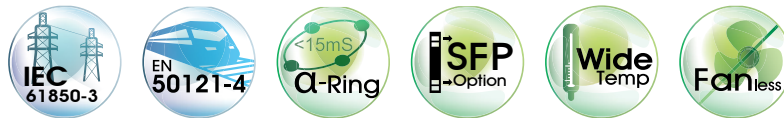


# EX87000 Series

IEC61850-3/IEEE1613 Hardened Managed 24-port 10/100BASE and 4-port Gigabit Ethernet Switch with SFP options



## Overview

EtherWAN's EX87000 Series provides a Hardened Fully Managed 28-port switching platform combining high performance switching backbone with robust and secure management features required for mission critical and harsh environments where sustained connectivity is crucial.

The EX87000 Series is equipped with twenty-four 10/100BASE Fast Ethernet ports, in combination with up to four Gigabit, Fixed Fiber, or SFP Combo port options. Mountable on a 1U rack, the EX87000 Series is equipped with EtherWAN's Alpha-Ring self-healing technology, providing less than 15ms fault recovery time making it ideal for applications intolerant to interruption.

Users are able to access management features such as port security, IGMP snooping, VLANs, GARP protocols, LACP, and GOOSE messaging to name a few, via web browser, Telnet, SNMP, RMON, TFTP, and RS-232 console interfaces. With its hardened-grade specifications and IEC61850 & IEEE1613 certifications, the EX87000 Series is capable of operating under high EMI environments at the temperatures ranging from  $-40^{\circ}\text{C}$  to  $75^{\circ}\text{C}$ , making it an ideal choice for harsh applications.

EtherWAN – "When Connectivity is Crucial."

## Spotlight

### • Versatile Connectivity

- Provides flexibility of 24-port 10/100BASE-TX/FX/BX/SFP plus 4-port Gigabit-TX/SX/LX/BX/SFP

### • Hardened Grade

- Wide operating temperature range for extreme environments
- Fanless and ruggedized housing
- High shock and electric noise immunity

### • KEMA-Certified

- IEC61850-3 and IEEE1613 performance tests conducted by KEMA

# Software Features

## Management

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- Interface
  - CLI, Telnet and Web Browser
  - SNMP v1/v2c/v3
- Firmware and configuration upgrade and backup via TFTP
- Supports DHCP Server/Client
- RMON (Remote monitoring)
- Port mirroring: TX/RX and both
- NTP (Network Time Protocol) time synchronization
- IEEE802.1ab LLDP (Link Layer Discovery Protocol)

## Security

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- MAC address filtering
- Enable/disable port
- Storm control (broadcast and multicast types)
- IEEE802.1x LAN access control
- Remote authentication through RADIUS
- SSH for CLI and Telnet security
- SSL for web security
- ACL

## Quality of Service (QoS)

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- Priority Queues: 4 queues per port
- Traffic classification based on IEEE802.1p CoS, DSCP, WRR (Weighted round robin) and strict mode
- Rate Limiting (Ingress/Egress)

## Layer 2 Features

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- Auto-negotiation for port speed and duplex mode
- Flow Control
  - IEEE802.3x full duplex mode
  - Back-Pressure half duplex mode
- Redundant Protocol
  - IEEE802.1D Spanning Tree Protocol (STP)
  - IEEE802.1w Rapid Spanning Tree Protocol (RSTP)
  - IEEE802.1s Multiple Spanning Tree Protocol (MSTP)
  - EtherWAN's  $\alpha$ -Ring network fault recovery (<15ms) and  $\alpha$ -Chain
- VLANs
  - Port-based VLANs
  - IEEE802.1Q Tag VLANs (128 groups, 4096 VID)
  - GVRP (GARP VLAN Registration Protocol)
  - GMRP (GARP Multicast Registration Protocol)
- Link Aggregation
  - Static Trunk (2 groups, support MAC base)
  - IEEE802.3ad Link Aggregation Control Protocol
- IGMP Snooping
  - IGMP snooping v1/v2/v3

## Performance

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- Switching Capability: 12.8Gbps
- Packet Buffer Size: 3M bits
- MAC Address Table: 4K

# Hardware Specifications

## Technology

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### Standards

- IEEE802.3 10BASE-T
- IEEE802.3u 100BASE-TX/100BASE-FX
- IEEE802.3ab 1000BASE-T
- IEEE802.3z 1000BASE-SX/1000BASE-LX
- IEEE802.3x Full duplex and flow control
- IEEE802.1p QoS
- IEEE802.1Q Tag VLANs
- IEEE802.1w RSTP
- IEEE802.1x Port-based Network Access Control

### Forward and Filtering Rate

- 14,880pps for 10Mbps
- 148,810pps for 100Mbps
- 1,488,100pps for 1000Mbps

### Packet Buffer Memory

- 3M bits

### Processing Type

- Store-and-Forward
- Auto-Negotiation
- Half-duplex back-pressure and IEEE802.3x full-duplex flow control
- Auto MDI/MDIX

### Address Table Size

- 8192 MAC addresses

## Power

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### Input

- (T): + / - 48VDC (36 - 75VDC) Internal Universal PSU
- (W): 88 - 370VDC and 90 - 264VAC Internal Universal PSU
- (C): 90 - 264VAC, 50 - 60Hz Internal Universal PSU

### Power Consumption

- 42.7W Max.

