Datasheet

PB 348

GarrettCom® Magnum 6KQ Series Industrial Ethernet Managed Field Switch

The fiber-rich 6KQ series can be configured with up to twelve 100Mb fiber ports and two Gigabit ports.

The Magnum 6KQ Series Switch is Ideal for Building a Switched, Hardened Ethernet Network Infrastructure, Connecting Edge Devices such as PLCs and IEDs with Upstream Switches or Routers.

Features

6KQ

- 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

6KQE

- Same as 6KQ except with a maximum of ten ports and has Universal AC power option

Maximized Configurability

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 two Gig ports.

The 6KQE base unit comes with four 10/100 copper ports (which may be either regular or PoE). Up to three 100Mb fiber ports or up to four more 10/100 copper ports, or combinations, may also be configured.

In addition, one or two Gb ports may be configured as 10/100/1000 copper or SFP fiber in any 6KQE base unit.

Managed Networks Software

Magnum 6KQ series comes with the best-of-breed MNS-6K managed networks software. Software features include:

- 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

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.

GarrettCom Magnum 6KQ Series Industrial Ethernet Managed Field Switch

Applications

The Magnum 6KQ series 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.

Thermal Design

Advanced patent pending thermal design techniques use the 6KQ series 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.

Power Supplies

The 6KQ series 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 and AC power within the 6KQE base unit. External AC power supplies are optional for the 6KQ.

Agency Approvals and Compliance

Like all Magnum products, the 6KQ series has all appropriate agency approvals and compliance certifications, including: third-party UL testing for safety and temperature rating, IEC 61850 & IEEE 1613 for power utilities, NEMA TS-2 for use outdoors and EN50155 for railways.

Warranty

Three years.

Product Specifications

Type	6KQ	6KQE
Product Description	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.	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 6KQE port modules per this 6KQE Configuration Guide. Heavy duty metal case used as heat sink, IP52 for environmental protection, no fans.

Mechanical		
Enclosure	High-strength extruded aluminum for heat-sinking. Vertical panelmounting brackets included.	
Console Port	RJ-45 serial interface.	DB9
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).	

Network Standards		
Ethernet	IEEE 802.3, 802.3ab, 802.1p:10BASE-FL;100BASE-TX,FX;1000BASE-SX,LX,ZX	
Auto-negotiation and Auto-Cross	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.

Performance		
Gigabit Ports, 1000 Mb	Configurable, standard 10/100/1000Mb copper or SFP transceiver modules for SX, ESX, LX, ZX , up to 2 Gigabit ports.	
Fiber Ports, 100 Mb (multi-mode and single-mode)	Configurable SC, ST, LC and MTRJ, multi-mode and single-mode for each type, max of 12 fiber.	SFF-FX (LC or MTRJ), multi-mode and single-mode for each type, max of three 100Mb 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.	100 or 10 Mb speed, full- or half-duplex mode, per port, individual determined. 10/100 auto-negotiating & auto-cross, up to eight ports. PoE Ports, RJ-45 Power Sourcing per IEEE 802.3af, power on data pair.
Processing Types	Store and Forward with IEEE 802.3p QOS and IEEE 802.3x	
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)	

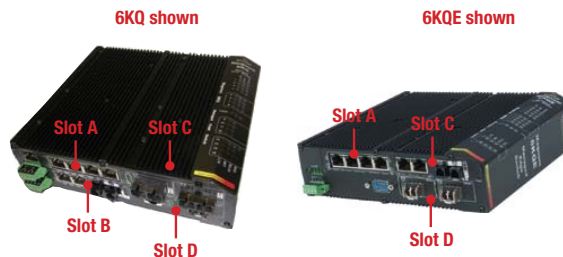| AC Power Supply (Internal)		
AC Power Connector	IEC-type, male recessed, ON/OFF switch (optional).	
Power Input AC	100 to 240 VAC, 47 to 63 Hz (auto ranging).	
Power Consumption	60 watts typical for a fully-loaded fiber model 30 watts typical for copper-only models.	

Product Specifications (continued)

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 power draw
Power Consumption	35 watts typical for a fully-loaded fiber model, 20 watts typical for 4 port copper-only model.
Standard Terminal Block	"-, GND, +"
Dual Source	-A, -B, +A, +B, chassis ground.

DC Dual Power Source (Optional)	
Magnum 6KQ series: 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.	

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.

Relay Contacts for Alarms	
Form C, one NC indicating internal power, one NC software controllable.	

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).	

Operating Environment	
Operating Temperature	IEC 60068 Operating temp. per "Type Test" -60° to 195°F (-50° to 85°C).
Temperature Rating (components)	UL 60950 -40° to 140°F (-40° to 60°C).
Storage Temperature	-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)	Request quote

Network Cable Connectors	
1000 Mb Fiber Ports	All standard Gb SFP Transceiver types supported.
1000 Mb Copper Ports	10/100/1000Mb auto-negotiating, Cat5e & 6 UTP/STP.
100 Mb Copper and PoE Ports	Category 5 UTP/STP; 10 Mb: Cat. 3, 4, 5 UTP/STP.
100 Mb Fiber Ports	Multi-mode FX-MTRJ, LC, ST, SC; single-mode 15Km LC, 20Km SC and ST, and 40Km "long reach" single-mode SC
10 Mb Fiber Port Options	Multi-mode ST, 10BASE-FL.
For other port types and port connector types, request quote.	

