

EOTec 2104

Industrial Ethernet Ring Switch

Modular - Expandable - Redundant

Key Features:

► High Performance Deterministic Technology

- Fault-tolerant Self-Healing Ring (SHR) with 30 mS plus 5 mS per hop recovery time
- Pre-configured from factory for SHR operation
- 10/100BASE-T(X) (RJ45), 100BASE-FX (SC or ST optical fiber connectors, Multi/Single mode)
- Supports IEEE 802.3/ 802.3u/ 802.3x/ 802.3z/ 802.1p
- Intelligent store and forward, non-blocking
- Full/Half-Duplex, MDI/MDIX auto crossover, auto negotiate, auto polarity

► Enhanced Diagnostics

- Global and local relay alarm outputs and LED indication
- Status monitoring through simple Modbus over Ethernet (UDP)
- Expandable up to 8 ports

► Industrial Design for High Reliability

- Operating temperature range -40 to +85 °C
- Long-haul transmit distances of 2, 15, 40 and 60km
- Real-time traffic prioritization
- 45mm wide, DIN rail mounted
- Universal redundant power supply available
- Low power consumption (8 W)

► Expansion Modules & Accessories

- Universal Power Supplies (120/240VAC, 125VDC)
- 2-port Expansion Modules, Copper and MM or SM Fiber
- 4-port Expansion Module, 4-RJ45 copper ports



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EOTec 2104 Industrial Ethernet Ring Switch

EXCELLENCE in Solutions - Products - Service

Overview

The EOTec 2104 Industrial Ethernet Ring Switch is available in five different models: 2104-55, 2104-57, 2104-59, 2104-61 and 2104-63. Each model features the ease of use of a typical unmanaged switch plus advanced capabilities that are only found in a managed switch, including ring functionality. When connected in a ring topology, an EOTec 2104 increases network reliability by providing an alternative path for message flow in the event of a network segment failure. When it detects a communications break, it quickly notifies the other switches in the ring and messages are automatically rerouted

through the alternative ring path within milliseconds. The EOTec 2104 also has expansion capabilities through its unique “backplane port” with no external wiring necessary. Other advanced capabilities include priority queuing for prioritizing traffic, message rate filtering for broadcast storm protection and port mirroring for diagnostics.

For enhanced diagnostics, the EOTec 2104 has relay outputs that can be used to signal error conditions to a PLC, PC or other supervisory devices. These alarms include one Global alarm relay for ring status and two Local alarm relays, which will open when their respective ring ports lose a link.

Pre-configured for Redundant Self-Healing Ring Operation

The EOTec 2104 is pre-configured at the factory for redundant self-healing ring operation. No configuration software is necessary, although a simple configuration software program is provided so that any EOTec 2104 can be re-configured to fit almost any application. No IP address or complex set-up is required. The switches are ideal for use in many industrial applications, such as:

- PLC and SCADA systems with critical operations to minimize down-time.
- Networks utilizing 10/100 Mbps redundant Ethernet backbones



- Factory (manufacturing) automation
- Industrial-rated indoor/outdoor transportation systems
- Security systems

Deterministic Performance / Broadcast Storm Protection

The EOTec 2104 utilizes a special algorithm that assures very fast recovery times. The recovery time can be estimated by multiplying 5 mS times the number of switches, and then adding 30 mS (for loss of link errors) or 60 mS (for message loss errors). For example, a ring of 10 switches would have a recovery time of 80 mS for the typical loss of link type errors. Many competitive switches and hubs may take several seconds or even minutes to recover when connected in a ring configuration.

Broadcast storms can bring a network to a stop if conventional switches or hubs are connected in a ring topology. This is due to broadcast message reproduction. Using EOTec 2104 Ring Switches in the loop will prevent broadcast storms because the switches have the intelligence to detect loops and to assign the necessary ports to be in the backup (disabled) state. A backup port will be quickly enabled if the primary path in the ring fails.

Expansion Modules Available for Additional Ethernet Ports (Up to 8 Ports Possible)

Each switch comes with an integrated backplane that can be used to expand the number of copper/fiber ports on the switch with no external wiring needed. Expansion modules increase the number of ports available for end devices to be connected to the ring network. The 2EXX Expansion Modules are available with one copper (RJ45) port and one MM or SM fiber port and support distances of 2km to 60km over fiber. The 2C52 Expansion Module is available with four copper (RJ45) ports to increase the number of ports on the ring switch to eight (6 copper, 2 fiber). A second EOTec 2104 Ring Switch can be connected to the expansion port to allow for the capability for increased port counts.



