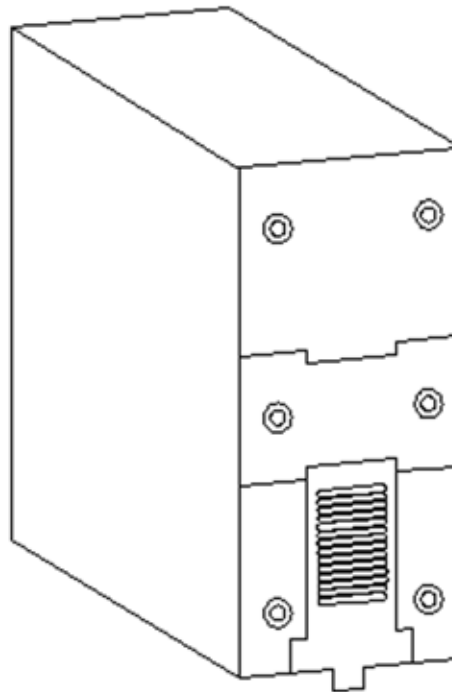
Industrial Ethernet applications are demanding - This 5-port/8-port Fast Ethernet switch become the basic unit of the whole Ethernet network. It is also the good companion of our I-7188EX and I-8000 ethernet embedded controller. The NS-105/NS-108 comes with multiple ports, each capable of transmitting or receiving information simultaneously at full wire speed to control and allocate the network bandwidth. Besides that, the NS-105/NS-108 Industrial Ethernet Switch automatically determines and remembers where an Ethernet device is located and routes the messages only through the appropriate port. This minimizes network loading and enables true deterministic communications over Ethernet



(NS-105)



Front Panel



Rear Panel

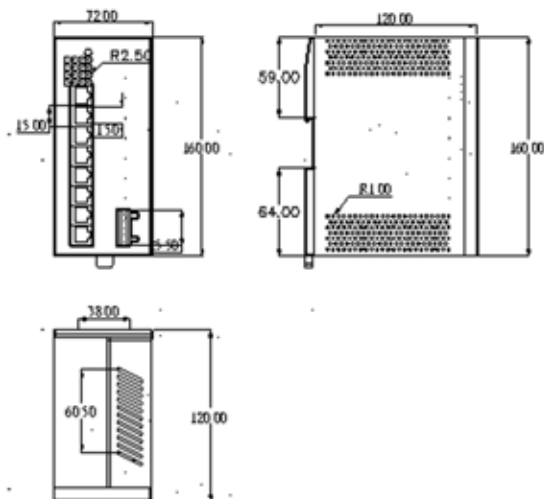
(NS-108)

The key features of this switch unit are:

- **Optimized Bandwidth :** Combining five/eight 10/100Mbps-based Fast Ethernet switched ports, the switch delivers a high network bandwidth for your Fast Ethernet network
- **Easy Migration:** With 10BASE-T support on each port, the switch provides a non-disruptive and smooth migration path from Ethernet to a Fast Ethernet network.
- **Easy Installation:** With the functions of auto-speed-sensing and auto-negotiation on each port, the switch supports plug-and-play installation which eliminates configuration problems.

1.1 Features

- IEEE 802.3 10BASE-T, IEEE802.3u 100BASE-TX and IEEE 802.3x flow control standards
- Five/Eight 10/100BASE-TX auto-negotiation switched ports for flexible connections to desktop PCs, servers and Ethernet hubs.
- The 10/100BASE-TX switched support :
 - Auto speed sensing for 100Mbps or 10Mbps connection
 - Auto Configuration with auto-negotiation devices
 - Full-duplex or half-duplex operation
- Self learning for active MAC addresses
- Store and forward switching to ensure only good packets are forwarded
- Forwarding and filtering at full wire speed
- Supports IEEE 802.3x flow control for full-duplex operation
- Supports back-pressure flow control for half-duplex operation
- Comprehensive LED indicators provide quick, easy to read port and switch information



(NS-108)