### Protection

- Overload current protection

## Mechanical

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### Casing

- Metal Case
- IP30

### Dimensions

- Single Power:  
442mm (W) x 343mm (D) x 44.2mm (H);  
17.4" (W) x 13.5" (D) x 1.74" (H)
- Redundant Power:  
442mm (W) x 250mm (D) x 44.2mm (H);  
17.4"(W) x 14.7" (D) x 1.74"(H)

### Weight

- Single Power: 5.1Kg (11.2lbs.)
- Redundant Power: 6.2Kg (13.7lbs.)

### Installation

- Rack mounting

## Interface

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### Ethernet Port

- 10/100BASE-TX: 24, 16, 8 or 0 port
- 100BASE-FX: 0, 4, 8, 12, 16, 20 or 24 ports
- Gigabit: 0, 2 or 4 ports

### Console Port

- Port: One DB9 RS-232 port

### LED Indicators

- Per Unit: Power
- Per Port: Link/Activity (Green)
- Per SFP slot: Selected (Green)

## Environment

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### Operating Temperature

- -40°C to 75°C (-40°F to 167°F)
- Tested @ -40°C to 85°C (-40°F to 185°F)

### Storage Temperature

- -45°C to 85°C (-49°F to 185°F)

### Ambient Relative Humidity

- 5% to 95% (non-condensing)

## Regulatory Approvals

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### ISO

- Manufactured in an ISO9001 facility

### EMI

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#### FCC Part 15B, Class A

#### EN61000-6-4

### EMS

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#### EN61000-6-2

- EN61000-4-2 (ESD Standards)
- EN61000-4-3 (Radiated RFI Standards)
- EN61000-4-4 (Burst Standards)
- EN61000-4-5 (Surge Standards)
- EN61000-4-6 (Induced RFI Standards)
- EN61000-4-8 (Magnetic Field Standards)
- IEC61000-4-10 (Oscillatory wave magnetic field test)
- IEC61000-4-16 (Power frequency immunity test)
- IEC61000-4-18 (Oscillatory wave immunity test)

### Environmental Test Compliance

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#### IEC60068-2-6 Fc (Vibration Resistance)

#### IEC60068-2-27 Ea (Shock)

#### FED STD 101C Method 5007.1 (Free fall w/ package)

### Industrial Compliance

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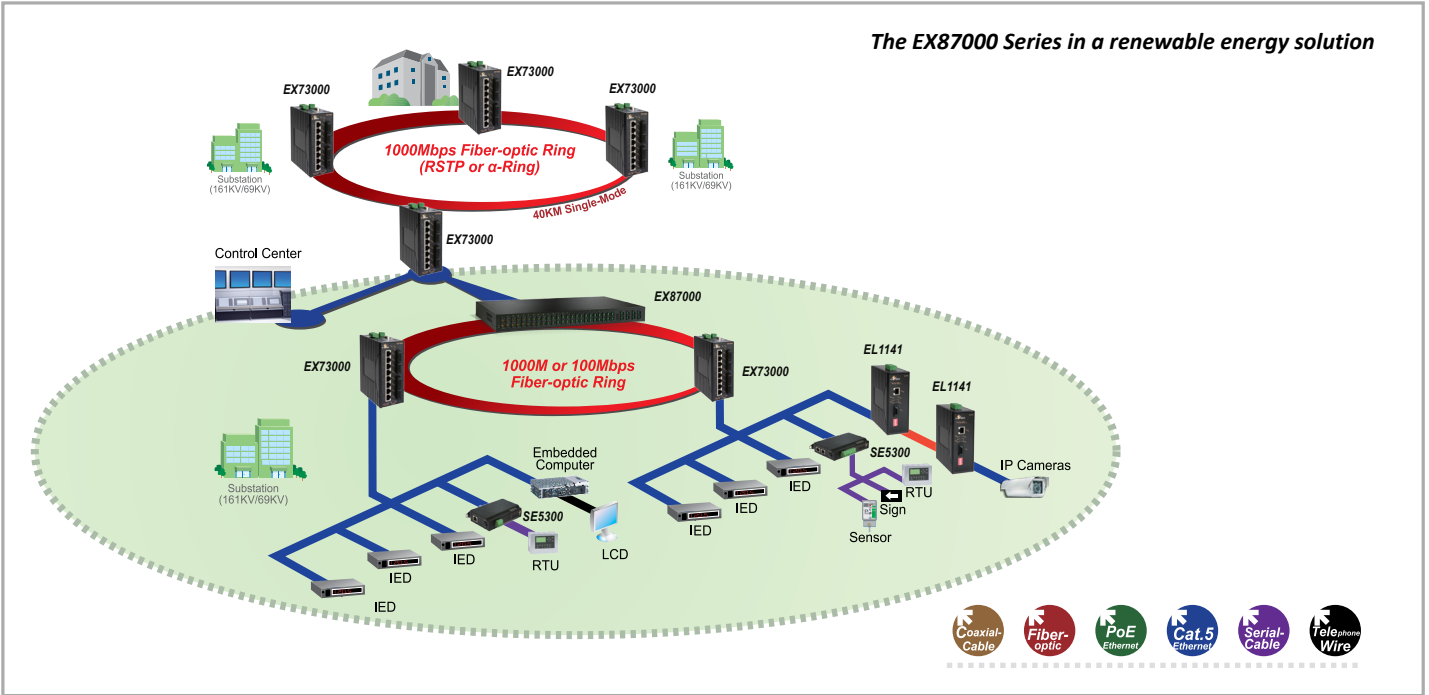
#### IEC61850-3 / iIEEE1613