Easy Plug-In Connector



Mix or Match to Fit Your Application

Specifications:

Copper RJ45 Ports: (10/100BASE-TX)

Connectors

Shielded RJ45

Protocols supported

All standard IEEE 802.3

Ethernet compliancy

IEEE 802.3, 802.3u, 802.3x, 802.3z, 802.1p and more

Auto-crossover

RJ45 MDI/MDIX (use straight or cross wired cables)

Auto-negotiating

10BASE-T and 100BASE-T

Auto-sensing

Full or half duplex

Auto-polarity

Yes, on the TD and RD pairs

Flow control

Yes, for half or full duplex

Half or full duplex

Yes, automatic or configurable

Ethernet isolation

1500 VRMS 1 minute

Cable requirements

Twisted pair (Cat. 5 or better) (shielded recommended)

Max. cable distance

100 meters

Backplane Port: (10/100BASE-TX)

Connectors

Standard EOTec 2000 backplane connector

Protocols supported

All standard IEEE 802.3

Ethernet compliancy

IEEE 802.3, 802.3u, 802.3x, 802.3z, 802.1p and more

SC or ST Fiber Ports: (100BASE-FX Multi-mode or Single mode)

100BASE-FX ports

Two (2)

Fiber port mode

Multi-mode (MM) or Single mode (SM)

Fiber port connector

Duplex SC or ST

Optimal fiber cable

62.5/125 µm for MM; 9/125 µm for SM

Center wavelength

1300 nm

TX output power

Contact factory

RX input sensitivity

Contact factory

Max. distance

2 km with MM; 15 km with SM, 40+ km with long haul SM

Half and full duplex

Software configurable

Eye safety

IEC 60825-1, Class 1; FDA 21, CFR 1040.10 and 1040.11

General Operation:

Operation

Intelligent store & forward, nonblocking

Typical latency for 10 Mbps

16 µs + frame time varies on load and settings

Typical latency for 100 Mbps

5 µs + frame time

MAC addresses supported

2K (10/100 models)

Buffer memory

1 Mbits (128 Kbytes)

Buffer allocation per port

Automatic and dynamic

Memory bandwidth

3.2 Gbps (10/100 models) full-wire speed on all ports

Address learning

Automatic

Address aging

Remove old address after 300 s

Address migration

Automatic

Back pressure

Automatic for half-duplex

Illegal frames

Dropped per 802.3

Flow control

Yes, for half and full duplex

Traffic prioritization

802.1p, QoS, CoS, ToS

Status reporting

Power and operational status

Modbus over Ethernet (UDP)

Modbus status registers "OK", "A1" and "A2"

Relay contacts

30 VDC, 0.5A

Ring Features:

Maximum switches in ring

50

Dual ring support

Yes

Link loss recovery time

Less than 30 mS plus 5 mS per hop

Power Requirement:

Power input

Backplane and screw terminals

Input power (typical with all ports active)

8.0 W

Input voltage

15-40 VDC

Transient protection

1500 watts peak

Spike protection

5,000 watts (10x for 1000 µS) or 250 volts (50x for 100 µS)

Ethernet isolation

1500 VRMS 1 minute

Mounting

DIN rail mounting

Environmental and Safety:

Operating temperature range

-40 to +85 °C

Storage temperature range

-40 to +85 °C

Humidity (non-condensing)

5 to 95% RH

Vibration

IEC 60068-2-6

Electrical safety

CSA C22, IEC 61010-1

EMI emissions

FCC part 15, IEC 55022

EMC immunity

IEC61326-1

Hazardous locations

FM Approved (US & Canada) for Class I, Division 2, Groups A, B, C & D, T4

Packaging (Polyamide)

