

# IED1516LI / IED1516LI-E

## Installation Instructions 16 Input Logic Module

**Document Number: 1217B**

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# IMPORTANT SAFETY INSTRUCTIONS

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.

12.  Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.



**WARNING:** To reduce the risk of fire or electric shock, do not expose this apparatus to rain, moisture, dripping, splashing, or place objects filled with liquids on the equipment.

**AVERTISSEMENT:** Afin de réduire le risque d'incendie ou de choc électrique, n'exposez pas cet appareil à la pluie, à l'humidité, à l'égouttement, aux éclaboussures, et ne posez pas des objets remplis de liquide sur l'appareil

**WARNING:** If apparatus is equipped with Class I grounding plugs for safety purposes, it must be connected to MAINS that employ a protective earth ground connection.

**AVERTISSEMENT:** si l'appareil est équipé de prises de terre classe I, pour des raisons de sécurité, il doit être branché sur un réseau ayant une prise de terre de protection.

**WARNING:** The MAINS plug on this device may be used as the DISCONNECT DEVICE for MAINS power and must remain readily operable.

**AVERTISSEMENT:** La prise principale de cet appareil peut être utilisé comme DISPOSITIF de DECONNEXION du courant principal et doit rester facilement accessible.

**WARNING:** Installation and maintenance of IED equipment is to be made by trained/qualified personnel and must conform to all applicable local codes.

**AVERTISSEMENT:** l'installation et la maintenance des équipements IED doit être faite par du personnel formé / qualifié et doivent être conformes à toutes les réglementations locales en vigueur.

**WARNING:** If unit contains a lithium battery, there is a danger of explosion. Replace only with the same or equivalent type.

**AVERTISSEMENT:** Si l'unité contient une pile au lithium, il y a un danger d'explosion. Remplacez-la uniquement avec un modèle identique ou équivalent.

## SAFETY SYMBOLS

Labeling on products and the *Installation Instructions & User Manual* may use safety related graphical symbols as shown below to note safety requirements.



 **Lightning Bolt:** The lightning flash with arrowhead symbol, within an equilateral triangle, WARNING symbol, is intended to alert the user to the presence of uninsulated **dangerous voltage** within the product's enclosure that may be sufficient in magnitude to constitute a risk of electric shock to persons or domestic animals.

 **Exclamation Point:** The exclamation point within an equilateral triangle, CAUTION symbol, is intended to alert the user to the presence of important operating and maintenance (servicing) instructions, or a hazard that can damage equipment.

 Do not proceed beyond a WARNING or CAUTION notice until you have understood the hazardous condition and have taken appropriate steps.

Ne continuez pas avant d'avoir pris connaissance du danger et prendre les mesures appropriées.

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## SAFETY CONSIDERATIONS

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### SAFETY PRECAUTIONS

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Personnel properly qualified in the application and use of life safety equipment ("qualified personnel") shall read this manual carefully before performing any actions to specify, apply, install, maintain and perform operational tests of IED systems, and associated products in accordance with the instructions in this manual. This manual shall be made available to all qualified personnel who operate, test, maintain, or service IED systems, and associated products. It is strongly recommend that such personnel read and understand the entire manual.

**WARNING: IF SAFETY PRECAUTIONS, INSTALLATION AND TESTING ARE NOT PERFORMED PROPERLY, CONDITIONS COULD EXIST IN WHICH THE IED SYSTEM MAY NOT OPERATE, OR MAY OPERATE IMPROPERLY. THIS COULD RESULT IN PROPERTY DAMAGE AND SERIOUS INJURY OR DEATH TO YOU AND/OR OTHERS.**

**AVERTISSEMENT: SI LES MESURES DE SECURITE, L'INSTALLATION ET LES ESSAIS NE SONT PAS EFFECTUES CORRECTEMENT, CELA POURRAIT EMPECHER LE SYSTEME IED DE FONCTIONNER, OU DE FONCTIONNER CORRECTEMENT. CELA POURRAIT PROVOQUER DES DEGATS MATERIELS ET DES BLESSURES GRAVES, OU LA MORT POUR LES AUTRES ET/OU VOUS-MEMES.**

It is very important that only responsible, trained personnel are allowed to operate and maintain these systems, and that they use only appropriate equipment and tools. If a person is not trained, they shall contact the IED factory for direction on how to operate and maintain an IED system.

**Unauthorized personnel and equipment must be restricted from the areas of operation.**

All operations should be performed carefully, methodically, and without hurrying. Greater effectiveness will be developed by increased familiarity of personnel with their assignments. During any maintenance operation, if a malfunction occurs or an incorrect indication appears, stop the operation and determine whether or not it is safe to proceed. Before performing any step in a procedure, be sure that the preceding step has been properly executed and correct results obtained. Cleanliness and good housekeeping in all installation areas are major factors in effective accident prevention. Tools and equipment should be maintained in good working order and should always be returned to their proper storage place after usage. Cleaning agents and other cleaning aids should be removed from the equipment areas immediately upon completing the task at hand.

### GENERAL PRECAUTIONS

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Changes, modifications, or additions in connection with the IED system equipment shall not be made without explicit authorization of IED.

Safety devices found on mechanical, and electrical and electronic equipment are put there for the protection of personnel and equipment. These devices must be maintained in good working order and operative at all times. Safety devices shall never be removed or bypassed unless specifically authorized by the IED factory. Where safety devices have been rendered inoperable by proper and specific authorization, adequate notices shall be posted to warn personnel of the potential hazard.

Avoid the use of flammable or toxic cleaning fluids, and the use of carbon tetrachloride is prohibited.

Maintenance of the equipment shall be at least what is specified in the IED manuals and literature, and performed only by qualified personnel.

Whenever operation and maintenance is ongoing, personnel in the equipment areas shall have an effective communication among these areas in order to protect people if any accident occurs.