1.2 (NS-105) Specifications

Port 1-4	10BASE-T/100BASE-TX connectivity One MDI-X RJ-45 jack
Port 5	10BASE-T/100BASE-TX connectivity One MDI-X RJ-45 / MDI RJ-45 jack (by Push Button setting)
Cables	10BASE-T Cat.3,4,5 UTP cable (100meters max.) 100BASE-TX Cat.5 UTP cable (100meters max.)
LED indicators	Power status Link/Activity/Speed/Duplex/Collision status per port
Filtering rate	14,880pps for Ethernet(100BASE-T) 148,800pps for Fast Ethernet(100BASE-TX)
Forwarding rate	14,880pps for Ethernet(10BASE-T) 148,800pps for Fast Ethernet(100BASE-TX)
Filtering address	Multicast/Broadcast/Unicast address 8K MAC address per unit
RAM buffers	256KB
Environment	Temperature 0 ⁰ C to 60 ⁰ C Relative humidity 10% to 90% non-condensing
Dimensions	70mm x 160mm x 120mm
Power Requirement	+10 ~ +30 VDC
Power Consumption	0.08A@24Vdc; +/- 5%, arrowed.

(NS-108)Specifications

Port 1-8	10BASE-T/100BASE-TX connectivity One MDI-X RJ-45 / MDI RJ-45 jack
Cables	10BASE-T Cat.3,4,5 UTP cable (100meters max.) 100BASE-TX Cat.5 UTP cable (100meters max.)
LED indicators	Power status 10/100Link/Activity/Speed/Duplex/Collision status per port
Filtering rate	14,880pps for Ethernet(100BASE-T) 148,800pps for Fast Ethernet(100BASE-TX)
Forwarding rate	14,880pps for Ethernet(10BASE-T) 148,800pps for Fast Ethernet(100BASE-TX)
Filtering address	Multicast/Broadcast/Unicast address 1K MAC address per unit
RAM buffers	64KB
Environment	Temperature 0 ⁰ C to 60 ⁰ C Relative humidity 10% to 90% non-condensing
Dimensions	70mm x 160mm x 120mm
Power Requirement	+10 ~ +30 VDC
Power Consumption	0.24A@24Vdc; +/- 5%, arrowed.

2. Installing the Switch

2.1 Unpacking

Check to see that you have everything before you start the installation.

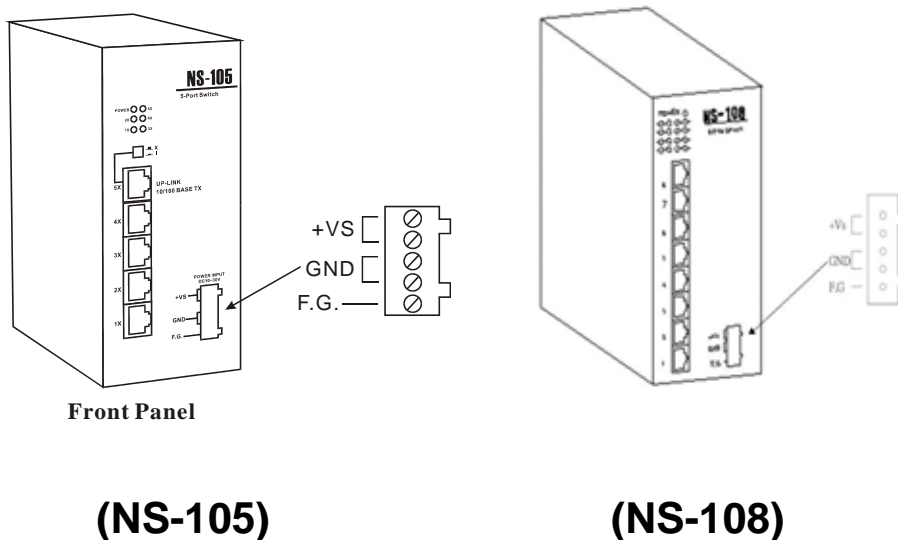
- Installation guide
- The switch unit

2.2 Checking Power

Since NS-105 consume 2W power(NS-108 consume 6W power), make sure your power supply can meet this demand.

