



RFL 3000 6K-25

Ethernet Managed Switch



Features

- Provide 4 modular slots for user-selection of 100 Mb, 10 Mb, and Gigabit fiber ports, and 10/100 copper ports
- Non-blocking wire speed performance on all ports, 802.1p QoS prioritization
- Options include -48VDC, 24VDC, 125VDC power, dual source, or AC, “reverse” rack mount, ETSI and 23” Telco brackets
- NEBS Level 3 Certified
- IEC 61850 and IEEE 1613 Compliant

Description

With the increasing design of Ethernet Communication ports on newer equipment, power utilities are more and more turning to networking solutions for their substations using Industrial Ethernet equipment because of their high reliability and emphasis on standards, which translates into lower cost and more flexibility.

With the modular versions of hardened Ethernet switches such as the RFL 3000 6K-25 that provide a mix of noise-immune fiber and convenient copper ports as well as 10 MB and 100 Mb speeds, Ethernet LAN applications are allowed to be designed into substations where control and instrumentation equipment and connection techniques are evolving and changing rapidly.

RFL 3000 6K-25 Managed Switches provide the flexibility of both 100 Mb fiber and ports, 10 Mb fiber and copper ports, as well as Gigabit ports and management software. Featuring SFF (Small Form Factor) 100 Mb fiber port connectors, high-capacity, high-performance fiber switching services are delivered in a robust 1U rack-mount package designed for the most demanding Industrial and substation applications.

The port modules allow user-selection of mixed-media fiber (all connector types, multi- and single-mode) and 10/100 Mb RJ-45 auto-negotiating ports. Standard GBIC ports can be configured for a variety of Gigabit fiber cabling types and distances. High performance hardware features include non-blocking speed on all ports and 802.1p QoS Traffic Prioritization. The RFL 3000 6K-25 switches are “plug-and-play” ready for use as backbone switches where a mix of bursty data traffic and priority streaming traffic for VoIP and audio/video applications is present.

The RFL 3000 6K-25 Managed Switches are provided with LAN software support including SNMP management control via command line interface, RMON, and Port Security support.

The RFL 3000 6K-25 Switches enhance LAN flexibility by allowing a combination of mixed-media modules and port types. RFL 3000 6K-25s are ideal for building a switched fiber network infrastructure when used in applications connected to routers, hubs, or other switches. Designed for use in Network segments requiring Gigabit backbone interconnections among substation networks, the RFL 3000 6K-25 Managed Switch is easy to install and operate. Addresses of attached nodes are automatically learned and maintained, adapting the switching services to network changes and expansions to provide plug-and-play operation.

RFL 3000 6K-25 Managed Switches have rugged metal cases and auto-ranging power supplies for operation with standard AC power worldwide. Internal DC power supplies are optional. The RFL 3000 6K-25s are designed and manufactured in the USA and backed by a three year warranty.



Performance

Gigabit Ports, 1000 Mb: Configurable, standard GBIC transceiver modules

Fiber Ports, 100 Mb (multi-mode and single-mode): Configurable in modules, up to 24 ports total. Each FDX or HDX, default is FDX mode

Fiber Ports, 10 Mb: Configurable, 4 ST ports per slot.

Each port may be FDX or HDX, default is HDX mode

RJ-45 Ports: 100 or 10 Mb speed, full- or half-duplex mode, per port, individually determined. 10/100 auto-negotiating and auto-cross

All Ports non-blocking:

Processing type: Store and Forward with IEEE 802.3x full-duplex flow control System aggregate forward and filter rate 5.1Mpps (24ports @ 100Mb speed, 1 port @ Gb).

Address table: 4K nodes, self-learning, with address aging

Packet buffers: 240 KB for 10/100 and 120KB for 1000 Mb

Latency: $6\mu s$ + packet time max (TX - TX, TX - FX, FX - FX, TX-G, G-G)

Network Standards

IEEE 802.3z, 802.3ab, 802.1p: 100BASE-TX, -FX, 1000BASE-SX, -LX.

Auto-negotiation on TP, IEEE 802.3u

Operating Environment

UL 60950 "Component Parts" temperature rating: 130°F (55°C)

IEC 60068 "Type Test" rating: -40° to 185°F (-40° to 85°C).

Storage: -40° to 185°F (-40° to 85°C)

Ambient relative humidity: 5% to 95% (non-condensing)

Altitude: -200 to 13000ft (-60 to 4000m)

Relay Contacts for Alarms (Optional)

Form C, one NC indicating internal power, one NC software controllable.

Network Cable Connectors

1000 Mb ports: all standard GBIC Transceiver types supported

100 Mb Copper: Category 5 UTP/STP; 10 Mb: Cat. 3, 4, 5 UTP/STP

100 Mb Fiber ports connector options: multi-mode FX-MTRJ, LC, ST, SC; single-mode LC, 20Km SC, and 40Km "long reach" single-mode SC

10 Mb Fiber port connector: multi-mode ST

Power Supply (internal)

AC Power Connector: IEC-type, male recessed, ON/OFF switch

Power Input Voltage: 100 - 240 VAC (auto ranging)

Power Input Frequency: 47 to 63 Hz

Power Consumption: 60 watts typical for a fully-loaded fiber model, 35 watts typical for copper-only models

DC Power Supply Options

-48VDC: Input -36 to -70VDC

24VDC: Input 20 to 40VDC

125VDC: Input 88 to 300VDC

Std. Terminal Block: "-", GND, "+"

Power Consumption: Same as AC

DC Dual Power Source (Optional)

The RFL 3000 6K-25 may be ordered with optional Dual DC power input, for continuity of operation when either one of the DC input sources is interrupted. Available for -48VDC, 24VDC, or 125VDC