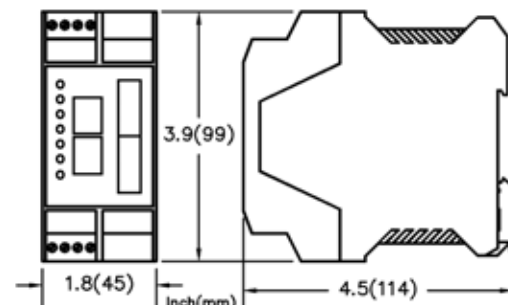
UL 94V-0

MTBF (MIL-HDBK-217F)

22.3 years



Mechanical Dimensions:



Ordering Information:

Base modules:

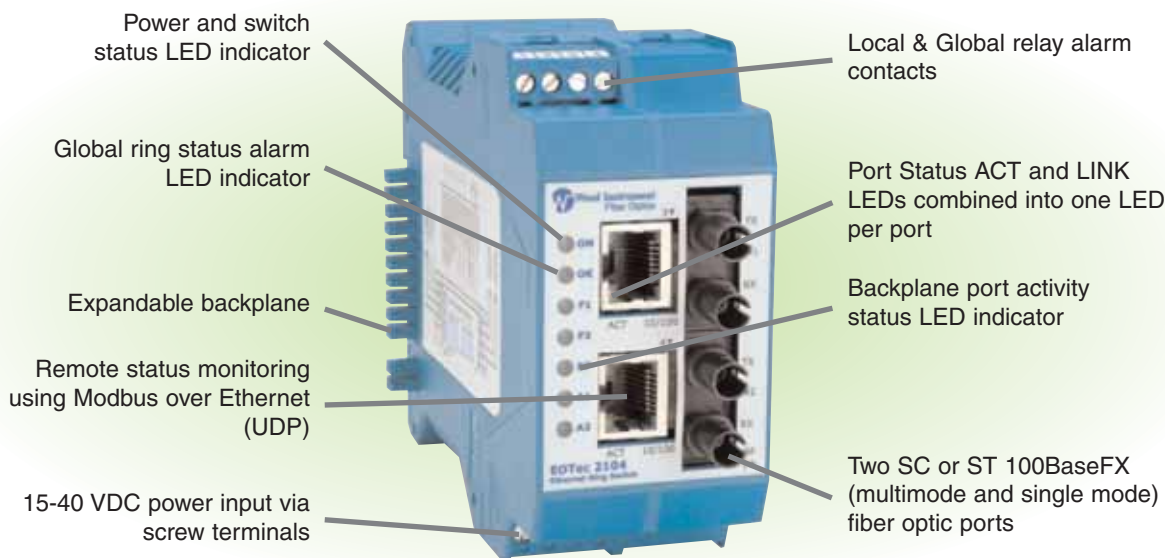
- 2104-55 EOTec Ring Switch, 4-port (2 RJ45 / 2 fiber), MM, ST, 2km
- 2104-57 EOTec Ring Switch, 4-port (2 RJ45 / 2 fiber), MM, SC, 2km
- 2104-59 EOTec Ring Switch, 4-port (2 RJ45 / 2 fiber), SM, SC, 15km
- 2104-61 EOTec Ring Switch, 4-port (2 RJ45 / 2 fiber), SM, SC, 40km
- 2104-63 EOTec Ring Switch, 4-port (2 RJ45 / 2 fiber), SM, SC, 60km

Optional Power Supply module:

- 2A06 Universal Power Supply, 85-240VAC, 50/60Hz, 85-125VDC
- 2A16 Universal Power Supply, 85-240VAC, 50/60Hz, 85-125VDC, w/ alarm diagnostic output
- 2A08 Redundant Power Supply, 24 VDC
- 2A18 Redundant Power Supply, 24 VDC, w/ alarm diagnostic output

Optional Expansion modules:

- 2E54 Expansion Module, 2-port (1 RJ45 / 1 fiber), MM, ST, 2km
- 2E56 Expansion Module, 2-port (1 RJ45 / 1 fiber), MM, SC, 2km
- 2E58 Expansion Module, 2-port (1 RJ45 / 1 fiber), SM, SC, 15km
- 2E60 Expansion Module, 2-port (1 RJ45 / 1 fiber), SM, SC, 40km
- 2E62 Expansion Module, 2-port (1 RJ45 / 1 fiber), SM, SC, 60km
- 2C52 Expansion Module, 4-port RJ-45 (all copper)



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Specifications subject to change without notice.



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