Amphenol SOCAPEX
RJ-Switch

IP68 rugged Unmanaged Ethernet Switch
RJSMLAC 8UG CAPS
- Hardware User Manual -

Contents

This manual applies to the following products:

- **RJSMLAC 8UG (CAPS)**
  Rugged IP67/68 Unmanaged Ethernet Switch, with RJFTV reinforced 38999 connectors

Revision	Date	Modifications
1	2013 May, 16	Initial document
1.1	2022 January, 6	Updated Guarantee information, Performance specifications, Service information Updated Power plug wiring

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ARTICLE 11: GUARANTEE - LIABILITY

11.1. Products shall benefit from a legal guarantee of one year following the date of delivery in accordance with the terms and conditions indicated hereunder.

11.2. In all instances, Seller's guarantee shall be limited to free replacement, in identical quantities, of the Product acknowledged as defective by Seller with the exclusion of any compensation or damages and interests and subject that Client notifies Seller of defect immediately following discovery thereof by any written means during the legal guarantee period. Defective Products shall be returned to Seller in accordance with the same procedure as that applicable to Products which do not comply with orders as indicated under article 9 hereinabove.

11.3 The following shall be excluded from the guarantees provided by Seller:

- Product defects resulting from inadequate maintenance, or supervision and, more widely, any use which does not comply with written instructions of Seller and indicated in technical notices and/or product specifications, or default in respecting applicable standards or professional customs and uses;

- Product defects resulting from an external cause or any modification or intervention by Client or third party without the prior written consent of Seller;

- the guarantee shall not cover normal wear and tear of Products ;

- Product defects resulting generally in whole or in part from damage or accidents attributable to Client or a third party;

- the guarantee shall not cover any defects resulting from instructions given by Client to Seller ;

- damages resulting from force majeure, such as this is defined under article 11 hereunder, or resulting from any unpredictable event or natural disaster.

Client shall retain sole and exclusive liability for the use of Products provided by Seller and the suitability thereof for use. Client should ensure that its premises and storage conditions are adequate for the due and proper storage of Products and ensure all safety guarantees as stipulated by regulations in force. No guarantee shall be provided by Seller in this regard.
In all instances and under no circumstances whatsoever shall Seller be liable for any damage, whether direct or indirect, or predictable or not, caused by any defect of the Product sold. In this regard, no compensation may be claimed.

Note: All information in this document is subject to change without notice.

Section 1 | General Information

Overview

This manual will help you install and maintain the Amphenol Rugged Ethernet Unmanaged switches. These products are extremely easy to install and operate.

Military applications can now take full advantage of 1000Mbps Gigabit Ethernet performance.

The installation guide describes how to install and use the hardened compact Ethernet RJSMLAC-8UG-CAPS Military Rugged Switch. Capable of operating at extreme temperature of -35°C to +75°C and meet the toughest industrial and military environments such as MIL-STD-810F, MIL-STD-1275B, MIL-STD-461E up to the highest levels. The mentioned ability turns the RJSMLAC-8UG-CAPS to the optimal solutions switch of choice for harsh environments constrained by space.

Developed for military and harsh mobile applications, the RJSMLAC-8UG-CAPS features mechanical packaging enhancements designed for MIL-STD-810F airborne and ground environmental compliance and high reliability. The unit has been especially hardened to improve ingress, impact, and shock/vibration protection, as well as eliminate all moving parts through passive cooling, and interface through sealed MIL-DTL-38999 RJFTV reinforced circular connectors.

Leveraging best-in-class switching technology, the RJSMLAC-8UG-CAPS serves as a robust solution for providing local area network (LAN) connectivity to IP-enabled computing and net-centric devices. Compact in size, the RJSMLAC-8UG-CAPS is particularly useful for expanding port density to tactical IP routers in space-constrained airborne and ground vehicle environments.

RJSMLAC-8UG-CAPS is specifically designed for Data Acquisition & Transmission, Battlefield Communication C4ISR, Rugged Networks, Mobile Communications, Combat vehicles and Avionic & Shipboard Systems.

