

MGate™ MB3660 Series

8 and 16-port redundant Modbus gateways



- > **Innovative Command Learning eliminates the need to key-in SCADA Modbus commands (acts as an agent gateway)**
- > **High performance through active and parallel polling of serial devices**
- > **Supports serial (Master) to serial (Slave) communications**
- > **2 Ethernet ports with the same IP or dual IP addresses**
- > **SD card for configuration backup**
- > **Access by up to 256 TCP master/client devices, or connect to 128 TCP slave/server devices**
- > **Dual VDC or VAC power inputs with wide power input range**
- > **3-pin fault relay circuit for event alarms**
- > **2 kV isolation protection (for “-I” models)**



: Overview

The MGate MB3660 (MB3660-8 and MB3660-16) series gateways are redundant Modbus gateways that convert between the Modbus TCP and Modbus RTU/ASCII protocols. They can be accessed by up to 256 TCP master/client devices, or connect to 128 TCP slave/server devices. The MGate MB3660 series isolation model provides 2 kV isolation protection suitable for power substation applications. The MGate MB3660 gateways are designed to easily integrate Modbus TCP and RTU/ASCII networks. The MGate MB3660 series gateways offer features that make network integration easy, customizable, and compatible with almost any Modbus network.

For large-scale Modbus deployments, MGate MB3660 gateways can effectively connect a large number of Modbus nodes to the same network. The MB3660 series can physically manage up to 248 serial slave nodes for 8-port models or 496 serial slave nodes for 16-port models (the Modbus standard only defines Modbus IDs from 1 to 247). Each RS-232/422/485 serial port can be configured individually for Modbus RTU or Modbus ASCII operation and for different baudrates, allowing both types of networks to be integrated with Modbus TCP through one Modbus gateway.

: High Performance with Innovative Command Learning

The MGate MB3660 series gateways support two communication modes: transparent mode and agent mode. For transparent mode, the gateway converts Modbus commands from Modbus TCP to Modbus RTU/ASCII, and vice versa, or from serial (Master) to serial (Slave). However, since only one Modbus protocol request-response action can be executed at any given time, each Modbus device has to wait its turn, resulting in poorer performance. Agent mode is designed to overcome this performance weakness. By allowing users to manually key in Modbus commands, the gateway can send Modbus commands to multiple Modbus devices at the same time. Since the gateway actively and continuously retrieves data from Modbus devices simultaneously through the different serial ports, users will see a dramatic reduction in the amount of time a Modbus device needs to wait to be accessed. SCADA systems can retrieve Modbus device data directly from the gateway's memory, instead of waiting for the gateway to pass commands to the serial ports, enhancing the Modbus gateway's communication performance.

Transparent mode helps users adopt existing SCADA programs, but with reduced communication performance, whereas agent mode is characterized by high performance, but requires users to go through the trouble of keying in Modbus commands. In order to provide better performance, without requiring users to key in a lot of Modbus commands, the MGate MB3660 series gateways are designed with an innovative Command Learning function, which can be activated with a single mouse click. Once activated, the gateway will learn and remember the Modbus commands it receives, and once a command has been learned, the gateway will act as though it were in agent mode, and actively send Modbus requests to the relevant Modbus devices. Since the data is saved in a different memory space that can be accessed by the SCADA system, the SCADA system can retrieve Modbus response data directly from the gateway's memory, instead of waiting for the data to pass through the Modbus devices, dramatically increasing communication performance.

: Modbus Gateway with Power and Ethernet Redundancy

For a complicated Modbus system, redundancy is extremely important. The MGate MB3660 Modbus gateways support redundancy for both the power input and Ethernet connection. The MGate MB3660 gateways come with dual AC or DC power inputs built-in for power redundancy, and have dual Ethernet ports (with different IPs) for network redundancy. To accommodate different types of applications, the dual Ethernet ports can be configured in one of two ways:

1. Use the same IP for both Ethernet ports. In this case, the MGate MB3660 gateway will automatically switch to the backup LAN when the main LAN fails.
2. Use different IP addresses for each of the two Ethernet ports.

: Specifications

Ethernet Interface

Protocols: Modbus TCP Client/Server
Number of Ports: 2 (2 IP addresses)
Speed: 10/100 Mbps, Auto MDI/MDIX
Connector: RJ45 x 2

Serial Interface

Protocols: Modbus RTU/ASCII Master/Slave
Number of Ports:
 MGate MB3660-8: 8
 MGate MB3660I-8: 8
 MGate MB3660-16:16
Serial Standards: RS-232/422/485, software selectable
Connectors: DB9 male
RS-485 Data Direction Control: ADDC® (automatic data direction control)

Isolation Protection: 2 kV (for “-I” model)

Serial Communication Parameters

Data Bits: 7, 8
Stop Bits: 1, 2
Parity: None, Even, Odd, Space, Mark
Flow Control: RTS/CTS, DTR/DSR, RTS Toggle (RS-232 only)
Baudrate: 50 bps to 921.6 Kbps

Serial Signals

RS-232: TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422: Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w: Data+, Data-, GND

Software

Configuration Options: Web console, Serial console, Telnet console
Utility: Device Search Utility (DSU) for Windows 95, 98, ME, NT, 2000, Windows XP, Server 2003, Vista, Server 2008 (x86/x64), Windows Server 2008 R2, Windows 7/8/8.1 (x86/x64), Windows Server 2012 (x64), Windows 2012 R2
Network Protocols: TCP/IP, UDP, HTTP, SMTP, NTP, DNS, DHCP Client, SNMPv1 (read only), ARP, Telnet, Radius

Multi-master and Multi-drop:

Master mode: 128 TCP slaves/servers
 Slave mode: 256 TCP masters/clients

Physical Characteristics

Fault Relay Circuit: 3-pin circuit with current carrying capacity of 2 A @ 30 VDC

External Storage Drive: SD card for configuration backup

Housing: Metal, IP30

Weight:

MGate MB3660-8-2AC: 2,731 g (6.02 lb)
 MGate MB3660-8-2DC: 2,684 g (5.92 lb)
 MGate MB3660I-8-2AC: 2,753 g (6.07 lb)
 MGate MB3660-16-2AC: 2,830 g (6.24 lb)
 MGate MB3660-16-2DC: 2,780 g (6.13 lb)

Dimensions:

Without ears: 440 x 45 x 198 mm (17.32 x 1.77 x 7.80 in)
 With ears: 480 x 45 x 198 mm (18.90 x 1.77 x 7.80 in)

Environmental Limits

Operating Temperature: 0 to 60°C (32 to 140°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)
Vibration: IEC 60068-2-6, IEC 60068-2-64
Shock: IEC 60068-2-27
Drop: IEC 60068-2-32

Power Requirements

Input Voltage:
 For DC models: Dual 20 to 60 VDC (1.5 kV isolation)
 For AC models: Dual 100 to 240 VAC, 47 to 63 Hz

Input Current:

MGate MB3660-8-2AC: 144 mA @ 110 VAC; 101 mA @ 220 VAC
 MGate MB3660-8-2DC: 312 mA @ 24 VDC; 156 mA @ 48 VDC
 MGate MB3660I-8-2AC: 244 mA @ 110 VAC; 159 mA @ 220 VAC
 MGate MB3660-16-2AC: 178 mA @ 110 VAC; 120 mA @ 220 VAC
 MGate MB3660-16-2DC: 390 mA @ 24 VDC; 195 mA @ 48 VDC

Power Connector: Terminal block (for DC models)

Standards and Certifications

Safety: UL 60950-1, EN 60950-1 (LVD)
EMC: EN 55032/24
EMI: CISPR 32, FCC Part 15B Class A

EMS:
 IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV
 IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m
 IEC 61000-4-4 EFT: Power: 1 kV; Signal: 1 kV
 IEC 61000-4-5 Surge: Power: 2 kV; Signal: 1 kV
 IEC 61000-4-6 CS: 150 kHz to 80 MHz: 10V/m
 IEC 61000-4-8 PFMF

MTBF (mean time between failures)

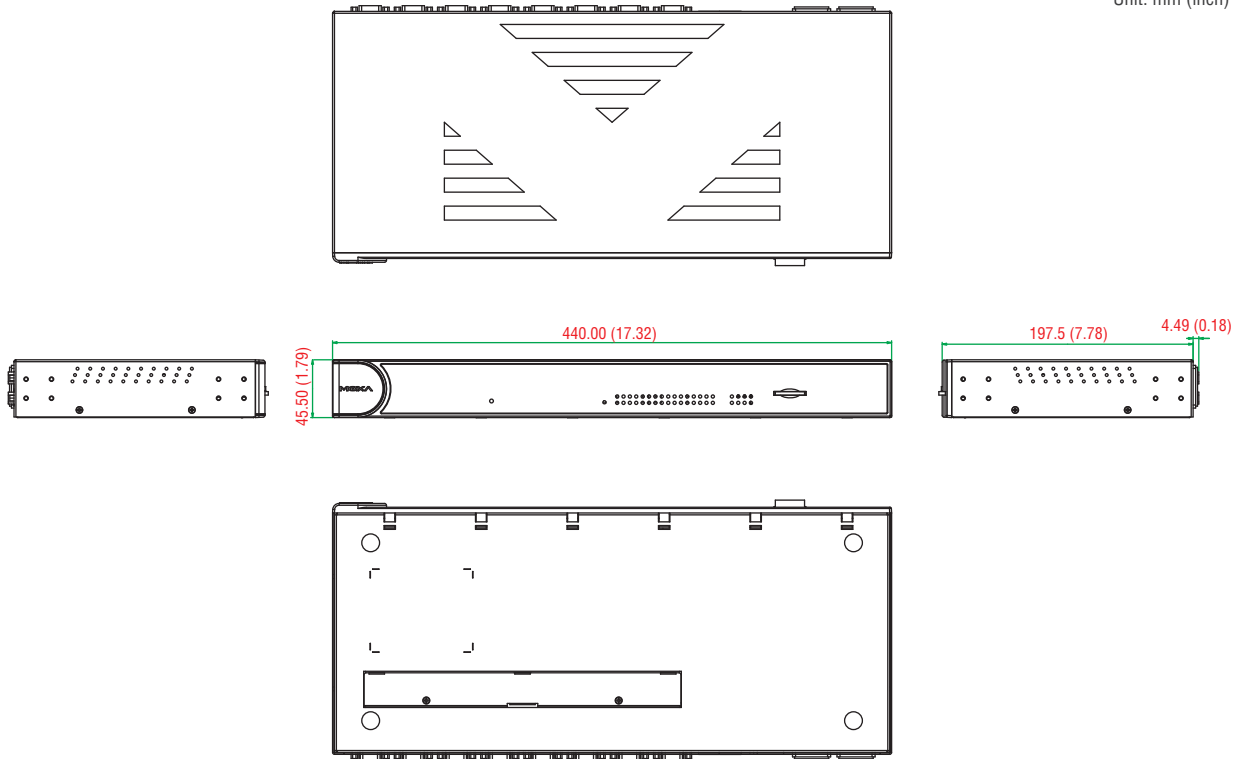
Time:
 MGate MB3660-8-2AC: 716,647 hrs
 MGate MB3660-8-2DC: 706,783 hrs
 MGate MB3660I-8-2AC: 224,851 hrs
 MGate MB3660-16-2AC: 487,416 hrs
 MGate MB3660-16-2DC: 482,835 hrs
Standard: Telcordia SR332

Warranty

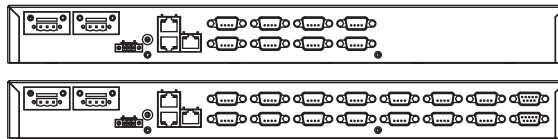
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

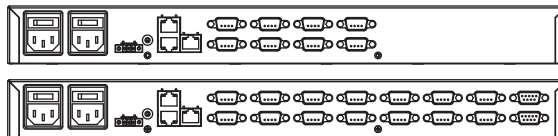
Unit: mm (inch)



DC Models



AC Models



Ordering Information

Available Models

MGate MB3660-8-2AC: Modbus gateway with dual LANs, dual AC power inputs, 8 RS-232/422/485 ports, 0 to 60°C operating temperature

MGate MB3660-8-2DC: Modbus gateway with dual LANs, dual DC power inputs, 8 RS-232/422/485 ports, 0 to 60°C operating temperature

MGate MB3660I-8-2AC: Modbus gateway with dual LANs, dual AC power inputs, 8 RS-232/422/485 ports, 0 to 60°C operating temperature, 2 kV isolation

MGate MB3660-16-2AC: Modbus gateway with dual LANs, dual AC power inputs, 16 RS-232/422/485 ports, 0 to 60°C operating temperature

MGate MB3660-16-2DC: Modbus gateway with dual LANs, dual DC power inputs, 16 RS-232/422/485 ports, 0 to 60°C operating temperature

Optional Accessories (can be purchased separately)

Mini DB9F-to-TB: DB9 female to terminal block connector

One power adapter suitable for your region is included in the product package. Additional power adapters can be purchased separately. Please refer to the Appendix for details.

Package Checklist

- 1 MGate MB3660-8 or MB3660-16 Modbus gateway
- 1 serial cable: DBL-RJ45F9-150
- 2 L-shaped brackets for wall mounting
- 2 power cords (suitable for your region)
- Documentation and software CD
- Quick installation guide
- Warranty card