

Enhancing Power Transmission Reliability over an Extensive Railway Network

2009-07-31

Location / Country : Japan

Product Solutions:

[EDS-510A Series](#)

7+3G-port Gigabit managed Ethernet switches

Introduction

Project Introduction

Rail transport is one of the primary modes of transportation in Japan, carrying 22.24 billion passengers in 2006. Passengers rely heavily on rail transit and take it for granted that trains operate on time. The power system is one of the major components in railway operation, so special emphasis is placed to ensure its reliability.

The Midosuji subway line in Osaka, Japan implemented a rail electrification system based on 750 VDC third rail technology where traction power substations energize the third rail to power the trains and onboard amenities. The power system is also served by an emergency shutdown system (ESD) to minimize the consequences of emergency situations and to ensure reliable and continuous power transmission.

System Requirements

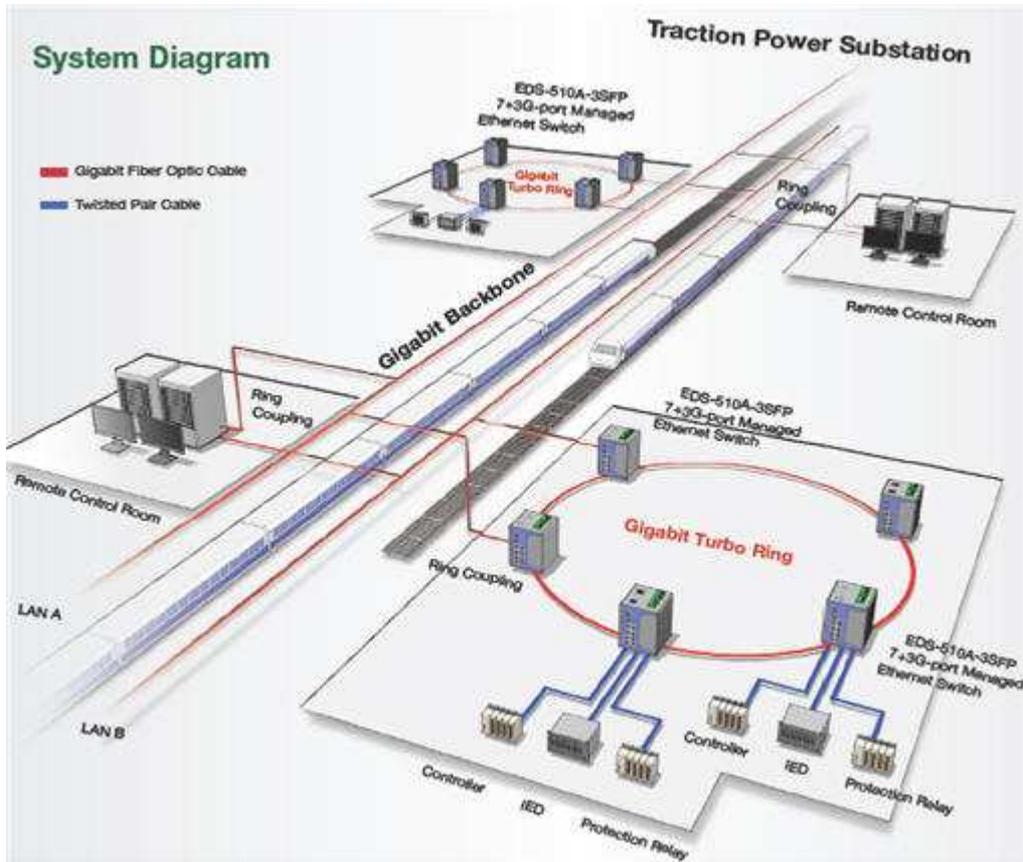
- A power control system to ensure reliable and sustainable power supply for the trains and necessary facilities onboard.
- Fast redundant ring technology and ring coupling typology function to combine subsystems into the backbone.
- Communication devices capable of VLAN configuration to operate station-segment.
- Long-haul transmission capability for the communication devices to operate across an extensive railway network.

Moxa Solution

There are several traction power substations established along the Midosuji line's electric railway. In order to monitor and control its power transmission remotely, the railway company deployed several units of TCR (Telemeter Control Remote) along the traction substations. Moxa's EDS-510A-3SFP Gigabit managed Ethernet switches were deployed in the subsystem to connect protection relays and remote I/Os for data collection. In the event of an emergency, such as a power overload, the EDS-510A-3SFP will give a warning relay for immediate shutdown. Additionally, the railway company chose WDM-type (BiDi) SFP modules to save on cabling costs for the extensive railway network. The modules are capable of transmitting data up to 40 km and require only one fiber cable to transmit and receive data.

Along the traction substations are numerous Ethernet redundant rings formed by a total of 100 EDS-510A-3SFP Ethernet switches. Different VLANs are assigned to each redundant ring according to the location of the train stations that operate each station segment. In order to

integrate the subsystems into the main system, two of the EDS-510A Ethernet switches on each of the redundant rings used ring coupling technology to connect different LANs of the Gigabit backbone. The EDS-510A series supports self-healing technology with a recovery time of less than 20 ms, enhancing non-stop network connections for power monitoring and control. This feature greatly improves the reliability of the railway network's power system.



Why Moxa

- The EDS-510A-3SFP's VLAN configuration facilitates station segment operations.
- The WDM-type (BiDi) SFP modules takes only one fiber cable to transmit and receive data, allowing users to save on cabling costs.
- Moxa's managed Ethernet switches support ring coupling typology to combine subsystems into the backbone easily.
- The EDS-510A-3SFP's transmission distance of up to 40 km is well suited for an extensive railway network.
- The fast recovery time of less than 20 ms enhances non-stop networking for the power control system.

Product

EDS-510A-3SFP

- Turbo Ring (Recovery time < 20 ms), RSTP/STP (IEEE802.1W/D) for Ethernet redundancy
- 2 Gigabit Ethernet ports for redundant ring and 1 Gigabit Ethernet port for uplink solution
- Long-haul transmission capability of 40 or 80 km