## PRELIMINARY PRECAUTIONS

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Precautions which are applicable to general electrical or electronic maintenance are as follows:

- a. Check yourself. Wear no article that might catch on equipment or that might act as a conductor.
- b. Check the working area. The equipment area shall be clean and dry. If possible, stand on a special insulator such as a rubber mat. There should be ample working space and good lighting.
- c. Check the tools. Always use proper tools and check them for their safe condition. Use screwdrivers with plastic handles. Check test equipment periodically and examine test leads carefully as the slightest break in insulation is dangerous.
- d. Check the procedures. Study the entire procedure before taking the first step. Consult the circuit diagram frequently to obtain an understanding of what is accomplished at each step. Know what is in the equipment and how it differs from others on which you have worked.
- e. Be aware that high voltages may be present across terminals that are normally low voltage, due to equipment breakdown. Be careful when measuring low voltages in equipment containing high voltage circuits.
- f. Do not make resistance measurements with power on.
- g. Do not work within the equipment without the presence of a person who is capable of rendering aid, and who is familiar with the procedure for emergency shutdown of the equipment.

## PRECAUTIONS WHEN MEASURING HIGH VOLTAGE POTENTIALS

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Observe the following precautions when measurements must be performed on circuits with potentials over 48 volts.

- a. Do not measure potentials over 48 volts without the presence or assistance of a person who is capable of rendering aid, and who is familiar with the procedure for emergency shutdown of the equipment.
- b. Be sure you are not grounded when you are adjusting equipment or using measuring equipment. Stand on a rubber mat or other insulator if possible. Be sure the equipment area is clean and dry. In general, use only one hand when servicing live equipment.
- c. If a test meter must be held or adjusted while voltage is applied, ground the case of the meter before starting a measurement. Do not touch the live equipment or personnel working on live equipment while holding the meter. The "common" terminal on some A/C electronic voltmeters is at ground potential; never connect the "common" terminal to any point above ground potential.
- d. High-voltage, high-capacitance capacitors should be discharged before servicing is started.



**WARNING!** Discharging must be done carefully and judiciously. First ascertain whether there is a built-in bleeder network. If so, wait a minute or two for the capacitor to discharge through the network. Otherwise, use an external discharge network. This is most important in the case of high voltage or high capacitance capacitors. If one terminal is connected to ground, connect the discharge network between the other terminal and ground. If neither terminal of the capacitor is grounded, connect the network across the capacitor terminals. Connecting a short circuit across the terminals is not recommended. Doing so can produce extremely high currents and a flash which can injure the eyes, vaporize metals, and cause burns.



**AVERTISSEMENT:** La décharge doit être faite soigneusement et judicieusement. Vérifier d'abord si il y a un réseau de purgeur incorporé. Si c'est le cas, attendez une minute ou deux pour que le condensateur se décharge par le réseau. Sinon, utilisez un réseau de décharge externe. Ceci est très important en cas de haute tension ou des condensateurs à haute capacité. Si un terminal est relié à la terre, connecter le réseau de décharge entre l'autre terminal et la terre. Si aucun terminal de condensateur est fondé, relier le réseau au terminal du condensateur. La connexion d'un court-circuit entre les terminaux n'est pas recommandée. Cela peut créer des courants très élevés où des étincelles pourrait blesser les yeux, fondre les métaux et causer des brûlures.

## PRECAUTIONS WHEN WORKING ON ENERGIZED EQUIPMENT

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When it is necessary to work on energized equipment, think ahead and anticipate every hazard. Never work alone on energized equipment.

Interlock switches are installed on some of the doors and panels to break the power circuits when the enclosure is entered. When it is necessary to work within such an enclosure on energized equipment, the interlock may be bypassed. Extreme caution should then be exercised, as dangerous voltages are present within the unit.

## AC POWER CIRCUITS

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Equipment obtaining power from a secondary distribution system should be grounded at all times by means of a third grounding wire on the power lines. Equipment permanently wired to a secondary distribution system should also be grounded separately by connection to a grounding bus or ground rod with a sufficiently large conductor to handle the current expected if the secondary source is accidentally shorted to the equipment.

The ground wire should be protected from mechanical damage and periodically inspected for good physical condition.

Personnel should never depend on a switch to remove power from equipment. If the equipment is connected to the secondary distribution system by means of a power cable, detach the cable from the receptacle before attempting any repairs or removal of chassis.

If the equipment is permanently wired to the secondary distribution system, remove the main fuses or open the power switch. Attach a suitable warning tag to the switch which will warn personnel not to operate the equipment; only the person who originally attaches the warning tag should be authorized to remove it.

## RESUSCITATION

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Personnel working with or near high voltage should be familiar with modern methods of resuscitation. Such information and training is available from the Red Cross or local emergency response personnel such as the police and fire departments.

## DESCRIPTION

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The 1516LI is a network logic input device used to interface with an IED GLOBALCOM® announcement control system. It provides 16 optically-isolated inputs that can be driven using dry contact closures or 0 to 50VDC logic signals. A green LED is provided above each input that illuminates when activated. The announcement controller is configured using the GLOBALCOM® System Management Center software where logic inputs can be used to launch announcements, pre-recorded messages, events, or fault reports.

The 1516LI-E is a 16 input expansion module that connects directly to a 1516LI to bring its total input capacity up to 32 inputs.

The device receives its power over IEEE 802.3af Power over Ethernet (PoE) and communicates with other system devices over the Ethernet network. The maximum power consumption from the PoE switch is 4 watts if the 1516LI-E is used. If the expansion unit is not used, the maximum power consumption is 3 watts. If PoE equipment is not available, an input is provided for an alternate 48VDC power supply. A green LED is provided to show that the unit is powered on. The 1516LI-E receives its power through its connection to the 1516LI.

The 1516LI and 1516LI-E are provided in an enclosure that either mounts to a DIN rail or is screwed down on a panel or wall to allow for convenient installation close to the signaling sources. The 1516LI-E connects to the 1516LI through the supplied 5-conductor expansion cable.

