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Magnum 6KQ

Industrial Ethernet Managed Field Switch



Features

- Heavy Duty Field Switch for industrial networking applications
- Full-featured MNS-6K software in a small factory-floor package
- Highly configurable, all fiber port types, up to 12 100Mb, 10 Mb, Gb with SFPs
- Advanced thermal design with metal case used as a heat sink (no fans)
- DC power at 12, 24, 48, 125, 250V; Dual-Source; PoE; Panel or DIN-Rail mounting

Magnum™ 6KQ Managed Field Switches provide maximum configurability in their class. The fiber-rich 6KQ can be configured with up to 12 100Mb fiber ports and two Gigabit ports. For 10/100 copper, regular or PoE-equipped 10/100 RJ-45 or 10/100/1000 copper ports may be configured to a maximum of 12 at 10/100 and 2 Gig ports.

Magnum 6KQ comes with the best-of-breed MNS-6K managed networks software featuring GUI ease of use, Secure Web Management, SNMPv2,v3 management, 802.1p QoS Prioritization, Tag-based VLANs, IGMP Snooping and IGMP-L2 multicast management, port security, and a choice of software redundancy options including RSTP-2004 with industry-leading fault recovery times in rings and meshes, and GarrettCom's S-Ring product which supports unmanaged switches as part of resilient rings. MNS-6K-SECURE adds more security features such as SSH, RADIUS and TACACS+ support, SFTP, DHCP Server, Syslog events, and SNTP Server. Over 10 years of field use in industrial networking applications assures maturity and stability. See the MNS-6K and MNS-6K-SECURE datasheets for more information.

Magnum 6KQs are ideal for building a switched, hardened Ethernet network infrastructure, connecting edge devices such as PLCs and IEDs with upstream switches or routers. It is designed for use in industrial applications such as factory floors and control cabinets, industrial video surveillance systems with PoE, power utility substations, tariffed carrier field facilities, or transportation and oil and gas.

Advanced patent pending thermal design techniques use the 6KQ's metal case as a heat sink. The unique ribbed-surface aluminum case offers maximum heat dissipation without fans to keep internal components cool and reliable. This sealed-case design enables the unit to operate in the harshest industrial grade environments and achieves high EMI noise immunity. The 6KQ is available with Conformal Coating options and rated IP52 for dust and water resistance.

The 6KQ can be configured with the user's choice of DC power supplies: 12V and 24V for factory floor, 48V for tariffed carrier field facilities and for PoE-powered applications such as video surveillance, and 125V or 250V for power utility substations. External AC power supplies are optional.

Like all Magnum products, the 6KQ Field Switch has all appropriate agency approvals and compliance certifications, including: third-party UL testing for safety and temperature rating, NEBS L3 compliance, IEC 61850 & IEEE 1613 for power utilities, and NEMA TS-2 for use outdoors.

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Specifications

6KQ Industrial Ethernet Managed Field Switch

PERFORMANCE:
Fiber Ports, 100 Mb: Configurable SC, ST, LC and MTRJ, multi-mode and single-mode for each type, max of 12 fiber
Fiber Ports, 10 Mb: Configurable, ST, up to 4 fiber mm ports, each FDX or HDX, default is HDX mode.
RJ-45 Ports: 100 or 10 Mb speed, full- or half-duplex mode, per port, individ. determined. 10/100 auto-negotiating & auto-cross, up to 12 ports.
PoE Ports, RJ-45 Power Sourcing per IEEE 802.3af, power on data pair, configurable up to 8 PoE ports.
Gigabit Ports, 1000 Mb: Configurable, standard 10/100/1000Mb copper or SFP transceiver modules for SX, ESX, LX, ZX , up to 2 Gigabit ports.
Processing type: Store and Forward with IEEE 802.3p QOS and IEEE 802.3x full-duplex flow control.
All Ports non-blocking. System aggregate forward and filter rate 4.76M pps.
Address table: 4K nodes, with address aging time of 300 seconds typical.
Packet buffers: 240 KB for 10/100 and 120KB for 1000 Mb
Latency: 6µs + packet time max (TX - TX, TX - FX, FX - FX, TX-G, G-G)

NETWORK STANDARDS:
IEEE 802.3, 802.3ab, 802.1p:10BASE-FL;100BASE-TX,FX;1000BASE-SX,LX,ZX
Auto-negotiation and auto-cross on 10/100 TP and PoE, IEEE 802.3u
See MNS-6K datasheet for software network standards and 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:
IEC 60068 Operating temp. per "Type Test" -60° to 195°F (-50° to 85°C)
UL 60950 and "Component Parts" rating: -40° to 140°F (-40° to 60°C)
Storage: -60° to 210°F (-50°to 100°C)
Relative humidity: 5% to 95% (non-condensing)
Altitude: -200 to 13,000ft (-60 to 4,000m)
Conformal coating (humidity protection) optional: Request quote

RELAY CONTACTS FOR ALARMS:
Form C, one NC indicating internal power, one NC software controllable.