Input DC voltage range: 10~30V

The screw terminal of the DC power input is located on the front of the switch as shown below:

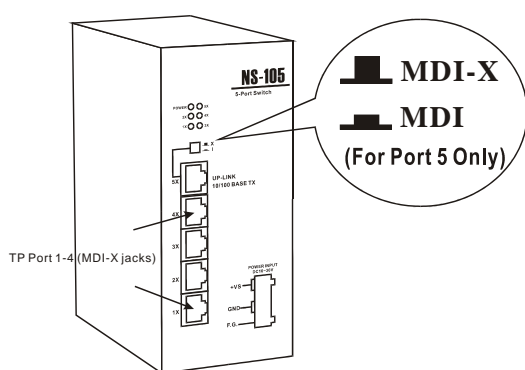


3.0 Making Network Connections

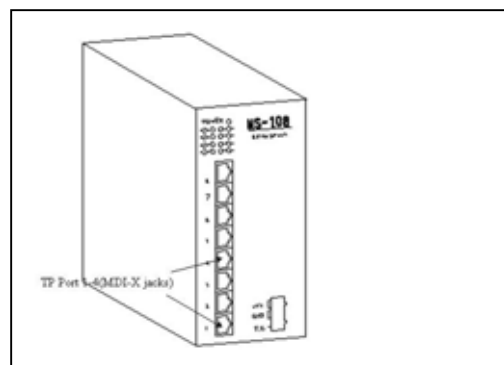
3.1 Network Switched Ports

There are five/eight ports on the switch for connection to five/eight LAN segments.

Each segment is an independent shared network in one collision-domain.



(NS-105)



(NS-108)

- **Five/Eight 10/100BASE-TX switched ports**

Each port consists of one RJ-45 connector and is used for connection to either a 10BASE-T or 100BASE-TX device. The RJ-45 connectors are fixed MDI-X jacks, which are designed with internal crossover function. It allows a connection to an end station using straight-through UTP cable.

- **MDI Jack support for Port 5 (for NS-105)**

One additional push button is provided for Port 5 to switch MDI-X or MDI. It is useful when using Port 5 as an uplink port and using straight-through UTP cable for the connection to any device.

(NS-105)

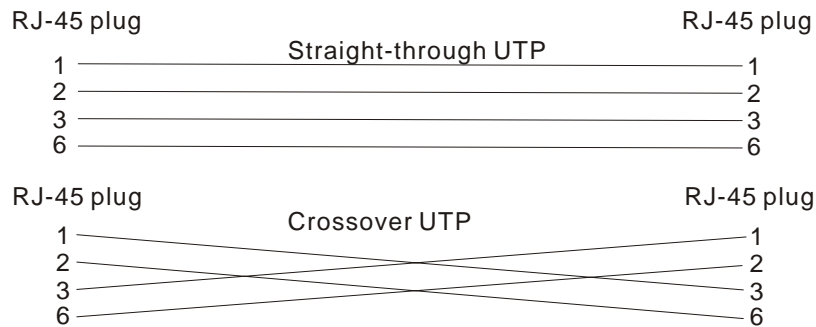
(NS-105) RJ-45	Pin Definition		Port 1-4	Port 5 (Push Button Setting)
MDI-X	1 2 3 6 4,5,7,8	RX+ RX- TX+ TX- NC	▼	▼
MDI	1 2 3 6 4,5,7,8	TX+ TX- RX+ RX- NC	N/A	▼

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RJ-45	Pin Definition		Port 1-8
MDI-X	1 2 3 6 4,5,7,8	RX+ RX- TX+ TX- NC	▼
MDI	1 2 3 6 4,5,7,8	TX+ TX- RX+ RX- NC	▼

3.2 UTP Cable

When making a connection to another device using straight-through UTP cable, make sure MDI-X to MDI connection rule is followed. The following figure illustrates the pin assignments of a straight-through UTP and a crossover UTP cable :



It is suggested to use straight-through UTP cables for all UTP connections. The maximum length and UTP cable categories used for the connections to a 10BASE-T device and 100BASE-TX device are :

CONNECTED DEVICE UTP CABLE USED & MAXIMUM LENGTH

10BASE-T device Cat. 3,4,5 UTP(100meters)

