red lion®

8-Port Gigabit IP67 Industrial Ethernet Switch

Installation and Wiring Manual

Contents at a Glance:

This manual applies to the following products:

- **ET-8EG-MIL-1**   IP67 unmanaged Ethernet switch with 8 Gigabit ports
- **ET-8MG-MIL-1**   IP67 managed Ethernet switch with 8 Gigabit ports

Red Lion Protected Technology Policy - Red Lion protects your investment in Red Lion systems with long-term planned technology and our unique Protected Technology Policy. We will continue to support the specified capabilities of standard Red Lion products for at least five years (twenty years for Industrial Managed Switches). We plan each product improvement and new feature to be upward compatible with existing designs and installations. Our goals are to make each new software release bring new power to your Red Lion systems and have every existing feature, applications program and data file continue to work. We protect your investment even further with a liberal five-year trade-in policy. Exchange standard products for upgraded versions of the same product to take advantage of new features and improvements at any time for five years. A prorated trade-in allowance will be given for your existing unit. Red Lion protects your long-term productivity with state-of-the-art planned technology and continued support.

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INSTALLATION WARNINGS - These products should not be used to replace proper safety interlocking. No software-based device (or any other solid-state device) should ever be designed to be responsible for the maintenance of consequential equipment or personnel safety. In particular, Red Lion disclaims any responsibility for damages, either direct or consequential, that result from the use of this equipment in any application. All power, input and output (I/O) wiring must be in accordance with Class I, Division 2 wiring methods and in accordance with the authority having jurisdiction. Refer to section 1 for other important installation warnings.

FCC Statement - This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Reorient or relocate the receiving antenna; Increase the separation between the equipment and receiver; Connect the equipment into an outlet on a circuit different from that to which the receiver is connected; Consult the dealer or an experienced radio/TV technician for help.

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Section 1 | General Specifications

Overview

This manual will help you install and maintain the switch which is offered as unmanaged (model ET-8EG-MIL-1) or managed (model ET-8MG-MIL-1). The unmanaged model requires no configuration and is completely "plug and play". The managed model allows you to configure the switch to optimize and increase network performance.

> **Note: This manual only covers the installation and wiring of these switches. For the managed model, refer to the separate Software User Manual for details on configuring and using any of the management functions such as SNMP, RSTP, IGMP, port mirroring, etc.**

Basic Operation

Unlike an Ethernet hub that broadcasts all messages out all ports, these industrial Ethernet 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 real-time systems.

The switch supports 10BaseT (10 Mbps), 100BaseT (100 Mbps) and 1000BaseT (1000 Mbps) on 8 ports. Each of these ports independently and automatically senses the speed and duplex for best performance. They also offer auto-crossover and auto-polarity to assure a proper link with either straight or crossed wired cables or even when the cable is incorrectly wired.

Performance Specs

The switch has the following performance specifications. Note: All specifications are subject to change. Consult factory for latest information.

ETHERNET PERFORMANCE
- 8 Gigabit Ethernet ports for 10/100/1000 Mbps links
- Store & forward wire-speed non-blocking switching
- Managed or unmanaged model available
- All IEEE 802.3 Ethernet protocols supported
- Auto-negotiation for Ethernet speed and duplex
- Auto-crossover for Ethernet MDI/MDIX wiring
- Auto-polarity for Ethernet TD and RD polarity
- Full or half duplex operation (auto or configurable)
- 8192 MAC addresses supported
- 32 Gbps Memory bandwidth
- Ethernet isolation 1500 VRMS 1 minute
- Connector: MIL-STD-38999 series III receptacle with shell/insert style 9-9, 9 socket contacts & N keying

ETHERNET COMPLIANCE
- IEEE 802.3 (Original Ethernet 10Mbps)
- IEEE 802.3u (Fast Ethernet 100Mbps)
- IEEE 802.3z (Gigabit Ethernet 1000Mbps)
- IEEE 802.3x (Full-Duplex with Flow Control)
- And many more

Red Lion Controls • 20 Willow Springs Circle • York, PA 17406 • USA • 1-717-767-6511 • support@redlion.net

