

# Amphenol RJ-Switch



## IP67 rugged Ethernet Managed Switch RESMLAC 8MG CAPS - Hardware User Manual -

### Contents

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<b>Section 1</b>	<b>General Information</b>	<b>Page 3</b>
<b>Section 2</b>	<b>Hardware</b>	<b>Page 4</b>
<b>Section 3</b>	<b>Installation</b>	<b>Page 5</b>
<b>Section 4</b>	<b>Wiring</b>	<b>Page 7</b>
<b>Section 5</b>	<b>Management</b>	<b>Page 11</b>
<b>Section 6</b>	<b>Features Overview</b>	<b>Page 12</b>
<b>Section 7</b>	<b>Service Information</b>	<b>Page 14</b>

This manual applies to the following products:

- **RESMLAC 8MG CAPS**  
Rugged IP67 Managed Ethernet Switch,

Revision	Date	Modifications
1	April 2012	Initial document
2	January 2013	Revised Warranty information

### ***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 Managed 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 RESMLAC8MGCAPS 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-461C up to the highest levels. The mentioned ability turns the RESMLAC8MGCAPS to the optimal solutions switch of choice for harsh environments constrained by space.

Developed for military and harsh mobile applications, the RESMLAC8MGCAPS 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, the RESMLAC8MGCAPS serves as a robust solution for providing local area network (LAN) connectivity to IP-enabled computing and net-centric devices. Compact in size, the RESMLAC8MGCAPS is particularly useful for expanding port density to tactical IP routers in space-constrained airborne and ground vehicle environments.

RESMLAC8MGCAPS 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-1275, MILSTD-461C, MILSTD-810F GM, IP67
Electromagnetic	MIL-STD-461C 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

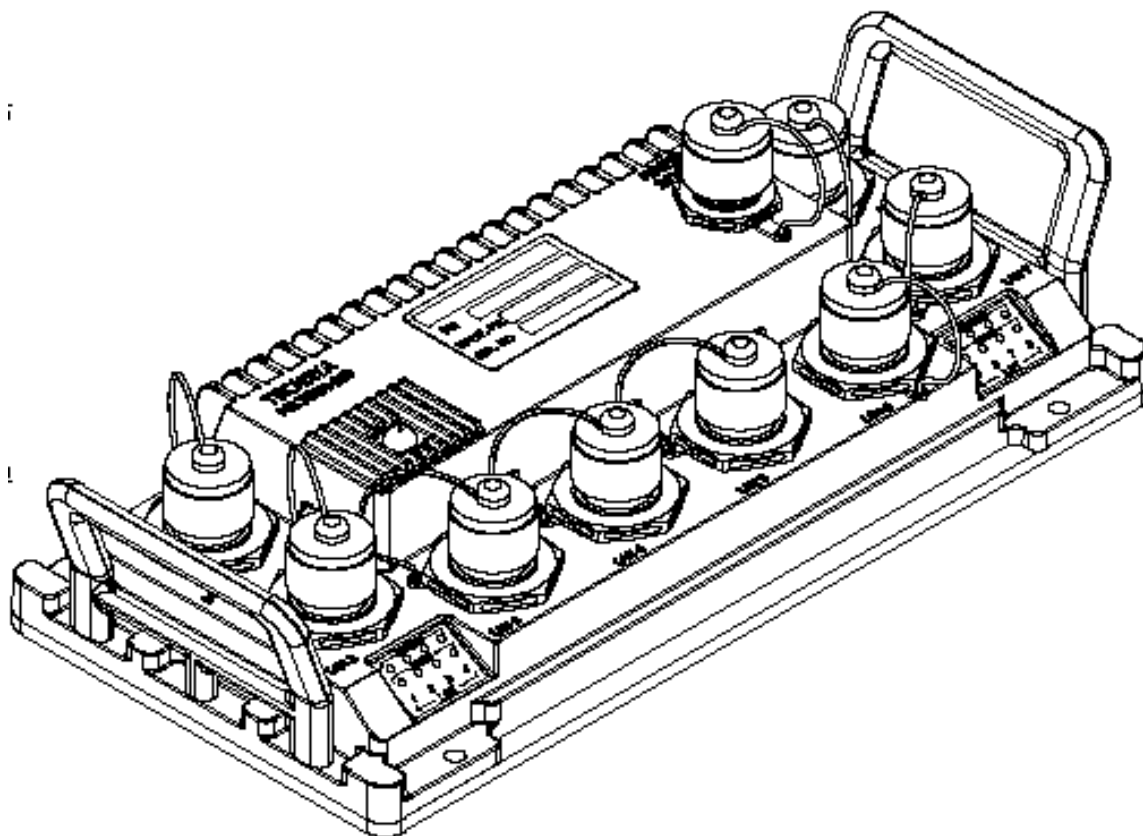
### Overview

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 RESMLAC8MGCAPS.



