

Amphenol RJ-Switch



IP65/68 sealed Managed Rugged Ethernet Switch - User Manual -

Contents

Section 1	General Information	Page 4
Section 2	Installation	Page 5
Section 3	Power Wiring	Page 6
Section 4	Ethernet Wiring	Page 9
Section 5	Technical Specifications	Page 12
Section 6	Service Information	Page 14

This manual applies to the following products:

- **RJS-ML-MG7F3G-(704)-(PSM)-(CAPS)** - Managed IP68 Ethernet switch with 7x 10/100 Mbps ports and 3 10/100/1000 Mbps ports, Olive drab cadmium plating on both receptacles and enclosure
- **RJS-BKN-MG7F3G-(704)-(PSM)-(CAPS)** - Managed IP68 Ethernet switch with 7x 10/100 Mbps ports and 3 10/100/1000 Mbps ports, Black painted enclosure with nickel plated receptacles

Note: **704** = option: filter for power supply allowing better lightning protection
 PSM = option: the switch is powered with 85-264 VAC instead of DC power
 CAPS = option: the switch comes with caps fixed onto each receptacle

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.



Amphenol Socapex, en tant que fabricant des appareils mentionnés ci-dessous, déclare sous sa seule responsabilité que les équipements désignés ci-après,


(RJS-) et (RES-) RJ-Switch Commutateurs Ethernet et convertisseurs de media,

sont conformes aux normes suivantes :

EN55022 (Emissions);

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

EN61010-1 ou EN60950 (Sécurité électrique);

EN60079-15 : 2010 et EN60079-0 : 2009 (EN50021 : 1999) -  II 3G Ex nA II T4 X (uniquement modèles RJSPCEX-)

Températures de fonctionnement - modèles RJSPC-EX IP68 : - 40°C à + 75°C

Températures de fonctionnement - modèles IP30: - 40°C à + 75/85°C

- aux directives suivantes :

Directive CEM 2004/108/EC relative à la compatibilité électromagnétique

Directive Basse Tension 2006/95/EC relative à la sécurité électrique

Directive ATEX 94/9/EC relative aux zones de catégorie 3 du Groupe II (uniquement modèles RJSPCEX-)

Amphenol Socapex, as the manufacturer of the apparatus listed, declare under our sole responsibility that the products trade named as


(RJS-) and (RES-) RJ-Switch Ethernet switches and media converters

to which this declaration relates is in conformity with the following standards

EN55022 (Emissions);

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

EN61010-1 ou EN60950 (Electrical safety);

EN60079-15 : 2010 et EN60079-0 : 2009 (EN50021 : 1999) -  II 3G Ex nA II T4 X (only models RJSPCEX-)

Operating temperature range - IP68 RJSPCEX models : - 40°C to + 75°C

Operating temperature range -IP30 models : - 40°C to + 70/85°C

and therefore conforms with the protection requirements of

EMC Directive 2004/108/EC (as amended) relating to electromagnetic compatibility

Low Voltage Directive 2006/95/EC (as amended) relating to electrical safety

ATEX Directive 94/9/EC (as amended) relating to Group II, Category 3 locations (only models RJSPCEX-)

Nom/Name : C. JULLIAN Signature
Fonction/Title : Quality Manager
Date : 2012, November 12

Section 1

General Information

Overview

This manual will help you install and maintain the **Amphenol Rugged Ethernet Managed switches**. Installation of the MG7F3G managed switches will enable the user to wire redundant connections between nodes, manage the network by monitoring/gathering network data, allow for browser or telnet configuration, increase network performance, and more. 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.

Note: This manual only covers the installation and wiring of these switches.

Please refer to the separate **Software User Manual for managed switches** for details on configuring and using any of the management functions such as SNMP, RSTP, IGMP, port mirroring, etc.

Refer also to the Ethernet Switch Tool's comprehensive On-line help for more details!

Managed switch Operation

Unlike a regular Ethernet switch, very resilient networks can be implemented because the Managed Switch has the intelligence to detect and allow for ring Ethernet topologies. In other words, implementing this switch will optimize the network for optimal bandwidth conditions, reduce the number of collisions, and allow for redundant data path connections to reduce/eliminate downtime.