Mechanical

Enclosure: Rugged high-strength sheet metal. Suitable for stand-alone or 1U rack-mounting

Rack-mounting brackets: 19" included; ETSI and 23"

Telco optional

Cooling Method: Fan cooled, internal @ 25cfm

Dimensions: 1.70 in H x 17.0 in W x 9.0 in D

(4.32 cm H x 43.2 cm W x 22.9 cm D)

Weight: rack-mount 5.0 lbs. (2.0 kg)

LED Indicators Per RJ-45 Port

LK: Steady On when twisted-pair link is operational

ACT: On with port activity

FDX/HDX: ON = full-duplex mode, OFF = half-duplex mode

100/10 ON = 100Mb speed, OFF = 10Mb

LED Indicators, 100Mb and 10Mb

Fiber Ports

LK: Steady On when fiber link is operational

ACT: On with port activity, FDX/HDX

Port-Specific Settings

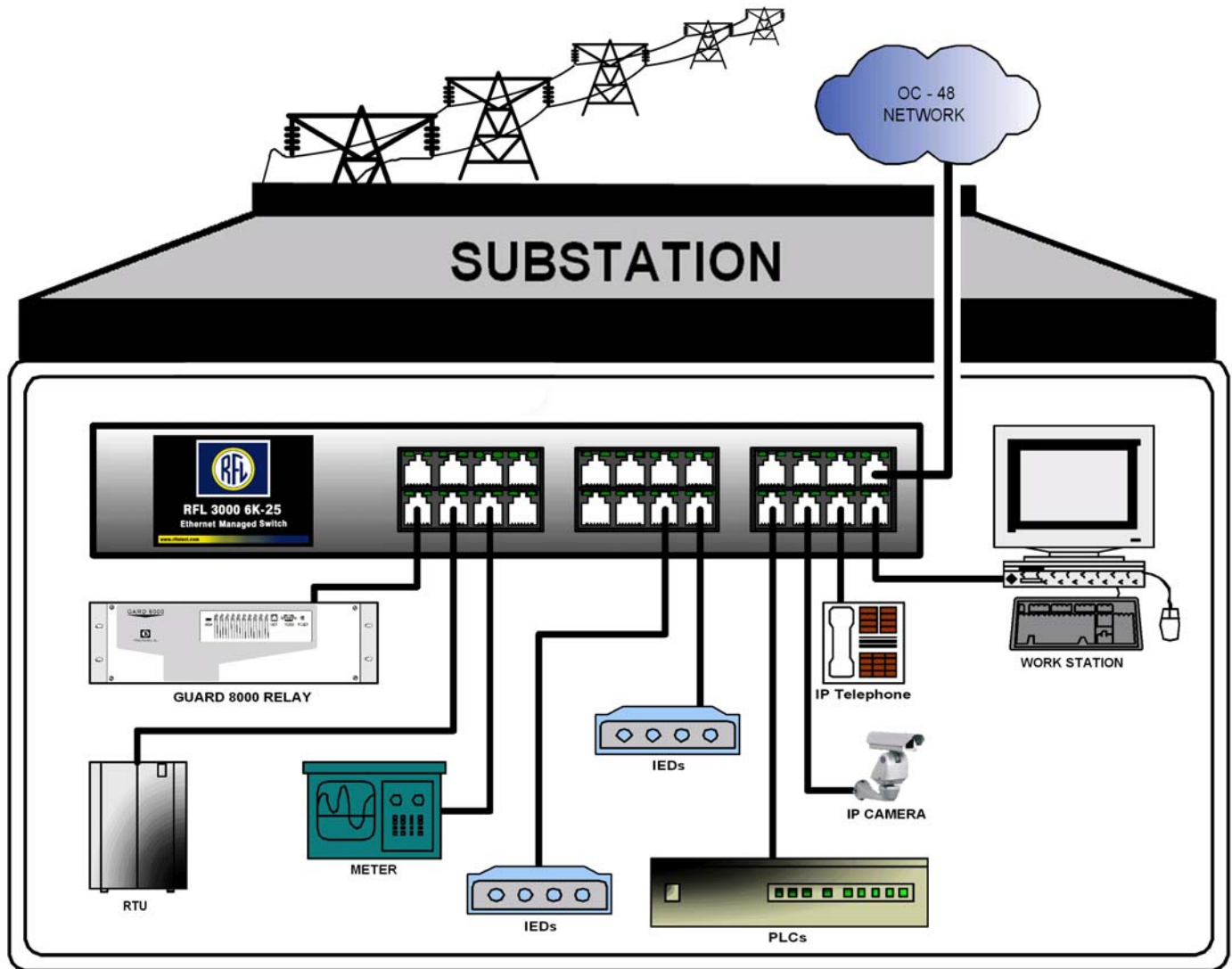
The copper module has an internal switch for MDIX crossover on port #1. Other port-specific user settings (such as FDX or HDX, copper 10/100speed) can be set using software commands

Agency Approvals/Standard Compliance

UL Listed (UL60950), cUL, CE, Emissions meet FCC Part 15, Class A

NEBS Level 3 and ETSI Certified for Carrier Central Offices
IEEE 1613 Environmental Standard for Electric Power Substations

IEC61850 EMC and Operating Conditions Class C for Power Substations



Application Notes

Above is an example of a typical Ethernet communications application in the substation. Ethernet communications for equipment such as RTUs, Meters, Relays, IP Telephones and IP Cameras, (which requires high reliability, dual DC power supplies for redundancy and Ethernet media configuration flexibility) are currently being deployed into new and existing substations for the control and communications workhorse of each substation.