Agency Standards Approval and Compliance	
UL/cUL 60950	cUL, CE, Emissions meet FCC Part 15, Class A
IEC61850	EMC and Operating Conditions Class C for Power Substations
IEEE 1613 Class 2	Environmental Standard for Electric Power Substations
NEMA TS-2 & TEES	For DC-powered and PoE-powered traffic control equipment.
EN50155	Railways
DNV	Marine

Warranty	
Warranty	Three Years

Magnum 6KQ Series Configuration Guide

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.

6KQ shown

Slot A Slot C Slot B Slot D

6KQE shown

Slot A Slot C Slot D

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 No.	Base Unit Description
6KQ-12V	12V DC power, slot A has 4 10/100 ports
6KQ-24V	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-125V	125V (88-150) DC power, slot A has 4 10/100 ports
6KQ-250V	250V (160-300) DC power, slot A has 4 10/100 ports
6KQP-48V	-48V (44-57) DC power, slot A has 4 PoE 10/100 ports

OR: Choose 6KQE chassis and power input type:

6KQE-24V	24V (18-36) DC power, slot A has 4 10/100 ports
6KQE-12V	12V DC power, slot A has 4 10/100 ports
6KQE-48V	-48V (44-57) DC power, slot A has 4 10/100 ports
6KQEP-48V	-48V (44-57) DC power, slot A has 4 PoE 10/100 ports
6KQE-125V	125V (88-150) DC power, slot A has 4 10/100 ports
6KQE-250V	250V (160-300) DC power, slot A has 4 10/100 ports
6KQE-AC	100 to 240 VAC, 47 to 63 Hz, slot A has 4 10/100 ports

Step 2. 6KQ chassis only - Slot B: Choose one module from below:

Module No.	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 in 6KQ: Choose one module from below:

Module No.	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 (20lm LC)
6KQF-2SLC		2 (20km LC)

Step 3a Slot C in 6KQE: If more than 4 ports at 10/100 or fiber at 100Mb is desired, choose one module from below. Slot C is always four ports, of which a maximum of three may be 100Mb fiber, SFF only. Note: If PoE is selected for Slot A, there is a maximum of two fiber ports in Slot C.

Module No.	10/100 RJ-45 Copper	100BASE-FX Fiber SFF
6KQE4-RJ45	4	
6KQE4-1MMRJ	3	1 multi-mode MTRJ
6KQE4-2MMRJ	2	2 multi-mode MTRJ
6KQE4-3MMRJ	1	3 multi-mode MTRJ
6KQE4-1MLC	3	1 multi-mode LC 2km
6KQE4-2MLC	2	2 multi-mode LC 2km
6KQE4-3MLC	1	3 multi-mode LC 2km
6KQE4-1SLC	3	1 single-mode LC 20km
6KQE4-2SLC	2	2 single-mode LC 20km
6KQE4-3SLC	1	3 single-mode LC 20km
6KQE4-1SLCL	3	1 single-mode LC 40km
6KQE4-2SLCL	2	2 single-mode LC 40km
6KQE4-3SLCL	1	3 single-mode LC 40 km

Step 4a. Slot D in 6KQE: Choose from the following for optional Gb. (Gb is only available in slot D. Slot D may only be Gb).

Module No.	Gigabit
Gb modules, fixed SFP ports	
6KQE-2GSFP	2 SFP
6KQE-2GCU	2 CU
6KQE-1GSFP	1 SFP
6KQE-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 4 Slot D in 6KQ: 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 No.	Gigabit
Gigabit Modules with fixed SFP ports	
6KQ-2GSFP	2 SFP
6KQ-2GCU	2 CU
6KQ-2GSFPCU	1SFP, 1CU
6KQ-1GSFP	1 SFP
6KQ-1GCU	1 CU
Gigabit 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 & extras:

Module No.	Description
DIN-Rail-6KQ	DIN-Rail mount
6KQ-BLNK	Blank cover for one unused module slot
DUAL-SRC	Two separate (dual-source) power inputs available at 12, 24, 48 and 125VDC
S-RING-KEY	Software, self-healing ring management
CONSOLE-CBLQD	Console attachment cable serial null Modem cable with one RJ-45 for the 6KQ and a DB-9
CONSOLE-CBLQU	Console attachment cable serial null Modem cable with one RJ-45 for the 6KQ and a USB
CONSOLE-USB	As above, but with a USB connector
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
MNS-6K-SECURE-LIC1	Optional, licensed per switch for extra security
PSAC-24V60	AC to 24VDC, 60 watts, panel or DIN-Rail
PSAC-48V150	AC to 48VDC, 150 watts, panel or DIN-Rail