# CONNECTIONS

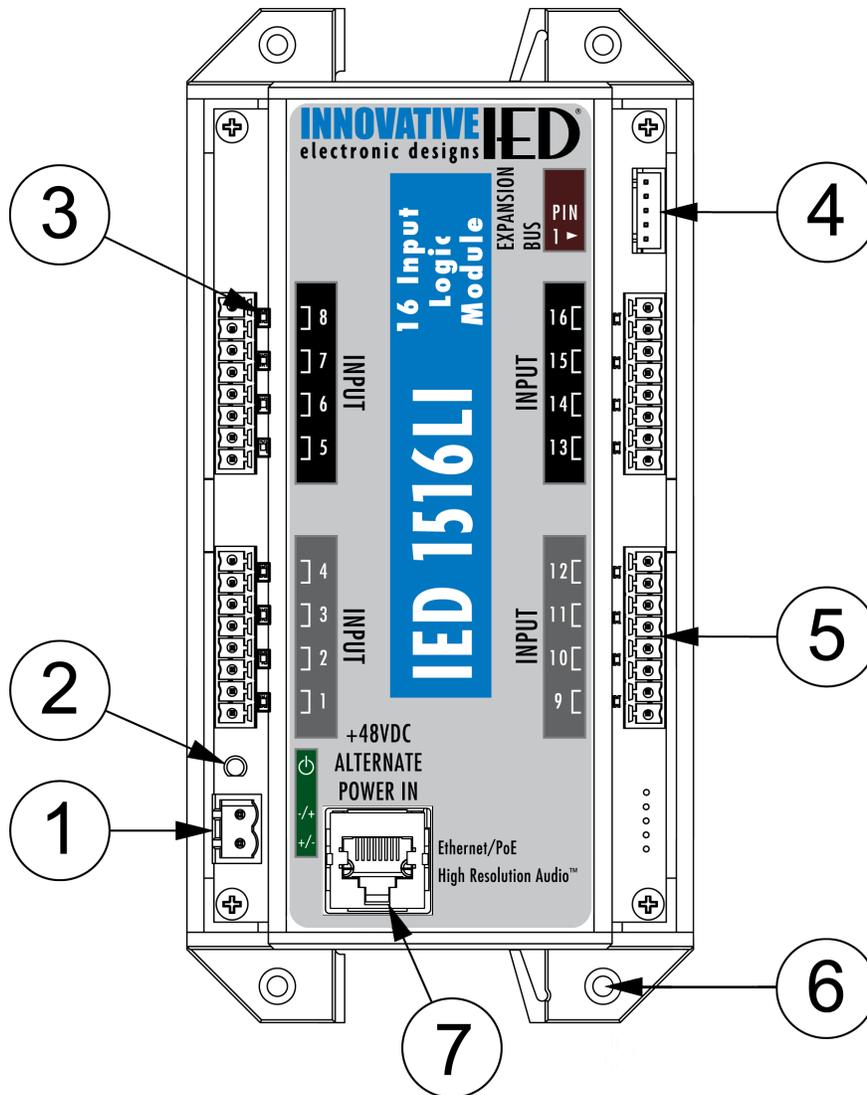


Figure 1 - Front View - 1516LI Connections

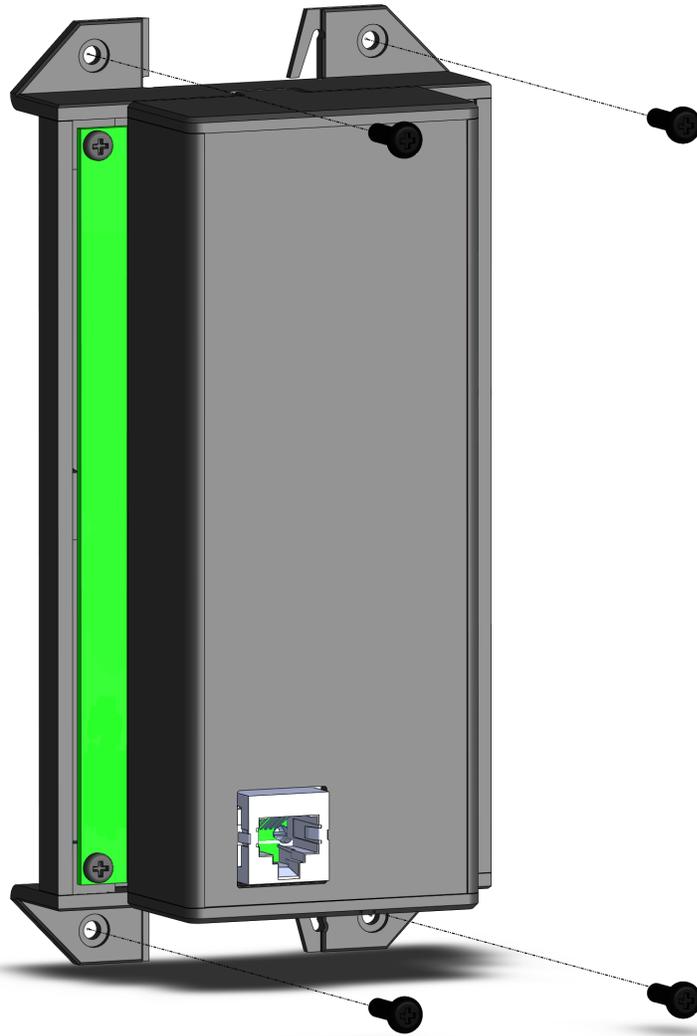
- 1. 48VDC Alternate Power Input Connector**  
When PoE is not used, an external DC supply can be used to supply power to the 1516LI.
- 2. Power LED**  
This LED will illuminate when the unit is powered on.
- 3. Logic Input Active LEDs**  
The Logic Input LEDs will illuminate when activated.
- 4. Expansion Bus Connector**  
The Expansion Bus Connector is connected using the supplied 5-pin, 2.50 mm spacing plugs.
- 5. Logic Input Connectors**  
The Logic Input Connectors are connected using the supplied 8-pin, 3.81 mm spacing Phoenix plugs. Ensure that the proper polarity is maintained throughout all terminations.
- 6. Optional Screw Mounting Locations**  
There are 4 optional screw mounting locations and up to a size 6 screw can be used.
- 7. Ethernet/PoE Connector**  
The Ethernet PoE connector is used to connect the unit to the network using a standard RJ-45 (Cat 5e or higher, 100BaseTX cable) connector.