Performance Specifications

These general specifications apply to these switches. Refer to Section 6 for complete technical specifications.

Ports	10/100/1000BaseT(x) (Shielded RJ45)
Voltage	24Vdc Nominal (18-32V) Power Consumption: 7W Typical
MIL standards	MILSTD-1275B, MILSTD-461E, MILSTD-810F GM, IP67
Electromagnetic	MIL-STD-461E: CE102, CS114, CS115, CS116, RE102, RS103 MIL-STD-461F: RE101, RS101
Operating Temp.	-35ºC to +75ºC (-31ºF to +167ºF) – Cold Start-Up
Waterproof	IP67/68

Section 2 | Hardware

Overview

The switches can be mounted directly to a flat surface or to a wall. Refer to the mechanical drawing below. Its high protected enclosure makes it able to withstand immersion (IP67/68 rating).

The Ethernet connections come out from rugged MIL-DTL-38999 RJFTV connectors.

Front Panel Display

The following describes the front panel, and LED indicators of the RJSMLAC-8UG-CAPS.

LED Indicators

The Single LED indicator on the front panel labelled PWR shows the operative status of the switch.
Once the switch is powered, the LED PWR is turned on.
This LED will be on solid green when proper power has been applied to the unit.

Each port has 2 LEDs indication:

- Link / Activity (Off – there is no link, Steady Green – There is a device connected, Flashing Green – there is data transmission)

- Speed (Green for 1000Mbps, Off for 10 or 100Mbps)

Section 3 | Installation

Selecting a Site

As with any electronic device, you should place the switch where it will not be subject to extreme temperatures, humidity, or electromagnetic interference that exceeds the RJSMLAC-8UG-CAPS's profile. Specifically, the site you select should meet the following requirements:

- The ambient temperature should be between -35 to 75 degrees Celsius.
- The relative humidity is recommended to be less than 95% percent, non-condensing.
- Surrounding electrical devices should not exceed the electromagnetic field (RFC) standards for MIL-STD-461E.

CAPS for unused connectors

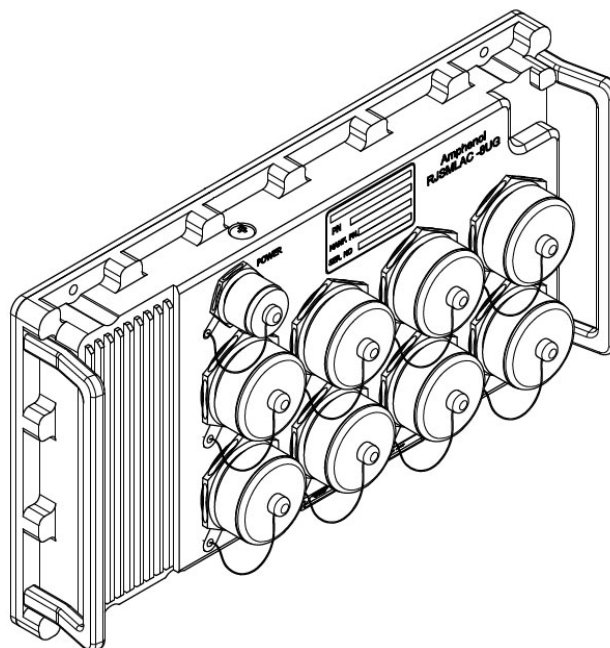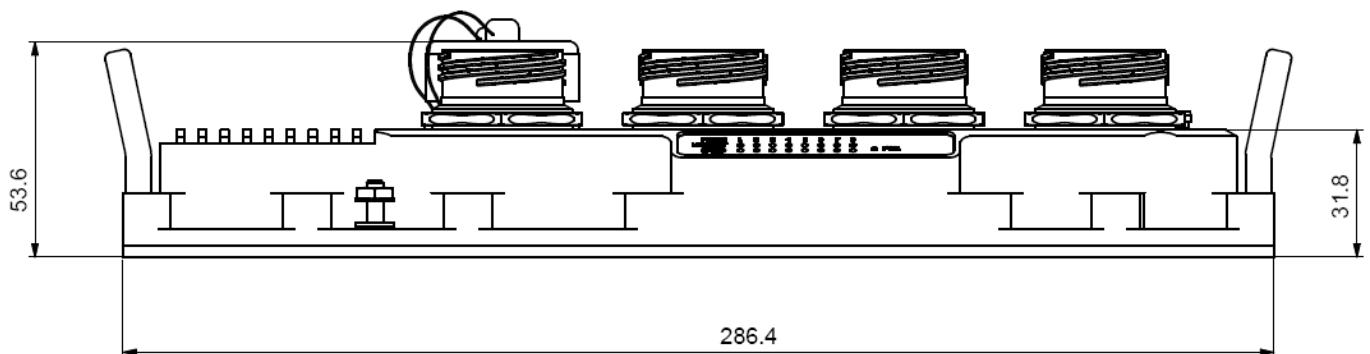The switches are pre-equipped with caps on all ports, including power and Ethernet.

