

***Omniconverter***<sup>®</sup> GLAPS/Sx  
Unmanaged  
Single Pair Ethernet Switch PSE



**User Manual**

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The equipment covered by this manual must be disposed of or recycled in accordance with the Waste Electrical and Electronic Equipment Directive (WEEE Directive) of the European Community directive 2012/19/EU on waste electrical and electronic equipment (WEEE) which, together with the RoHS Directive 2015/863/EU, for electrical and electronic equipment sold in the EU after July 2019. Such disposal must follow national legislation for IT and Telecommunication equipment in accordance with the WEEE directive: (a) Do not dispose waste equipment with unsorted municipal and household waste. (b) Collect equipment waste separately. (c) Return equipment using collection method agreed with Omnitron.



The equipment is marked with the WEEE symbol shown to indicate that it must be collected separately from other types of waste. In case of small items the symbol may be printed only on the packaging or in the user manual. If you have questions regarding the correct disposal of equipment go to [www.omnitron-systems.com/support](http://www.omnitron-systems.com/support) or e-mail to Omnitron at [intlinfo@omnitron-systems.com](mailto:intlinfo@omnitron-systems.com).

## Safety Warnings and Cautions



**ATTENTION:** Observe precautions for handling electrostatic discharge sensitive devices.



**WARNING:** Potential damage to equipment and personal injury.



**WARNING:** Risk of electrical shock.

# OmniConverter® GLAPS/Sx User Manual

## Product Overview

The OmniConverter GLAPS/Sx is an unmanaged Single Pair Ethernet (SPE) switch that features copper or fiber uplink ports and four single-pair 10BASE-T1L copper ports designed for digital instrumentation solutions used for Industrial process automation applications. The SPE switch can be deployed in a spur or trunk topology.

The GLAPS/Sx switch features four 10BASE-T1L 3-pin terminal or IEC 63171-2 ports and two 10/100/1000 RJ-45 or 100/1000 fiber SFP uplink ports.

The switches are interoperable with Ethernet-APL Class A and C edge/field devices, and Class 3 and 4 trunk SPE switches. These switches are capable of delivering up to 92 watts per Single Pair Ethernet port, depending on the power class model type.

The GLAPS/Sx functions can be configured using easily accessible DIP-switches

## Front Panel

The front of the GLAPS/Sx provides access to the RJ-45 or SFP uplink ports and the four single-pair 10BASE-T1L Ethernet copper SPE ports.

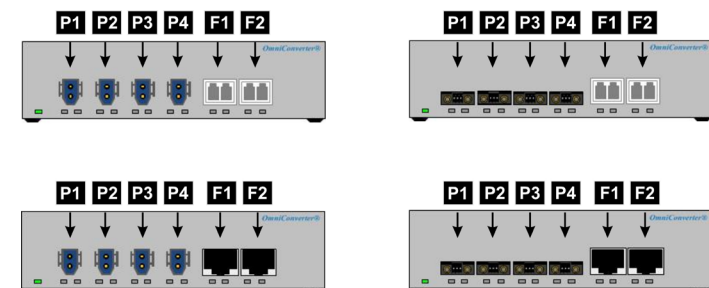
## Uplink and Single-Pair Ports

The four IEEE 802.3cg compliant 10BASE-T1L Ethernet ports feature either a 3-pin terminal or an IEC 63171-2 connector, depending on the model number.

Models are available with an RJ-45 or SFP uplink port.

The SFP transceiver receptacle port supports a variety of copper and fiber transceivers. It supports 10/100/1000BASE-T and 1000BASE-T copper transceivers and 100M and 1G multimode or single-mode fiber, dual or single-fiber transceivers in standard, CWDM and DWDM wavelengths.

The RJ-45 uplink port is a 10/100/1000 copper port.



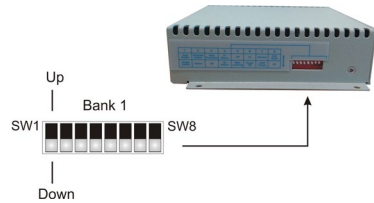
*Front Panel Layout*

## Installation Procedure

- 1) Configure DIP-switches
- 2) Installing the Switch
- 3) Apply Power
- 4) Connect Cables
- 5) Verify Operation

### 1) Configure DIP-switches

DIP-switches are located on the side of the OmniConverter GLAPS/Sx.