To further aid in network reliability and performance, SNMP is available to extract and exchange network statistical information. Through the use of SNMP, various groups of statistical information can be obtained such as TCP, RMON, IP, and more to aid the user's job to extrapolate the "health" of the network.

The Managed Switches can support 10BaseT (10 Mbps), 100BaseT (100 Mbps) and 1000BaseT (1000Mbps) on their RJ45 ports (depending on the ports). Each of these ports will independently auto-sense the speed, allowing you to interface to regular, fast or gigabit Ethernet devices.

Performance Specifications

These general specifications apply to the Switches. Refer to Section 7 for complete technical specifications.

10 Ethernet ports (shielded)	7x 10/100 plus 3x 10/100/1000 (with auto-negotiation, auto-crossover and auto-polarity)
Ethernet Protocols	All standard IEEE 802.3 (see Specifications for details)
Managed Ethernet Switch Type	Managed with SNMP, RSTP, IGMP, VLANs and much more
Ethernet Isolation	1500 Volts RMS (for 1 minute)
Temperature	Operating -40°C to +70°C Storage -40°C to +85°C
Sealing	IP65/68 2 m water for 24 hours
Shocks	MIL-STD-810F 40g, 11ms, 18 saw tooth shocks
Surge and Spike protection (with -704 option)	MIL-STD-461E CE102 conducted emission MIL-STD-704A 600V input transient, applied for 10µs MIL-STD-1275A: Spikes: +/- 250 V for 100us Surges: 100 V for 50 ms at 0.5 mohm Ripple: 14VAC pk-pk)
Vibrations	RTCA/DO-160C Sinusoidal vibrations 5-55 Hz: 0.01 inch ; 55-500 Hz: 1.5 g
Altitude	MIL-STD-810F 50,000 ft – 15,000 m

Section 2 Installation

Overview

All switches share the same footprint and 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 water jets (IP65 rating) but also immersion until 2m depth for 24 hours (IP68 rating).

The Ethernet connections for all models come out from rugged MIL-DTL-38999 III connectors from RJField range (see www.rjfield.com). Make sure to allow enough room to route your Ethernet cables.

