

Amphenol

RJ-Switch



IP67 rugged Ethernet Unmanaged Switch RESMLAC 8US CAPS SX - User Manual -

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This manual applies to the following products:

- **RESMLAC 8US CAPS SX**
Rugged IP67 Unmanaged Ethernet Switch

Revision	Date	Modifications
1.0	January 2013	Initial document

Amphenol Statement of Limited Warranty:

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

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 other than agreed in a specific contract. The guarantee is 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.

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;
- More specifically whether the cover of the switch enclosure have been opened.
- Whether the components have been damaged in transit or have not been stored by the Customer in conditions in accordance with the specification.
- The guarantee shall not cover any defects resulting from instructions given by Client to Seller ;
- Whether the components have been subjected to abuse (mechanical, electrical or thermal) on installation or on use and, in the case of slices/dice, have been subjected to handling or such operations as the welding of connecting wires mounting by soldering or sticking.
- Whether the unfitness or defectiveness of the components has resulted from exceeding the maximum values for usage (temperature limit, maximum voltage, etc.) as defined by the Vendor, or from incorrect choice of application.
- Damages resulting from force majeure, such as this is defined under article 11 of Amphenol Socapex Sales Conditions hereunder, or resulting from any unpredictable event or natural disaster.
- Furthermore, the guarantee shall not cover consequential liability, direct or indirect which may result from the failure of a component supplied by the Vendor.

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.

CE Declaration of conformity:

This equipment complies with the requirements relating to electromagnetic compatibility and security.

EN55022 (Emissions);

EN55024 (EN50082-1 ou -2) et/ou EN61326-1 (Immunity);

EN61010-1 ou EN60950 (Electrical safety);

This meets the essential protection requirements of the European Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

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 because little or no user configuration is required. Once the Ethernet connections are made and the unit is powered up it will immediately begin to operate.

Military applications can now take full advantage of 100Mbps Fast Ethernet performance. The installation guide describes how to install and use the hardened compact Ethernet RESMLAC8USCAPSSX 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 RESMLAC8USCAPSSX to the optimal solutions switch of choice for harsh environments constrained by space.

Developed for military and harsh mobile applications, the RESMLAC8USCAPSSX 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-D-38999 circular connectors.

Leveraging best-in-class switching technology from Techaya, the RESMLAC8USCAPSSX serves as a robust solution for providing local area network (LAN) connectivity to IP-enabled computing and net-centric devices. Compact in size, the RESMLAC8USCAPSSX is particularly useful for expanding port density to tactical IP routers in space-constrained airborne and ground vehicle environments.

RESMLAC8USCAPSSX is specifically designed for Data Acquisition & Transmission, Battlefield Communication C4ISR, Rugged Networks, Mobile Communications, Combat vehicles and Avionic & Shipboard Systems.

Operation

Unlike an Ethernet hub that broadcasts all messages out all ports, these switches will intelligently route Ethernet messages only out the appropriate port. The major benefits of this are increased bandwidth and speed, reduction or elimination of message collisions, and deterministic performance when tied with Unmanaged systems.

The switch supports double speed 10/100BaseTx (up to 100 Mbps).

Each of these ports will independently auto-sense the speed, allowing you to interface to regular or fast Ethernet devices.

Refer to following sections for more information on operation and features.

Performance Specifications

These general specifications apply to these switches. Refer to Section 5 for complete technical specifications.

Ports	10/100BaseT(x) (Shielded RJ45)
Voltage	24Vdc Nominal (18-32V) Power Consumption: 2.8W Typical
Ethernet Standards	IEEE 802.3 (10BaseT), 802.3u (100BaseTX), 802.3x (Full Duplex),
Speed Per Port	RJ45: 100 Mbps (half duplex) or 200 Mbps (full duplex)
MIL standards	MILSTD-1275, MILSTD-461E, MILSTD-810F GM, IP67
Electromagnetic	MIL-STD-461E Electromagnetic compatibility RE-02, RS-03
Operating Temp.	-35°C to +75°C (-31°F to +167°F) – Cold Start-Up
Waterproof	IP67