→ *Make sure all connectors are protected with cap or sealed plug to ensure sealing and prevent from deterioration of the contacts.*
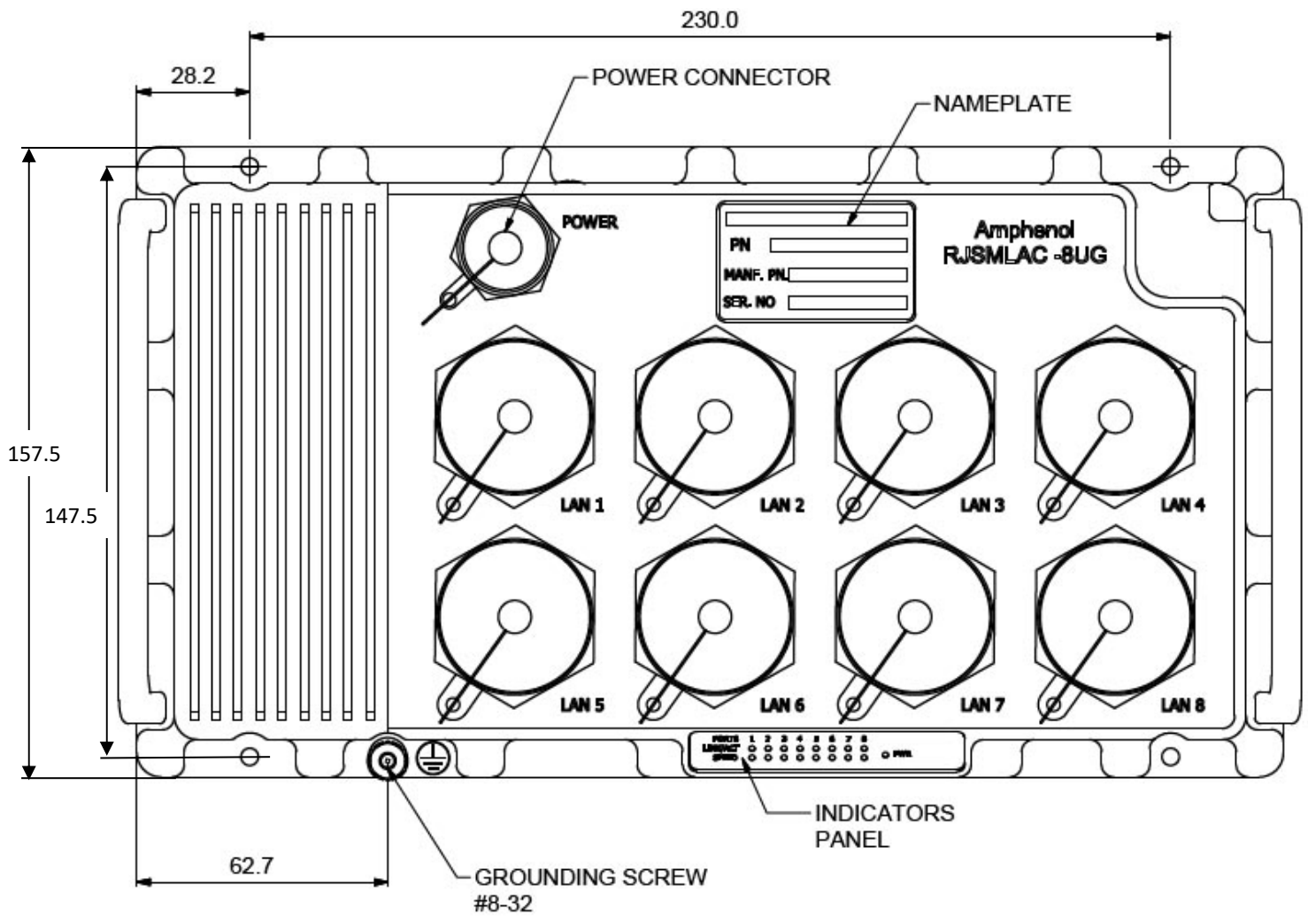
Mounting