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## WALL MOUNTING

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After unpacking the 1516LI from its shipping carton, install four screws securely in the designated areas. Screw size can be up to a size 6.



**Figure 2 - Wall Mounting with Screws**

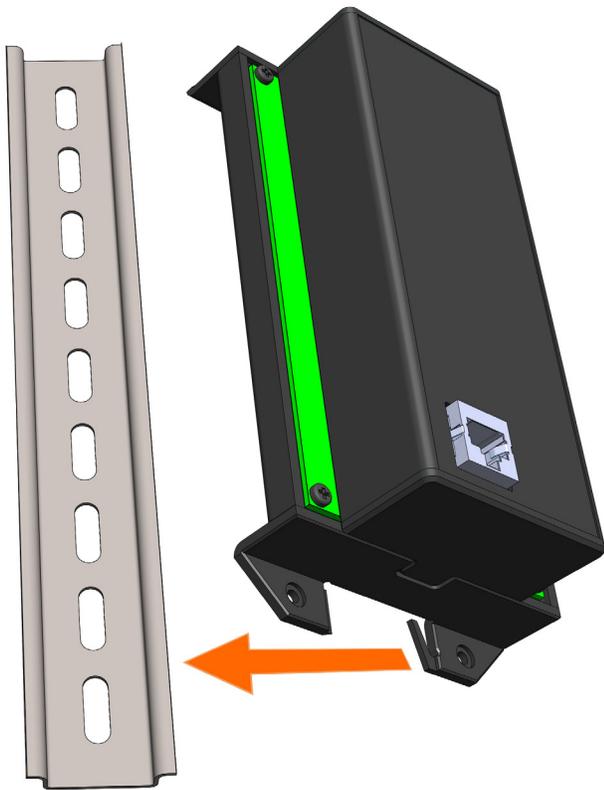
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## DIN RAIL MOUNTING

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**STEP 1:** Position the tabs on the right side flanges under the lip of the DIN rail.

**STEP 2:** Rotate the 1516LI to the left until it snaps into place.



**Figure 3** - 1516LI Mounting on the DIN Rail Example



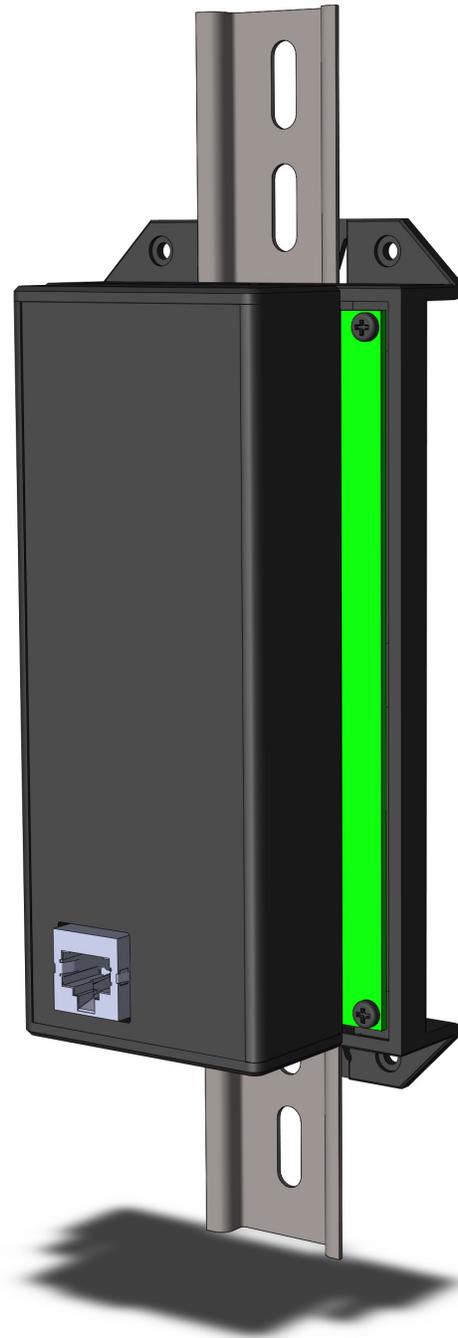
**Figure 4** - 1516LI Rotating and Snapping into Place Example

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## DIN RAIL MOUNTING (Continued)

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The figure below depicts the completed DIN rail mounted option.

