ConneXium

Industrial Ethernet Cabling System
5TX IP67 Switch, TCSESU051F0

4/2010

Schneider Electric

Safety Information

Overview

Introduction

This ConneXium switch has been especially designed for use in industrial environments. It supports Ethernet 10 Mbps and Fast Ethernet 100 Mbps.

The Ethernet switch module supports switched Ethernet networks in accordance with IEEE standard 802.3 (10BASE-T) or 802.3u (100BASE-TX) using copper technology.

The switch module is mounted at the installation site using screws.

The module has five 10/100 Mbps twisted pair ports (10BASET/100BASE-TX, shielded M12 connectors).

It is possible to connect up to five end devices or other network segments to this port using twisted pair cabling. Schneider Electric recommends CAT 5e cable for both 10 Mbps and 100 Mbps

The ports support half/full duplex and 10/100 Mbps autonegotiation, autopolarity, and autocrossing.

IP67 Protection

The switch conforms to protection class IP67:
● protection against shock and foreign particles
● dust proof
● water protection (temporary immersion)

Description

The ConneXium Ethernet 5TX IP67 switch is shown below:
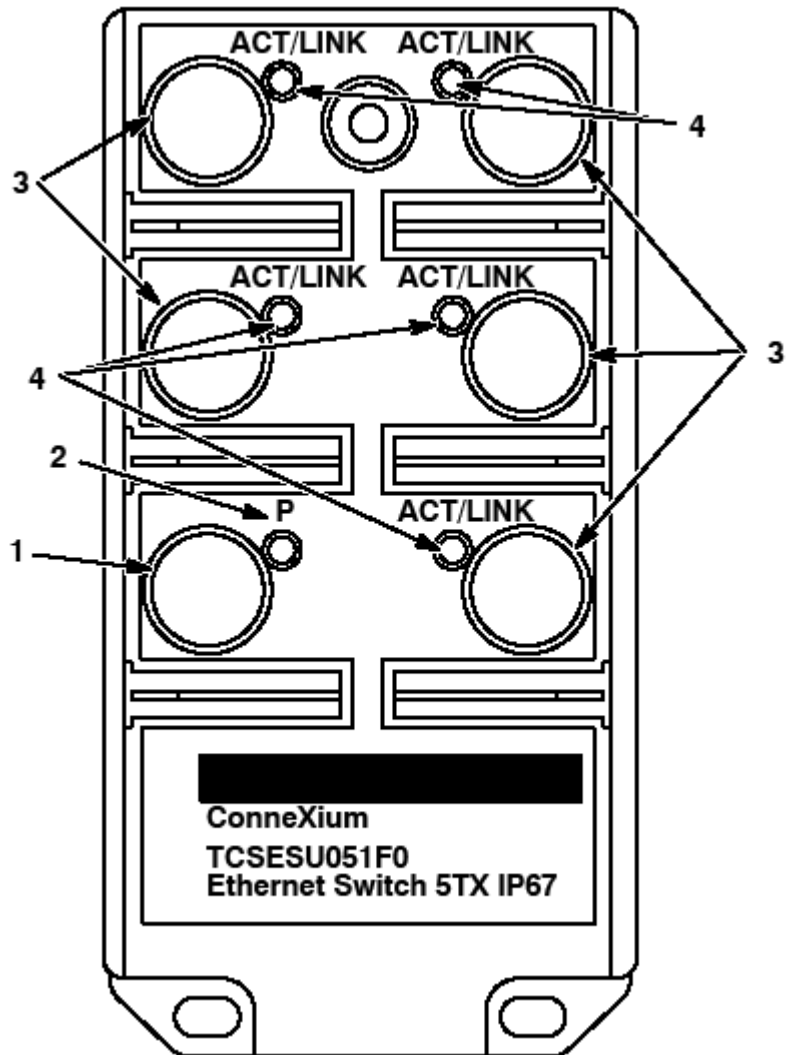
1   power supply connector (5-pin, M12 male, A coding)
2   power LED
3   Ethernet connector (4-pin, M12 female, D coding)
4   port status LEDs

More information about LEDs *(see page 6)* is found later in this document.