### 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 (Orange 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 RESMLAC8MGCAPS'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-461C.

### CAPS for unused connectors

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

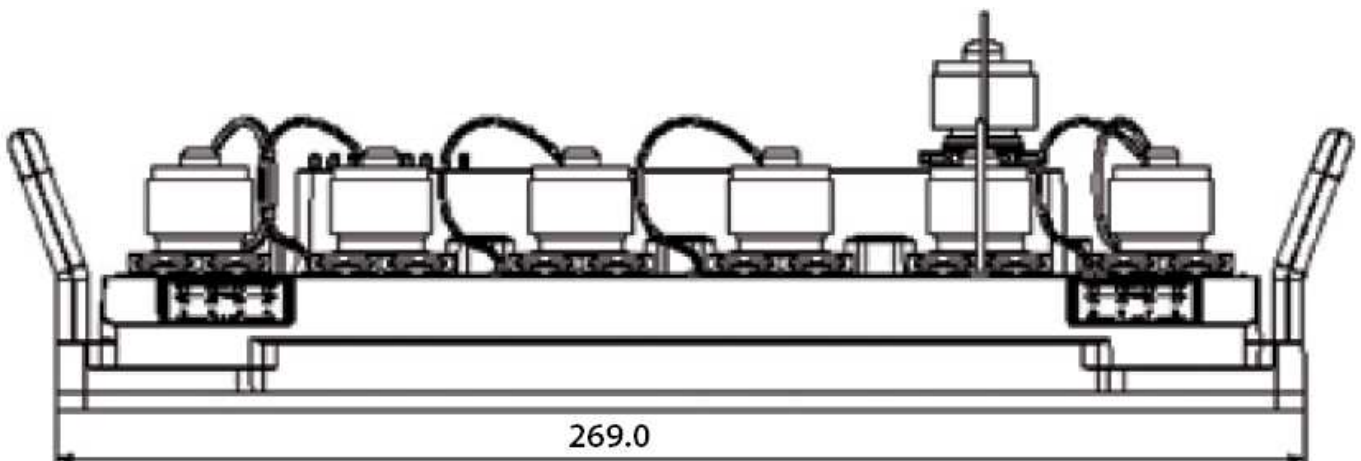
**→ Make sure all connectors are protected with cap or sealed plug to ensure sealing and prevent from deterioration of the contacts.**

