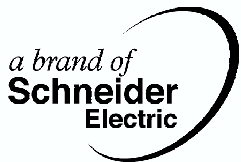ConneXium
Ethernet Switch 499NES18100
8-Port, 10/100 Base-TX
Quick Reference Guide

Version 1.0

Telemecanique

Important Information

Notice

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a Danger or Warning safety label indicates that an electrical hazard exists, which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation, which, if not avoided, **will result** in death, serious injury, or equipment damage.

⚠ WARNING

WARNING indicates a potentially hazardous situation, which, if not avoided, **can result** in death, serious injury, or equipment damage.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation, which, if not avoided, **can result** in injury or equipment damage.

Please Note

Electrical equipment should be serviced only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material. This document is not intended as an instruction manual for untrained persons.
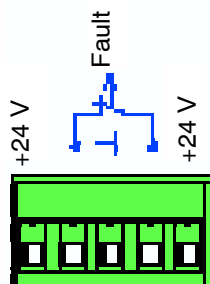
Physical Description

Summary The ConneXium 499NES18100 rail switch supports Ethernet 10 base-T and Fast Ethernet 100 base-TX operations in industrial environments. It supports switched Ethernet networks in accordance with IEEE standard 802.3 or 802.3u, using copper technology. The module has eight RJ45 twisted-pair ports that support eight 10/100 MBit/s Ethernet connections. It plugs onto a standard ISO/DIN rail.
You can connect up to eight data terminal equipment (DTE) units or other network segments to the 10/100 Mbit/sports using twisted-pair cabling.The ports support autonegotiation, autopolarity and autocrossing.

five-pin terminal block

LED display

eight-pin DIP-switch

eight 10/100-base-T(X) ports (RJ45 connectors)
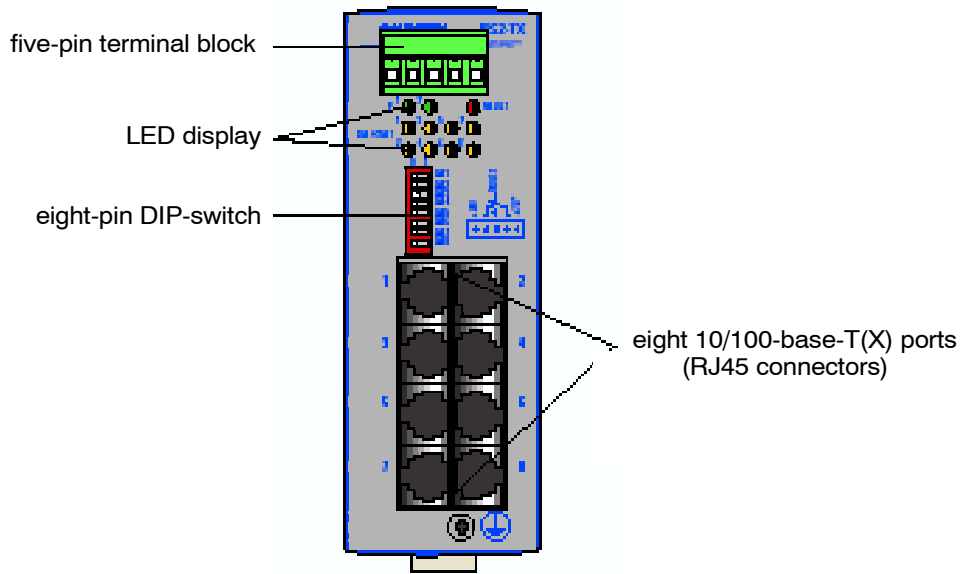
The Five-pin Terminal Block The supply voltage and the indicator contact are connected to the switch module via a five-pin terminal block:

Voltage supply

	WARNING
⚠	**POWER SUPPLY GUIDELINES** The device is designed for safety extra-low voltage (SELV) operation. It may be connected only to the supply voltage shown on the type plate. When the module is operated with an external power supply, use only a SELV supply that complies with IEC 950/EN 60 950/VDE 0805. Connect the protecting line before you establish any further connections. When you remove connections, disconnect the protecting line last. **Relevant for North America**: The subject unit is to be supplied by a Class 2 power source complying with the requirements of the National Electrical Code, table 11(b). If power is supplied redundantly (with two individual power sources), the power sources together should comply with the requirements of the National Electrical Code, table 11(b). **Relevant for North America**: Use 60/75° C copper (CU) wire only. **Failure to follow this precaution can result in death, serious injury, or equipment damage.**

Redundant voltage supplies are supported. Both inputs are decoupled. There is no load distribution. With redundant supplies, the power pack supplies only the switch module with the higher output voltage. The supply voltage is electrically isolated from the housing.

