Amphenol SOCAPEX

IP67 rugged Ethernet Managed Switch
RESMLAC-12EMG-F35
- Hardware User Manual -

Contents

This manual applies to the following products:

- **RESMLAC 12EMG F35** ***(options)***
  Rugged IP67 Managed Ethernet Switch, with 12 gigabit port, all LAN ports shared within two MIL-DTL-38999 connectors.

Revision	Date	Modifications
1	August 2022	Initial document

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 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 RESMLAC-12EMG-F35 Military Rugged Switch. Capable of operating at extreme temperature of -45°C to +80°C and meet the toughest industrial and military environments such as MIL-STD-810F/G/GM, MIL-STD-1275, MIL-STD-461E up to the highest levels. The mentioned ability turns the RESMLAC-12EMG-F35 to the optimal solutions switch of choice for harsh environments constrained by space.

Developed for military and harsh mobile applications, the RESMLAC-12EMG-F35 features mechanical packaging enhancements designed for MIL-STD-810F/G/GM 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 RESMLAC-12EMG-F35 serves as a robust solution for providing local area network (LAN) connectivity to IP-enabled computing and net-centric devices. Compact in size, the RESMLAC-12EMG-F35 is particularly useful for expanding port density to tactical IP routers in space-constrained airborne and ground vehicle environments.

Performance Specifications

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

Ports	12x 10/100/1000BaseT(x) (Shielded RJ45) All LAN ports shared into two MIL-DTL-38999 connectors
Voltage	24Vdc Nominal (16-36V) Power consumption: 7W Typical
MIL standards	MIL-STD-1275, MIL-STD-704, MIL-STD-810F/G/GM, IP67
Electromagnetic	MIL-STD-461E Electromagnetic compatibility CE-102, CS-114, CS-115, CS-116, RE-102, RS-103
Operating Temp.	-45ºC to +80ºC (-49ºF to +185ºF) – 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 RESMLAC-12EMG-F35.

LED Indicators

The RESMLAC-12EMG-F35 unit has LEDs indications,

- 1 LED - Power Indications
- 24 LEDs – Ethernet Indications.

The PWR LEDs is illuminated when input power is applied to the RESMLAC-12EMG-F35.
Each of the 12 LAN ports has two LED with dual color indication, Yellow and green.

Table 5 - LED Indicators

Indicator	LED	Marking	Description
General Indications	Power	Status	Green LED ON: PWR OK
Ethernet Indications	Speed	Port number	100 Mbps Green
			1000 Mbps Yellow
	Link/Activity	Port number	Green ON - Link is OK
			Green Flashing - Transmitting or Receiving Data
			OFF - No link and No Data

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 RESMLAC-12EMG-F35 profile. Specifically, the site you select should meet the following requirements:

- The ambient temperature should be between -45 to +80 degrees Celsius.
- Surrounding electrical devices should not exceed the electromagnetic field (RFC) standards for MIL-STD-461E.