*DIP-switch Bank Locations*

The table below provides a description of each DIP-switch position and function.

Switch	Description
SW1	Mode of Operation
SW2	
SW3	Uplink Redundancy
SW4	
SW5	MAC Learning
SW6	Reserved
SW7	
SW8	PoDL Reset

*DIP-switch Definitions*

### SW1 and SW2: Mode of Operation

The switch supports Switch, Directed Switch and Dual Device modes.

The modes are described with MAC learning enabled. When MAC learning is disabled, unicast packets are forwarded to all ports.

SW1	SW2	Function
DOWN	DOWN	Switch Mode (factory default)
DOWN	UP	Directed Switch Mode
UP	DOWN	Dual Device Mode - Switch Mode
UP	UP	Dual Device Mode - Directed Switch Mode

*Modes of Operation*

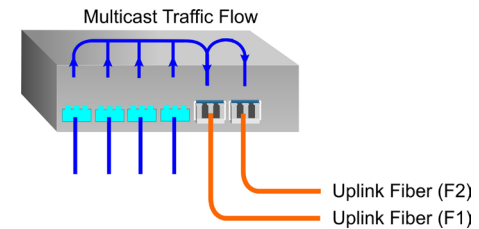
## Switch Mode

When configured for Switch Mode (factory default), the switch operates as a standard layer 2 switch. Data flow will follow MAC address mapping.

### Directed Switch Mode

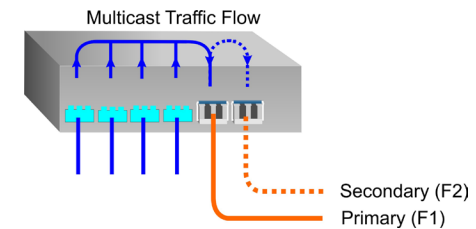
When configured for Directed Switch Mode, traffic from the SPE ports and uplink port F2 is only forwarded to the uplink port F1, preventing the multicast traffic from flooding other network ports. Incoming traffic from uplink port F1 is flooded to all SPE ports and uplink port F2.

The illustrations below show fiber uplink ports. The switch is available with copper uplink ports and operate in the same manner as shown below.



*Directed Switch Mode*

When configured for Directed Switch Mode and Uplink Redundancy (per DIP-switches 3 and 4), traffic is forwarded to both the primary and secondary uplink ports. The secondary port will block all traffic while the primary port is active. When the primary port goes down, the secondary port will be active and all traffic will be forwarded out the secondary port (F2).

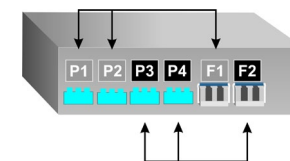


*Directed Switch Mode with Uplink Redundancy*

### Dual Device Mode

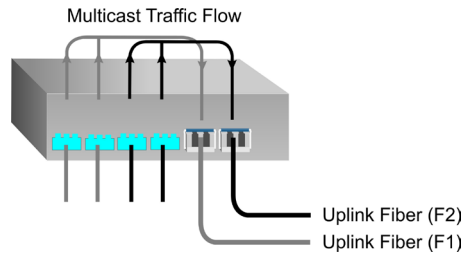
Dual Device Mode is only supported on models with two uplink ports.

When configured for Dual Device Mode, the switch is configured as two logically independent Layer 2 switches. Port F1 is associated with ports P1 and P2 and Port F2 is associated with ports P3 and P4. Data flow will follow MAC address mapping.



*Dual Device Mode*

When configured for Dual Device Mode and Directed Switch Mode, the traffic from ports P1 and P2 is only forwarded to uplink port F1 and ports P3 and P4 are only forwarded to uplink port F2. This prevents broadcast traffic from flooding other network ports. Incoming traffic from F1 and F2 follows MAC address mapping.



