



# IES-1890 16 FE + 2 GE Combo SFP Managed Switch -40 to 75C, DIN-rail, IEC61850

#### Overview

LevelOne IES-1890 Industry Ethernet Switch provides 16 ports of 10/100Base-TX plus 2 ports of 1000Base Ethernet / SFP Combo to enable high speed network at mission-critical environment. This device is designed to be mounted on an industry standard DIN-rail, plus the clearly visible status LEDs provide simple monitoring of port link activity. Moreover, the SFP slots support pluggable modules that enabling you to choose from a variety of transceivers.

#### Management

It supports a variety of management features including: CLI via Console or Telnet; Graphic User Interface via Web Browser or Simple Network Management Protocol via SNMP tools. It provides better visibility and management of those critical assets.

# **Resilient Ring Network**

Supports Ring topology network providing simple installation and ultra fast network recovery performance, less than 15ms. Unlike much complex resilient topology, such as a redundant star, the Ring simplifies the network design and requires less cabling installation. In addition, fast network recovery time helps minimize system downtime.

#### **Features**

- Complies with IEC61850-3/IEEE1613 for power substations & EN50121-4 for railway applications
- Supports  $\alpha\text{-ring}$  and RSTP/MSTP/STP for Ethernet redundancy and GOOSE Message
- Zero Packet Loss pass by GOOSE Message
- IP Multicast Filtering through IGMP Snooping V1, V2 & V3
- Port-based VLAN and IEEE802.1Q VLAN Tagging and GVRP
- IEEE802.1p QoS with four priority queues
- MAC-based trunking and LACP
- IEEE802.1x Security
- Bandwidth Rate Control
- Per-port programmable MAC address locking

#### Diagrams

#### **GOOSE** Message

Critical GOOSE (Generic Object Oriented Substation Event) messages can be sent reliably using the multicast and prioritisation functionality within LevelOne Industrial switches. Moreover, the test was conducted by KEMA, a renown laboratory for testing and certification for substations.

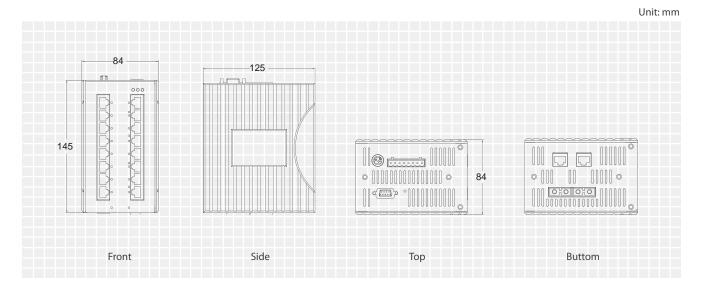
# **High Reliability**

All components are built to withstand harsh environment applications without compromise where humidity, temperature variation and even shock vibration are concerns, including Electric & Utility, Critical Infrastructure, Transportation and Surveillance Security. This device operates under -40 to 75 Celsius (-40 to 167 Fahrenheit) temperature.

# **Substation & Railway Applications**

This device is complied with IEC 61850-3 / IEEE 1613 for the power substations and EN 50121-4 for the railway applications. IEC 61850-3 is an international standard for electrical substation systems. The standard enables integration of all control, measurement, monitoring and protection functions within a substation.

- Up to 24 Static Secure MAC addresses per port
- Port mirroring
- NTP synchronization
- DHCP Client/Server
- RS-232 Console, Telnet, SNMP V1, V2c & V3, RMON, Web Browser, and TFTP Management
- 1000Mbps-Full-duplex, 10/100Mbps-Full/Half-duplex,
- Auto-Negotiation, Auto-MDI/MDIX - Full wire-speed forwarding rate
- -40°C to 75°C (-40°F to 167°F) operating temperature range, tested for functional operation @ -40°C to 80°C (-40°F to 176°F)