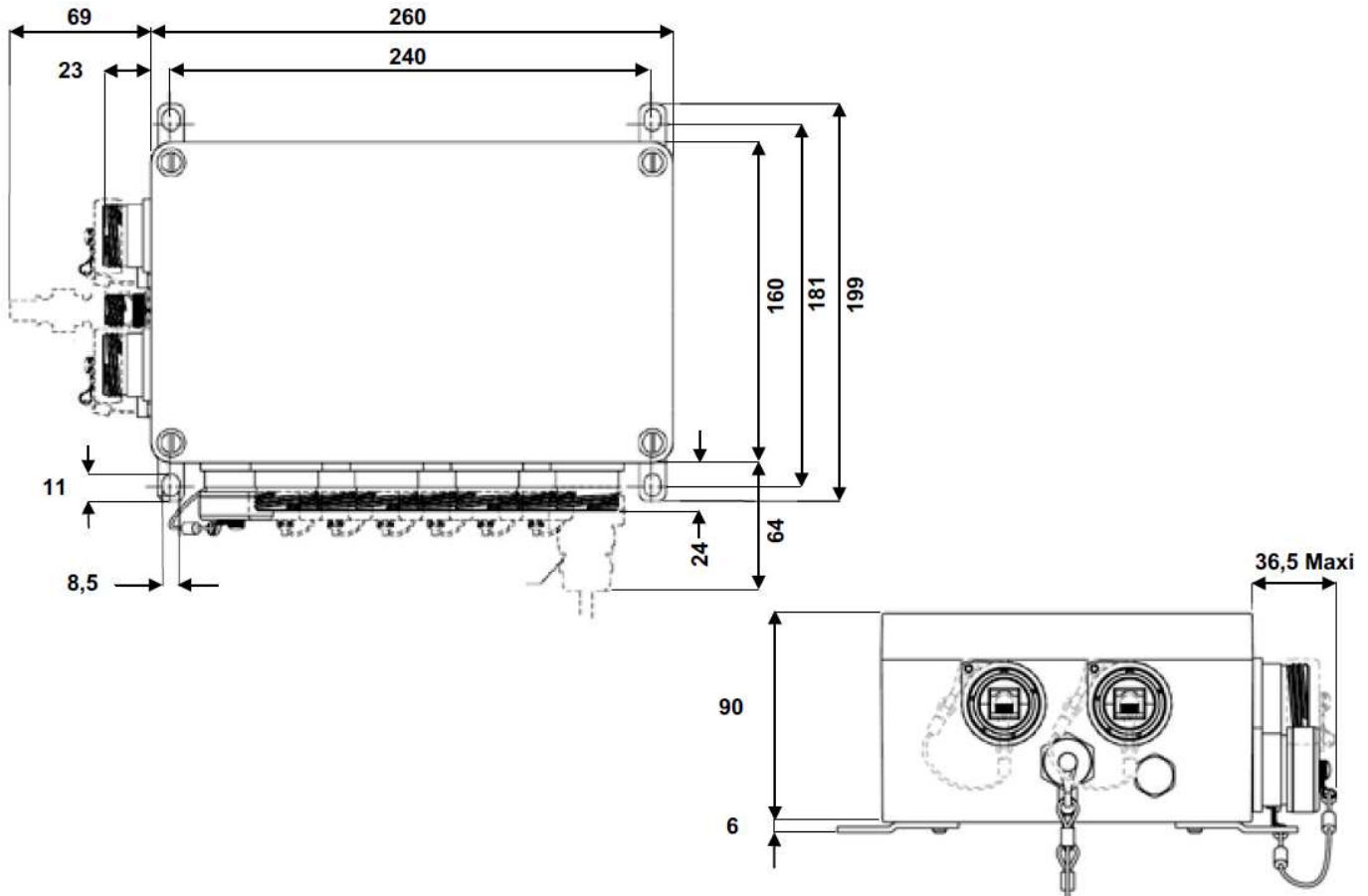


Figure 3A – Mechanical Dimensions

- ① IP68 Aluminium enclosure with Cadmium Conductive Plating or Black paint (RoHS)
- ② Redundant Power Inputs
- ③ Balance pressure vent
- ④ 10 Rugged IP68 RJF TV Ethernet Ports
- ⑤ Fixture for vertical mounting
- ⑥ Optional caps available

IMPORTANT NOTE

This model has no LED indicator.
Management is done through a web browser



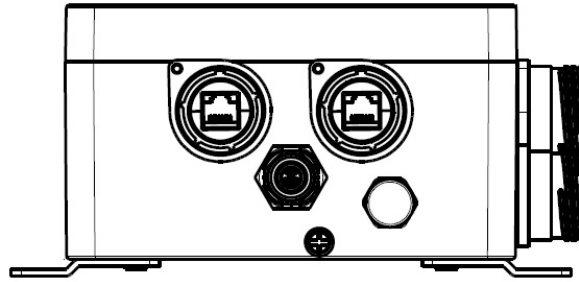
Figure 3B – Mechanical Description

Section 3

Power Wiring

Overview

The Managed Switches can be powered from the same DC source that is used to power your I/O devices. The continuous voltage needs to be applied between the P1 and/or P2 terminal and the Minus terminal (shown hereunder). The terminal GND should be tied to panel or chassis ground.



To reduce down time resulting from power loss, the Managed Switch can be powered redundantly. 2 contacts for power are available on the switch (P1 and P2). You may use only one or both up to your need.

Refer to the DC Power diagram hereafter for wiring details.

Note: the P2 terminal is not available with -704 or PSM option.

Plugs and backshells

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.

Accessories part numbers




	RJS-ML-MG7F3G (-options)	RJS-BKN- MG7F3G (-options)
Plugs	TV 06 RW 0935 S (Size 9; using 6 contacts #22D)	TV S06 RF 0935 S (Size 9; using 6 contacts #22D)
Suggested Backshells	TVNSA 09 014	TVNSA 09 023
Heat shrinks	804221	804221

Crimping tools

The plugs are using crimp contacts.

We suggest using hereunder tooling.