The RJSMLAC-8UG-CAPS Ethernet Switch can be fastened to any flat surface by mounting the box directly. Refer to the mechanical drawings below. Make sure to allow enough room to route your Ethernet and power cables.

The RJSMLAC-8UG-CAPS weights 1.8 Kg and is mounted via its four 4x4.5 mm holes for screws.
The external dimensions of the RJSMLAC-8UG-CAPS are given here after.

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Mechanical drawing of Amphenol RJSMLAC-8UG showing POWER CONNECTOR, NAMEPLATE, POWER, PN, MANF. PN, SER. NO, LAN 1 through LAN 8 ports, INDICATORS PANEL, and GROUNDING SCREW #8-32. Dimensions: 230.0, 28.2, 157.5, 147.5, 62.7.

Section 4 | Wiring

Overview

These switches provide connections to Ethernet devices in harsh environment. Typically, a port is used to connect to another Ethernet switch that is connected to the main Ethernet backbone. The other Ethernet ports are then connected to Ethernet devices such as communication systems, Ethernet I/O, or industrial computers. Electrical isolation is provided on the Ethernet ports for increased reliability.

Please follow normal Ethernet wiring practices when installing these switches.

Power wiring

The switches should be powered using mating plugs and backshells compliant with MIL-DTL-38999 series III. We suggest using hereunder accessories. Another backshell can be used but it must ensure a correct sealing protection.

Power plug part number

Military designation: JD38999/26WA98SA

Amphenol designation: TV06RW0998SA

This plug is size 9. It is coming with 3 contacts size 20 (designed for 7.5 A nominal current).

Power plug wiring

Contact	Signal	Suggested Harness Color Table
A	+ 24 V	red
B	0 V	black
C	*Not connected*	*Not applicable*

Tooling

The plugs are using crimp contacts.

We suggest using hereunder tooling.

Crimping tools		Amphenol No	Military No
	Crimping tool	For #20: 809 857	For #20: M22520/1-01
	Positioner	For #20: 809 858	For #20: M22520/1-04

Plastic insertion and removal tools	Contact size	Amphenol No	Military no
	20	809 854	M81969/14-10

Backshell

We suggest using TVNSA backshells with corresponding heat shrinks.

These backshells, providing an electrical continuity between cable and connector, ensure a high level or of EMI/RFI protection. The sealing is ensured by straight heat shrink molded piece at the rear of the backshell. NSA and SA backshells ensure the shielding by clamping the braid with a screwing system. The free inner ring avoids twisting of the braid during screwing.

Heat-shrinks are molded pieces for harsh environment, fluid resistant (with preinstalled adhesive).