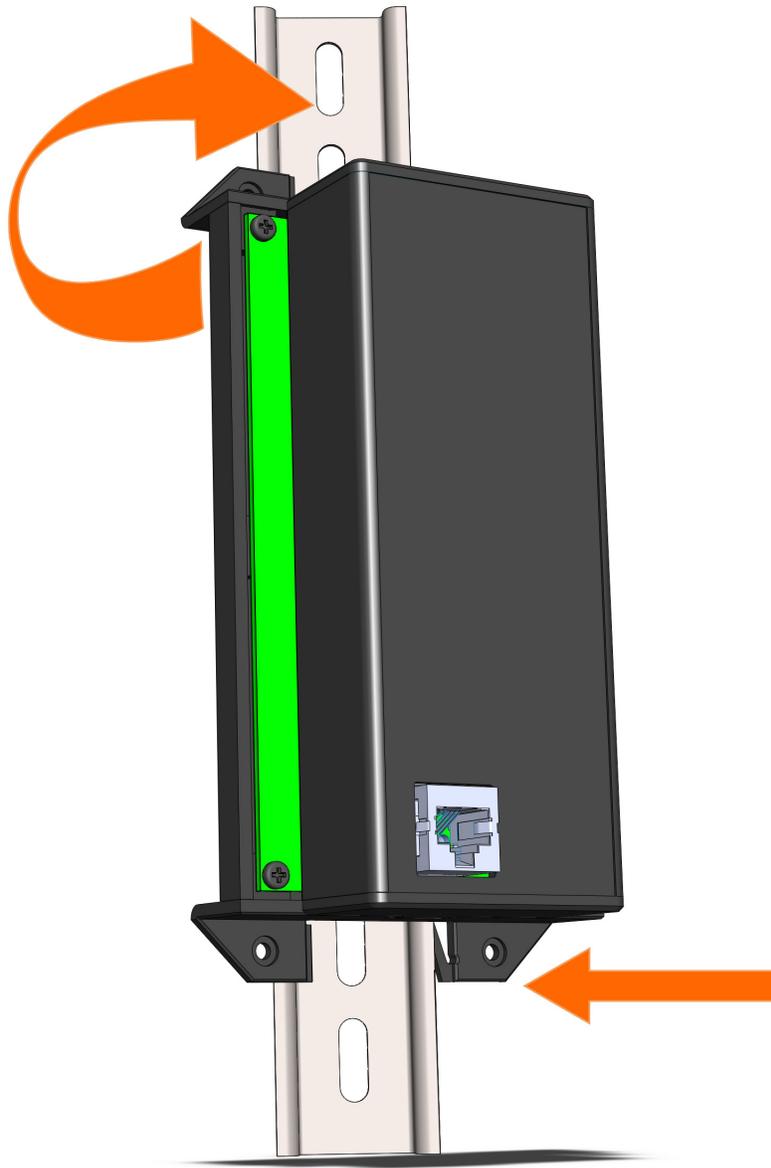


**Figure 5 - 1516LI - Din Rail Mounted Example**

## REMOVING FROM DIN RAIL MOUNT

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**STEP 1:** Push the 1516LI in from the right side, and rotate the unit to the right and pull away from the DIN rail.



**Figure 6** - 1516LI Removing from DIN Rail Example

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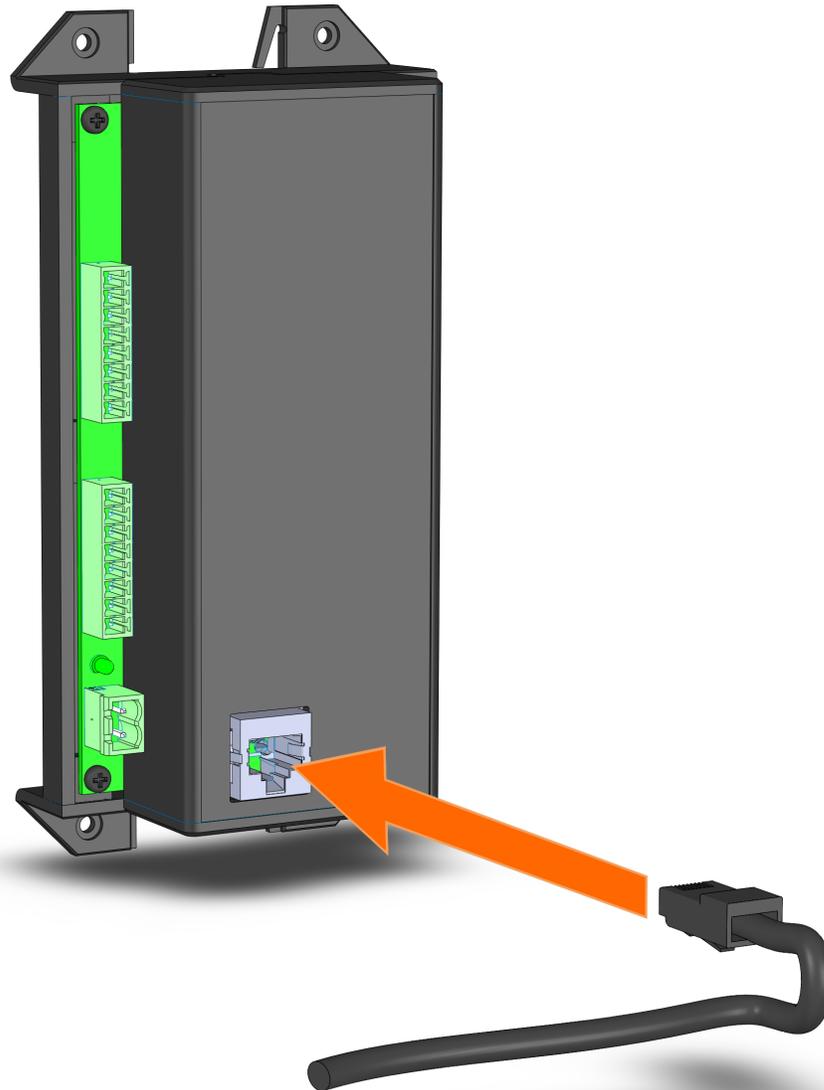
## 1516LI EXAMPLES

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### ETHERNET/PoE INPUT CONNECTION EXAMPLE