Section 2

Hardware

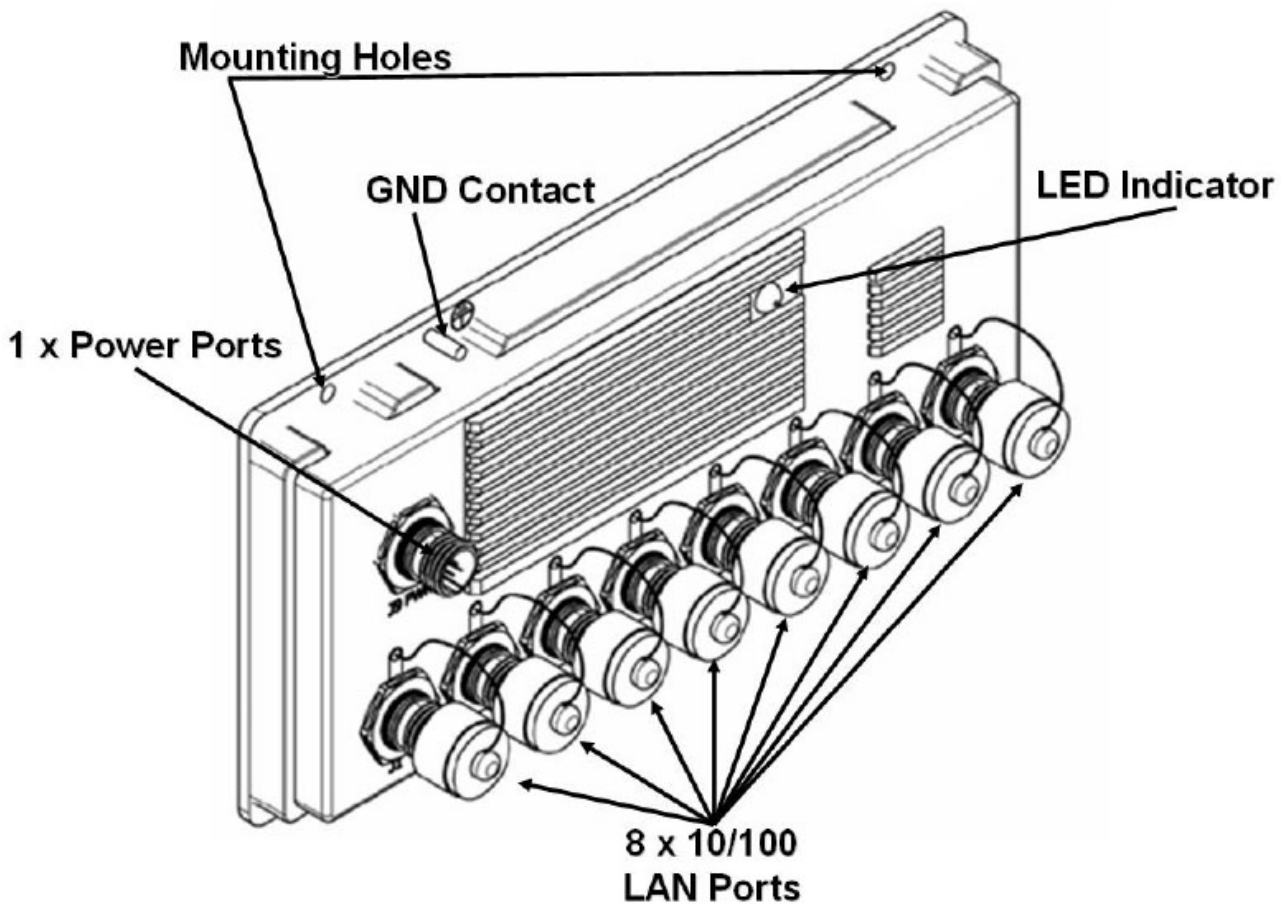
Overview

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 rating).

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

Front Panel Display

The following describes the front panel, and LED indicators of the RESMLAC8USCAPSSX.



Note: the Handles are not represented.

LED Indicators

The Single LED indicator on the front panel shows the operative status of the switch. Once the LED is turned on, the switch is powered and ready-for-use.

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 (Orange for 100Mbps, Off for 10Mbps)

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 RESMLAC8USCAPSSX'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.