Crimping tools for all models

	Amphenol No	Military No
 Crimping tool	809 801	M22520/2-01
 Positioner	809 835	M22520/2-07
 Contact insertion and removal tool (plastic) (*)	809 856	M81969/14-01

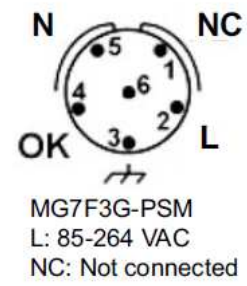
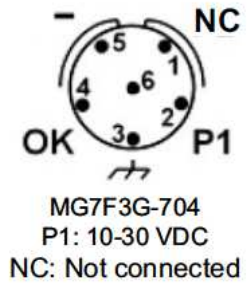
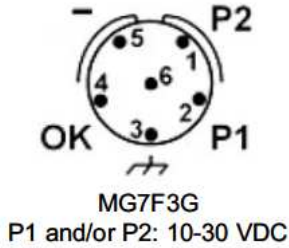
(*): Note: metallic tools are also available. Consult dedicated Tri-Start TV-CTV catalog (E113) for details.

Wiring power inputs

The diagrams below show the rear face of mating plugs.

The plugs to be used with the switches are from our TV series. They are compliant with MIL-DTL-38999 series III.

In case you would like to power your switch using a redundant power supply, we suggest using a second plug.



Note : the contact 6 is not connected.

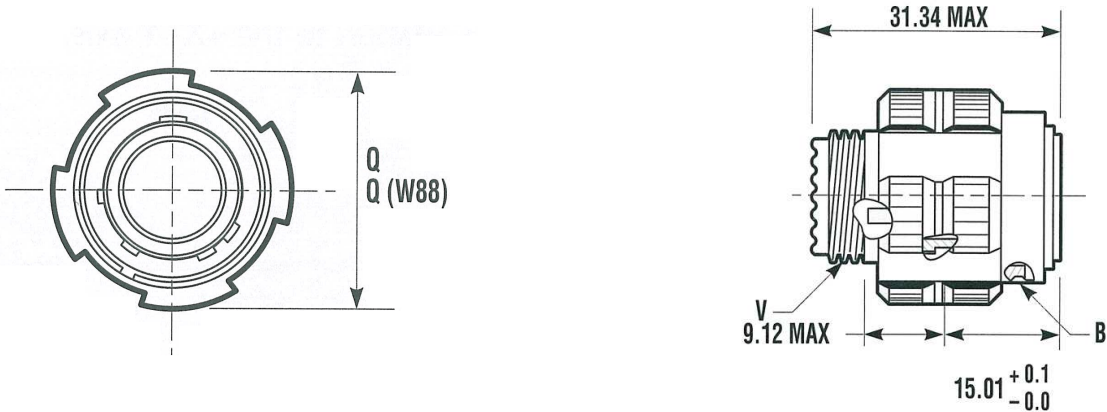
Note: The use of 2 contacts P1 and P2 facilitates the cabling of redundant power inputs. It allows using an additional backup battery.

Note: P2 and OK terminal are not active with -704 option. Only one connector shall be plugged.

Dimensions of acceptable wires

Contact size	Gauge AWG / Section mm ²		Outside diameter (mm)		
	min	max	Min	Average	Max
22D	28	22	0.76	1.20	1.37
	0.095	0.38			

Plugs dimensions



Plug size	B Thread Class 2A (mm)	Q Max (mm)	V thread metric
9 (A)	.6250	21.82	M12x1-6g

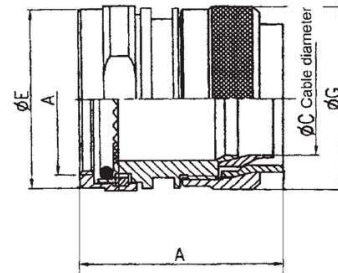
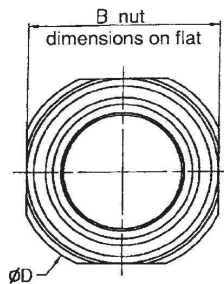
Backshells

We suggest using TVNSA backshells with corresponding heat-shrinks. See previous page for part numbers.

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).

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.

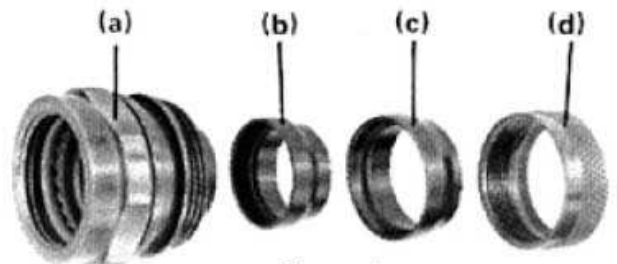


Figure 1

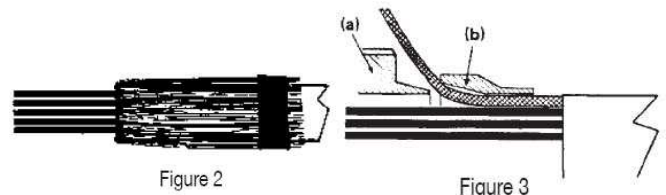


Figure 2

Figure 3



Figure 4

Figure 5

Section 4

Ethernet Wiring

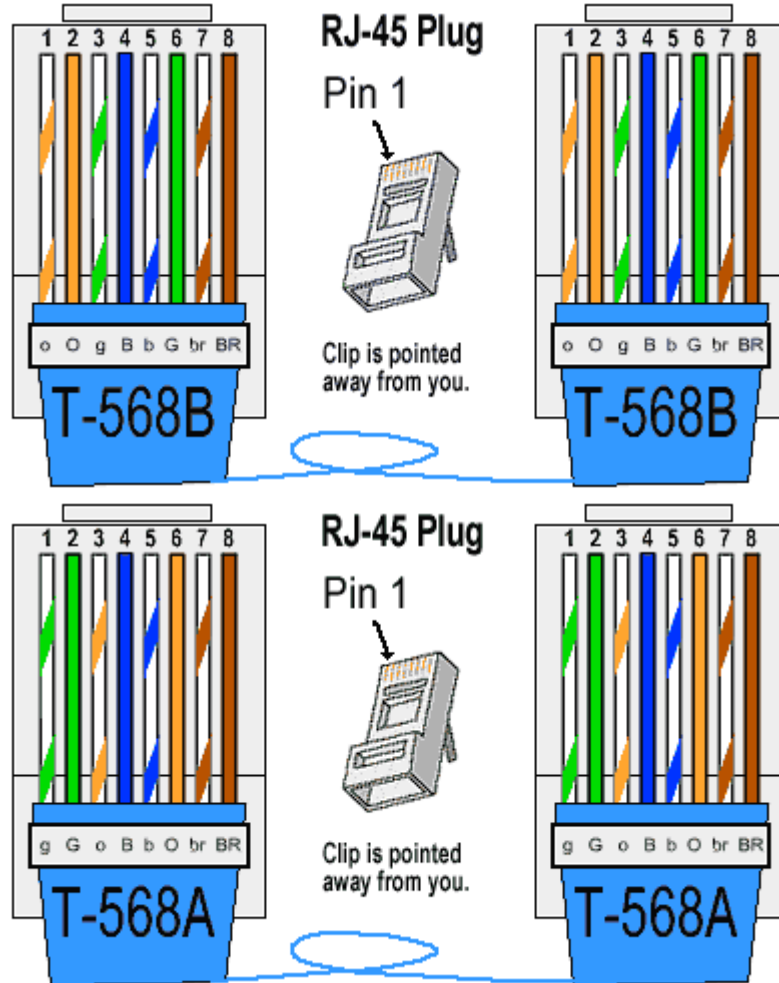
Overview

The Managed Switches provides connections to Ethernet devices on the battlefield. Typically the gigabit 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 PLCs, Ethernet I/O, or industrial computers. Electrical isolation is provided on the Ethernet ports for increased reliability.

RJ45 Wiring Guidelines

Use data-quality (not voice-quality) twisted pair cable rated category 5 (or 5e for gigabit) with standard RJ45 connectors. For best performance use shielded cable. 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.

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



RJ45 Cable Distance

The maximum cable length for 10/100/1000BaseT is typically 100 meters (328 ft.).

Duplex Operation

The RJ45 ports will auto-sense for Full or Half duplex operation, while the fiber ports are configured for full duplex operation. Note: Fiber devices with half duplex settings should still communicate with the switch. If otherwise then contact your switch vendor.

Network Device Check

The Managed Switches are capable of supporting 10/100BaseT or 10/100/1000BaseT following to the port. Make sure you connect the appropriate devices to each port.

Ethernet reinforced plugs

The reinforced 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.

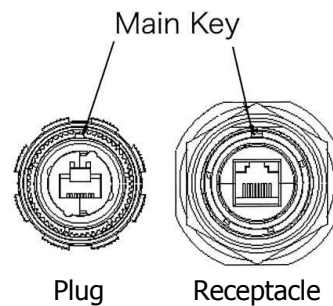
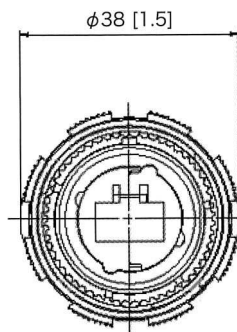
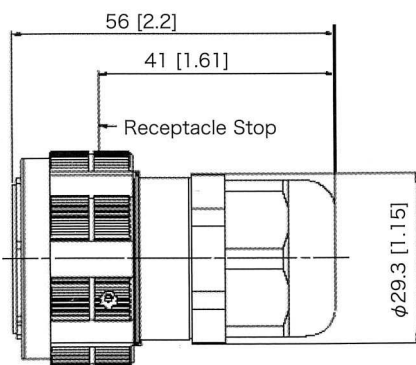
This plug may be assembled with 4 different coding. Use the coding A to make your assembly. For more details, please consult:

http://www.rjfield.com/ethernet_connectors_rjf-tv_en.htm.



	RJS-ML-MG7F3G	RJS-BKN- MG7F3G
Ethernet Plug part number	RJF TV 6 M G	RJF TV 6 M N
Plating	Olive drab Cadmium	Nickel (RoHs compliant)

RJFTV6 plug dimensions and A coding

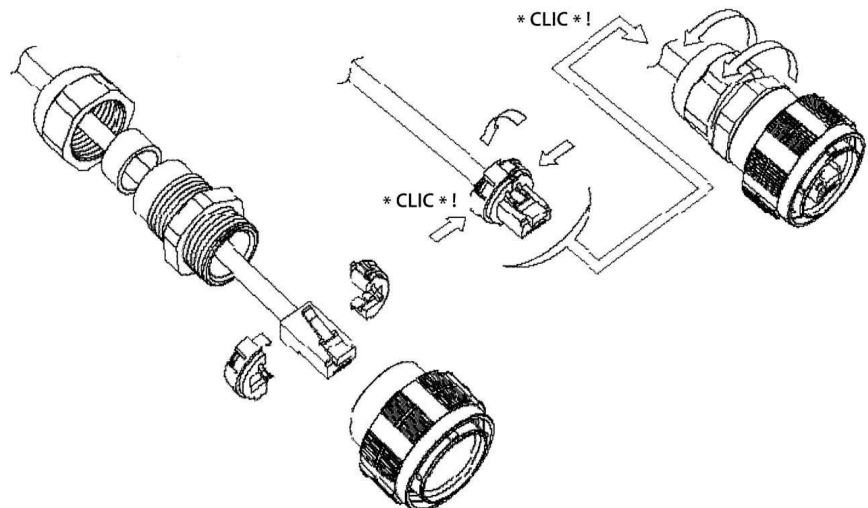


Code A



RJFTV6 plug assembly instructions

- 1- Push down the RJ45 cordset latch, and fix it inside the insert.
- 2- Press in and click the other part of the insert.
- 3- Insert in the metallic housing. The RJ45 cordset latch should be at the same position than the main key of the shell to meet the A coding.

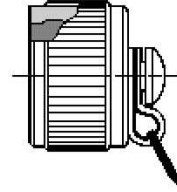


CAPS for Ethernet ports

The models of switches with –CAPS (example: RJSML-MG7F3G-CAPS) termination are pre-equipped with caps on all ports, including power and Ethernet.

The models without –CAPS termination (example: RJSML-MG7F3G) do not have caps on ports. The required number of caps may be ordered separately as accessories.

In the case you order the cap separately, it may be screwed directly on the receptacle.



Note: The screw comes with the cap.

Part numbers for Ethernet ports caps


	RJS-ML-MG7F3G	RJS-BKN-MG7F3G
Ethernet Plug part number	RJS ML C7G	RJS ML C7 N
Plating	Olive drab Cadmium	Nickel (RoHs compliant)

Section 5

Technical Specifications

Technical Specs

Here are the technical specifications for the Ring and Managed Switches covered by this manual.

General Specifications:		
Ethernet switch type	Managed with 10 Ethernet ports	
Latency for 10 Mbps ports	16 us + frame time (typical)	
Latency for 100 Mbps ports	5 us + frame time (typical)	
Full or half duplex operation	Configurable per port	
“OK” Output	MG7F3G: ON if P1 and P2 have power and switch software is running MG7F3G-704: ON when software is running MG7F3G-PSM: ON when software is running; output power: 24VDC	
OK Output Voltage	MG7F3G: Same as switch input voltage MG7F3G-704: Same as switch input voltage MG7F3G-PSM: output voltage: 24VDC	
Maximum current output	0.5 Amp	
Environmental	Direct panel or wall mounting	
Input power	7.0 W (typical - all ports active at 100 Mbps) (10 W maximum)	
Input voltage	10-30 VDC for MG7F3G models, redundant 10-30 VDC for MG7F3G-704 models 85-264 VAC for MG7F3G-PSM models	
Ethernet isolation	1500 VRMS 1 minute	
Operating temperature range	-40 to +70 °C	
Storage temperature range	-40 to +85 °C	
Vibration	IEC68-2-6, RTCA/DO-160C	
Electrical safety	 UL508/CSA C22, EN61010-1	
EMI emissions		FCC part 15, ICES-003, EN55022
EMC immunity		IEC61326-1, IEEE C37.90
Shocks	MIL-STD-810F (40g)	
Surge and Spike protection	(with -704 option) see below for details	
Altitude	50,000 ft – 15,000 m	
Protection	IP65 & IP67 & IP68 protection	
Salt spray	48h with nickel plating 500h with olive drab cadmium plating	
Dimensions (L x W x H)	See mechanical diagrams for details	

IEEE Ethernet compliancy	
IEEE 802.3/u	10 Mbps & 100 Mbps Fast Ethernet
IEEE 802.3ab	1000 Mbps Gigabit Ethernet
IEEE 802.1p	Priority queuing - QoS, CoS, ToS/DS
IEEE 802.3x	Full-Duplex with Flow Control
IEEE 802.1D/w	Rapid Spanning Tree for redundant rings
IEEE 802.1Q	VLAN for traffic segregation

Copper RJ45 Ports: (10/100BaseT or 10/100/1000BaseT)	
10/100/1000BaseT ports	Shielded RJ45
Coupling mechanism	RJFTV - Tri start Thread (MIL-DTL-38999 series III type)
Protocols supported	All standard IEEE 802.3
Auto-crossover	Yes, allows you to use straight or cross wired cables
Auto-sensing operation	Full and half duplex
Auto-negotiating	10BaseT and 100BaseT and 1000BaseT as applicable
Auto-polarity	Yes, on the TD and RD pair
Flow control	Automatic
Ethernet isolation	1500 VRMS 1 minute
Plug and play	Yes
Cable requirements	Twisted pair (Cat. 5 or better) (shielded recommended)
Max. cable distance	100 meters

704 option: improved EMC filtering for power supply	
Input Reverse Voltage Protection	Continuous as well as surges and spikes
Conducted emissions Power leads	MIL-STD-461E Test level: CE102
Conducted emissions	Def Stan 59-41 Test level: DCE01 DCE02
Spikes	MIL-STD-1275 A Criteria: +/- 250 V for 100 us
Surges	MIL-STD-1275 A Criteria: 100 V for 50 ms at 0.5 mohms
Ripple	MIL-STD-1275 A Criteria: 14 VAC pk-pk
600 V input transient	MIL-STD-704A Criteria: Applied for 10 us, 50 ohms source impedance

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. <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>