



RFL 3000 6K8

Managed Field Switch



Features

- Industrial Ethernet Field Switch for heavy duty applications
- “Big Switch” managed networks software in small Field Switch Package
- All port types, including 100 Mb, 10 Mb, Gigabit, fiber and copper; up to 8 ports
- Advanced thermal design with metal case used as a heat sink (no fans)
- Options include -48VDC, 24VDC, 125VDC, dual source, or worldwide AC; DIN-Rail mountable

Description

With the increasing design of Ethernet Communication ports on newer equipment, power utilities are 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 6K8 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 6K8 Managed Field Switches, the newest and smallest members of the RFL 3000 6K line, enhance Industrial LAN flexibility by allowing a combination of mixed-media port types and input power choices in a hardened compact package that includes sophisticated MNS-6K network management software. All DC power options, worldwide AC power, and DIN-Rail mounting make the RFL 3000 6K8 the easy choice for tough jobs. Best of all, it includes the best-of-breed MNS-6K software.

MNS-6K software includes SNMPv2, v3 management control via GUI-based Secure Web Management, 802.1p QoS Traffic Prioritization, Tag-based VLANs, IGMP Snooping, Port Security, RADIUS support, and much more. See the Managed Networks Software (MNS-6K) datasheet for additional details on the powerful but easy-to-use set of software packages and options.

Advanced thermal design techniques (patent pending) use the metal case as a heat sink as well as for electrical noise and physical protection. The unique package features an elongated dual-cavity shape for optimal cooling of internal components without any ventilation openings. This sealed-case design enables the unit to operate in temperature uncontrolled environments, achieves high EMI noise immunity, and provides an unmatched IP53 physical protection rating against dust, dirt, insects and liquids.



Description Continued

RFL 3000 6K8s are ideal for building a switched field network infrastructure when used in applications connected to industrial nodes, PLCs, IEDs, upstream switches, or routers. Designed for use in industrial applications such as factory-floors, power utilities, tariffed carrier facilities, traffic control, transportation and video surveillance systems, the RFL 3000 6K8 handles stressful traffic loads (mixes of bursty data traffic and priority streaming traffic) as well as stressful environmental conditions.

The port type choices allow user selection of mixed-media fiber and 10/100 Mb RJ-45 auto-negotiating auto-cross ports. A standard GBIC port can be configured for a variety of Gigabit fiber cabling types and distances. A notable configuration choice provides four copper 10/100 ports plus 2 fiber ST or SC ports for use in a self-healing ring structure.

RFL 3000 6K8 Managed Field Switches have universal AC power supplies for operation worldwide. Internal DC power supplies are optional. The RFL 3000 6K8s and all other RFL 3000 series products are designed and manufactured in the USA and backed by a three year warranty.

Performance

Fiber Ports, 100 Mb (multi-mode and single-mode):

Configurable SC, ST, LCMTRJ, Small Form Factor (SFF) is featured for high fiber port density.

Fiber Ports, 10 Mb: Configurable, ST, up to 4 fiber ports (multi-mode and single mode), each 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 & auto cross, up to 8 ports.

Gigabit Ports, 1000 Mb: Configurable, standard GBIC transceiver modules, up to 2 Gigabit ports.

Processing type: Store and Forward with IEEE 802.3x full-duplex flow control. All Ports non-blocking. System aggregate forward and filter rate 3.0 Mpps.

Address table: 4K nodes, with address aging time of 155 seconds typical

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:10BASE-FL, 100BASE-TX, FX, 1000BASE-SX, -LX

Auto-negotiation and auto-cross on TP, IEEE 802.3u

See MNS-6K datasheet for software network standards, Link Loss-Learn, and other software features.

All 10 Mb ports obey the rules for configuring 10 Mb Ethernet

All 100 Mb ports use Fast Ethernet rules. 1000 Mb ports use Gigabit rules.

Operating Environment

UL 60950 and "Component Parts" rating: -40° to 140°F (-40° to 60°C)

IEC 60068 "Type Test" rating: -60° to 205°F (-50° to 95°C)

Storage: -60° to 210°F (-50° to 100°C)

Relative humidity: 5% to 95% (non-condensing)

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

Conformal coating (humidity protection) optional: Request quote

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 ST, and 40Km "long reach" single-mode SC.