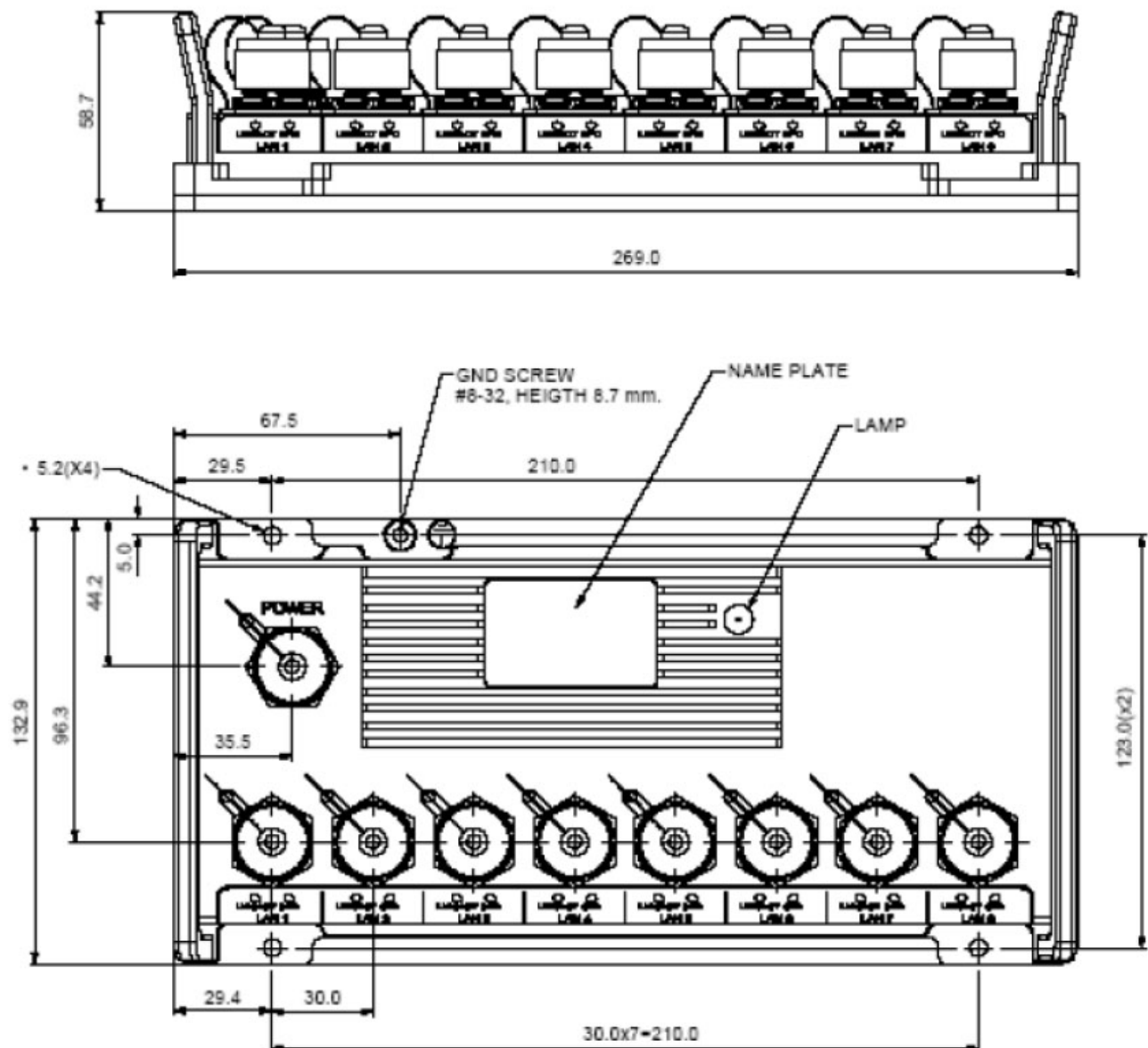
CAPS for unused connectors

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 RESMLAC8USCAPSSX 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.



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 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.

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 (7.5 A nominal current).

Power plug wiring

Contact	Signal	Harness Color Table
A	24 V (+)	red
B	24 V (-)	black
C	Not connected	white

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.

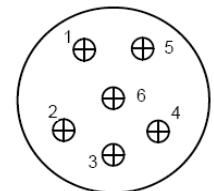
The switches should be connected using mating plugs and backshells compliant with MIL-DTL-38999 series III. We suggest using hereunder accessories. Another backshell can be used but it must ensure a correct sealing protection.