#### EN50121-4

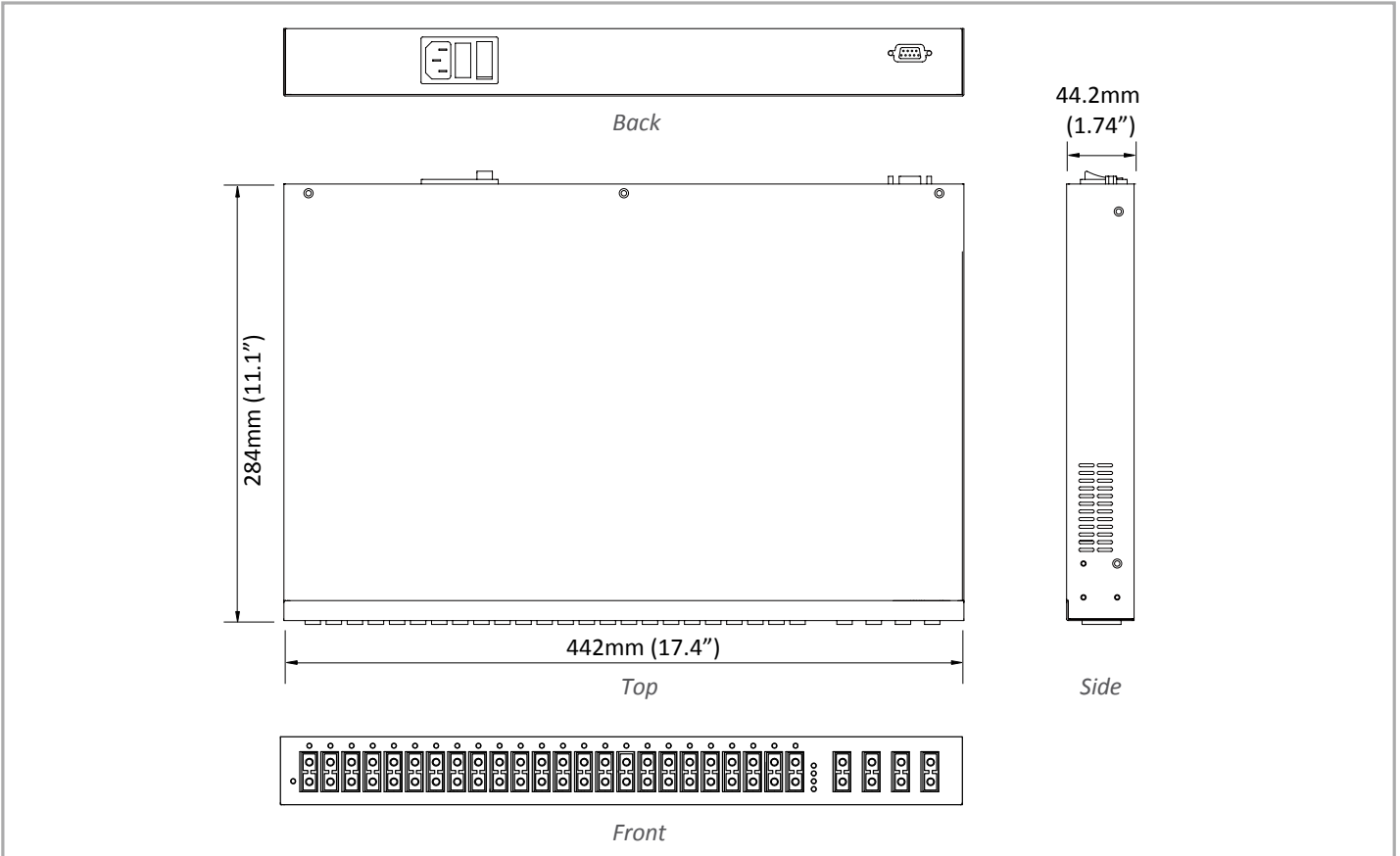
#### IEC60870-2-1

# Application Diagram

The EX87000 Series in a renewable energy solution



# Dimension



## Ordering Information

### Model

|                     |  |
|---------------------|--|
| <b>EX87604-0XYZ</b> | 24-port 10/100BASE-TX + 4-port Gigabit Managed Ethernet Switch                     |
| <b>EX87424-WXYZ</b> | 16-port 10/100BASE-TX + 8-port 100BASE-FX + 4-port Gigabit Managed Ethernet Switch |
| <b>EX87244-WXYZ</b> | 8-port 10/100BASE-TX + 16-port 100BASE-FX + 4-port Gigabit Managed Ethernet Switch |
| <b>EX87064-WXYZ</b> | 24-port 100BASE-FX + 4-port Gigabit Managed Ethernet Switch                        |
| <b>EX87064-V0VZ</b> | 24-port 100BASE-SFP + 4-port Gigabit SFP Combo Managed Ethernet Switch             |

\* Rack mounting kit included

### 100FX Fiber Options (W)

|          |   |
|----------|---|
| <b>1</b> | Multi Mode (SC) - 2Km                           |
| <b>2</b> | Multi Mode (ST) - 2Km                           |
| <b>6</b> | Multi Mode (SC) WDM-TX:1310nm/RX:1550nm - 2Km   |
| <b>7</b> | Multi Mode (SC) WDM-TX:1550nm/RX:1310nm - 2Km   |
| <b>8</b> | Multi Mode (SC) WDM-TX:1310nm/RX:1550nm - 5Km   |
| <b>9</b> | Multi Mode (SC) WDM-TX:1550nm/RX:1310nm - 5Km   |
| <b>A</b> | Single Mode (SC) - 20Km                         |
| <b>B</b> | Single Mode (SC) - 40Km                         |
| <b>F</b> | Single Mode (FC) - 20Km                         |
| <b>H</b> | Single Mode (ST) - 20Km                         |
| <b>P</b> | Single Mode (SC) WDM-TX:1310nm/RX:1550nm - 20Km |
| <b>Q</b> | Single Mode (SC) WDM-TX:1550nm/RX:1310nm - 20Km |
| <b>R</b> | Single Mode (SC) WDM-TX:1310nm/RX:1550nm - 40Km |