10 Mb Fiber port connector: multi-mode and single-mode ST

AC Power Supply (internal)

AC Power Connector: IEC-type, male, recessed, top
Power Input: 100 - 240 VAC, 47 to 63 Hz, auto ranging
Power Consumption: 25 watts typical for a fully-loaded fiber model, 15 watts typical for 8 port copper-only models.

DC Power Supply Options (internal)

-48VDC: Input -36 to -70VDC

24VDC: Input 18 to 36VDC

125VDC: Input 88 to 300VDC

Std. Terminal Block: "-", GND, "+", Power Consumption: Same as AC

DC Dual Power Source (Optional)

The RFL 3000 6K8 DC models 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: High-strength metal. Flange for heat-sinking and panel-mounting included.

DIN-Rail mounting, used w/ heat-sink flange: Model # DIN-Rail-6K8, optional

Enclosure Ingress Protection rating: IP53, protects against (5) dust particles and (3) spraying liquids per IEC 60529, and NEMA-3,3X



Cooling Method: Convection, fully-enclosed elongated dual-cavity case used as a heat sink, designed for vertical mounting, no fans.

Dimensions: 9.80 in H x 5.90 in W x 3.70 in D (4.2 in W w/o mounting flange) 24.9cm H x 15.0cm W x 9.4cm D (10.7 cm W w/o mounting flange)

Weight: 2.1 est lbs. (0.95 kg)

LED Indicators Per RJ-45 Port

LK: Steady on when twisted-pair link is operational.

ACT: On with port activity

F/H: 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

F/H: ON = full-duplex mode, OFF = half-duplex mode.

Port-Specific Settings

Port-specific user settings (such as FDX or HDX, copper 10/100 speed) can be set using software commands.

(The RJ-45 copper ports are auto-negotiating and auto-crossover, there are no user controls for auto-crossover).

Agency Approvals/Standard Compliance

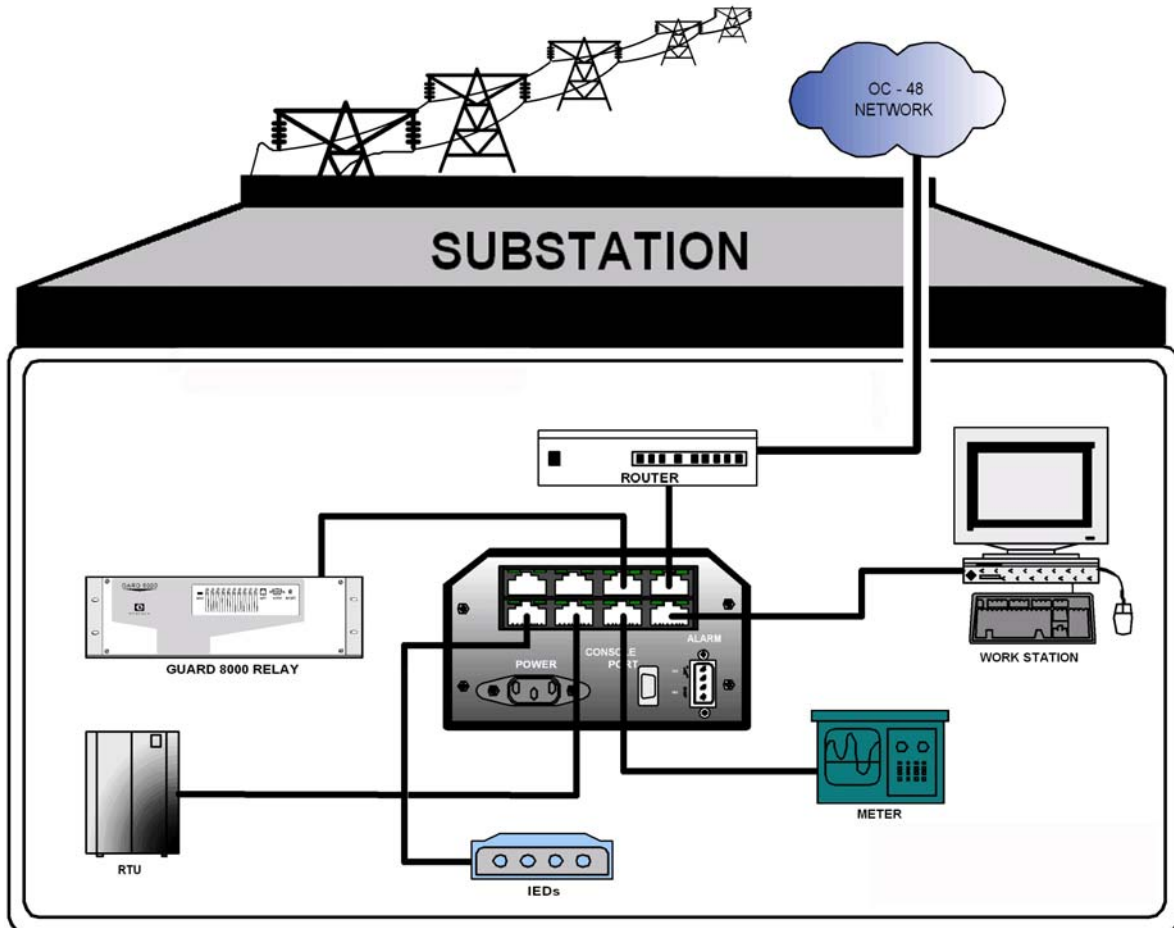
UL Listed (UL60950), cUL, CE, Emissions meet FCC Part 15, Class A.