Ethernet plug part number

Military designation: JD38999/26WA35PN

Amphenol designation: TV06RW0935P .

This plug is size 9. It is coming with 6 contacts size 22D.



Ethernet plug wiring

Contact	Signal type	Description	Wire gauge
1	LAN RX+	10/100 BaseT Receive Data Positive	22 Gauge
2	LAN RX-	10/100 BaseT Receive Data Negative	22 Gauge
3	LAN TX+	10/100 BaseT Transmit Data Positive	22 Gauge
4	Reserved	Not connected	N/C
5	Reserved	Not connected	N/C
6	LAN TX-	10/100 BaseT Transmit Data Negative	22 Gauge

RJ45 Wiring Guidelines

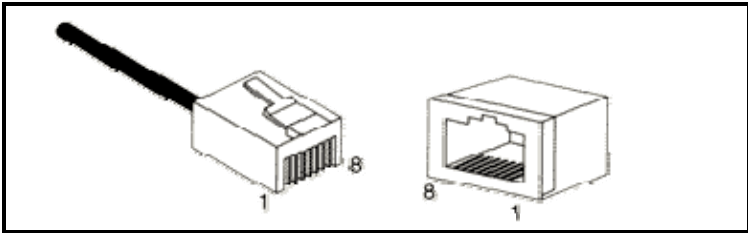
Use data-quality (not voice-quality) twisted pair cable rated category 5e (or better) with standard RJ45 connectors.

Please note that these cables are available as straight-thru or cross-over configurations. Either type can be used because these switches support auto-mdi/mdix-crossover. For reference, the pin-outs of the two cable types are listed below.

Ethernet Cable Pin-outs

Straight-thru Cable Wiring		Cross-over Cable Wiring	
Pin 1	Pin 1	Pin 1	Pin 3
Pin 2	Pin 2	Pin 2	Pin 6
Pin 3	Pin 3	Pin 3	Pin 1
Pin 6	Pin 6	Pin 6	Pin 2

Ethernet Connector Pin Positions



Ethernet Connector Pin-outs

Pin #	MDI-X Port	MDI Port (typical for uplink)	Auto-MDI/MDI-X	Ethernet Device Port
1	TX+	RX+	TX/RX+	RX+
2	TX-	RX-	TX/RX-	RX-
3	RX+	TX+	RX/TX+	TX+
6	RX-	TX-	RX/TX-	TX-

Cable Distance



The maximum cable length for 10/100BaseT(x) is typically 100 meters (328 ft.).


From	To	Maximum Distance
Switch	Switch or Hub	100 meters (328 feet)
Switch or Hub	PLC, Ethernet I/O, PC, etc.	100 meters (328 feet)

Note: Hubs and switches are different devices. Hubs simply broadcast all messages out all ports. Switches intelligently route messages only out the appropriate port.

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 #22D: 809 801	For #20: M22520/1-01 For #22D: M22520/2-01
	Positioner	For #20: 809 858 For #22D: 809 835	For #20: M22520/1-04 For #22D: M22520/2-07

Plastic insertion and removal tools	Contact size	Amphenol No	Military no
	22D	809 856	M81969/14-01
	20	809 854	M81969/14-10

Backshell

We suggest using TVNSA backshells with corresponding heat shrinks.

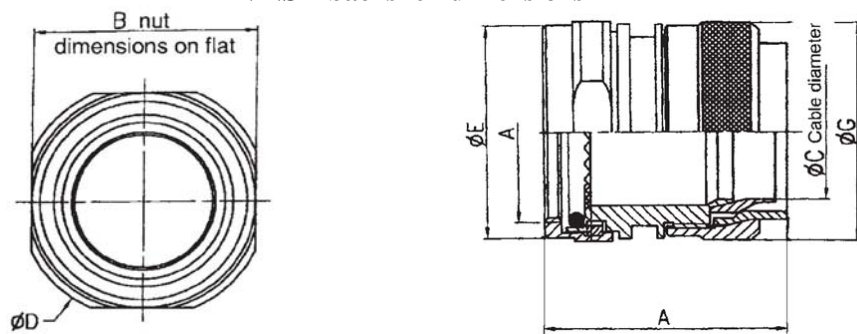
These backshells, providing an electrical continuity between cable and connector, ensure a high level of EMI/RFI protection. The sealing is ensured by straight heat shrink molded piece at the rear of the backshell. NSA and SA backshells ensure the shielding by clamping the braid with a screwing system.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