NETWORK CABLE CONNECTORS:
1000Mb fiber ports: all standard Gb SFP Transceiver types supported
1000Mb copper ports:10/100/1000Mb auto-negotiating, Cat5e & 6 UTP/STP
100Mb Copper and PoE: 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; sgl-mode 15Km LC, 20Km SC and ST, and 40Km "long reach" sgl-mode SC.
10 Mb Fiber port connector: multi-mode ST, 10BASE-FL
For other port types and port connector types, request quote

DC POWER SUPPLY (Internal, floating ground for internal PCBs):
Power Input: 12V nominal (10 to 15V) 24V nominal (18 to 36V), 48V nominal (36 to 60V), 125V nominal (88 to 150V) 250V nominal (160 to 300V)
Power Input for PoE: add up to 15 watts per PoE port to base unit pwr draw
Power Consumption: 35 watts typical for a fully-loaded fiber model, 20 watts typical for 4 port copper-only model.
Std. Terminal Block: "-, GND, +". Dual Source is -A, -B, +A, +B, chassis gnd.

DC DUAL POWER SOURCE (OPTIONAL):
Magnum 6KQ models: 24VDC, 48VDC, 125VDC may be ordered with optional Dual-Source DC power input, for continuity of operation when either one of the DC input sources is interrupted.

MECHANICAL:
Enclosure: High-strength extruded aluminum for heat-sinking. Vertical panel-mounting brackets included. Console port: RJ-45 serial interface
DIN-Rail mounting: Model # DIN-Rail-6KQ, optional
Enclosure Ingress Protection rating: IP52, per IEC 60529, and NEMA-3,3X
Cooling Method: Convection, fully-enclosed ribbed-surface aluminum case used as a heat sink, designed for vertical mounting, no fans.
Dimensions: 6.85 in H x 7.50 in W x 2.0 in D in vertical panel-mount position. (17.4cm H x 19.1cm W x 5.08cm D) Weight: 3 lbs. (1.3 kg)

LED INDICATORS (two sets) PER RJ-45 PORT:
LK: Steady ON when twisted-pair link is operational.
ACT: ON with port activity
100/10 ON = 100Mb speed, OFF = 10Mb
(Port-side LED set only) F/H: ON for full-duplex, OFF for half-duplex
(PoE only, port-side only) PoE: ON for power to PD device. Note: LK/ACT port becomes steady ON for Link, blinking for activity.

LED INDICATORS (two sets) per 100Mb and 10Mb FIBER PORTS:
LK: Steady ON when fiber link is operational
ACT: ON with port activity
(Port-side LED set only) F/H: ON for full-duplex, OFF for half-duplex

LED INDICATORS PER Gb PORT:
LK: Steady ON when link is operational.
ACT: ON with port activity 1000Mb ON = Gb speed
(Top-side LED set only, copper only) 100/10 ON = 100Mb speed, OFF = 10Mb
(Port-side LED set only) F/H: ON for full-duplex, OFF for half-duplex
(Port-side LED set only, copper only) 3 LEDs indicate Gb, 100Mb or 10Mb speed

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 auto-crossover, there are no user controls for auto-crossover).

AGENCY APPROVALS AND STANDARDS COMPLIANCE:
UL Listed (UL60950), cUL, CE, Emissions meet FCC Part 15, Class A.
IEC 61850 EMC and Operating Conditions Class C for Power Substations
IEEE 1613 Class 2 Environmental Standard for Electric Power Substations
NEBS L3 and ETSI compliant
NEMA TS-2 & TEES for DC-powered and PoE-powered traffic ctrl equipment.
Class1 Division 2 for hazardous locations = pending

WARRANTY: Three years Made in USA

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Ordering Information

Magnum 6KQ-24VDC Magnum 6KQ Managed Field Switch, base unit with four 10/100 copper ports. May be configured with a variety of 10/100/1000 Mb fiber and copper port connector types from a family of port modules. Heavy duty metal case used as heat sink, IP52 for environmental protection, no fans.