NEBS L3 and ETSI compliant

IEEE 1613 Environmental Standard for Electric Power Substations.

IEC61850 EMC and Operating Conditions Class C for Power Substations

NEMA TS-2 and TEES for traffic control equipment.



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.

RFL 3000 6K8 Managed Field Switch Ordering Information

RFL Smart Number Description (fill in blanks):	6K8	D	0	1	E	0	A	A	A	1
						Slot A	Slot A	Slot A	Slot A	
RFL 3000 6K8 Ethernet Managed Field Switch Base Unit With Power Supply										
6K8 Panel or DIN-Rail mounted with Auto Ranging 100 - 240 VAC Power Supply		A								
6K8-24VDC Same as Model 6K8 except for power input is 24VDC		B								
6K8-48VDC Same as Model 6K8 except for power input is -48VDC		C								
6K8-125VDC Same as Model 6K8 except for power input is 125VDC (Range 88 to 300VDC)		D								
Optional Redundant DC P.S.										
None			0							
24 VDC Redundant Power Supply			1							
48 VDC Redundant Power Supply			2							
125 VDC Redundant Power Supply			3							
Optional DIN-RAIL										
None				0						
DIN-RAIL-6K8: DIN-Rail holder for a secure vertical mount of 6K8				1						
10/100/1000 Port Modules Selection for slot A										
None						A				
6KP8V-MTRJ SFF Fiber Module w/ eight 100Mb 2km Multi-mode FX MT-RJ Conn.						B				
6KP8V-MLC SFF Fiber Module w/ eight 100Mb 2km Multi-mode FX LC Conn.						C				
6KP8V-SLC SFF Fiber Module w/ eight 100Mb 15km Single-mode FX LC Conn.						D				
6KP8V-RJ45 TP Module w/eight 10/100Mb Auto-negotiating RJ-45 Ports						E				
6KP8V-45-2MT *6+2* module w/ six 10/100 RJ-45 and two 100 Mb 2km M.M. MTRJ Conn.						F				
6KP8V-45-2SLC *6+2* module w/ six 10/100 RJ-45 and two 100 Mb 15km S.M. FX LC Conn.						G				
6KP8V-45MT *4+4* module w/ four 10/100 RJ-45 and four 100 Mb 2km M.M. MTRJ Conn.						H				
6KP8V-45MLC *4+4* module w/ four 10/100 RJ-45 and four 100 Mb 2km M.M. FX LC Conn.						I				
6KP8V-45SLC *4+4* module w/ four 10/100 RJ-45 and four 100 Mb 15km S.M. FX LC Conn.						J				
6KP6V-RJMST *4+2* module w/ four 10/100 RJ-45 and two 100 Mb 2km M.M. FX ST Conn.						K				
6KP6V-RJMSC 4+2* module w/ four 10/100 RJ-45 and two 100 Mb 2km M.M. FX SC Conn.						L				
6KP6V-RJSSC 4+2* module w/ four 10/100 RJ-45 and two 100 Mb 20km S.M. FX SC Conn.						M				
6KP6V-RJSSCL 4+2* module w/ four 10/100 RJ-45 and two 100 Mb 40km S.M. FX SC Conn.						N				
6KP6V-MT10ST 4+2* module w/ four 10/100 MTRJ fiber and two 10 Mb 2km FL ST Conn.						O				
6KP6V-RJ10ST 4+2* module w/ four 10/100 RJ-45 fiber and two 10 Mb 2km FL ST Conn.						P				
6KP4V-FXSC *2+2* 100Mb Fiber Module w/ four 100 Mb 2km FX SC Conn.						Q				
6KP4V-FXST *2+2* 100Mb Fiber Module w/ four 100 Mb 2km FX ST Conn.						R				
6KP4V-F10ST *2+2* 10Mb Fiber Module w/ four 10 Mb 2km FL ST Conn.						S				
6KP4V-FLSTFX *2+2* ST Fiber Module w/ two 10 Mb FL and two 100 Mb FX Ports						T				