*Dual Device with Directed Switch Mode*

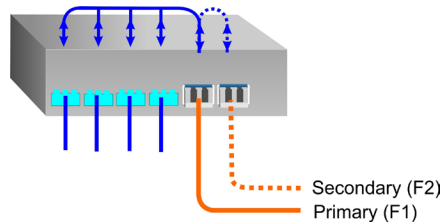
### SW3 and SW4: Uplink Redundancy

The modes are described with MAC learning enabled. When MAC learning is disabled, the switch will send data to all ports.

SW3	SW4	Function
DOWN	DOWN	Switch Mode (factory default)
DOWN	UP	Switch Mode (factory default)
UP	DOWN	Uplink Redundancy Mode - no return to primary (F1)
UP	UP	Uplink Redundancy Mode - return to primary (F1)

#### *Uplink Redundancy*

When configured for Uplink Redundant Mode “no return to primary”, the uplink ports operate as redundant links. A fault on the primary Port F1, will automatically switchover to the secondary Port F2 within 50msec. Once the fault on Port F1 has been restored, the switch will continue to operate on Port F2 because “no return to primary” has been selected.



*Redundant Uplink*

When configured for Uplink Redundant Mode “return to primary”, a fault on the primary Port F1, will cause a fail over to the secondary Port F2 within 50msec. The switch will return to the primary Port F1 after the failure condition has been restored.

### SW5: MAC Learning - “ON/OFF”

When this DIP-switch is in the DOWN “ON” position (factory default), all ports on the switch will learn the source MAC address of each received packet and store

the address so packets destined for the stored addresses can be forwarded to the appropriate port on the switch. When the DIP-switch is in the UP “OFF” position, learning is turned off and all received unicast packets are forwarded to all ports.

### SW6 and SW7: Reserved

These DIP-switches are reserved and must be left in the DOWN default position.

### SW8: PoDL - OFF/PoDL Reset

When this DIP-switch is in the factory default DOWN “OFF” position, output power on all ports will not reset on a loss of receive link on the uplink port.

When this DIP-switch is in the UP “PoDL Reset” position, the output power will be disabled for 5 seconds following a loss of receive link on the uplink port. The operation of this feature will depend on the configuration of the Mode of Operation DIP-switches. See table below.

Uplink Port F1	Uplink Port F2	Dual Device Mode DIP-switch #1, 2	Redundant Uplinks DIP-switch #3, 4	PoDL Reset DIP-switch #8	Function
X	X	X	X	OFF	Ports will not reset
OFF	X	Switch Mode	No Redundancy	PoDL Reset	All port reset
OFF	OFF	Switch Mode	Uplink Redundancy	PoDL Reset	All port reset
ON	ON	Dual Device Mode	X	PoDL Reset	Ports will not reset
ON	OFF	Dual Device Mode	X	PoDL Reset	Ports P3 and P4 will be reset
OFF	ON	Dual Device Mode	X	PoDL Reset	Ports P1 and P2 will be reset
OFF	OFF	Dual Device Mode	X	PoDL Reset	All ports reset

X = Configuration of the DIP-switches or the status of the link does not matter

### Pause

Pause frames will be configured to advertise Symmetrical and Asymmetrical Pause capability on all ports.

### L2CP

All Layer 2 Control Protocol (L2CP) frames will be tunneled.

## 2) Installing the Switch

### Wall Mounting

The wall mounting height of the switch should be less than or equal to 2 meters (6.6 feet) from the floor. Use the four mounting holes on the switch to secure the switch to the wall. The mounting holes can accommodate #6 screws (not included).

Installation of the switch should be such that the air flow in the front, back, side and top vents of the switch are not compromised or restricted.

The accessory cables should have their own strain relief and do not pull down on the switch.

### Rack Mounting

The switch can be rack mounted using the optional Rack Mount Shelf (8260-0). Refer to the Rack Mount Shelf user manual (040-08260-001x) for the proper installation guidelines.

### 3) Apply Power

#### DC Power

This switch is intended for installation in restricted access areas. (“Les matériels sont destinés à être installés dans des EMBLEMES À ACCÈS RESTREINT”). A restricted access area can be accessed only through the use of a special key, or other means of security.

The over current protection for connection with centralized DC shall be provided in the building installation, and shall be a UL listed circuit breaker rated 20 Amps, and installed per the National Electrical Code, ANSI/NFPA-70.