Features

Switching

Store and Forward

All data received by the ConneXium switch from all ports are stored and checked for validity. The switch discards the invalid and defective frames (frames greater than 1522 bytes or with CRC errors) and frame fragments (less than 64 bytes). The switch forwards valid frames.

Multi-Address Capability

The switch learns source addresses on a per-port basis. Only packets with unknown addresses, addresses learned at the specific port, or multicast and broadcast addresses are sent to the ports. The switch also monitors the age of the learned addresses and deletes entries aged above 300 s from the table.

A switch can learn up to 1000 addresses.

NOTE: Restarting the switch deletes the learned address entries.

Tagging

Data packets with VLAN tags are transmitted unchanged by the switches (IEEE 802.1 Q).

Ethernet Interface

Link Control

The switch monitors the connected ethernet 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 segment from which it does not receive link test pulses.

NOTE: An unpopulated connection is assessed as a line interrupt. The 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 (when 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 crossover or straight cable.

Autonegotiation

The switch automatically selects the speed and duplex operating mode of its ports. When a connection is initially established, the switch detects the speed (10 or 100 Mbps) and the transmission mode of the connected network (half/full duplex).

Indicators

LEDs

The Equipment Status LEDs report information about statuses that affect the function of the entire ConneXium switch.

Equipment Status			
Indicator	**Color**	**State**	**Meaning**
P (power)	green	on	supply voltage is supplied
		off	supply voltage not present

The ACT/LNK (Activitiy/Link) LEDs (1 through 5) report port-related information:

Port Status			
Indicator	**Color**	**State**	**Meaning**
ACT/LNK 1...5	green	on	valid link
		off	no valid link
		flashing	receiving data

Installation

Installing

The equipment is delivered in a ready-to-operate condition. The following procedure is appropriate for installation.

Connect the individual system components in a dry, clean area to protect them from damage. Cover unassigned ports with the covering caps provided.

NOTE: Open type UL listed product intended to be installed in a type 1 or better enclosure. Restrict access to authorized personnel.

NOTE: Connectors are not electrical isolating devices. For this reason you should plug the connector into the power supply before switching on the power supply.

Step	Action
1	Prepare the installation site by drilling holes as indicated in the drilling template provided at the end of the installation instructions.
2	Mount the module on a level surface with three M4x16 screws.
3	Connect the ground wire.
4	Connect the rest of the power wires and turn the power on.
5	Install the ethernet cables.
Note: The switch module must be bolted to a panel or cabinet to achieve protection class IP67.	
Note: Empty ports must be sealed with the protective caps supplied.	

Notes on Wiring

In keeping with general installation regulations, ensure that the signal and power lines >60V are laid separately (cable, duct, clamps). The signal and 24V supply voltage lines should be laid away from the module and kept as straight as possible.

Notes on Strain Relief

Provide sufficient strain relief and secure cable fastening for all connected wiring.

Ground Connection

The ConneXium switch module is grounded through the mounting screws at the chassis or through pin 5 of the M12 power supply connector. The preferred grounding method is through the mounting screws.

Use the clips at the screen plate to provide a low impedance ground connection, either by mounting directly on a conductive surface or by the additional connection of a ground wire to a fastening strap on the screen plate. Use toothed locking washers for a good electrical connection.