# Specifications

EE802.3 10BASE-T, IEEE802.3u 100BASE-TX, EEE802.3ab1000BASE-T, IEEE802.3z 1000BASE- X/1000BASE-LX, IEEE802.3x, IEEE802.1p, EEE802.1Q, IEEE802.1w, IEEE802.1x 4,880pps for 10Mbps 48,810pps for 100Mbps 488,100pps for 1000Mbps bits pre-and-Forward If-duplex back-pressure and IEEE802.3x full-duplex w control 22 MAC addresses put Voltage: 12 to 48VDC (Terminal Block); 12VDC (DC Jack) 5W Max. 1.25A @ 12VDC, 0.625A @ 24VDC resent	Environment Operating Temperature Storage Temperature Ambient Relative Humidity MTBF Regulatory A ISO EMI EMS	<ul> <li>Manufactured in an ISO9001 facility</li> <li>FCC Part 15, Class A</li> <li>EN61000-6-4</li> <li>EN55022         <ul> <li>EN61000-3-2, EN61000-3-3</li> </ul> </li> <li>EN61000-6-2         <ul> <li>EN61000-4-2 (ESD Standards) Contact: + / - 8KV Air: + / - 15KV</li> <li>EN61000-4-3 (Radiated RFI Standards) 10V/m, 80 to 1000MHz; 80% AM</li> </ul> </li> </ul>
EEE802.3ab1000BASE-T, IEEE802.3z 1000BASE- X/1000BASE-LX, IEEE802.3x, IEEE802.1p, EEE802.1Q, IEEE802.1w, IEEE802.1x 4,880pps for 10Mbps 48,810pps for 100Mbps 488,100pps for 1000Mbps bits bits pre-and-Forward If-duplex back-pressure and IEEE802.3x full-duplex w control 22 MAC addresses put Voltage: 12 to 48VDC (Terminal Block); 12VDC (DC Jack) 5W Max. 1.25A @ 12VDC, 0.625A @ 24VDC	Temperature Storage Temperature Ambient Relative Humidity MTBF Regulatory A ISO EMI	Iested @ -40°C to 80°C (-40°F to 176°F)         -45°C to 85°C (-49°F to 185°F)         5% to 95% (non-condensing)         28.62 years         Manufactured in an ISO9001 facility         FCC Part 15, Class A         EN61000-6-4         EN55022         EN61000-6-2         - EN61000-6-2         - EN61000-4-2 (ESD Standards)         Contact: + / - 8KV         Air: + / - 15KV         - EN61000-4-3 (Radiated RFI Standards)         10V/m, 80 to 1000MHz; 80% AM
EE802.1Q, IEEE802.1w, IEEE802.1x 4,880pps for 10Mbps 48,810pps for 100Mbps 488,100pps for 1000Mbps bits bits pre-and-Forward If-duplex back-pressure and IEEE802.3x full-duplex w control 22 MAC addresses put Voltage: 12 to 48VDC (Terminal Block); 12VDC (DC Jack) 5W Max. 1.25A @ 12VDC, 0.625A @ 24VDC	Temperature Ambient Relative Humidity MTBF Regulatory A ISO EMI	<ul> <li>5% to 95% (non-condensing)</li> <li>28.62 years</li> <li>Manufactured in an ISO9001 facility</li> <li>FCC Part 15, Class A</li> <li>EN61000-6-4</li> <li>EN55022 <ul> <li>EN61000-3-2, EN61000-3-3</li> </ul> </li> <li>EN61000-6-2 <ul> <li>EN61000-6-2</li> <li>EN61000-4-2 (ESD Standards)</li> <li>Contact: + / - 8KV</li> <li>Air: + / - 15KV</li> <li>EN61000-4-3 (Radiated RFI Standards)</li> <li>10V/m, 80 to 1000MHz; 80% AM</li> </ul> </li> </ul>
48,810pps for 100Mbps 488,100pps for 1000Mbps bits bits bre-and-Forward If-duplex back-pressure and IEEE802.3x full-duplex v control 22 MAC addresses put Voltage: 12 to 48VDC (Terminal Block); 12VDC (DC Jack) 5W Max. 1.25A @ 12VDC, 0.625A @ 24VDC	Relative Humidity MTBF Regulatory A ISO EMI	<ul> <li>28.62 years</li> <li>Manufactured in an ISO9001 facility</li> <li>FCC Part 15, Class A</li> <li>EN61000-6-4</li> <li>EN55022         <ul> <li>EN61000-3-2, EN61000-3-3</li> <li>EN61000-6-2</li> <li>EN61000-6-2</li> <li>EN61000-4-2 (ESD Standards) Contact: + / - 8KV Air: + / - 15KV</li> <li>EN61000-4-3 (Radiated RFI Standards) 10V/m, 80 to 1000MHz; 80% AM</li> </ul> </li> </ul>