Appropriate overloading protection should be provided on the DC power source outlets utilized.

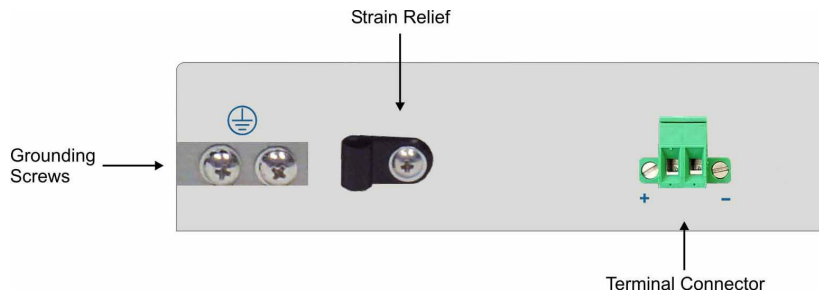
The GLAPS/Sx requires the following DC voltages, inclusive of tolerances:

Class A		Class C	
2937	2952	2939	2953
+12 to +15VDC; 0.78A @ 12VDC	+24 to +48VDC; 0.36A @ 48VDC	+12 to +15VDC; 0.94A @ 12VDC	+24 to +48VDC; 0.52A @ 48VDC

Class 3	Class 4
2941	2943
+46 to +50VDC; 5.16A @ 48VDC	+46 to +50VDC; 8.20A @ 48VDC

Appropriate overloading protection should be provided on the DC power source outlets utilized.



DC Models Rear View: 2-Pin Terminal for DC Power

**WARNING:** Only a DC power source that complies with safety extra low voltage (SELV) requirements can be connected to the DC-input power supply.

#### WARNING REGARDING EARTHING GROUND:

- This equipment shall be connected to the DC supply system earthing electrode conductor or to a bonding jumper from an earthing terminal bar or bus to which the DC supply system earthing electrode is connected.
- This equipment shall be located in the same immediate area (such as adjacent cabinets) as any other equipment that has a connection between the earthed conductor of the same DC supply circuit and the earthing conductor, and also the point of earthing of the DC system. The DC system shall not be earthed elsewhere.
- The DC supply source is to be located within the same premises as this equipment.
- There shall be no switching or disconnecting devices in the earthed circuit conductor between the DC source and the earthing electrode conductor.

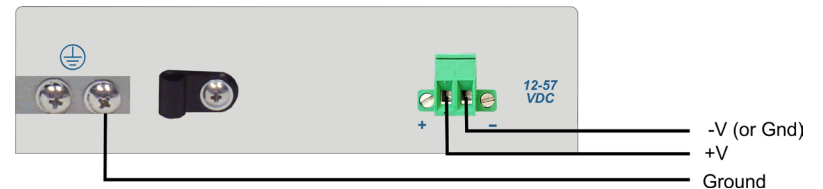
Locate the DC circuit breaker of the external power source, and switch the circuit breaker to the OFF position.

Prepare a power cable using a three conductor insulated wire (not supplied) with 12AWG to 14AWG thickness. Cut the power cable to the length required.

Strip approximately 3/8 of an inch of insulation from the power cable wires.

Connect the ground wire to the grounding screws on the back of the switch.

Connect the power cables to the switch by fastening the stripped ends to the DC power connector.



DC Models Rear View: Power Connections

**WARNING:** The positive lead of the power source must be connected to the “+” terminal on the switch and the negative lead of the power source to the “-” terminal on the switch as shown above.

**WARNING:** Note the wire colors used in making the positive, negative and ground connections. Use the same color assignment for the connection at the circuit breaker.

Connect the power wires to the circuit breaker and turn ON the circuit breaker. If any switch is installed, the Power LED will indicate the presence of power.

During the installation, ensure that the ground potentials are maintained throughout the system connections. This includes but not limited to the power source ground and any shielded cabling grounds.

**WARNING!!!**  
**NEVER ATTEMPT TO OPEN THE CHASSIS OR SERVICE THE POWER SUPPLY. OPENING THE CHASSIS MAY CAUSE SERIOUS INJURY OR DEATH. THERE ARE NO USER REPLACEABLE OR SERVICEABLE PARTS IN THIS UNIT.**

Make sure to disconnect the power and ground cables before removing the equipment.