Indicator contact

The indicator contact is used to supervise the functions of the ConneXium 499NES18100 switch, facilitating remote diagnosis without management software. A contact interrupt uses a potential-free indicator contact (a closed circuit relay contact) that indicates:

- the failure of at least one of the two supply voltages
- a permanent fault in the switch (internal 3.3 VDC voltage, supply voltage 1 or 2 less than 9.6 V)
- faulty link status on at least one port. The indication of the link state on the 499NES18100 switch can be masked on a port-by-port basis using DIP switches LA1 ... LA8

The switch module is shipped with no link test.

Note: In the case of the voltage supply being routed without redundancy, the ConneXium 499NES18100 indicates the failure of a supply voltage. You can prevent this message by feeding in the supply voltage through both inputs.

The 10/100 Base-T(X) Connections

Eight 10/100 Mbit ports (eight-pin R45 sockets) on the ConneXium 499NES18100 allow eight DTE or other independent network segments complying with the standards IEEE 802.3 100BASE-TX / 10BASE-T to be connected. These ports support autopolarity.

The socket casings are electrically connected to the front panel of the switch module. The pin configuration complies with MDI-X:
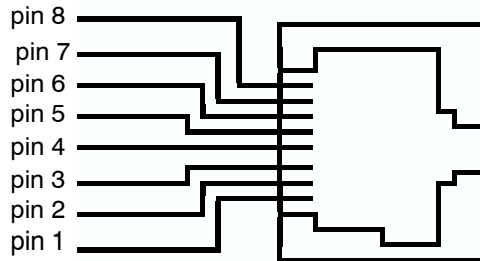
pins 3 and 6 provide one line pair

pins 1 and 2 provide another line pair

**remaining pins** are not used

The LED Display

The ConneXium 499NES18100 switch module provides 11 display elements that indicate power status, fault detection and port status:

Indicator	Color	Meaning
P1	green	on when power supply voltage 1 is present
		off when power supply voltage 1 is below 9.6 V
P2	green	on when power supply voltage 2 is present
		off when power supply voltage 2 is below 9.6 V
FAULT	red	on when an error is present
		off when no errors have been detected
DA/STAT 1 ... 8	green or yellow	off either when no valid link is on the port or when the DA/STAT message for that port has been suppressed.*
		steady green when the link is valid and data is not being received
		flashes yellow while data is being received
* Link status indications can be suppressed using the eight-pin DIP switch on the module's front panel.		

The Eight-pin DIP Switch

Using the eight-pin DIP switch on the front panel, you can suppress the messages about the link status of any or all port connections:

0	1	
■	□	LA1
■	□	LA2
■	□	LA3
■	□	LA4
■	□	LA5
■	□	LA6
■	□	LA7
■	□	LA8
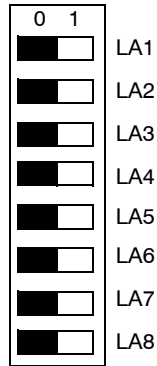
LA1 If the switch is set to 0, the message to the DA/STAT 1 LED is suppressed.

LA2 If the switch is set to 0, the message to the DA/STAT 2 LED is suppressed.

LA3 If the switch is set to 0, the message to the DA/STAT 3 LED is suppressed.

LA4 If the switch is set to 0, the message to the DA/STAT 4 LED is suppressed.

LA5 If the switch is set to 0, the message to the DA/STAT 5 LED is suppressed.

LA6 If the switch is set to 0, the message to the DA/STAT 6 LED is suppressed.

LA7 If the switch is set to 0, the message to the DA/STAT 7 LED is suppressed.

LA8 If the switch is set to 0, the message to the DA/STAT 8 LED is suppressed.