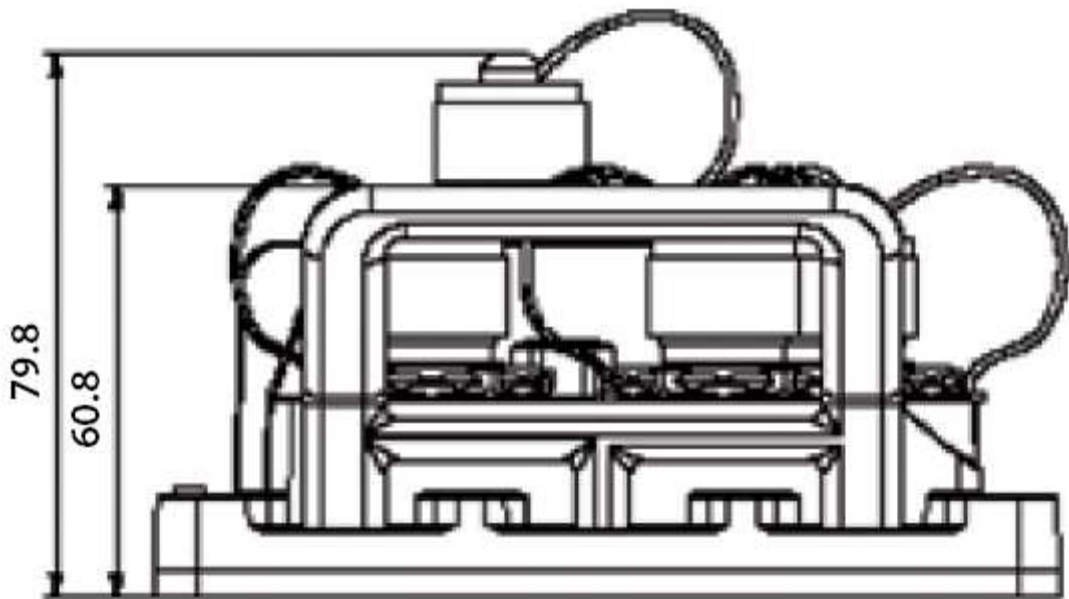
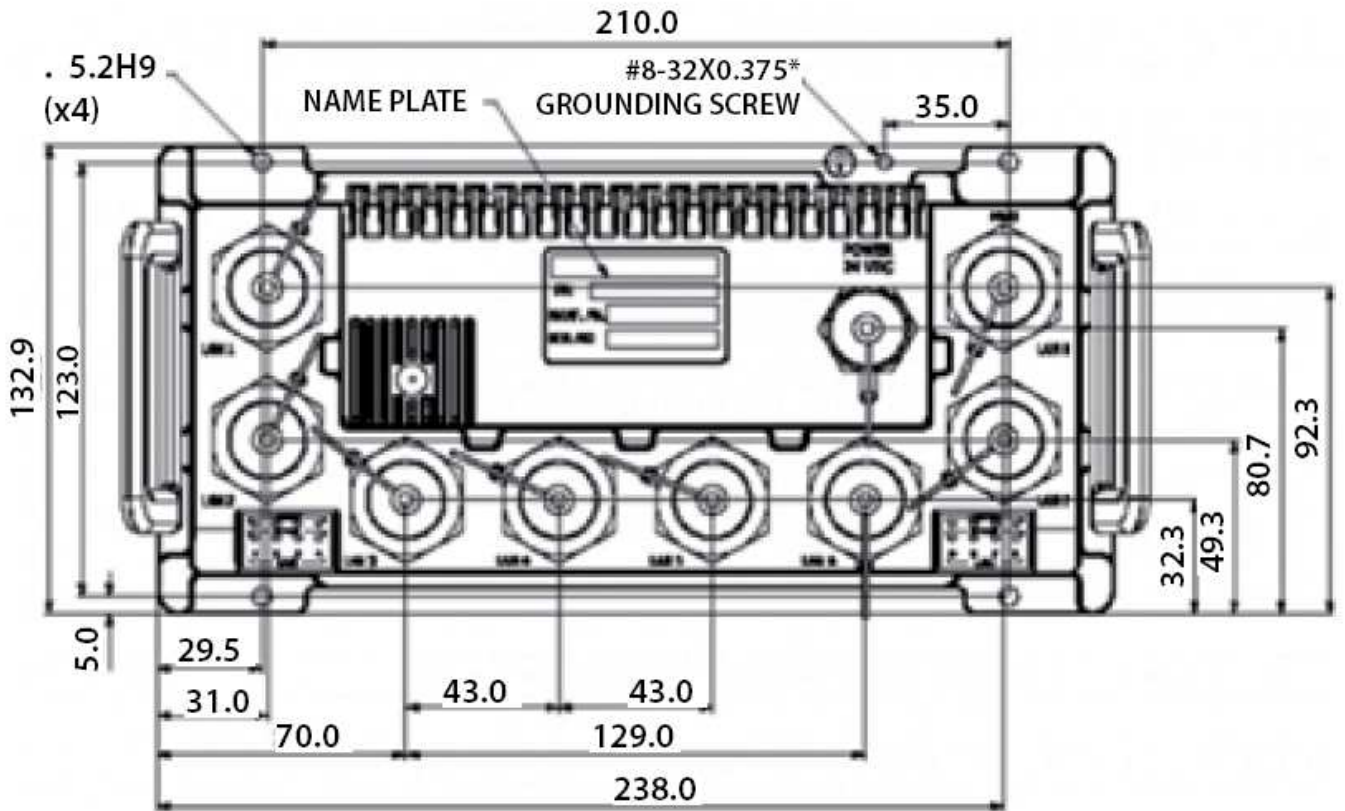
### Mounting

The RESMLAC8MGCAPS 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 RESMLAC8MGCAPS weighs 1.5 Kg and is mounted via its four 4x4.5 mm holes for screws.