Dimensions

Use the drilling template and measurements below to complete step 1.

$$\frac{mm}{inches}$$
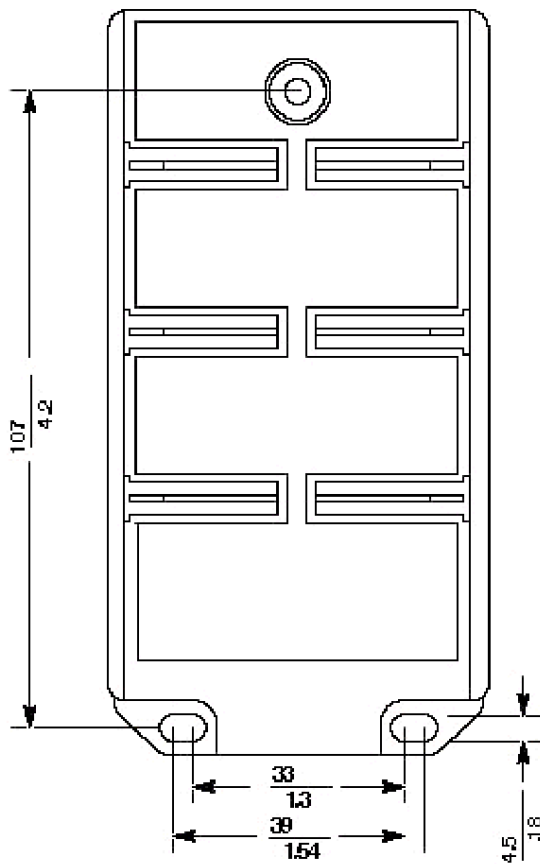
Wiring

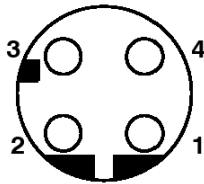### Ethernet Wiring

Five 10/100 Mbps ports (4-pin shielded M12 female socket with D coding) allow the connection of data terminal equipment or independent network segments conforming to the IEEE 802.3 100 BASE-TX/10BASE-T standard. These ports support the autonegotiation and autopolarity functions.

The shielding of the connected twisted pair wires must be grounded to the plug housing of the M12 connector.

4-Pin M12 Socket Configuration

1   Pin 1: TD+ Transmit Data +
2   Pin 2: RD+ Receive Data +
3   Pin 3: TD- Transmit Data -
4   Pin 4: RD- Receive Data -

Power Wiring

| ⚠ **WARNING** |
|---|
| **HAZARD OF ELECTRICAL SHOCK OR BURN** |
| ● The ConneXium Ethernet 5TX IP67 switch is designed for operation with an extra-low voltage for safety. For this reason it may only be connected to the supply voltage connections with PELV circuits or, alternatively, SELV circuits with voltage and current of not more than 150 VA in accordance with IEC/EN 60950 and EN6113-2 2003. |
| ● Connect the ground wire before establishing any further connections. |
| ● When you remove connections, disconnect the ground wire last. |
| **Failure to follow these instructions can result in death, serious injury, or equipment damage.** |

The power for the ConneXium Ethernet IP67 Switch is supplied through a 5-pin M12 male connector (A coding). Typically, the supply voltage is +24V DC. It is electrically isolated from the functional ground.

Pin Assignment of the M12 Connector
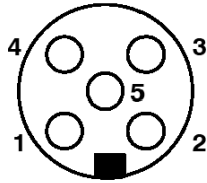
1   Pin1: Input Voltage +
2   Pin 2: Not assigned
3   Pin 3: Input Voltage -
4   Pin 4: Not Assigned
5   Pin 5: Functional Ground

If you use Schneider parts XZCP1164L*, as suggested in the accessories section of this manual, see the graphic below, which illustrates the color-coded pinout of the cable accessory.
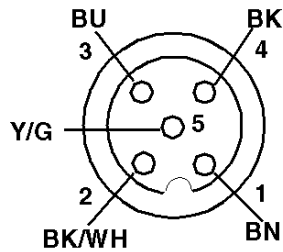
Below are the instructions of how to wire the power cable:

Cable Type - Pin	Description
Yellow / Green (Y/G) - 5	to the ground of your power supply
Brown (BN) - 1	to power supply (+)
Blue (BU) - 3	to power supply (-)