CAPS for unused connectors

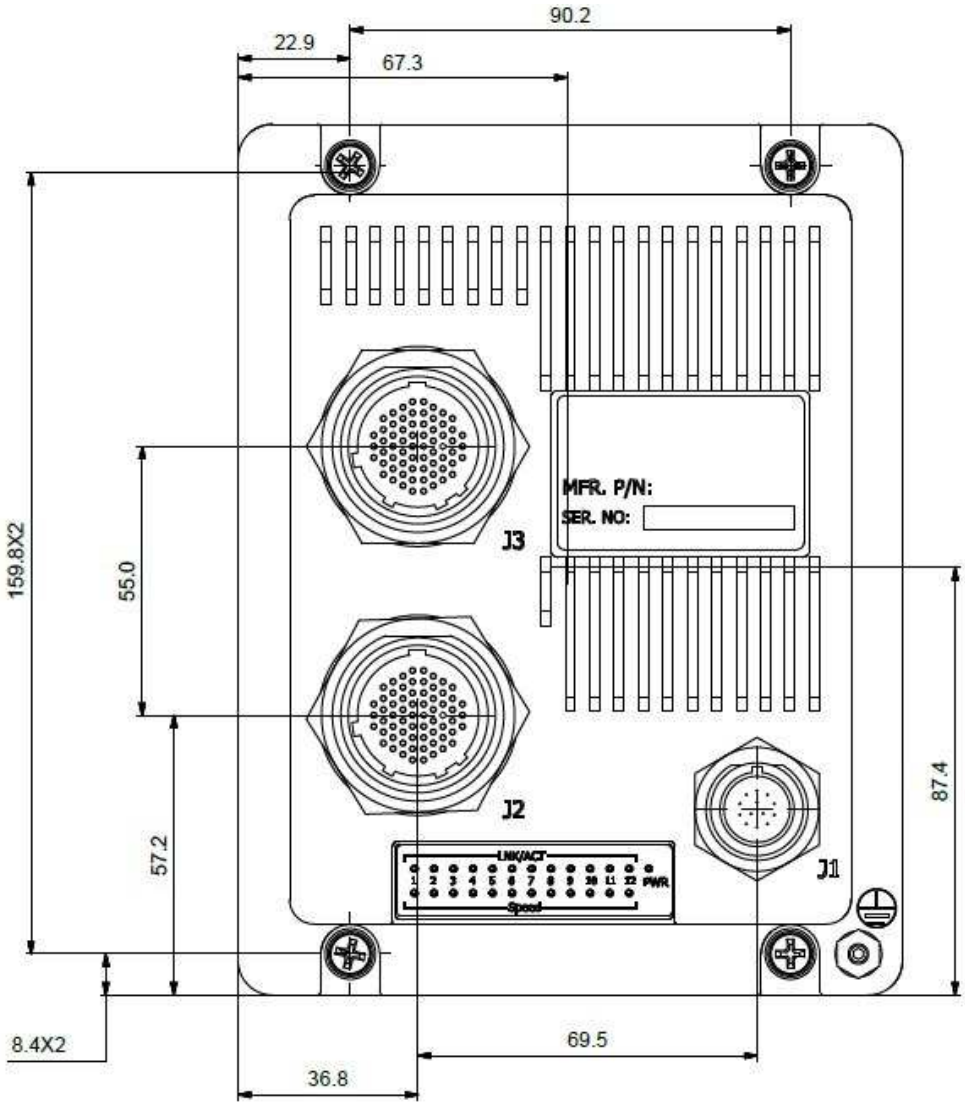
The switches are pre-equipped with caps on all ports, including power and Ethernet.

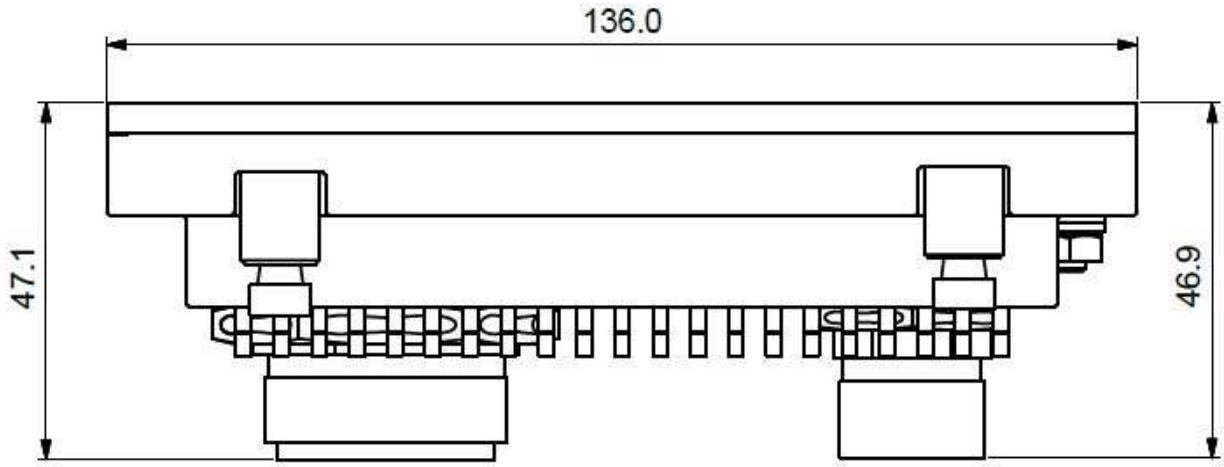
→ Make sure all connectors are protected with cap or sealed plug to ensure sealing and prevent from deterioration of the contacts.