#### 4) Connect Cables



- a. For SFP uplink models, insert the SFP/SFP+ transceiver into the SFP receptacle on the front of the module. Refer to the SFP Data Sheet 091-17000-001 for supported 100M and 1G transceivers.

**NOTE: The release latch of the SFP fiber transceiver must be in the closed (up) position before insertion.**

- b. Connect an appropriate multimode or single-mode fiber cable to the fiber port on the front of the module. It is important to ensure that the transmit (TX) is attached to the receive side of the transceiver at the other end and the receive (RX) is attached to the transmit side. When using single-fiber (SF) models, the TX wavelength must match the RX wavelength at the other end and the RX wavelength must match the TX wavelength at the other end.
- c. For RJ-45 uplink models, connect the port using a Category 3 or better cable to an external 10/100/1000 Ethernet device.
- d. Connect the 3-Pin Terminal or IEC 63171-2 connector via a single-pair Ethernet (SPE) cable to an Ethernet-APL device based on the model number. It is important to use the correct model for the class of field device being installed. See the table below for Class and voltage information.

Base Model #	Port 1 - Port 4	
2937 2952	T1L/PSE 0.5W	Class A (1.0V)
2939 2953	T1L/PSE 1.0W	Class C (1.0V)
2941	T1L/PSE 36W	Class 3 (2.4V)
2943	T1L/PSE 92W	Class 4 (2.4V)

Cable must meet the SPE cable requirements: IEC 61156-13 (fixed) or IEC 61156-14 (flexible) 18AWG cable or better.

Connector	+	-	Gnd
 IEC	Pin 1	Pin 2	Shield
 3 Pin	Pin 1	Pin 2	Pin 3

#### Hazardous Area Use Disclaimer:

This product is not certified for use in hazardous (classified) locations, including Zone 0, Zone 1, or Zone 2 as defined by IEC 60079-10-1 or equivalent national standards.

It is intended for installation in non-hazardous (safe) areas only.

The product supports interoperability with Ethernet-APL networks and devices, including those installed in hazardous zones, provided that all connections are made through certified intrinsically safe interfaces as part of a compliant system architecture.

When connecting to devices located in hazardous areas, appropriate energy-limiting devices, field switches, or barriers must be used to ensure compliance with all applicable safety standards.

## 5) Verify Operation

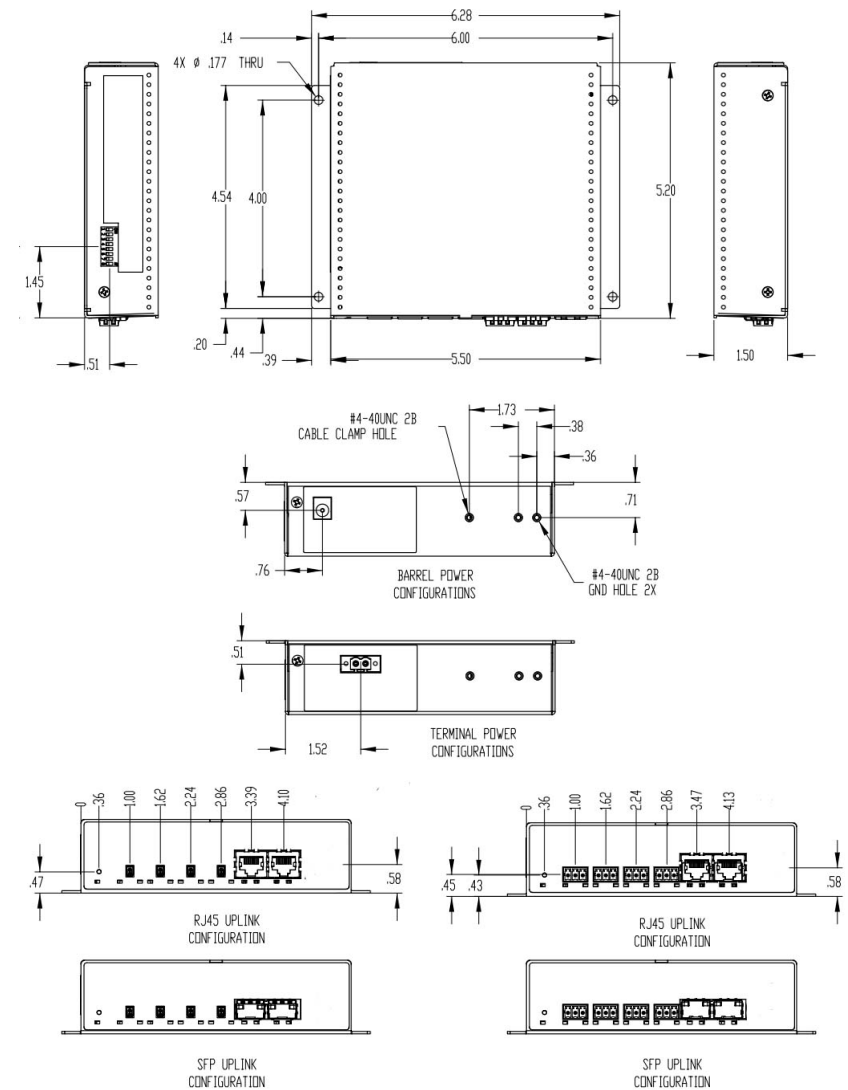
Verify the switch is operational by viewing the LED indicators.