POWER INPUT

- Connector: MIL-STD-38999 Series III receptacle with shell size A, style 98, 3 pin contacts and A keying
- Input voltage range: 18-30 VDC (continuous)
- Input power: 12 W (typical under full load)
- Reverse polarity protection
- Meets MIL-STD-1275 for power protection
- Surge protection: 100 volts for 1 second
- Transient protection: 15,000 watts peak
- Spike protection: 5,000 watts (10x for 10 uS)
  or 250 volts (50x for 100 uS)

ENVIRONMENTAL

- Operating temperature: -40 to +75°C (cold startup at -40°C)
- Storage temperature: -40 to +85 °C
- Humidity (non-condensing) 5 to 95% RH
- Vibration, shock and freefall per MIL-STD-810F and IEC68-2-6, -27 and -32
- Vent plug for high altitude operation

PHYSICAL

- Dimensions (L x W x H) 11 x 6 x 2.85" (279 x 152 x 72 mm)
- Weight (including caps) 3.5 lbs (1.6 Kg)
- IP67 dust, oil and water-tight package protection

STANDARDS COMPLIANCE

- FCC part 15 / ICES-003; EN55022; IEC61326-1
- Safety : UL508 (CSA C22.2 No. 142) and ISA12.12.01 (CSA C22.2 No. 213)
- MIL-STD-461E for EMC performance
- MIL-STD-810F for environmental performance
- MIL-STD-1275B for power protection

MANAGED MODELS

- USB / RS232 console port via MIL-STD-38999 series III connector w/ shell size A, style 35, 6 contacts & A keying
- Real-Time-Ring or Rapid Spanning Tree for fault-tolerant ring or mesh networks
- Priority queuing for real-time performance
- SNMP v1 and V2 for network management
- SNMP v3 for authentication and encryption
- SNMP notifications (traps) for report on event
- IGMP v1 & v2 for IP multicast filtering
- VLAN (port & tag based) for traffic segregation
- Message filtering to stop broadcast/multicast storms
- RMON and port mirroring for diagnostics
- Configuration via secure (https) Web interface, Telnet / SSH (network), terminal (RS232) or SNMP (v1, v2, v3)
- And much more (Contact us for latest features list)

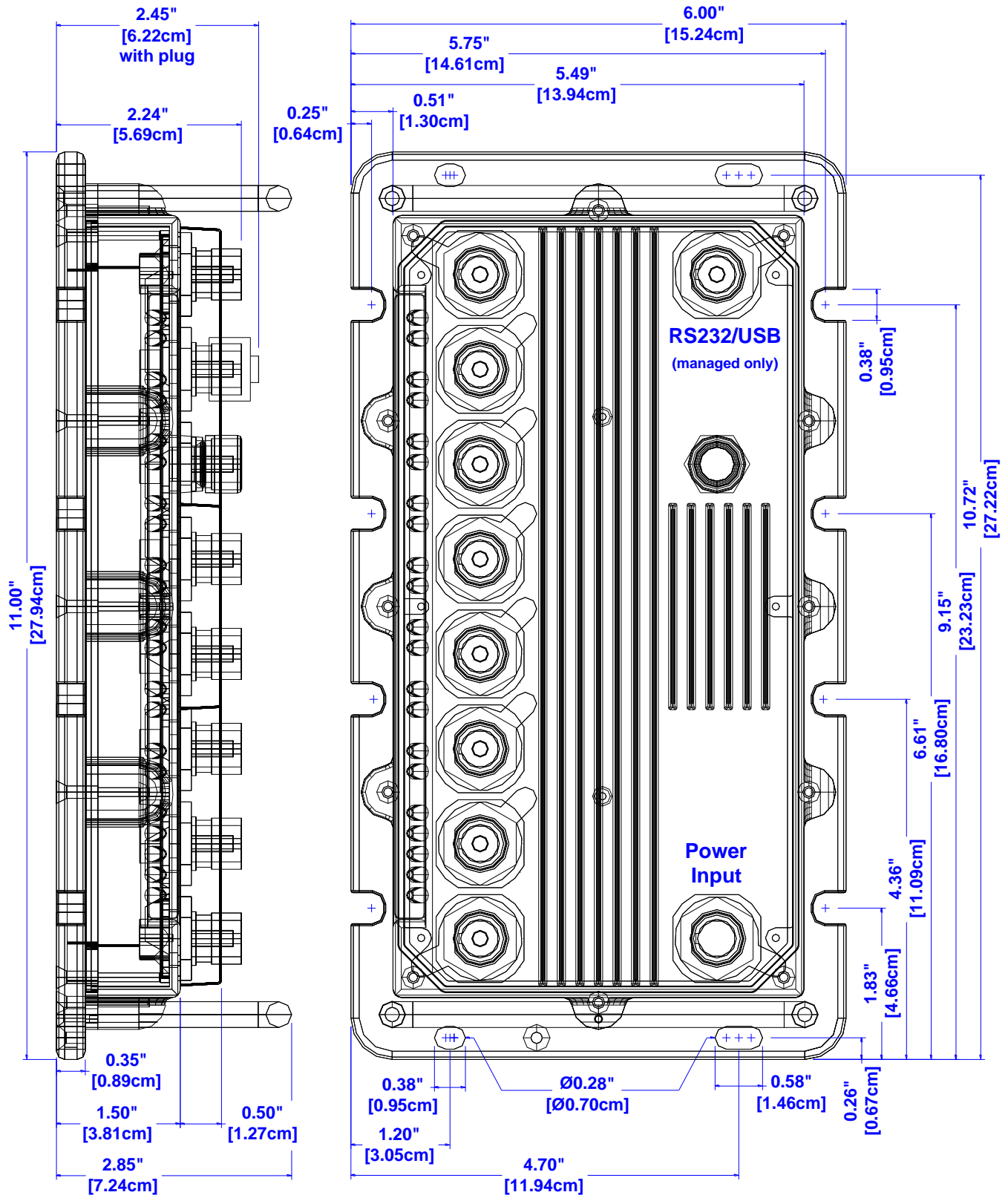|	
Safety Warnings	Strictly abiding by these warnings will help ensure the safe installation, startup and operation of the switch.
⚠️	**INSTALL THE SWITCH IN ACCORDANCE WITH ALL LOCAL AND NATIONAL ELECTRICAL CODES.**
⚡	**LIGHTNING DANGER: DO NOT WORK ON EQUIPMENT DURING PERIODS OF LIGHTNING ACTIVITY.**
WARNING (EXPLOSION HAZARD)	**SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS 1, DIVISION 2 (ZONE 2).**
WARNING (EXPLOSION HAZARD)	**WHEN IN HAZARDOUS LOCATIONS, DISCONNECT POWER BEFORE REPLACING OR WIRING UNITS.**
WARNING (EXPLOSION HAZARD)	**DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NONHAZARDOUS.**
Consignes de Sécurité	Le strict respect de ces avertissements contribuera à assurer la sécurité de l'installation, le démarrage et le fonctionnement de l'interrupteur.
⚠️	**INSTALLEZ L'APPAREIL CONFORMÉMENT AUX CODES ÉLECTRIQUES LOCAUX ET NATIONAUX.**
⚡	**DANGER DE FOUDRE: NE PAS TRAVAILLER SUR L'ÉQUIPEMENT PENDANT LES PÉRIODES D'ACTIVITÉS DE FOUDRE.**
. **AVERTISSEMENT (RISQUE D'EXPLOSION)**	**LA SUBSTITUTION DE TOUT COMPOSANT PEUT NUIRE À LA CONFORMITÉ DE CLASSE I, DIVISION 2 (ZONE 2).**
. **AVERTISSEMENT (RISQUE D'EXPLOSION)**	**LORSQUE DANS DES ENDROITS DANGEREUX, DÉBRANCHEZ LE CORDON D'ALIMENTATION AVANT DE REMPLACER OU DE BRANCHER DES MODULES.**
. **AVERTISSEMENT (RISQUE D'EXPLOSION)**	**NE DÉBRANCHEZ PAS L'ÉQUIPEMENT PENDANT QUE LE CIRCUIT EST DIRECT OU À MOINS QUE L'ENVIRONNEMENT SOIT CONNU POUR ÊTRE LIBRE DE CONCENTRATIONS INFLAMMABLES.**

Section 2 | Mechanical Dimensions and Installation

Overview

The switch is designed to be mounted to any flat surface. The oval mounting holes or side slots will accept up to a 0.25 inch or 6.5 mm diameter screws.

RS232/USB
(managed only)

Power
Input

2.45"
[6.22cm]
with plug

2.24"
[5.69cm]

0.25"
[0.64cm]

0.51"
[1.30cm]

6.00"
[15.24cm]

5.75"
[14.61cm]

5.49"
[13.94cm]

0.38"
[0.95cm]

10.72"
[27.22cm]

9.15"
[23.23cm]

6.61"
[16.80cm]

11.00"
[27.94cm]

4.36"
[11.09cm]

1.83"
[4.66cm]

0.35"
[0.89cm]

1.50"
[3.81cm]

0.50"
[1.27cm]

2.85"
[7.24cm]

0.38"
[0.95cm]

Ø0.28"
[Ø0.70cm]

1.20"
[3.05cm]

4.70"
[11.94cm]

0.58"
[1.46cm]

0.26"
[0.67cm]

Section 3	# Power and Communication Connections

Overview

The switch features 38999 Series III style connectors which meet or exceed the MIL-STD-38999 standard. All these connectors have EMI shielding, ESD protection, plus moisture and corrosion resistance. All mating connectors will self-lock with one 360 degree turn of the coupling nut.

Typical MIL-STD-38999 Connectors

(shown with tethered plugs)

Typical MIL-STD-38999 Plug

(not typically supplied with switch)

Grounding

Use the provided 8-32 ground stud to connect the switch to a suitable safety, chassis or earth ground. Use of heavy gauge (at least 16 AWG) grounding wire is recommended. Make sure to follow your local or national codes for the proper ground connection.
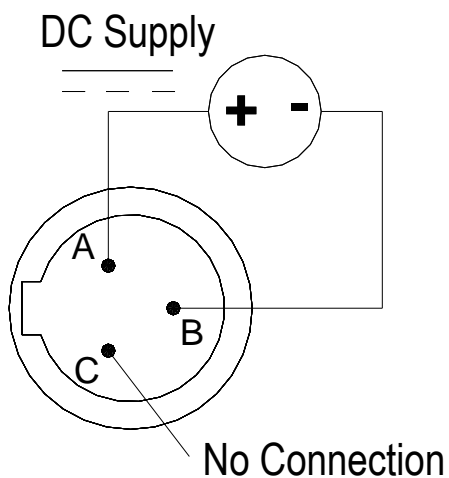
Chassis Ground Connection Point

Power Receptacle

The switch requires a positive voltage between **18 and 30 VDC**. Make the power connections as shown in the diagram below.

Power Receptacle Location

Power Receptacle Pinout

DC Supply

No Connection

Receptacle:
Shell=A, Insert=98, Contacts=P, Keying=A

Recommended Plug

Model # **D38999/26WA98SA**
(w/ socket contacts and A keying)

.**Note:** The W in the above recommended plug specifies cadmium plating. However, you may choose a different plating to meet your requirements. The MIL receptacles on the switch have black nickel plating which is RoHS compliant.
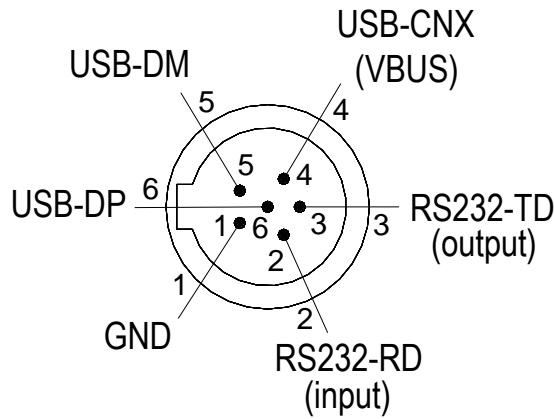
Console Receptacle

The managed model of the switch offers a RS232 serial port for accessing the local management interface. Once you have made a physical connection refer to the software user manual on how to access the switch via this console port.

Console Receptacle Location (managed model only)

RS232 and USB

Console Receptacle Pinout

Receptacle:
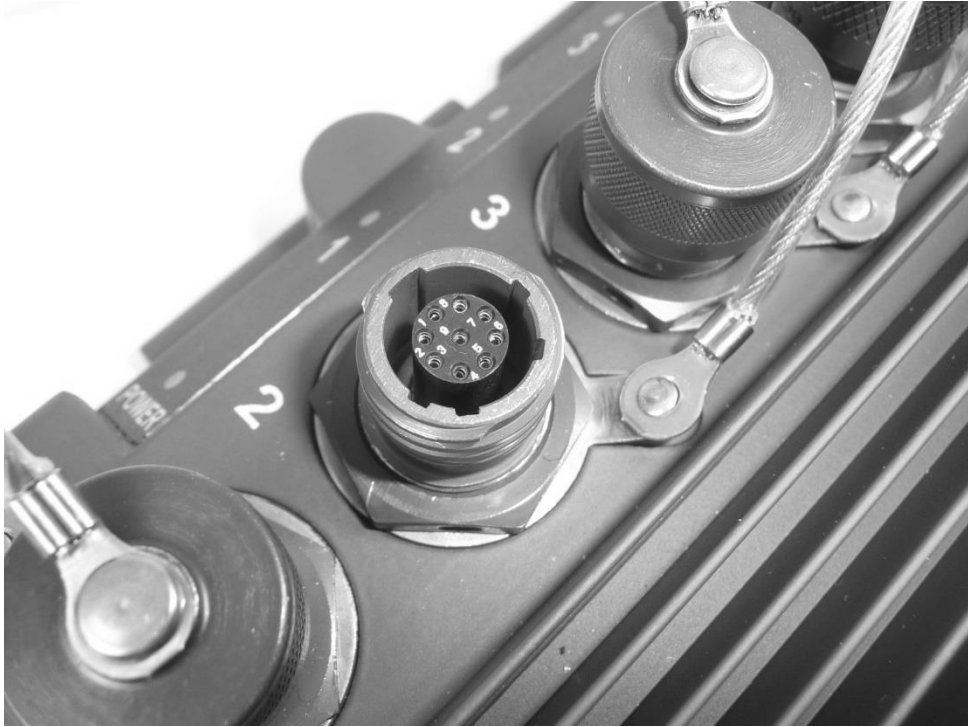Shell=A, Insert=35, Contacts=S, Keying=A

Recommended Plug

Model # **D38999/26WA35PA**
(w/ pin contacts and A keying)

Note: The W in the above recommended plug specifies cadmium plating. However, you may choose a different plating to meet your requirements. The MIL receptacles on the switch have black nickel plating which is RoHS compliant

The switch has eight 10/100/1000 Ethernet ports. These ports will auto-detect the speed and duplex of the connection. Alternatively in the managed model, the ports can be disabled or configured for fixed settings via one of the management interfaces. See the software user manual for details.

Ethernet Receptacle Location (typical)

Ethernet Receptacle Pinout

7 DD+
8 DD-   6 DB-
1 DA+   5 DC-
2 DA-   4 DC+
3 DB+

Receptacle:
Shell-Insert = 9-9, Contacts = S, Keying = N
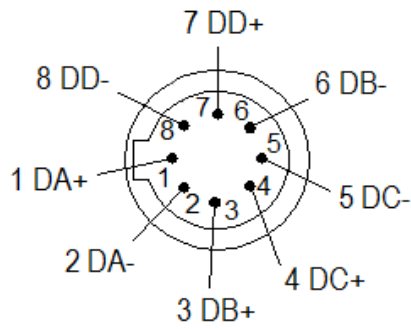
Typical Pinout Connections

Pin-1 - - - TX +   (For 10/100)
Pin-2 - - - TX −   (For 10/100)
Pin-3 - - - RX +   (For 10/100)
Pin-4 - - - TX +   (For Gig)
Pin-5 - - - TX −   (For Gig)
Pin-6 - - - RX −   (For 10/100)
Pin-7 - - - RX +   (For Gig)
Pin-8 - - - RX −   (For Gig)

Wiring Standards Table

Pin	EIA / TIA 568A	EIA / TIA 568B, or AT&T 258A	10Base-T 10 Mbps Cat 3	100Base-TX 100 Mbps Cat5	100Base-T4 100 Mbps Cat3	100Base-T2 100 Mbps Cat3	1000 Base-T 1Gbps Cat5+
1	white / green	white / orange	TX+	TX+	TX D1+	BI DA+	BI DA+
2	green / white (green)	orange / white (orange)	TX-	TX-	TX D1-	BI DA-	BI DA-
3	white / orange	white / green	RX+	RX+	RX D2+	BI DB+	BI DB+
4	blue / white (blue)	blue / white (blue)	na	na	BI D3+	na	BI DC+
5	white / blue	white / blue	na	na	BI D3-	na	BI DC-
6	orange / white (orange)	green / white (green)	RX-	RX-	RX D2-	BI DB-	BI DB-
7	white / brown	white / brown	na	na	BI D4+	na	BI DD+
8	brown / white (brown)	brown / white (brown)	na	na	BI D4-	na	BI DD-

BI=BI directional data RX=Receive Data TX=Transmit Data
(Pair Colors may be solid and striped/color,
or color with white stripe and white with color stripe)

Wiring Standards Table

Recommended Plug AERO AE90-365-BN9-9PN or Amphenol (without center pin)

Section 4 | LEDs

Pressure Vent

The switch has a set of LEDs to indicate the status of various operating conditions as defined below.

Typical LED Location

Status LED

(managed model only)
The Status LED indicates the overall health of the switch. It is normally ON solid indicating that no internal CPU or software problems are detected. It will flash when loading firmware and briefly on power up or reset. Otherwise, if it is OFF or flashing for an extended period of time then a problem is detected. In this case, please contact technical support.

Power LEDs

There is a power LED labeled as Power. It will be on solid when power is applied to the switch.

Ethernet LEDs

The switch has a set of LEDs to indicate the status of various operating conditions as defined below.

Solid Green = 1000 Mbps linked detected but no Ethernet activity.

Flashing Green = 1000 Mbps linked detected with Ethernet activity.

Solid Orange = 10/100 Mbps linked but no Ethernet activity.

Flashing Orange = 10/100 Mbps linked detected with Ethernet activity.

OFF = No link detected.

Section 5 | Pressure Vent

Without a pressure ventilation system the pressure differential that can occur due to temperature or altitude changes can result in condensation. To prevent this, the switch incorporates a pressure vent that adjusts the internal air pressure to match the surrounding (external) pressure. At the same time the vent is IP67 rated and will not let moisture into the switch.

Pressure Vent

Characteristics of the Pressure vent

Air flow rate: 0,4 l/min at 0,1 bar ΔP to 5,0 l/min at 1 bar ΔP
Point of water entry: > 1,5 bar
Temperature resistance: –40°C to +120°C (in assembled state)

Pressure Vent

Section 6 | Service Information

We sincerely hope that you never experience a problem with any Red Lion product. If you do need service, call Red Lion at 1-877-432-9908 for Technical Support. 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 RO (Repair Order) can be obtained on the Red Lion website.

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

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 RO 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. Repairs are completed as soon as possible. If you need a quicker turnaround, ship the unit to us by air freight. We give priority service to equipment that arrives by overnight delivery.

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 **Red Lion** system for future reference:

Serial #:_____ Date Purchased: _____

Purchased From:_____

Product Support

To obtain support for Red Lion products:
Latest product info: www.redlion.net
Phone: 1-877-432-9908
Fax: 1-518-877-8346
E-mail: support@redlion.net
Mailing address: Red Lion Controls, 20 Willow Springs Circle, York, PA 17406