Mounting

The RESMLAC-12EMG-F35 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 RESMLAC-12EMG-F35 weighs 1.150 Kg and is mounted via its four # 10-32UNF Captive Screws.
The overall external dimensions of the RESMLAC-12EMG-F35 are 178(L) x 136(W) x 47(H) millimeters.

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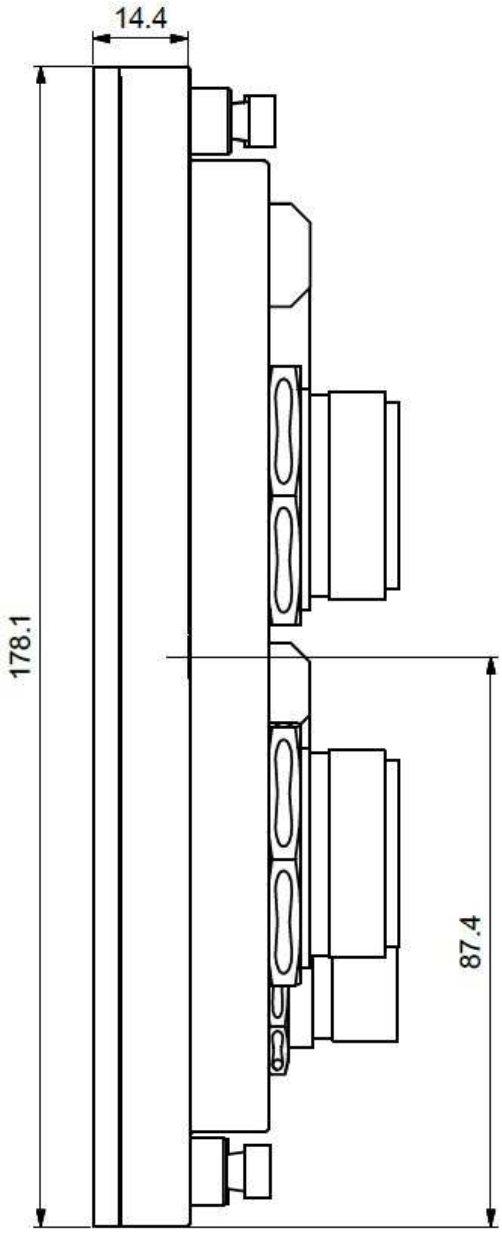
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Section 4

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.

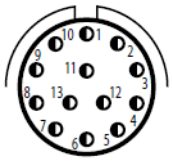
Power wiring

Power is provided to the switch through J1. 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

Amphenol designation: TV06 RW 11 35 SN

This plug is size 11. It is coming with 13 contacts size 22D (designed for 5A nominal current).



Power plug wiring

Contact	Signal	Suggested Harness Color Table
6	24 V (+)	red
3	24 V (-)	black
All other contacts	Not connected	None

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.