Power LED Indicators		
Legend	Indicator	Description
Pwr	OFF	Switch not powered
	Green - ON	Switch powered
	Green - Blinking 1Hz	Switch is powered and ready for reset to factory default state

Uplink Ports LED Indicators - SFP and Copper Uplink Models		
Legend	Indicator	Description
100	OFF	No link
	Green - ON	Port linked at 100Mbps FDx
	Green - Blinking at 10Hz	Port Tx/Rx data activity at 100Mbps FDx
	Green - Blinking at 1Hz	Port linked at 100Mbps and in redundant standby mode
	Amber - ON	Port linked at 100Mbps HDx
	Amber - Blinking at 10Hz	Port Tx/Rx data activity at 100Mbps HDx
1000	OFF	No link
	Green - ON	Port linked at 1000Mbps FDx
	Green - Blinking at 10Hz	Port data activity at 1000Mbps FDx
	Green - Blinking at 1Hz	Port linked at 1000Mbps and in redundant standby mode
	Amber - ON	Port linked at 1000Mbps HDx
	Amber - Blinking at 10Hz	Port Tx/Rx data activity at 1000Mbps HDx
100+1000	OFF	No link
	Green - ON	Port linked at 10Mbps FDx
	Green - Blinking at 10Hz	Port Tx/Rx data activity at 10Mbps FDx
	Green - Blinking at 1Hz	Port linked at 10Mbps and in redundant standby mode
	Amber - ON	Port linked at 10Mbps HDx
	Amber - Blinking at 10Hz	Port Tx/Rx data activity at 10Mbps HDx

10BASE-T/11 Ports LED Indicators		
Legend	Indicator	Description
Lk/Act	OFF	No link
	Green - ON	Port linked at 10Mbps FDx
	Green - Blinking at 10Hz	Port Tx/Rx data activity at 10Mbps FDx
PSE	OFF	10T1L Port PSE inactive
	Green - ON	10T1L Port PSE (SPoE) being supplied
	Amber - ON	PSE failed negotiation
	Amber Blinking (1Hz)	10T1L Port PSE inactive due to Power demand exceeding the Power source capacity, short circuit or resistance low or high