Magnum 6KQ-12VDC Same as Model 6KQ-24VDC except the power input is 12VDC.
Magnum 6KQ-48VDC Same as Model 6KQ-24VDC except the power input is -48VDC.
Magnum 6KQ-125VDC Same as Model 6KQ-24VDC except the power input is 125VDC nominal range 88-150VDC).
Magnum 6KQ-250VDC Same as Model 6KQ-24VDC except the power input is 250VDC nominal range 160-300VDC).
Magnum 6KQP-48VDC PoE, same as Model 6KQ-48VDC except the four 10/100 ports are PoE-enabled, data pairs.

Configuration Options: Each Magnum 6KQ may be configured with a choice for the three modular slots.

6KQ4-RJ45	6KQ module, four 10/100 copper ports, may be used in 6KQ slots B and/or D
6KQ4-RJMLC	6KQ module, two 10/100 copper ports and two 100Mb 2km multi-m. LC fiber ports, slots B and/or D
6KQ2-10ST	6KQ module, two 10 Mb FL 2km multi-mode ST fiber ports, slots B and/or D
6KP8-MTRJ	SFF Fiber module for 6K Switches, w/eight 100 Mb 2km multi-mode FX MTRJ connectors
6KP4-MT	SFF Fiber module for 6KQ Switches, with four 100 Mb 2km multi-mode FX MTRJ connectors
6KQ2-MST	6KQ module, two 100Mb 2km multi-mode ST fiber ports, slots B and/or D
6KP6-RJMST	"4+2" module for 6Ks, w/four 10/100 RJ-45 and two 100 Mb 2km multi-mode FX ST connectors
6KQ2-SSC	6KQ module, two 100Mb 20km single-mode SC fiber ports, slots B and/or D
P6KQ4-RJ45	PoE 6KQ module, four 10/100 copper ports with PoE on data pairs, may be used in 6KQ slot B only
6KQF-4MT	6KQ module, four 100Mb 2km multi-m. MTRJ fiber ports, factory slot C fiber-only
6KQF-2MSC	6KQ module, two 100Mb 2km multi-mode SC fiber ports, factory slot C fiber-only
6KQF-1MST	6KQ module, one 100Mb 2km multi-mode ST fiber ports, factory slot C fiber-only
6KQ-2GCU	6KQ Gig module, two auto-negotiating 10/100/1000 Mb copper ports, configure in 6KQ slot D only
6KQ-2GSFP	6KQ Gig module, two SFP pluggable open transceiver ports for user-selectable SFP Fb transceivers in each, configure in 6KQ slot D only. Gb SFP's are available for multi-mode SX (550M) and ESX (2KM); for single-mode LX (10 and 25KM), ZX (40 and 70KM); and specials.

Several other Port Modules are available on config. guide at www.garrettcom.com/techsupport/insertion_guides/6kqcg.pdf

DIN-RAIL-6KQ	DIN-Rail holder for a secure vertical mount of 6KQ, with screws to attach to 6KQ case.

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Magnum 6KQ Configuration Guide

Magnum 6KQ Configurable Managed Field Switch, base unit with DC power supply and four 10/100 copper ports. May be configured with a variety of 10/100/1000 Mb fiber and copper port connector types via selection from a family of 6KQ port modules per the 6KQ Configuration Guide. 16 ports max. Heavy duty fully enclosed metal case designed with ribbed surface for heat dissipation, used as a heat sink, rated IP52 for environmental protection, no fans. Includes two Alarm Contacts (1 PWR, 1 software controlled), metal bracket for vertical wall or panel mounting, DIN-Rail optional. Wire speed filtering and forwarding across all ports. For licensed network management software information (MNS-6K, S-Ring, Dual-Homing, IGMP-L2, Security, etc.), see their respective data sheets.