Ground Connection

The switch is grounded via the separated ground screw. It is located on the left under the front panel.
Make sure that the electrical installation meets local or nationally applicable safety regulations.

Functional Description

Overview

The 10/100 base-T ports provide terminal connections for the connected LAN segment. You can connect single devices or complete network segments. The module supports several frame switching, TP/TX interface, and other functions.

Switch Functions

The ConneXium 499NES18100 supports four frame switching functions:
Store and forward switching:
All data received by the ConneXium 499NES18100 switch from the system bus or at the ports are stored and checked for validity. Invalid and defective frames (frames greater than 1.522 bytes or with a CRC error) and frame fragments (greater than 64 bytes) are discarded. The switch forwards the valid frames.

Multi-address switching:
The switch learns all its source addresses on a per-port basis. Only packets with
- unknown addresses
- addresses learned at the specific port
- a multi-broadcast address

in the destination address field are sent to the port.

A switch can learn up to 1000 addresses. This becomes necessary if more than one terminal device is connected to one or more port(s). Multi-address switching allows several independent subnetworks to be connected to a ConneXium 499NES18100 switch.

Learned address switching?
The switch monitors the age of the learned addresses and deletes entries from the address table when they exceed a certain age (300 s).

> **Note:** Restarting deletes the learned address entries.

Tagging
The switch includes a VLAN tag (designated by the IEEE 802.1 Q standard) in a MAC data frame for VLAN and prioritizing functions. The tag comprises four bytes— a two-byte tag protocol identifier (TPID) and two bytes of tag control information (TCI). It is inserted between the source address field and the type field. Data packets with VLAN tags are transmitted unchanged by the 499NES18100.

TP/TX Interface

The TP/TX interface supports three specific functions:

Link control
The switch monitors the connected TP/TX line segments for short circuits and interrupts. It uses regular link test pulses in accordance with IEEE standard 802.3 for 10/100 base-T. The switch module does not transmit any data to a TP/TX segment from which it does not receive a link test pulse.

> **Note:** An unpopulated connection is assessed as a line interrupt. The TP/TX line to any terminal equipment that has been switched off is also assessed as a line interrupt since a de-energized bus coupler cannot transmit link test pulses.

Autopolarity exchange
The switch automatically reverses polarity if the receive line pair is incorrectly connected—if RD+ and RD- are switched.

Autocrossing
The switch detects the transmit and receive pairs (MDI, MDI-X). It automatically configures its port for the correct transmit and receive pins. Consequently, it does not matter whether you connect devices using a cross-over or straight cable.

Additional Features	If the input voltages fall below a threshold, the ConneXium 499NES18100 switch will be reset. After a reset, the ConneXium 499NES18100 switch will initialize.

ConneXium 499NES18100 Assembly and Startup

Unpacking	When you unpack the ConneXium 499NES18100 switch module, compare your package content with the scope of delivery provided in the product specifications.Make sure that the delivery is complete and that none of the parts are damaged. Use only undamaged parts when you assemble the module.

Assembly

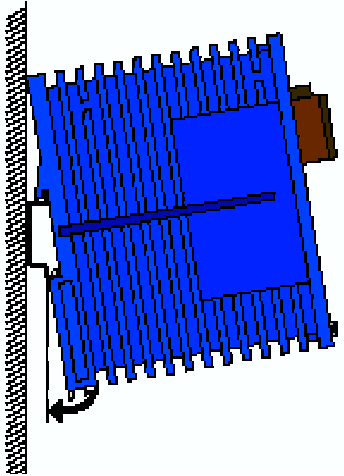|	**DANGER**
⚠	**ELECTRIC SHOCK HAZARD**
	Never insert pointed objects (thin screwdrivers, wires, etc.) into the inside of the subrack, especially in the area behind the socket connectors.
	Failure to follow this precaution will result in death, serious injury, or equipment damage.

	WARNING
⚠	**EXPOSED ELECTRICAL COMPONENTS**
	Switch the basic devices on only when the case is closed.
	Failure to follow this precaution can result in death, serious injury, or equipment damage.

	WARNING
⚠	**HOUSING SAFETY GUIDELINES**
	The ventilation slits must not be covered, inhibiting free air circulation. The distance to the ventilation slots of the housing has to be a minimum of 10 cm.
	Failure to follow this precaution can result in death, serious injury, or equipment damage.