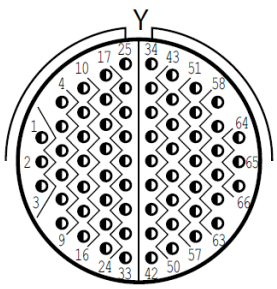
The switches should be connected using mating plugs and backshells compliant with MIL-DTL-38999 series III. We suggest using hereunder accessories. Another backshell can be used but it must ensure a correct sealing protection.

Ethernet plug part number

LAN ports are shared through J2 and J3.

J2 & J3 Amphenol designation: TV06RW1935SN (F35)

These plugs are size 19. They are coming with 66 contacts size 22D.



Ethernet plug wiring

Pinout for J2 connector

Pin#	Description		Pin#	Description
1			34	CH 12 B +
2			35	CH 12 B -
3			36	CH 10 A -
4			37	CH 10 A +
5			38	N.U
6			39	CH 10 D -
7	UART Transmit – (RS232-Tx) output		40	CH 11 C +
8	UART Receive + (RS232-Rx) input		41	CH 9 C -
9	Signal GND for RS232		42	CH 9 C +
10			43	CH 12 A -
11			44	CH 12 A +
12			45	CH 10 B +
13			46	CH 10 B -
14			47	CH 10 D +
15			48	CH 11 C -
16	Reset input (Optional)		49	CH 9 A +
17	GND for reset (Optional)		50	CH 9 A -
18	O/G input PWR rail (Optional)		51	CH 12 D +
19	O/G input (Optional)		52	CH 12 D -
20			53	CH 10 C -
21			54	CH 10 C +
22			55	CH 11 D +
23			56	CH 11 D -
24			57	CH 9 D +
25			58	CH 12 C -
26			59	CH 12 C +
27			60	CH 11 B +
28			61	CH 11 A +
29	N.U		62	CH 9 B -
30			63	CH 9 D -
31	O/G output		64	CH 11 B -
32	O/G output common		65	CH 11 A -
33			66	CH 9 B +

Pinout for J3 connector

Pin#	Description		Pin#	Description
1	CH 8 D -		34	CH 4 B +
2	CH 8 C -		35	CH 4 B -
3	CH 6 D +		36	CH 2 A -
4	CH 7 A -		37	CH 2 A +
5	CH 7 A +		38	N.U
6	CH 8 D +		39	CH 2 D -
7	CH 8 C +		40	CH 3 C +
8	CH 6 D -		41	CH 1 C -
9	CH 6 C -		42	CH 1 C +
10	CH 7 B -		43	CH 4 A -
11	CH 7 B +		44	CH 4 A +
12	CH 5 B +		45	CH 2 B +
13	CH 5 B -		46	CH 2 B -
14	CH 8 B +		47	CH 2 D +
15	CH 8 B -		48	CH 3 C -
16	CH 6 C +		49	CH 1 A +
17	CH 7 C -		50	CH 1 A -
18	CH 7 C +		51	CH 4 D +
19	CH 5 C -		52	CH 4 D -
20	CH 5 C +		53	CH 2 C -
21	CH 5 A -		54	CH 2 C +
22	CH 8 A -		55	CH 3 D +
23	CH 6 B +		56	CH 3 D -
24	CH 6 B -		57	CH 1 D +
25	CH 7 D-		58	CH 4 C -
26	CH 7 D +		59	CH 4 C +
27	CH 5 D +		60	CH 3 B +
28	CH 5 D -		61	CH 3 A +
29	N.U		62	CH 1 B -
30	CH 5 A +		63	CH 1 D -
31	CH 8 A +		64	CH 3 B -
32	CH 6 A -		65	CH 3 A -
33	CH 6 A +		66	CH 1 B +

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 0 (+/-)	1/2	BI_DA+-	TX+-	TX+-	BI_DA+-	RX+-	RX+-
Pair 1 (+/-)	3/6	BI_DB+-	RX+-	RX+-	BI_DB+-	TX+-	TX+-
Pair 2 (+/-)	4/5	BI_DC+-	Unused	Unused	BI_DC+-	Unused	Unused
Pair 3 (+/-)	7/8	BI_DD+-	Unused	Unused	BI_DD+-	Unused	Unused

Serial wiring

To manage the switch via the WEB interface you can use all tweve ports.