Backshell designation: TVNSA 09 014

Heat shrink designation: 804221

TVNSA backshell dimensions
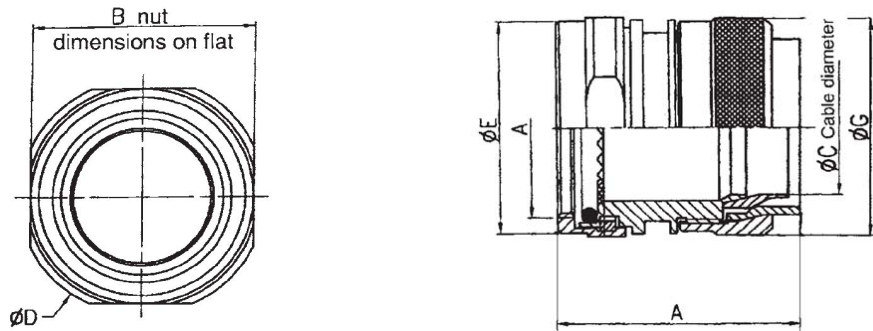
Plug size	A length mm (in)	A thread Metric	B max mm (in)	C max mm (in)	Ø E max mm (in)	Ø G max mm (in)
9 (A)	35.60 (1.402)	M12x1.0 -6H	16.70 (0.658)	6.90 (0.272)	15.62 (0.615)	16.50 (0.650)

## TVNSA backshell assembly instruction

1. Prepare the cable for termination process and slide onto the cable the items in the order shown on figure 1.

2. Screw the backshell at the rear of the connector.

3. Fold back the braid on the outer jacket and fix it (figure 2).

4. Install the braid as shown on figures 3 and 4:

Release the braid and cover the backshell (a) and the connector's shell. Slide the first ring (b) over the braid. Fold back the braid on the ring (b) and slide the second ring (c) over the braid and the first ring (b). Screw the last ring (d) at the rear of the backshell. If necessary, fix the extra braid on the outer jacket of the cable. If this installation (double folding of the braid) is not possible, refer to figure 5: Slide the first ring (b).

Release the braid and cover the backshell (a) and the connector's shell. Cut the braid as shown. Slide the second ring (c) over the braid and the first ring (b).

Screw the last ring at the rear of the backshell.

5. Install the heat-shrink molded piece.

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5
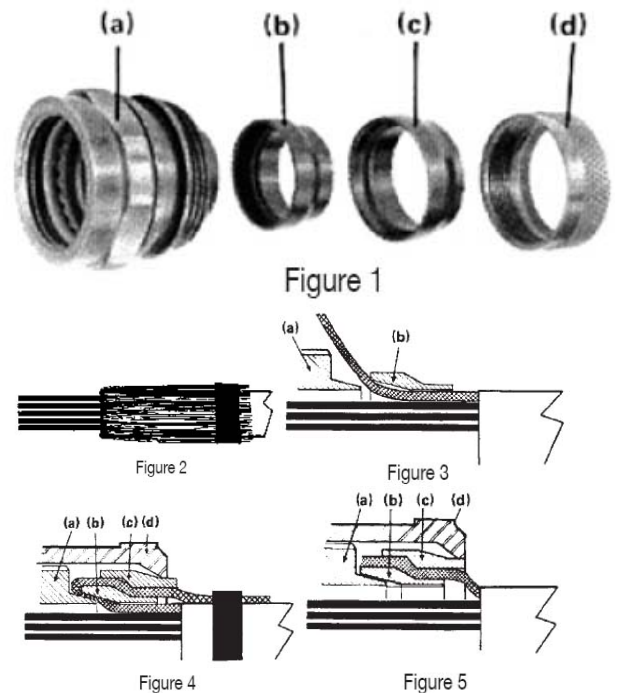
Ethernet wiring

These switches provide connections to Ethernet devices on the battlefield. Typically a port is used to connect to another Ethernet switch or hub that is connected to the main Ethernet backbone. The other Ethernet ports are then connected to Ethernet devices such as communication systems, Ethernet I/O, or industrial computers. Electrical isolation is provided on the Ethernet ports for increased reliability.

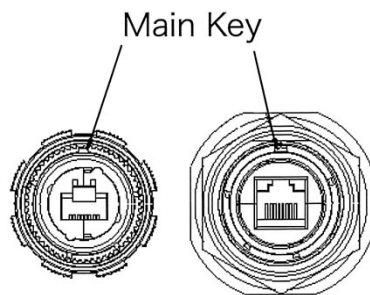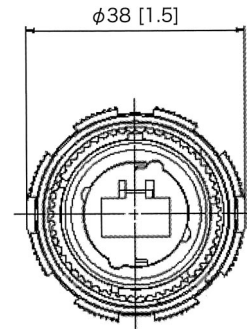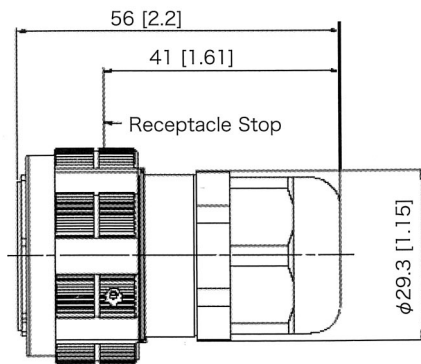Please follow normal Ethernet wiring practices when installing these switches.

Use data-quality (not voice-quality) twisted pair cable rated category 5 (or better) with standard RJ45 connectors. You can use all standard existing RJ45 Cat5e cordset and transform it into an environmental connector, without any cabling operation, and without any tool!

Ethernet plug part number

The IP68 rated RJ45 plug is field installable and does not require any special tools. It can be installed over any standard Ethernet patch cable (though you may have to remove the latch cover if it has an over-molded boot). Refer to the diagrams for mechanical and assembly details.

Part number of the plug to be used: RJF TV 6 M G. This plug may be assembled with 4 different coding. Use the coding A to make your assembly. For more details, please consult:
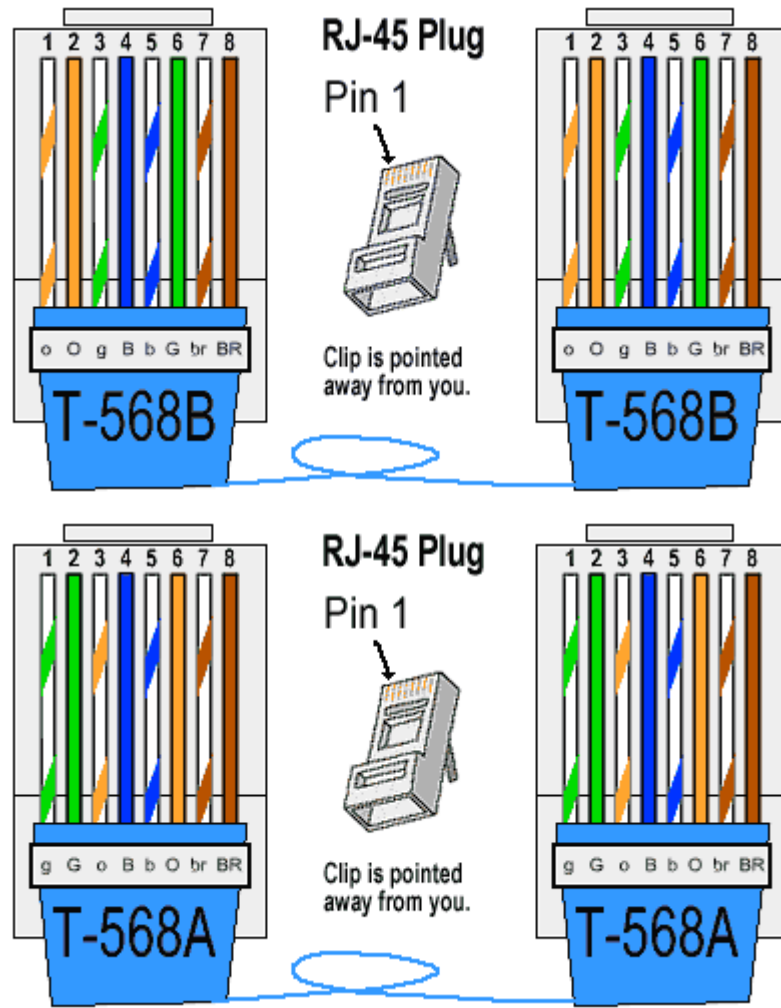
http://www.rjfield.com .