488,100pps for 1000Mbps bits bits bre-and-Forward If-duplex back-pressure and IEEE802.3x full-duplex v control 32 MAC addresses put Voltage: 12 to 48VDC (Terminal Block); 12VDC (DC Jack) 5W Max. 1.25A @ 12VDC, 0.625A @ 24VDC	Humidity MTBF Regulatory A ISO EMI	Pprovals                • Manufactured in an ISO9001 facility                 • FCC Part 15, Class A                 • FCC Part 15, Class A                 • EN61000-6-4                 • EN55022                 EN61000-3-2, EN61000-3-3                 • EN61000-6-2                 • EN61000-4-2 (ESD Standards)             Contact: + / - 8KV             Air: + / - 15KV                 • EN61000-4-3 (Radiated RFI Standards)             10V/m, 80 to 1000MHz; 80% AM
bits pre-and-Forward If-duplex back-pressure and IEEE802.3x full-duplex v control 22 MAC addresses put Voltage: 12 to 48VDC (Terminal Block); 12VDC (DC Jack) 5W Max. 1.25A @ 12VDC, 0.625A @ 24VDC	Regulatory A ISO EMI	Pprovals                • Manufactured in an ISO9001 facility                 • FCC Part 15, Class A                 • FCC Part 15, Class A                 • EN61000-6-4                 • EN55022                 EN61000-3-2, EN61000-3-3                 • EN61000-6-2                 • EN61000-4-2 (ESD Standards)             Contact: + / - 8KV             Air: + / - 15KV                 • EN61000-4-3 (Radiated RFI Standards)             10V/m, 80 to 1000MHz; 80% AM
ere-and-Forward If-duplex back-pressure and IEEE802.3x full-duplex w control 22 MAC addresses put Voltage: 12 to 48VDC (Terminal Block); 12VDC (DC Jack) 5W Max. 1.25A @ 12VDC, 0.625A @ 24VDC	ISO EMI	<ul> <li>Manufactured in an ISO9001 facility</li> <li>FCC Part 15, Class A</li> <li>EN61000-6-4</li> <li>EN55022         <ul> <li>EN61000-3-2, EN61000-3-3</li> </ul> </li> <li>EN61000-6-2         <ul> <li>EN61000-4-2 (ESD Standards) Contact: + / - 8KV Air: + / - 15KV</li> <li>EN61000-4-3 (Radiated RFI Standards) 10V/m, 80 to 1000MHz; 80% AM</li> </ul> </li> </ul>
If-duplex back-pressure and IEEE802.3x full-duplex w control 22 MAC addresses put Voltage: 12 to 48VDC (Terminal Block); 12VDC (DC Jack) 5W Max. 1.25A @ 12VDC, 0.625A @ 24VDC	ISO EMI	<ul> <li>Manufactured in an ISO9001 facility</li> <li>FCC Part 15, Class A</li> <li>EN61000-6-4</li> <li>EN55022         <ul> <li>EN61000-3-2, EN61000-3-3</li> </ul> </li> <li>EN61000-6-2         <ul> <li>EN61000-4-2 (ESD Standards) Contact: + / - 8KV Air: + / - 15KV</li> <li>EN61000-4-3 (Radiated RFI Standards) 10V/m, 80 to 1000MHz; 80% AM</li> </ul> </li> </ul>
If-duplex back-pressure and IEEE802.3x full-duplex w control 22 MAC addresses put Voltage: 12 to 48VDC (Terminal Block); 12VDC (DC Jack) 5W Max. 1.25A @ 12VDC, 0.625A @ 24VDC	EMI	<ul> <li>FCC Part 15, Class A</li> <li>EN61000-6-4</li> <li>EN55022         <ul> <li>EN61000-3-2, EN61000-3-3</li> </ul> </li> <li>EN61000-6-2         <ul> <li>EN61000-4-2 (ESD Standards)</li> <li>Contact: + / - 8KV</li> <li>Air: + / - 15KV</li> <li>EN61000-4-3 (Radiated RFI Standards)</li> <li>10V/m, 80 to 1000MHz; 80% AM</li> </ul> </li> </ul>
v control 92 MAC addresses put Voltage: 12 to 48VDC (Terminal Block); 12VDC (DC Jack) 5W Max. 1.25A @ 12VDC, 0.625A @ 24VDC		<ul> <li>EN61000-6-4</li> <li>EN55022         <ul> <li>EN61000-3-2, EN61000-3-3</li> </ul> </li> <li>EN61000-6-2         <ul> <li>EN61000-4-2 (ESD Standards)</li> <li>Contact: + / - 8KV</li> <li>Air: + / - 15KV</li> <li>EN61000-4-3 (Radiated RFI Standards)</li> <li>10V/m, 80 to 1000MHz; 80% AM</li> </ul> </li> </ul>