6KP2V-2GSX Two-port one slot Gigabit 6K module with two Gigabit Fiber SXSC (1000BASE-SX M.M.) ports.						U				
6KP2V-2GCU Two-port one slot Gigabit 6K module with two Gigabit Copper (1000BASE-T) ports.						V				
6KP5V-1CU4RJ Five-port one slot Gigabit 6K module with one Gigabit Copper (1000BASE-T) ports and four 10/100 RJ-45 Ports.						W				
6KP5V-1CU4MT Five-port one slot Gigabit 6K module with one Gigabit Copper (1000BASE-T) ports and four 100Mb MTRJ Fiber FX M.M. Po						X				
6KP3V-1CU2FXT Three-port one slot Gigabit 6K module with one Gigabit Copper (1000BASE-T) ports and two 100Mb ST Fiber FX M.M. Port						Y				
Gigabit Port Modules Selection for GBIC transceiver for Slot A										
None			0							
6KP5V-G4RJ *G+4* module to provide one 6K slot for one GBIC transceiver module plus four 10/100Mb copper ports.			1							
6KP3V-G2SC *G+2* module to provide one 6K slot for one GBIC transceiver module plus two 100Mb 2 km FX SC fiber ports.			2							
GBPMV-2OTX Two-Port one slot Gigabit 6K module for use with two GBIC transceiver module.			3							
GBPMV-COTX One slot Gigabit 6K module for use with one GBIC transceiver.			4							
GBIC transceiver Module Selection for Slot A										
None						A				
GBIC-SXSC Gigabit Transceiver module, one 1000BASE-SX port with mm SC Fiber conn.						B				
GBIC-LXSC10 Gigabit Transceiver module, one 1000BASE-LX/LH port 1310nm S.M. SC 10km						C				
GBIC-LXSC25 Gigabit Transceiver module, one 1000BASE-LX/LH port 1310nm S.M. SC 25km						D				
GBIC-ZXSC40 Gigabit Transceiver module, one 1000BASE-ZX port 1550nm S.M. SC 40km						E				
GBIC-ZXSC70 Gigabit Transceiver module, one 1000BASE-ZX port 1550nm S.M. SC 70km						F				
GBIC-ZXSC120 Gigabit Transceiver module, one 1000BASE-ZX port 1550nm S.M. SC 120km						G				
GBIC-TP Gigabit Transceiver module, one 802.3ab 1000BASE-T port, RJ-45 Conn.						H				
GBIC transceiver Module Selection for Slot A (second module if GBPM-2TOX is selected above)										
None						A				
GBIC-SXSC Gigabit Transceiver module, one 1000BASE-SX port with mm SC Fiber conn.						B				
GBIC-LXSC10 Gigabit Transceiver module, one 1000BASE-LX/LH port 1310nm S.M. SC 10km						C				
GBIC-LXSC25 Gigabit Transceiver module, one 1000BASE-LX/LH port 1310nm S.M. SC 25km						D				
GBIC-ZXSC40 Gigabit Transceiver module, one 1000BASE-ZX port 1550nm S.M. SC 40km						E				
GBIC-ZXSC70 Gigabit Transceiver module, one 1000BASE-ZX port 1550nm S.M. SC 70km						F				
GBIC-ZXSC120 Gigabit Transceiver module, one 1000BASE-ZX port 1550nm S.M. SC 120km						G				
GBIC-TP Gigabit Transceiver module, one 802.3ab 1000BASE-T port, RJ-45 Conn.						H				
6k Managed Network Switch Software and Software Options										
NMS-6K License Licensed software for use on RFL 3000 6K Switches										1
S-RING key S-Ring™ Redundancy Manager Licenced software for redundant ring management.										2

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