Plug   **Receptacle**

Coding A

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Ethernet RJ45 pins position

Most standard Ethernet cordsets follow one of the TIA-568 guideline given hereafter.

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Section 5

Switching Features

Features Overview

Here's a brief explanation of some of the features found in these switches documented by this manual.

ETHERNET PORTS

- 8 x switched 10/100/1000 (Gigabit Ethernet) ports

STANDARDS COMPLIANCE

- IEEE 802.1x MAC based Authentication
- IEEE 802.3/u 10/100Mbps Fast Ethernet
- IEEE 802.3ab 1000Mbps Gigabit Ethernet

STANDARDS

- MILSTD-1275B
- MILSTD-461E
- MIL-STD-704A
- MILSTD-810F GM
- IP67 / 68

PERFORMANCE

- 26.8 Mpps wire speed forwarding rate
- 20 Gbps maximum forwarding bandwidth
- 8K MAC Address

CHASSIS

- Low profile rugged aluminum extrusion
- Conductively cooled w/custom internal heat-sinks
- Ingress protection against sand, dust and moisture
- Anodize Coating, MIL-A-8625, Type II, Class 2

POWER

- Exceed MIL-STD-1275B Surge and Spike protection
- Voltage Input: 24Vdc Nominal (18-32V)
- Power Consumption: 7W Typical
- Ground: Grounding screw provided for connection to system chassis ground

ELECTROMAGNETIC

- MIL-STD-461E : CE102, CS114, CS115, CS116, RE102, RS103
- MIL-STD-461F : RE101, RS101

SHOCK/VIBRATION/HUMIDITY

- MIL-STD-810F, 501.4I, 501.4II, 502.4I, 502.4II, 507.4, 500.4II, 514, 516I, 516VI, 514.5, 512.4.
- IP67/68

PHYSICAL

- Weight: 1.8kg
- No Moving Parts. Passive Cooling
- Installation: Set of Four 4x4.5 mounting holes on bottom for mounting to any flat surface.

OPERATING TEMP

- -35ºC to +75ºC (-31ºF to +167ºF) – Cold Start-Up

STORAGE TEMP

- -45ºC to +85ºC (-49ºF to +185ºF)

Section 6 | Service Information

Service Information

We sincerely hope that you never experience a problem with any **Amphenol** product. If you do need service, call **Amphenol** at +33(0) 450 89 28 00 and ask for Applications Engineering. A trained specialist will help you to quickly determine the source of the problem. Many problems are easily resolved with a single phone call. If it is necessary to return a unit to us, an RMA (Return Material Authorization) number will be given to you.

Amphenol tracks the flow of returned material with our RMA system to ensure speedy service. You must include this RMA number on the outside of the box so that your return can be processed immediately.

The applications engineer you are speaking with will fill out an RMA request for you. If the unit has a serial number, we will not need detailed financial information. Otherwise, be sure to have your original purchase order number and date purchased available.

We suggest that you give us a repair purchase order number in case the repair is not covered under our warranty. You will not be billed if the repair is covered under warranty.

Please supply us with as many details about the problem as you can. The information you supply will be written on the RMA form and supplied to the repair department before your unit arrives. This helps us to provide you with the best service, in the fastest manner. Normally, repairs are completed in two days. Sometimes difficult problems take a little longer to solve.

We apologize for any inconvenience that the need for repair may cause you. We hope that our rapid service meets your needs. If you have any suggestions to help us improve our service, please give us a call. We appreciate your ideas and will respond to them.

For Your Convenience:
Please fill in the following and keep this manual with your **Amphenol** system for future reference:

P.O. #:_____   Date Purchased: _____

Purchased From:_____

Product Support

To obtain support for Amphenol products:

Visit our website. https://www.amphenol-socapex.com/en/technical-support

Phone: +33(0) 450 89 28 00

Mailing Address: Amphenol, Promenade de l'Arve, B.P.29, 74311 Thyez Cedex, France

For more information

You will find all useful information on the RJ-Switch series on the dedicated website:

https://www.amphenol-socapex.com/en/products/connectors/rugged-ethernet-usb/ethernet-military-switches