put Voltage: 12 to 48VDC (Terminal Block); 12VDC (DC Jack) 5W Max. 1.25A @ 12VDC, 0.625A @ 24VDC	EMS	EN61000-3-2, EN61000-3-3 = EN61000-6-2 - EN61000-4-2 (ESD Standards) Contact: + / - 8KV Air: + / - 15KV - EN61000-4-3 (Radiated RFI Standards) 10V/m, 80 to 1000MHz; 80% AM
12VDC (DC Jack) 5W Max. 1.25A @ 12VDC, 0.625A @ 24VDC	EMS	<ul> <li>EN61000-4-2 (ESD Standards) Contact: + / - 8KV Air: + / - 15KV</li> <li>EN61000-4-3 (Radiated RFI Standards) 10V/m, 80 to 1000MHz; 80% AM</li> </ul>
12VDC (DC Jack) 5W Max. 1.25A @ 12VDC, 0.625A @ 24VDC		Contact: + / - 8KV Air: + / - 15KV - EN61000-4-3 (Radiated RFI Standards) 10V/m, 80 to 1000MHz; 80% AM
12VDC (DC Jack) 5W Max. 1.25A @ 12VDC, 0.625A @ 24VDC		Air: + / - 15KV - EN61000-4-3 (Radiated RFI Standards) 10V/m, 80 to 1000MHz; 80% AM
12VDC (DC Jack) 5W Max. 1.25A @ 12VDC, 0.625A @ 24VDC		- EN61000-4-3 (Radiated RFI Standards) 10V/m, 80 to 1000MHz; 80% AM
5W Max. 1.25A @ 12VDC, 0.625A @ 24VDC		
·		
resent		- EN61000-4-4 (Burst Standards) Signal Ports: + / - 4KV
		D.C. Power Ports: + / - 4KV
Current Protection		- EN61000-4-5 (Surge Standards)
resent		Signal Ports: + / - 4KV; Line-to-Earth
		D.C. Power Ports: + / - 2KV; Line-to-Earth - EN61000-4-6 (Induced RFI Standards)
		Signal Ports: 10Vrms @ 0.15 - 80MHz; 80% AM
		D.C. Power Ports: 10Vrms @ 0.15 - 80MHz; 80% AM
		<ul> <li>EN61000-4-8 (Magnetic Field Standards)</li> <li>30A/m @ 50, 60Hz</li> </ul>
230		<ul> <li>IEC61000-4-10 (Oscillatory wave magnetic field test) 100kHz and 1MHz: 30A/m</li> </ul>
Dimensions 84mm (W) x 125mm (D) x145mm (H)		<ul> <li>IEC61000-4-16 (Power frequency immunity test) 50Hz: 300V</li> </ul>
8.3" (W) x 4.92" (D) x 5.71" (H))		- IEC61000-4-18 ( oscillatory wave immunity test):
Kg (3.1lbs.)		100kHz, 2.5kV CM and 2.5kV DM
N-Rail (Top hat type 35mm), Wall Mount		1MHz , 2.5kV CM and 2.5kV DM - IEEE1613: power frequency withstand voltage: 2KV, Insulation
Ethernet Port         = 10/100BASE-TX: 16, 12 or 8 ports           = 100BASE-FX: 0, 1, 2 or 4 ports           = Gigabit: 0, 1 or 2 ports		resistance >550 MOhm
		RJ45 Port 500V, Insulation resistance >550 MOhm
		Impulse voltage: 5Kv, Insulation resistance >550 MOhm IEC 60870-2-1: DC power supply voltage variations
ort: One DB9 RS-232 port	Environmental Test	<ul> <li>IEC60068-2-6 Fc (Vibration Resistance) 30A/m @ 50, 60Hz</li> </ul>
er Unit: Power Status (Power 1, Power 2, Power 3)		
Per Port: 10/100BASE: Link/Activity 1000BASE: Link/Activity	Compliance	5g @ 10 - 150Hz, Amplitude 0.35mm
		<ul> <li>(Operation/Storage/Transport)</li> <li>IEC60068-2-27 Ea (Shock)</li> <li>25g @ 11ms (Half-Sine Shock Pulse; Operation)</li> <li>50g @ 11ms (Half-Sine Shock Pulse; Storage/Transport)</li> <li>IEC60068-2-32 Ed (Free Fall)</li> </ul>
(Green: Copper Amber: Fiber)		
2) 4 3. - P 2 - - P - - - P - - - - - - - - - -	mm (W) x 125mm (D) x145mm (H) 3" (W) x 4.92" (D) x 5.71" (H)) (g (3.1lbs.) -Rail (Top hat type 35mm), Wall Mount /100BASE-TX: 16, 12 or 8 ports 0BASE-FX: 0, 1, 2 or 4 ports 0BASE-FX: 0, 1, 2 or 4 ports gabit: 0, 1 or 2 ports rt: One DB9 RS-232 port rt Unit: Power Status (Power 1, Power 2, Power 3) r Port: 10/100BASE: Link/Activity	30 mm (W) x 125mm (D) x145mm (H) 3" (W) x 4.92" (D) x 5.71" (H)) (G (3.1lbs.) -Rail (Top hat type 35mm), Wall Mount /100BASE-TX: 16, 12 or 8 ports 0BASE-FX: 0, 1, 2 or 4 ports 0BASE-FX: 0, 1, 2 or 4 ports gabit: 0, 1 or 2 ports rt: One DB9 RS-232 port r Unit: Power Status (Power 1, Power 2, Power 3) r Port: 10/100BASE: Link/Activity 1000BASE: Link/Activity (Green: Copper, Amber: Fiber)