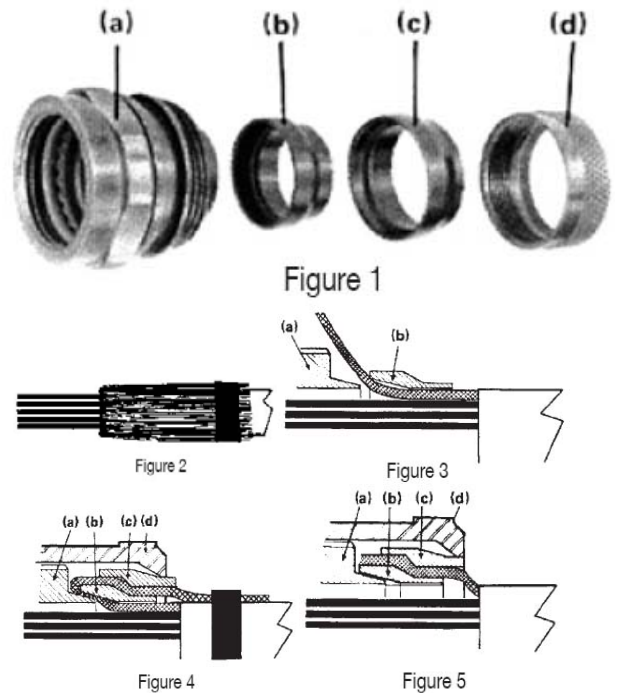
1. Prepare the cable for termination process and slide onto the cable the items in the order shown on figure 1.
2. Screw the backshell at the rear of the connector.
3. Fold back the braid on the outer jacket and fix it (figure 2).
4. Install the braid as shown on figures 3 and 4:

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.



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 (Fast Ethernet) ports

STANDARDS COMPLIANCE

- IEEE 802.3 10 Mbps 10BASE-T (Ethernet)
- IEEE 802.3u 100BASE-TX 100 Mbps (Fast Ethernet)
- IEEE 802.3x Flow Control

NETWORKING

- Full wire-speed forwarding rate
- Store-and-forward mechanism
- Auto MDI-II, MDI-X
- Auto-Negotiation Protocol
- Address Look-Up
- Migration
- Learning

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

STANDARDS

- MILSTD-1275B
- MILSTD-461E
- MILSTD-810F GM
- IP67

ELECTROMAGNETIC

- MIL-STD-461E Electromagnetic compatibility
- RE-02, RS-03

PERFORMANCE

- 128K Byte of SRAM for Frame Buffering
- 2.0Gbps High-Performance Memory Bandwidth
- Wire-Speed Reception and Transmission
- Integrated Address Look-Up Engine
- Automatic Address Learning

POWER

- MIL-STD-1275B Surge and Spike protection
- Voltage Input: 24Vdc Nominal (18-32V)
- Power Consumption: 2.8W Typical
- Ground: Grounding screw provided for connection to system chassis ground

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

PHYSICAL

- Dimensions: 269mm (L) x 133(W) x 65(H), including connectors & hardware
- Weight: 1.5kg

INSTALLATION

- Set of Four 4x4.5 mounting holes on bottom for mounting to any flat surface.
- Option for Shock absorber up to 40g.

COOLING

- No Moving Parts. Passive Cooling

OPERATING TEMP

- -35°C to +75°C (-31°F to +167°F) – Cold Start-Up

STORAGE TEMP

- -45°C to +85°C (-49°F to +185°F)

Section 6

Maintenance and Service Information

Maintenance

This product has been designed in order to operate on the field without any maintenance operation. It comes as a complete solution without any modular components that would require change.

You will not need to change any components during all the life of the product.

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. <http://www.rjswitch.com>

Phone: +33(0) 450 89 28 00

Fax: +33(0) 450 96 29 75

E-mail: <mailto:contact@rjswitch.com>

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:

<http://www.rjswitch.com>