You can access the CLI mode via port MNG through serial link.

The following table indicates the appropriate wiring connections for the serial port, spread among J2 connector.

7	UART Transmit – (RS232-Tx) output
8	UART Receive + (RS232-Rx) input
9	Signal GND for RS232

Tooling

The plugs are using crimp contacts.

We suggest using hereunder tooling.

Crimping tools		Amphenol No	Military No
	Crimping tool	809 801	M22520/2-01
	Positioner	809 835	M22520/2-07

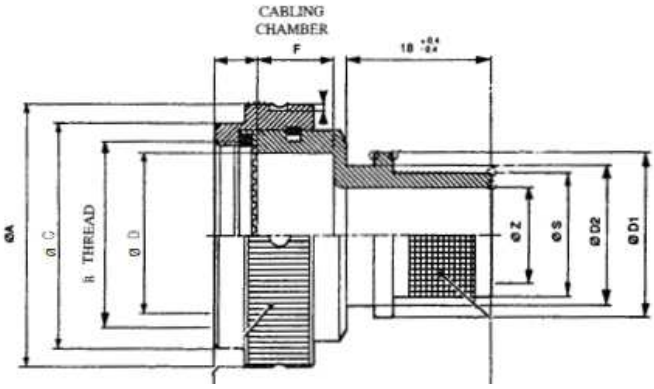
Plastic insertion and removal tools	Contact size	Amphenol No	Military no
	22D	809 856	M81969/14-01

Backshell

We suggest using TV35 backshells with corresponding heat shrinks.

These band backshells provide a full 360° shield termination. They are available with different cabling chamber lengths and exit diameters. The use of replaceable bands facilitates future maintenance or reparability. Sealing is ensured by straight or right angled heat shrink moulded piece at the rear of backshell.

TV35 is suitable for TV-CTV (MIL-DTL-38999 Series III). These straight band backshells provide a full 360° shield termination with a quick, easy and cost effective cabling process.



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

Section 5 Management

Management

The switch is managed. It can be accessed either using the web interface or using RS-232 console port (shared among J2 connector, see Serial Wiring for details).

Web management

For in-band Ethernet management configuration use either one of the 12 ports.

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

Switch default IP address: 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 management port supports out-of-band configuration management of the switch. There is one serial port associated with the Management Processor.

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

- 12 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

- MIL-STD-1275
- MIL-STD-461E
- MIL-STD-704
- MIL-STD-810F GM
- IP67

PERFORMANCE

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

CHASSIS

- Machined rugged aluminum
- 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-1275 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 Electromagnetic compatibility
- CE-102, CS-114, CS-115, CS-116, RE-102, RS-103

SHOCK/VIBRATION/HUMIDITY

- MIL-STD-810G:

  Random vibration (514.5I)
  Bench Handling (516.6VI)
  High Temp. (501.5I,II)
  Low Temp. (502.5I)
  Humidity (507.5II)
  Air Pressure (500.5I,II)
  Blowing Rain (506.5I)
  Immersion (512.5I)
  Salt Atmosphere (509.5I),
  Blowing Dust (510.5I)
  Loose Cargo Vibration (514.6II)
  Wind Analysis.

- IP67

PHYSICAL

- Dimensions: 178 (L) x 136(W) x 47(H), including connectors & hardware
- Weight: 1.150kg

INSTALLATION

- Set of Four # 10-32UNF Captive Screws for mounting to any flat surface.

COOLING

- No Moving Parts. Passive Cooling

OPERATING TEMP

- -45ºC to +80ºC (-49ºF to +176ºF) – Cold Start-Up

STORAGE TEMP

- -45ºC to +85ºC (-49ºF to +185ºF)

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. 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