# **Order Information**

IES-1890 - 16 FE + 2 GE Combo SFP Managed Switch -40 to 75C, DIN-rail, IEC61850

### **Package Contents**

IES-1890 CD Manual / Utility Quick Installation Guide

#### **Optional Accessories**

 SFP-4200
 - 1.25G MMF SFP Transceiver (550m, 850nm, -20 to 85C)

 SFP-4210
 - 1.25G SMF SFP Transceiver (10km, 1310nm, -40 to 85C)

 SFP-4240
 - 1.25G SMF SFP Transceiver (40km, 1310nm, -40 to 85C)

 SFP-4270
 - 1.25G SMF SFP Transceiver (70km, 1550nm, -40 to 85C)

 SFP-4310
 - 1.25G BIDI SMF SFP Transceiver (10km, 1310nm, -40 to 85C)

 SFP-4320
 - 1.25G BIDI SMF SFP Transceiver (10km, 1350nm, -40 to 85C)

 SFP-4330
 1.25G BIDI SMF SFP Transceiver (20km, 1310nm, -40 to 85C)

 SFP-4340
 1.25G BIDI SMF SFP Transceiver (20km, 1550nm, -40 to 85C)

 SFP-4350
 1.25G BIDI SMF SFP Transceiver (40km, 1310nm, -40 to 85C)

 SFP-4360
 1.25G BIDI SMF SFP Transceiver (40km, 1310nm, -40 to 85C)

 SFP-4360
 1.25G BIDI SMF SFP Transceiver (40km, 1550nm, -40 to 85C)

 SFP-4370
 1.25G BIDI SMF SFP Transceiver (60km, 1310nm, -40 to 85C)

 SFP-4380
 1.25G BIDI SMF SFP Transceiver (60km, 1550nm, -40 to 85C)