Configuration

Connecting End Devices and Other Network Segments

It is possible to connect up to five end devices or other network segments to the 10/100 Mbps ports of the switch using twisted pair cabling:
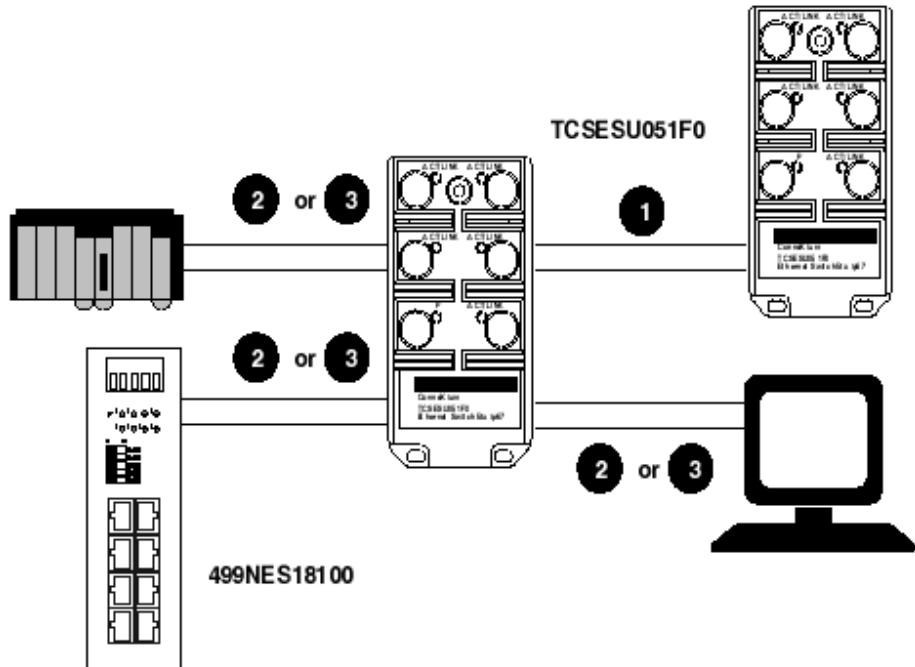
Patch Cables

NOTE: To operate the ConneXium switch, use patch cables as described below.

- Use a shielded CAT 5e cable.
- Use a shielded 4-pin M12 connector.
- Connect the cable shield to the connector housing.

The following figures show the patch cable configuration options:

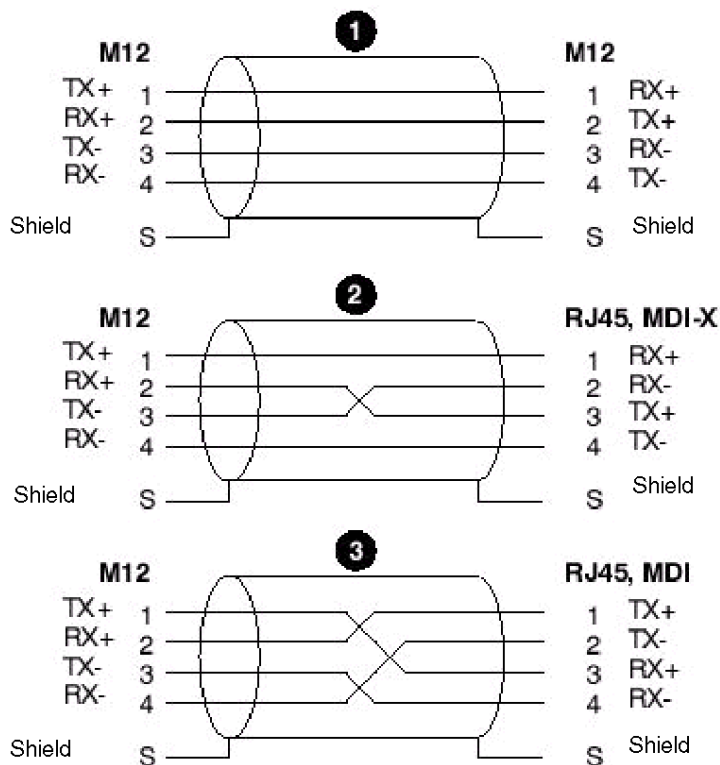**1** M12-to-M12 connection
2 M12-to-RJ45, MDI-X connection
3 M12-to-RJ45, MDI connection