Step 1. Slot A: Choose 6KQ chassis and power input type: Note, this slot has four fixed RJ-45 ports. Ports may be Standard 10/100 or 10/100 PoE (-48VDC only)

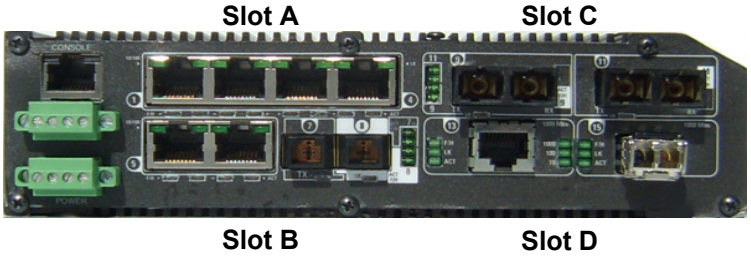
Model #	Base Unit, Description
6KQ-12VDC	12V DC power, slot A has 4 10/100 ports
6KQ-24VDC	24V (18-36) DC power, slot A has 4 10/100 ports
6KQ-48VDC	-48V (44-57) DC power, slot A has 4 10/100 ports
6KQ-125VDC	125V (88-150) DC power, slot A has 4 10/100 ports
6KQ-250VDC	250V (160-300) DC power, slot A has 4 10/100 ports
6KQP-48VDC	-48V (44-57) DC power, slot A has 4 **PoE** 10/100 ports

Step 2. Slot B: Choose one module from below:

Module Model #	10/100	10BASE-FL	100BASE-FX(MM)	100BASE-FX(SM)
6KQ4-RJ45	4			
6KQ4-RJMT	2		2 (MTRJ)	
6KQ4-RJMLC	2		2 (2km LC)	
6KQ4-RJSLC	2			2 (20km LC)
6KQ3-RJMSC	2		1 (SC)	
6KQ2-10ST		2 (ST)		
6KQ2-MST			2 (ST)	
6KQ2-MSC			2 (SC)	
6KQ2-SSC				2 (20km SC)
6KQ2-SSCL				2 (40km SC)
6KQ4-MT			4 (MTRJ)	
6KQ4-MLC			4 (LC)	
6KQ4-SLC				4 (20km LC)
PoE Module (Slot B only) prerequisite is PoE base unit)				
P6KQ4-RJ45	4			

Step 3. Slot C: Choose one module from below:

Module Model #	100BASE-FX(MM)	100BASE-FX(SM)
6KQF-2MST	2 (ST)	
6KQF-1MST	1 (ST)	
6KQF-2MSC	2 (SC)	
6KQF-1MSC	1 (SC)	
6KQF-2SSC		2 (20km SC)
6KQF-1SSC		1 (20km SC)
6KQF-2SSCL		2 (40km SC)
6KQF-1SSCL		1 (40km SC)
6KQF-4MT	4 (MTRJ)	
6KQF-2MT	2 (MTRJ)	
6KQF-4MLC	4 (LC)	
6KQF-2MLC	2 (LC)	
6KQF-4SLC		4 (20km LC)
6KQF-2SLC		2 (20km LC)



Step 4. Slot D: Choose one module *from the Step 2 list,* (OR choose from the following for Gigabit. (Gb is only available in slot D. No PoE in slot D).

Module Model #	Gigabit
Gb Modules, fixed ports--SFP	
6KQ-2GSFP	2 SFP
6KQ-2GCU	2 CU
6KQ-2GSFPCU	1SFP, 1CU
6KQ-1GSFP	1 SFP
6KQ-1GCU	1 CU

Gb SFP fiber optic transceivers	
SFP-GTP	Gb Copper
SFP-SX	Gb SX, 850nm wavelength, 550 meters distance
SFP-ESX	Gb SX, 1310nm wavelength, 2km distance
SFP-LX10	Gb LX, 1310nm wavelength, 10km distance
SFP-LX25	Gb LX, 1310nm wavelength, 25km distance
SFP-ZX40	Gb ZX, 1550nm wavelength, 40km distance
SFP-ZX70	Gb ZX, 1550nm wavelength, 70km distance

Step 5. Choose options and extras:

Model #	Description
DIN-Rail-6KQ	DIN-Rail mount
6KQ-BLNK	Blank cover for 1 unused module slot
DUAL-SRC	Two separate (dual-source) power inputs available at 12, 24, 48 and 125VDC
CONSOLE-CBLQD	Console attachment cable serial null Modem cable with one RJ-45 for the 6KQ and a DB-9
S-RING-KEY	Software, self-healing ring management
CONSOLE-CBLQU	Console attachment cable serial null Modem cable with one RJ-45 for the 6KQ and a USB
CONFORM05-CRM	Conformal coating, 5 mil, for moisture protect.
CONFORM08-CRM	Conformal coating, 8 mil, for corrosive environ.
KQ-CABLE-BKT	Bracket for cable tie-wrap attachment
PSAC-24V60	AC to 24VDC, 60 watts, panel or DIN-Rail
PSAC-48V150	AC to 48VDC, 150 watts, panel or DIN-Rail

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