	WARNING
⚠	**RADIO INTERFERENCE**
	This is a Class A device. This equipment may cause radio interference if it is used in a residential area. It is the operator´s responsibility to take appropriate preventative measures.
	Failure to follow this precaution can result in death, serious injury, or equipment damage.

The equipment is delivered in a ready-to-operate condition. Follow this procedure to assemble the switch.

Step	Action
1	Check whether the DIP switch pre-settings suit your application (see *p. 6*).
2	Pull the five-pin terminal block off the switch module and wire up the supply voltage and indicator lines.
3	Fit the 499NES18100 on a 35 mm standard DIN EN 50 022 rail.
4	Attach the upper snap-on slide bar on the module to the DIN rail and press it down until it locks in position.
5	Fit the signal lines.

Notes

- The front panel of the ConneXium 499NES18100 switch module is grounded via a separate ground connection.
- Do not open the module housing.
- The shielding ground of the twisted-pair lines that can be connected is electrically connected to the front panel.

Startup

To start up the ConneXium 499NES18100 switch module, connect the supply voltage via the five-pin terminal block.

Dismantling

To take the ConneXium 499NES18100 switch module off the ISO/DIN rail, insert a screwdriver horizontally under the housing into the locking slide, pull it downward (without tipping the screwdriver), and lift the module upward.

ConneXium 499NES18100 Specifications

General Data

Operating voltage			NEC Class 2 SELV/PELV 24 VDC (-25% +33%) power source
			redundant inputs decoupled
			5 A maximum
Buffer time			10 ms @ 24 VDC minimum
Potential difference between input voltage and housing			32 VDC @ +24 VDC
			-32 VDC @ ground
Current consumption@ 24 VDC			7.0 W maximum
Overload current protection at input			non-changeable fuse
Dimensions (W x H x D)			47 x 135 x 111 mm (1.9 x 5.3 x 4.4 in)
Weight			230 g (5.07 lb)
Temperature	ambient		0 ... 60º C (32 ... 140º F)
	storage		- 20 ... +80º C (-4 ... +176º F
Humidity)			up to 95% (noncondensing
Atmospheric pressure			79 kPa minimum
maximum length of a twisted-pair segment	connected to a 10 base-T/100 base-TX TP/TX port		100 m (328 ft)
Protection type			IP 20
Radiated emission			CFR-47 Part 15 Class A,
			Germanischer Lloyd Guidelines for the Performance of Type Tests Part 1 EN 55022 Class A
Interference proof	static discharge	contact	EN 61000-4-2 Test level 3
		air	EN 61000-4-2 Test level 3
	electromagnetic fields		EN 61000-4-3 Test level 3
	fast transients		EN 61000-4-4 Test level 3
	surge voltage	symmetrical	EN 61000-4-5 Test level 2
		asymmetrical	EN 61000-4-5 Test level 3
	cable-based RF faults		EN 61000-4-6 Test level 3
Stability	vibration		IEC 60068-2-6 Test FC, testing level in line with IEC 61131-2 E2 CDV
			Germanischer Lloyd Guidelines for the Performance of Type Tests Part 1
	shock		IEC 60068-2-27 Test Ea, testing level in line with IEC 61131-2 E2 CDV

**Interfaces,
Displays and
Controls**

Interfaces	eight TP/TX ports		RJ45 sockets, 10/100 MBit/s
	indicator contact		1 A maximum, 24 V
Displays	equipment status LEDs	1 green	P1 – power 1, supply voltage 1 present
		1 green	P2 – power 2, supply voltage 2 present
		1 red	FAULT – indicator contact is open and indicates error
	port status LEDs	8 green/yellow	DAT/STAT 1 ... 8 – data/link status
Controls	eight-pole DIP switch		LA1 ... LA8 – suppress messages about link status
Scope of delivery	order number: 499NES18100		ConneXium rail switch module
			terminal block for supply voltage
			installation and operating instructions

Accessories

TF Ethernet SFTP CAT5 RJ45 cables	490NTW000**
TF Ethernet SFTP CAT5 RJ45 crossed cables	490NTC000**
where ** = length in meters; allowable choices are 2, 5, 12, 40 or 80.	