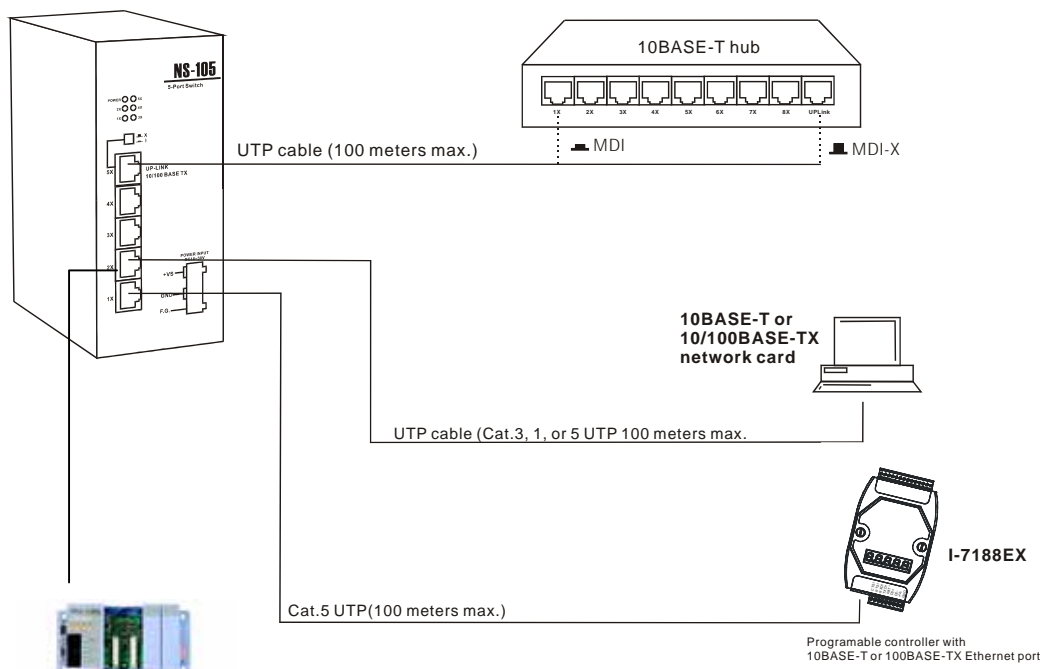
100BASE-TX device Cat. 5 UTP(100meters)

3.3 UTP Connections

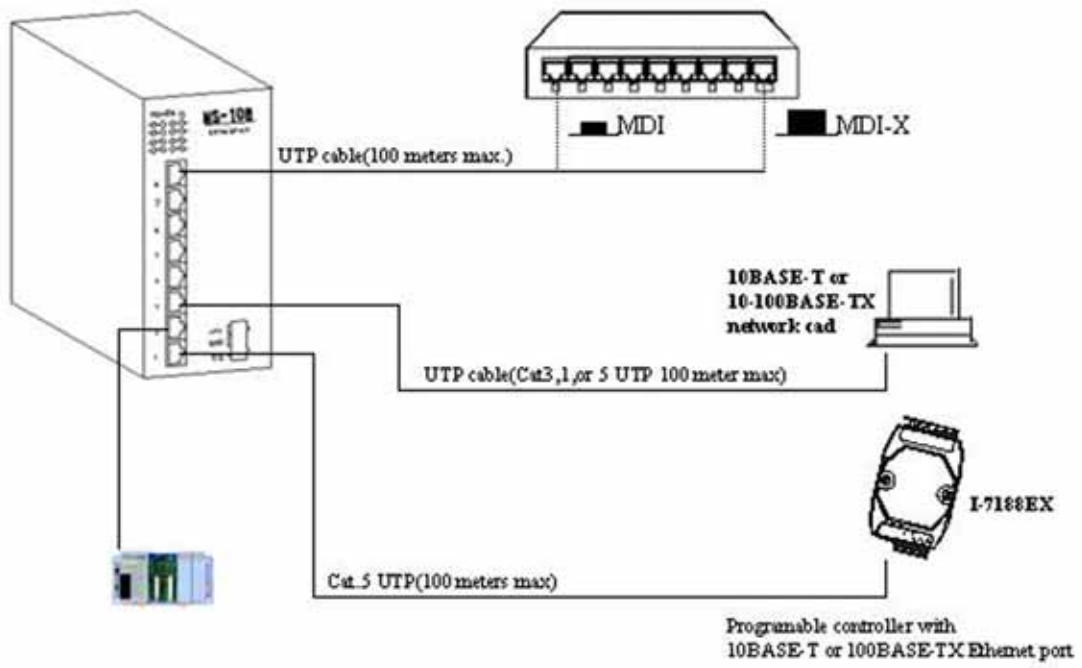
The NS-105/NS-108 switch can support connections to the following devices:

- 10BASE-T network cards
- 10/100BASE-TX network cards
- 10BASE-T hub ports
- 100BASE-TX hub ports
- 10/100BASE-TX dual speed hub ports
- 10/100BASE-TX switch ports
- Ethernet devices
- Ethernet Embedded controller, such as I-7188EX, I-7188EA, I-8430, I-8431, I-8830, I-8831, I-8437, I-8837, I-8438, I-8838

The following figure shows some connection examples and also specifies the maximum distance of each connections:



(NS-105)



(NS-108)

3.4 Operating Mode

All switched ports are designed as auto-negotiation capable switched ports. Each port can determine the speed and duplex type used automatically through an auto-negotiation process with the remote connected auto-negotiation device. The auto-negotiation process is performed when the connection is made.

When connecting to a non-auto-negotiation device, each TP port also features the capability to auto-sense the connection speed.

The following table lists the operation mode used for the switched port when it connects to different devices. The operating mode includes the connection speed and duplex type.

Connected Device	Operation Mode Used
10BASE-T hub	10Mbps, half-duplex
100BASE-TX hub	100Mbps, half-duplex
Auto-negotiation device	Auto-negotiation ^{*2}
Non-auto ^{*1} half-duplex device	Auto-speed-sensing ^{*3} , half-duplex
Non-auto full-duplex device	Not supported

*1 Non-auto : non-auto-negotiation

*2 determined through auto-negotiation process

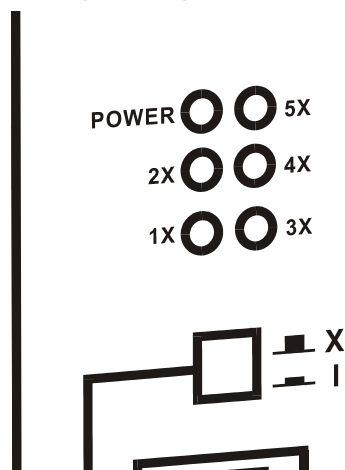
*3 speed is determined by auto-sensing function

Most of 10BASE-T hubs and 100BASE-TX hubs are non-auto-negotiation devices and operate on half-duplex mode.

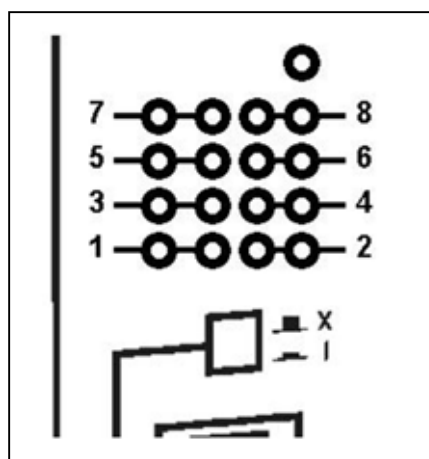
4. LED Indicators

4.1 LED Panel

The NS-105 & NS-108 switch provides comprehensive LED indicators for diagnosing and monitoring the operation of the unit as shown below:



(NS-105)



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4.2 Interpretation for *LED functions*:

Standard RJ45 female connectors are provided. A standard RJ45 plug cable is all that is necessary to connect your device to the unit since switch that supports auto crossover. Table 1 shows the LED indicator functions for NS-105. Table 2 shows the LED indicator functions for NS-108.

NS-105

LED	Color	Description
Power	Red	Power is On
	Off	Power is Off
Ethernet Port	Green On	Full-duplex
	Red On	Half-duplex
	Green/Red	Traffic Collisions

NS-108

LED	Color	Description
Power	Red	Power is On
	Off	Power is Off
Ethernet Port	Red On	Link/Act
	Red Off	Not Networking
	Green On	Link to 100 Mbps
	Green Off	Link to 10 Mbps