| <b>S</b> | Single Mode (SC) WDM-TX:1550nm/RX:1310nm - 40Km |
| <b>V</b> | 100BASE SFP                                     |

\*More 100FX Fiber options also available upon request.

### Numbers of fixed Gigabit Fiber (X)

|          |                           |
|----------|---------------------------|
| <b>0</b> | None                      |
| <b>1</b> | One Gigabit Fiber Port    |
| <b>2</b> | Two Gigabit Fiber Ports   |
| <b>3</b> | Three Gigabit Fiber Ports |
| <b>4</b> | Four Gigabit Fiber Ports  |

### Gigabit Port Options (Y)

|          |   |
|----------|---|
| <b>1</b> | 10/100/1000BASE-TX                                |
| <b>3</b> | 1000BASE-SX(SC) - 550m                            |
| <b>4</b> | 1000BASE-SX (SC) - 2Km                            |
| <b>5</b> | 1000BASE-SX (ST) - 550m                           |
| <b>A</b> | 1000BASE-LX (SC) - 10Km                           |
| <b>B</b> | 1000BASE-LX (SC) - 20Km                           |
| <b>R</b> | 1000BASE-BX (SC) WDM-TX:1310nm/RX:1550nm - 20Km   |
| <b>S</b> | 1000BASE-BX (SC) WDM-TX:1550nm/RX:1310nm - 20Km   |
| <b>V</b> | 4-port 1000BASE SFP Combo with 10/100/1000BASE-TX |

\* More Gigabit options also available upon request

## Ordering Information - continued

### Power Input Interface (Z)

|           |  |
|-----------|--|
| <b>T</b>  | ± 48VDC (Terminal Block)                               |
| <b>W</b>  | 88 - 370VDC and 90 - 264VAC (Terminal Block)           |
| <b>C</b>  | 90 - 264VAC (AC Inlet)                                 |
| <b>TR</b> | ± 48VDC Redundant (Terminal Block)                     |
| <b>WR</b> | 88 - 370VDC and 90 - 264VAC Redundant (Terminal Block) |
| <b>CR</b> | 90 - 264VAC Redundant (AC Inlet)                       |