ConneXium Ethernet IP67 Switch Specifications

General Data

Operating voltage		NEC Class 2 power source 24 VDC (-25% +33%) safety extra-low voltage (SELV/PELV)	
		5 A maximum	
Buffer time		min. 10 ms at 24 VDC	
Potential difference between input voltage and housing		potential difference to input voltage, +24 VDC: 32 VDC	
		potential difference to input voltage, ground: -32 VDC	
Current consumption		130 mA max @ 24 VDC	
Dimensions W x H x D		60 mm x 126 mm x 31 mm	
Weight		210 g	
Ambient temperature		0 ºC to + 60 ºC	
Storage temperature		- 25 ºC to + 70 ºC	
Atmospheric pressure		min. 79 kPa	
Protection	protection type	IP 67, according to EN 60529	
	protection against shock and foreign particles	full shock protection, impenetrable to dust	
	water protection	protected against water penetration, during submersion under specified pressure and time conditions	
Interference proof	discharge of static electricity	contact discharge	EN 61000-4-2 Test level 2
		air discharge	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		fast transients EN 61000-4-4 Test level 3
	surge voltage symmetrical		EN 61000-4-5 Test level 2
	surge voltage asymmetrical		EN 61000-4-5 Test level 3
	cable-based RF faults		EN 61000-4-6 Test level 3
EMC emitted immunity	EN 55022	class A	
	FCC 47 CFR Part 15	class A	
Stability	vibration	IEC 60068-2-6 Test FC, testing level in line with IEC 61131-2 :2003	
	shock	IEC 60068-2-27 Test Ea, testing level in line with IEC 61131-2 :2003	
Agency certifications and approvals		UL 508, CSA 22.2 No. 14 (cUL mark), CE	

Network Size

TP port 10BASE-T/100BASE-TX	
Length of a twisted pair segment	100 m (328 ft) maximum

Interfaces

5 TP ports	M12 female sockets (4-pin, D coding), 10/100 Mbps

Displays

Equipment status	1 x green LED	P	power, supply voltage present
Port status	5 x green LEDs	ACT/LNK	data, link status

Delivery Scope

Switch	protective caps for sealing unused ports (x2)
	labels, description, and operating instructions
Order number	TCSESU051F0

Accessories

Cables	Available Part	Available Length (in meters	Connector Type
Power Cables	XZCP1164L•	•= 2, 5	Female M12, straight
	XZCP1264L•	•= 2, 5	Female M12, elbow
Spare Power Connectors	XZ-CC12FDM50B		Female M12, straight
	XZ-CC12FCM50B		Female M12, elbow
Ethernet Cables (terminated)	TCSECL1M3M•S2	•= 1, 3, 5, 10, 25, 40	M12 (IP67) to RJ45 (IP20)
	TCSECL1M1M•S2	•= 1, 3, 5, 7, 10, 15, 25, 40	M12 to M12
Ethernet Bulkhead Adapter	TCSEAAF11F13F00		M12F(IP67) to RJ45F (IP20)

CE Information

This device complies with the regulations of the following European directive:

89/336/EEC

Council directive on the harmonization of the legal regulations of member states on electromagnetic compatibility (amended by Directives 91/263/EEC, 92/31/EEC, and 93/68/EEC).

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Contact Information

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