## Mechanical



## Specifications

<b>Description</b>	<b>OmniConverter® GLAPS/Sx</b> 10T/T1L to 100/1000 Fiber or 10/100/1000 Copper Uplinks Unmanaged PSE Ethernet Switch
<b>Standard Compliances</b>	IEEE 802.3, 802.3cg
<b>PSE Mode and DC Power Requirements</b>	Model 2937 12 to 15 VDC; 0.78A @ 12VDC 2-Pin Terminal Class A field/edge devices, 1.0 V peak-to-peak; 0.5 W Model 2952 24 to 48 VDC; 0.36A @ 48VDC 2-Pin Terminal Class A field/edge devices, 1.0 V peak-to-peak; 0.5 W Model 2939 +12 to +15VDC; 0.94A @ 12VDC 2-Pin Terminal Class C field/edge devices, 1.0 V peak-to-peak; 1.0 W Model 2953 24 to 48 VDC; 0.52A @ 48VDC 2-Pin Terminal Class C field/edge devices, 1.0 V peak-to-peak; 1.0 W Model 2941 +46 to +50VDC; 5.16A @ 48VDC 2-Pin Terminal Class 3 field/edge devices, 2.4 V peak-to-peak, 36 W Model 2943 +46 to +50VDC; 8.20A @ 48VDC 2-Pin Terminal Class 4 field/edge devices, 1.82 Amps Max, 2.4 V peak-to-peak, 92 W
<b>Frame Size</b>	Up to 2,048 bytes
<b>Port Types</b>	10BASE-T1L: 3-Pin Terminal or IEC 63171-2 SPE connector RJ-45: 10/100/1000BASE-T SFP: 10/100/1000BASE-T SGMII or 1000BASE-T SERDES Copper Transceiver, 100BASE-X or 1000BASE-X Fiber Transceiver
<b>Cable Types</b>	10BASE-T1L: Single-Pair Ethernet (SPE) cable, IEC 61156-13 (fixed) or IEC 61156-14 (flexible) 18AWG cable or better RJ-45: EIA/TIA 568A/B, Cat 3 UTP and higher Fiber: Multimode: 50/125, 62.5/125µm Single-mode: 9/125µm
<b>Dimensions (W x D x H)</b>	6.28" x 5.2" x 1.5" (159.5 mm x 132.1 mm x 38.1 mm)
<b>Weight</b>	1.5 lb.; 720 grams
<b>Operating Temperature</b>	Commercial: 0 to 50°C Wide: -40 to 60°C (-20°C AC cold start) Extended: -40 to 75°C (-20°C AC cold start) Storage: -40 to 80°C
<b>Humidity</b>	5 to 95% (non-condensing)
<b>Altitude</b>	-100m to 4,000m (operational)
<b>MTBF (hours)</b>	224,000 for Model 2937, 2939, 2952 and 2953 220,000 for Model 2941 and 2943
<b>Warranty</b>	5 year product warranty with 24/7/365 free Technical Support

<b>Regulatory Compliances (Pending)</b>	<b>Safety:</b>	UL 62368-1, UL 60950-1, IEC 62368-1, IEC 60950-1, EN 62368-1, EN 60950-1, CAN/CSA C22.2 No. 62368-1-14, CAN/CSA C22.2 No. 60950-1, CE Mark, UKCA
	<b>EMC:</b>	EN 55032/24 CE Emissions/Immunity, IEC 61000-6-4 Industrial Emissions, IEC 61000-6-2 Industrial Immunity
	<b>EMI:</b>	CISPR 32, FCC 47 Part 15 Subpart B Class A
	<b>EMS:</b>	IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV, IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m, IEC 61000-4-4 EFT: Power: 2 kV; Signal: 1 kV (DC models), IEC 61000-4-4 EFT: Power: 1 kV; Signal: 1 kV (AC models), IEC 61000-4-5 Surge: Power: 2 kV; Signal: 2 kV (DC models), IEC 61000-4-5 Surge: Power: 1 kV Line/Line; 2 kV Line/Gnd; Signal: 2 kV (AC models), IEC 61000-4-6 CS: Signal: 10 V, IEC 61000-4-8 (Magnetic Field) 30A/m, IEC 61000-4-11 (Voltage Dips, interrupts)
	<b>IP Rating:</b> <b>Act:</b>	IP20 Protection TAA, BAA, NDA
<b>Environmental</b>	REACH, RoHS, WEEE	

## Customer Support Information

If you encounter problems while installing this product, contact Omnitron Technical Support:

Phone: (949) 250-6510  
 Fax: (949) 250-6514  
 Address: Omnitron Systems Technology, Inc.  
 38 Tesla  
 Irvine, CA 92618, USA  
 Email: support@omnitron-systems.com  
 URL: www.omnitron-systems.com