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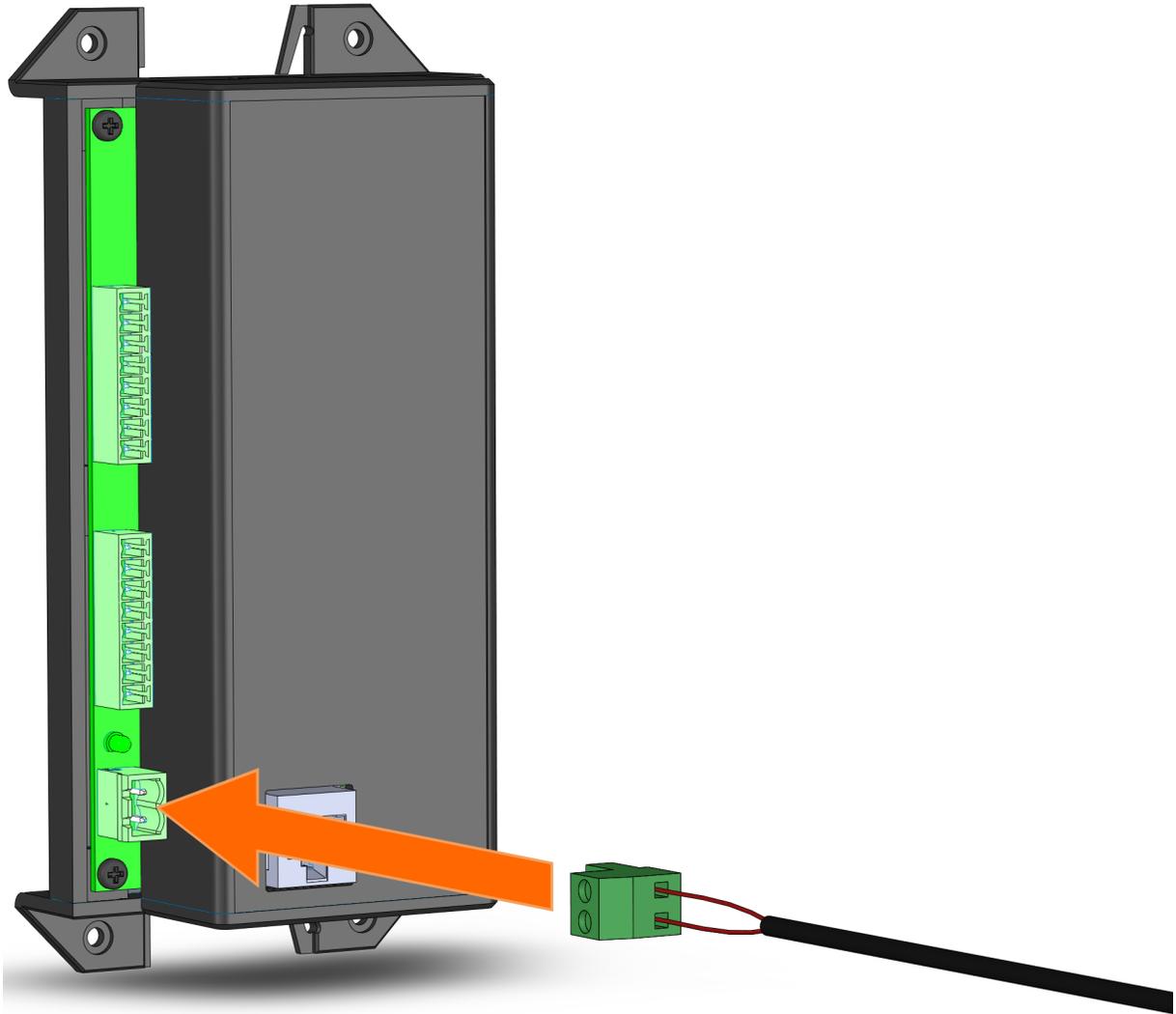
The Ethernet/PoE Input connection cable should be an RJ-45 (Category 5e or higher, 100BaseTX cable) with or without PoE power that conforms to IEEE 802.3af.



**Figure 7 - 1516LI Ethernet/PoE Input Connection Example**

## 48VDC ALTERNATE POWER INPUT CONNECTION EXAMPLE

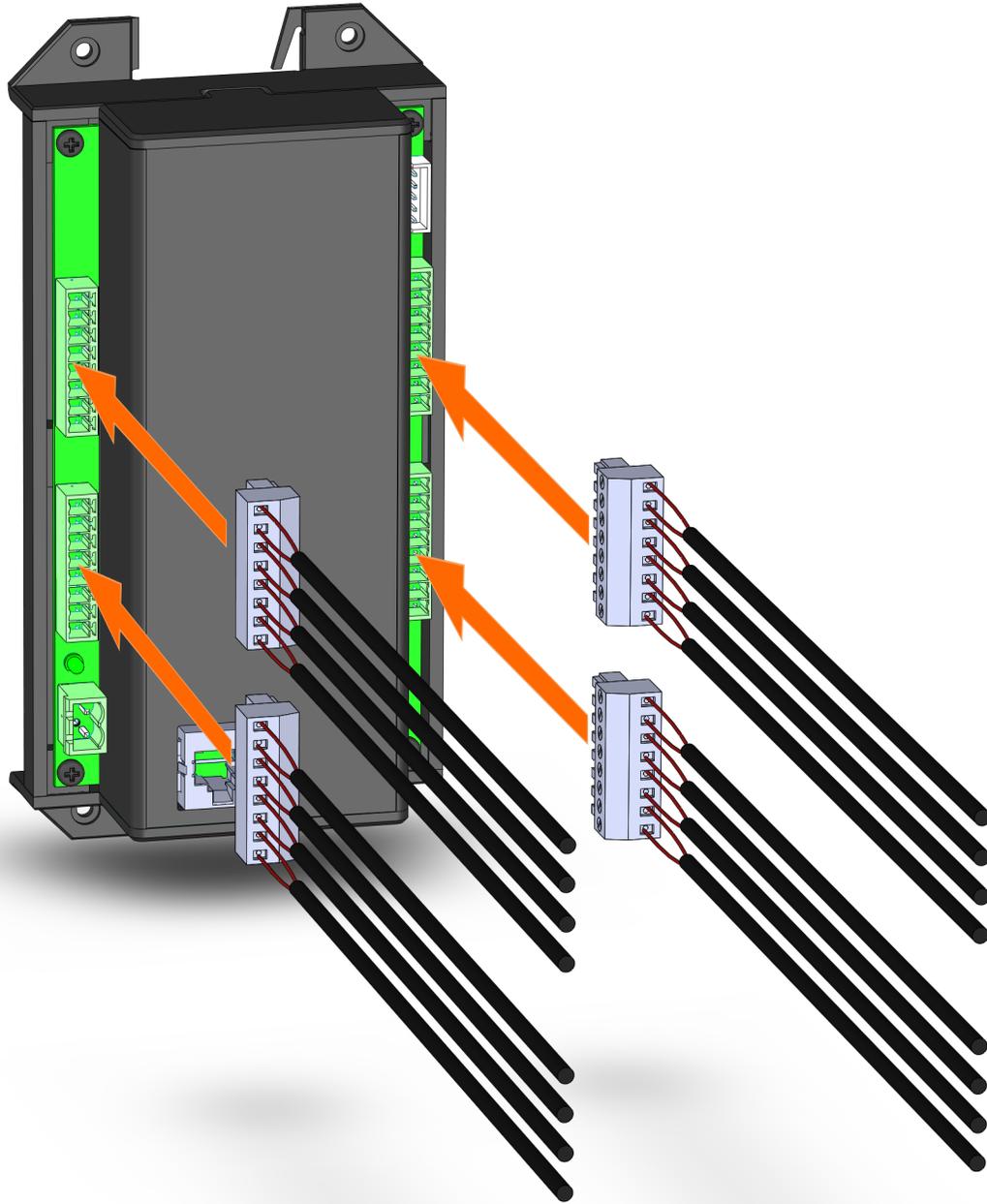
When PoE is not used, an external DC supply can be used to supply power to the 1516LI. The 48VDC connection has no polarity and therefore, plus and minus may be in either orientation.