The overall external dimensions of the RESMLAC8MGCAPS are 269(L) x 133(W) x 80(H) millimeters.







## 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	24 V (-)	black
C	GND	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.

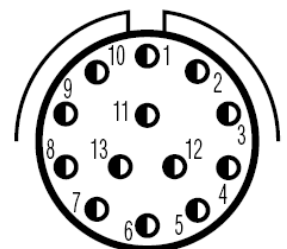
The switches should be connected using mating plugs and backshells compliant with MIL-DTL-38999 series III. We suggest using hereunder accessories. Another backshell can be used but it must ensure a correct sealing protection.

### Ethernet plug part number

Military designation: JD38999/26WB35PN

Amphenol designation: TV06RW1135P .

This plug is size 11. It is coming with 13 contacts size 22D.



## Ethernet plug wiring

Contact	Signal type	Description	Wire gauge
1	Reserved	Not connected	N/C
2	Reserved	Not connected	N/C
3	BI_DB-	10/100/1000 BaseT Pair B Negative	22 Gauge
4	BI_DB+	10/100/1000 BaseT Pair B Positive	22 Gauge
5	BI_DA-	10/100/1000 BaseT Pair A Negative	22 Gauge
6	BI_DA+	10/100/1000 BaseT Pair A Positive	22 Gauge
7	BI_DD-	10/100/1000 BaseT Pair D Negative	22 Gauge
8	BI_DD+	10/100/1000 BaseT Pair D Positive	22 Gauge
9	BI_DC-	10/100/1000 BaseT Pair C Negative	22 Gauge
10	BI_DC+	10/100/1000 BaseT Pair C Positive	22 Gauge
11	Reserved	Not connected	N/C
12	Reserved	Not connected	N/C
13	Reserved	Not connected	N/C

## Ethernet ports connection

The following table indicates the appropriate wiring connections for the Gigabit Ethernet ports relative to the available link speeds. Please note that MDI is the preferred connection choice. The Ethernet switches are capable of connecting using the MDIX scheme, but it is not advised.

Switch Contacts	RJ-45 Pinout P/N	MDI			MDI-X		
		1000 Base-T	100 Base-T	10 Base-T	1000 Base-T	100 Base-T	10 Base-T
Pair A(+/-)	6/5	BI_DA+-	TX+-	TX+-	BI_DA+-	RX+-	RX+-
Pair B(+/-)	4/3	BI_DB+-	RX+-	RX+-	BI_DB+-	TX+-	TX+-
Pair C(+/-)	10/9	BI_DC+-	Unused	Unused	BI_DC+-	Unused	Unused
Pair D(+/-)	8/7	BI_DD+-	Unused	Unused	BI_DD+-	Unused	Unused

## Serial wiring

The LAN1 is a shared port for both serial and Ethernet. With a dedicated cable you can access the CLI mode via port LAN1. To manage the switch via the WEB interface you can use all eight ports.

The following table indicates the appropriate wiring connections for the LAN1 dedicated serial port.



Signal	Direction	Type	DB9 Pinout
TX (PIN-12)	Output	RS-232	PIN 2
RX (PIN-13)	Input	RS-232	PIN 3
GND (PIN-11)	Reference	Ground	PIN 5




## 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:

For power: TVNSA 09 014

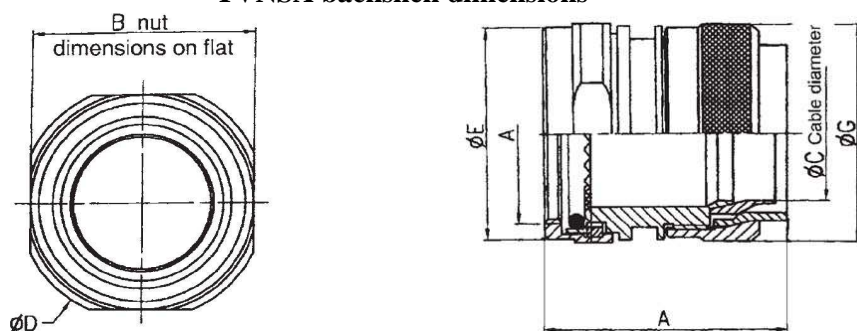
For Ethernet: TVNSA 11 014

Heat shrink designation:

For power: 804221

For Ethernet: 804222

### 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)
11 (B)	35.60 (1.402)	M15 x 1.0 -6H	20.70 (0.815)	9.60 (0.378)	18.62 (0.733)	19.40 (0.764)

### TVNSA backshell assembly instruction

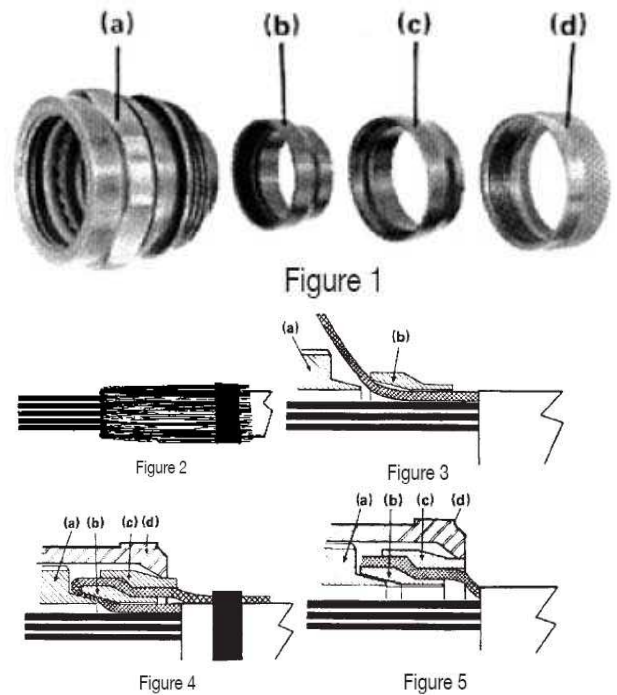
1. Prepare the cable for termination process and slide onto the cable the items in the order shown on figure 1.
2. Screw the backshell at the rear of the connector.
3. Fold back the braid on the outer jacket and fix it (figure 2).
4. Install the braid as shown on figures 3 and 4:

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

## Management

### Management

The switch is managed. It can be accessed either using the web interface or using RS-232 console port (port 1, see Serial Wiring for details).

### Web management

For in-band Ethernet management configuration use either one of the 8 ports.

Configure your computer with compatible IP address and access to the switch using a web browser.

Switch default                    IP address: 192.168.0.254 or 192.168.1.111  
Mask: 255.255.255.0  
Gateway: [empty].

Enter 'admin' for the password.

You have now access to the configuration settings. You can enter your desired IP address and subnet, or enable DHCP.

### Serial management

The MNG port supports out-of-band configuration management of the switch.

There is one serial port (the port 1, shared with LAN 1) associated with the Management Processor, MNG.

This port is RS-232 compatible and can operate only at:

- 115,200 baud rate
- 1 Stop Bits
- No Parity
- No Flow Control

***→ Consult the dedicated Command Line Interface User Manual for getting all details regarding the commands description.***

## Section 6

### 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 802.1Q Vlan Tagging
- IEEE 802.1P QoS
- IEEE 802.1S Multiple STP
- IEEE 802.1W Rapid STP
- IEEE 802.1AD Link Aggregation
- IEEE 802.1X

### NETWORKING

- Spanning Tree (802.1d), RSTP (802.1w) and multiple Spanning Tree (802.1S) for fast recovery rings
- Security via Radius Authentication 802.1x, Port Security, Port Mirroring
- Multicasting (IGMP Snooping), GARP, GMRP, and GVRP Broadcasting and flooding Control up to 8K Groups.
- 802.1q Tagged based VLAN up to 4K VLAN groups.
- QoS Multi-Layer Classifier, 802.1p, ToS/DSCP traffic classification. WFQ, Strict Queuing.
- Bridge support for Q-in-Q.
- Link Aggregation 802.3AD.
- WEB, CLI, Telnet Management.

### STANDARDS

- MILSTD-1275B
- MILSTD-461C
- MIL-STD-704A
- MILSTD-810F GM
- IP67

### 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-461C Electromagnetic compatibility
- RE-02, RS-03

## 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 80(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 7

## 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.** <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>