**Figure 8** - 1516LI Optional 48VDC Alternate Power Input Connection Example

## INPUT CONNECTIONS EXAMPLE

The Logic Input Connectors are connected using the supplied 8-pin, 3.81 mm spacing Phoenix plugs. Ensure that the proper polarity is maintained throughout all terminations.

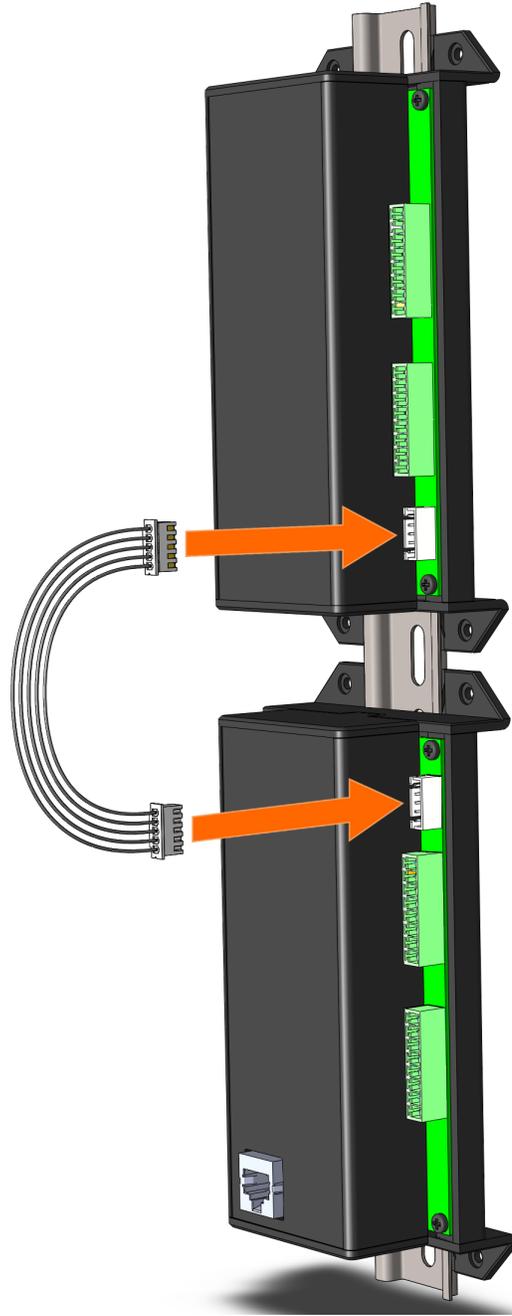


**Figure 9** - 1516LI Input Connections Example

## EXPANSION BUS CONNECTION EXAMPLE

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The 1516LI and the 1516LI-E connect using the supplied 5-pin, 2.50 mm spacing plugs. Ensure that the proper polarity is maintained throughout all terminations. This will allow the total input capacity up to 32 inputs.



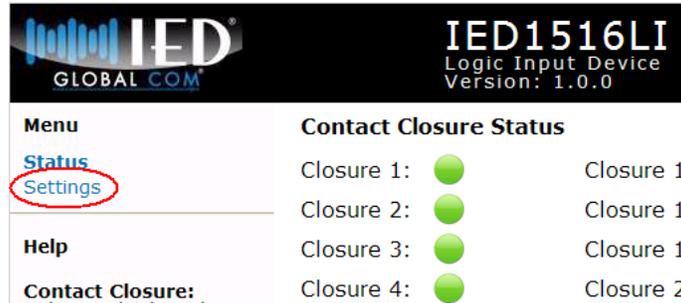
**Figure 10 - 1516LI TO 1516LI-E Expansion Bus Connection Example**

# 1516LI INITIAL CONFIGURATION

From the factory, the 1516LI comes with a fixed address of 10.2.150.182, and is configured to NOT talk to a 1516LI-E expansion module. These settings can be changed as necessary via the built-in web pages. One accesses the web pages by typing the IP address into a browser address bar, e.g., “http://10.2.150.182”.

*Note, one will need to be on a computer configured to be on a compatible 10.x.y.z network in order to access the device at this address. This may require one to (temporarily) add a compatible network setting on their laptop or desktop computer used to access these web pages.*

The first page one encounters is the Status page. This shows the current state of all of the logic inputs or contact closures (including the 1516LI-E inputs, if so configured). One wants to click on the “Settings” label on the left (circled in red in the figure below) to go to the Settings page.



Before accessing the Settings page, one must enter the current password in the edit box shown below. By default from the factory, the password is “iednet” (without the quotes). This password can be changed on the Settings page, once accessed.

Once the correct password is entered and the **Enter** button pressed, one is taken to the Settings page as shown in the example below.



On this page, one can either enter the proper fixed address settings (IP address, subnet mask, and router or default gateway) or alternately enable DHCP (dynamic addressing) via the checkbox provided. This is also where one tells the 1516LI whether it has a 1516LI-E expansion or not via the **Enable Expansion Board** checkbox provided. The **Password** edit box is where one can change the password used to access the Settings page.

Once all the changes are made, one presses the **Save Settings** button. After the settings are saved to flash, they will not take effect until the unit is rebooted or repowered. When changes are made and saved, the web page will prompt to reset the device via the button and red notification shown in the figure below.



# IED1516LI

Logic Input Device  
Version: 1.0.0

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<p><b>Menu</b></p> <p><a href="#">Status</a></p> <p><a href="#">Settings</a></p> <hr/> <p><b>Help</b></p> <p><b>Network Settings:</b>  <b>IP Address</b> - The static IP Address of this device if DHCP is not enabled.  <b>Subnet Mask</b> - The Subnet Mask of your network.  <b>Router</b> - Gateway/Router IP Address.  <b>Enable DHCP</b> - Obtain network addresses automatically.  <b>Report IP</b> - IP Address where this device sends UDP report to.  <b>Report Port</b> - Port on the Report IP where this device sends UDP report to.</p> <p><b>Operational Settings:</b>  <b>Password</b> - If used, requires authentication prior to making changes to the settings of this device.  <b>Enable Expansion Board</b> - Enables the operation and interaction with the expansion board.</p>	<p><b>Network Settings</b></p> <p>Device ID: 0</p> <p>MAC Address: 00:02:C1:71:00:8B</p> <p>IP Address: <input type="text" value="192.168.0.118"/></p> <p>Subnet Mask: <input type="text" value="255.255.255.0"/></p> <p>Router: <input type="text" value="0.0.0.0"/></p> <p>Enable DHCP: <input type="checkbox"/></p> <p>Report IP: <input type="text" value="0.0.0.0"/></p> <p>Report Port: <input type="text" value="0"/></p> <hr/> <p><b>Operational Settings</b></p> <p>Password: <input type="text" value="iednet"/></p> <p>Enable Expansion Board: <input checked="" type="checkbox"/></p> <hr/> <p style="text-align: center;"><input type="button" value="Save Settings"/></p>
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After pressing the Reset button, one gets the web page shown below. Note, if the IP address is changed, the link to the web pages will break. The new IP address will have to be entered into the browser address bar.

The screenshot shows the web interface for the IED1516LI Logic Input Device. At the top, there is a header with the IED GLOBAL COM logo and the device name 'IED1516LI Logic Input Device Version: 1.0.0'. Below the header, there is a 'Menu' section with 'Status' and 'Settings' links. A red message states: 'The system should be reset to take the new settings into effect.' A 'Reset System' button is visible. The 'Network Settings' section includes fields for Device ID (0), MAC Address (00:02:C1:71:00:8B), IP Address (192.168.0.117), Subnet Mask (255.255.255.0), Router (0.0.0.0), and an 'Enable DHCP' checkbox. A 'Help' section on the left provides definitions for IP Address, Subnet Mask, Router, and Enable DHCP.

*GLOBALCOM®/GCK Note: If the GLOBALCOM® or GCK system this device is being added to is itself on a compatible 10.x.y.z network, it should not be necessary to access the web pages at all. Instead, System Management Center (SMC) will discover the 1516LI device and set it up for expansion and any new IP address as defined in the project file.*

This screenshot shows the IED1516LI web interface during a reset process. The header is the same as the previous screenshot. The main content area displays a message: 'It takes 5 - 10 seconds to reset the system. After reset completion (10 seconds), please direct your browser to its new IP address.' At the bottom, there is a copyright notice: 'Copyright © 2013 Innovative Electronic Designs, LLC'.

## DEVICE RECOVERY

In the case somebody forgets the Settings password and not be able to properly access it, this can be reset by the Factory Reset option. This can be done by sending the command via HTTP from a browser, followed by a Reboot command. The form of these commands are:

`http://w.x.y.z/cmd?FactoryReset=A55A`

`http://w.x.y.z/cmd?Reboot=A55A`

where w.x.y.z is the current IP Address of the 1516LI. (Note, the capitalization is important.) The device should respond to the first command with text in the browser that simply says:

Command Accepted

Note, after the reboot, the device will be at the factory default IP address and so may not be addressable without changing the browser to point to that IP address.

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# SPECIFICATIONS

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## Part Numbers

IED1516LI  
IED1516LI-E

## Electrical

Optically Isolated Inputs

Voltage Range ..... 0 – 1.6VDC (ON) / 1.7 – 50VDC (OFF)  
Max Current ..... 3 mA source / 160 mA sink  
Minimum Hold Time (high or low) ..... 250 ms

## Power Requirements

Input Voltage.....48VDC (PoE Compliant with IEEE 802.3af)  
Power 1516LI..... 3 Watts max  
Power 1516LI-E ..... 1 Watt max  
Optional 48VDC Alternate Power Input Voltage.....40 - 50VDC

## Indicator

Power LED ..... 1 (Green)  
Input Active LEDs ..... 16 (Green)

## Connectors

Inputs (4) .....8-pin Phoenix, 3.81 mm spacing  
Ethernet/PoE..... RJ-45 (Cat 5e or higher, 100BaseTX cable)  
48VDC Alternate Power Input.....2-pin Phoenix, 5.08 mm spacing  
Expansion Bus..... 5-pin Connector, 2.50 mm spacing

## Mechanical

Height ..... 7.01" (17.81 cm)  
Width..... 3.50" (8.90 cm)  
Depth ..... 2.00" (5.08 cm)  
Weight.....7.3 oz (206.9 g)

## Environmental

Operating Temperature Range.....-22 °F – +149 °F (-30 °C – +65 °C)

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## FCC NOTICE

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This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

**NOTE:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense